Aesculap Orthopaedics

Targon® PF

Intramedullary Nail
for Proximal Femoral Fractures

B BRAUN
SHARING EXPERTISE

TARGON® PF

creates strong connections

In recent years, the use of cephalo-medullary nails has to a greater extent taken over from extra-medullary support systems using cervico-cephalic support screws in the treatment of unstable trochanteric fractures of the femur. The strong nail construction and the shorter lever arm in the intramedullary support system have made significant progress possible, especially in geriatric traumatology. This progress is characterised by earlier full load bearing, faster rehabilitation and shorter hospital stays.

In using these nails, some typical problem areas have established themselves:

- Formation of haematomas and varisation of the medial fragment
- Eccentric positioning of the guide wire in the nail hole
- Inaccurate drilling
- Support screw cut out
- Lateral protrusion of the support screw
- Nail tip fractures of the femoral shaft

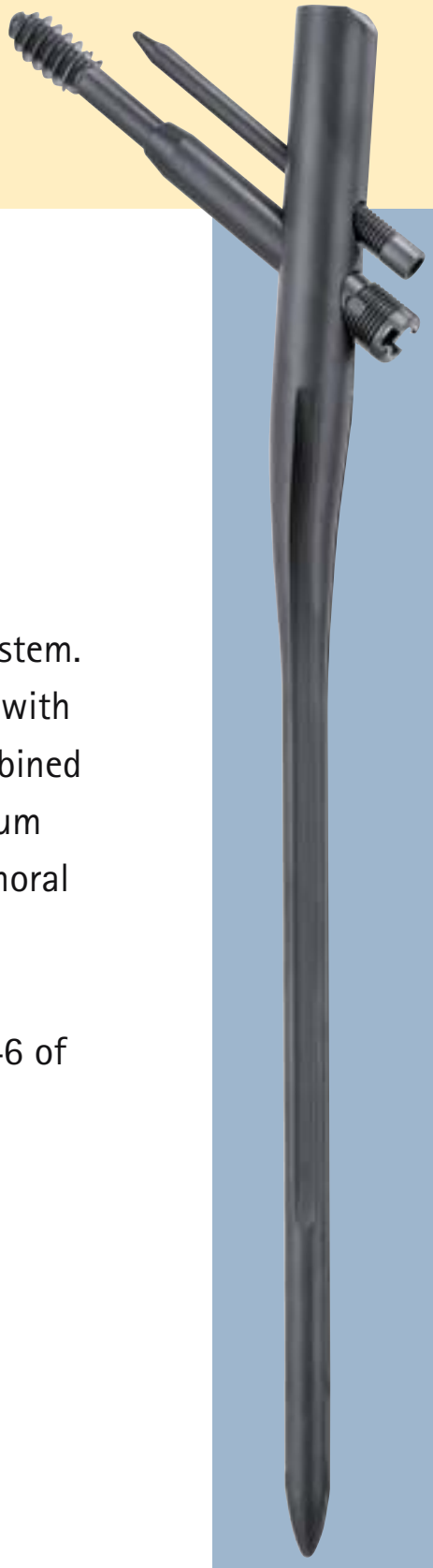
Many years of experience with other cephalo-medullary nails and analysing the causes of these problems have led to solutions which have been logically and consistently implemented in the Targon® PF System. Targon® PF provides the surgeon with a future orientated implant system for the treatment of all unstable pertrochanteric, intertrochanteric and subtrochanteric fractures.

Priv. Doz. Dr. H.-W. Stedtfeld
Centre for Trauma Surgery, Nuremberg

November, 2006

TARGON® PF

creates strong connections



New addition to the implant range

Dear Targon®-User,

there is now a new nail version in the Targon® PF system. The range has been extended to include a long nail with a 125° CCD angle for pertrochanteric fractures combined with fractures of the shaft. This nail permits optimum treatment of combination fractures with a varic femoral neck situation.

You can find full information on pages 40, 44 and 46 of this brochure.

B BRAUN
SHARING EXPERTISE

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- Hardened implant surface using a special anodisation process

  reduces osteointegration and implant wear

- Telescopic support system

  no lateral protrusion of the support screw, anti-rotation pin with short lever arm guarantees safe dynamisation

- Anatomical nail design with improved elasticity in the nail stem

  reduces the risk of intra- and postoperative nail tip fractures

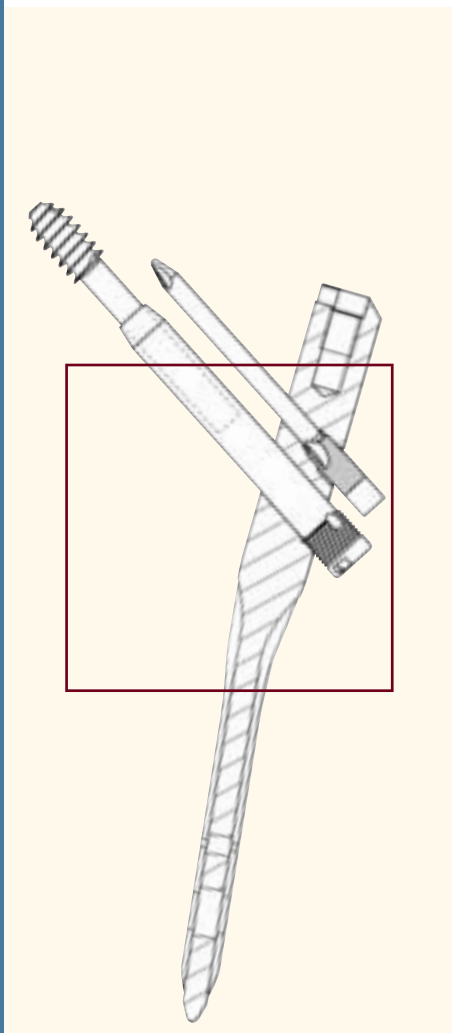
- Rotationally secure fracture stabilisation

  prevents support screw cut out

- Safe, minimally invasive operative technique

  precise approach, less fracture displacement and fewer drilling errors

System Advantages: Implants



Telescopic support system

Protrusion of the gliding screw into the peritrochanteric soft tissue is the result of impaction of the fracture zone. This can occur to a substantial degree during mobilisation, especially in osteoporotic bone. Lateral telescoping of the support system is essential, since a rigid implant would perforate the femoral head medially. Protrusion of the gliding screw in a lateral direction can, however, lead to considerable irritation and pain in the fascia lata area, and can severely disrupt rehabilitation, particularly for frail elderly patients.

This has been avoided by securing the support sleeve firmly in to the nail by means of a thread and by making sure that the support screw cannot slide out beyond the end of the supporting sleeve.

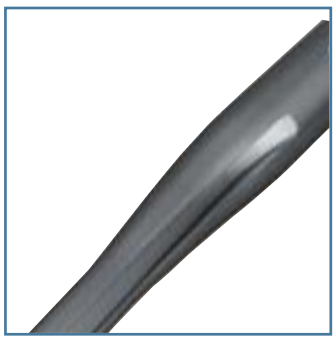
In this construction, the shortened lever arm of the support screw has a positive effect on the telescoping procedure. A short lever arm requires very little force to guarantee dynamisation.

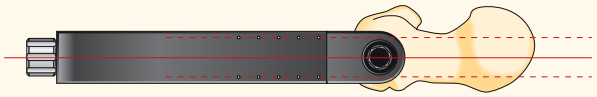
Anatomical nail design with improved elasticity in the nail stem

There is a risk of nail tip femoral shaft fracture when a rigid nail becomes jammed in the medullary cavity or where the change in elasticity between the nail-filled upper bone cavity and the empty lower bone cavity is too abrupt.

The complication of a nail tip fracture occurs either during the operation or post-operatively as the result of some minor trigger.

This situation is avoided by optimising the fit of the nail in the medullary cavity and giving the nail tip a titanium alloy and a double groove design to increase its elasticity.





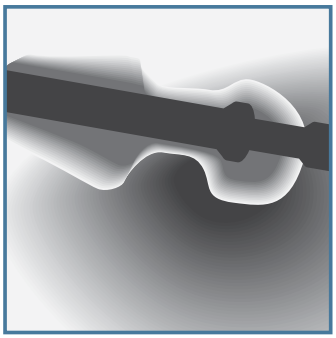
Rotationally secure fracture stabilisation

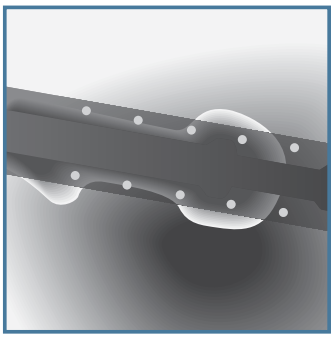
Perforation of the gliding screw through the femoral head (cut out) occurs more easily if the screw is eccentrically positioned in the femoral head. This creates a torque when load is placed on the femoral head, making the head rotate around the longitudinal axis of the gliding screw and causing cut out.

Two different methods are used to counteract this effect:

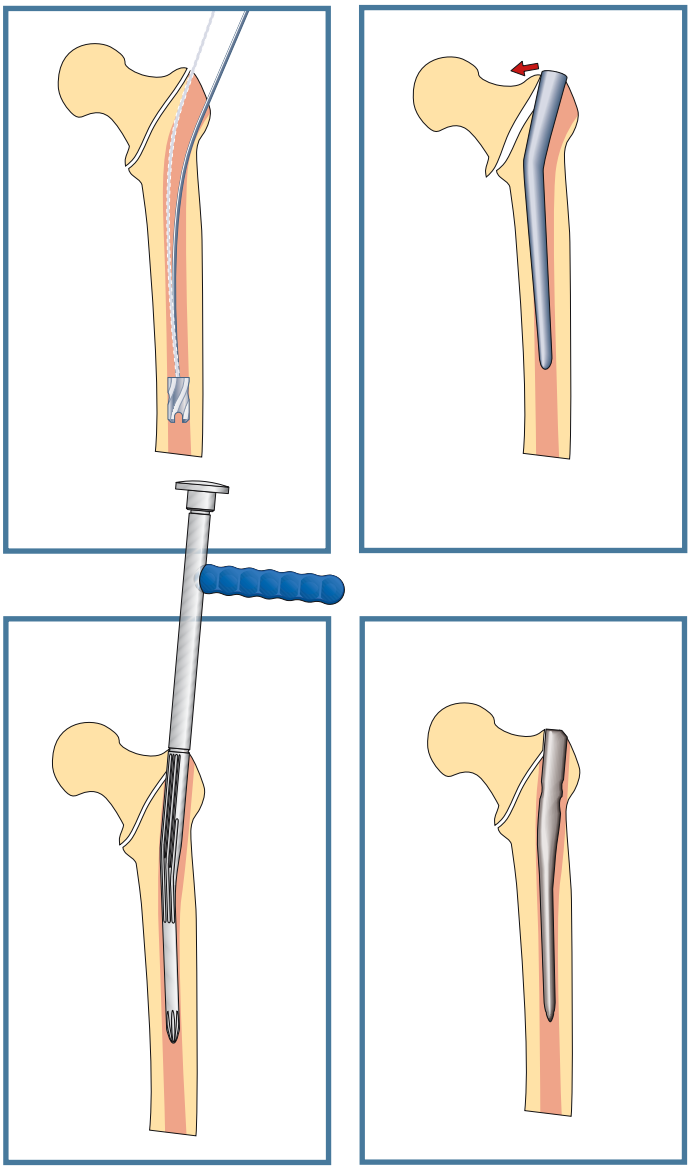
1) Biaxial fragment fixation: placing an anti-rotation pin in the neck of the femur effectively blocks the torque in the femoral head.

2) The x-ray transparent targeting device with integrated orientation beads supports central positioning of the support screw.





System Advantages: Instruments



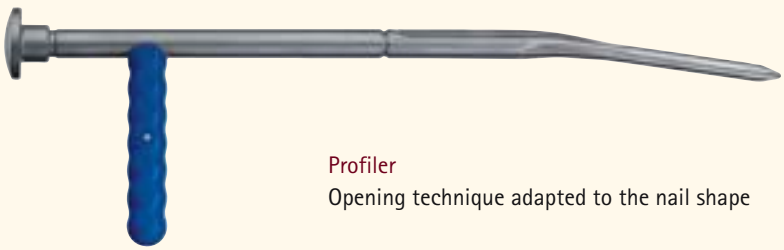
Formation of haematomas and varisation of the medial fragment

The formation of haematomas is promoted through the use of large diameter flexible reamers which tend to remove too much of the lateral cortex, resulting in a mismatch between the space required by the intramedullary nail and the area hollowed out, which is too far in a lateral direction.

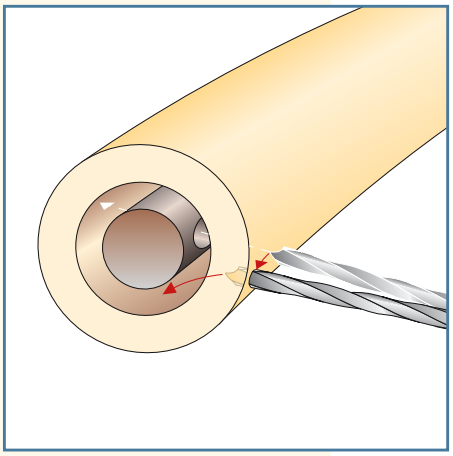
Gaps left unfilled on the lateral cortex lead to increased formation of haematomas.

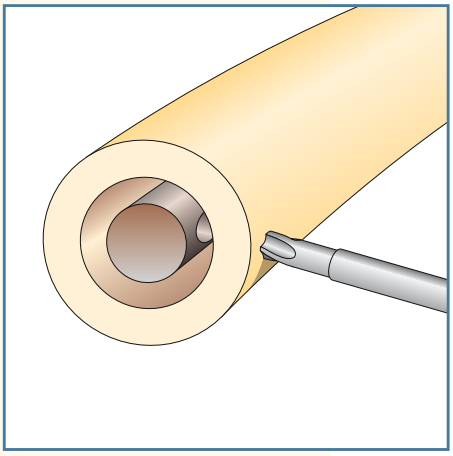
The unreamed medial fragment is forced into a varus position by the nail, which is exerting pressure in a medial direction.

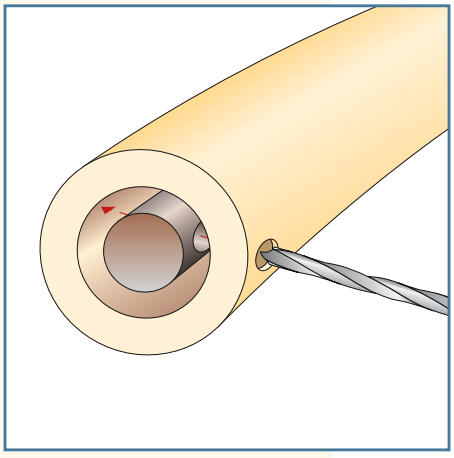
The profiler creates an intraosseous implant bed which exactly matches the shape of the nail and which includes the medial fragment. Thus the nail fills the space created for it, with no gaps and with the medial fragment remaining in its repositioned location.



Profiler
Opening technique adapted to the nail shape





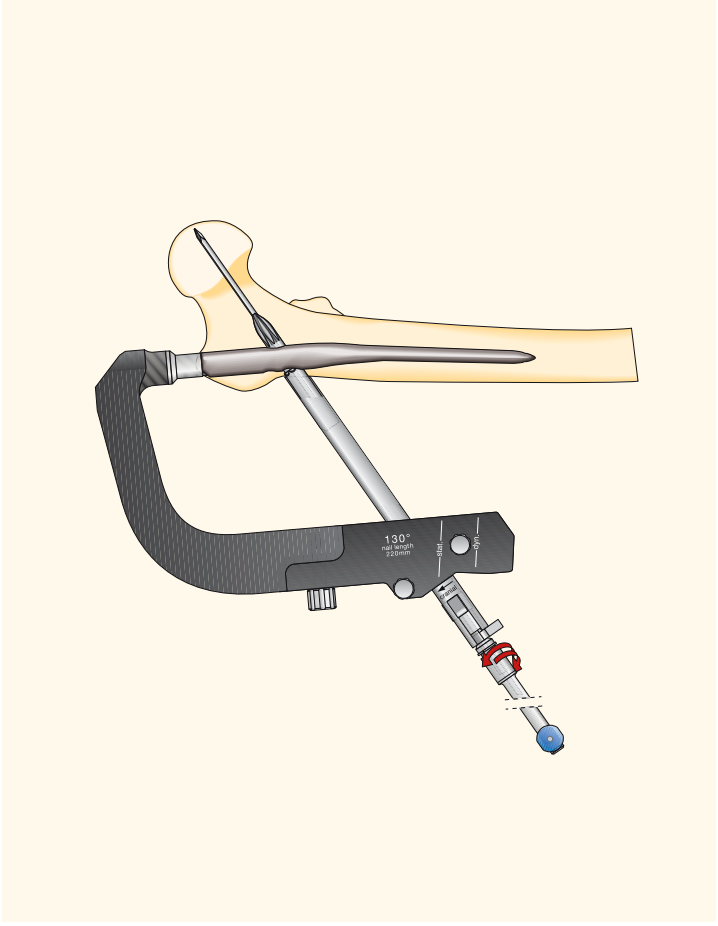


Safe, minimally invasive operating technique

Despite using the direct targeting device, inaccurate drilling at the distal nail end can occur when the drill meets the curved hard surface of the femoral shaft.

The drill tip can be prevented from slipping away from the desired direction by first milling the curved surface of the cortex flat with a facing cutter. This guarantees that the drill remains safely on target through the nail hole.

System Advantages: Instruments

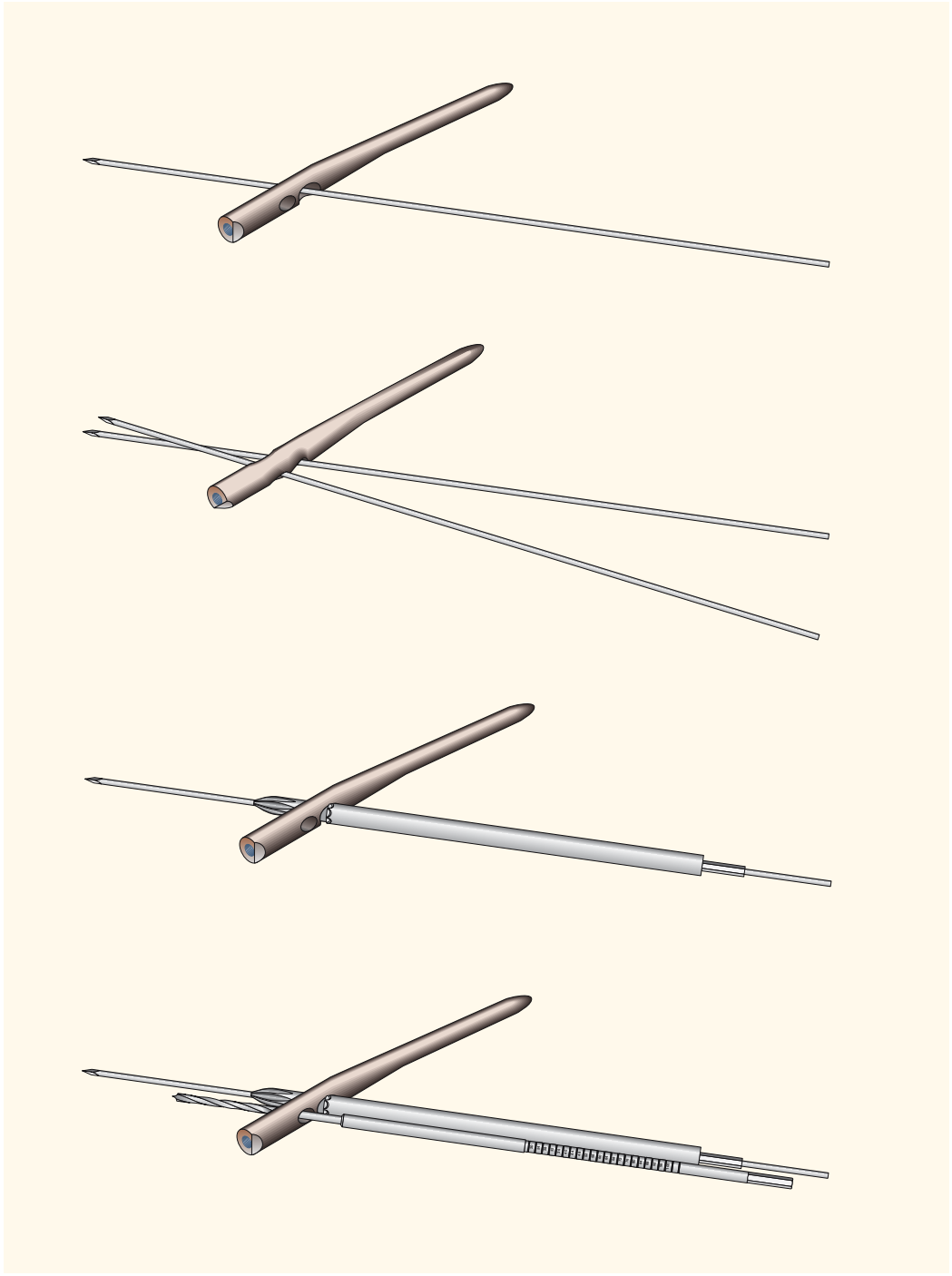


Safe, minimally invasive operating technique

The centering awl, introduced over the guide wire, guarantees that the support elements are parallel to each other, stabilising the entire system against rotation.

This ensures parallel conditions in both planes during the preparation process and after implantation.

Centering awl
guarantees support elements



TARGON® PF

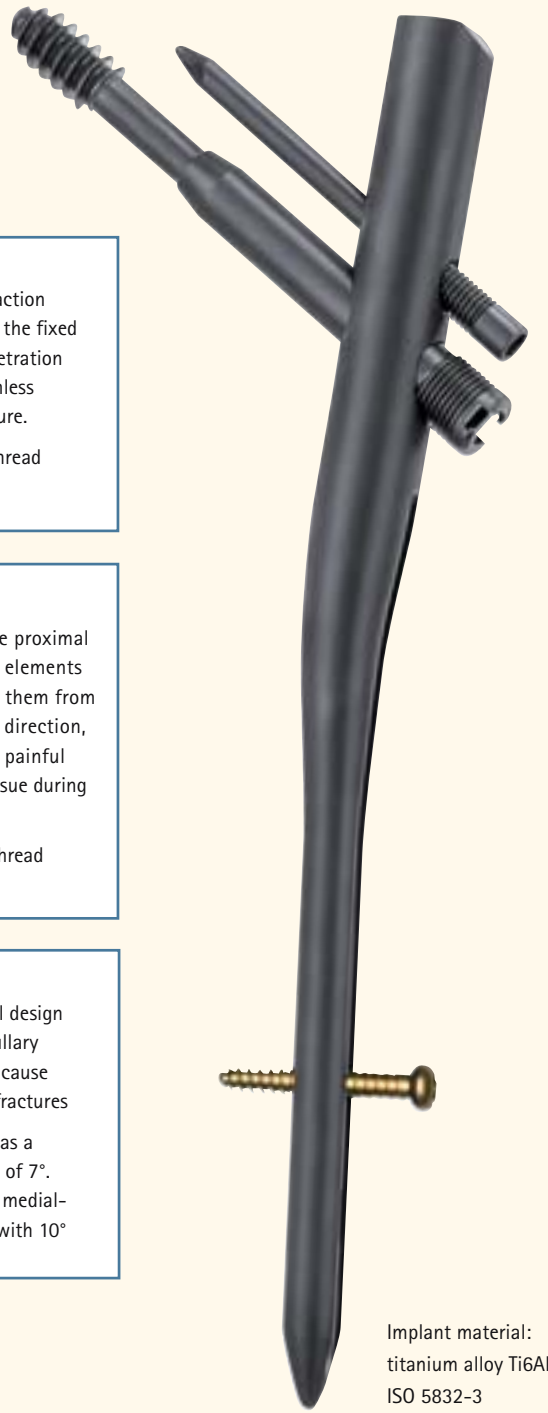
The Implant

Proximal diameter

- Minimal additional trauma owing to the slim 16.5 mm diameter

Tapered nail end

- Reduces soft tissue irritation



Support screw

- Limited telescopic action of support screw in the fixed support sleeve. Penetration reserve allows harmless subsidence of fracture.
- Self back-cutting thread

Anti-rotation pin

- Double fixation of the head/neck fragment in unstable fractures ensures high rotational stability
- Optional single locking for stable fractures guarantees secure fixation
- Self back-cutting thread

Support sleeve

- Firm fixation of the proximal head/neck support elements in the nail prevent them from gliding in a lateral direction, which could cause painful irritation to soft tissue during rehabilitation.
- Self back-cutting thread

Surface

- Hardened by anodisation
  - Reduces friction particles in micro-movements between bone and implant
  - Simple explantation (no osteointegration)

Nail design

- The anatomical nail design prevents intramedullary stresses which can cause secondary nail tip fractures

  The standard nail has a mediallateral curve of 7°. The long nail has a medial-lateral curve of 4° with 10° antetorsion.

Locking screw

- 4.5 mm locking screws made from high fatigue resistant titanium alloy
- Computer optimised thread design for excellent stability under load

Implant material:
titanium alloy Ti6Al4V
ISO 5832-3

Firm fixation

- of support system and anti-rotation pin in nail.

Longitudinal grooves

- accelerate regeneration of endosteal blood supply
- reduce pressure when implanting the long PF nail
- achieve higher elasticity and more favourable force transmission, reducing the risk of bone fracture

Distal locking holes

- ocated outside the maximum stress area in the bone to reduce the risk of spontaneous femoral shaft fractures
- tatic or axial dynamic fixation.

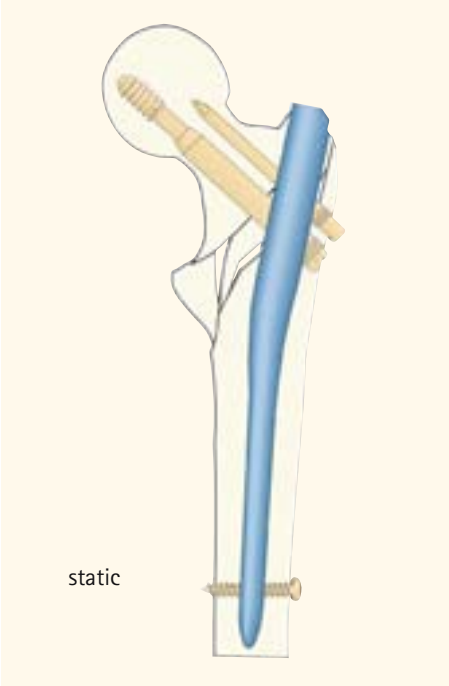
Targon® PF long

For the fixation of long subtrochanteric fractures or metadiaphyseal combination fractures

Targon® PF standard

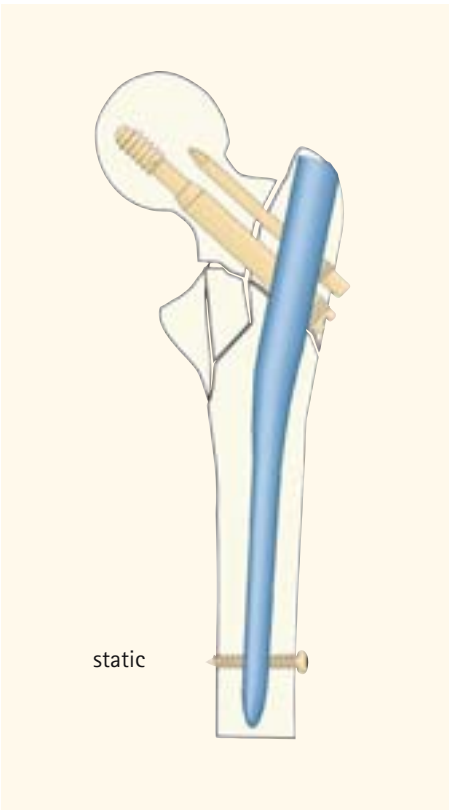
For the fixation of pertro-chanteric, intratrochanteric and subtrochanteric fractures.

Indications



1. Unstable pertrochanteric fractures with and without detatchment of the lesser trochanter (AO Classification 31-A2)

For these fractures it is almost always possible to achieve complete reposition under extension. Using the hollow reamer and the profiler conserves the lateral wall of the major trochanter. The nail fits effortlessly into its final position, i.e. a hammer should never be used. The support screw and support sleeve, together with the anti-rotation pin, protect the medial fragment against rotational and bending forces. Axial compression forces are controlled and absorbed. Despite the telescoping effect on the fracture zone, the peritrochanteric soft tissue remains protected from protruding implant ends, and rehabilitation is not disturbed by soft tissue irritation. Distal locking ensures rotational stability in the shaft axis and is static.



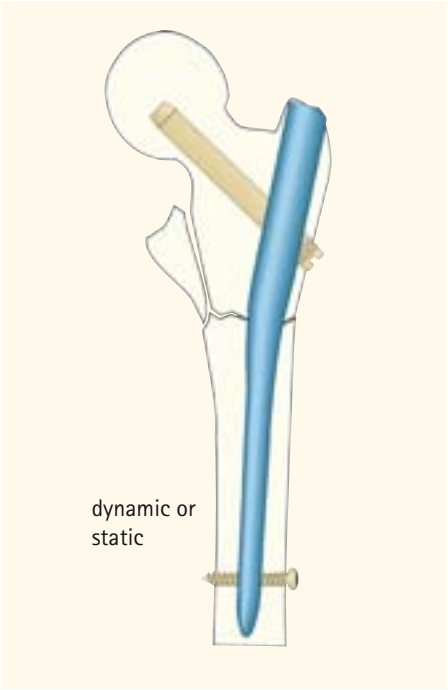
2. Intertrochanteric fractures with and without detatchment of the lesser trochanter (AO Classification 31-A3)

For these fractures it is not always possible to achieve complete reposition under extension. The femoral medullary cavity is accessed with the hollow reamer and the profiler and the nail site is prepared in the trochanter region. The nail is subsequently inserted and cervico-cephalic locking is performed with the support screw and sleeve (below) and the anti-rotation pin (above). Tension on the leg is relaxed slightly until the shaft fragment and the two main proximal fragments come into contact. Static distal locking is subsequently performed.

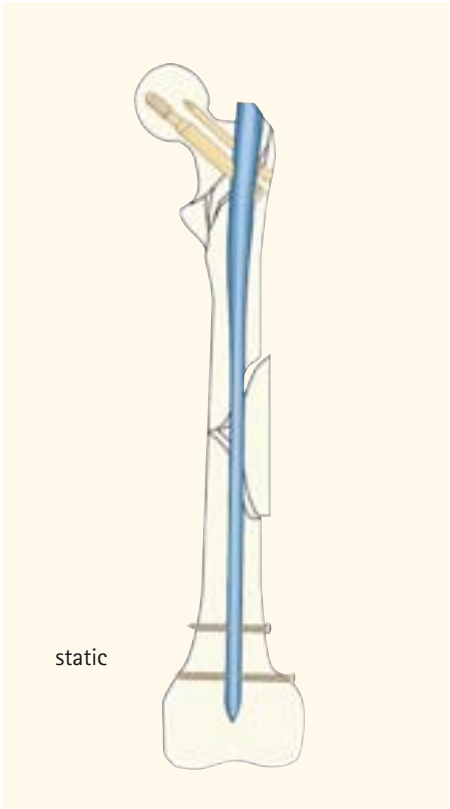
Seinsheimer Classification

3. Subtrochanteric fractures with and without detatchment of the lesser trochanter (Seinsheimer's classification)

These fractures are classified according to Seinsheimer's classification. Correcting the dislocation typical for this type of fracture (proximal main fragment in flexion, abduction and external rotation) is more successful using the normal operating table. The correct nail entry site can only be determined with the guide pin and opened with the hollow reamer following successful repositioning. The nail site is prepared with the profiler. Where a fracture component moving in a cranial direction (Type V) can be definitely ruled out, all that is required for cervico-cephalic locking is a long support sleeve. If not, complete double locking is necessary. Stable fractures with good fragment support (Types IIA, IIIA and B) are treated with dynamic distal locking. The unstable types (particularly Types IIC, IV and V) are treated with static distal locking where there is verified fragment contact.



dynamic or static



static

4. Pertrochanteric fractures combined with shaft fracture

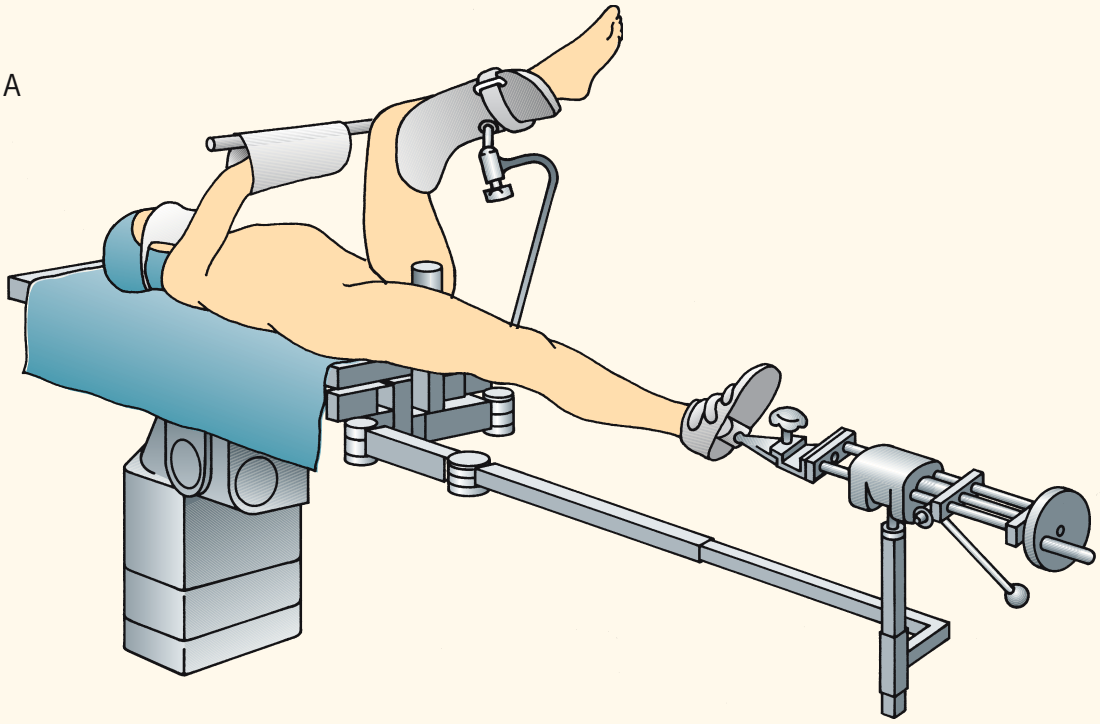
These can be either extensive pertrochanteric to subtrochanteric fractures or fractures on two or more separate levels, one of which is located in the trochanter region and the other along the femoral shaft. For these fractures, treatment is only possible with the long nail version. The entry point for the nail is at the tip of the trochanter, because of the long nail's less pronounced medial-lateral curve. As these are very rotationally unstable fractures (femoral neck axis and shaft axis!), complete proximal and static distal locking is essential.

Pathological fractures in advanced stage metastatic tumours can as a rule only be treated palliatively. Thanks to its high fatigue resistance, the long, undrilled 10 mm Targon® PF nail offers rapid and sustained full load bearing for the rest of the patient's life.

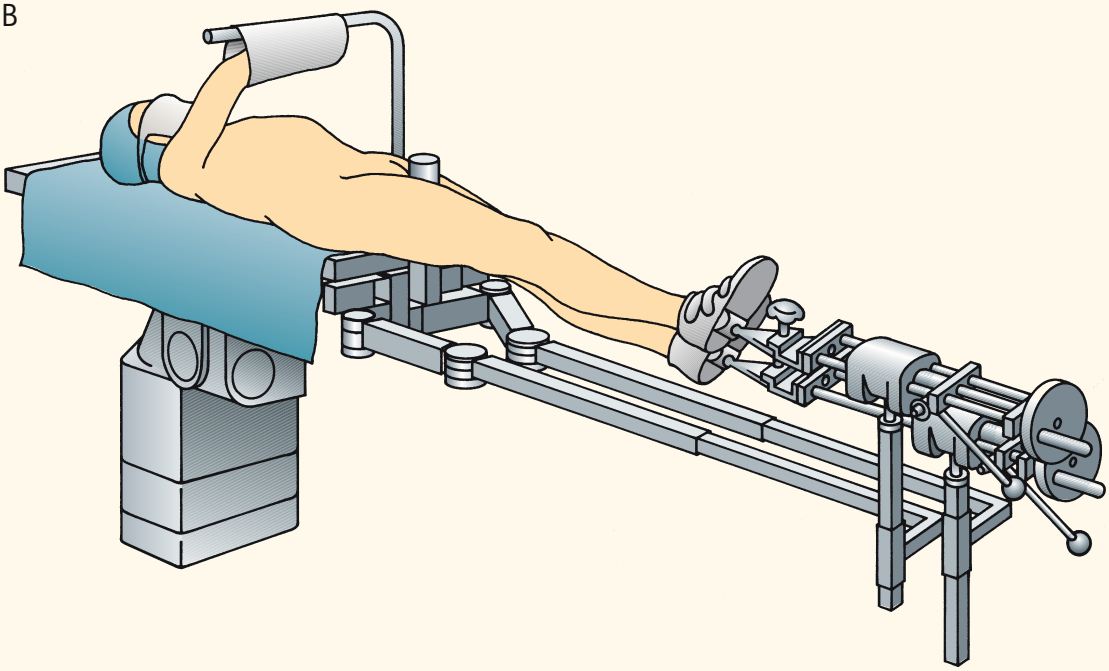
Operating Manual

Patient Positioning

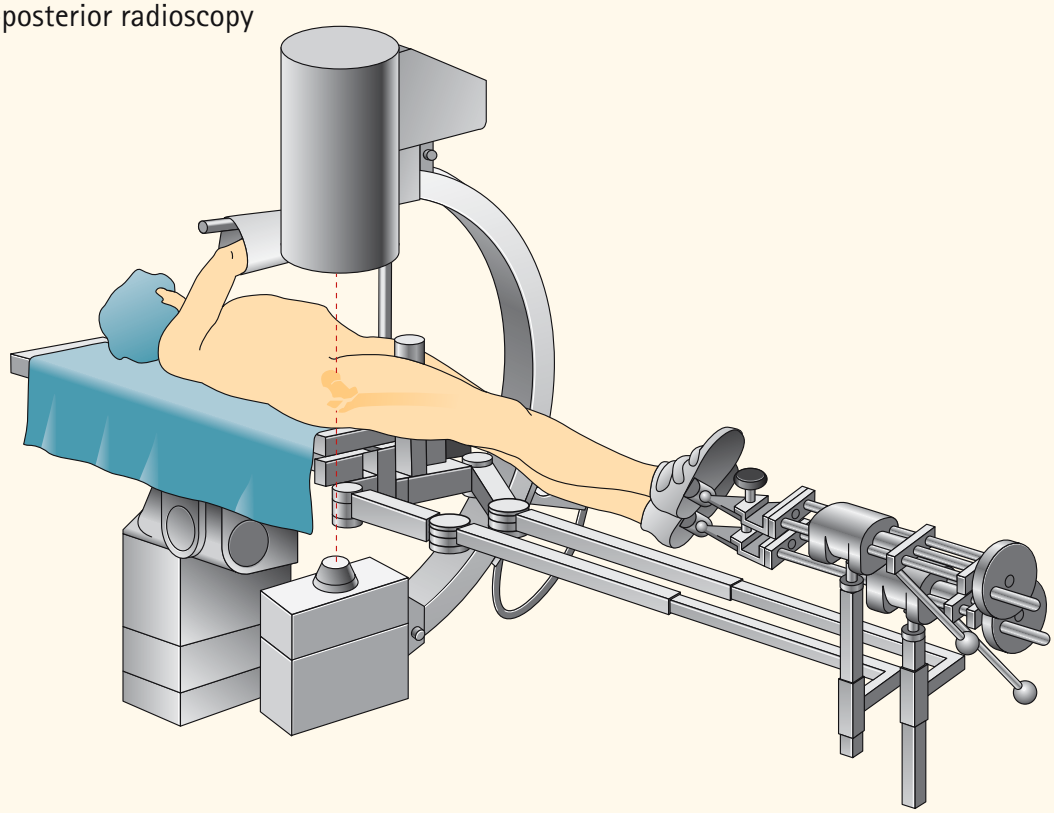
Option A



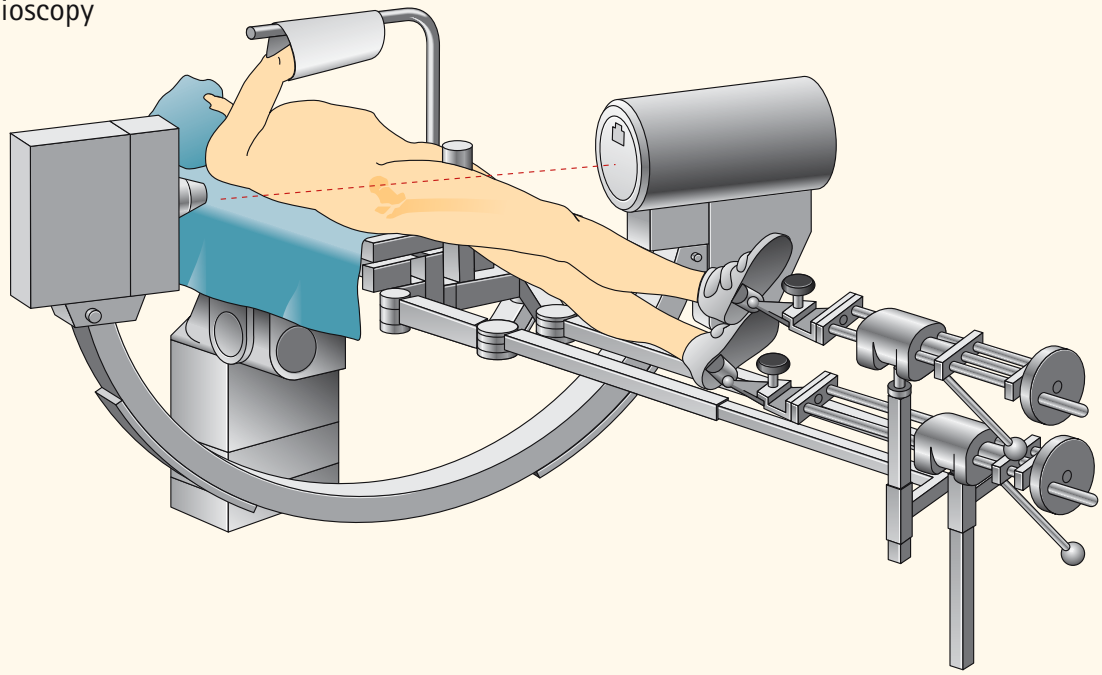
Option B



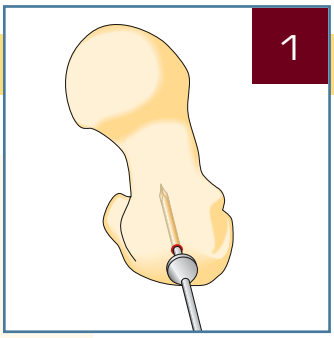
Anterior-posterior radioscopy

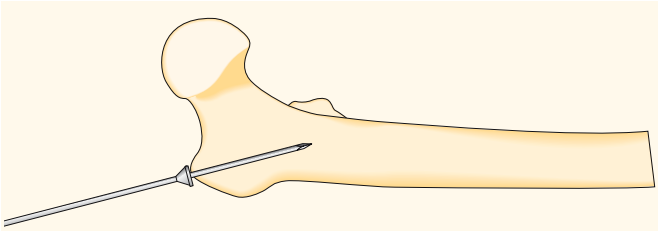


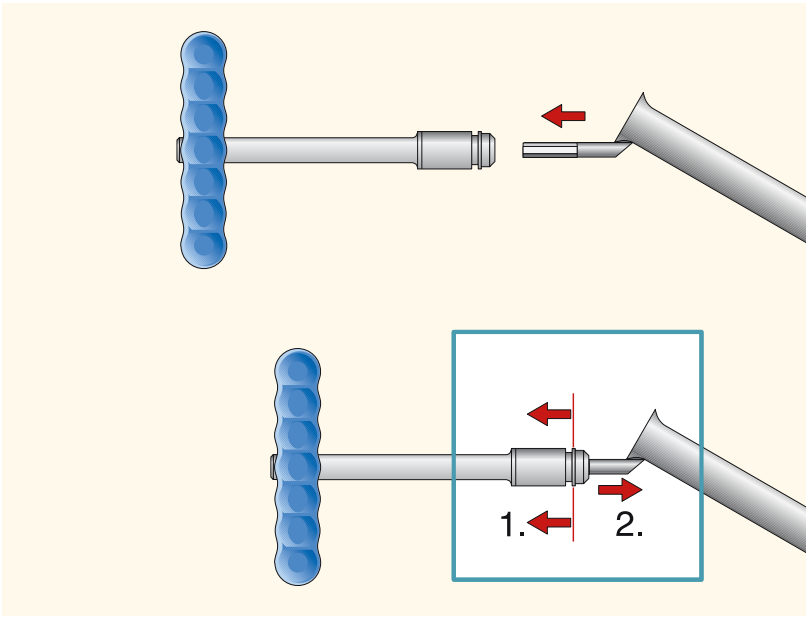
Axial radioscopy

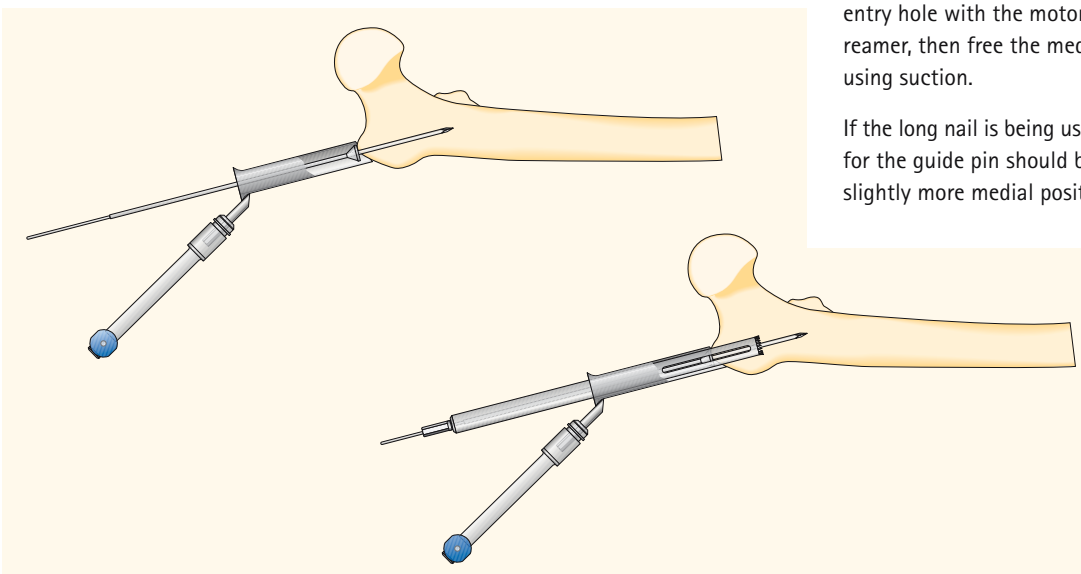


Operating Manual









Preparing The Support System

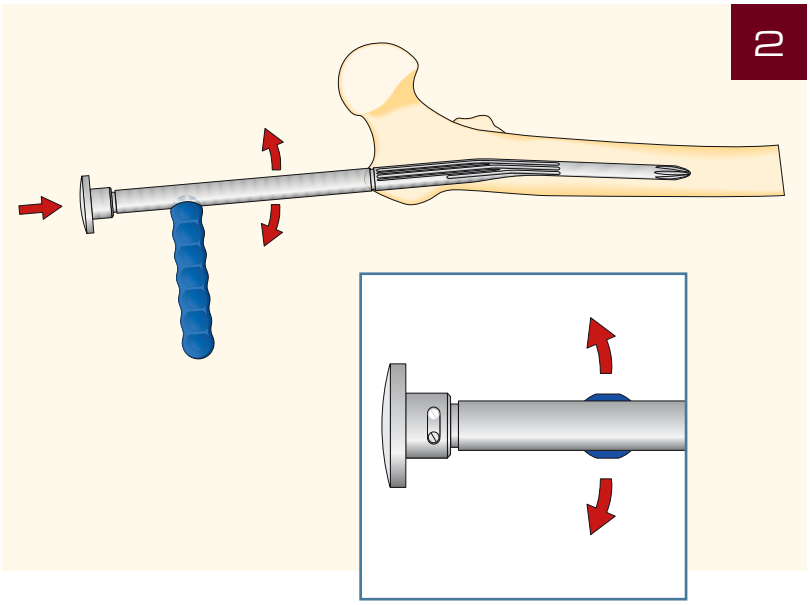
Approach

- Guide pin KH420R
- Universal handle KH319R
- Tissue protection funnel KH316R
- Rapid action T-handle KH428R
- Hollow reamer Ø 15 mm KH422R

Perform skin incision and tissue separation of subcutaneous tissue, fascia lata, insertion of the gluteus medius muscle proximal from the major trochanter. Introduce the guide pin into the major trochanter with the universal handle. Check with image intensifer.

Slide the tissue protection funnel over the guide pin until it reaches the bone. Open the entry hole with the motor-powered hollow reamer, then free the medullary cavity of fat using suction.

If the long nail is being used, the entry point for the guide pin should be chosen in a slightly more medial position.



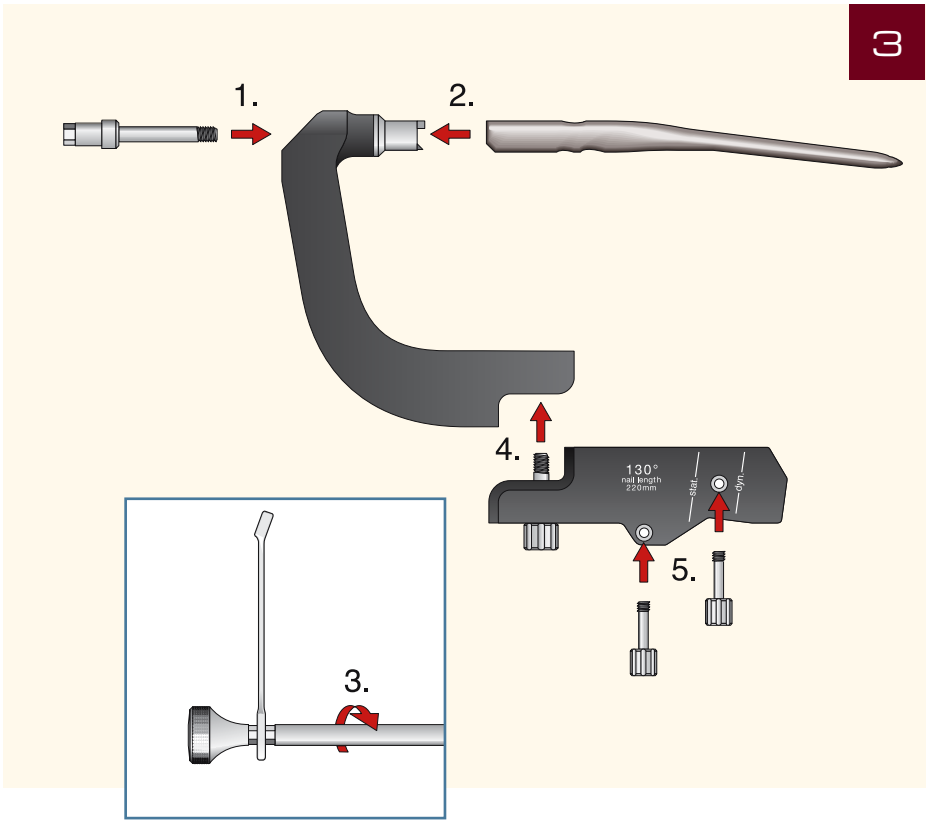
2 Preparing the nail bed

- Profiler KH352R for PF nail Ø 10 x 220 mm
- Profiler KH371R for PF nail long version
- Profiler KH353R for PF nail Ø 10 x 180 mm

If necessary: flexible medullary canal reamers with drilling guide pins.

Introduce the profiler by moving the handle up and down while exerting slight axial pressure in a distal direction (never use a hammer!) until the indicator notch has reached the tip of the trochanter. Check with image intensifer. For nails with a diameter of more than 10 mm, or for very narrow medullary cavities, the implant bed might need to be opened with a flexible intramedullary reamer in the isthmus region.

If the bone contour is displaced on insertion of the profiler in the Adams' arch, the procedure must be repeated with more pressure in a medial direction in order to create a swale in the medial fragment to receive the nail.

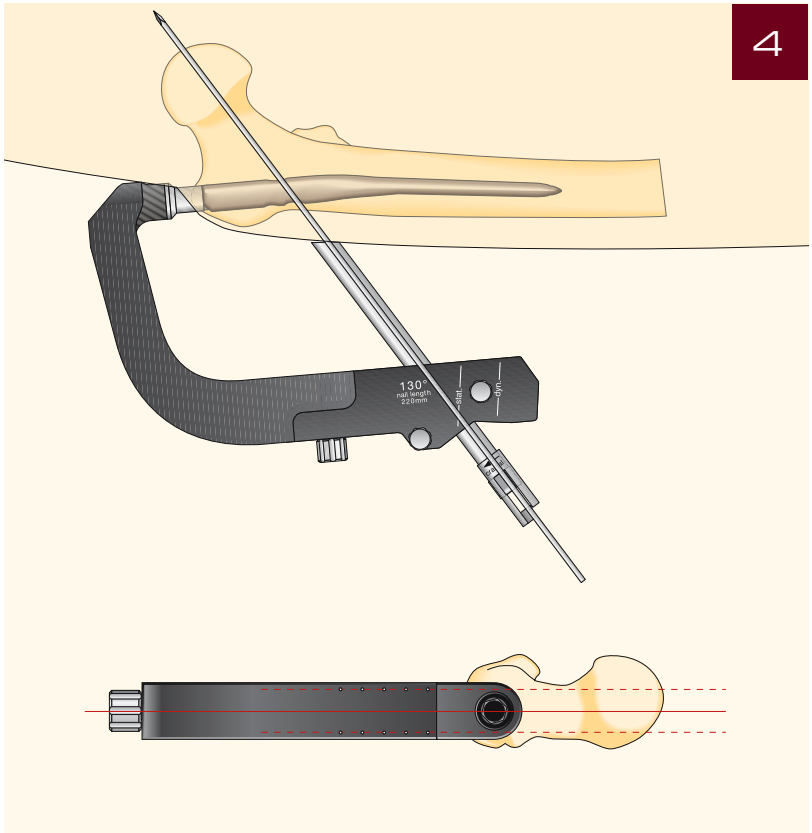


3 Assembling the nail with the targeting device

- Targeting device KH357R
- Targeting device attachments
  KH360P (220 mm/125°)
  KH361P (220 mm/130°)
  KH362P (220 mm/135°)
  KH390P (180 mm/130°)
  KH391P (180 mm/135°)
  KH369P (long/130°)
  KH433P (long/125°)
- Nail adapter screw KH443R
- Amboss-Schlüssel
  Anvil key KH321R (SW 10 mm)
- Flat spanner KH324C

Assemble the targeting device with the appropriate attachments according to the implant selected. Insert the nail adapter screw into the targeting device and screw onto the nail using the anvil key and flat spanner. When using the long nail, make sure you fit the correct right or left version.

Operating Manual



Insertion of nail

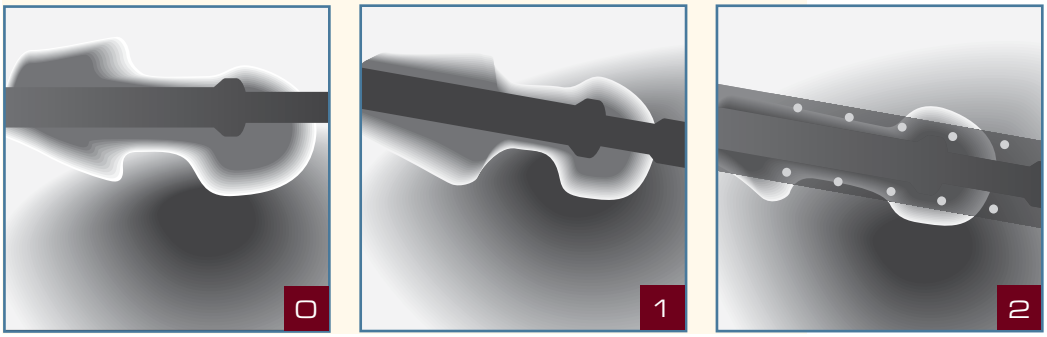
Implant the nail by hand.

If the nail has to be driven in, it is absolutely essential only to hit the anvil key, never the targeting device. Bring the nail into correct alignment.

Orientation for nail depth:

Place the guide wire in alignment with the tissue protection sleeve over the soft tissue (drapes). The C-bow check should show the guide wire not running centrally through the femoral head, but closer to the Adams` arch.

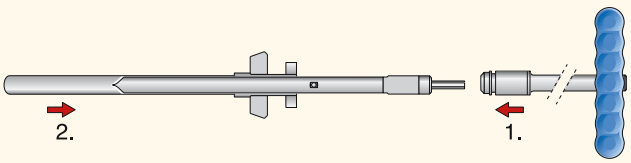
Axial orientation



1. Adjusting the c-arm in the axial x-ray position to the shared plane of the femoral head and the shadow of the targeting device's metal core.

2. Turning the targeting device until its shadow lies in the same plane as the femoral neck and head. The orientation markers should be evenly aligned along the neck of the femur.

In the subsequent course of the operation it may prove necessary to exert pressure on the nail in a distal direction (to compensate for the procedures which have a slight cranial orientation). This can be performed by an assistant exerting pressure on the anvil key.



5

Fine positioning of the nail

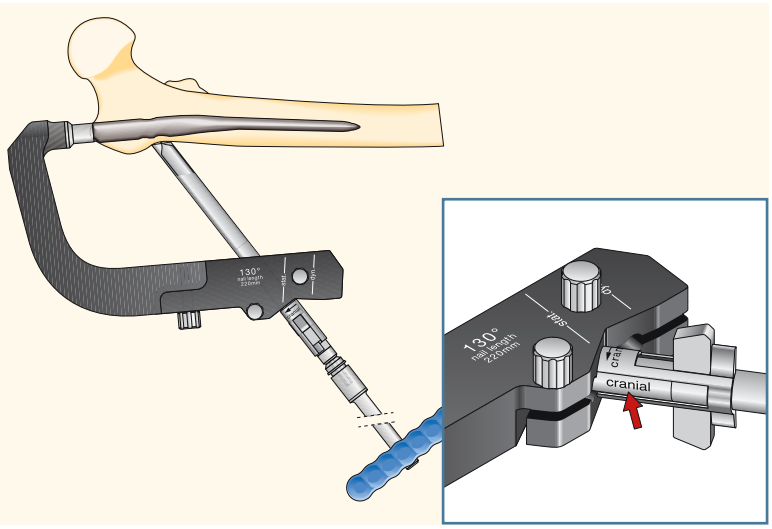
- Clamping screws KH359T
- Large tissue protection sleeve KH430R
- Large obturator KH423R
- Rapid action T-handle KH428R

Push the tissue protection sleeve with the obturator through the short skin and fascia incision right up against the bone.

Pay attention to the "cranial" marking on the tissue protection sleeve. Screw the clamping screws into the targeting device, remove the obturator.

Establish the correct nail depth with the help of the image intensifer. If the nail cannot be inserted deeply enough, remove the implant, insert the profiler and push it further in a distal direction.

After the correct depth has been achieved the targeting device is turned into the correct rotational position.



6

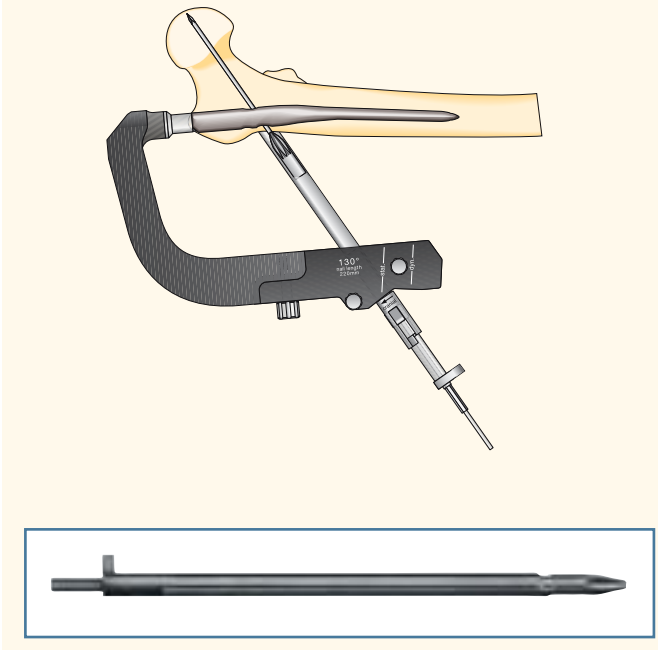
Opening the cortex on the approach side/setting the guide wire

- Centering awl KH426R
- Guide wire KH365R

Manually insert the centering awl through tissue protection sleeve KH430R. Use the centering awl only as a drilling sleeve for the guide wire. Do not grind the bone. Take care that no soft tissue parts press against the drilling sleeve and may change its position

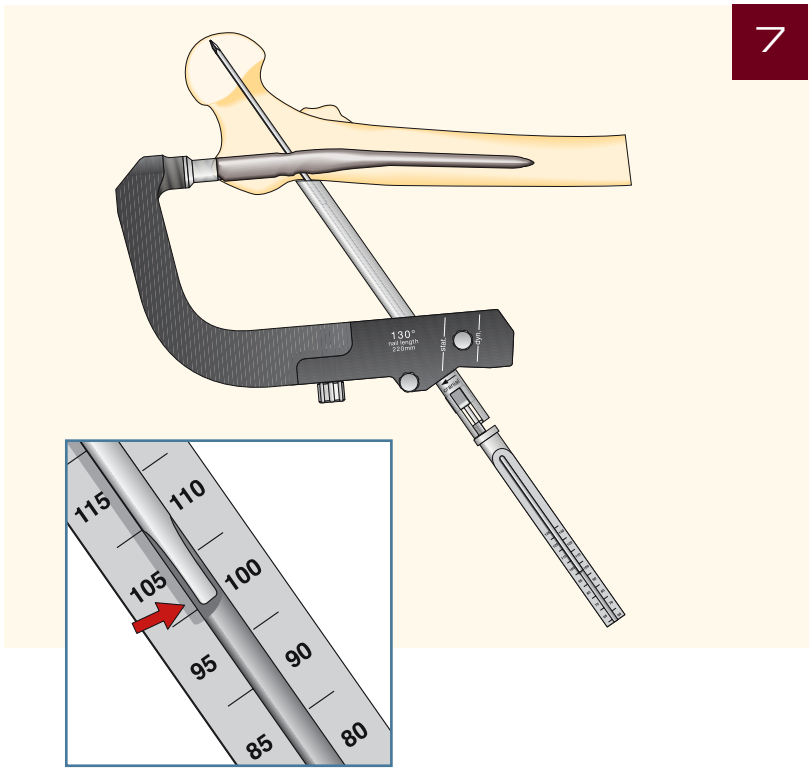
Apply the guide wire, which is running at high speed, on the bone and drive it through the centering awl down to the cortical bone of the femoral head. When doing this, hold the drill in axial direction and do not cant it.

Checking the position of the guide wire, using the C-bow, in a-p and axial projection. If the guide wire is found to be in the wrong position, pull back the guide wire and reinsert it in the correct direction, again under C-bow control.



Note:
Use the guide pin only once. When used repeatedly, the guide pin can get bent sideways at the trabeculae. Another unwelcome result of repeated use can be that the guide pin gets stuck in the drilling machine, or gets drilled off.

Operating Manual



7 Measuring the length of the support sleeve

- Length gauge KH399T

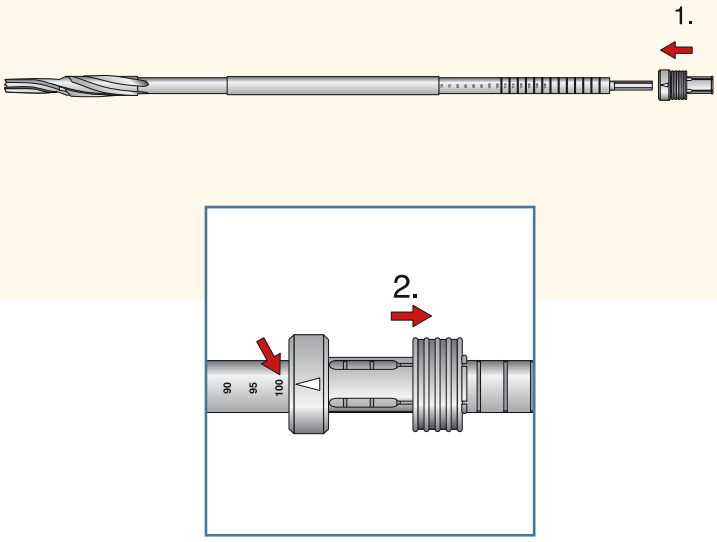
Once the guide wire is positioned correctly, remove the centering awl and slide the length gauge over the guide wire down to the tissue protection sleeve as far as it will go. Read off the length at the end of the guide wire. A safety distance of 10 mm between the femoral head and the tip of the support screw is already allowed for in the measuring procedure. Remove the length gauge.

The length of the support sleeve is derived from: *the measured length minus 40 mm (20 mm thread length + 20 mm glide path of support screw).*

If necessary, shorter glide paths can be set for the support screw:
measured length minus 35 mm = glide path 15 mm
measured length minus 30 mm = glide path 10 mm

EXAMPLE:

measured length 100 mm minus thread
length of support screw 20 mm minus
desired glide path of support screw 15 mm
=support sleeve length 65 mm.



8 Mounting the step drill with depth stop

- Graduated reamer KH373R
- Depth stop KH374R

Attach the depth stop to the thread cutter and connect it to the rapid action T-handle. Tap the thread by hand using the thread cutter over the guide wire. Check the insertion depth of the thread cutter with the image converter and the length scale. Remove the thread cutter and guide wire after cutting the thread.

Adjust the stop of the graduated reamer to the measured overall length. The stop of the graduated reamer should always be used to avoid errors with regard to the drilling depth. Insert the graduated reamer over the guide wire in the large tissue protection sleeve and drive it into the bone up to the stop. Remove the graduated reamer. It sometimes happens that the guide wire deviates in a cranial direction on contact with the trabeculae of the femoral head. In this case the graduated reamer should not be driven completely in before the guide wire is removed.

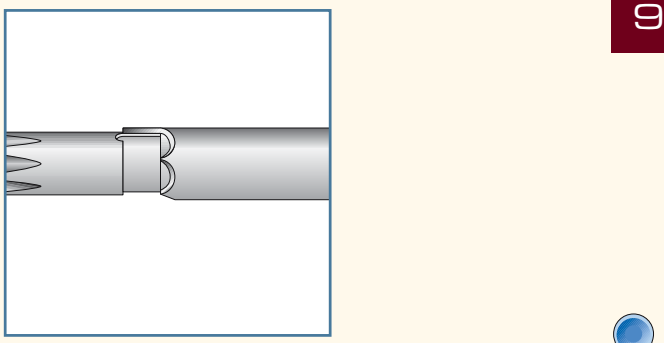
9

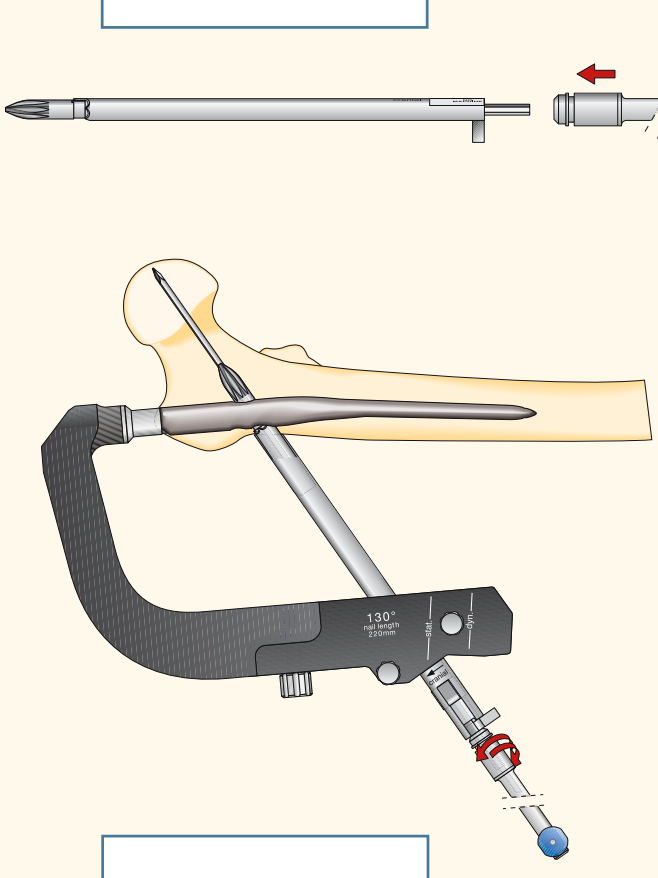
Stabilizing the nail position with the centering awl

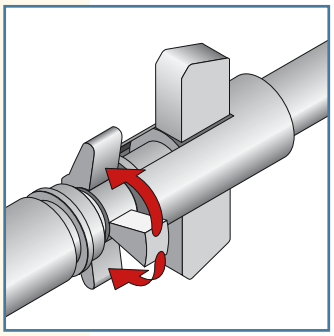
- Centering awl KH426R

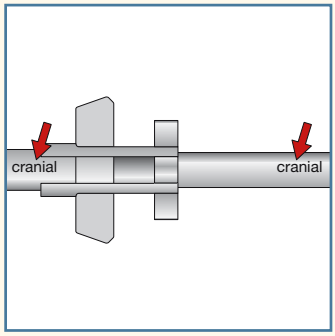
With the step drill removed, reinsert the centering awl to stabilize the nail position. This step of the procedure must only be performed by hand, through oscillating movements of the centering awl.

Observe the cranial alignment. A cutting edge acting towards cranial is used to remove a cortical bone edge and prepare the insertion path for the support sleeve.









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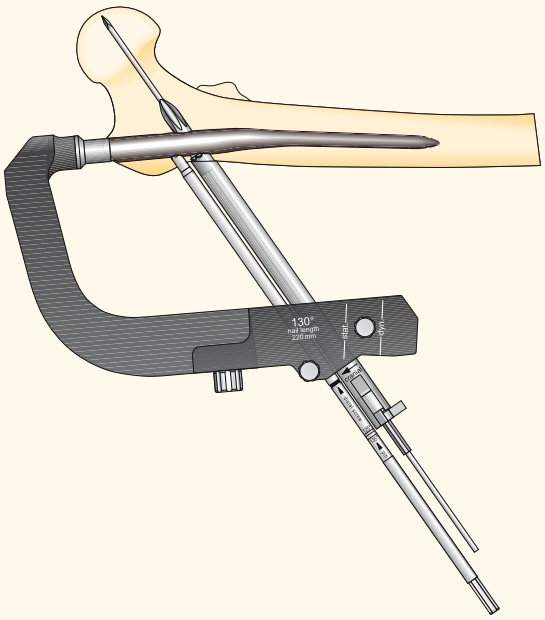
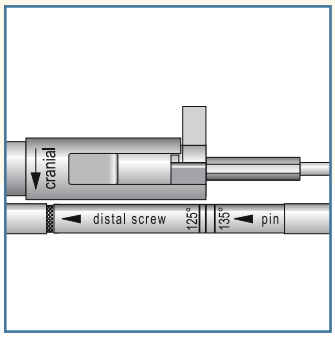
Optional: Preparing the facing for the antirotation pin

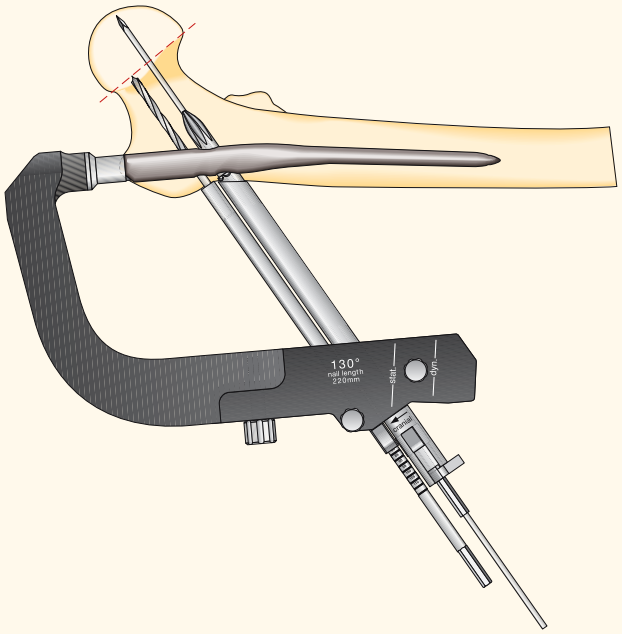




- Tissue protection sleeve small KH429R
- Obturator small KH425R
- Rapid-action T-handle KH428R
- Clamping screw KH359T
- Small facing cutter KH431R

Loosen the clamping screw. Push the small tissue protection sleeve KH429R with the small obturator through the targeting attachment down to the bone. Tighten the clamping screw. Carefully push down the motor-driven small facing cutter until it touches the nail.

This step (facing for the antirotation pin) can be skipped when using the new self-tapping antirotation pin.



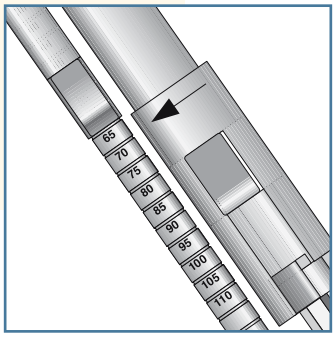
11

Preparing the drill hole for the antirotation pin

- Twist drill, Ø 4 mm KH384R
- Length gauge KH274R

Under C-bow control, open the drill hole down to the head/neck border of the femur, using 4 mm twist drill KH384R. Read the length of the antirotation pin at the drill scale.

Alternatively, the length of he antirotation pin can be measured with the length gauge.



Operating Manual

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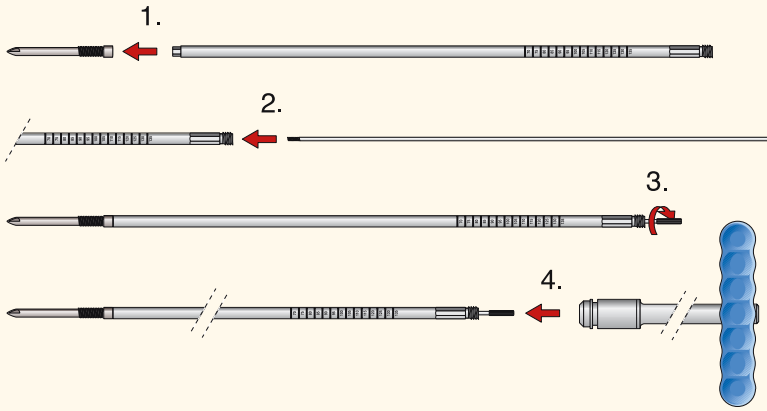
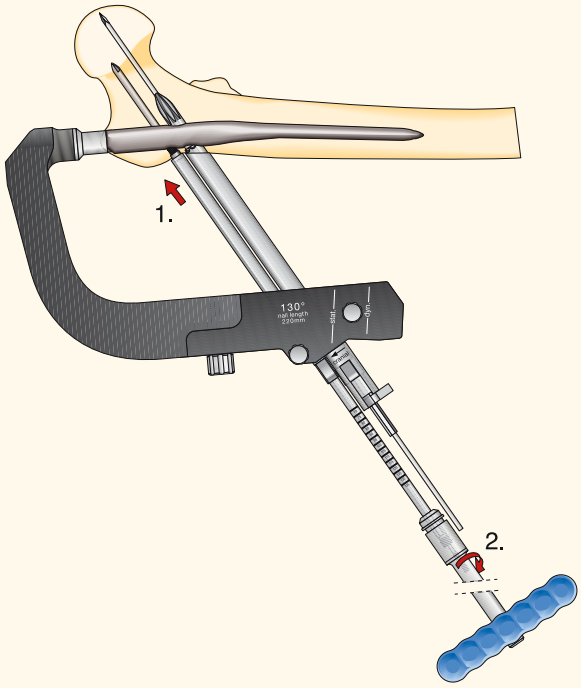
Inserting the antirotation pin

- Rapid-action T-handle KH428R
- Inserter KH377R
- Connecting screw KH378R

Connect the selected antirotation pin and the inserter with the connecting screw. Apply T-handle and turn in the antirotation pin until it is firmly seated in the nail. Remove the inserter and the centering awl.





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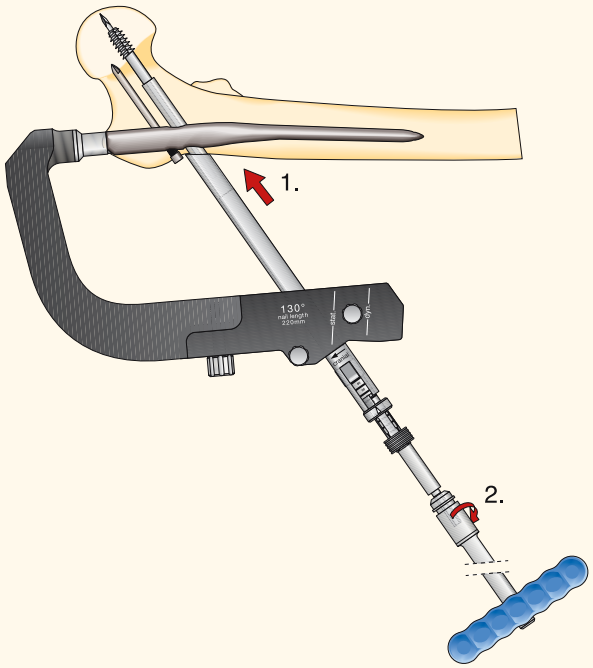

Optional: Tapping the thread for the support screw

- Thread cutter KH375R
- Depth stop KH374R
- Rapid action T-handle KH428R

Optional for very hard bone structures. Attach the depth stop to the thread cutter and connect it to the rapid action T-handle. Tap the thread by hand using the thread cutter over the guide wire. Check the insertion depth of the thread cutter with the image converter and the length scale. Remove the thread cutter and guide wire after cutting the thread.

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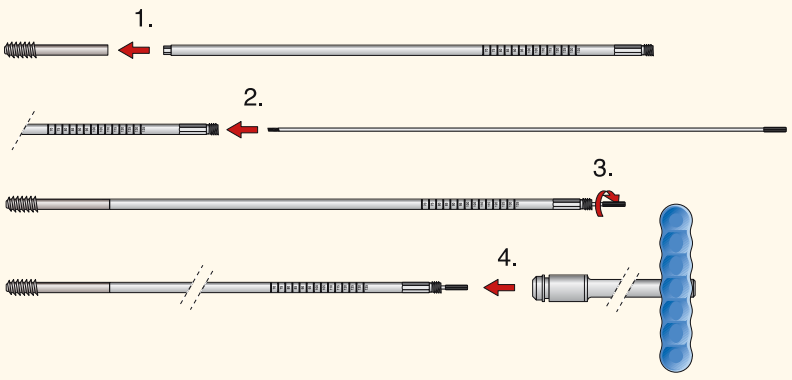

Mounting the support screw and the inserter

- Rapid action T-handle KH428R
- Inserter KH377R
- Connecting screw KH378R

Place the support screw onto the inserter and secure with the connecting screw. Attach the rapid action T-handle and screw in the support screw.

The insertion depth of the support screw is read on the length scale on the outside of the tissue protection sleeve (please make sure that the sleeve is lying as far up in the targeting device as possible) and checked with the image converter.

Remove the rapid action T-handle.

Leave the inserter attached to the support screw.

Operating Manual

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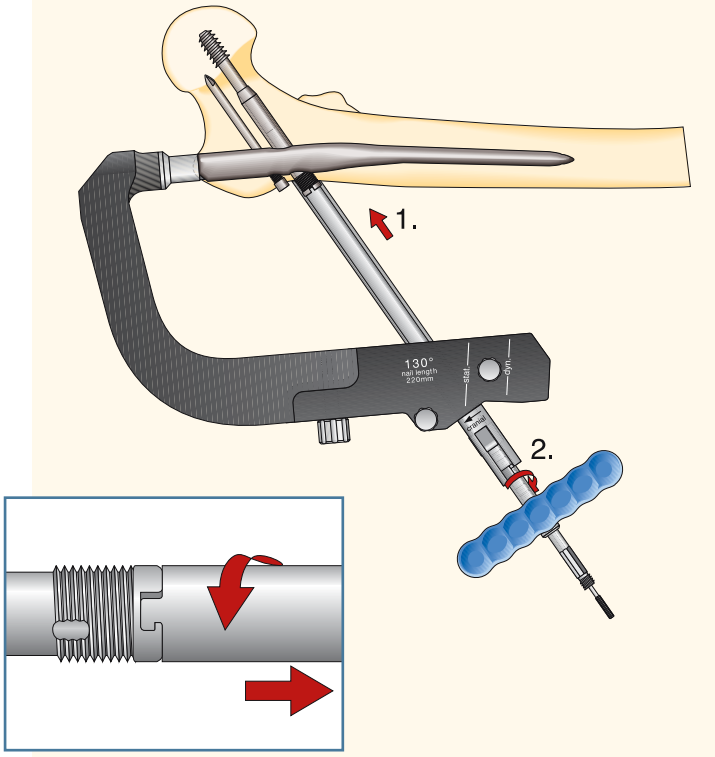
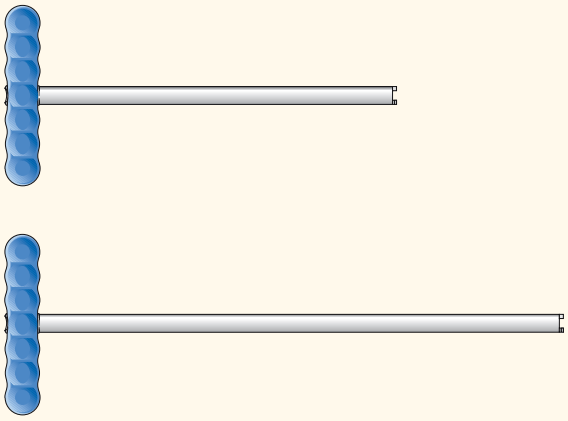




Screwing in the support sleeve

- Sleeve inserter KH427R
- Sleeve inserter long KH434R

Select the support sleeve:

Recommendation: overall length minus 40 mm, this sets a standardised glide path of 20 mm (measured overall length minus 20 mm support screw thread length minus 20 mm glide path).

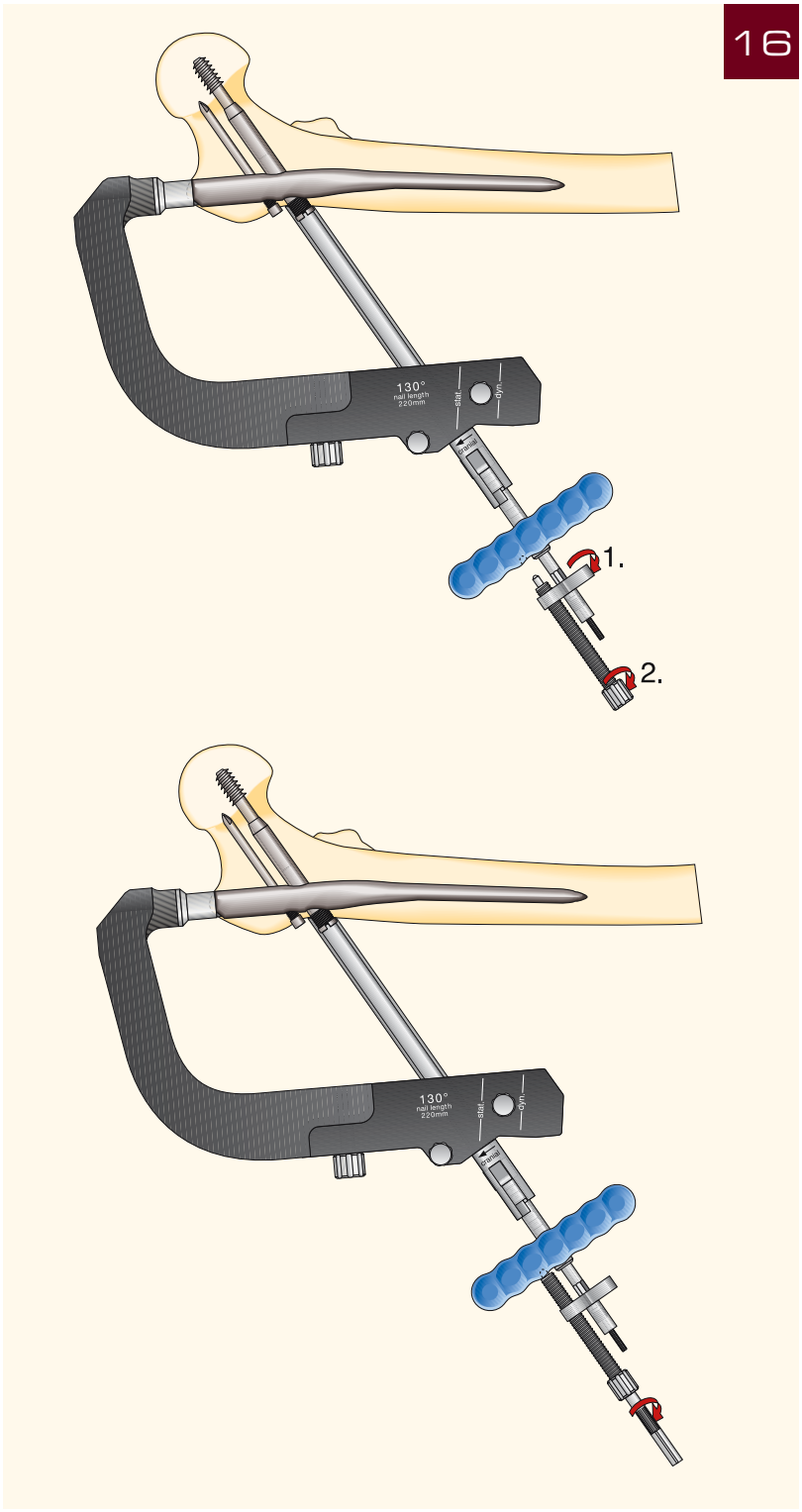
Example: measured overall length 100 mm – 40 mm = support sleeve length 60 mm

If a shorter dynamisation path is desired, a correspondingly shorter glide path (possible lengths 15 mm, 10 mm, 5 mm) is subtracted from the overall length. The 20 mm support screw thread length is the constant value in determining the length of the support sleeve.

Note:
Sleeve inserter long KH434R is intended for use with the self-tapping sleeves. For other sleeves we recommend using sleeve inserter KH427R.

Introduce the support sleeve over the inserter. Then introduce the sleeve inserter also over the inserter and screw the support sleeve firmly onto the nail by turning and pushing the sleeve inserter. Check the position of the support sleeve with the image converter.

If no compression is desired, the sleeve inserter, screwdriver, connecting screw and tissue protection sleeve can be removed. Otherwise please see the section "Interfragmentary compression" below.



16

Optional: interfragmentary compression

- Sleeve inserter KH427R
- Compression device KH368R

For interfragmentary compression, which anticipates the dynamisation to be expected, the compression device is screwed onto the inserter.

Screw the pressure screw of the compression device into the hollow provided for it on the handle of the sleeve inserter. Further careful screwing in of the pressure screw (by hand or with a inserter) will compress the fracture. Check the fracture situation with the image converter.

After the compression procedure has been completed, remove the compression device, sleeve inserter, Inserter, connecting screw and tissue protection sleeve.

Operating Manual

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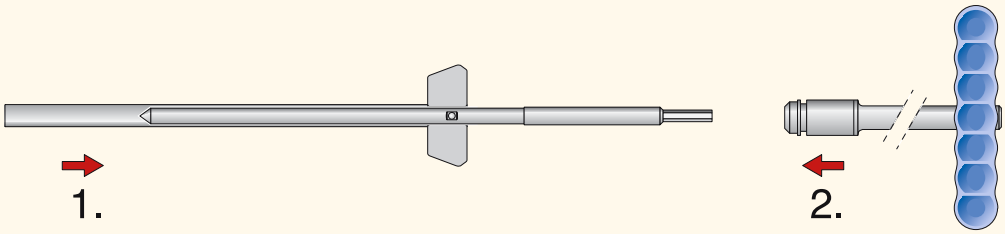
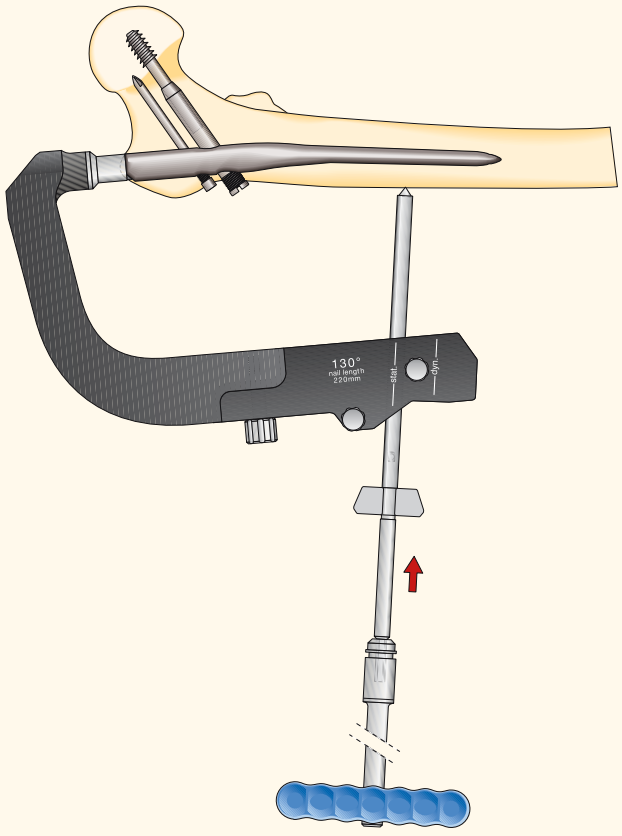




Distal locking

Introducing the small tissue protection sleeve

- Small tissue protection sleeve KH429R
- Small obturator KH425R
- Rapid action T-handle KH428R
- Clamping screw KH359T

Introduce the small tissue protection sleeve with the obturator into the appropriate hole provided in the targeting device, depending on the type of locking selected (static or dynamic). Perform skin incision, split the fascia and the gluteus vastus lateralis muscle. Make sure that the tissue is sufficiently separated in the exact direction of the sleeve. Push the tissue protection sleeve together with the obturator up to the bone. Remove the obturator. Tighten the clamping screw.

18

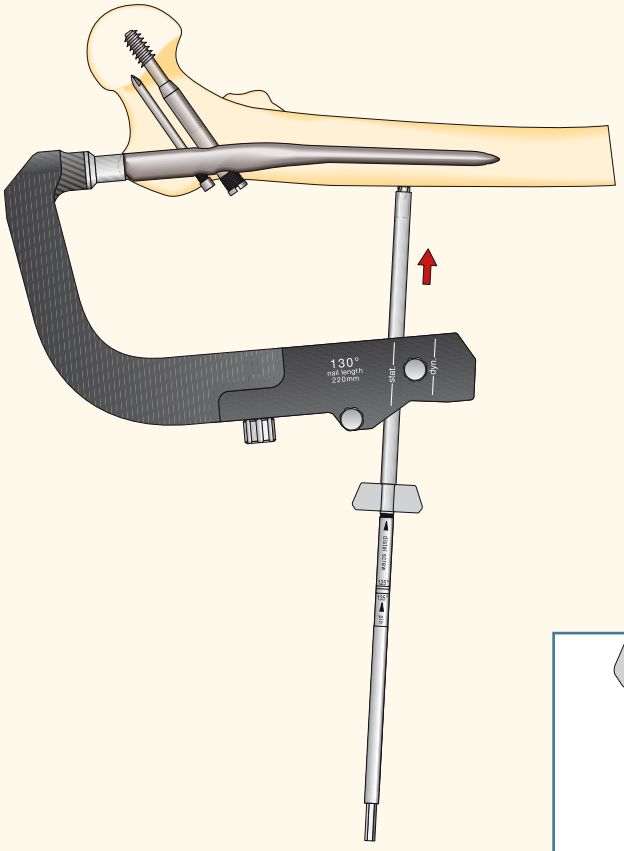
Counterboring the cortex on the approach side

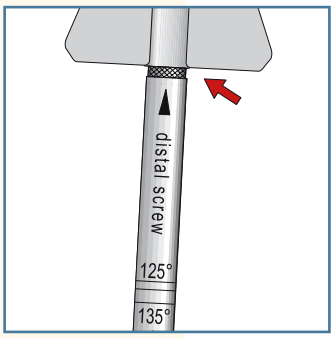
- Small facing cutter KH431R

Insert the small facing cutter without tension in the tissue protection sleeve, push the cutter on high speed up to the cortex and counterbore to a depth of approx. 1-2 mm.

The gold marking reaches the tissue protection sleeve and is still visible.

N.B. In no circumstances should the cortex be penetrated..





Operating Manual

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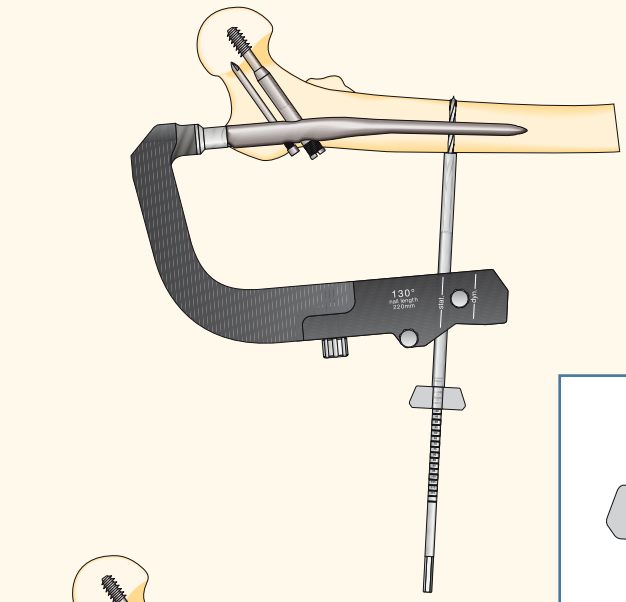
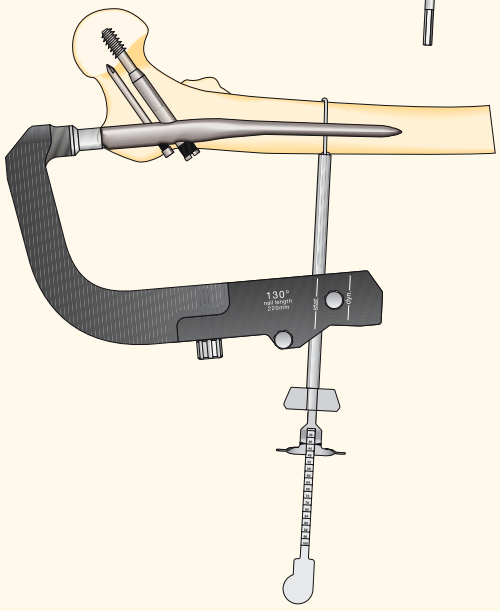
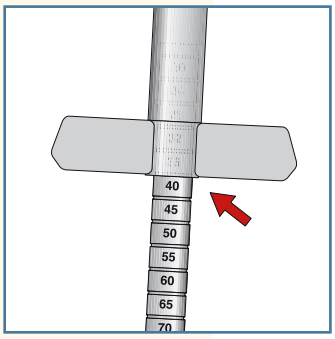
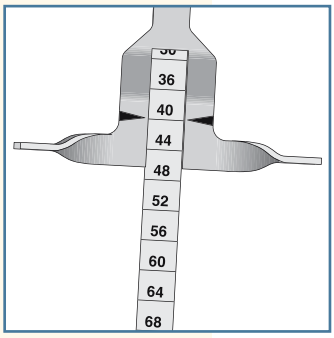








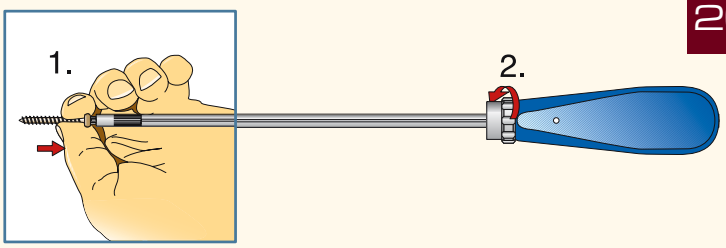
Drilling

- Twist drill KH384R
- Length measuring device KH274R

Drill through the cortex on both the approach and the opposite side using the 4 mm twist drill inside the tissue protection sleeve.

Establish the screw length required using the length measuring device or the scale on the drill.

20



Locking

- Self-locking screwdriver SW 4.5 mm KH325R

Place the screw with the correct measured length onto the screwdriver. Press the screw towards the handle and at the same time turn the knurled nut to the right.

Implant the locking screw through the tissue protection sleeve using the screwdriver. Turn the knurled nut on the screwdriver to the left to disconnect it from the locking screw. Remove the tissue protection sleeve.

In case of long nail version a free hand locking for the distal end has to be performed. Therefore the special drill KH277R can be used.

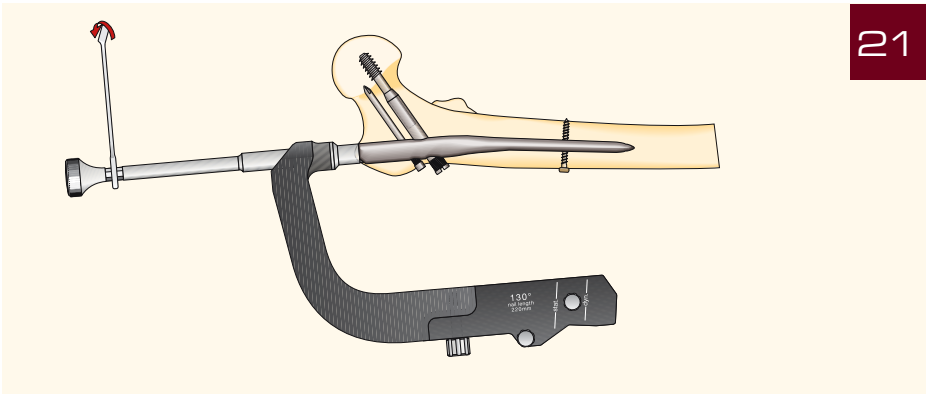
Inserting the closing screw

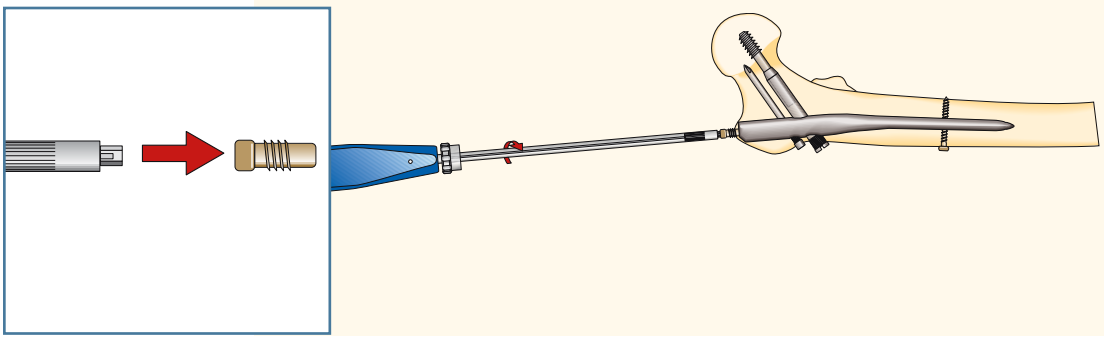
- Self-locking screwdriver SW 4.5 mm KH325R
- Anvil key KH321R
- Combination spanner KH324C

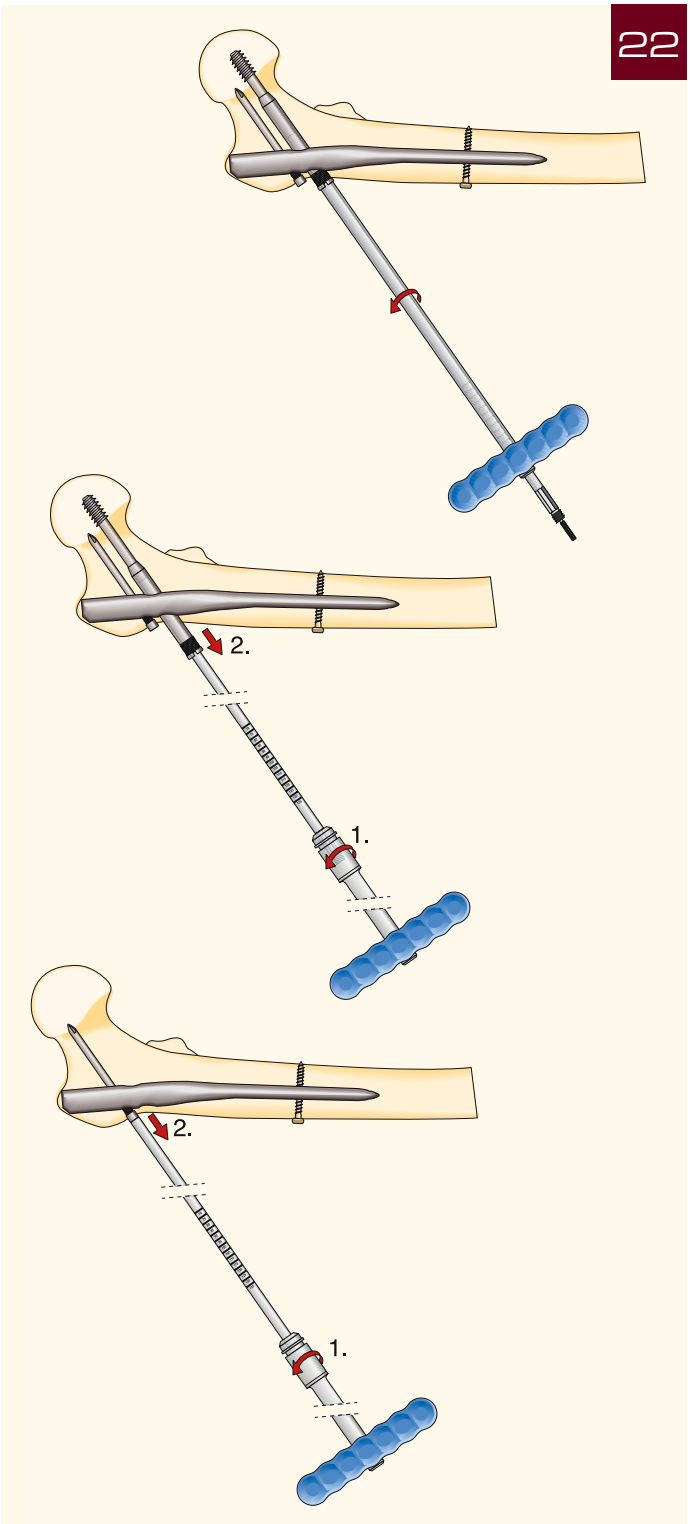
Remove the targeting device with the anvil key and the flat spanner.

Fix the closing screw onto the self-locking screwdriver and screw it into the end of the nail.

Subsequently check the position of the implant with the image converter and document.







Metal Removal

Support sleeve/screw

- Inserter KH377R
- Connecting screw KH378R
- Sleeve inserter KH427R
- Sleeve inserter long KH434R
- Rapid action T-handle KH428R

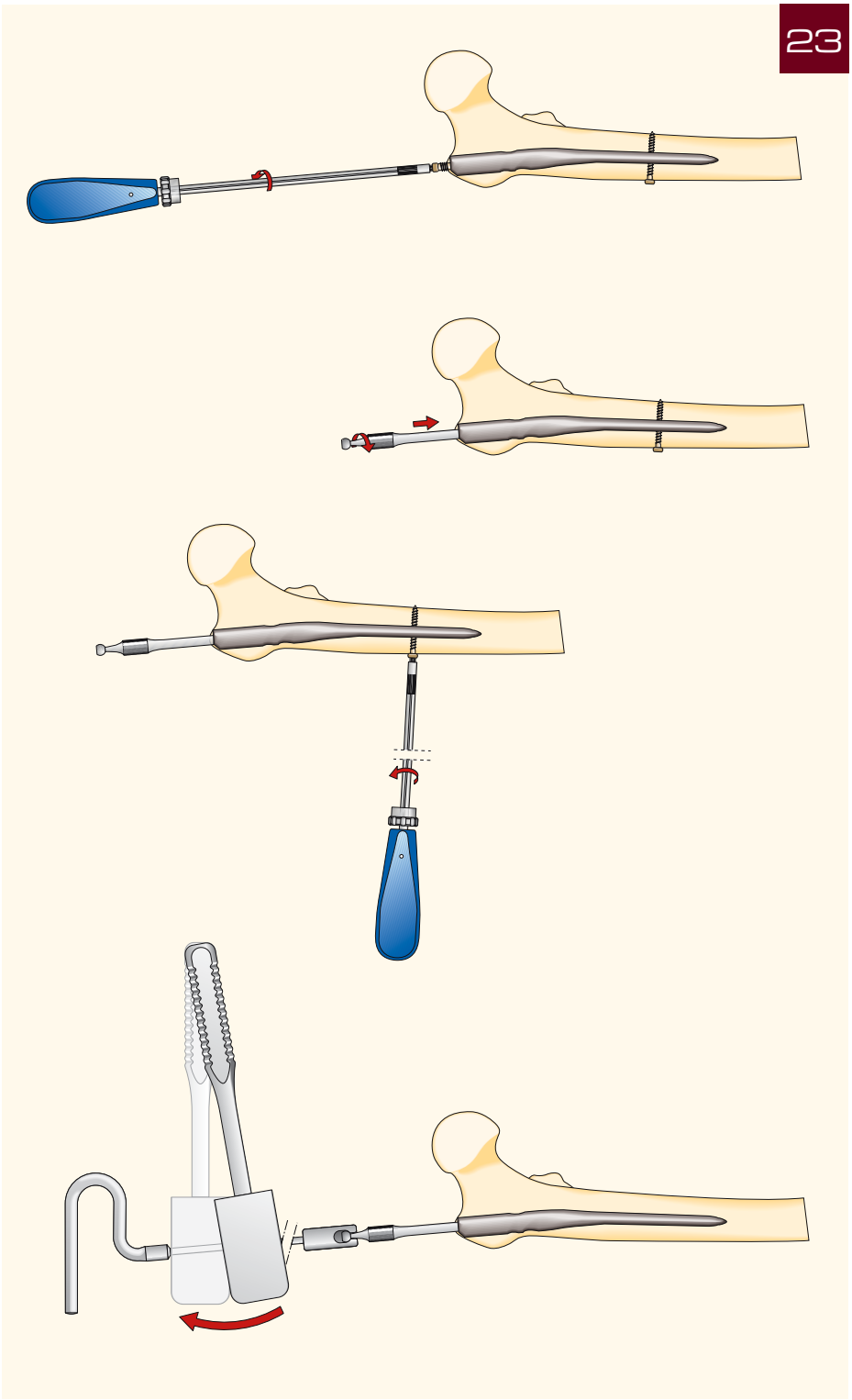
After the soft tissue has been opened using the same approach as for the implantation, the inserter is driven under image converter monitoring through the soft tissue into the support sleeve and coupled to the support screw via the connecting screw. The sleeve inserter is introduced over the inserter and, when it is in contact with the support sleeve, turned until it slots into the grooves on the support sleeve. Now the support sleeve can be screwed out of the nail thread (at least 6 complete turns), but not completely removed. The support sleeve is removed by unscrewing the support screw. To do this, remove the sleeve inserter and attach the rapid action T-handle onto the inserter. Unscrew the support screw until the thread touches the bone. Subsequently extract the support screw and support sleeve together.

Note:
Self-tapping screws have to be removed with sleeve inserter long KH434R. For other sleeves use sleeve inserter short KH427R.

Anti-rotation pin

- Inserter KH377R
- Connecting screw KH378R
- Rapid action T-handle KH428R

Insert the inserter through the soft tissue under image converter monitoring until its tip sits in the anti-rotation pin. Fix with the connecting screw. Attach the rapid action T-handle to the screwdriver. Screw the anti-rotation pin out of the nail thread and pull out.



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Closing screw/nail/ distal locking

- Self-locking screwdriver SW 4.5 mm KH325R
- Extractor KH310R
- Extraction adapter KH311R
- Slotted hammer KH113R

Make skin incision in the scar of the proximal approach for the nail implantation. Separate subcutaneous tissue, fascia lata and insertion of the gluteus medius muscle to reach the upper opening for the nail.

Remove the closing screw with the self-locking screwdriver and screw in the extraction adapter.

If there is pronounced bone overgrowth on the nail, push the guide pin under image converter monitoring through the bone overgrowth into the nail opening. Introduce the funnel shaped tissue protection sleeve right up to the bone overgrowth. Using the hollow reamer, carefully drill open the bone overgrowth up to the proximal nail end. After removing the boney obstacle, proceed as described above.

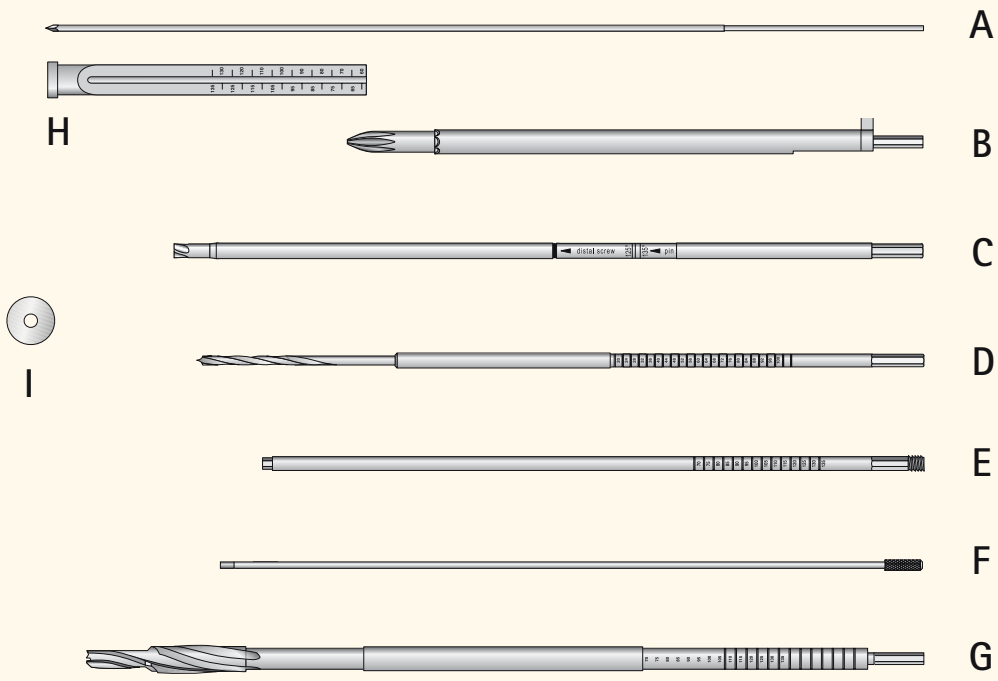
Now the distal locking screw is removed with the screwdriver via a small skin incision.

Attach the extractor onto the extraction adapter and hit the nail out using light blows with the slotted hammer.

Note:
Please note special instruments for metal removal on page 42. We recommend having these instruments ready for every planned metal removal.

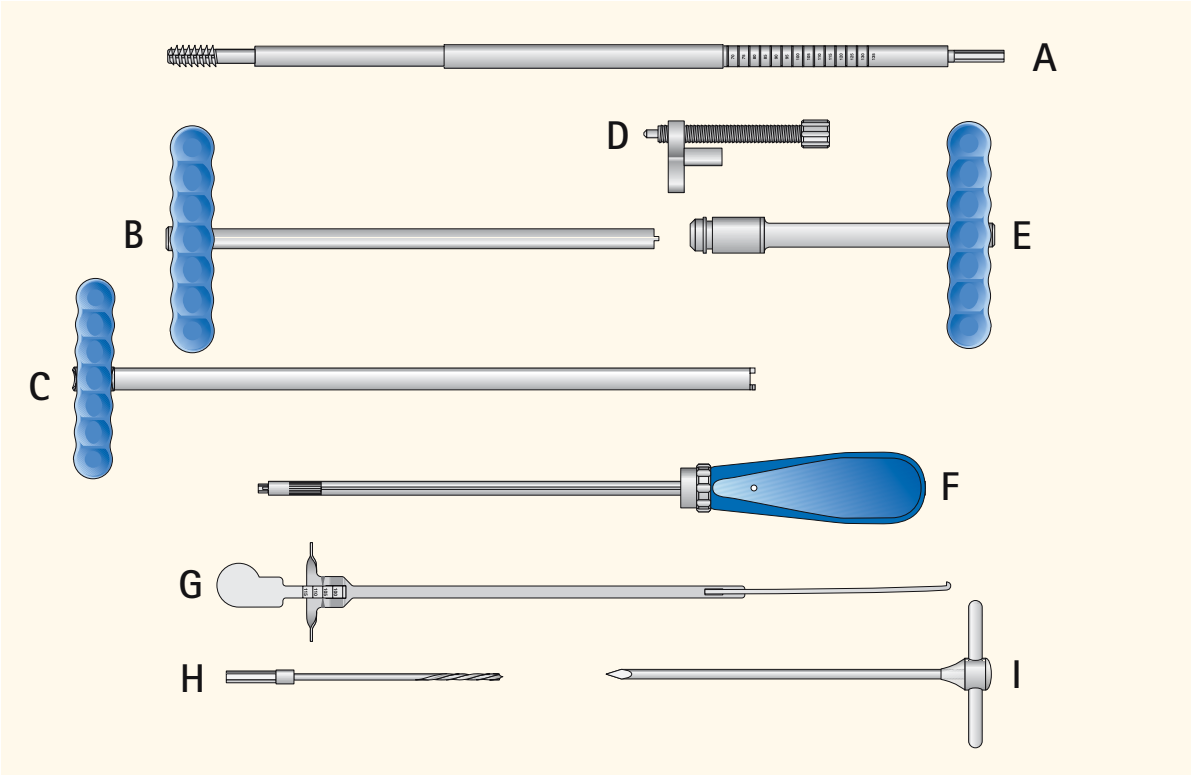
Instrumentation Overview

KH141 Basic Set Basket 1



	Article No.	Description
A	KH365R	Guide wire
B	KH426R	Centering awl
C	KH431R	Small facing cutter
D	KH384R	Twist drill Ø 4 mm
E	KH377R	Inserter for anti-rotation pin/support screw
F	KH378R	Connecting screw for KH377R
G	KH373R	Graduated reamer
H	KH399T	Length gauge
I	KH374R	Depth stop

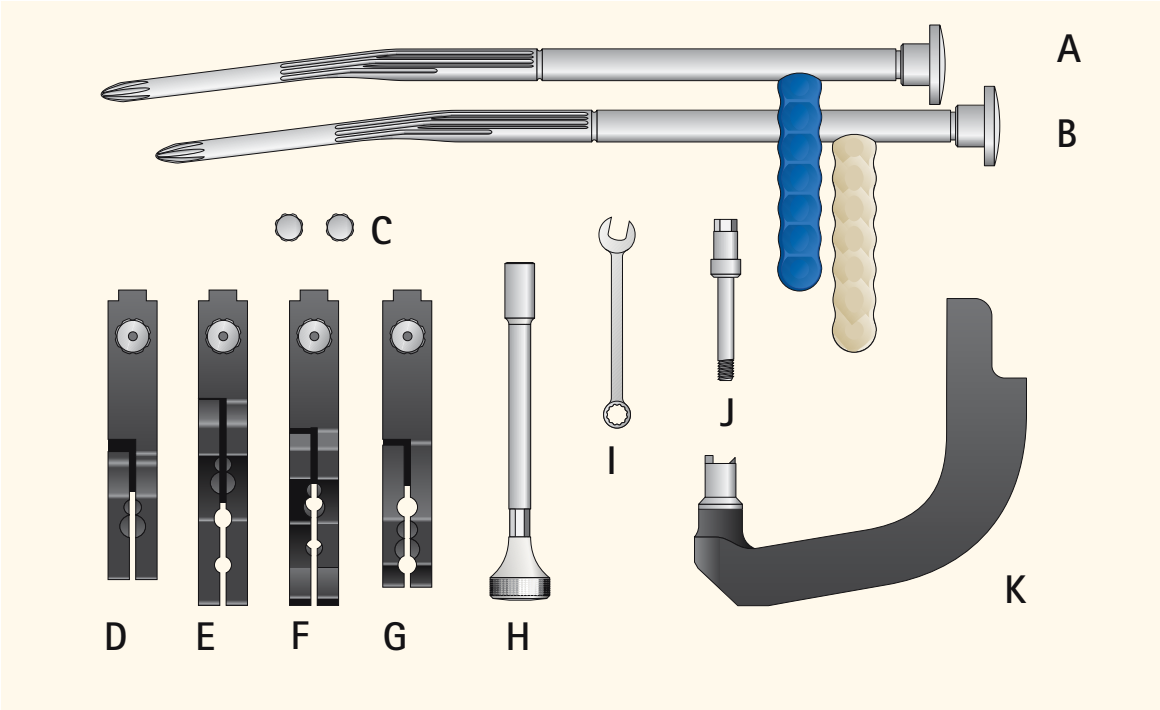
KH141 Basic Set Basket 2



	Article No.	Description
A	KH375R	Thread cutter
B	KH427R	Sleeve inserter
C	KH434R	Sleeve inserter long
D	KH368R	Compression device
E	KH428R	Rapid action T-handle
F	KH325R	Self-locking screwdriver
G	KH274R	Length measuring device
H	KH277R	Drill for free hand locking
I	KH285R	Centre punch

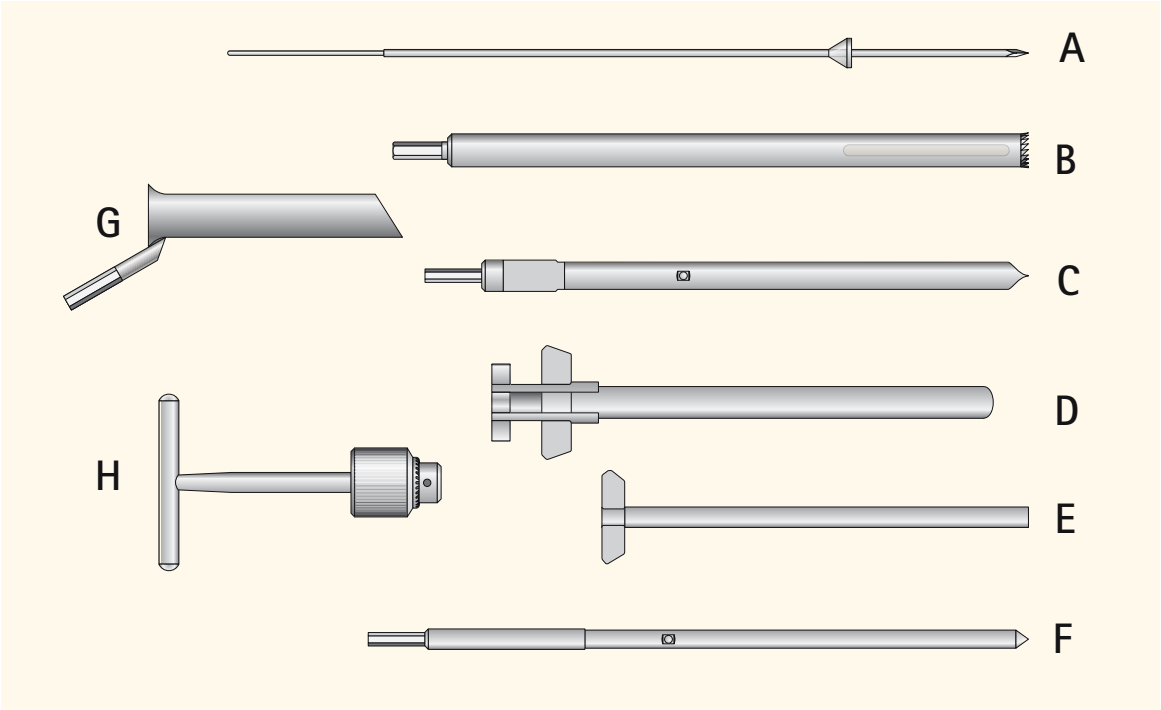
Instrumentation Overview

KH143 Targeting Device Set Basket 1



	Article No.	Description
A	KH352R	Profiler Ø 10 x 220 mm
B	KH371R	Long profiler
C	KH359T	Clamping screw
D	KH369P	Targeting attachment 130° long nail
E	KH360P	Targeting attachment 125°
F	KH361P	Targeting attachment 130°
G	KH362P	Targeting attachment 135°
H	KH321R	Anvil key
I	KH324C	Flat spanner
J	KH443R	Nail adapter screw
K	KH357R	Targeting device

KH143 Targeting Device Set Basket 2



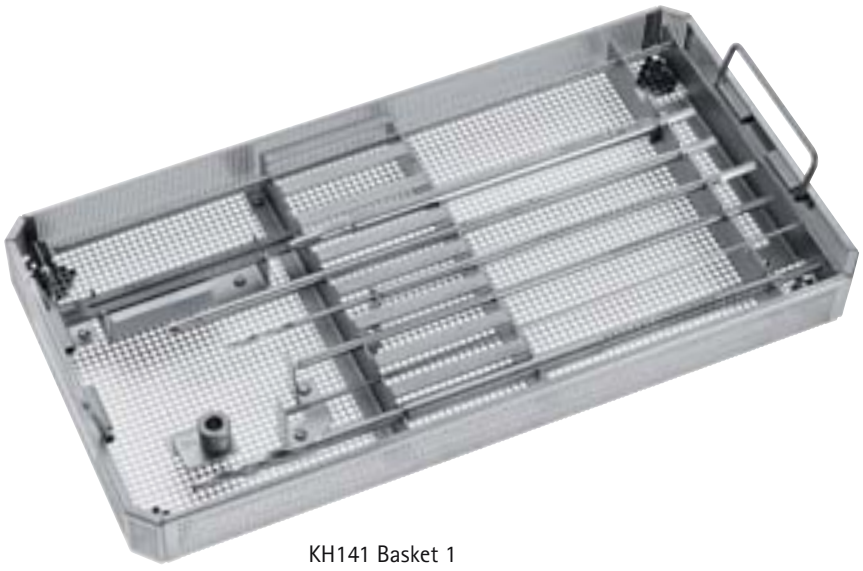
	Article No.	Description
A	KH420R	Guide pin
B	KH422R	Hollow reamer
C	KH423R	Large obturator
D	KH430R	Large tissue protection sleeve
E	KH429R	Small tissue protection sleeve
F	KH425R	Small obturator
G	KH316R	Tissue protection funnel
H	KH319R	Universal handle

Instrumentation

KH141

Basic Instruments Set 1

Quantity	Article No.	Description
1	KH241R	Perforated basket with storage
2	KH365R	Guide wire, 3 mm
1	KH426R	Centering awl, cannulated
1	KH431R	Facing cutter, small
1	KH384R	Twist drill, Ø 4 mm
1	KH377R	Inserter for support screw + anti-rotation pin
1	KH378R	Connecting screw for KH377R
1	KH374R	Drilling depth stop
1	KH399T	Length gauge
1	KH373R	Graduated reamer
1	TE802	Packing template
1	JF511	Wrapping cloth
2	JG785B	Identification label



KH141 Basket 1

Basic Instruments Set 2

Quantity	Article No.	Description
1	KH242R	Perforated basket with storage
1	KH375R	Thread cutter, cannulated, for support screw
1	KH368R	Compression device
1	KH428R	Rapid action T-handle
1	KH427R	Sleeve inserter
1	KH325R	Self-locking screwdriver 4.5 mm hexagonal
1	KH274R	Length measuring device
1	KH277R	Drill for free hand locking, Ø 4 mm
1	KH285R	Centre punch, 4.5 mm
1	TE803	Packing template
1	JG511	Wrapping cloth
1	KH434R	Sleeve inserter long

Extraction instruments

Quantity	Article No.	Description
PLEASE ORDER SEPARATELY:		
1	KH310R	Extractor
1	KH311R	Extraction adapter
1	KH113R	Slotted hammer

The expeller instrument set is also used for carrying out the removal procedure

KH141 Basket 2

Recommended container for KH141: Container base JK442, lid JP001

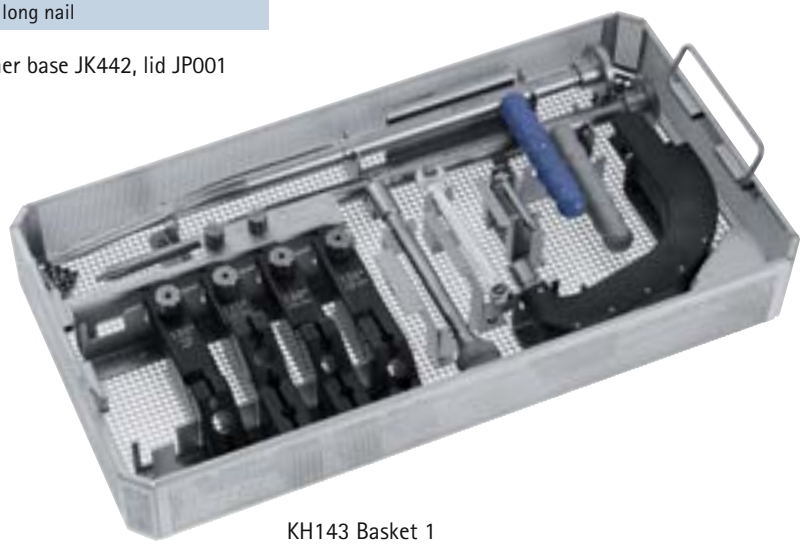
Instrumentation

KH143

Targeting Device Set Standard/long — Basket 1

Quantity	Article No.	Description
1	KH243R	Perforated basket with storage
1	KH352R	Profiler Ø 10 x 220 mm
1	KH371R	Profiler Ø 10 x > 240 mm
1	KH369P	Targeting attachment 130° long nail
1	KH360P	Targeting attachment 125°, 220 mm
1	KH361P	Targeting attachment 130°, 220 mm
1	KH362P	Targeting attachment 135°, 220 mm
1	KH321R	Anvil key SW 10
1	KH324C	Combination spanner SW 10
1	KH443R	Nail adapter screw
2	KH359T	Clamping screw
1	KH357R	Targeting device
1	KH387	X-ray template nail 220 mm
1	KH388	X-ray template nail long 130°
1	TE804	Packing template
1	JF511	Wrapping cloth
2	JG785B	Identification label
PLEASE ORDER SEPARATELY:		
1	KH433P	Targeting attachment 125° long nail
1	KH432	X-ray template 125° long nail

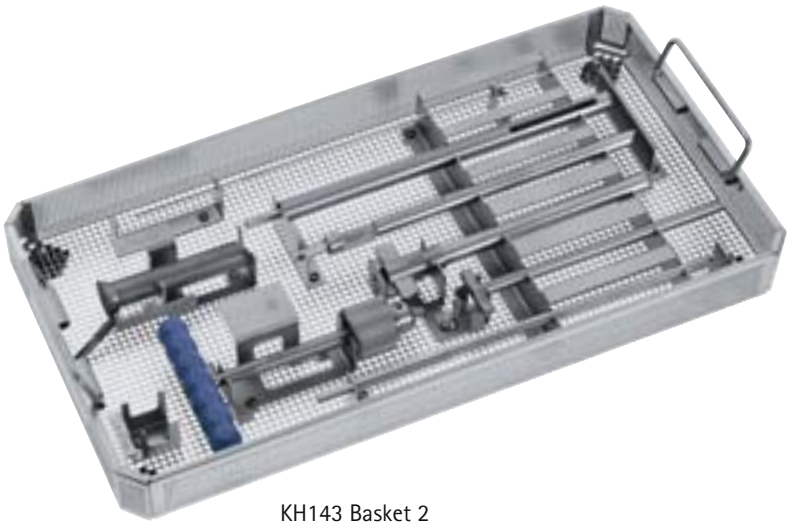
Recommended container for KH143: Container base JK442, lid JP001



KH143 Basket 1

Targeting Device Set Standard/long Basket 2

Quantity	Article No.	Description
1	KH246R	Perforated basket with storage
1	KH422R	Hollow reamer
1	KH420R	Guide pin
1	KH423R	Obturator, large
1	KH430R	Tissue protection sleeve, large
1	KH429R	Tissue protection sleeve, small
1	KH425R	Obturator, small
1	KH316R	Tissue protection funnel
1	KH319R	Universal handle
1	TE807	Packing template
1	JG511	Wrapping cloth
PLEASE ORDER SEPARATELY:		
1	GB413R	Hexagon chuck adapter for Acculan II
1	GB414R	Hexagon chuck adapter with triangular shaft for third-party machine



KH143 Basket 2

KH144

Targeting Set Short

Quantity	Article No.	Description
1	KH244R	Perforated basket with storage
1	KH353R	Profiler Ø 10 x 180 mm
1	KH390P	Targeting attachment 130°, 180 mm
1	KH391P	Targeting attachment 135°, 180 mm
2	KH359T	Clamping screw
1	TE805	Packing template
1	JF511	Wrapping cloth
2	JG785B	Identification label

Instrumentation

Loaner Set 0-0011

Standard Metal Removal

Qty.	Article No.	Description
1	GB020R	Tightening key standard hexagonal
1	JF212R	1/1 Tray perforated 485 x 253 x 56 mm
1	JF222R	1/1 Tray perforated 540 x 253 x 56 mm
1	JF932	Silicone positioning mat 470 x 230 x 30 mm
1	JK441	Basin only, for JK401P/T JK411P/T JK431P/T
1	JK489	Basis 1/1 inner lid silver
1	KH113R	Slotted hammer for extraction hook
1	KH188R	Targon® H/PH extractor adapter
2	KH215R	Targon® PF extractor for support sleeves
2	KH216R	Targon® PF external extractor for support sleeves
1	KH275R	Targon® hollow reamer for screw shaft Ø 3.5 mm
1	KH276R	Targon® hollow reamer for screw shaft Ø 4.5 - 6 mm
2	KH278R	Targon® extractor for screw head Ø 7.0 mm
2	KH279R	Targon® extractor for screw head Ø 8.0 mm
1	KH286R	Targon® Oversleeve for support sleeves
1	KH289R	Targon® screw driver SW 4.5 quick-action chuck adapter
1	KH290R	Targon® T-handle SW 6.0 for explantation instrument
1	KH291R	Targon® extractor for defective hexagon socket SW 4.5
1	KH292R	Targon® extractor for defective hexagon socket SW 3.5
1	KH293R	Targon® extractor for support sleeves
1	KH294R	Targon® hollow reamer for screw head Ø 7.0 and 8.0 mm
2	KH296R	Targon® extractor for screw shaft Ø 3.5 mm
2	KH297R	Targon® extractor for screw shaft Ø 4.5 mm
2	KH298R	Targon® extractor for screw shaft Ø 5.0 mm
2	KH299R	Targon® extractor for screw shaft Ø 6.0 mm
1	KH310R	Targon® expeller instrument for femur and tibia
1	KH311R	Targon® expeller adapter for nails 8 -11 mm
1	KH312R	Targon® expeller adapter for nails 12 -16 mm
1	KH319R	Targon® Universal T-handle
1	KH325R	Targon® screw driver SW 4.5 with holding device
1	KH377R	Targon® PF inserter for support screws
1	KH378R	Targon® PF connecting screw for inserter
1	KH404R	Targon® RF T-key for threaded sleeves
1	KH427R	Targon® PF inserter for support sleeves
1	KH428R	Targon® PF T-socket wrench SW 6.0
1	LS013R	Screwdriver SW 3.5 length 200 mm

Loaner Set 0-0012

Instrument Set for Removal of Broken Nails

Qty.	Article No.	Description
1	KH113R	Slotted hammer for extraction hook
1	KH326R	Targon® extractor for broken nails Ø 7 mm
1	KH327R	Targon® lever instrument for extractor
1	KH328R	Targon® extractor for broken nails Ø 8 mm
1	KH329R	Targon® extractor for broken nails Ø 9 mm
1	KH330R	Targon® extractor for broken nails Ø 10 mm
1	KH331R	Targon® extractor for broken nails Ø 11 mm
1	KH332R	Targon® extractor for broken nails Ø 12 mm
1	KH217R	Targon® extractor for broken nails Ø 13 mm
1	KH218R	Targon® extractor for broken nails Ø 14 -15 mm
1	KH219R	Targon® extractor for broken nails Ø 17 mm

Instrument sets for the explantation of Targon® nails can be ordered from Loaner Service:

Phone: +49 7461 95-2019

Implant Sets

KH346

Standard/long Nail Set

Quantity	Article No.	Description
1	KD012T	10/220/125°
1	KD013T	10/220/130°
1	KD014T	10/220/135°
1	KD032T	12/220/125°
1	KD033T	12/220/130°
1	KD034T	12/220/135°
1	KD063T	10/300/130° right
1	KD065T	10/340/130° right
1	KD067T	10/380/130° right
1	KD083T	10/300/130° left
1	KD085T	10/340/130° left
1	KD087T	10/380/130° left
1	KH345R	Perforated basket with storage
1	JF511	Wrapping cloth
2	JG785B	Identification label

KH348

Short/long Nail Set

Quantity	Article No.	Description
1	KD003T	10/180/130°
1	KD004T	10/180/135°
1	KD023T	12/180/130°
1	KD024T	12/180/135°
1	KD043T	14/180/130°
1	KD044T	14/180/135°
1	KD061T	10/260/130° right
1	KD063T	10/300/130° right
1	KD065T	10/340/130° right
1	KD081T	10/260/130° left
1	KD083T	10/300/130° left
1	KD085T	10/340/130° left
1	KH345R	Perforated basket with storage
1	JF511	Wrapping cloth
2	JG785B	Identification label

Targon® PF long

Targon® PF standard

Recommended container for KH346 and KH348: JK444 + JP001 lid

KH349

Set Components

Quantity	Article No.	Length
Support sleeve		
2	KD181T	50 mm
1	KD182T	55 mm
2	KD183T	60 mm
1	KD184T	65 mm
2	KD185T	70 mm
1	KD186T	75 mm
2	KD187T	80 mm
1	KD188T	85 mm
1	KD189T	90 mm
1	KD190T	95 mm
1	KD191T	100 mm
Support screw		
5	KD115T	70 mm
Anti-rotation pin		
2	KD203T	60 mm
2	KD205T	70 mm
2	KD207T	80 mm
1	KD209T	90 mm
1	KD211T	100 mm
1	KD213T	110 mm
Closing screw		
5	KB200T	

Quantity	Article No.	Length
Locking screw		
4	KB328T	28 mm
4	KB332T	32 mm
4	KB336T	36 mm
4	KB340T	40 mm
4	KB344T	44 mm
2	KB348T	48 mm
2	KB352T	52 mm
2	KB356T	56 mm
2	KB360T	60 mm
Storage		
1	KH347R	Perforated basket with storage
1	JF217R	Lid for KH347
1	JF511	Cloth
2	JG785B	Identification label

Recommended container for KH349: JK400 container base + JP001 lid
Recommended container for KH346 (or KH348) and KH349: JK444 + JP001 lid

Implant Range

Length 220 mm

Angle	Ø	Art. No.
125°	10 mm	KD012T
	12 mm	KD032T
130°	10 mm	KD013T
	12 mm	KD033T
135°	10 mm	KD014T
	12 mm	KD034T

Length 180 mm

Angle	Ø	Art. No.
130°	10 mm	KD003T
	12 mm	KD023T
	14 mm	KD043T
135°	10 mm	KD004T
	12 mm	KD024T
	14 mm	KD044T

Long Nail/Right 125°, Ø 10 mm

Length	Art. No.
260 mm	KD701T
300 mm	KD703T
340 mm	KD705T
380 mm	KD707T
420 mm	KD709T
460 mm	KD711T

Long Nail/Left 125°, Ø 10 mm

Length	Art. No.
260 mm	KD721T
300 mm	KD723T
340 mm	KD725T
380 mm	KD727T
420 mm	KD729T
460 mm	KD731T

Long Nail/Right 130°, Ø 10 mm

Length	Art. No.
260 mm	KD061T
300 mm	KD063T
340 mm	KD065T
380 mm	KD067T
420 mm	KD069T
460 mm	KD071T

Long Nail/Left 130°, Ø 10 mm

Length	Art. No.
260 mm	KD081T
300 mm	KD083T
340 mm	KD085T
380 mm	KD087T
420 mm	KD089T
460 mm	KD091T

Support Sleeves

Length	Art. No.
40 mm	KD179T
45 mm	KD180T
50 mm	KD181T
55 mm	KD182T
60 mm	KD183T
65 mm	KD184T
70 mm	KD185T
75 mm	KD186T
80 mm	KD187T
85 mm	KD188T
90 mm	KD189T
95 mm	KD190T
100 mm	KD191T

Support Screw

Length	Art. No.
70 mm	KD115T

Locking Screw Ø 4.5 mm

Length	Art. No.
20 mm	KB320T
24 mm	KB324T
28 mm	KB328T
32 mm	KB332T
36 mm	KB336T
40 mm	KB340T
44 mm	KB344T
48 mm	KB348T
52 mm	KB352T
56 mm	KB356T
60 mm	KB360T
64 mm	KB364T
68 mm	KB368T
72 mm	KB372T
76 mm	KB376T
80 mm	KB380T

Anti-Rotation Pin

Length	Art. No.
45 mm	KD200T
50 mm	KD201T
55 mm	KD202T
60 mm	KD203T
65 mm	KD204T
70 mm	KD205T
75 mm	KD206T
80 mm	KD207T
85 mm	KD208T
90 mm	KD209T
95 mm	KD210T
100 mm	KD211T
105 mm	KD212T
110 mm	KD213T

Closing Screw

Art. No.
KB200T

Implant material:
Titanium alloy Ti6Al4V
ISO 5832-3

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