stryker

Osteosynthesis

Omega™3 System
Hansson™ Twin Hook

Operative Technique

- Hip Fracture
- Axially Stable Locking Option

Contents

Introduction

The Omega3 Hip Fracture System in combination with the Hansson™ Twin Hook
is a unique and innovative system reflecting the long experience of Stryker Osteosynthesis in the treatment of hip fractures. In the following the Hansson™ Twin Hook is called Twin Hook.

This modular system offers the surgeon a wide choice of slimlined Hip Plates combined with a unique option of cephalic implants and state of the art instrumentation.

The system provides a simple and easy-to-use solution for surgeons facing hip fractures.

The Omega3 Hip Fracture System denotes the new Locking Technique for the Hip Plate shaft holes. Only the Omega3 Hip Plates offer the possibility to apply Ø5.0mm Locking Inserts and Locking Screws in the plate diaphysis as well as standard Ø4.5mm Cortical Screws, Ø6.5mm Cancellous Screws and Asnis™ III Cannulated Screws. To apply Locking Inserts and Locking Screws to the Omega3 Hip Plate, the appropriate locking instrumentation is available in the optional Locking Instrument Set.

All Omega2 instruments are compatible with the Omega3 Hip Plates.

Types of screws compatible with Omega Plates

Screw type	Omega Plus	Omega2	Omega3
Ø4.5mm Cortical Screws	✔	✔	✔
Ø6.5mm Cancellous Screws	✔	✔	✔
Ø6.5mm Asnis™ III Cannulated Screws	✔	✔	✔
Ø5.0mm Locking Inserts and Screws	✖	✖	✔

Potential Features & Benefits

Omega3
Low Profile Hip Plate

- Available in both Standard Barrel (38mm) and Short Barrel (25mm) styles and a full range of sizes and angles.
- Hip Plate barrel accepts the Omega Plus Lag Screws or Twin Hook.
- In addition to 4.5mm Cortical Screws, all sideplate holes accept 6.5mm Cancellous Screws or Asnis III 6.5mm Cannulated Screws for additional stabilization.
- The Hip Plate allows for 5.0mm Locking Inserts used in combination with 5.0mm Locking Screws for angular stable fixation. Bi-directional shaft holes increase the fixed angled construct. Innovative Locking Screws are guided into plate, thus reducing potential for cross-threading and coldwelding.
- Tapered plate allows for easier slide-in when used in minimal invasive technique with short incision.

Twin Hook

Twin Hook

Minimized disruption

- The smooth profile of the Twin Hook allows to slide into place without turning or hammering, thus minimizing dislocation of the fragments.

Preserved bone integrity

- Minimum disruption to cancellous bone.
- Full bone / implant surface contact for excellent stability.

Reduced invasive surgery

- The complete procedure may be carried out through a 4 to 6cm skin incision. This can reduce bleeding, tissue destruction, operative time, and may help to limit post-operative pain and rehabilitation time.

Simple "Push In " placement - no torque

- The insertion of the Twin Hook is done by simply pushing its shaft through the hip plate barrel into its final position in the femoral head. No torque is required, as this is seen using Lag Screws. No torque will be applied to the femoral head fragment during inserting the hook shaft.

Rotational stability of the femoral head fragment

- In conjunction with a keyed Hip Plate the Twin Hook may provide additional rotational stability in rotational unstable situations, due to the hook anchoring concept in the femoral head[1,2].

Simple and atraumatic removal procedure

- The Twin Hook can be removed or exchanged through a 10mm skin incision without need to remove the plate, reducing the trauma for the patient.

Fig. 1 Twin Hook shown with deployed hooks. Max. hook span of 31mm (+1.5/-2.5mm)

Fig. 2 Twin Hook shown as it looks when unpackaged

[1] O.Olsson, K.E. Tanner, L. Ceder, L. Ryd; A biomechanical study on fixation stability with Twin Hook or Lag Screw in artificial cancellous bone; Published in International Orthopaedics (SICOT), 2002 26:349-355
[2] O. Olsson, L. Ceder, K. Lunsjö, A. Hauggaard; Extracapsular hip fractures: fixation with a Twin Hook or a Lag Screw? Published in International Orthopaedics (SICOT), 2000 24:249-255

Potential Features & Benefits

Lag Screw Option

Omega™ Plus Lag Screws

13mm Standard Lag Screw

- Leading edge of the cutting thread engages quickly, with or without tapping, and provides tactile control during final positioning.

15mm Super Lag Screw

- Provide excellent resistance to migration in case of osteoporotic bone.

Please contact your local Stryker representative for more information about the Omega3 with Lag Screw technique.

State of the Art Instrumentation

Accurate angle guides:

- Radiolucency (Fig. 3) of the angle guide body to precisely position the instrument, and therefore the Guide Pin.
- Multiple guide pin holes (Fig. 5) for accurate placement of the Guide Pin without need to move the instrument.
- Variable Angle Guide (Fig. 6) with "freehand" technique option.
- Stiff CoCr Ø2.8mm Guide Pin (Fig. 4) for reduced deflection. Available also with quick coupling for increased interface between the power tool and the Guide Pin.
- Compatibility with the Stryker AxSOS™ Locking Plate System.
- Layout of the trays sequenced according to the surgical technique.

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Relative Indications & Contraindications

Relative Indications

The Omega3 System is indicated for fractures of the proximal femur which may include:

- **Trochanteric fractures and subtrochanteric fractures**

Note: When treating subtrochanteric fractures with Omega3 Hip Plates, the length of the Hip Plate has to be chosen according to the fracture situation. An intramedullary device like the Gamma3 Long Nail may be an option for the treatment of subtrochanteric fractures.

- **Intracapsular and basal neck fractures**

Note: When using the Omega3 Lag Screw System, if there is rotational instability, it is recommended that an **Asnis III 6.5mm Cannulated Screw** or **Hansson™ Pin** be added to stabilize the fracture. Please refer to page 15 (Fig. 23).

Relative Contraindications

The surgeon's education, training and professional judgement 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 or marked local inflammation in or about the affected area.
- Compromised vascularity that would inhibit adequate blood supply to the fracture or the operative site.
- Bone stock compromised by disease, infection or prior implantation that can not provide adequate support and/or fixation of the devices.
- Material sensitivity, documented or suspected.
- Obesity. An obese patient can produce loads on the implant that can lead to failure of the fixation of the device or to failure of the device itself.
- Patients having inadequate tissue coverage over the operative site.
- Implant utilization that would interfere with anatomical structures or physiological performance.
- Any mental or neuromuscular disorder which would create an unacceptable risk of fixation failure or complications in postoperative care.
- Other medical or surgical conditions which would preclude the potential benefit of surgery.

Detailed information are included in the instructions for use being attached to and shipped with every implant.

See package insert for a complete list of potential adverse effects and contraindications. The surgeon must discuss all relevant risks, including the finite lifetime of the device, with the patient, when necessary.

Caution: Bone Screws are not intended for screw attachment or fixation to the posterior elements (pedicles) of the cervical, thoracic or lumbar spine.

Operative Technique

Preoperative Planning

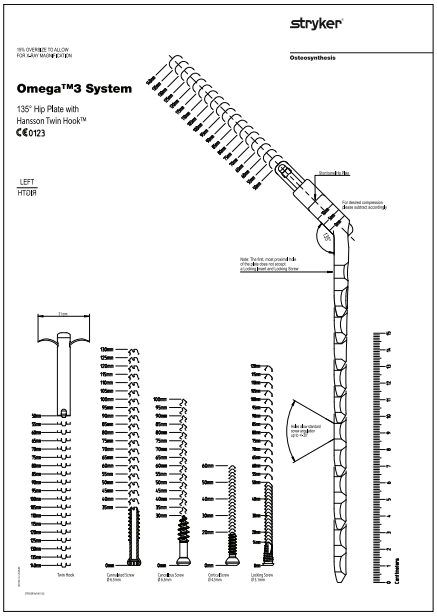


Fig. 7

Review the frontal and lateral X-Rays of the pelvis and injured femur prior to surgery to assess fracture stability, bone quality, as well as neck-shaft angle and to estimate plate length required.

Tip: Use templates (Fig. 7) praeoperatively to plan plate angle, plate length, barrel length, Locking Screw length and Twin Hook length.

The Twin Hook should be centered in the head within 10 millimeters of subchondral bone.

Preoperative X-Ray Templates for Omega3 System

REF	Description:
981120	Omega3 X-Ray Template Lag Screw 130 deg.
981121	Omega3 X-Ray Template Lag Screw 135 deg.
981122	Omega3 X-Ray Template Lag Screw 140 deg.
981123	Omega3 X-Ray Template Lag Screw 145 deg.
981124	Omega3 X-Ray Template Lag Screw 150 deg.
981125	Omega3 X-Ray Template Twin Hook 130 deg.
981126	Omega3 X-Ray Template Twin Hook 135 deg.
981127	Omega3 X-Ray Template Twin Hook 140 deg.
981128	Omega3 X-Ray Template Twin Hook 145 deg.
981129	Omega3 X-Ray Template Twin Hook 150 deg.
981130	Omega3 X-Ray Template Supracondylar Plate 95 deg.
982906	Omega3 X-Ray Template Folder, empty (**Note:** for the storage of the above mentioned X-Ray templates)

Operative Technique

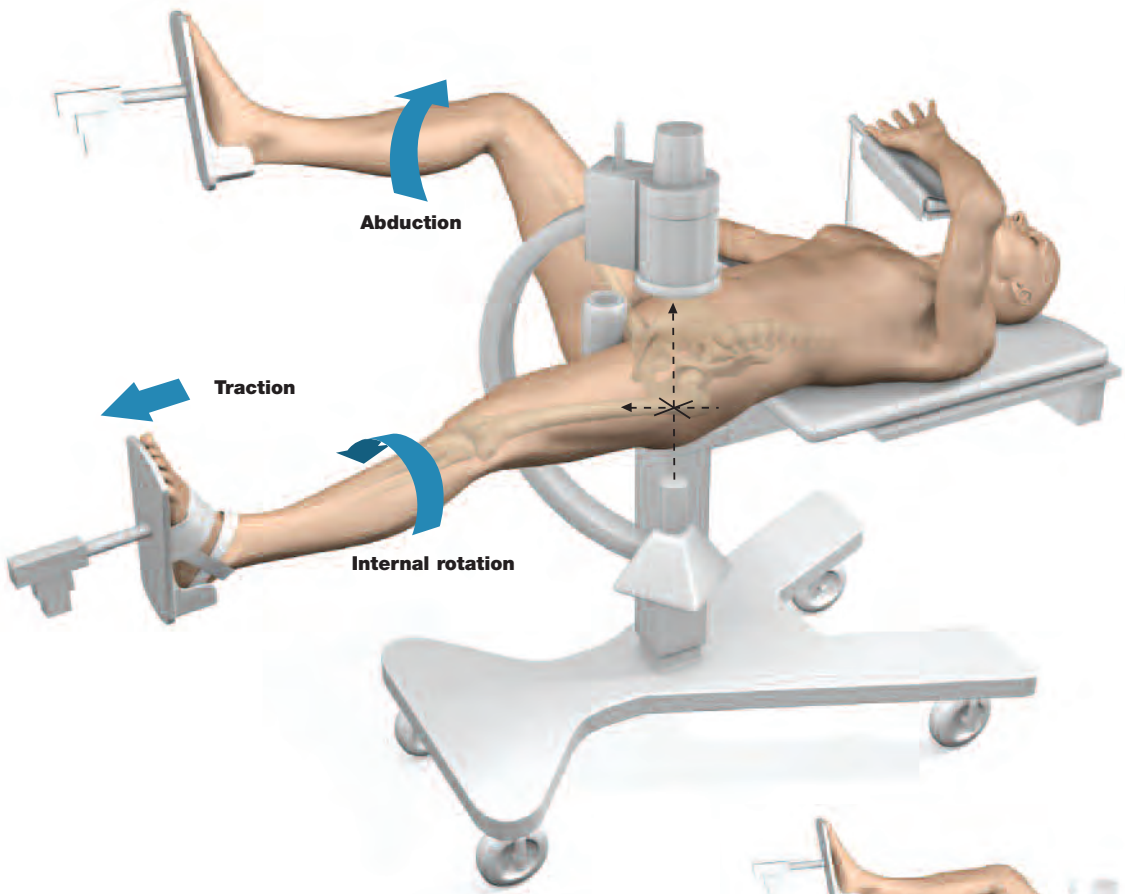
Patient Positioning

The patient is placed supine on the fracture table with the hip extended, adducted and slightly rotated inwards, until the patella is in a position parallel to the ground.

Satisfactory access to the hip with the C-arm in the frontal and lateral planes is verified.

The fracture is reduced as anatomically as possible by longitudinal traction, adduction and internal rotation on a fracture table.

In unstable fractures, Guide Pins can be placed in order to stabilize the reduced fragments.



Note: Access to the hip with the C-arm in the frontal and lateral planes is essential for the success of the system.

Skin Incision

Compared to a standard incision of up to 15cm, a reduced incision of approximately 4–6cm may be applied when using the Twin Hook together with the Omega3 Hip Plate.
The procedure is performed without exposing the fracture site and potentially involves less tissue damage, less bleeding, and reduced operative time than conventional techniques. This minimal access technique may help to reduce post-operative pain and to shorten rehabilitation time for the patient[3].

The barrelled Hip Plate entry site on the femoral shaft is situated about 2-3cm below the crest on which the vastus lateralis originates.

This distance is ample for the insertion of the Angle Guide, without any need for detaching the vastus lateralis from its trochanteric origin.

The continuity between the vastus lateralis and the gluteus medius is preserved. All that needs to be done is to reflect it anteriorly. Since the first 2cm of the vastus are not affected by the procedure, the skin incision used in the past to expose that part of the muscle is not required for this procedure.

The corresponding landmark is established by placing a Guide Pin on the skin under frontal view of the image intensifier, centrally in relation to the femoral neck and head. A 4cm longitudinal incision is made distal from this point through the skin. After closure at the end of the procedure, the incision should be over the holes in the side plate.

The incision is continued through the subcutaneous tissue and tensor fascia lata in line with the skin incision. Both proximally and distally, this incision is extended beyond the limits of the skin incision.

The posterior part of superficial fascia of the vastus lateralis is incised longitudinally. However, the vastus is not detached from its origin at the base of the greater trochanter.

The vastus is lifted with a periosteal elevator. A self-retaining retractor is placed underneath the vastus lateralis anteriorly and the tensor fascia lata posteriorly.

In this way, the shaft is exposed over a distance of 5 -7cm. The Angle Guide can be positioned against the femoral shaft.

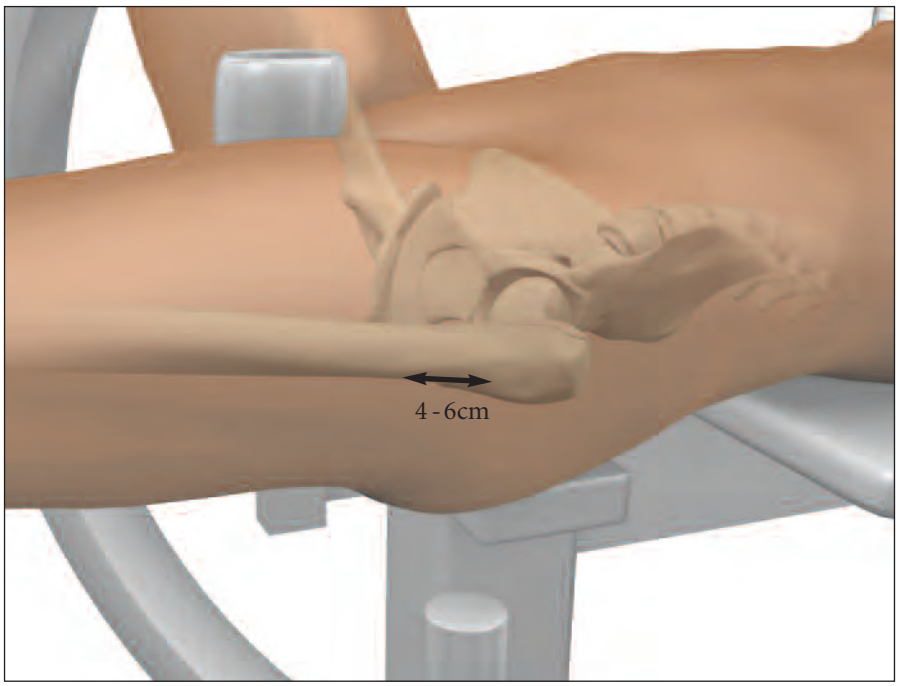


Fig. 8

The optimal point for skin incision is located at a point where the axis of the femoral neck intersects with the skin. (Fig. 8).

[3] A. Sermon, P. Reynders, P. Broos; Dept. of Traumatology U.Z. Gasthuisberg Leuven, Belgium; TWIN HOOK: A feasible alternative for the Lag Screw in the treatment of intertrochanteric fractures? Published in Folia Traumatologica Belgica 2005, ISBN 9080797820

Guide Pin Insertion

Orientation and placement of the Guide Pin is one of the most critical steps in this procedure.

By utilizing one or more of the following visual landmarks, correct positioning of the Guide Pin can be achieved.

With the Guide Pin placed at 135° angle, the pin crosses the lateral cortex at the level of the lesser trochanter (Fig. 10); at the insertion of the gluteus maximus at the posterolateral edge of the femur; or two fingerbreadths (2.5 to 3.5cm) below the crest of the greater trochanter at the origin of the vastus lateralis.

Correct positioning of the Guide Pin is achieved referencing anatomical and visual landmarks, as shown in the figure below.

In the following description of the operative technique the most common used 135° CCD is shown in the procedure.

For each 5° change in Hip Plate angle, the Guide Pin insertion point will be moved approximately 5mm distally (for increased angle) or proximally (for decreased angle).

The Fixed Angle Guide corresponds to the barrel plate angle. Angles of 130°, 140°, 145° or 150° may be guided using the Variable Angle Guide.

A Variable Angle Guide (Fig. 11) in conjunction with an T-Handle can be used to insert the Guide Pin at 130°, 135°, 140°, 145° and 150°.

Note: The Angle Guides are radiolucent (Fig. 10) to help the correct positioning of the Angle Guide and the Guide Pin under image intensifier (helpful when a reduced skin incision is performed and direct visibility of the site is therefore reduced).

Note: Be sure to verify that the set angle is not changed when the Variable Angle Guide is touching soft tissue. This may occur when

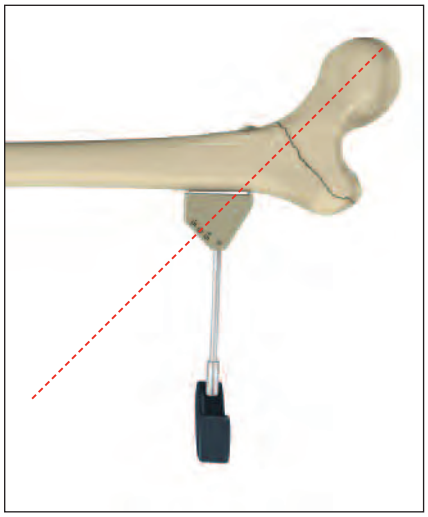


Fig. 9 Fixed Angle Guide for Guide Pin Placement

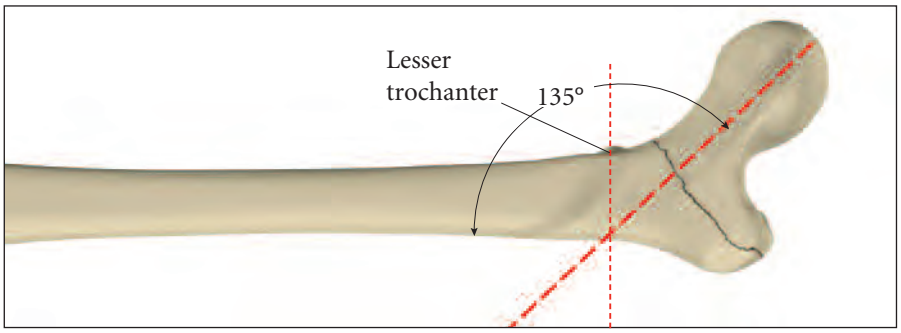


Fig. 10

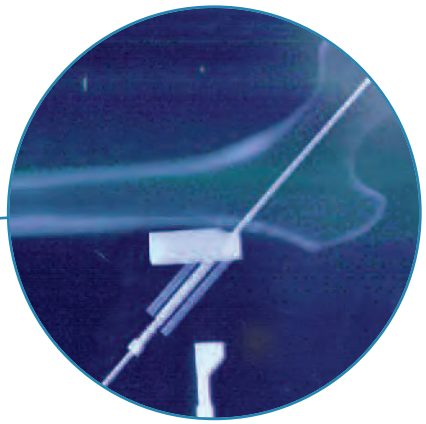


Fig. 12

Fig. 11 Variable Angle Guide for Guide Pin Placement or Angle Measurement when the Guide Pin is inserted in "free hand technique"

Guide Pin Insertion, continued

Frontal view

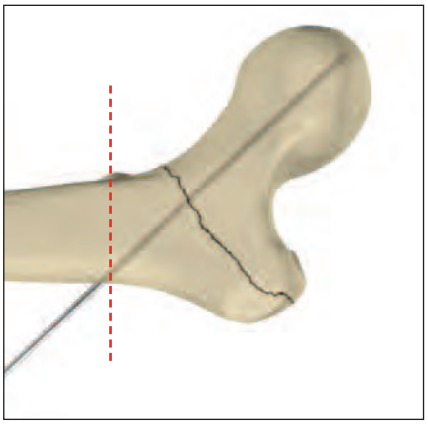


Fig. 13 A/P View

Lateral view

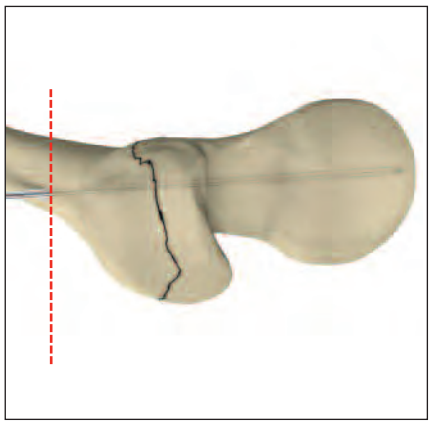


Fig. 14 Lateral View

While holding firmly the appropriate Angle Guide on the femoral shaft, the 2.8mm Guide Pin is inserted in the hole of the Angle Guide and advanced into the femoral head under image intensification until it reaches the subchondral bone in the center of the femoral head in both frontal and lateral views (Fig. 13 and 14).

If the Guide Pin is not positioned correctly, an additional pin can be inserted 5mm above or below the central position in the frontal plane, and 5mm anteriorly or posteriorly to the central position in the lateral plane, without removing the first Guide Pin (Fig. 15 and 16).

Note: To insert a second pin near the first one, use a Quick Coupling Chuck for 2.8mm Guide Pin (REF 704027) together with a 2.8mm Guide Pin with quick coupling fitting (REF 704012S), otherwise there is a risk that the power drill chuck will touch the first Guide Pin.

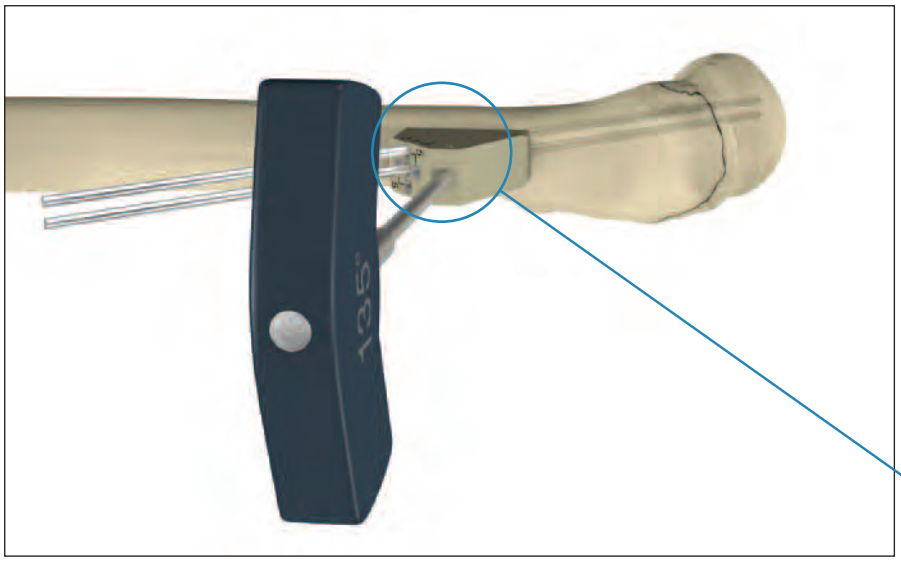
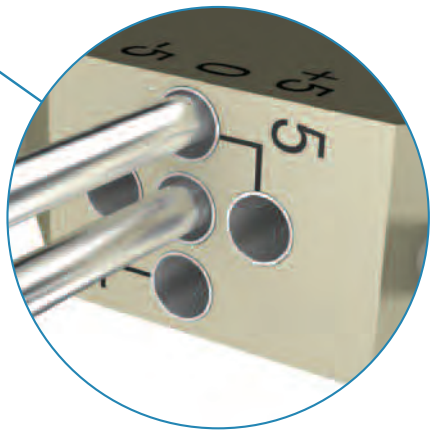


Fig. 15 Optional: Correction of Guide Pin placement possible using an additional Guide Pin: Lateral View



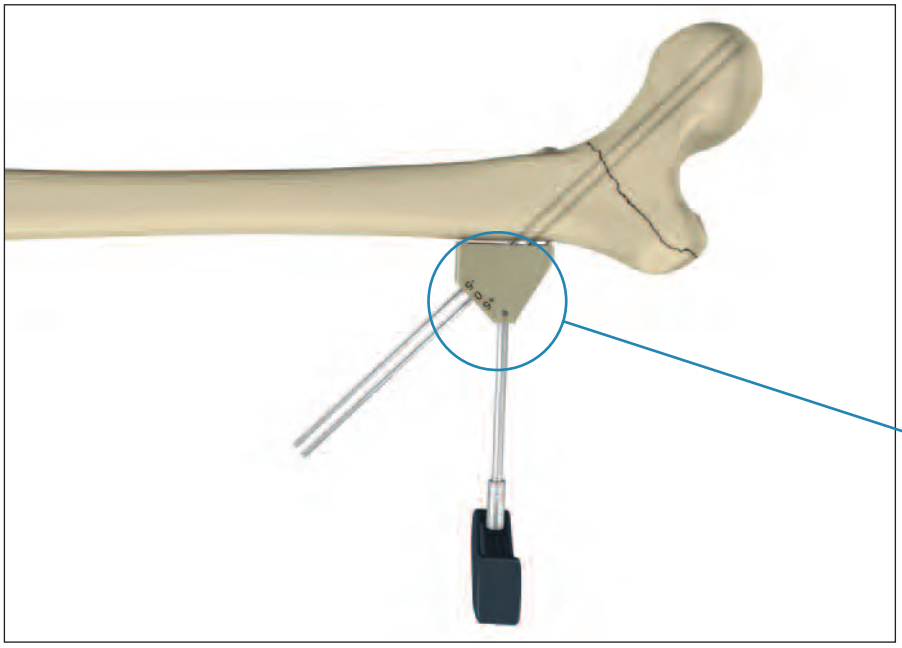
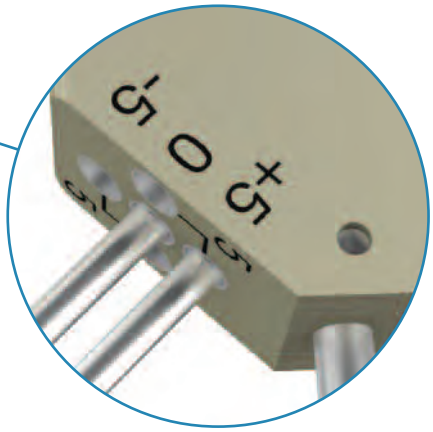


Fig. 16 Optional: Correction of Guide Pin placement possible using an additional Guide Pin: AP View



Guide Pin Insertion, continued

"Freehand" technique for Guide Pin placement:

Place a 2.8mm Guide Pin anterior to the neck of the femur (Fig. 17) and align it in the center of the head against the medial cortex by using image intensification.

A 3.2mm Drill Bit can be used to make an opening in the lateral cortex, allowing for easy insertion of the Guide Pin. Using image intensification, the Guide Pin is advanced until it reaches the subchondral bone in the femoral head. After confirming appropriate tip position of the Guide Pin on both frontal and lateral views, verify the appropriate plate angle by using the Variable Angle Guide. To unlock the mechanism, pull the cylinder of the guide (Fig. 18) and turn it by 90° (Fig. 19).

Slide the Variable Angle Guide over the Guide Pin and adjust it down to the lateral aspect of the femur (make sure that all the spikes are in contact with the bone shaft). The arrow on the cylinder will indicate at which angle the Guide Pin has been inserted (Fig. 20), and therefore the angle of the barrel plate to be selected.

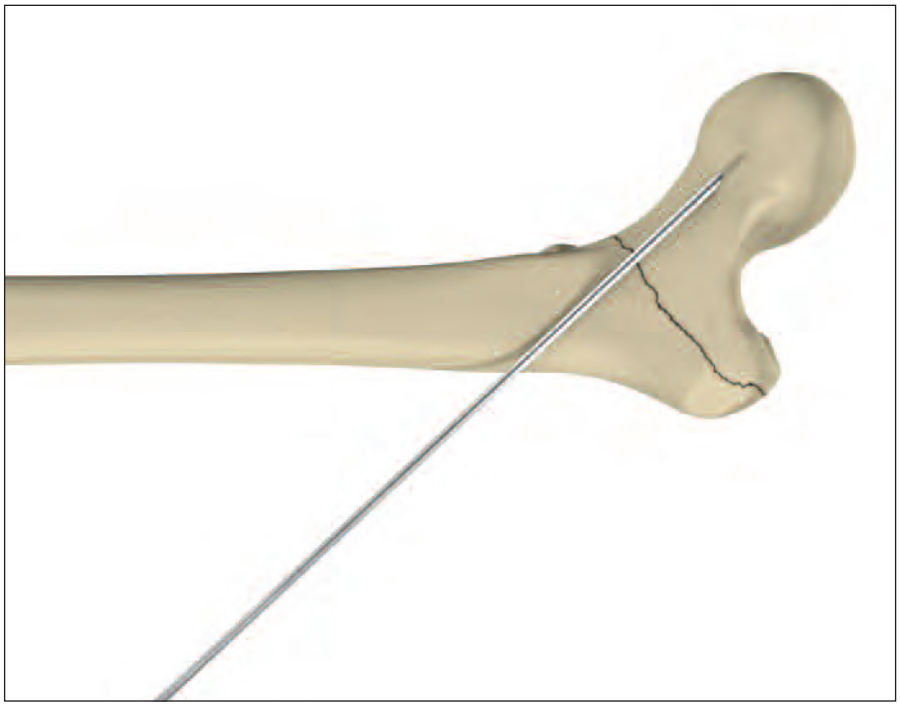


Fig. 17 Guide Pin anterior to the neck of the femur

Note: Be sure to verify that the set angle is not changed when the Variable Angle Guide is touching soft tissue. This may occur when the incision is made too small.

Fig. 18

Fig. 19

Fig. 20

Guide Pin Measurement

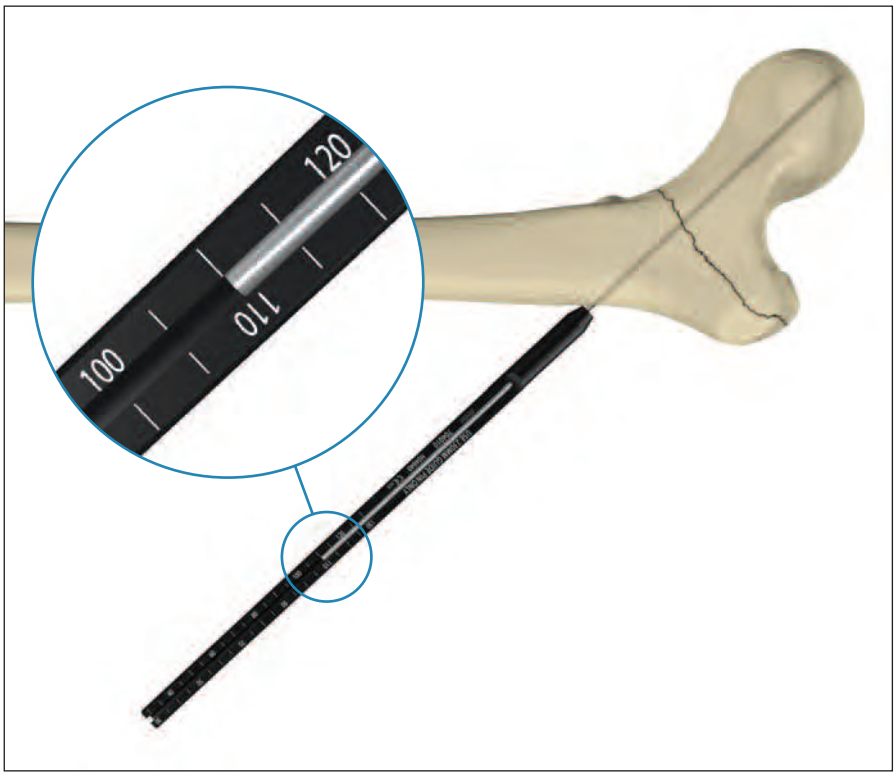


Fig. 21

Example without compression:

- Depth Gauge measurement: **110mm**
- Reamer depth setting: **100mm**
- Twin Hook length selected: **100mm**

Example with expected 5mm compression:

- Depth Gauge measurement: **110mm**
- Reamer depth setting: **100mm**
- Desired Compression: **5mm**
- Twin Hook length selected: **95mm**

The Depth Gauge indicates the exact amount of Guide Pin which has been inserted into the bone (Fig. 21).
The surgeon must decide the depth to which the Twin Hook will be inserted in order to allow the hooks to be introduced into the centre of the sphere of the femoral head without penetrating the joint surface.

The reaming depth is recommended to be approximately 10mm shorter than the Depth Gauge reading to permit the correct tip-apex distance.

The Twin Hook length should be the same as the chosen reaming depth when no compression is applied.

How to select the correct length of the Twin Hook when applying compression:

The fracture must first be reduced anatomically. Compression may enhance the reduction but does not replace it.

Intra-operatively, once the femoral neck channel has been reamed, the surgeon must use image intensification to judge the amount of compression required.

The compression is limited firstly by the length of the Compression Screw threads (10mm) and secondly by the length of the Twin Hook chosen.
The Twin Hook must be shorter than the reamed channel by the number of mm of compression required.

If, following the compression, a surgeon sees on the X-Ray that further compression is necessary but impossible due to the length of the implant and Compression Screw, he must remove the Twin Hook as described on page 32 and choose a shorter length implant.
Any attempt to force compression can result in breakage of the Compression Screw.

Anti-Rotation Guide Pin Insertion

The Guide Pin Replacement Instrument can also be used to insert a second Guide Pin parallel to the primary Guide Pin, depending on the fracture pattern (Fig. 22).

The Guide Pin for the Twin Hook must be placed in an inferior position to allow space for placement of a second pin or screw, if the femoral neck is narrow.

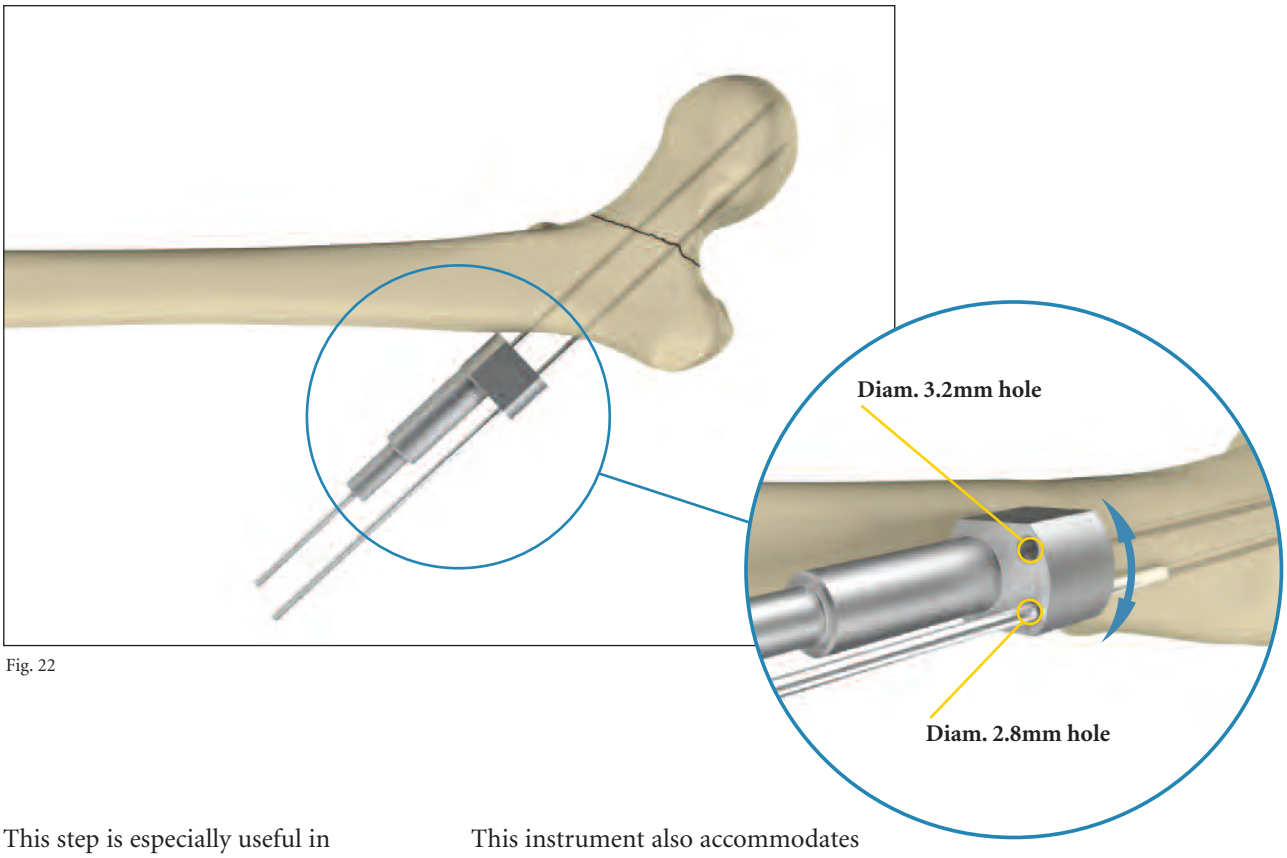


Fig. 22

This step is especially useful in providing temporary stability for femoral neck fractures and basal neck fractures, where the head could rotate during reaming or screw insertion.

Correct positioning of the anti-rotational wire can be done by rotating the instrument anteriorly or posteriorly (Fig. 22).

This instrument also accommodates a 3.2mm guide wire, should the surgeon wish to insert a 6.5mm Asnis III Cannulated Screw for definitive rotational stability (Fig. 23).

Alternatively to an Asnis III Cannultated Screw a Hansson Pin can be inserted as well.

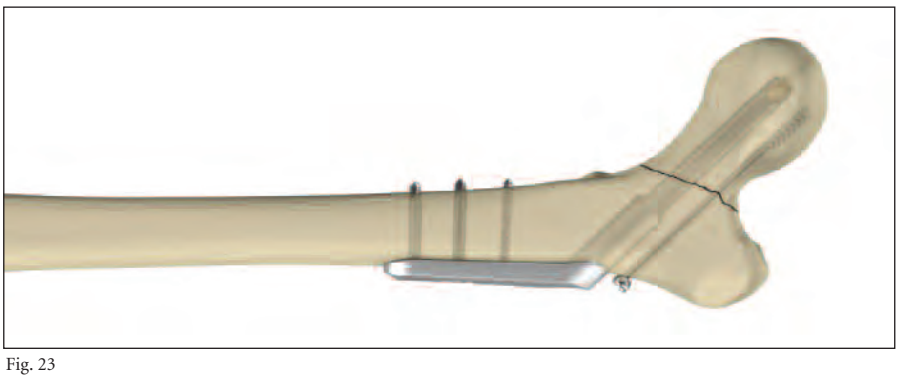
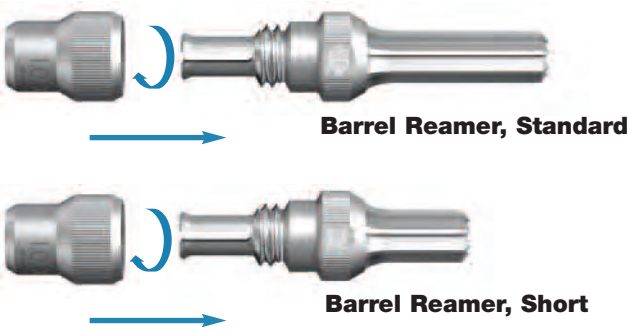


Fig. 23

Operative Technique

Combination Reamer Assembly Instructions



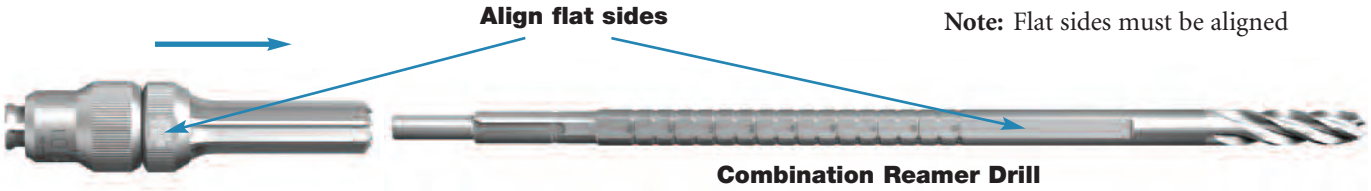
Step 1

Select and assemble the Barrel Reamer.
Note: Choose the corresponding Barrel Reamer, i.e. Standard Barrel Reamer for Omega3 Plate with Standard Barrel, or the Short Barrel Reamer for Omega3 Plate with Short Barrel. The Stop Sleeve must be threaded until a mechanical stop is felt.

Step 2

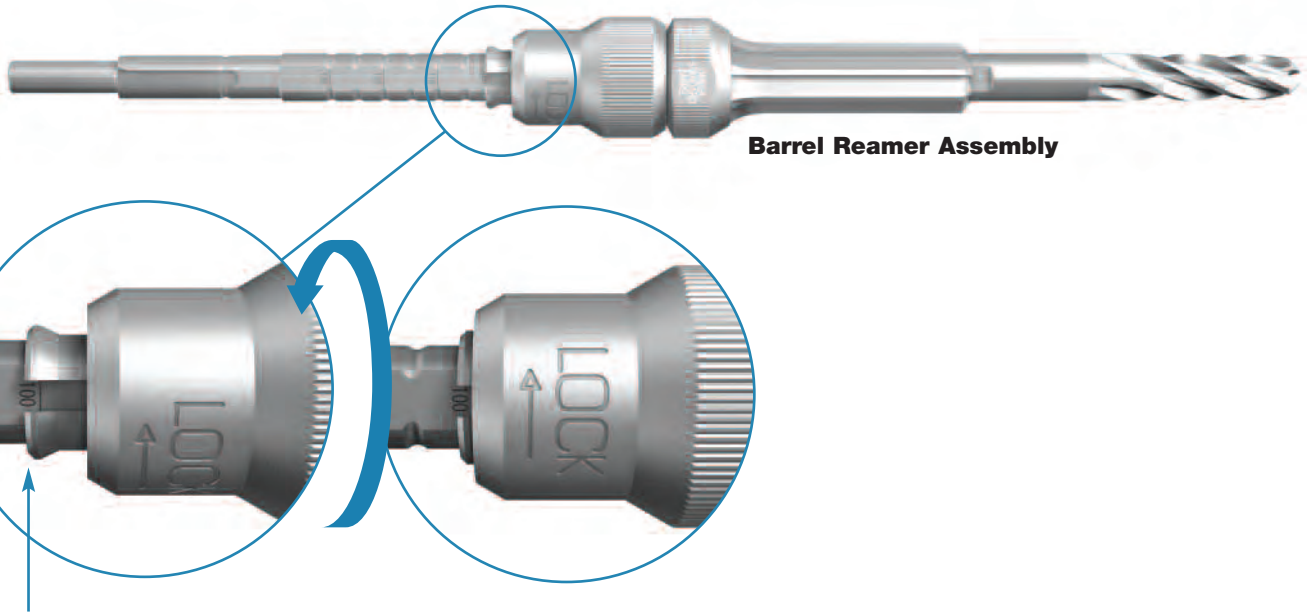
Align the flat side of the Barrel Reamer to the flat side of the Combination Reamer Drill, and engage the Barrel Reamer over the coupling end of the Combination Reamer Drill.

Note: Flat sides must be aligned



Step 3

Slide the Barrel Reamer until the stop has been adjusted to the right measurement behind the barrel. Lock the Barrel Reamer by turning the Stop Sleeve anticlockwise until the Barrel Reamer is fixed to the Combination Reamer Drill.



Note: Correct measurement behind the barrel, then lock the Stop Sleeve

Femoral Head / Neck Reaming

Select and assemble the correct Barrel Reamer (according to the standard or short barrel plate selected).

The Combination Reamer is set and locked by firmly turning the Stop Sleeve anti-clockwise at the predetermined depth setting (approximately 10mm less than the Guide Pin measurement).

Ream over the Guide Pin with the Combination Reamer until the stop reaches the lateral cortex (Fig. 24).

Remove the Combination Reamer while still reaming clockwise, in order to remove debris from the reamed canal.

Note: Guide Pins are not intended for re-use.
They are for single use only. Guide Pins may be damaged or bent during surgical procedures. If a Guide Pin is re-used, it may become lodged in the drill and could be advanced into the pelvis, damaging large blood vessels or vital organs.

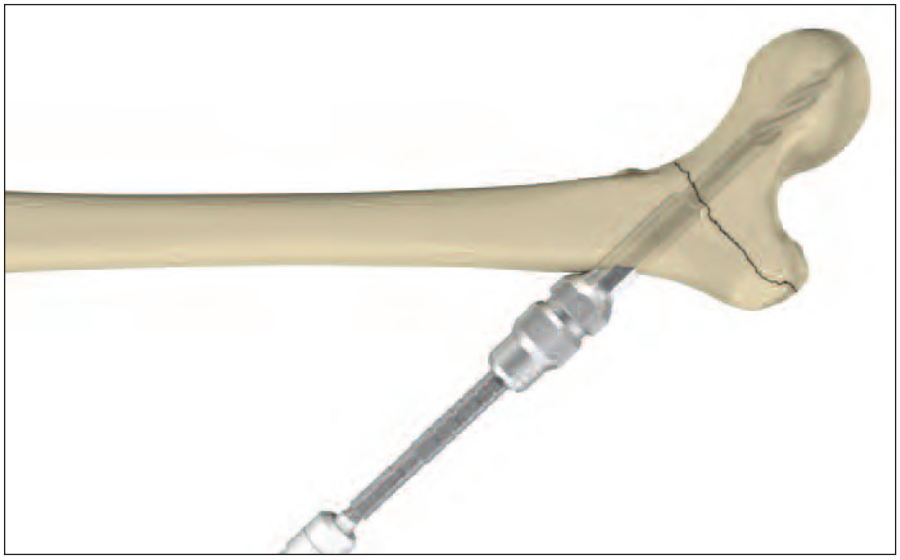


Fig. 24

Should the Guide Pin be inadvertently withdrawn, reverse the Guide Pin Replacement Instrument (Fig. 25), insert it into the femur, and reinsert the Guide Pin (Fig. 26).

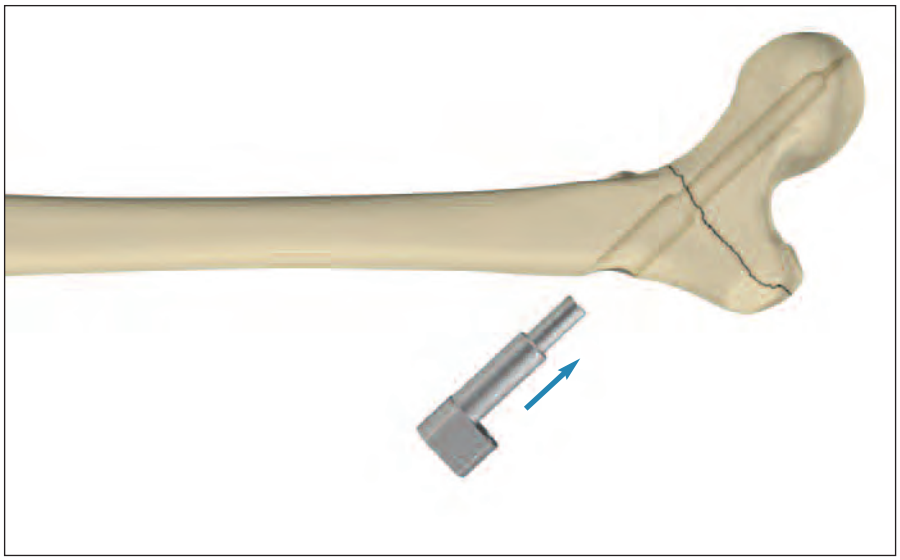


Fig. 25

Note for short barrel plates:

For more lateral intertrochanteric fractures or medial displacement osteotomies, the short barrel plates provide fixation without the barrel crossing the fracture.

Reaming is accomplished using the Short Barrel Reamer, following the same procedure for standard barrel reaming.

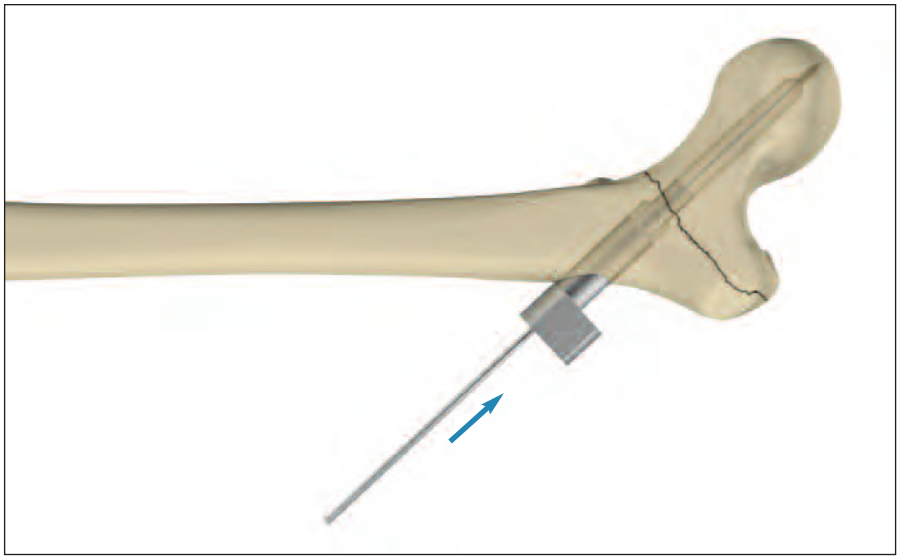
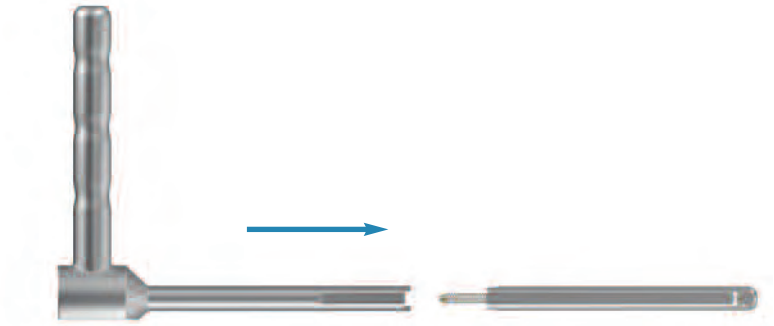


Fig. 26

Operative Technique

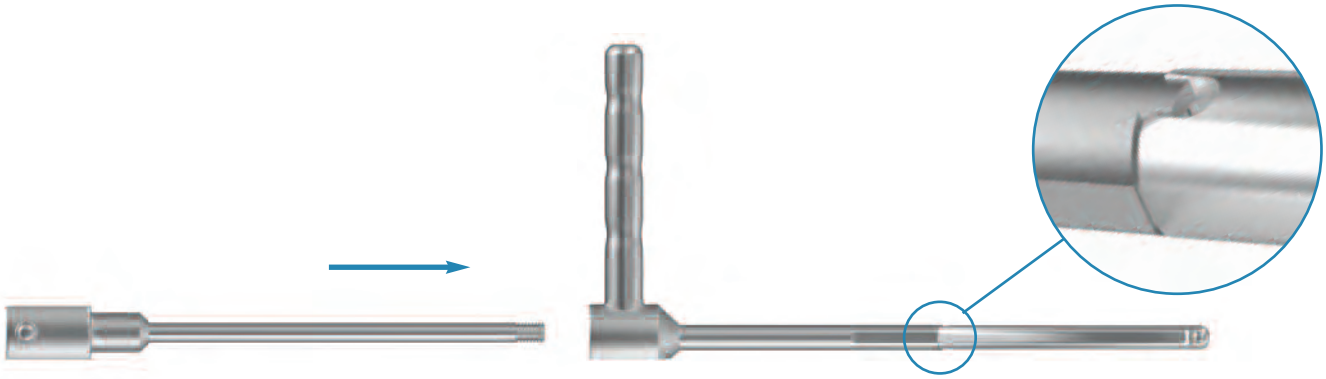
Twin Hook Introducer Assembly Instructions



Outer Introducer Twin Hook

Step 1

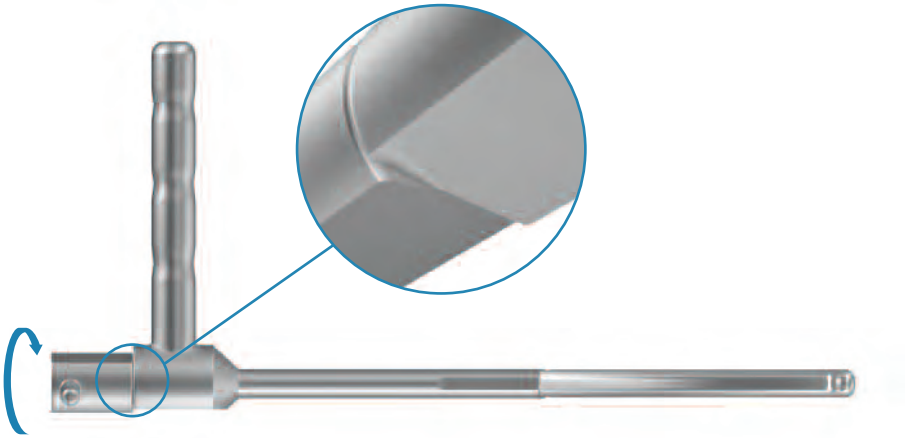
Select a Twin Hook of the appropriate length. Engage the Twin Hook with the Outer Introducer, ensuring that the pegs and grooves meet (see enlarged picture below).
The Inner Introducer is inserted into the Outer Introducer.



Inner Introducer

Step 2

The Inner Introducer is then firmly engaged into the base of the Twin Hook by turning clockwise while maintaining the Twin Hook and the Outer Introducer together.



Note: The Inner Introducer does not necessarily have to be in line with the Outer Introducer when tightening firmly together

Operative Technique

Hip Plate & Twin Hook Insertion in One Step

For Omega3 Hip Plate attachment using axial stable Locking Screws, please refer to page 25.

Before inserting the Omega3 Hip Plate, the Guide Pin must be removed.

Note: Only the Keyed Hip Plates provide rotational stability when used in conjunction with the Twin Hook.

The Hip Plate is slid through the small skin incision under the vastus lateralis against the femoral shaft. (Fig. 27 and 28).

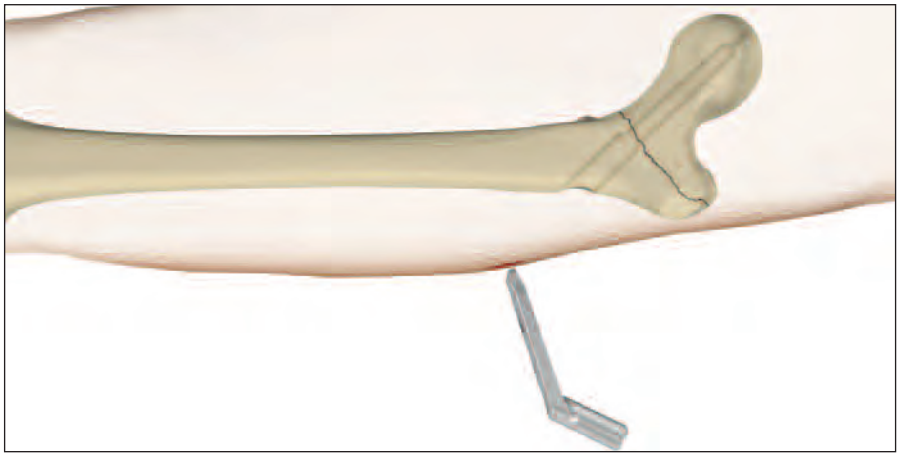


Fig. 27

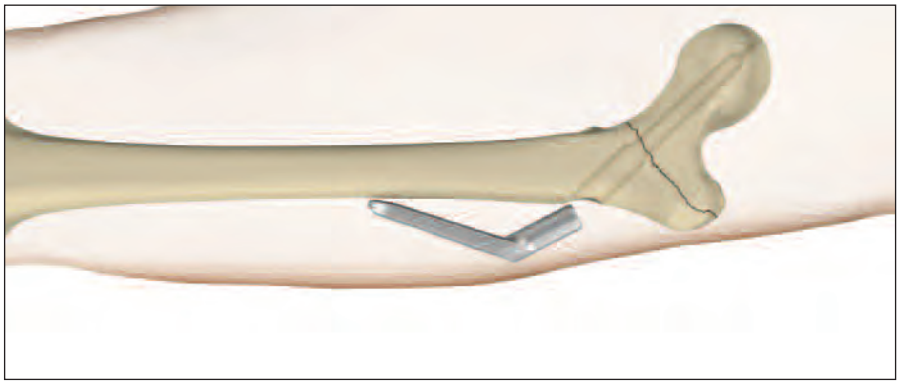


Fig. 28

Hip Plate & Twin Hook Insertion in One Step, continued

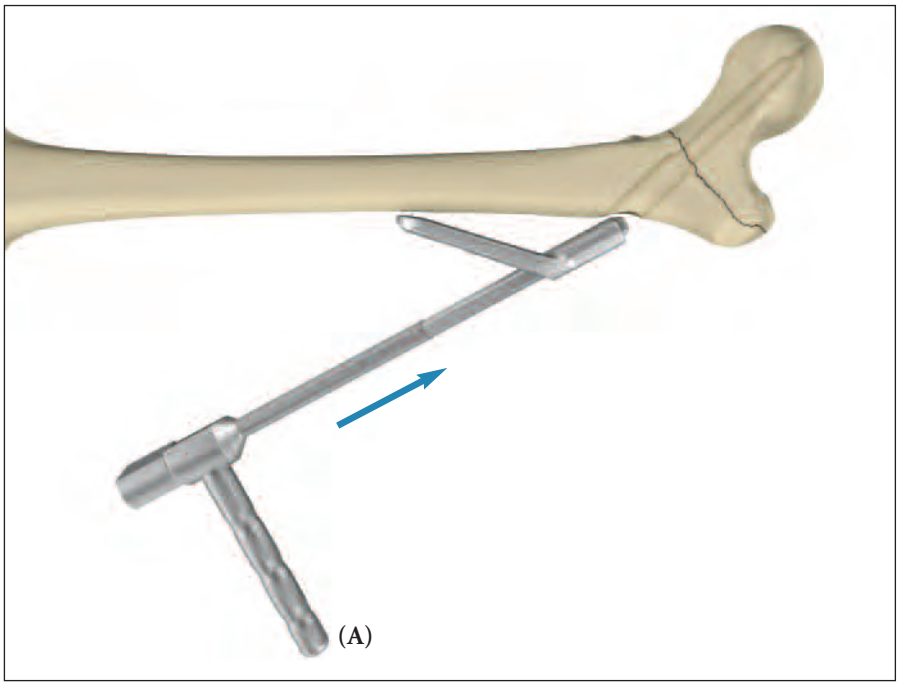


Fig. 29

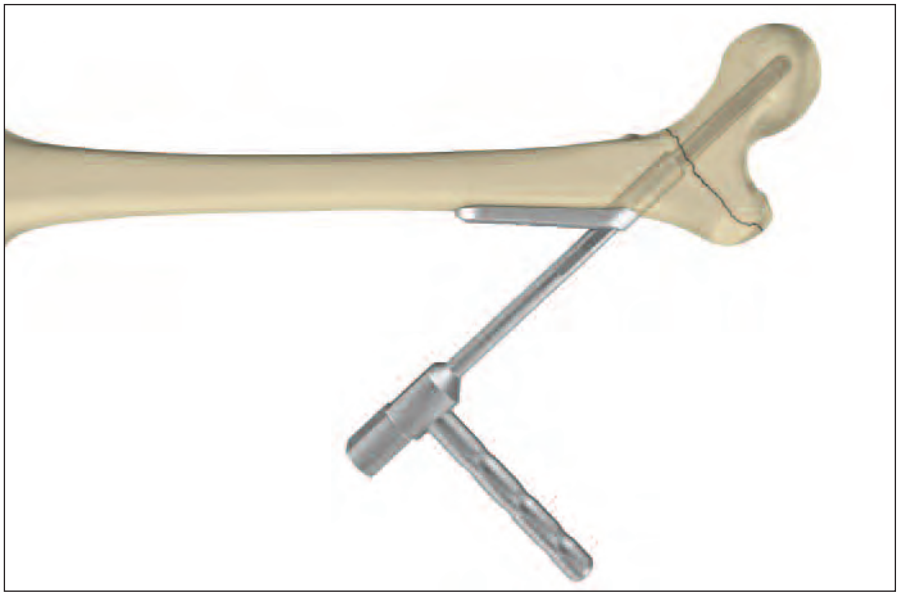


Fig. 30

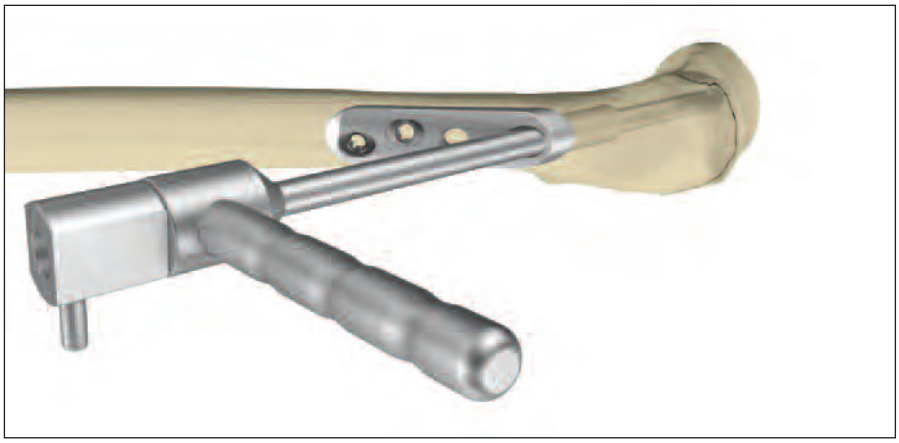


Fig. 31

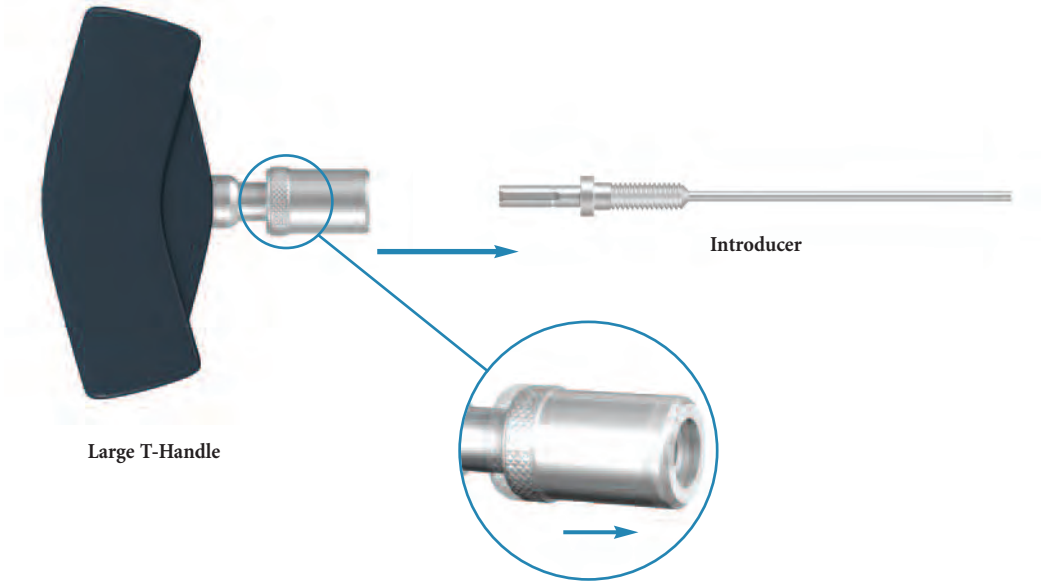
Step 1

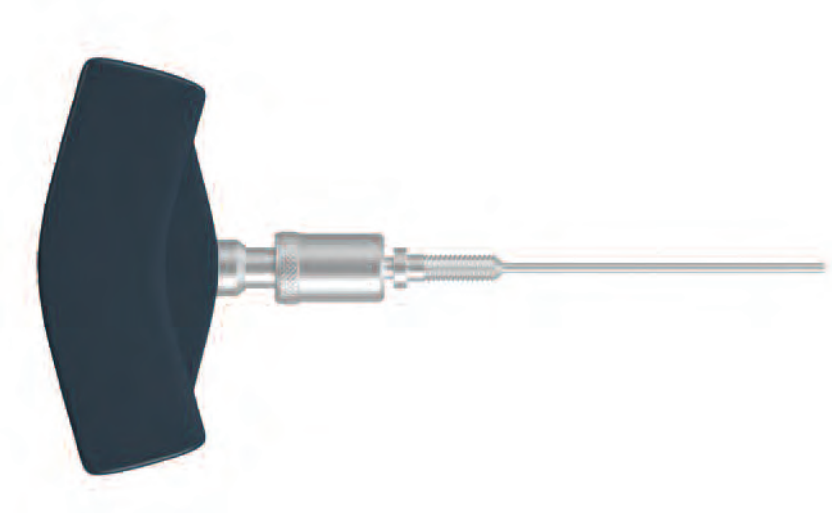
The Twin Hook is inserted through the plate barrel, and the assembly is pushed into the reamed channel. Use the insertion instrument as a joystick to seat the plate (Fig. 29–31).

Note: Both the Omega3 Hip Plate barrel and the Twin Hook are keyed. (i.e. the handle of the Outer Introducer must be inserted parallel to the shaft of the plate as well as to the shaft of the femur).

Note: The handle of the Outer Introducer must point away from the body (A in Fig. 29). Otherwise it gets into conflict with the soft tissue when inserting the Twin Hook.

Twin Hook Introducer Assembly Instructions





Twin Hook Deployment

Fig. 32

Step 2

The Introducer Handle is inserted (Fig. 32) through the channel of the Inner Introducer and rotated clockwise until it meets resistance, that is, the tip of the Introducer touches the tip of the inner pin.

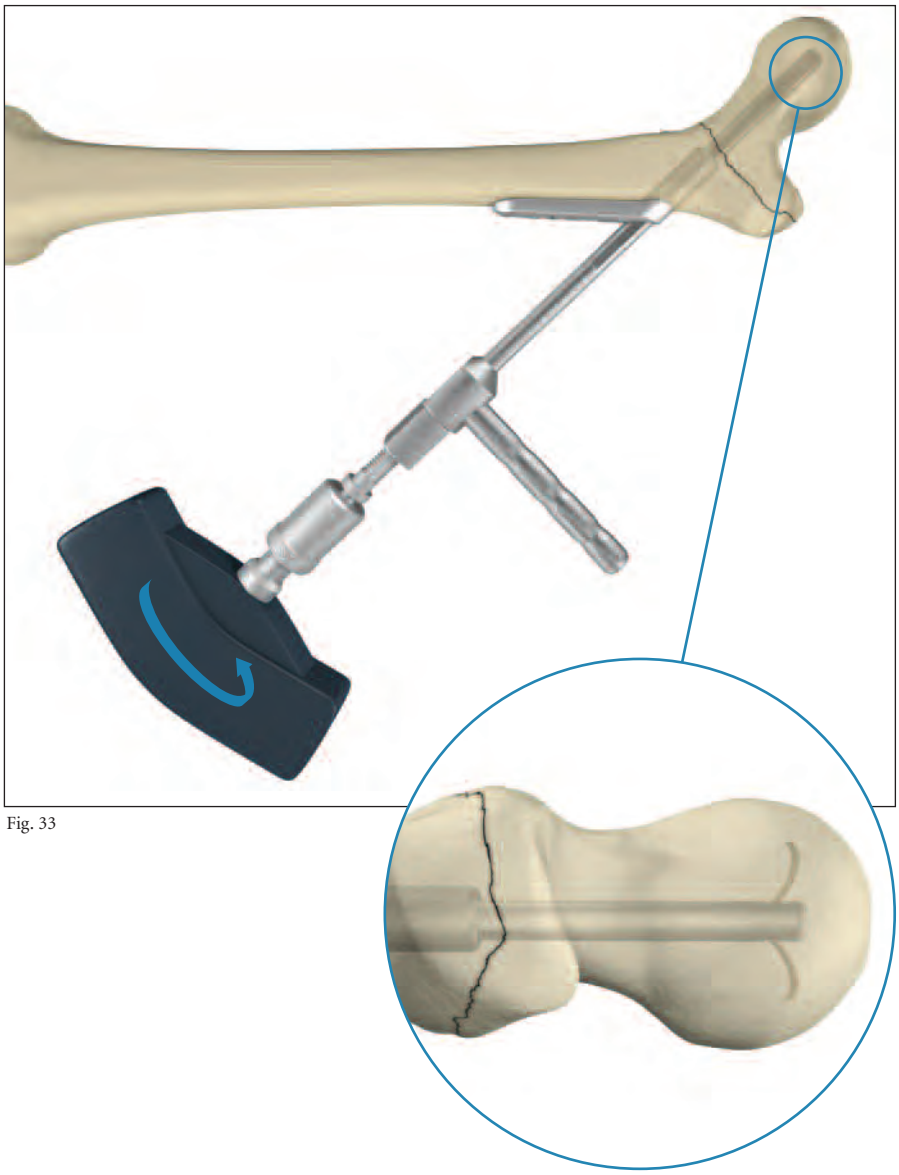


Fig. 33

Step 3

Note: Before deploying the hooks verify the central position of the Twin Hook from lateral by image intensifier.

The hooks are deployed by turning the Introducer Handle clockwise until a sudden stop is felt (Fig. 33).

Note: It is **important** that the Outer Introducer Handle is **pushed forward** when deploying the hooks, in order to prevent its lateralisation.

Note: In case of not central position of the Twin Hook in the femoral head the hooks may not be deployed fully. This is to prevent anterior or posterior penetration of the hooks through the head. In this case the biomechanical properties may be slightly different compared to fully deployed hooks.

Omega3 Hip Plate Impaction & Instrument Removal

Step 4

Both frontal and lateral image intensification are utilized to ensure accurate placement of the Hip Plate (Fig. 34 and 35).

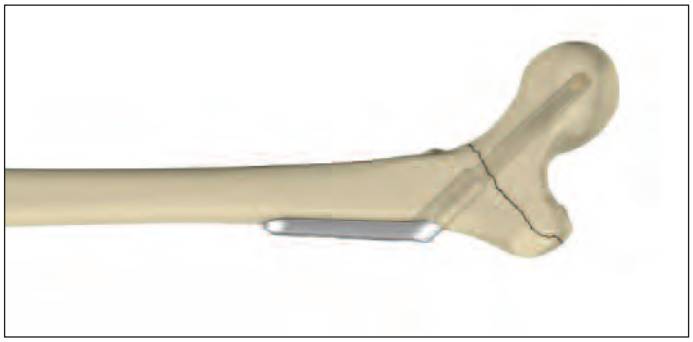


Fig. 34

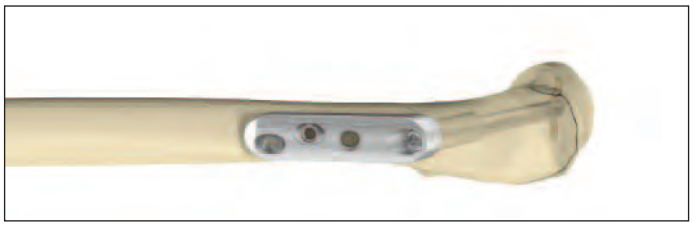


Fig. 35

Step 5

Impaction of the fracture may be accomplished by using the Plate Impactor together with a hammer or mallet (Fig. 36).

Note: Use gentle hammering only- otherwise the impactor may be destroyed.

Fig. 36

The Introducer Assembly is then removed by turning the Introducer Handle anti-clockwise, removing it and then repeating the same steps for the Inner Introducer. The Outer Introducer slides out as soon as it is no longer held in place by the Inner Introducer (Fig. 37).

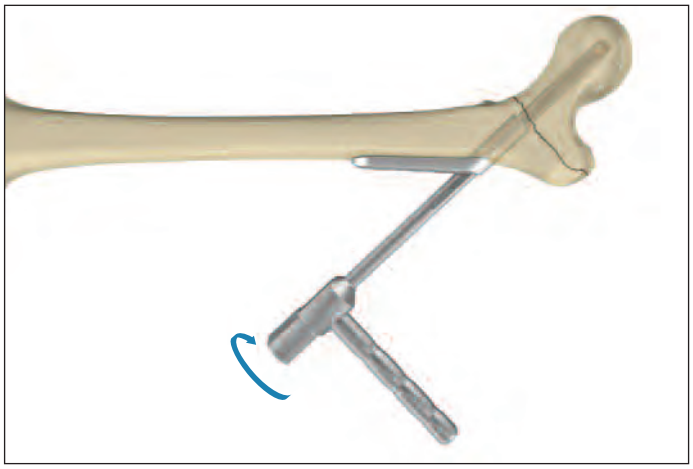


Fig. 37

Omega3 Hip Plate Fixation with Standard Cortical Screws

Fig. 38

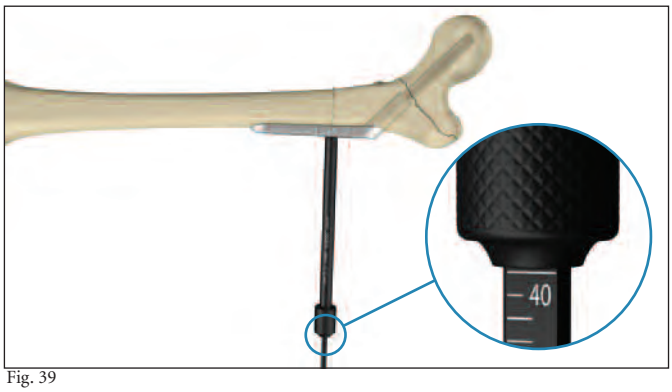


Fig. 39

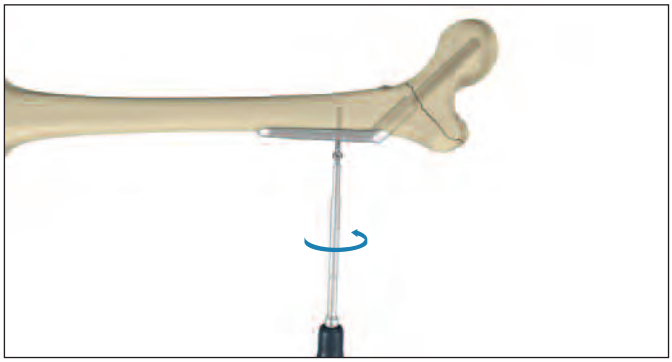


Fig. 40

Fig. 41

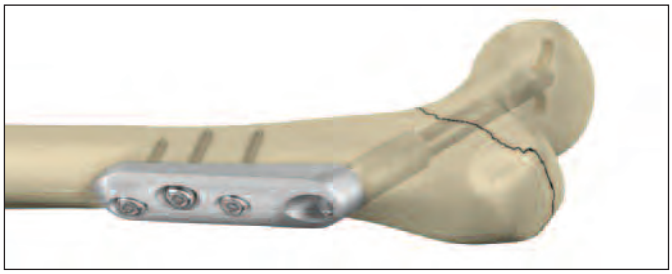


Fig. 42

The Omega3 System allows for two alternatives of plate fixation:
1. Fixation with 4.5mm Cortical Screws.
2. Axial stable fixation with 5.0mm Locking Inserts and Locking Screws.
For angular stable fixation with 5.0mm Locking Inserts and Locking Screws please refer to the section on page 25.
For Standard 4.5mm Cortical Screw fixation please follow the steps described below.
Using standard cortical screw insertion technique, fix the Omega3 Hip Plate to the femoral shaft beginning at the proximal end of the plate.

Note: When using the reduced skin incision technique, supplementary stab incisions can be performed for distal screw placements.

Use the drill bit through the drill sleeve with the green ring (Neutral) assembled to the Drill Guide Handle, to drill the bone screw holes (Fig. 38).

Note: If necessary it is possible to obtain compression of a shaft fracture or osteotomy site when using the drill sleeve with the yellow ring (1mm compression).

Determine appropriate Cortical Screw length using the Depth Gauge (Fig. 39). Always select a screw length one size longer in order to ensure the optimal bi-cortical purchase.

Insert the self tapping screw using the 3.5mm Hex Screwdriver with T-handle (Fig. 40).

Option

A 4.5mm Tap is available, to pre-tap in extremely hard cortical bone.
It is recommended to use the Tap in conjunction with a sleeve, if soft tissue is close to the Tap (Fig. 41).

Antero-lateral view of the Omega3 Hip Plate with Twin Hook fixed with Standard 4.5mm Cortical Screws (Fig. 42).

Omega3 Hip Plate Fixation with Axial Stable Locking Screws

The shaft of the Omega3 Hip Plate is designed to accept Ø4.5mm Standard Cortical Screws for neutral or compression plate attachment to the femoral bone according to standard technique described in this operative technique (page 24).

Alternatively, Locking Inserts and Ø5.0mm Locking Screws may be preferred for axial stable locking in patients with poor bone quality or to perform minimal invasive surgery with a shorter plate.

Locking Inserts and Screws may be used in conjunction with Standard Cortical Screws on the same Hip Plate. However, Standard Cortical Screws may not be used in the Locking Inserts. Also it is mandatory to utilize the instrumentation designed intentionally for the Locking Inserts and Screws.

Step 1
Locking Insert Placement: Option1: Placement of the Locking Insert before Implantation of the Hip Plate

Before placing the Hip Plate onto the bone, thread a 5.0mm Locking Insert to the Inserter Instrument and push the Locking Insert into the chosen shaft hole of the Omega3 Hip Plate.

Note: The first, most proximal hole of the plate does not accept a Locking Insert. A 4.5mm or 6.5mm bone screw always has to be used to align and advance the Hip Plate to the bone (**A**).

Note: Make sure that the Locking Insert is completely pushed into the shaft hole. Unthread the Inserter. Repeat this procedure with each hole you want to put a Locking Insert with Locking Screws.

Note: Do not attempt to push Locking Inserts into the plate holes with the Drill Sleeve.

Omega3 Hip Plate Fixation with Axial Stable Locking Screws, continued

Fig. 43

Fig. 44

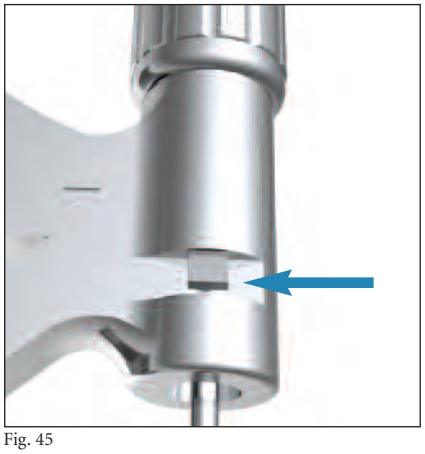


Fig. 45

Option2: Placement of the Locking Insert after Implantation of the Hip Plate (in situ):

If desired, a Locking Insert can be applied in a compression hole in the shaft of the plate intra-operatively (in situ) by using the Locking Insert Forceps, Holding Pin and Guide for Holding Pin. When choosing this option, first implant the Hip Plate according to the description on page 24, perform a Cortical Screw insertion in the most proximal hole and then continue as described below with the Locking Inserts and Locking Screws.

First, the Holding Pin is inserted through the chosen hole using the Centering Guide Drill Sleeve for Holding Pin (A) (Fig. 43). It is important to use the Guide as this centers the core hole for Locking Screw insertion after the Locking Insert is applied. After inserting the Holding Pin bi-cortically, remove the Guide.

Next, place a Locking Insert on the end of the Forceps and slide the instrument over the Holding Pin down to the hole (Fig. 44).

Push the button on the Forceps to remove the device (Fig. 45). At this time, remove the Holding Pin.

Omega3 Hip Plate Fixation with Axial Stable Locking Screws, continued

Step 1

Perform Cortical Screw insertion in the first, most proximal hole according to the description on page 24 (Fig. 46).

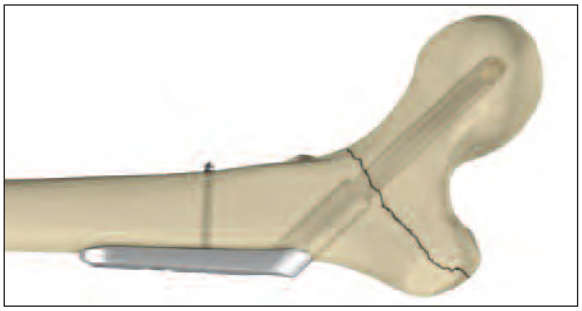


Fig. 46

Step 2
Apply Drill Sleeve:

Thread the Drill Sleeve into the Locking Insert to expand its base within the plate hole, thus securing it (Fig. 47).

For easier alignment, first push the Drill Sleeve down towards the plate and then rotate it to engage the thread.

Fig. 47

Step 3
Drill:

Drill through both cortices of the femoral shaft using the 4.3mm Drill Bit attached to power (Fig. 48).

Fig. 48

Omega3 Hip Plate Fixation with Axial Stable Locking Screws, continued

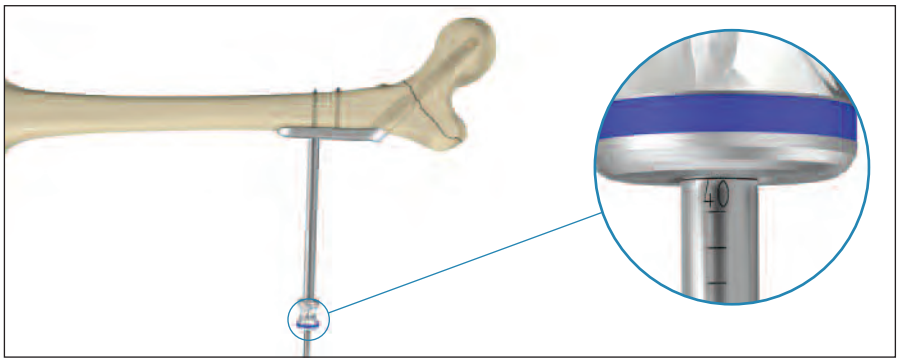


Fig. 49

Option 1:

Measuring off the drill, using the calibrations marked on the drill (Fig. 49).

Note: Always select a screw length one size longer in order to ensure the optimal bicortical purchase.

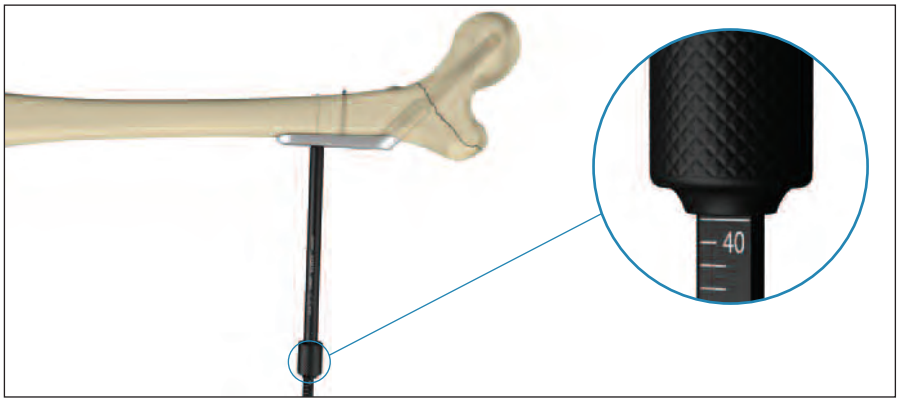


Fig. 50

Step 4
Screw Measurement:

Measure the required screw length by one of three possibilities:

Option 2:

Conventional direct, using the locking technique Direct Measuring Gauge through the locking insert and across both cortices (Fig. 50).

Note: Always select a screw length one size longer than measured in order to ensure the optimal bicortical purchase.

Omega3 Hip Plate Fixation with Axial Stable Locking Screws, continued

Step 5
Screw Insertion:
Insert the Locking Screw into the Locking Insert, using the Screwdriver T20, AO fitting assembled with the Screw Holding Sleeve and the Torque Limiter. Alternatively the Screwdriver T20, AO fitting can be used under direct power. However, final tightening always must be done manually. Final tightening must be done manually.

The Locking Screw is adequately tightened when the Torque Limiter clicks at least once at the end of manual tightening (Fig. 51).

Note: The Torque Limiter is crucial to the mechanical integrity of the construct.

Fig. 51

Antero-lateral view of the Omega3 Hip Plate fixed with Twin Hook and axial stable Locking Inserts and Screws (Fig. 52).

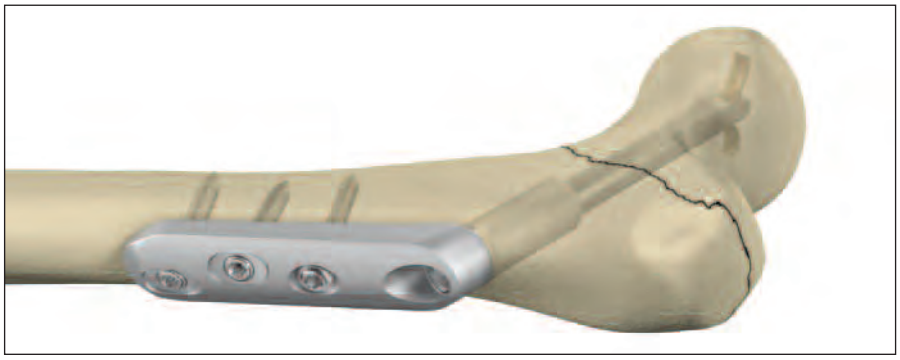


Fig. 52

Extraction of Locking Inserts

Should removal of a Locking Insert be required then the following procedure should be used:

Fig. 53

Fig. 54

Step 1: Thread the central portion (Fig. 53) of the Extractor into the Locking Insert until it is fully seated.

Step 2: Turn the outer collet (Fig. 54) clockwise until it pulls the Locking Insert out of the plate.

Step 3: Remove the Locking Insert from the Extractor by threading it back onto the Locking Inserts Rack.

Note: Discard the Locking Insert as it cannot be reused.

Fracture Compression

When all screws are inserted and tightened, and all traction is released, fracture compression can be accomplished by means of the Compression Screw (Fig. 55).

Caution should be used when applying compression.
The Compression Screw exerts a powerful force that must be correlated with the quality of the bone.

The compression is limited firstly by the length of the compression screw threads (10mm) and secondly by the length of the implant chosen. The implant must be shorter than the reamed channel by the number of mm of compression required.
See example on page 14.

If, following the compression, a surgeon sees on the X-Ray that further compression is necessary but impossible due to the length of the implant and compression screw, he must remove the implant and choose a shorter length implant.

Note: Any attempt to force compression can result in breakage of the compression screw.

The Compression Screw can also be used to protect the inner thread of the Twin Hook against soft tissue ingrowth, and it also prevents the Lag Screw from any medial migration.

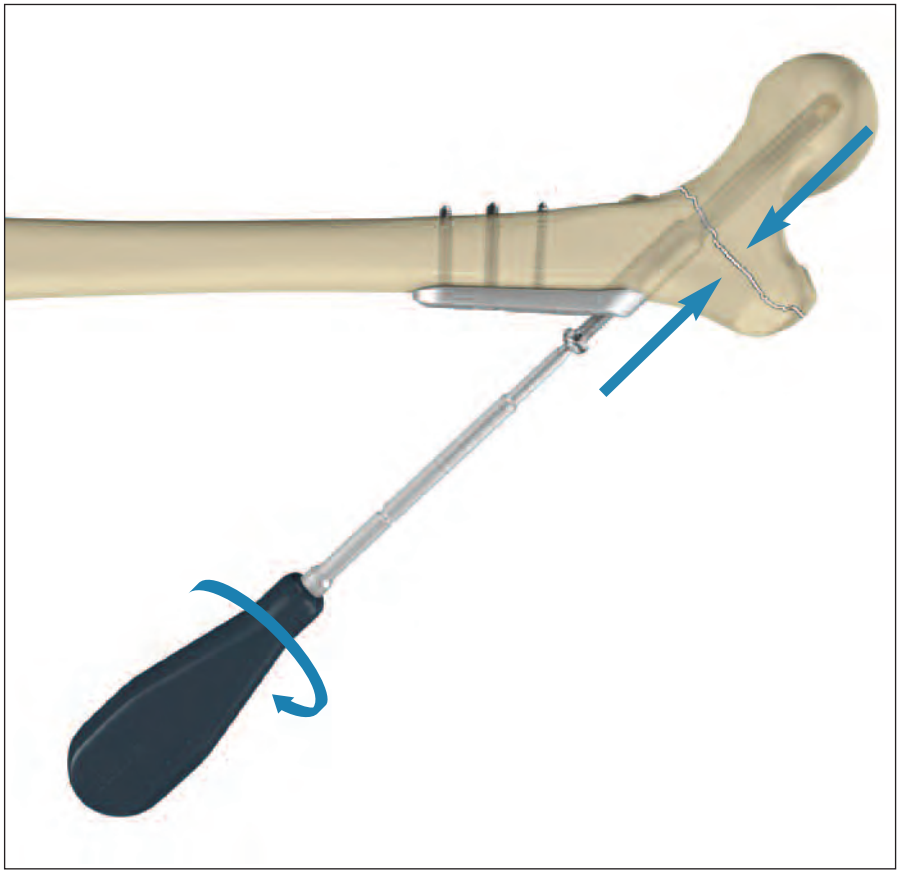


Fig. 55

Closing the Wound

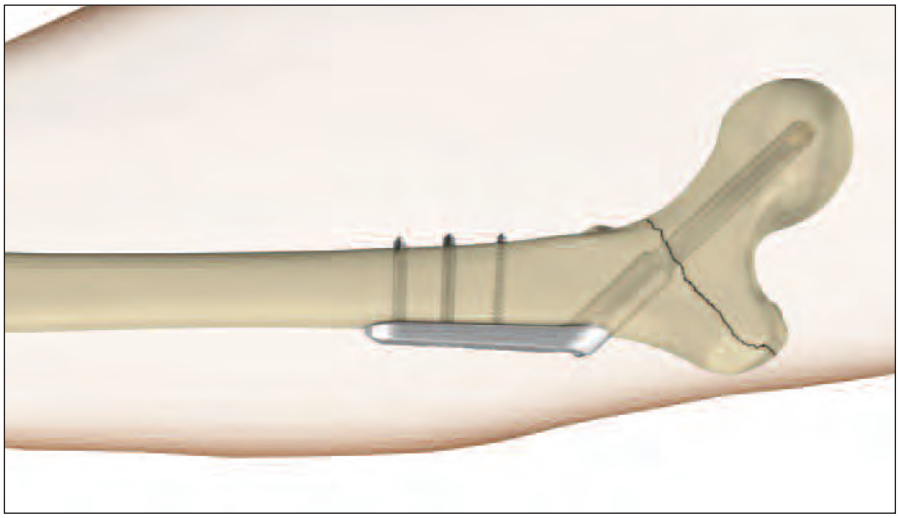


Fig. 56

It is important to ensure that the Twin Hook is placed within the centre of the femoral head in both the A-P and lateral planes.
This is checked by removing traction and rotating the hip under image intensification.

Closure of the wound is done in layers, closing separately the fascia of the vastus lateralis muscle and the fascia lata.

Carefully reapproximate the subcutaneous tissue and the skin (Fig. 56).

Twin Hook Removal

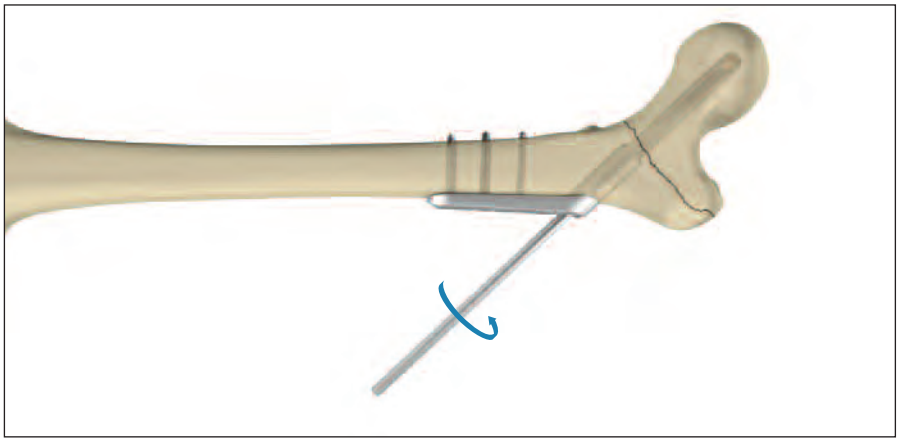


Fig. 57

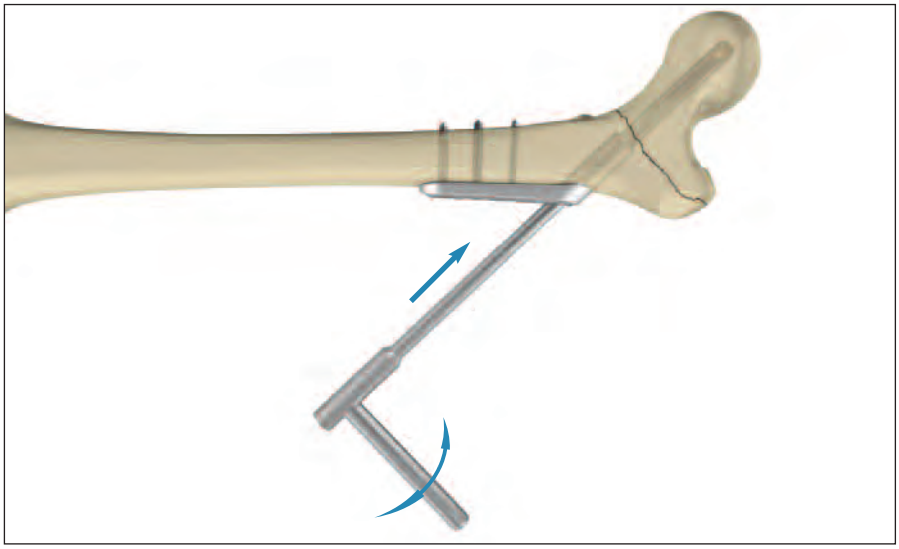


Fig. 58

Should the need arise for implant removal, a 1cm skin incision is made at the level of the lesser trochanter (corresponding to the plate barrel position).

If a Compression Screw has been used, remove the screw with the 3.5mm hex screwdriver.

The Inner Extractor (with the white-arrowed end) is screwed onto the inner pin of the Twin Hook, rotating clockwise until resistance is met.
It is crucial that the Inner Extractor be fully engaged (Fig. 57).
The Outer Extractor is slid over the Inner Extractor (Fig. 58).

Pushing gently, turn the handle of the Outer Extractor in either direction until it engages with the keyed Inner Extractor. At this point the Outer Extractor can no longer rotate and must be advanced until it is in contact with the outer pin of the Twin Hook (Fig. 58).

Twin Hook Removal, continued

Insert the tip of the Extractor Handle in the channel of the Outer Extractor and turn it clockwise to engage with the Inner Extractor (Fig. 59).
The handle of the Outer Extractor must remain in the same position at all times whilst turning the Extractor Handle.

Continue to turn the Extractor Handle. This withdraws the hooks back into the outer pin. Increasing resistance is felt, followed by decreasing resistance and then a sudden stop.

Check under image intensifier that the **hooks are fully retracted** prior to **pulling back the implant.**

If the image intensifier shows that the hooks are NOT fully retracted, remove the Extractor Handle and the Outer Extractor. Further engage the Inner Extractor with the inner pin and reassemble the Outer Extractor and the Extractor Handle.
Resume extraction whilst pulling back gently on the extraction assembly until the Twin Hook is easily removed through the Hip Plate barrel (Fig. 60).
Should the inner pin come out without the outer pin, this is of no consequence to the patient.
To remove the outer pin, reingage the inner and outer introducers and simply pull out the outer pin.

NOTE: Once the Twin Hook is removed the hooks **cannot be deployed again** for repositioning and must be **discarded.**

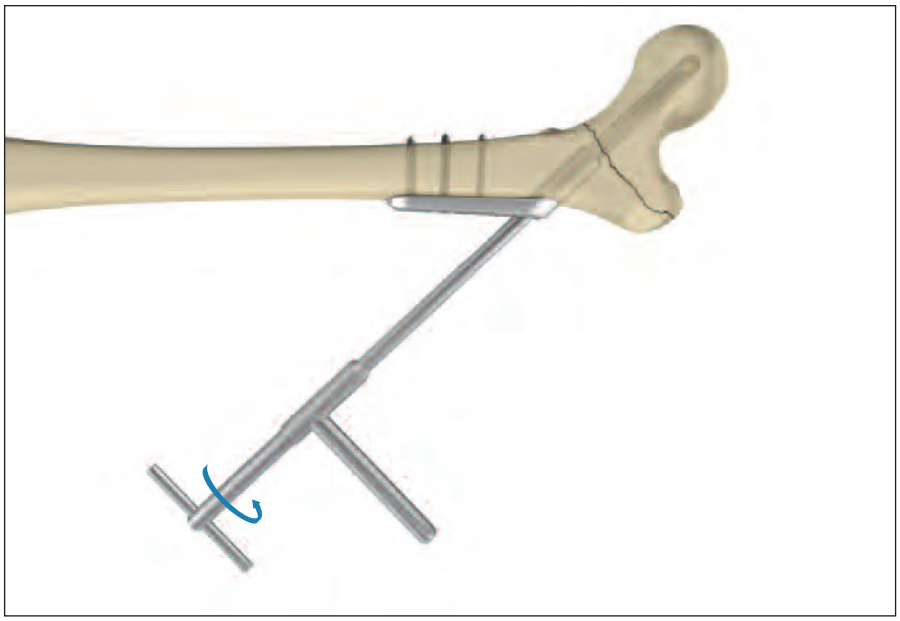


Fig. 59

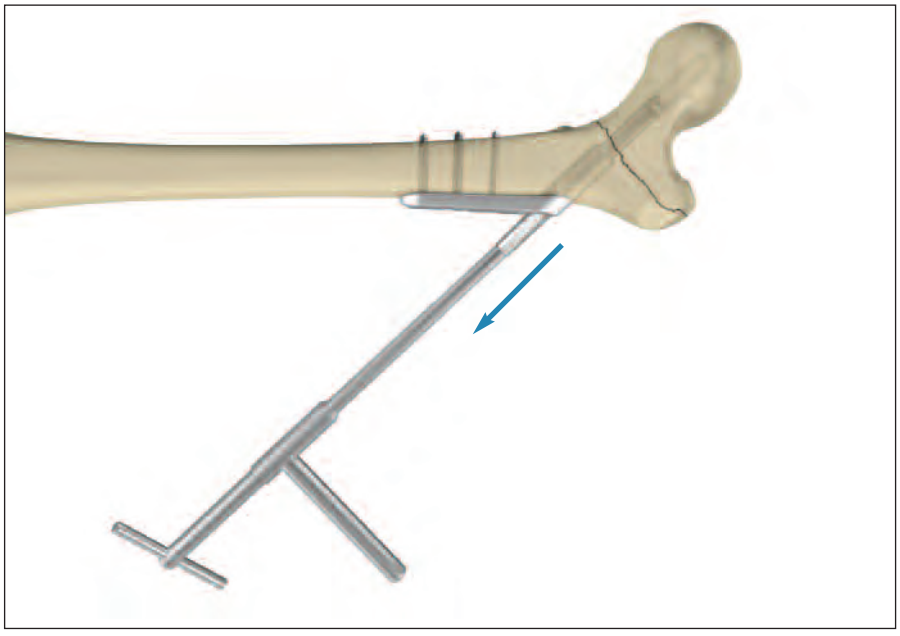


Fig. 60

Ordering Information

	REF	Description
	Basic Twin Hook Tray	
	902125	Omega3 Basic Twin-Hook Tray, empty
	902126	Omega3 Basic Twin-Hook Lid
	902112	Omega3 Basic Silicone Mat
	902116	Omega3 Cortical Screw Rack
	Large Metal Case *	
	902100	Omega3 Large Metal Case, empty
	902101	Omega3 Large Metal Case Lid
	Instruments **	
	700358	Drill Bit Ø 3.2mm x 145mm
	702822	Drill Guide Handle
	702840	Drill Sleeve Ø 3.2mm, Neutral
	702844	Screwdriver Hex 3.5mm
	702878	Depth Gauge Assembly
	704001	Plate Impactor Assembly
	704005	Combination Reamer Assembly, Standard (3 pieces)
	704013	Fixed Angle Guide 135°
	704020	Elastosil® T-Handle, Large AO Fitting
	704026	Cleaning Stylet, Ø 2.8mm

* The Large Metal Case (REF 902100) with Lid (REF 902101) allows to store two trays, e.g. a Basic Lag Screw Twin Hook Tray and an Optional Locking Tray or a Basic Lag Screw Twin Hook Tray and an Optional Instrument Tray.

** Instruments may be stored in the Basic Twin Hook Tray (REF 902125). It is available with Lid (REF 902126), a Cortical Screw Rack (REF 902116) if non-sterile Cortical Screws are used and a Silcone Mat (REF 902112) for the auxiliary bin.

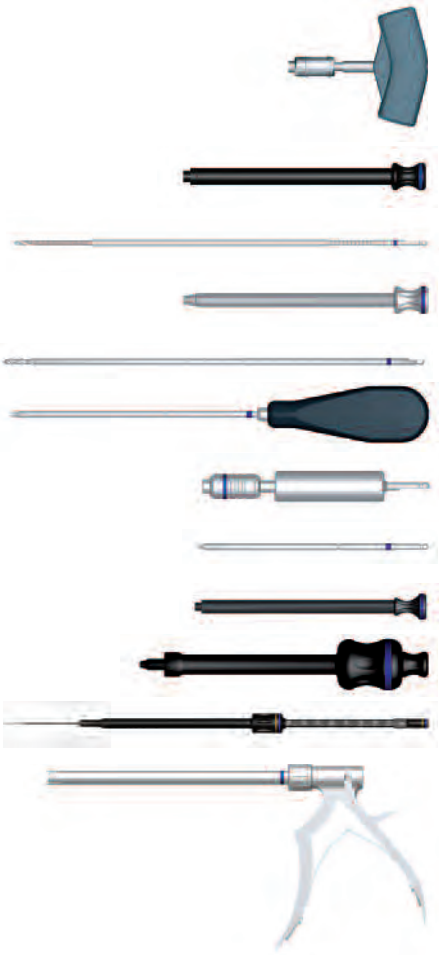
Ordering Information

	REF	Description
		Instruments **
	704601	Outer Introducer (for Twin Hook implantation)
	704602	Inner Introducer (for Twin Hook implantation)
	704606	Introducer (for Twin Hook implantation)
	704607	Extractor Handle (for Twin Hook extraction)
	704608	Outer Extractor (for Twin Hook extraction)
	704609	Inner Extractor (for Twin Hook extraction)
		Guide Wires
	704011S	Guide Wire Ø 2.8mm x 230mm, CoCr, Threaded Tip, Sterile
	704012S	Guide Wire, Quick Coupling, Ø 2.8mm x 230mm, CoCr, Threaded Tip, Sterile

** Instruments may be stored in the Basic Twin Hook Tray (REF 902125). It is available with Lid (REF 902126), a Cortical Screw Rack (REF 902116) if non-sterile Cortical Screws are used and a Silcone Mat (REF 902112) for the auxiliary bin.

Ordering Information

REF	Description
Optional Locking Tray	
902130	Omega3 Optional Locking Tray – Empty
902131	Omega3 Optional Locking Lid
902115	Omega3 Locking Screw Rack
Locking Instruments ***	
702430	Elstosil® T-Handle, Medium
702672	Drill Sleeve for Holding Pin, ø4.9mm, 5.0mm Locking Set
702674	Holding Pin, Ø4.3mm, 5.0mm Locking Set
702708	Drill Sleeve, 5.0mm Locking Set
702743	Calibrated Drill Bit, Ø4.3mm x 262mm, 5.0mm Locking Set, AO Fitting
702748	Screwdriver T20, 5.0mm Locking Set
702751	Universal Torque Limiter, 5.0mm Locking Set, AO Fitting
702754	Screwdriver T20, 5.0mm Locking Set, AO Fitting
702763	Locking Insert Inserter, 5.0mm Locking Set
702768	Locking Insert Extractor, 5.0mm Locking Set
702884	Direct Depth Gauge, 5.0mm Locking Set
702969	Locking Insert Forceps, 5.0mm Locking Set



*** Locking instruments may be stored in the Optional Locking Instrument Tray (REF 902130). It is available with Lid (REF 902131), a Screw Rack (REF 902115) if non-sterile Locking Screws are used and a Silcone Mat (REF 902112) for the auxiliary bin.

Ordering Information

	REF	Description
		Optional Instrument Tray
	902135	Omega3 Optional Instrument Tray, empty
	902136	Omega3 Optional Instrument Lid
	902113	Omega3 Optional Instrument Silicone Mat
		Optional Instruments ****
	700359	Drill Bit Ø4.5mm x 145mm
	702402	Tissue Protection Sleeve, Ø4.5mm / Ø6.5mm
	702634	Large AO to Hall Coupling
	702773	Tap Ø5.0mm x 140mm, 5.0mm Locking Set, AO Fitting
	702808	Tap Ø4.5mm x 145mm, AO Fitting
	702809	Tap Ø6.5mm x 145mm, AO Fitting
	702823	Drill Sleeve Ø3.2mm, Compression
	702853	Screwdriver Hex 3.5mm, AO Fitting
	702863	Holding Sleeve for Screwdrivers
	702918	Soft Tissue Spreader, 5.0mm Locking Set
	704002	One-Step Insertion Wrench
	704003	One-Step Insertion Sleeve
	704014	Variable Angle Guide, Modular
	704019	Guide Pin Replacement Instrument
	704025	Drill Sleeve Ø3.2mm, Supracondylar
	704205	95° Angle Guide for Supracondylar Plate
	704006-20	Barrel Reamer Assembly, Short
	704001-1	Plate Impactor Head
	900106	Screw Forceps

**** Optional instruments may be stored in the Optional Instrument Tray (REF 902135). It is available with Lid (REF 902136) and Silcone Mat (REF 902113).

Ordering Information – Implants

Omega3 KEYED Hip-Plate, Standard Barrel

Stainless Steel REF	Holes	Angle	Length mm
597002S	2	130˚	47
597003S	3	130˚	63
597004S	4	130˚	79
597005S	5	130˚	95
597006S	6	130˚	111
597008S	8	130˚	143
597010S	10	130˚	175
597012S	12	130˚	207
597022S	2	135˚	47
597023S	3	135˚	63
597024S	4	135˚	79
597025S	5	135˚	95
597026S	6	135˚	111
597028S	8	135˚	143
597030S	10	135˚	175
597032S	12	135˚	207
597042S	2	140˚	47
597043S	3	140˚	63
597044S	4	140˚	79
597045S	5	140˚	95
597046S	6	140˚	111
597048S	8	140˚	143
597050S	10	140˚	175
597052S	12	140˚	207
597062S	2	145˚	47
597063S	3	145˚	63
597064S	4	145˚	79
597065S	5	145˚	95
597066S	6	145˚	111
597068S	8	145˚	143
597070S	10	145˚	175
597072S	12	145˚	207
597082S	2	150˚	47
597083S	3	150˚	63
597084S	4	150˚	79
597085S	5	150˚	95
597086S	6	150˚	111
597088S	8	150˚	143
597090S	10	150˚	175
597092S	12	150˚	207

Omega3 KEYED Hip-Plate, Short Barrel

Stainless Steel REF	Holes	Angle	Length mm
597202S	2	130˚	47
597203S	3	130˚	63
597204S	4	130˚	79
597205S	5	130˚	95
597212S	2	135˚	47
597213S	3	135˚	63
597214S	4	135˚	79
597215S	5	135˚	95
597222S	2	140˚	47
597223S	3	140˚	63
597224S	4	140˚	79
597225S	5	140˚	95
597232S	2	145˚	47
597233S	3	145˚	63
597234S	4	145˚	79
597235S	5	145˚	95
597242S	2	150˚	47
597243S	3	150˚	63
597244S	4	150˚	79
597245S	5	150˚	95

Note: Implants available Sterile only

Special Order Items

Ordering Information – Implants

Omega3 KEYLESS Hip-Plate, Standard Barrel

Stainless Steel REF	Holes	Angle	Length mm
597102S	2	130˚	47
597103S	3	130˚	63
597104S	4	130˚	79
597105S	5	130˚	95
597106S	6	130˚	111
597108S	8	130˚	143
597110S	10	130˚	175
597112S	12	130˚	207
597122S	2	135˚	47
597123S	3	135˚	63
597124S	4	135˚	79
597125S	5	135˚	95
597126S	6	135˚	111
597128S	8	135˚	143
597130S	10	135˚	175
597132S	12	135˚	207
597142S	2	140˚	47
597143S	3	140˚	63
597144S	4	140˚	79
597145S	5	140˚	95
597146S	6	140˚	111
597148S	8	140˚	143
597150S	10	140˚	175
597152S	12	140˚	207
597162S	2	145˚	47
597163S	3	145˚	63
597164S	4	145˚	79
597165S	5	145˚	95
597166S	6	145˚	111
597168S	8	145˚	143
597170S	10	145˚	175
597172S	12	145˚	207
597182S	2	150˚	47
597183S	3	150˚	63
597184S	4	150˚	79
597185S	5	150˚	95
597186S	6	150˚	111
597188S	8	150˚	143
597190S	10	150˚	175
597192S	12	150˚	207

Omega3 KEYLESS Hip-Plate, Short Barrel

Stainless Steel REF	Holes	Angle	Length mm
597254S	4	130˚	79
597255S	5	130˚	95
597264S	4	135˚	79
597265S	5	135˚	95
597274S	4	140˚	79
597275S	5	140˚	95
597284S	4	145˚	79
597285S	5	145˚	95
597294S	4	150˚	79
597295S	5	150˚	95

Note: Implants available Sterile only

Special Order Items

Ordering Information – Implants

Twin Hook

Stainless Steel REF	Length mm
394550S	50
394555S	55
394560S	60
394565S	65
394570S	70
394575S	75
394580S	80
394585S	85
394590S	90
394595S	95
394600S	100
394605S	105
394610S	110
394615S	115
394620S	120
394625S	125
394630S	130
394635	135
394640	140

Note: The Twin Hook has a hook span of 31mm +1.5/-2.5mm
The Twin Hook comes sterile packed with non-deloyed hooks.

Twin Hook Compression Screw

Stainless Steel REF	Length mm
394500S	25

All Implants available Sterile only except Twin Hook, 135mm Length (REF 394635) and Twin Hook, 140mm Length (REF 394640)

Ordering Information – Implants

Cortical Screws ø4.5mm, Self Tapping, Hex 3.5mm

Stainless Steel REF	Length mm
340614	14
340616	16
340618	18
340620	20
340622	22
340624	24
340626	26
340628	28
340630	30
340632	32
340634	34
340636	36
340638	38
340640	40
340642	42
340644	44
340646	46
340648	48
340650	50
340652	52
340654	54
340655	55
340656	56
340658	58
340660	60
340662	62
340664	64
340665	65
340666	66
340668	68
340670	70
340672	72
340674	74
340675	75
340676	76
340678	78
340680	80
340685	85
340690	90
340695	95
340700	100
340705	105
340710	110

Screw lengths 30 – 60mm fit into
Cortical Screw Rack (REF 902116)

Locking Screws ø5.0mm, Self Tapping, T20 Drive

Stainless Steel REF	Length mm
370314	14
370316	16
370318	18
370320	20
370322	22
370324	24
370326	26
370328	28
370330	30
370332	32
370334	34
370336	36
370338	38
370340	40
370342	42
370344	44
370346	46
370348	48
370350	50
370355	55
370360	60
370365	65
370370	70
370375	75
370380	80
370385	85
370390	90
370395	95

Screw lengths 30 – 60mm fit into
Locking Screw Rack (REF 902115)

Locking Insert

Stainless Steel REF	Diameter mm
370003	14x8.5

5 Locking Inserts fit into
Locking Screw Rack (REF 902115)

Ordering Information – Screws

Cancellous Screws ø6.5mm – 16mm thread

Stainless Steel REF	Length mm
341030	30
341035	35
341040	40
341045	45
341050	50
341055	55
341060	60
341065	65
341070	70
341075	75
341080	80
341085	85
341090	90
341095	95
341100	100
341105	105
341110	110
341115	115
341120	120
341125	125
341130	130

Asnis III Cannulated Screws ø6.5mm, Thread Length 20mm

Stainless Steel REF	Length mm
326040S	40
326045S	45
326050S	50
326055S	55
326060S	60
326065S	65
326070S	70
326075S	75
326080S	80
326085S	85
326090S	90
326095S	95
326100S	100
326105S	105
326110S	110
326115S	115
326120S	120

Cancellous Screws ø6.5mm – 32mm thread

Stainless Steel REF	Length mm
342045	45
342050	50
342055	55
342060	60
342065	65
342070	70
342075	75
342080	80
342085	85
342090	90
342095	95
342100	100
342105	105
342110	110
342115	115
342120	120
342125	125
342130	130

Asnis III Cannulated Screws ø6.5mm, Thread Length 40mm

Stainless Steel REF	Length mm
326255S	55
326260S	60
326265S	65
326270S	70
326275S	75
326280S	80
326285S	85
326290S	90
326295S	95
326300S	100
326305S	105
326310S	110
326315S	115
326320S	120

Cancellous Screws ø6.5mm – Fully threaded

Stainless Steel REF	Length mm
343020	20
343025	25
343030	30
343035	35
343040	40
343045	45
343050	50
343055	55
343060	60
343065	65
343070	70
343075	75
343080	80
343085	85
343090	90
343095	95
343100	100
343105	105
343110	110
343115	115
343120	120
343125	125
343130	130

Asnis III Cannulated Screws ø6.5mm, Fully Threaded

Stainless Steel REF	Length mm
326430S	30
326435S	35
326440S	40
326445S	45
326450S	50
326455S	55
326460S	60
326465S	65
326470S	70
326475S	75
326480S	80
326485S	85
326490S	90
326495S	95
326500S	100
326505S	105
326510S	110
326515S	115
326520S	120
326525S	125
326530S	130

Note: For Sterile , add 'S' to REF of Cancellous Screws;
Asnis™ III Cannulated Screws are available Sterile only.

Notes

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Stryker Trauma AG
Bohnackerweg 1
CH-2545 Selzach
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www.osteosynthesis.stryker.com

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