



Surgical Technique

Hansson Twin Hook[®]

With Twin Hook
Locking Plate

Swemac

 TROCHANTERIC HIP
FRACTURE SYSTEM

Hansson Twin Hook[®]

With Twin Hook Locking Plate

The Hansson Twin Hook is a proven fixation device for the treatment of femoral neck and trochanteric hip fractures.

The implant features two hooks which are deployed to achieve purchase in both the cancellous and subchondral bone of the femoral head. The development of the Hansson Twin Hook was based on the long and successful experience with the Hansson Pin system and superior fixation has been demonstrated compared to a traditional compression hip screw.

The Hansson Twin Hook Locking Plate is an anatomical locking hip plate designed exclusively for use in combination with the Hansson Twin Hook. Together they provide **strong, stable fixation** and allow for **minimal surgical trauma** during implantation.

Hook Pin Fixation

More than **350 000 patients** treated with the Hansson Twin Hook, Hansson Pin or Hansson Pinloc Systems.

More than **280 scientific publications** and **10 Ph.D. theses** published on Hansson hook pin fixation technology.



Strong, stable fixation

Enhanced rotational stability

Reduced risk of femoral head penetration

Unique hip plate with oblique locking screws

Dynamic lateral support plate

Minimal surgical trauma

Reduced operative exposure

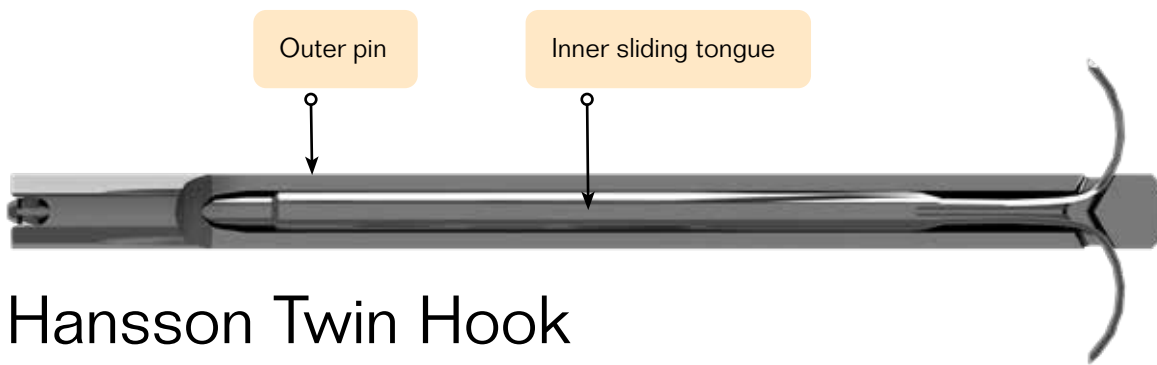
No rotational forces during insertion

Less damage to cancellous bone

Percutaneous removal procedure

Product overview

The Hansson Twin Hook and the Twin Hook Locking Plate are both part of the Swemac Trochanteric Hip Fracture System (THF) and require the THF instrument platform for implantation. All implants are made from stainless steel.



Hansson Twin Hook

The Hansson Twin Hook consists of two parts; an inner sliding tongue and an outer pin. The outer pin is 8.9 mm in diameter. Length options from 70-135 mm are available in 5 mm increments. Fixation in the femoral head is achieved by pushing the inner sliding tongue out through the proximal windows. The hooks are 4.6 mm wide and extend out approximately 11 mm on each side of the outer pin when fully deployed. The Hansson Twin Hook can be used in combination with the Twin Hook Locking Plate, Swemac Hip Plate or the Medoff Sliding Plate.

Compression Screw

The Compression Screw has 3 functions; Firstly, to keep the plate aligned with the femoral shaft. Secondly, to prevent the plate and Twin Hook from separating and thirdly, to compress the fracture.



Unicortical Screw

A 28 mm self-drilling/self-tapping Unicortical Screw (Ø4.5 mm) is used for fixation and compression in the most proximal hole in the Twin Hook Locking Plate. The Unicortical Screw is also used for fixation of the Lateral Support Plate.



Locking Cortical Screws

Obliquely angled Ø5.1 mm self-tapping Locking Cortical Screws are used for fixation. Length options from 28-68 mm are available in 4 mm increments.



Lateral Support Plate

The Lateral Support Plates are available in two sizes; a standard 2-hole plate and a short 1-hole plate. The holes in the Lateral Support Plate will accept either $\text{\O}4.5$ mm Unicortical Screws or $\text{\O}5.1$ mm Locking Cortical Screws.

The Lateral Support Plate has two additional $\text{\O}3.0$ mm holes for cerclage wire fixation.



Twin Hook Locking Plate

The Twin Hook Locking Plates are available with a plate barrel angle of 130° , 135° or 140° . A 3-hole (length 64 mm) or 4-hole (length 81 mm) option is offered for each. All plates have tracks for the Lateral Support Plate.

Pre-operative planning

Safe use of the Swemac Trochanteric Hip Fracture System (THF) requires the surgeon to have extensive knowledge about the indications and contraindications, the implants, the methods of application, the instrumentation and the recommended surgical technique of the device.

Indications

- Femoral neck fractures
- Basal neck fractures
- Stable trochanteric hip fractures
- Unstable trochanteric hip fractures
- Subtrochanteric fractures

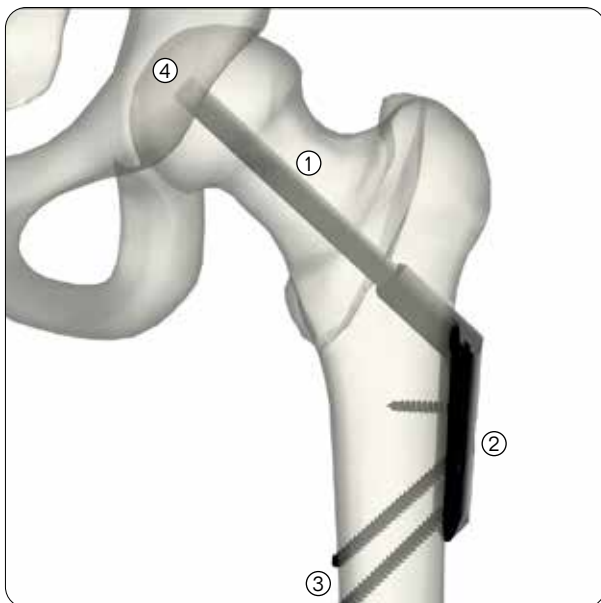
Contraindications

The physician's education, training and professional judgment must be relied upon to choose the most appropriate device and treatment. Conditions presenting an increased risk of failure include:

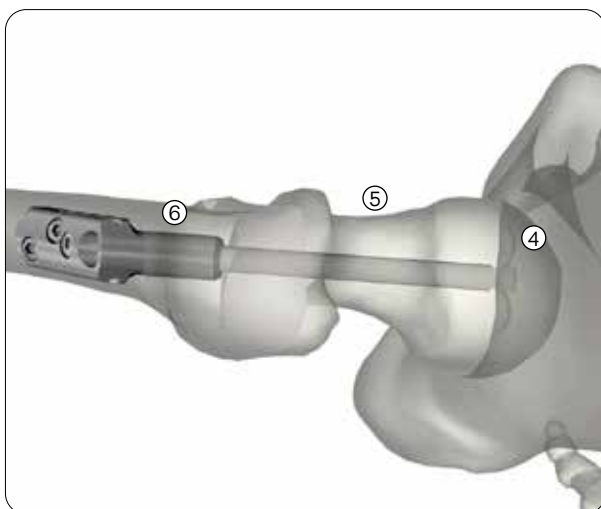
- Any active or suspected latent infection, sepsis or marked local inflammation in or around the surgical area.
- Material sensitivity, documented or suspected.
- Physical interference with other implants during implantation or use.
- Compromised vascularity, inadequate skin or neurovascular status.
- Compromised bone stock that cannot provide adequate support and/or fixation of the device due to disease, infection or prior implantation.
- Patients who are unwilling or incapable of following post-operative care instructions.
- Other physical, medical or surgical conditions that would preclude the potential benefit of surgery.
- Previously implanted or extracted osteosynthesis implants of the diaphyseal or proximal femur increases the risk of secondary fracture.
- Obesity. An obese patient can produce loads on the implant that can lead to device/treatment failure.
- The THF System is not recommended for use with pediatric hip fractures.

Caution: The surgeon must inform the patient about the use, limitations and possible adverse effects of the implants. The patient must also be warned that the implants/treatment might fail if they neglect the postoperative care instructions.

The principle



- The Twin Hook enters the lateral femoral cortex at an angle that allows the Twin Hook to be placed centrally in the femoral head in the AP view (1)
- The plate is parallel to the lateral femoral cortex (2)
- The distal Locking Screws penetrate the medial cortex (3) (Except for the Unicortical Screw)
- The tip of the Twin Hook should be placed 5-10 mm from the joint surface (4)



- In the lateral view, the Twin Hook is centered in relation to the femoral head (5)
- The alignment of the plate shall be centered on the femoral shaft (6)

Recommended implant configuration

Femoral neck fractures (and basal neck fractures)

- 1 Twin Hook Locking Plate, 3 holes
- 1 Hansson Twin Hook
- 1 Unicortical Screw
- 2 Locking Cortical Screws

Stable trochanteric hip fractures

- 1 Twin Hook Locking Plate, 3 holes
- 1 Hansson Twin Hook
- 1 Unicortical Screw
- 2 Locking Cortical Screws

Unstable trochanteric hip fractures

- 1 Twin Hook Locking Plate, 4 holes
- 1 Hansson Twin Hook
- 1 Unicortical Screw
- 3 Locking Cortical Screws

Unstable trochanteric hip fractures with broken lateral wall

- 1 Twin Hook Locking Plate, 4 holes
- 1 Hansson Twin Hook
- 2 Unicortical Screws
- 3 Locking Cortical Screws
- Lateral Support Plate

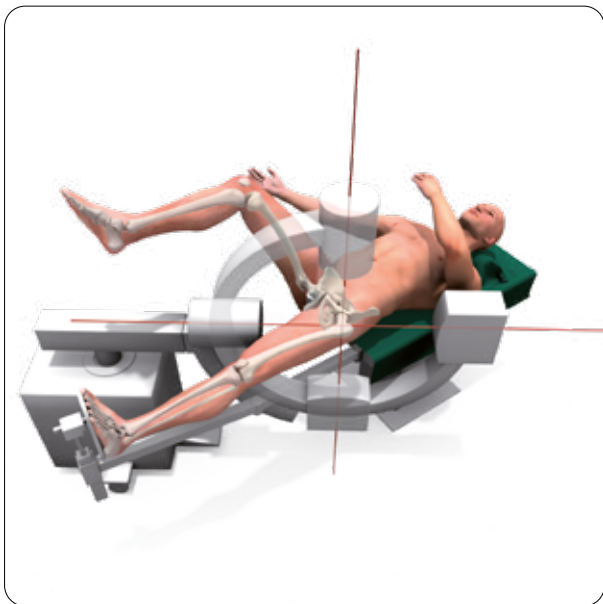
Subtrochanteric hip fractures

The long Swemac Hip Plates (8-16 holes) can be used in special cases when the surgeon prefers to use a hip plate rather than a long intramedullary nail or a Medoff Sliding Plate.

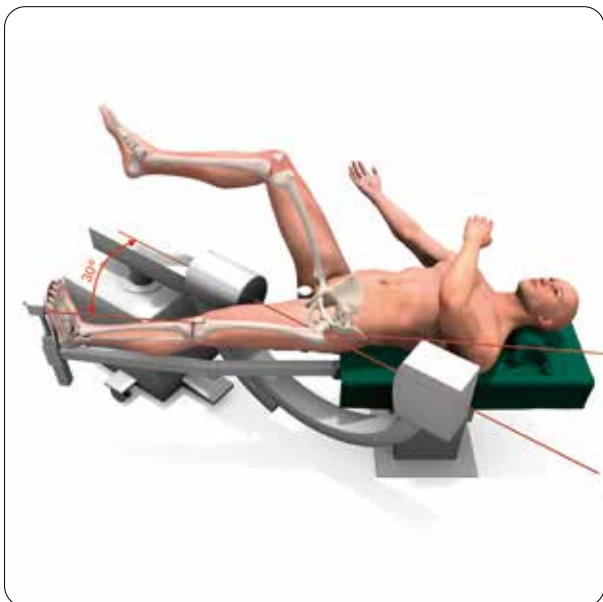
Warning: The Twin Hook Locking Plate is not compatible with the Swemac Lag Screw.

Surgical Technique

1. Patient positioning

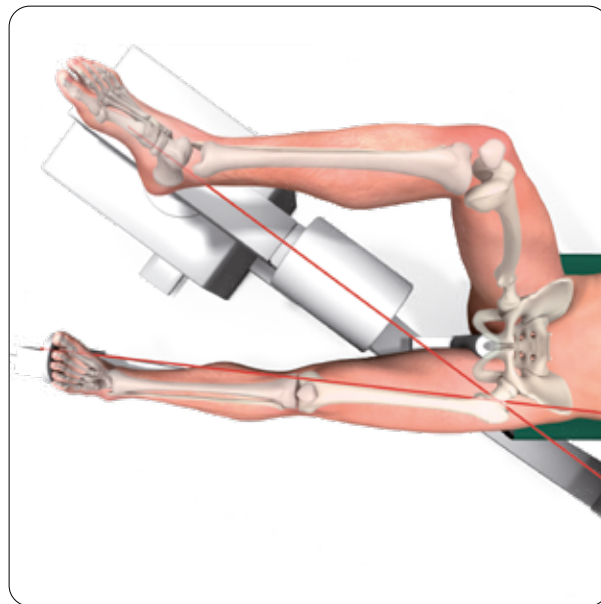


Place the patient supine on the fracture operating table. Position the unaffected leg with the hip in flexion and abduction to allow access for the C-arm. There must be enough room to allow for intraoperative adjustments to achieve both an anteroposterior (AP) and a lateral view.



It is important to obtain a true lateral view of the femoral neck and the femoral head. This surgical technique will describe fixation of a stable trochanteric fracture. A Twin Hook Locking Plate will be used in combination with a Hansson Twin Hook.

2. Reduction

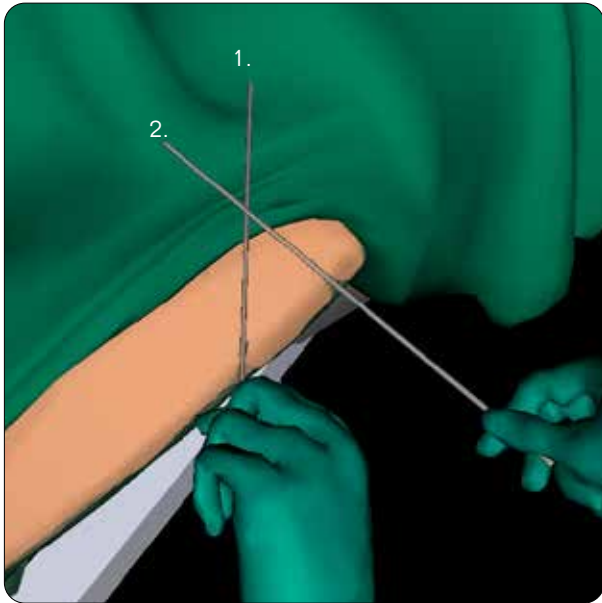


The fracture is reduced by longitudinal traction, abduction and internal rotation (if needed) on the fracture table. The fracture position should be in an anatomical position or with a slight valgus tilt. The proximal femur should ideally be positioned so that the head and neck are parallel to the floor.

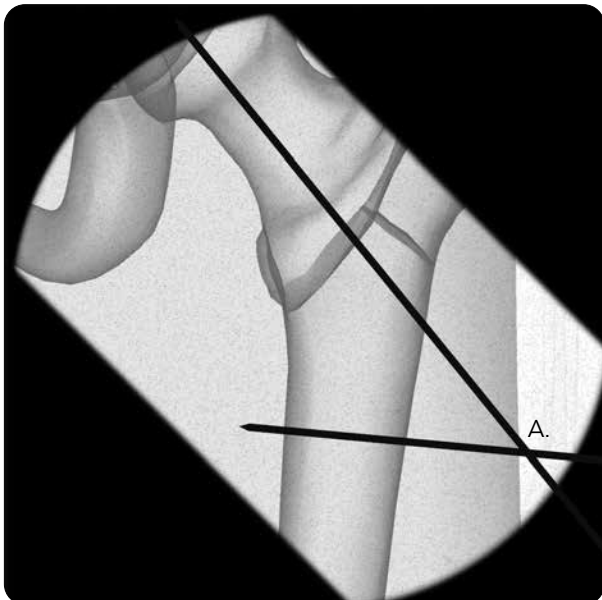


The patella should be in a horizontal or slightly internally rotated position. The patient should then be prepared and draped. In unstable fractures, Guide Wires can be placed to temporarily stabilise the reduced fragments.

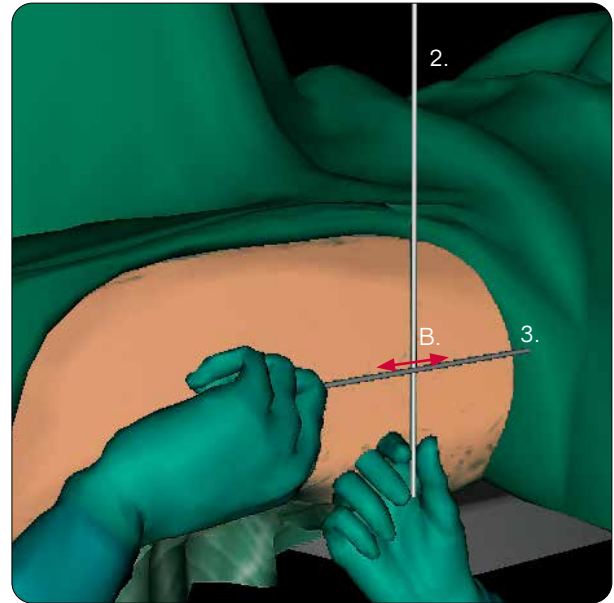
3. Locate the optimal point for skin incision



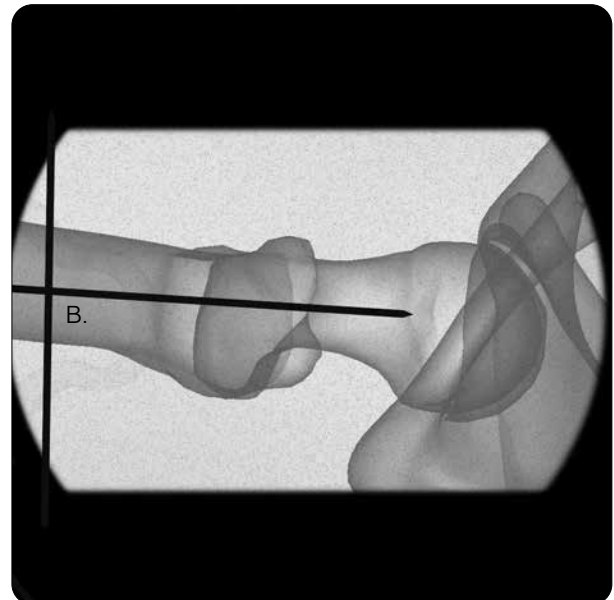
A Guide Wire (1) (200.00.125) is viewed under image intensification in an AP view and positioned (above the skin) anterior to the hip joint and in line with the medial cortex of the femoral neck.



A second Guide Wire, (2), is held transversely to the femoral shaft and directed against the point where the first Guide Wire and the skin meet, (A).



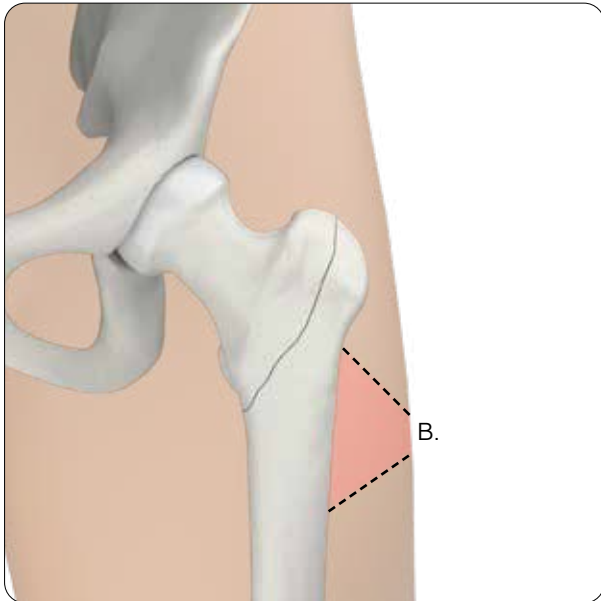
The second Guide Wire is then rotated around the femur until it is in a vertical position. A third Guide Wire, (3) (the first Guide Wire can be used), is held under lateral view of the image intensifier. It is placed along the midline of the axis of the femoral shaft.



The point where the second and the third Guide Wire cross, (B), is the optimal starting point for the incision.

Note: The Positioning Templates can also be used to locate the optimal point for skin incision. See page 10.

4. Make incision

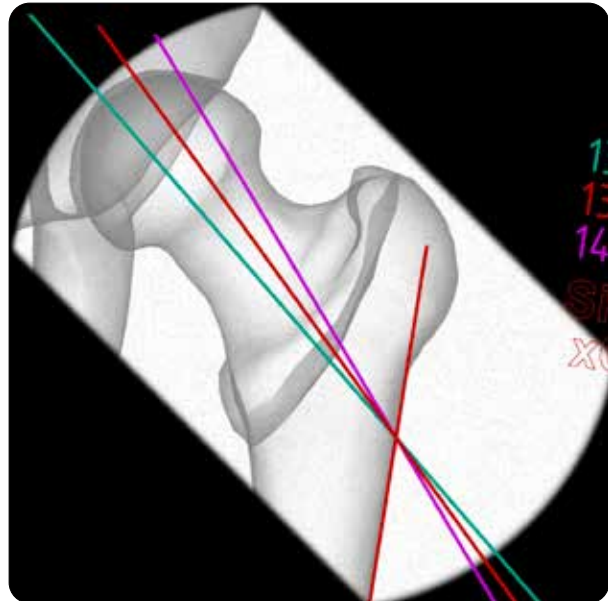


A longitudinal skin incision of approximately 40-60 mm is made, centered over point (B). The deep fascia is divided in the direction of the fibres. The lateral cortex of the femur may be approached either directly or posterolaterally by elevating the vastus lateralis muscle. The area of the femur where the plate is to be positioned is cleared with a raspatorium.

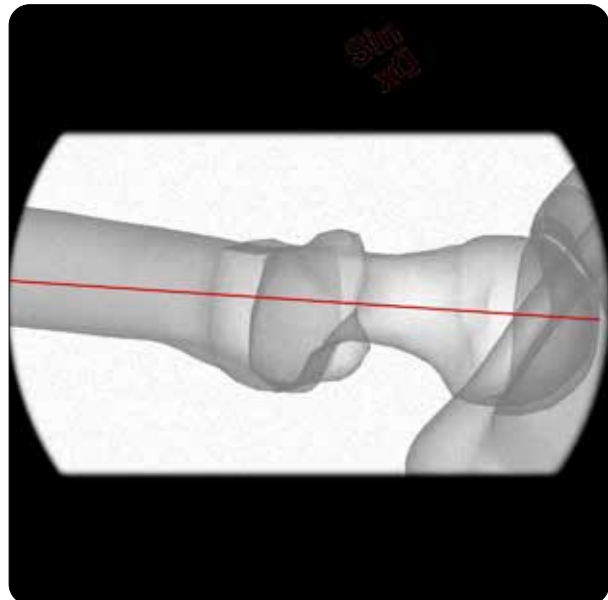
Twin Hook Locking Plate lengths

- 3 hole; 64 mm
- 4 hole; 81 mm

5. Place the Positioning Templates



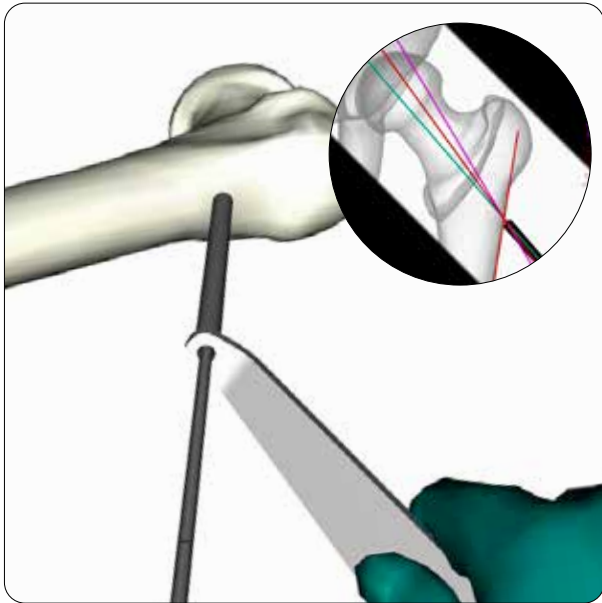
Place the Positioning Templates (200.00.220 and 62-3101) onto the monitors of the image intensifier. It is important that the vertical line is aligned along the lateral cortex of the femur. There are three different angles (130°, 135° and 140°). In the AP view the Ø3.2 mm Guide Wire should run central in the femoral head.



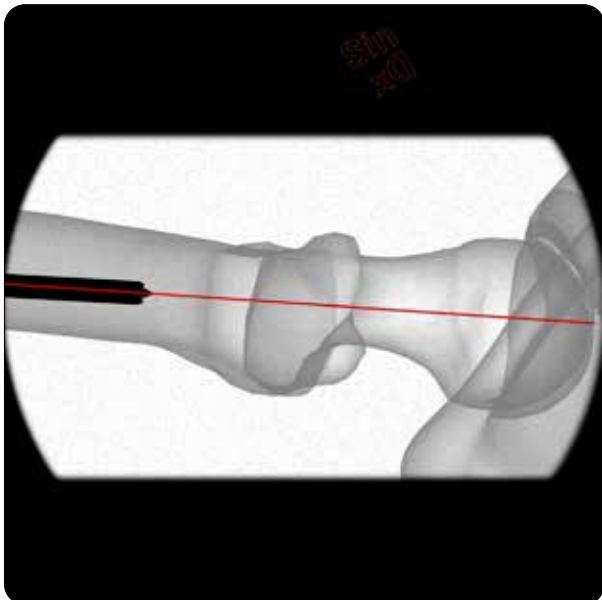
In the lateral view, the Positioning Template should be centered in relation to the femoral head.

Note: Orientation and placement of the Guide Wire is one of the most critical steps in the surgical technique. When using the Positioning Templates it is very important to lock the wheels of the image intensifier.

6. Introduce the Guide Wire Sleeve



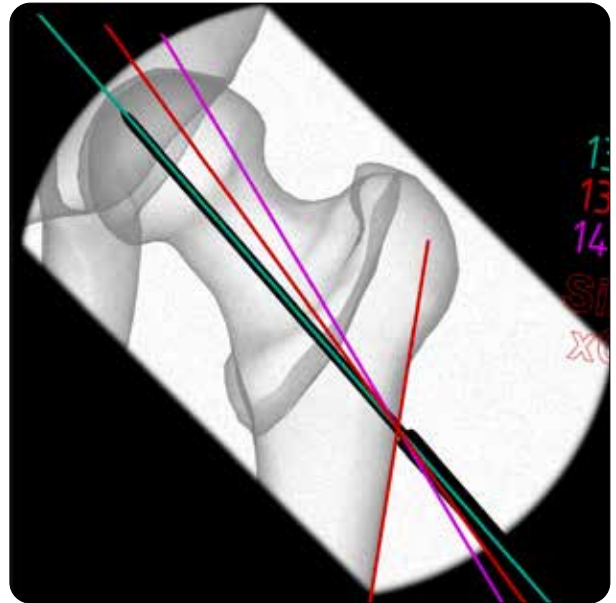
In the AP view, the 300 mm Guide Wire and the Guide Wire Sleeve (62-3036) are aligned with the chosen line of the Positioning Template. The Guide Wire is ready to be inserted. If required, a Multi Angle Guide (200.00.240) is also available in the THF Instrument Tray for this step.



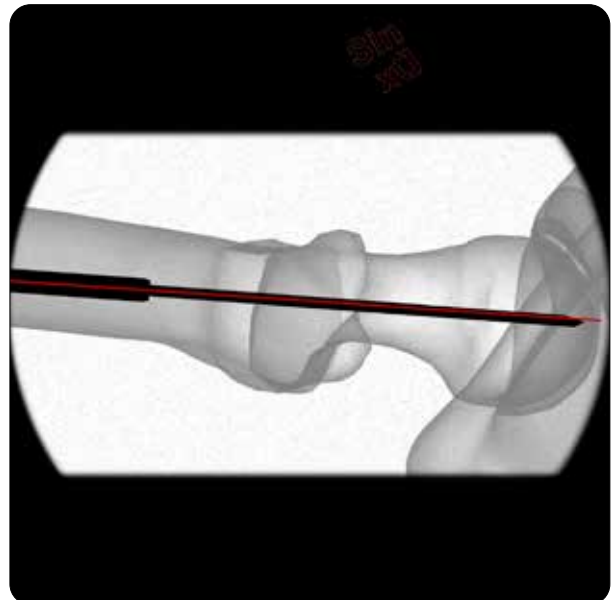
In the lateral view, the Guide Wire and the Guide Wire Sleeve are aligned with the line.

Note: If the Guide Wire position is incorrect, the optional Nonomiya PEEK Guide (200.00.320) allows a second Guide Wire to be accurately inserted using the first as a reference.

7. Guide Wire insertion



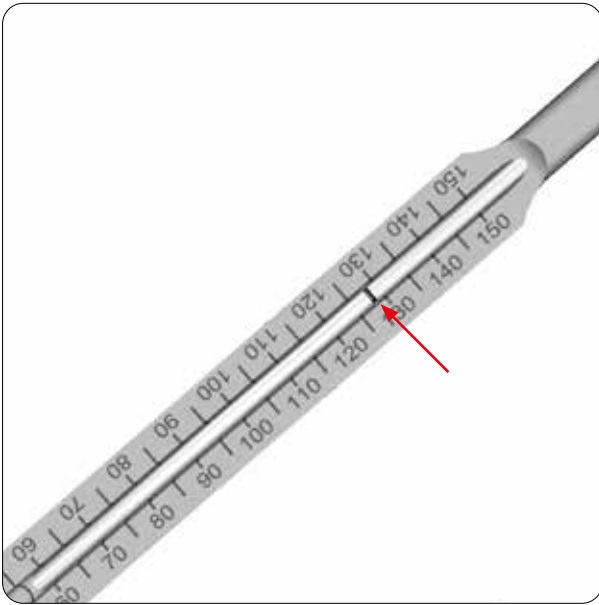
Once the alignment of the Guide Wire is satisfactory, the Guide Wire is advanced to the subchondral bone of the femoral head using image intensification. The rigid Ø3.2 mm Guide Wire will allow the surgeon to adjust the position of the Guide Wire slightly anteriorly or posteriorly whilst drilling.



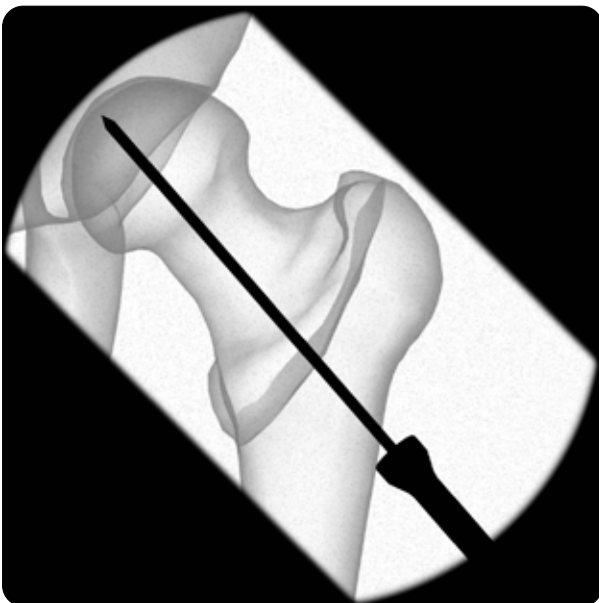
If the Multi Angle Guide has been used, it is removed by turning it 90° and pulling backwards. The Guide Wire is left in situ.

Note: An optional 230 mm Guide Wire (200.00.120) is available if a shorter wire is preferred. If the 230 mm Guide Wire is used, note that the measurement in the next step shall be from the end of the wire.

8. Measuring



Introduce the Measurement Gauge (200.00.100) over the Guide Wire and read the length against the mark on the Guide Wire. Ensure that the Measurement Gauge is in contact with the lateral bone surface before reading the length.



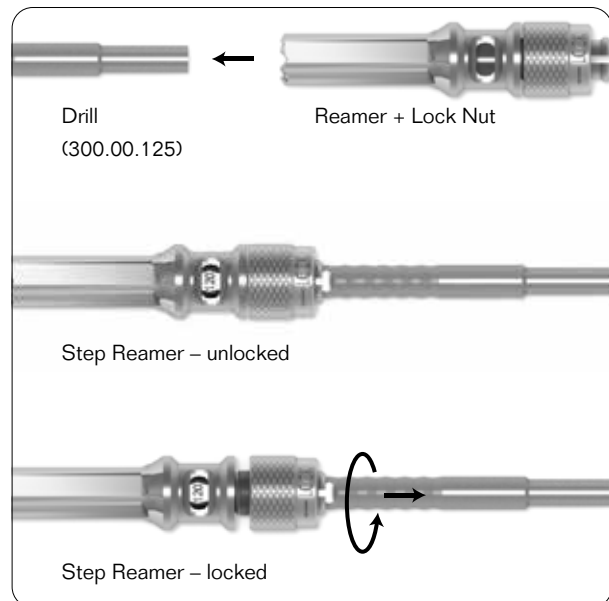
The measured value determines the length of the Hansson Twin Hook and the settings for the Step Reamer.

The correct depth for reaming and the chosen length of the Hansson Twin Hook should be 10 mm less than the measurement obtained from the Measurement Gauge. If the Guide Wire is accurately placed centrally in both the AP and lateral view, it is possible to deduct 5 mm instead of 10 mm.

9. Assemble the Step Reamer



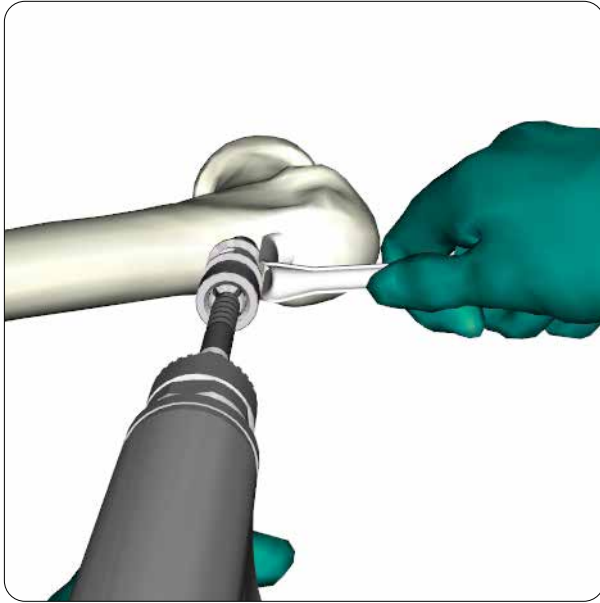
The Lock Nut is pushed forward onto the reamer and turned clockwise as far as it will go. The pre-assembled Reamer and Lock Nut is now ready to slide onto the back end of the Drill.



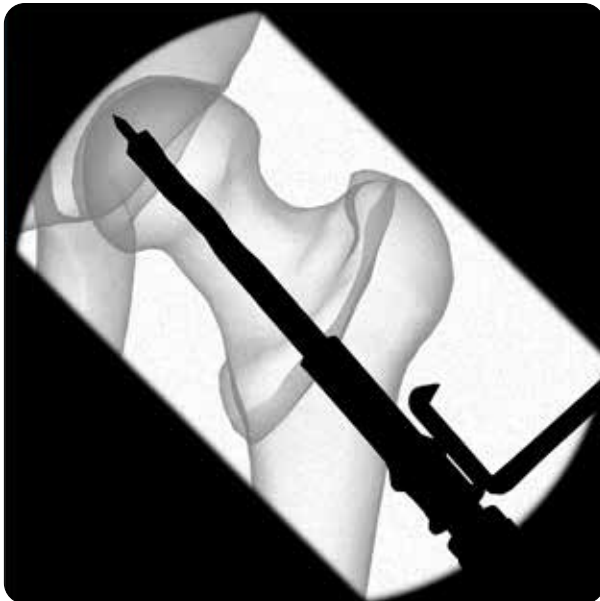
The Lock Nut of the Step Reamer is turned anti-clockwise when the correct length is seen in the measurement window. The reamer depth is adjustable in 5 mm increments. For example:

- Measurement Gauge measurement: 115 mm
- Step Reamer depth setting: 105 mm
- Hansson Twin Hook implant length: 105 mm
- If compression of the fracture is needed, the Hansson Twin Hook must be 5 mm shorter than the Step Reamer depth setting.

10. Reaming



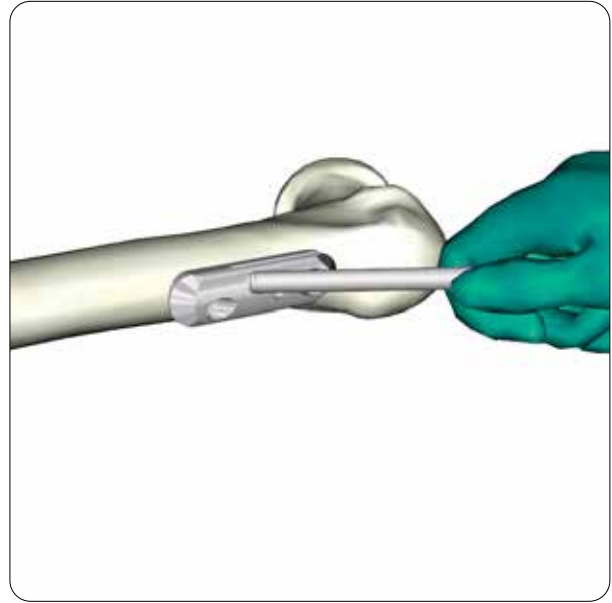
The Step Reamer is inserted over the Guide Wire and drilling is carried out to within 5-10 mm of the subchondral bone. The 90° Retractor (200.00.235) is used to protect the soft tissue when reaming.



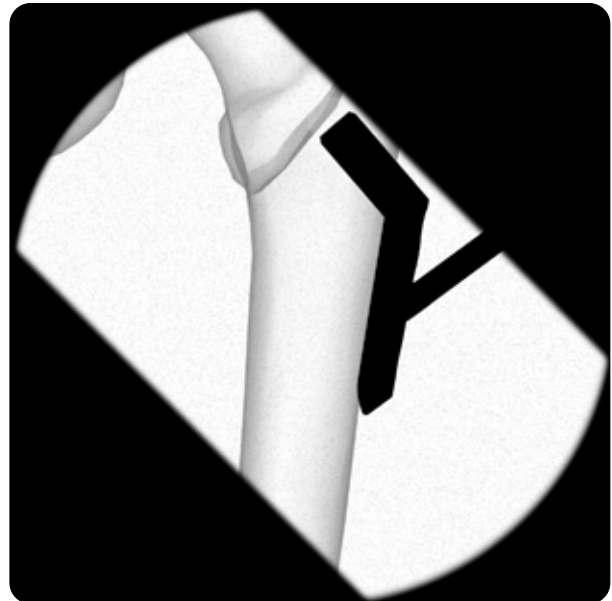
The hole which is made in one step has three different diameters: one for the Hansson Twin Hook, one for the plate barrel and one for the junction between the plate and the barrel.

Remove the Guide Wire.

11. Plate insertion



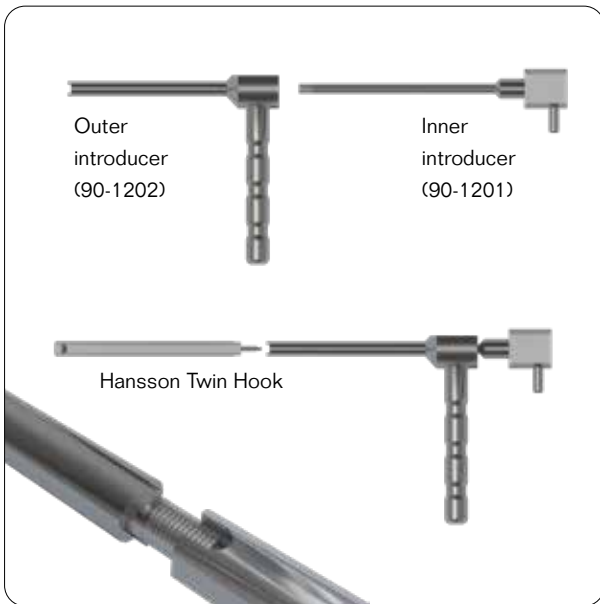
The Plate Inserter (300.00.015) is locked into one of the holes of the Twin Hook Locking Plate. This will facilitate the plate insertion. The Hansson Twin Hook and the assembled insertion instruments can also be used to insert the plate into the reamed canal.



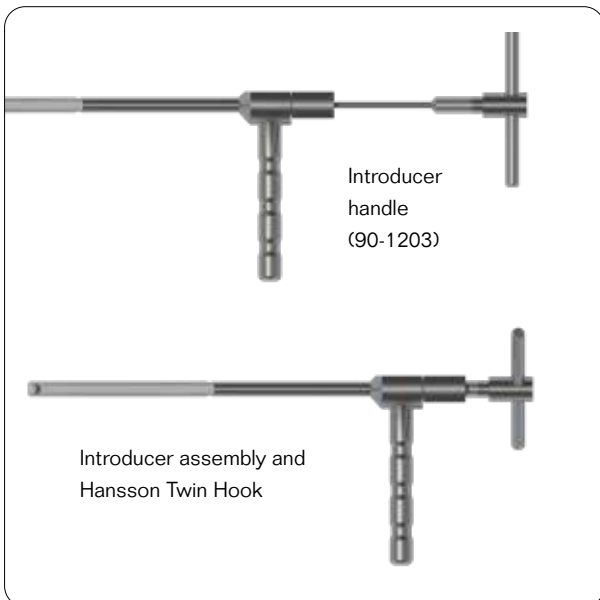
The plate barrel of the Twin Hook Locking Plate is pushed into the canal and the Plate Inserter is removed.

Note: When the lateral cortex is fractured, the Lateral Support Plate should always be used. The Lateral Support Plate must always be introduced at the same time as the Swemac Hip Plate. See page 18 'Fixation of the Lateral Support Plate'.

12. Assemble the Hansson Twin Hook and instruments

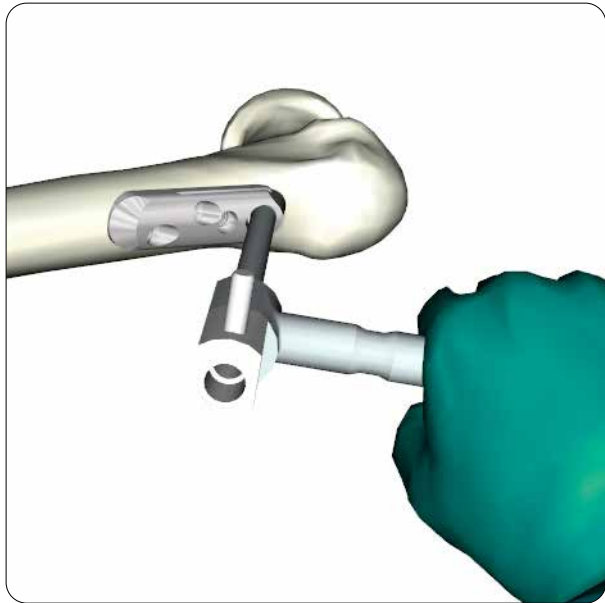


The Inner introducer is inserted into the Outer introducer. The inner introducer is then firmly engaged into the base of the selected Hansson Twin Hook.



If static compression of the fracture is required by the surgeon, the Hansson Twin Hook must be positioned not more than 5 mm within the end of the plate barrel. (A shorter Hansson Twin Hook must be selected.)

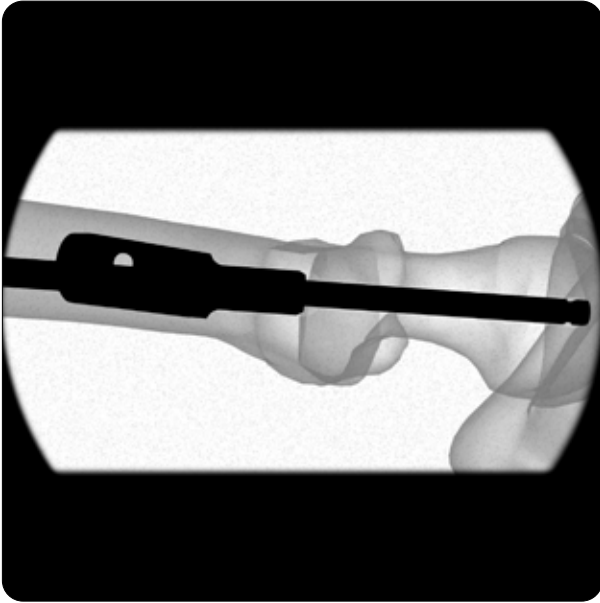
13. Hansson Twin Hook insertion



The Hansson Twin Hook is inserted through the plate barrel and pushed into the reamed channel.



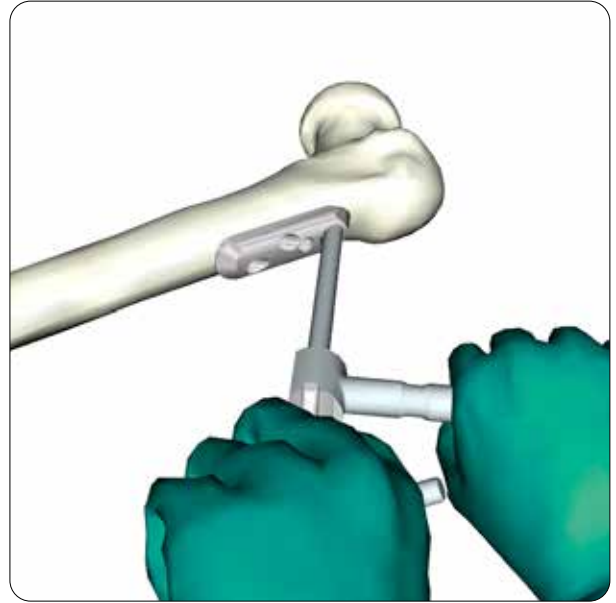
14. Plate alignment



When the Hansson Twin Hook is in position, align the Twin Hook Locking Plate with the length axis of the femoral shaft.



15. Deploy the hooks



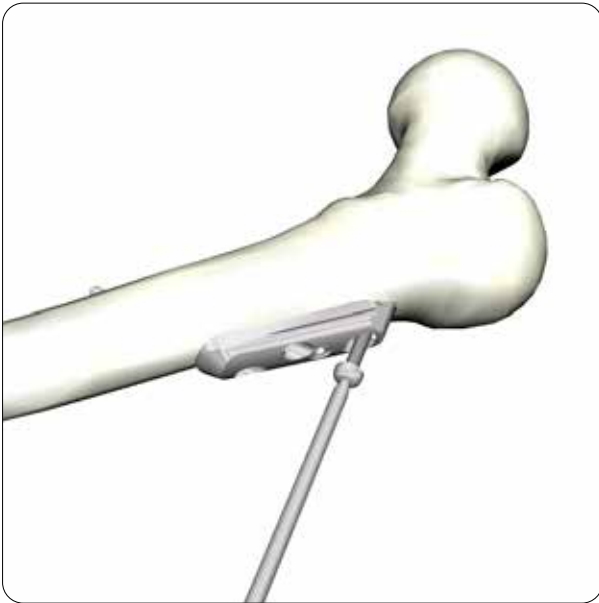
The Introducer handle is rotated clockwise until resistance is felt, i.e. the tip of the Introducer handle touches the tip of the Hansson Twin Hook. It is important to push forward on the handle of the Outer introducer when activating the hooks. This will increase the curvature of the hooks.



The hooks are deployed by turning the Introducer handle clockwise as far as it will go. Both AP and lateral image intensification is utilised to ensure accurate placement.

The introducer assembly is then removed.

16. Introduce the Compression Screw to hold the implants together

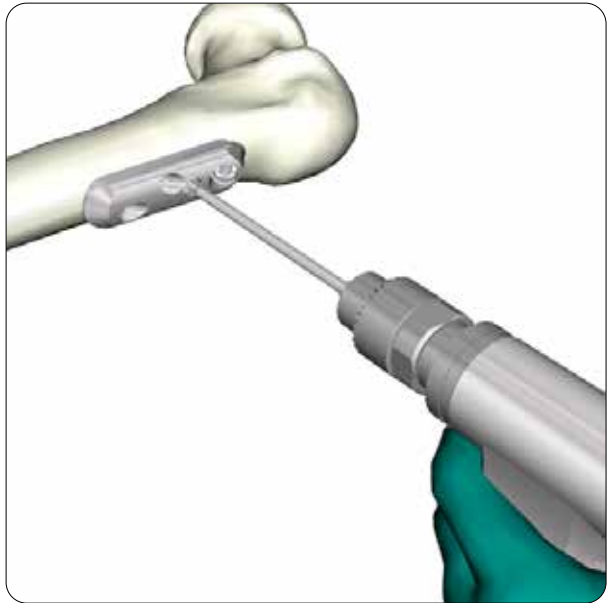


It is recommended to always use a Compression Screw, even if static compression of the fracture is not actually required (if compression is required see page 19 'Compress the fracture'). Firstly, this will maintain the alignment of the plate against the lateral cortex and secondly, it will prevent the Twin Hook Locking Plate and the Hansson Twin Hook from separating during the surgery or postoperatively.

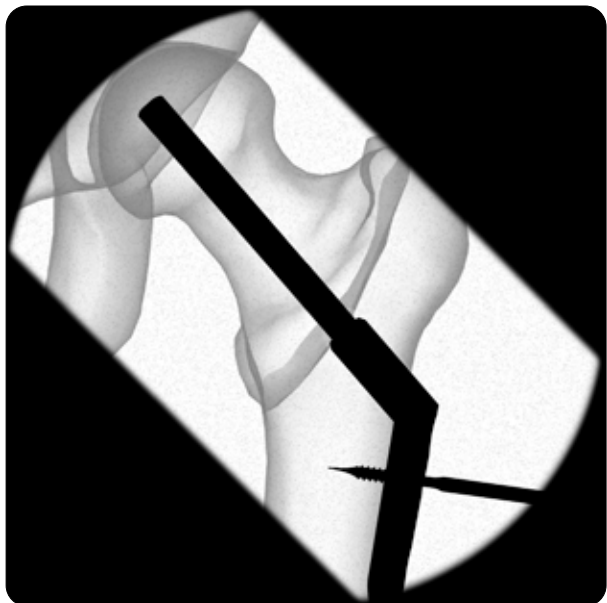
The Screwdriver Ø3.5 mm Hex (200.00.230) is used to insert the Compression Screw into the base of the Hansson Twin Hook. The screwdriver is turned clockwise. This will compress the plate against the lateral cortex.

Note: Before any drilling is carried out, the surgeon may reduce traction from the fracture table to allow impaction of the fracture. Care should be taken to avoid losing the fracture reduction. It is important to once more check the plate alignment before drilling is carried out.

17. Introduce the Unicortical Bone Screw

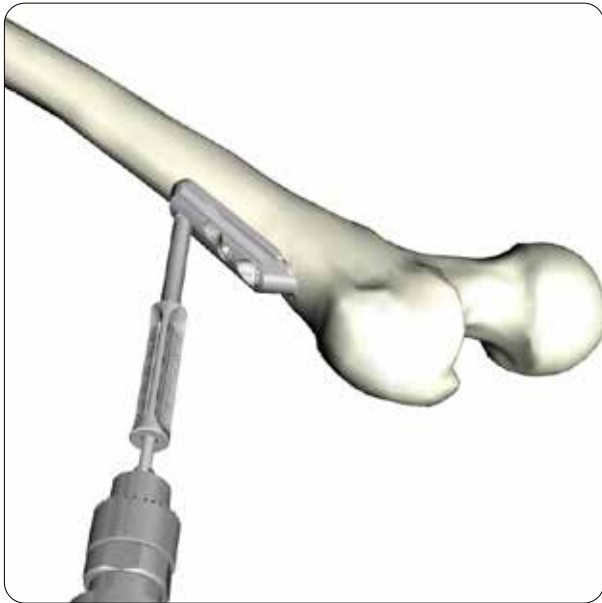


A 28 mm self-drilling/self-tapping Unicortical Screw (Ø4.5 mm) is introduced into the most proximal hole in the Twin Hook Locking Plate to compress the plate against the lateral cortex. A power tool is used to introduce the screw.

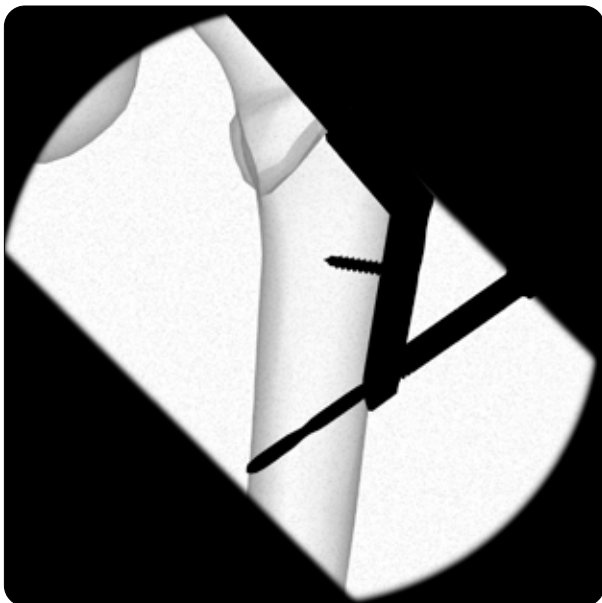


Note: After drilling with the Ø4.5 mm Drill, a 5.1 mm Locking Cortical Screw can also be used to compress the Plate against the lateral cortex.

18. Drill for Locking Cortical Screws

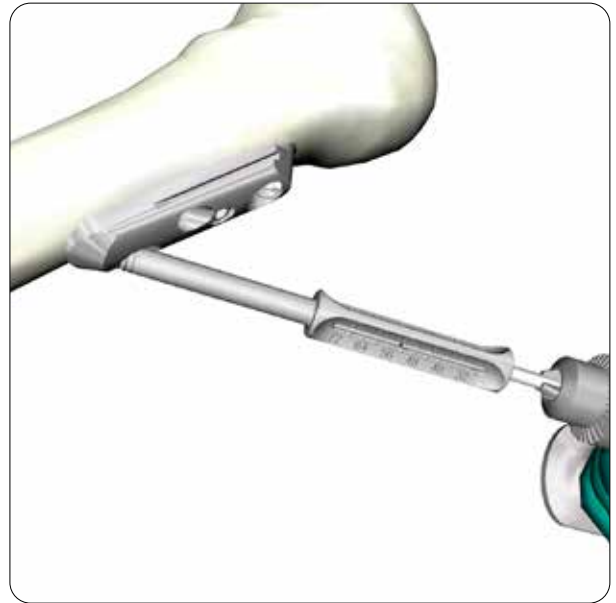


The threaded Drill Sleeve (300.00.030) is introduced and locked into the most distal hole in the Twin Hook Locking Plate.

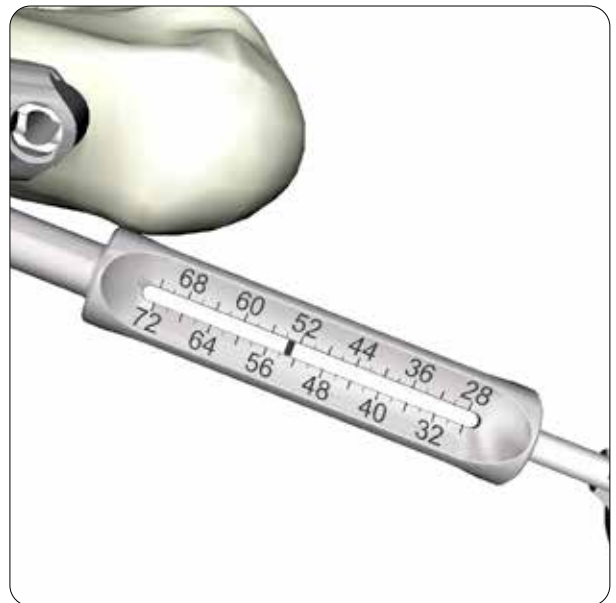


A hole is drilled with the Ø4.5 mm Drill (300.00.125) through the Drill Sleeve.

19. Measure Locking Cortical Screw length



The required screw length is read directly off the Drill Sleeve scale (the drill has a mark). In this case, the selected cortical screw length is 54 mm.



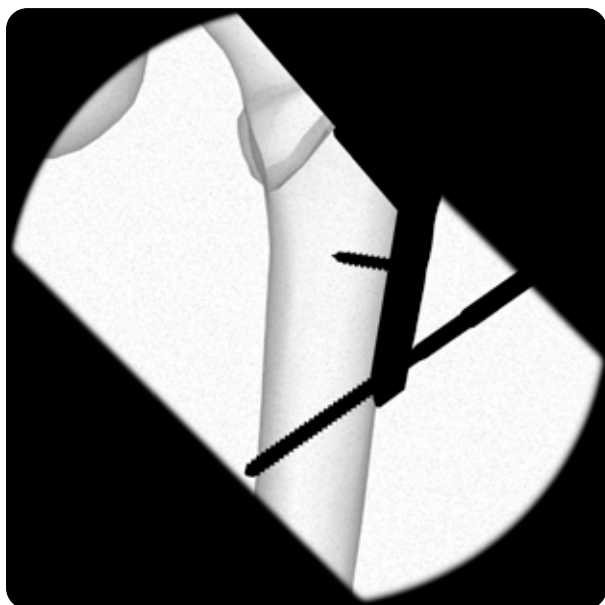
If between screw sizes, always choose the longer one.

Note: A Measuring Hook (300.00.215) is also available when measuring the screw length.

20. Insert Cortical Bone Screw



The Twin Hook Locking Plate is attached to the femoral shaft using Ø5.1 mm self-tapping Locking Cortical Screws. The screws are inserted with the Ø3.5 mm Screwdriver Hex.

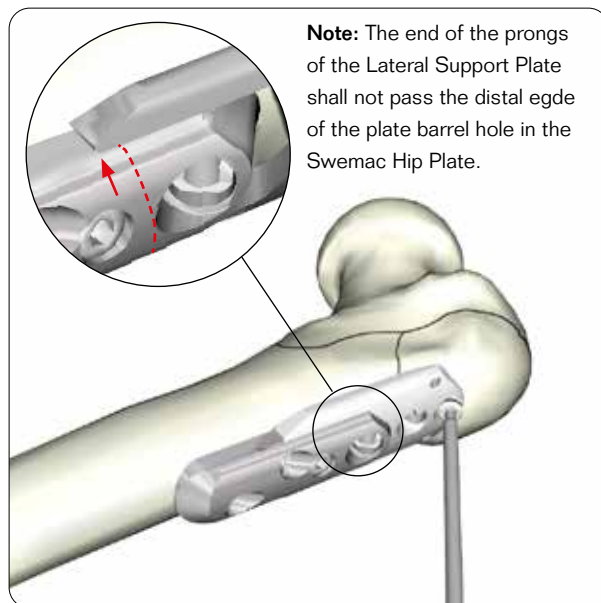


The Cortical Screw should penetrate the medial cortex for maximal bone purchase.

The same procedure used to drill, measure and insert the most distal Locking Cortical screw (steps 18-20) should be repeated for the remaining holes in the Twin Hook Locking Plate.

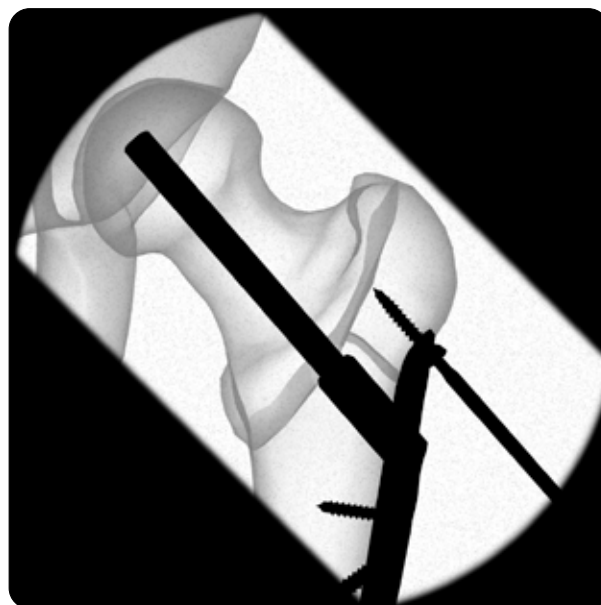
When all Locking Cortical Screws have been inserted, the wound is closed in layers as per normal procedure.

Fixation of the Lateral Support Plate



Note: The end of the prongs of the Lateral Support Plate shall not pass the distal edge of the plate barrel hole in the Swemac Hip Plate.

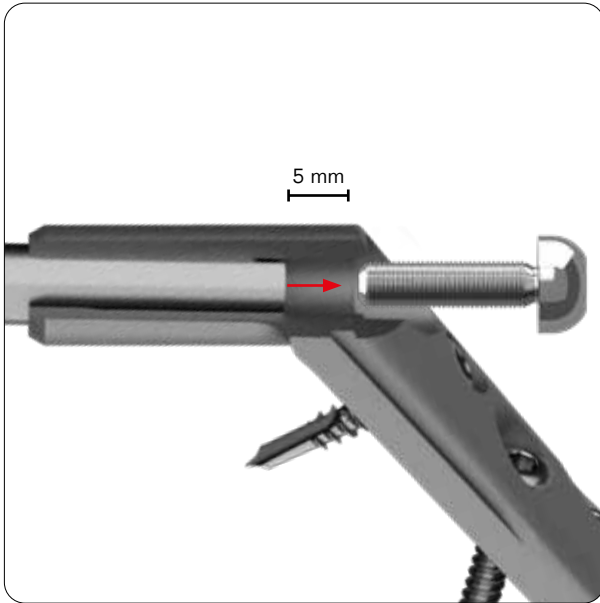
If the lateral wall is broken, a Lateral Support Plate should be used. The position of the Lateral Support Plate can be adjusted depending on the distance between the plate barrel and the greater trochanter.



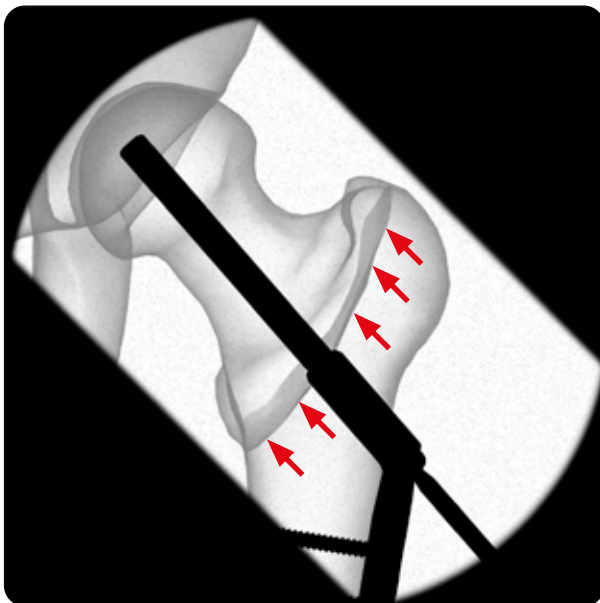
The holes in the Lateral Support Plate will accept either self-drilling/self-tapping Ø4.5 mm Unicortical Screws or Ø5.1 mm Locking Cortical Screws.

It is not necessary to introduce any screws through the Lateral Support Plate if the most proximal part of the plate, in its most distal position, is above the fracture line in the lateral wall.

Compress the fracture



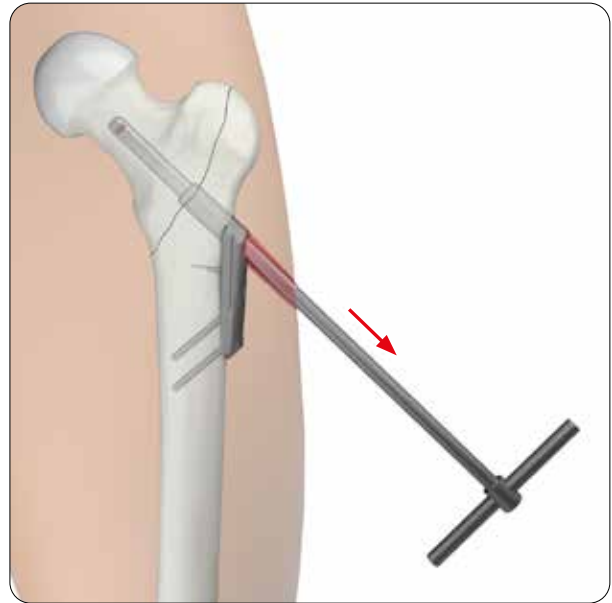
If static compression of the fracture is required by the surgeon, the Hansson Twin Hook must be positioned not more than 5 mm within the end of the plate barrel. Too much compression might bend the hooks. Prior to applying compression of the fracture, traction is reduced on the operating table.



Check implant position

It is important to ensure that the Hansson Twin Hook is placed within the femoral head. This can be done by removing traction and rotating the hip under image intensification in both the AP and the lateral view.

Extraction



Should the need arise for implant removal, the Hansson Twin Hook is extracted with the Hansson Twin Hook Extractor (90-1204).

The Hansson Twin Hook can be removed through a 10 mm skin incision without the need to remove the plate. This operation can be performed under local anaesthesia. Percutaneous removal can be advantageous in the case of femoral head penetration or if the patient suffers from soft tissue irritation after fracture healing caused by the distal end of the Hansson Twin Hook protruding into the soft tissue.

In the case that a Hansson Twin Hook is removed because of femoral head penetration, it is possible to insert a new shorter Hansson Twin Hook percutaneously without removal of the plate.

Should the Twin Hook Locking Plate and Lateral Support Plate need to be removed, this can be done with the Ø3.5mm Screwdriver Hex.

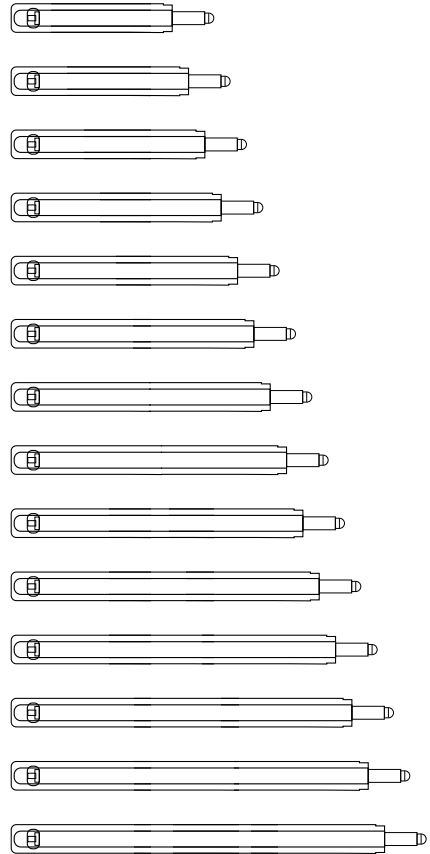
Product information

Part of the Swemac Trochanteric Hip Fracture System (THF)

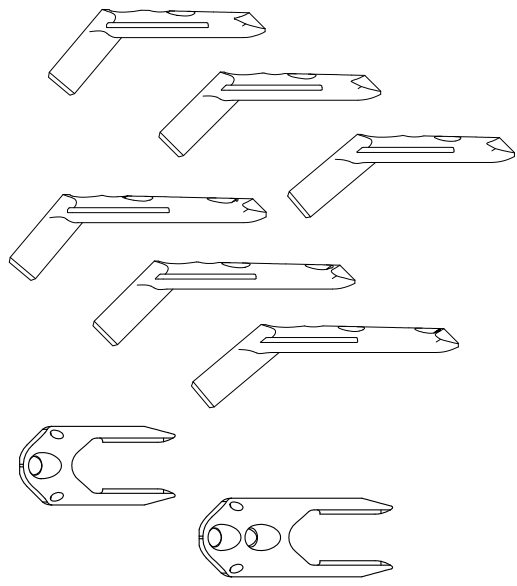
All implants, except screws, are delivered sterile. Screws are placed in the Screw Bank in the Swemac THF instrument tray.

Implants

Hansson Twin Hook Length 70 mm	90-0070S
Hansson Twin Hook Length 75 mm	90-0075S
Hansson Twin Hook Length 80 mm	90-0080S
Hansson Twin Hook Length 85 mm	90-0085S
Hansson Twin Hook Length 90 mm	90-0090S
Hansson Twin Hook Length 95 mm	90-0095S
Hansson Twin Hook Length 100 mm	90-0100S
Hansson Twin Hook Length 105 mm	90-0105S
Hansson Twin Hook Length 110 mm	90-0110S
Hansson Twin Hook Length 115 mm	90-0115S
Hansson Twin Hook Length 120 mm	90-0120S
Hansson Twin Hook Length 125 mm	90-0125S
Hansson Twin Hook Length 130 mm	90-0130S
Hansson Twin Hook Length 135 mm	90-0135S

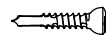
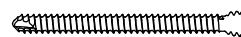
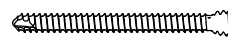
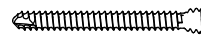
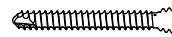
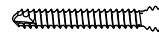
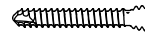
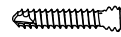
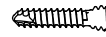


Twin Hook Locking Plate 3 holes 130° Ø9 mm	300.03.130S
Twin Hook Locking Plate 3 holes 135° Ø9 mm	300.03.135S
Twin Hook Locking Plate 3 holes 140° Ø9 mm	300.03.140S
Twin Hook Locking Plate 4 holes 130° Ø9 mm	300.04.130S
Twin Hook Locking Plate 4 holes 135° Ø9 mm	300.04.135S
Twin Hook Locking Plate 4 holes 140° Ø9 mm	300.04.140S



Lateral Support Plate, 1 hole	250.01.005S
Lateral Support Plate, 2 holes	250.01.010S

Compression Screw	90-1200
Locking cortical screw Ø5.1 mm Length 28 mm	302.51.028
Locking cortical screw Ø5.1 mm Length 32 mm	302.51.032
Locking cortical screw Ø5.1 mm Length 36 mm	302.51.036
Locking cortical screw Ø5.1 mm Length 40 mm	302.51.040
Locking cortical screw Ø5.1 mm Length 44 mm	302.51.044
Locking cortical screw Ø5.1 mm Length 48 mm	302.51.048
Locking cortical screw Ø5.1 mm Length 52 mm	302.51.052
Locking cortical screw Ø5.1 mm Length 56 mm	302.51.056
Locking cortical screw Ø5.1 mm Length 60 mm	302.51.060
Locking cortical screw Ø5.1 mm Length 64 mm	302.51.064
Locking cortical screw Ø5.1 mm Length 68 mm	302.51.068
Unicortical Screw Ø4.5 mm Length 28 mm	203.45.028



Instruments

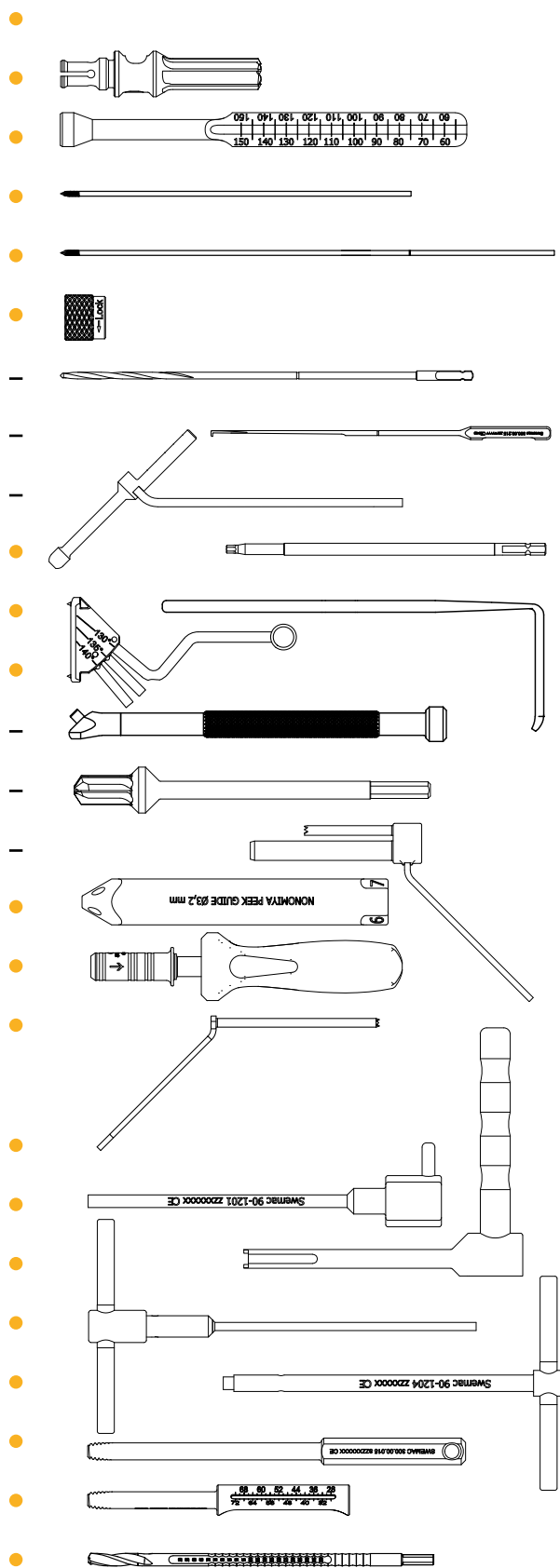
Instrument Tray – Standard 300.00.000


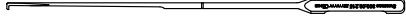

Reamer for Hip	200.00.016
Measurement Gauge Ø3.2 mm	200.00.100
Guide Wire Ø3.2 mm Length 230 mm (optional)	200.00.120
Guide Wire Ø3.2 mm Length 300 mm	200.00.125
Lock Nut	200.00.201
Drill Ø3.2 mm Length 195 mm	200.00.210
Measuring Hook	200.00.215
Drill Guide with Measuring Scale	200.00.225
Screwdriver Ø3.5 mm HEX	200.00.230
Retractor	200.00.235
Multi Angle Guide 130°, 135°, 140°	200.00.240
Impactor	200.00.245
Medoff Reamer	200.00.300
Medoff Guide	200.00.305
Nonomiya PEEK guide Ø3.2 mm (optional)	200.00.320
Handle with Quick-Lock	62-3092
Guide Wire Sleeve with Handle	62-3036

Instrument Tray – Twin Hook Insert 300.00.300

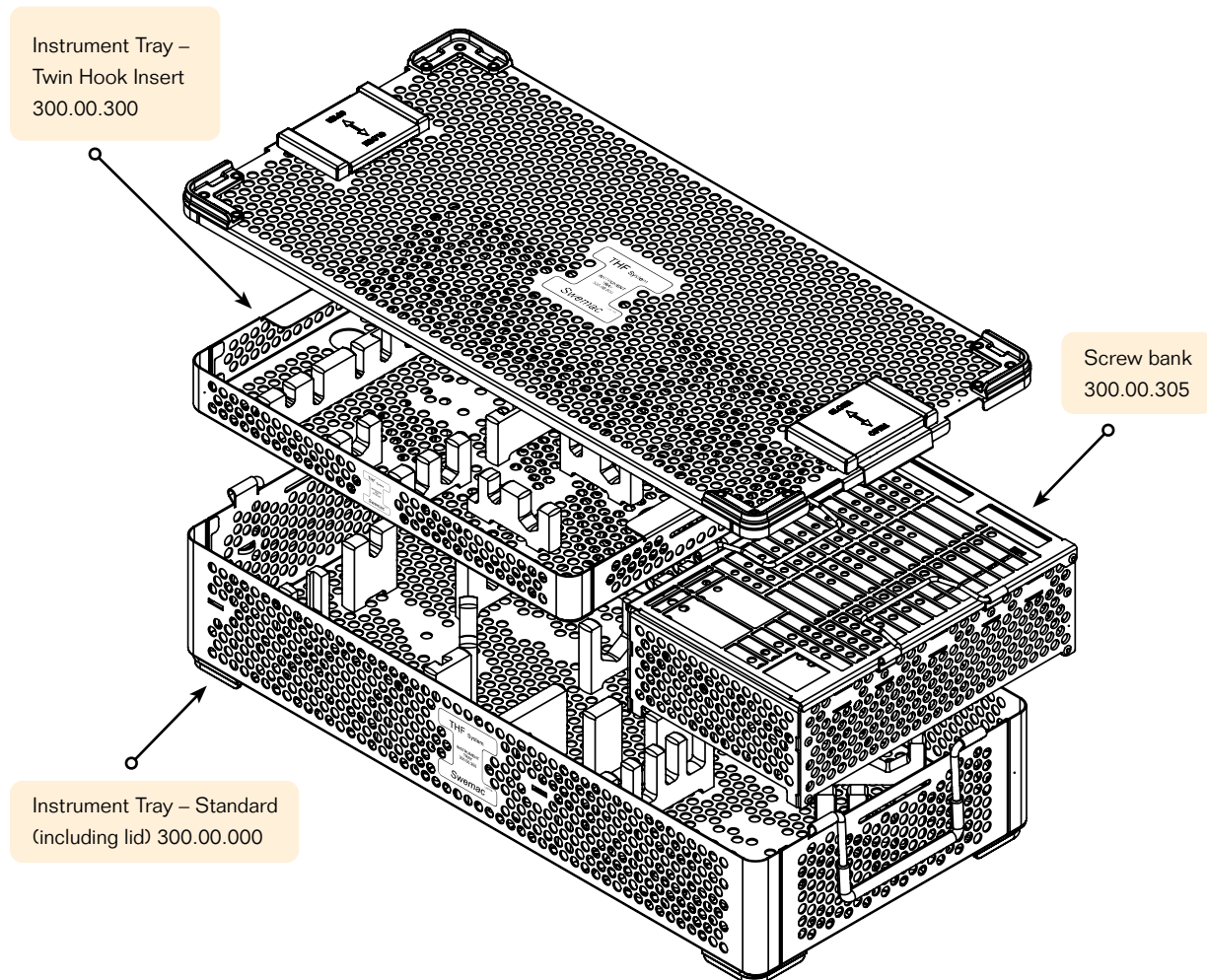
Inner introducer	90-1201
Outer introducer	90-1202
Introducer handle	90-1203
Extractor	90-1204
Plate Inserter	300.00.015
Drill Sleeve Ø4.5 mm Length 120 mm	300.00.030
Cannulated Drill Ø8.9 mm Length 245 mm	300.00.120

● Needed for Hansson Twin Hook with Twin Hook Locking Plate



Drill Ø4.5 mm Length 210 mm	300.00.125	●	
Measuring Hook	300.00.215	●	
Tweezers for Cortical screws	41-1730	●	
Screw bank	300.00.305	●	
Positioning Template (AP view) Angle 130°-140°	200.00.220	●	
Positioning Template (AP & lateral view) Straight line	62-3101	●	

Below shows the specific Swemac THF System instrument configuration required to implant a Hansson Twin Hook with a Twin Hook Locking Plate.




IFU

For the latest version of this Instruction For Use. Please visit:
download.swemac.com/Swemac-THF-System

Swemac

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P110-28-2-THLP-20200813

Print date: 2020-08-13