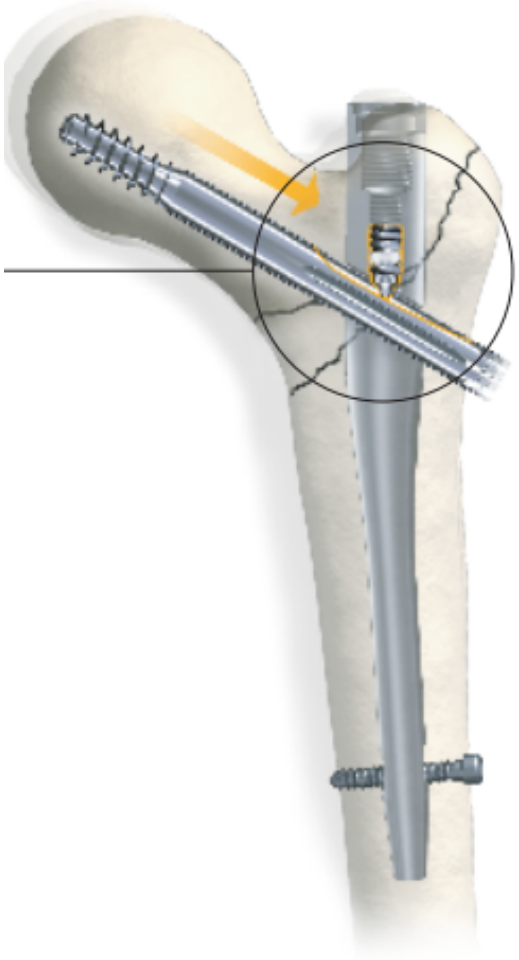
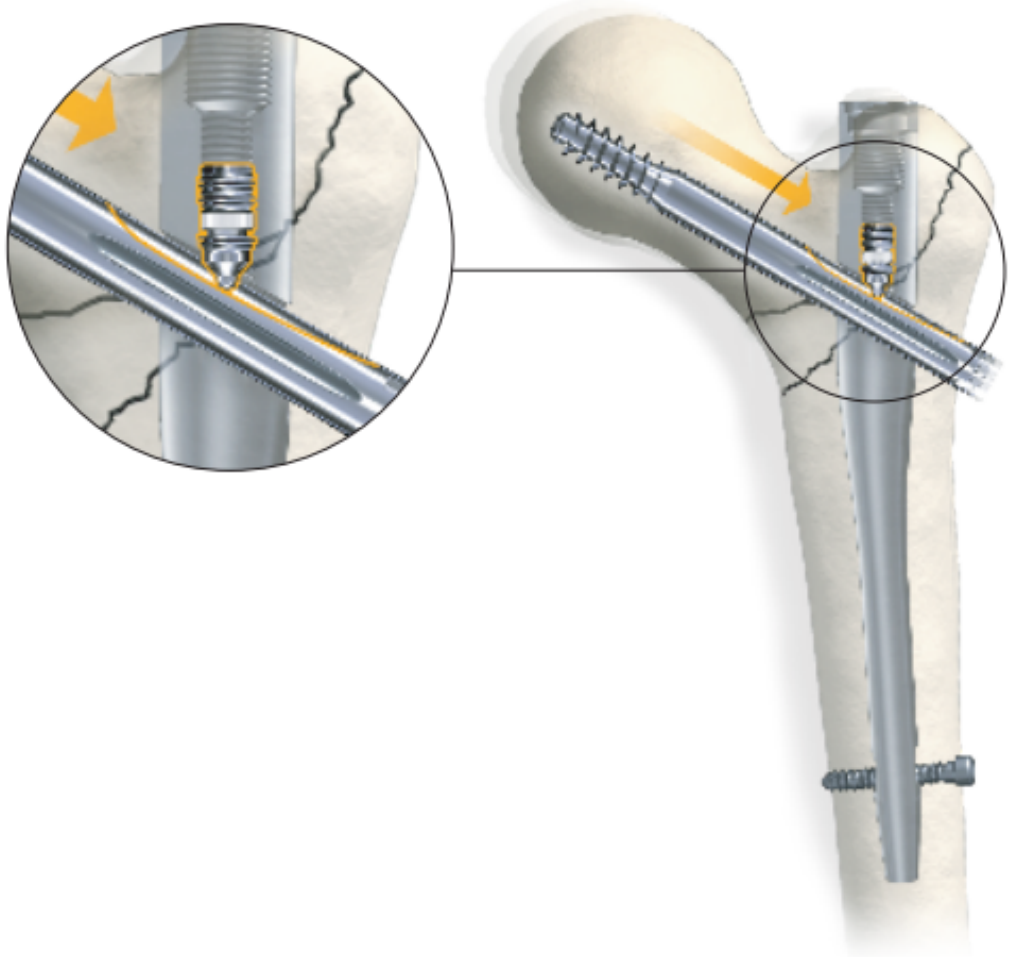
PFN

Approach & Techniques

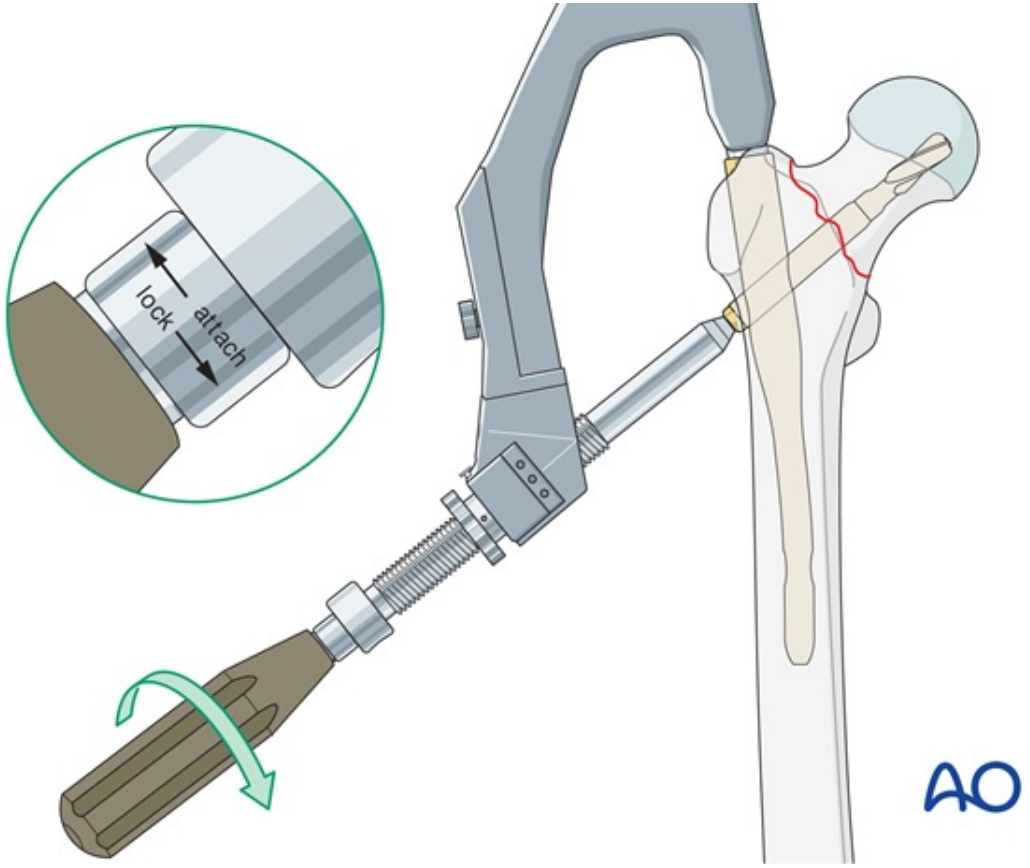
Design

- The Proximal Femoral Nail Antirotation (PFNA)





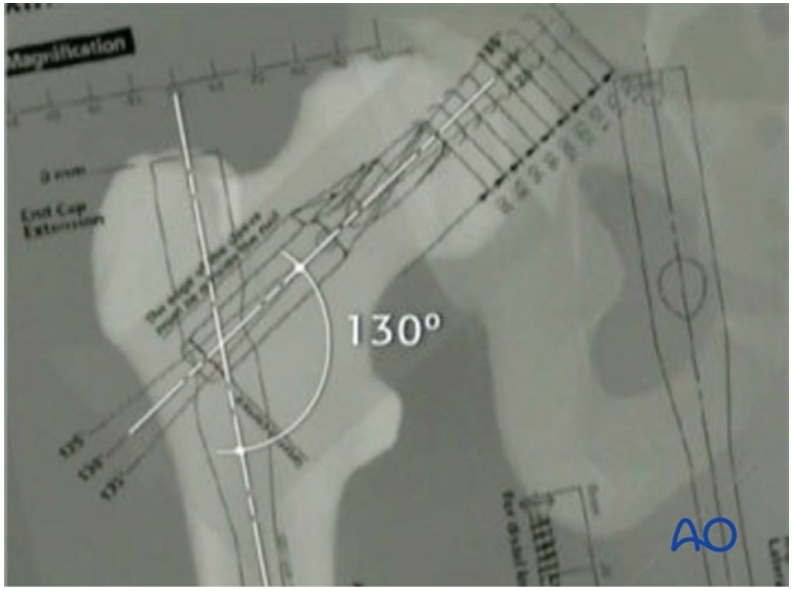
- Self retaining set screw to protect the lag screw against rotation and simultaneously allowing sliding of the lag screw laterally



- The blade has to be locked, and locking has to be verified intraoperatively. The blade is locked if all gaps are closed.

Preoperative planning

- CCD angle : (center-collum diaphysis angle, ie, angle subtended between the femoral neck and shaft axes)
- CCD angle has to be determined preoperatively of the uninjured leg.
- CCD angle of 130º angle will be appropriate mostly



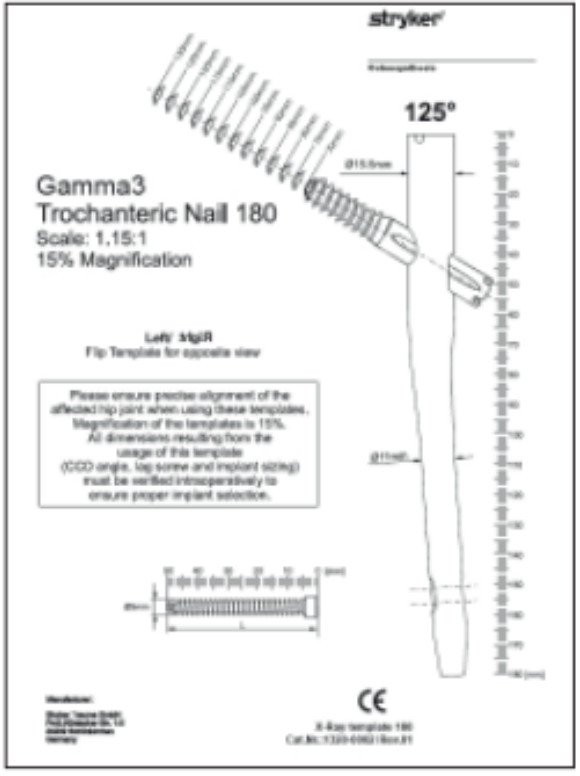
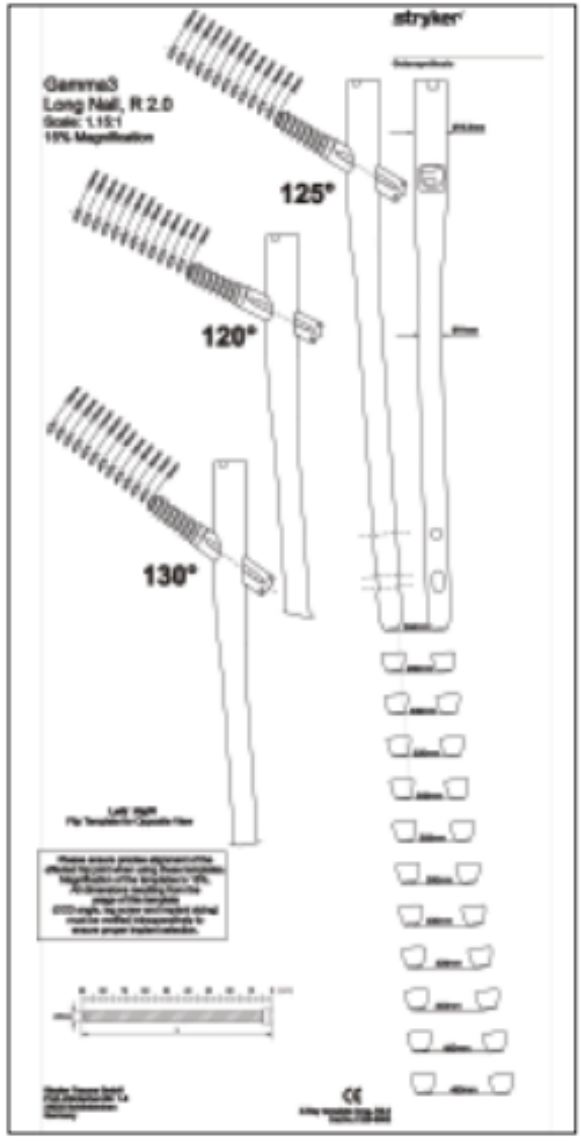
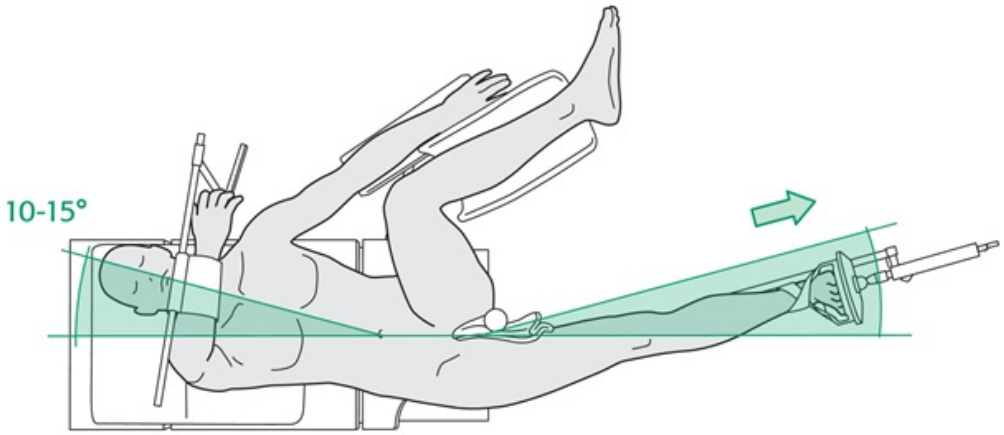


Fig. 9a
Gamma3 Nail 180 X-ray Template
(Ref. No 1320-0002)



Positioning

- **supine on the fracture table**.
- The ipsilateral arm is elevated in a sling
- The uninjured leg is placed on a leg holder.
- Ipsilateral hip is in an adducted position by pushing the trunck 10º to 15º to the contralateral side.



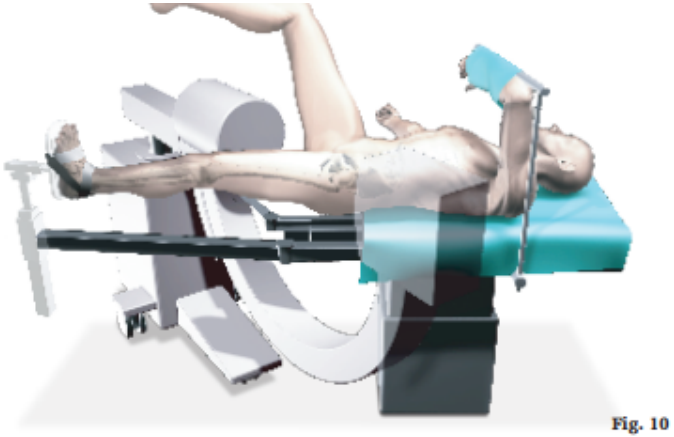


Fig. 10

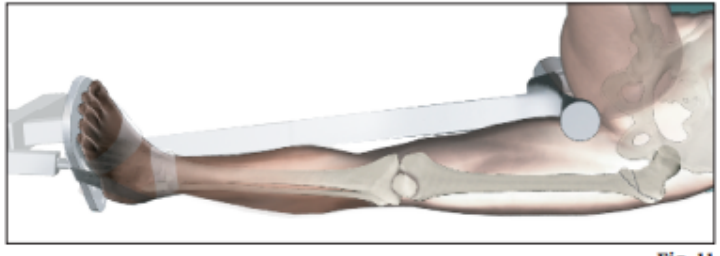
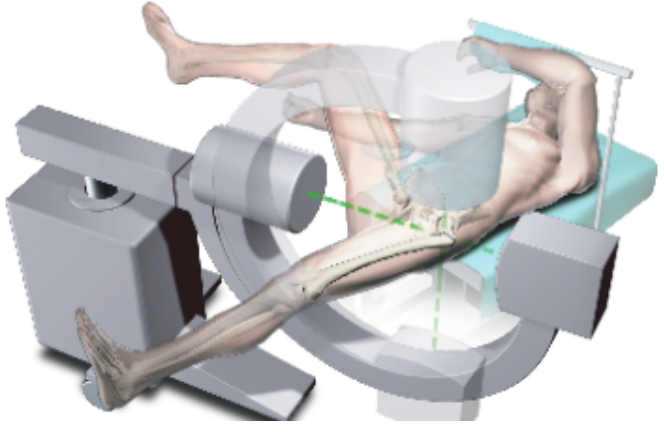
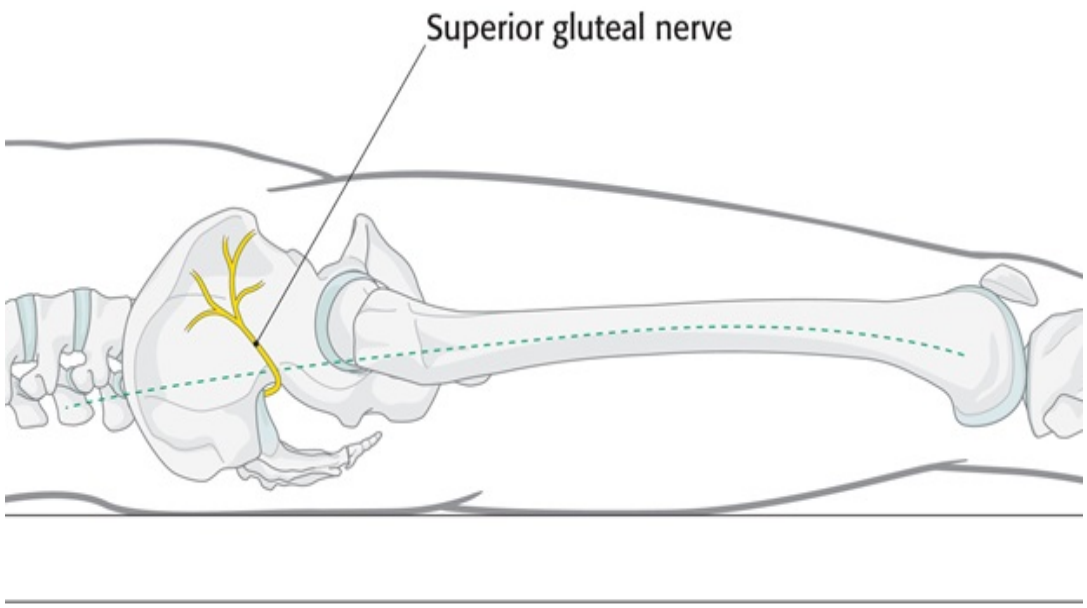


Fig. 11



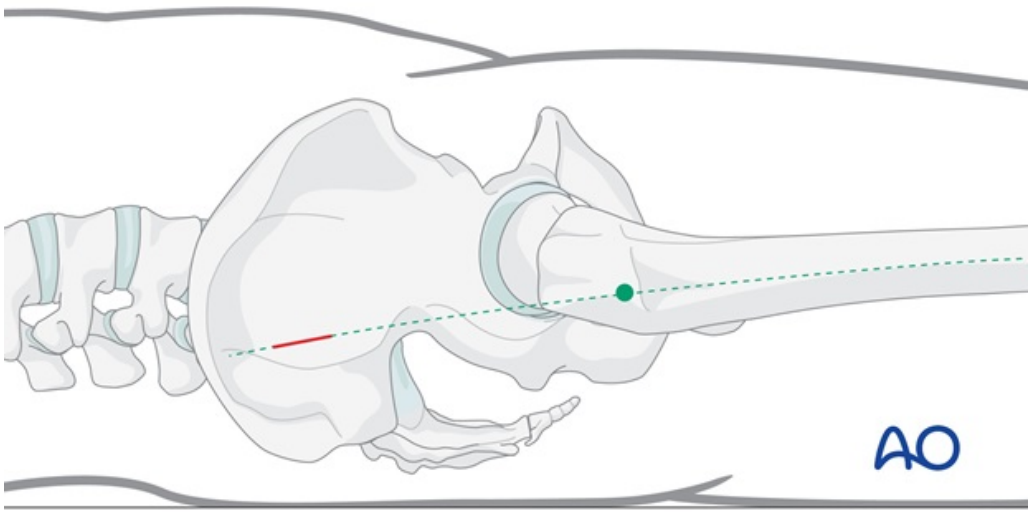
Approach



Incision for insertion :

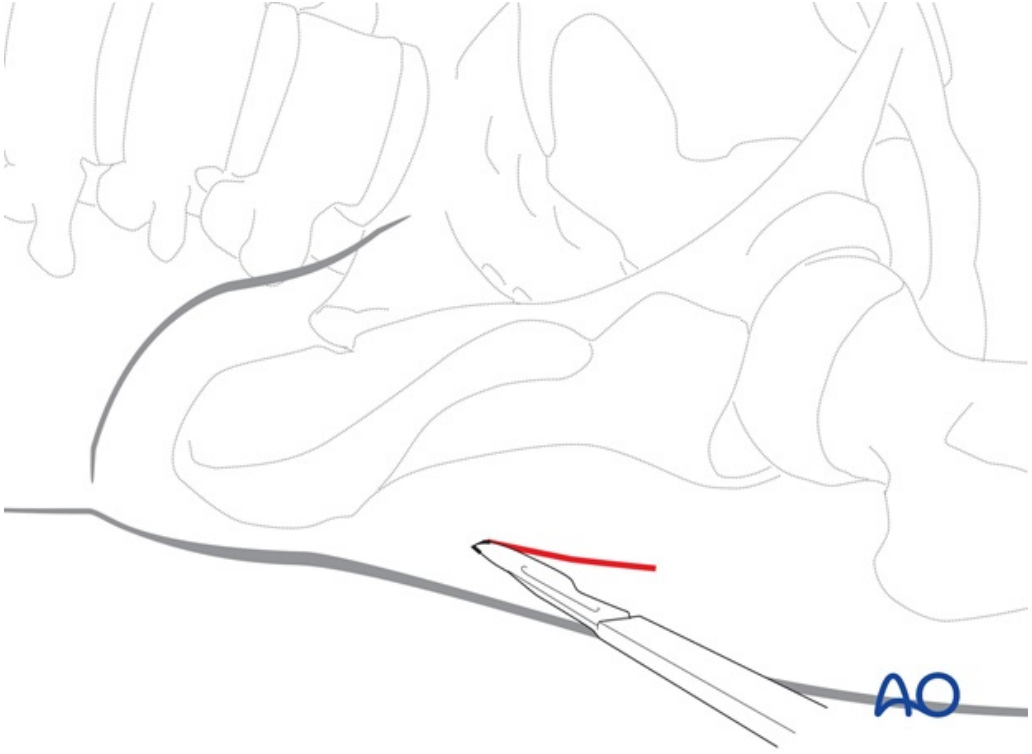
- On the curved “axis” (dashed line) of the femoral canal.
- In line with the path that instruments and nail must travel, to avoid errors that might lead to eccentric reaming, or perforation of the posterior femoral shaft

Localization of incision



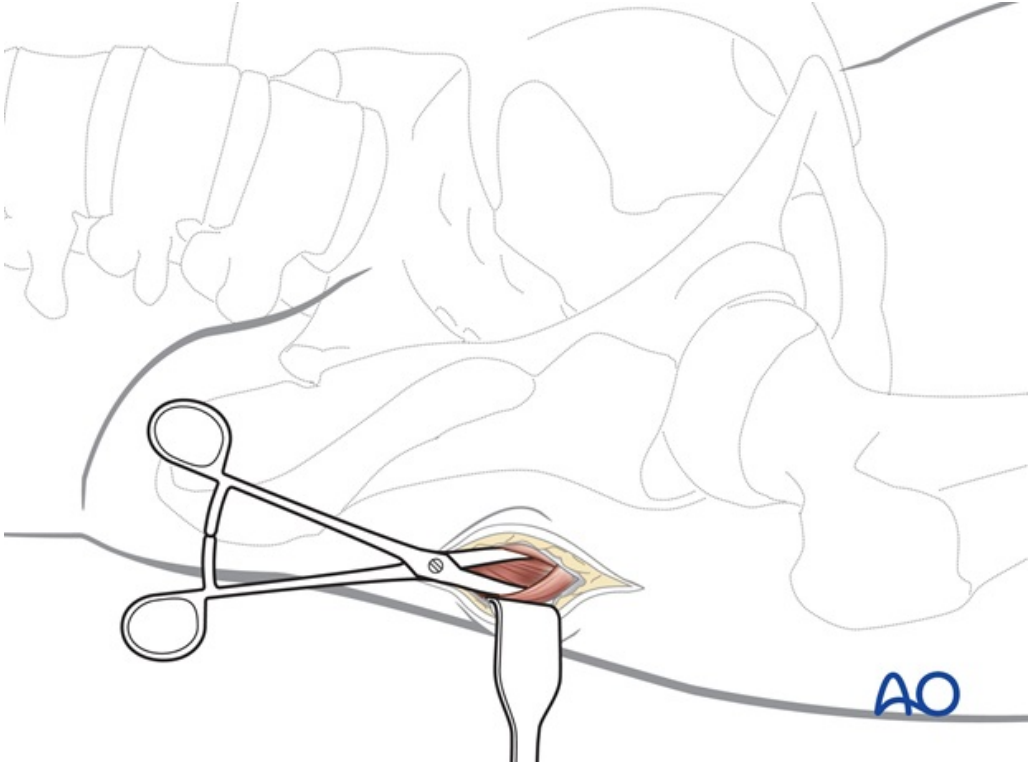
- Identify tip of the greater trochanter and the axis of the femur.
- Make a 3-5 cm skin incision proximal to the tip of the greater trochanter at level of the vertical line drawn from ASIS intersecting femur axis.

Superficial dissection



- Make a 3-8 cm straight longitudinal incision in the fascia of the gluteus maximus muscle, centered on the skin mark

Deep dissection



- Split the fibers of the gluteus maximus muscle by blunt dissection to gain access to the tip of the trochanter (by finger or scissors)

Technique

Determination of the entry point

- Correct entry point is located at the junction of the anterior third and posterior two-thirds of the tip of the greater trochanter and on the tip itself (Fig. 22).

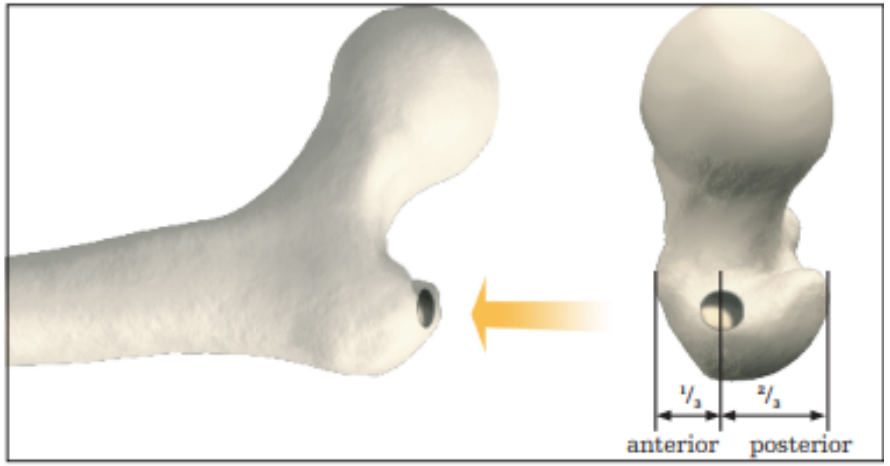


Fig. 22

- Through using cannulated curved awl , we gain entry point and perform medullary canal cortex opening under image intensification. (Fig. 23).

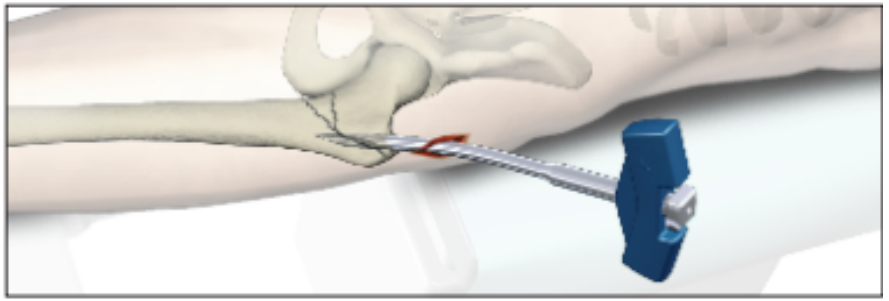
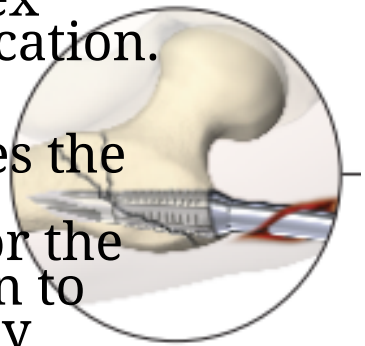
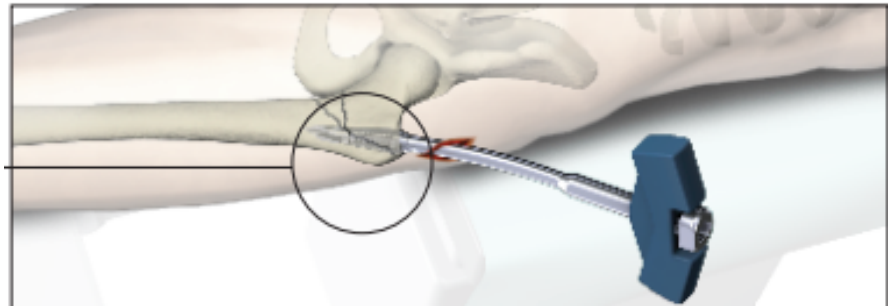


Fig. 23

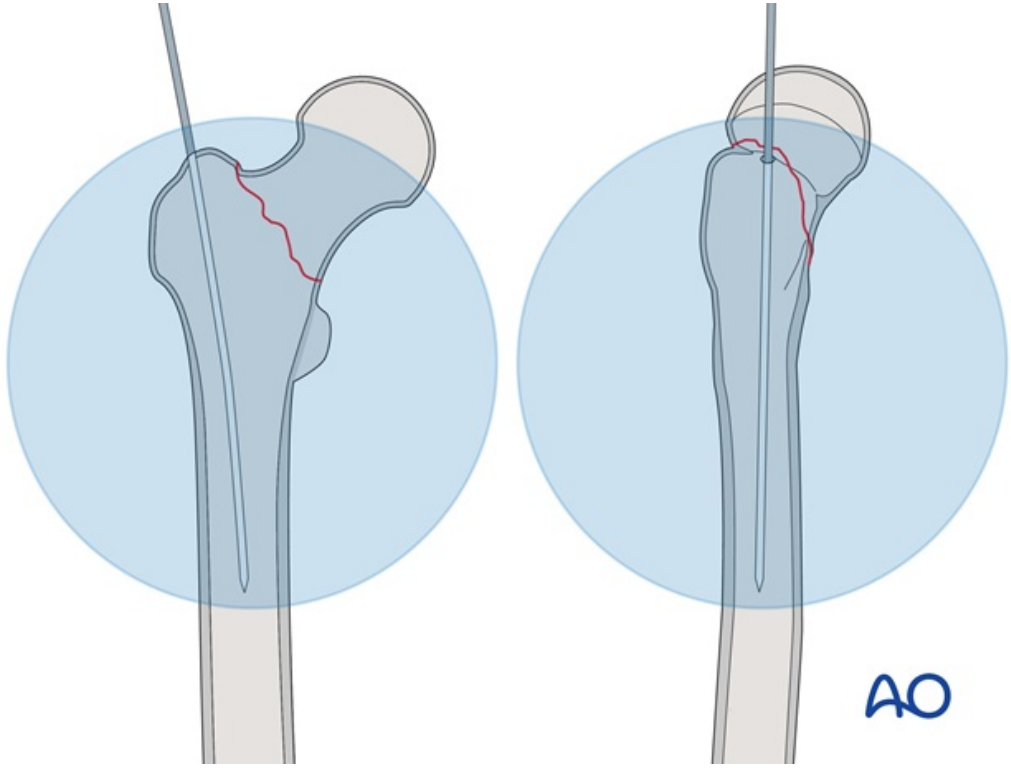
- The optional rasp awl combines the feature of the rasp and awl to prepare the proximal femur for the PFNA. It may provide an option to open the proximal femur cavity





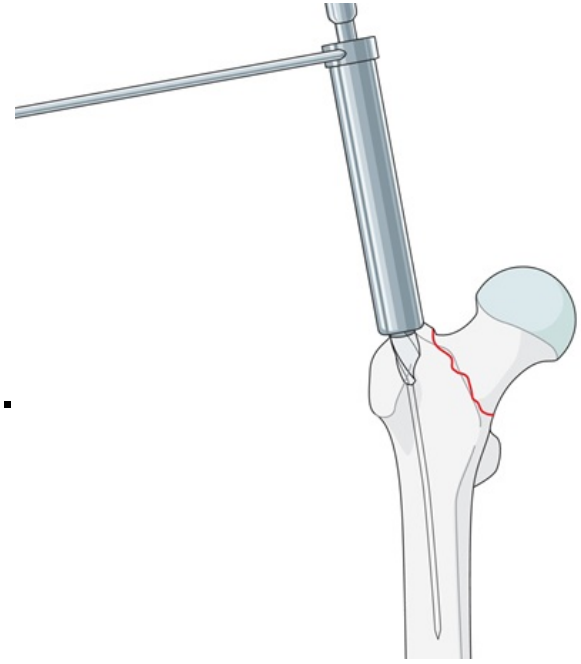
Guide-wire insertion

- The guide wire's position in the femoral shaft should be central and deviate slightly proximally according to the **degree of the lateral bend** of the implant in the AP plane.
- In the axial view (Lateral) it must be in line with the middle of the femoral neck.



Reaming and nail insertion

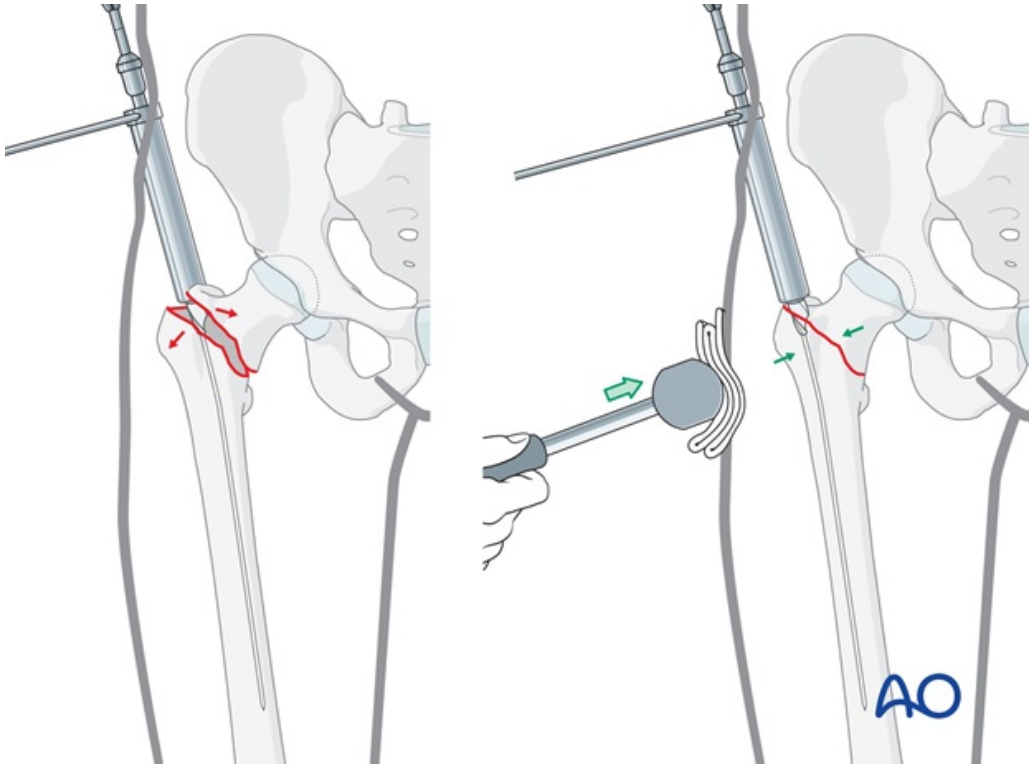
- **Opening of the femur**
- Insert the protection sleeve over the guide wire and push it through the soft tissues until it abuts against the greater trochanter.
- Ream out the trochanteric area.



- *Only in exceptional cases, where the medullary canal is smaller than the chosen nail, it will be necessary to overream the femoral shaft so that its diameter is 1 mm greater than that of the chosen nail.(to avoid cortex fracture & prevent proximal migration of nail)*

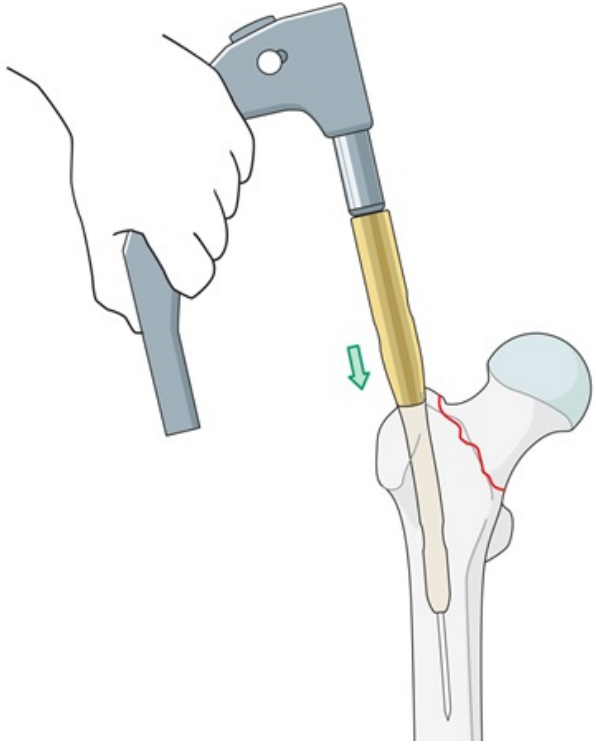
Pearl: Maintaining reduction during reaming

- If the fracture passes through the nail entry site, a **medially directed force** applied to the lateral trochanteric region helps prevent drills or reamers from displacing the greater trochanteric segment(s) laterally.
- This allows reaming of a channel for the nail, so that its insertion does not distract the fracture

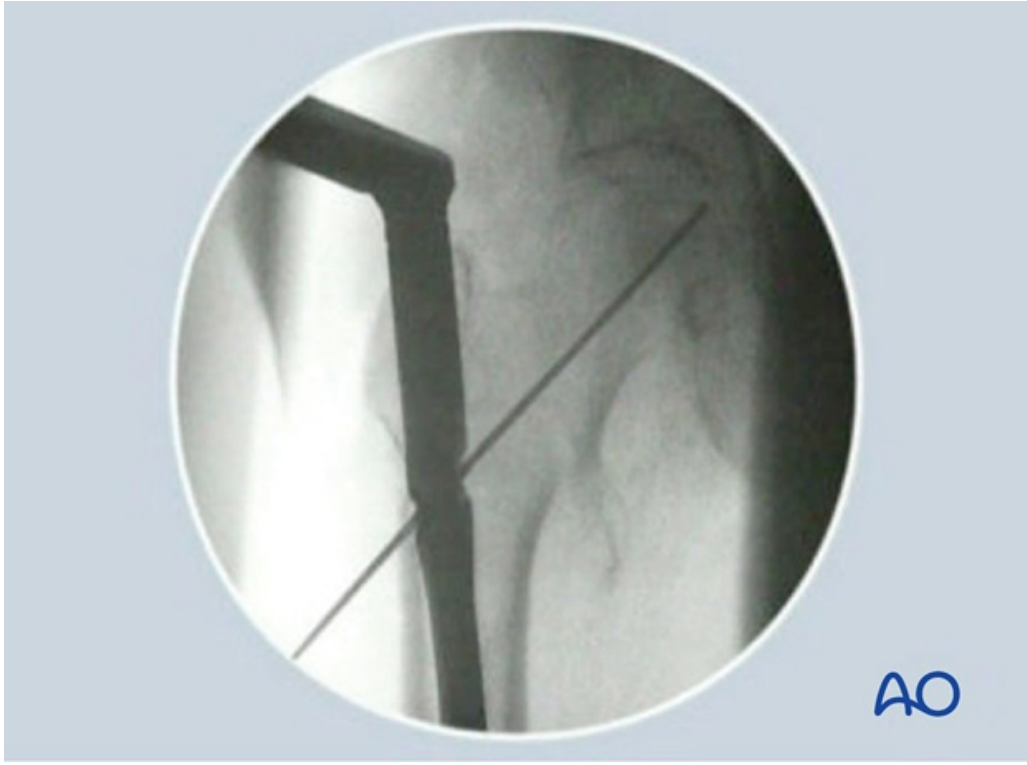


Nail insertion

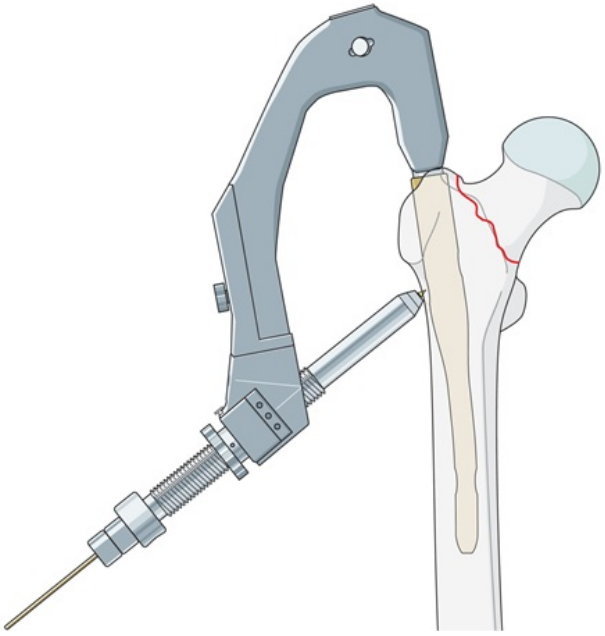
- In most patients the nail, mounted on the insertion device, can be inserted manually.



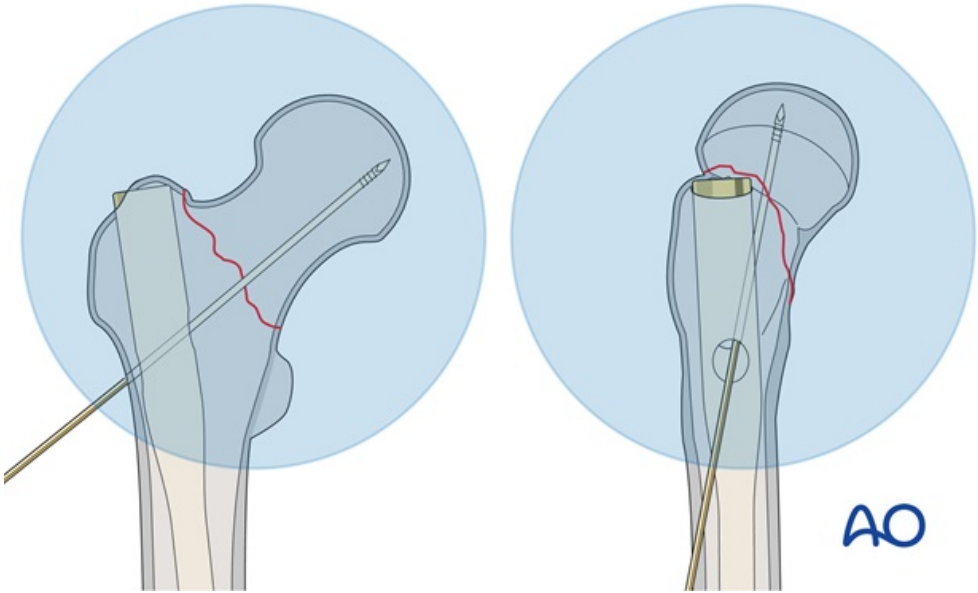
- Use the image intensifier as a help and insert the nail to such a depth that it will allow the lag screw or blade to be placed through the middle of the femoral neck.(over AP & Lat views)



Insertion of lag screw or blade



- The ideal position of the guide wire in the AP plane is in line with the axis (Central) of the neck or slightly in the lower half.
- In the lateral view it must be in line with the axis (Central) of the neck.



Lag screw positioning using the **one shot device**

- This device is designed to enable correct positioning of the K-wire for lag screw placement

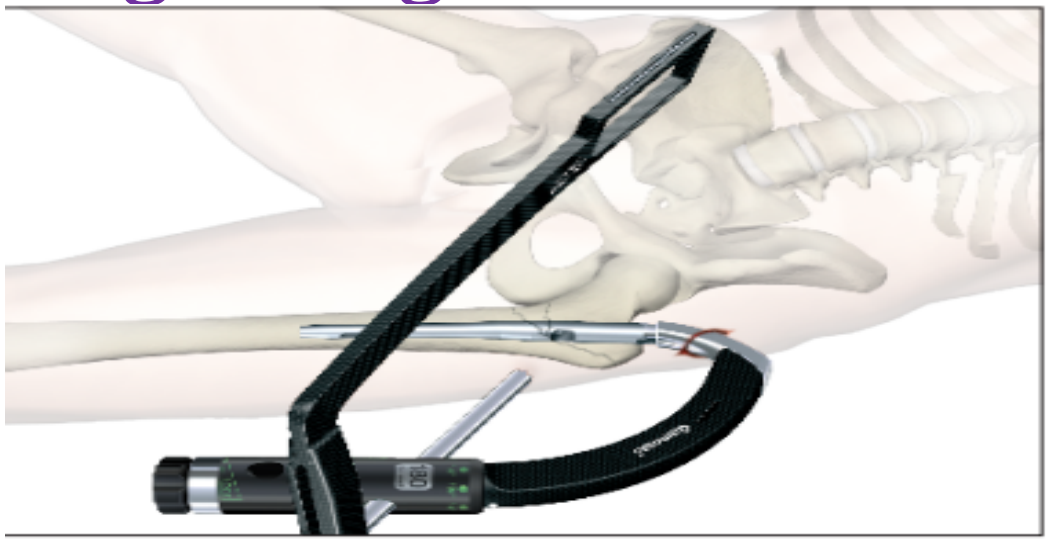


Fig. 46
Positioning of nail depth

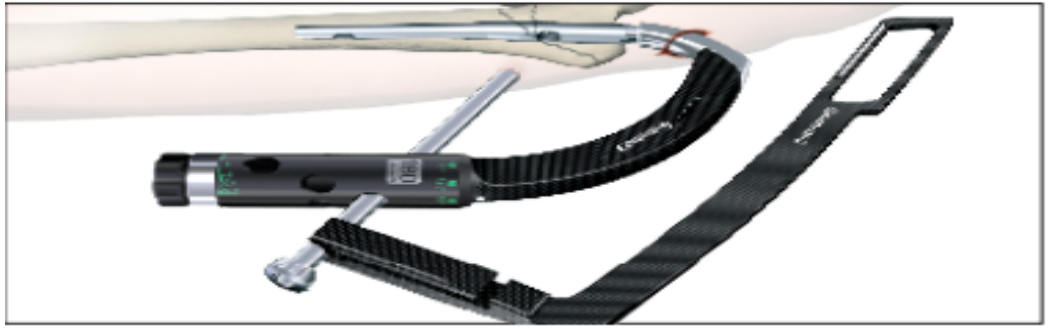
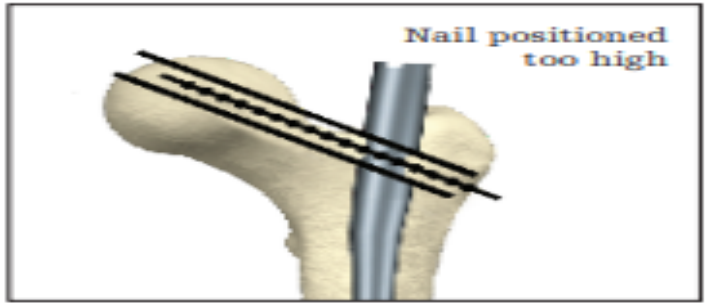
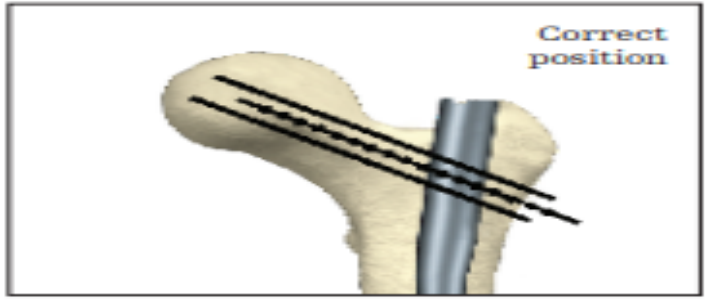


Fig. 47
Positioning of anteversion





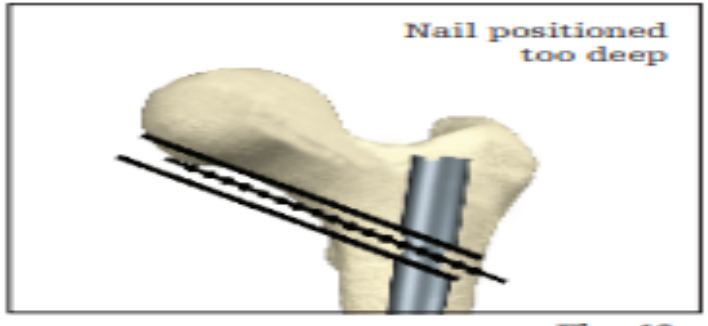


Fig. 46a
A/P view

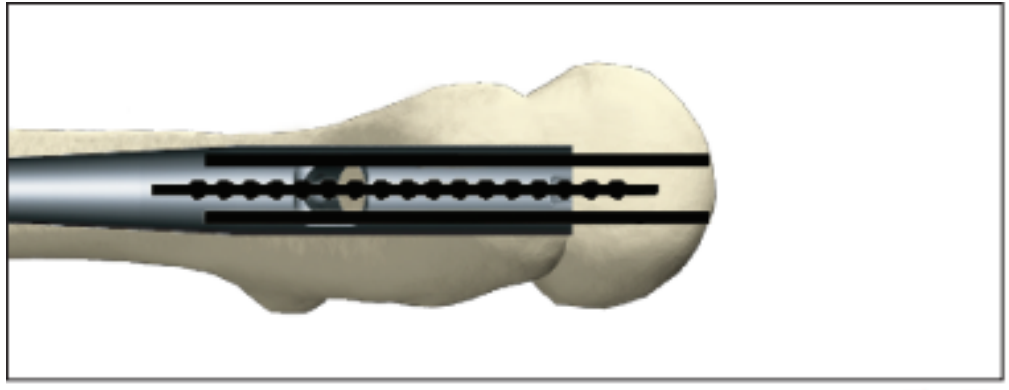


Fig. 47a
Lateral view

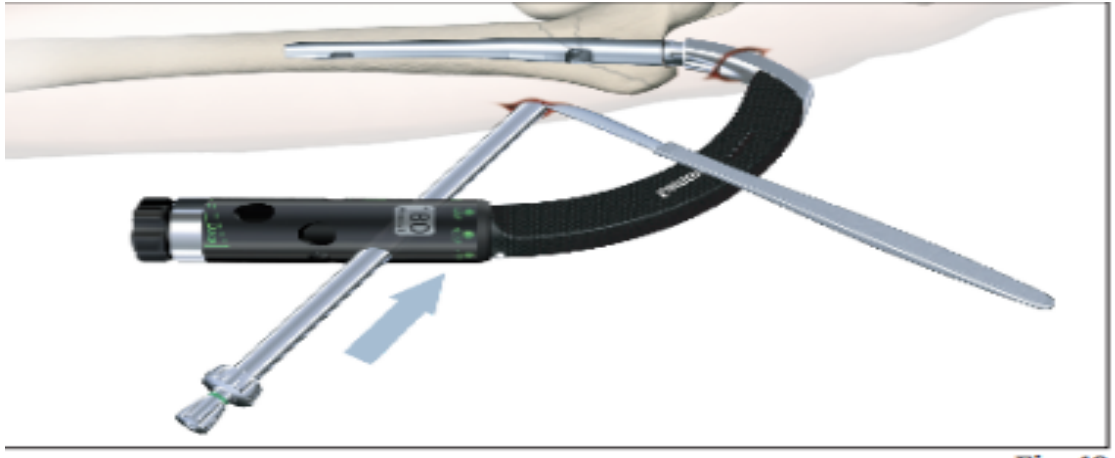


Fig. 48

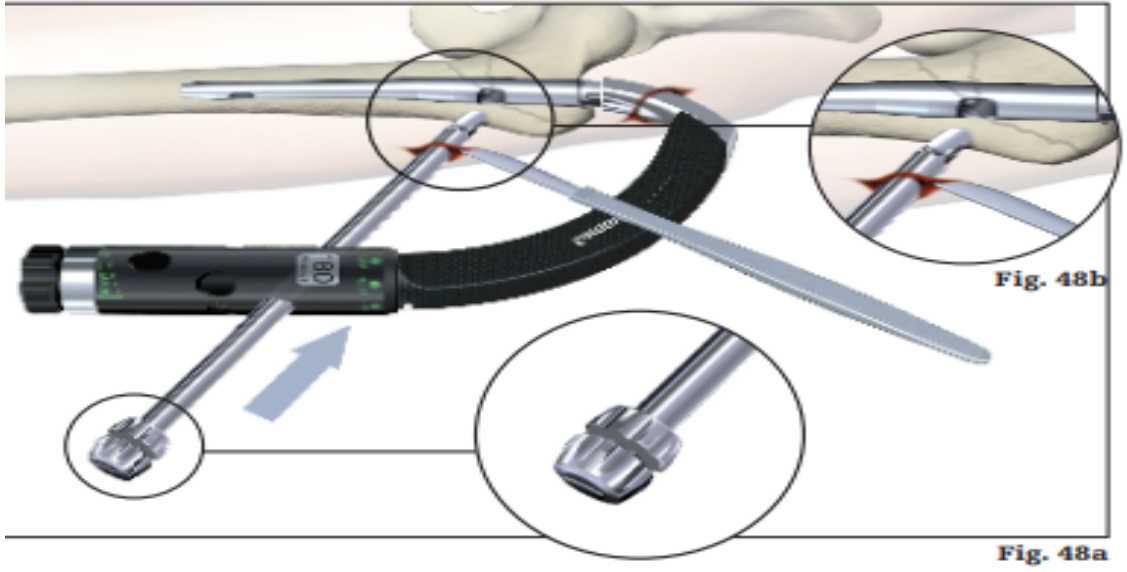


Fig. 48b

Fig. 48a

- For an accurate lag screw length measurement, the outer guide sleeve must be in good contact to the lateral cortex of the femur

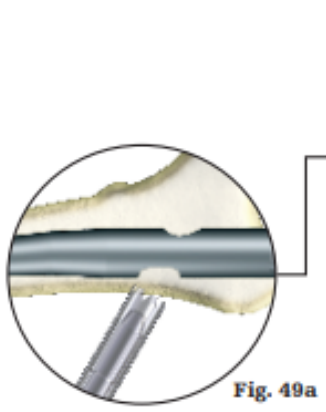


Fig. 49a

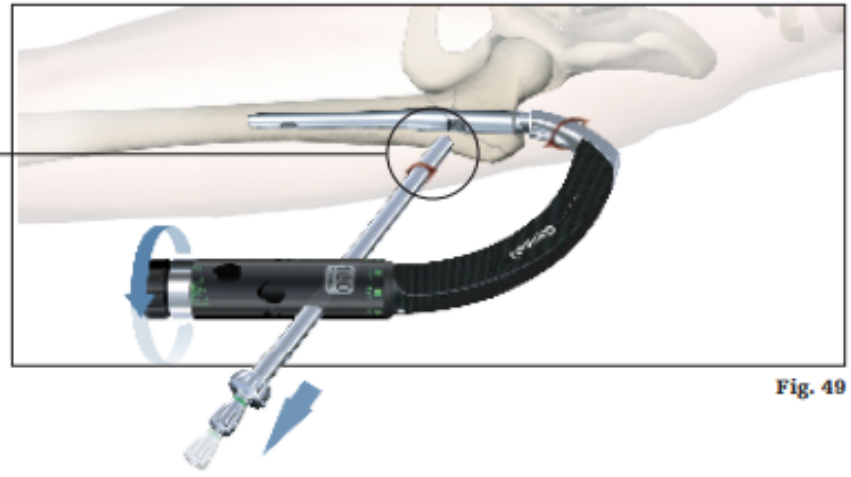
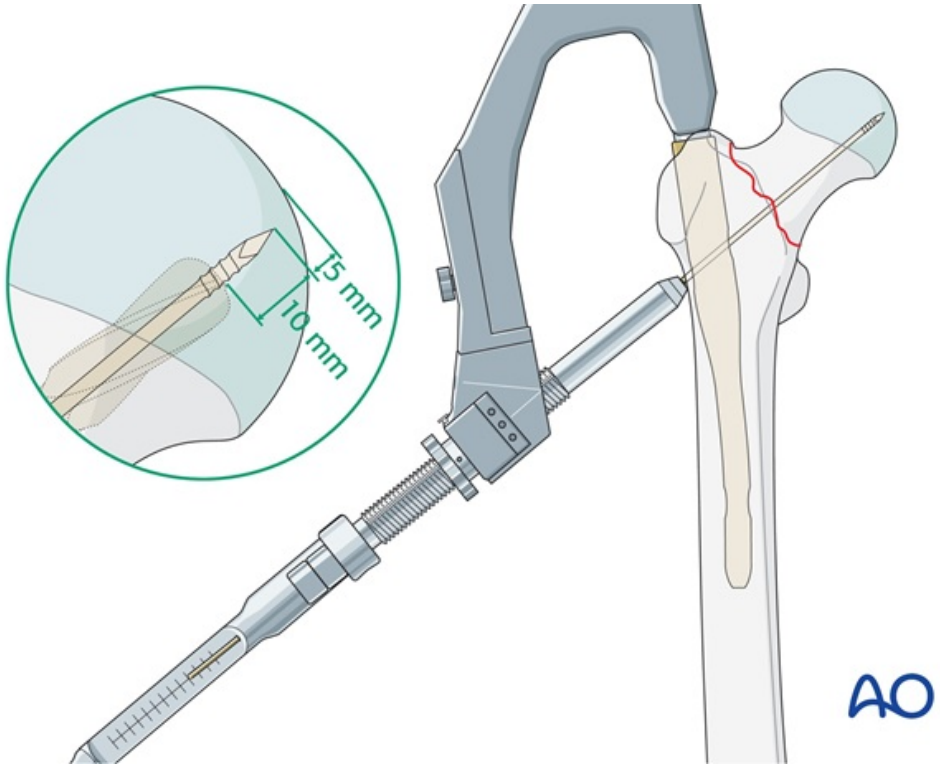


Fig. 49

- The guide wire is inserted subchondrally into the femoral head.
- Its tip should end 5 mm proximal of the joint.



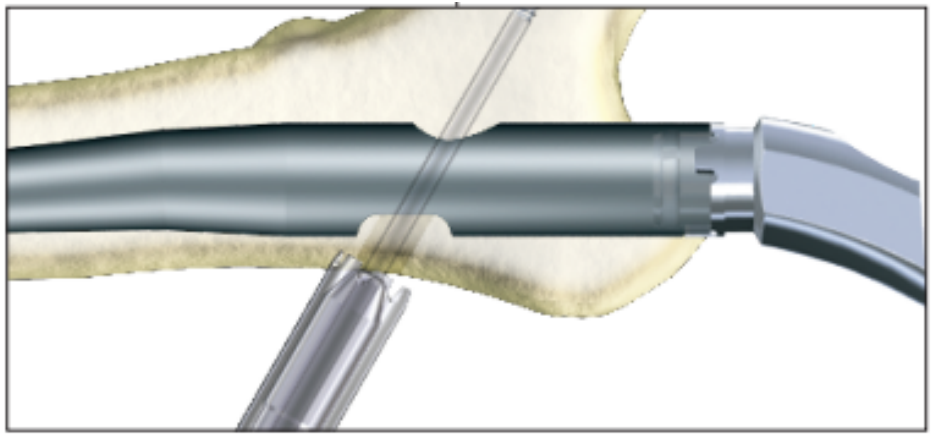


Fig. 52a

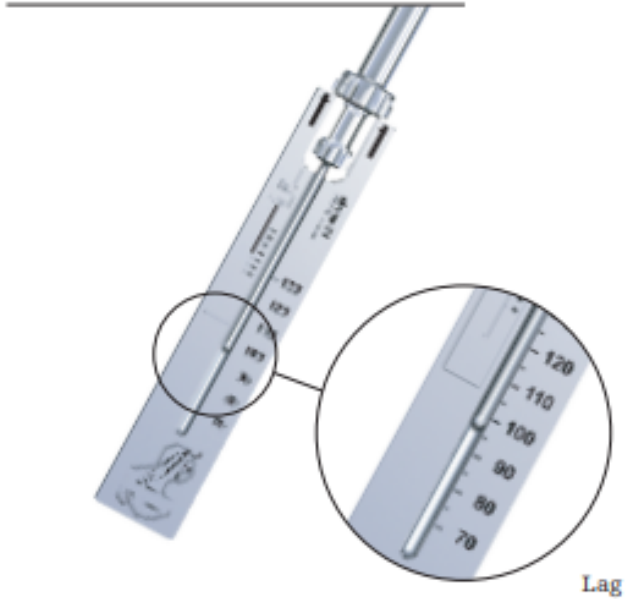


Fig. 53
Lag screw length measurement

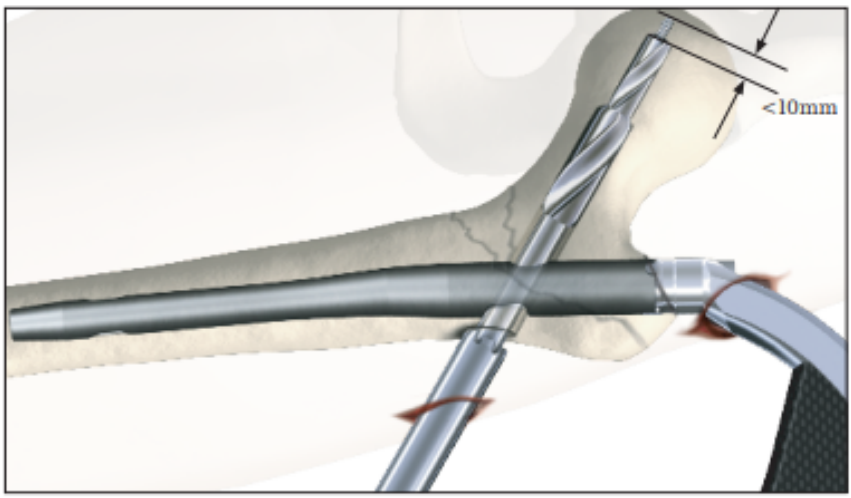


Fig. 57

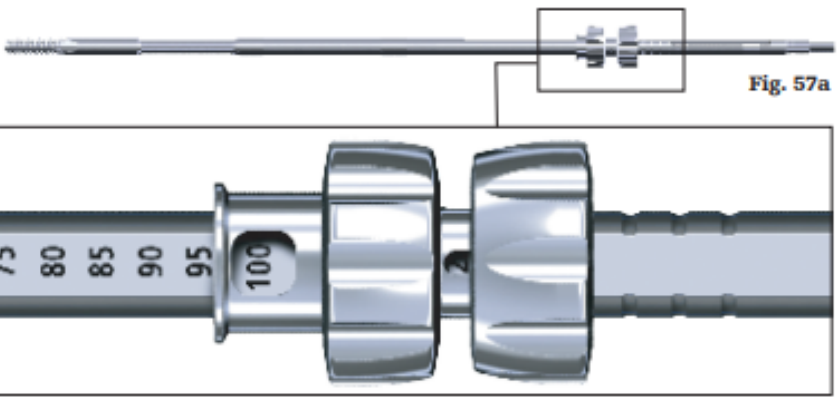


Fig. 57a

Fig. 57b

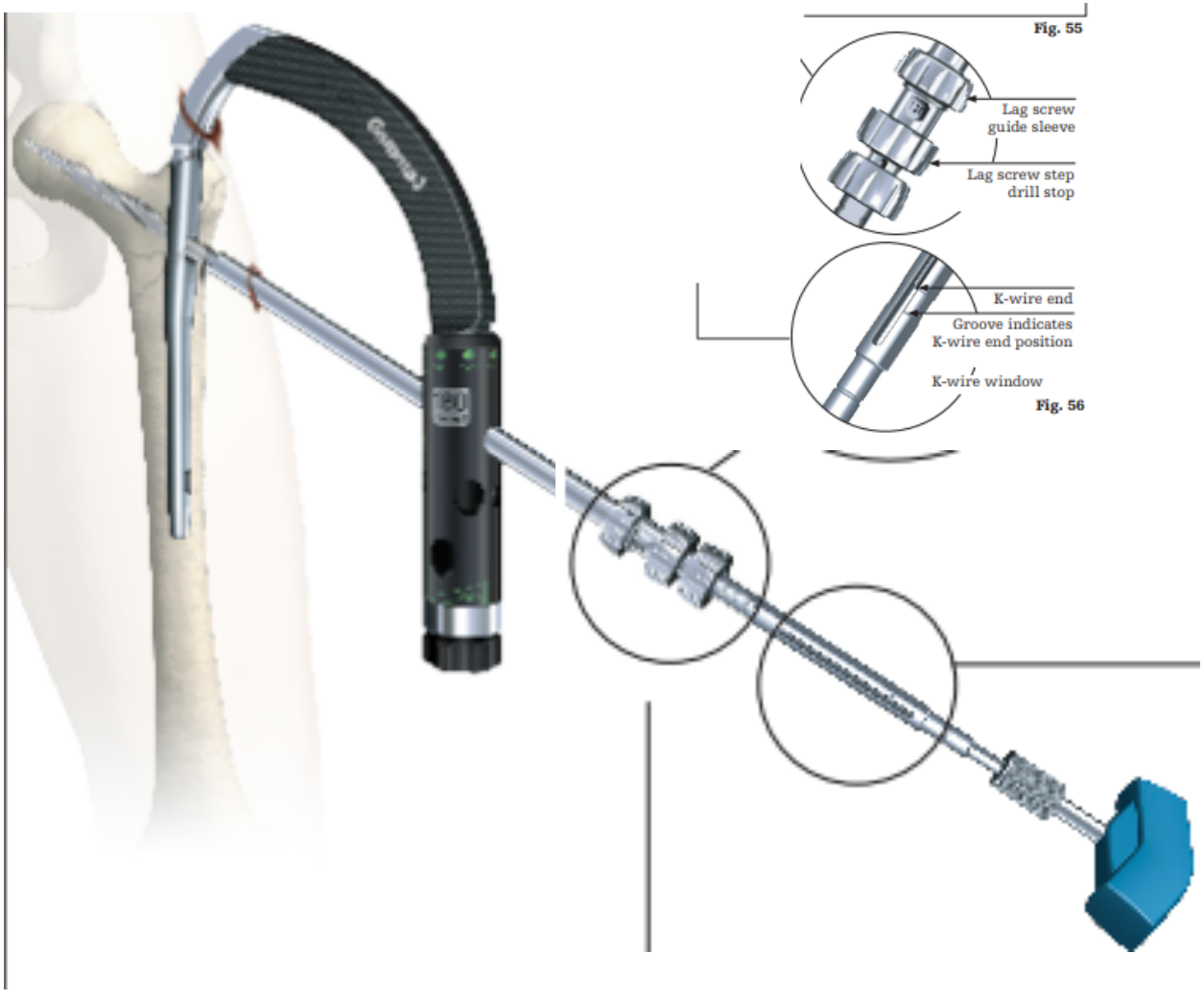


Fig. 55
Lag screw guide sleeve
Lag screw step drill stop
K-wire end
Groove indicates K-wire end position
K-wire window
Fig. 56

Set screw insertion

- Set screw insertion
- The set screw must be used.
- The use of the set screw is not optional

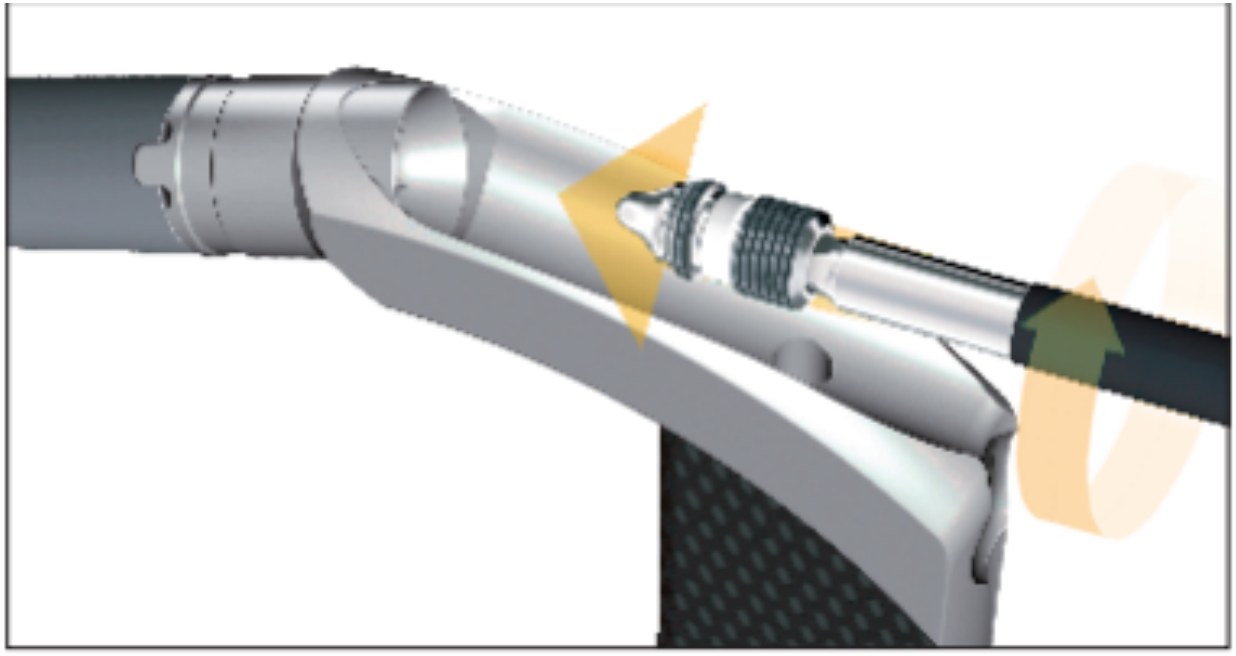
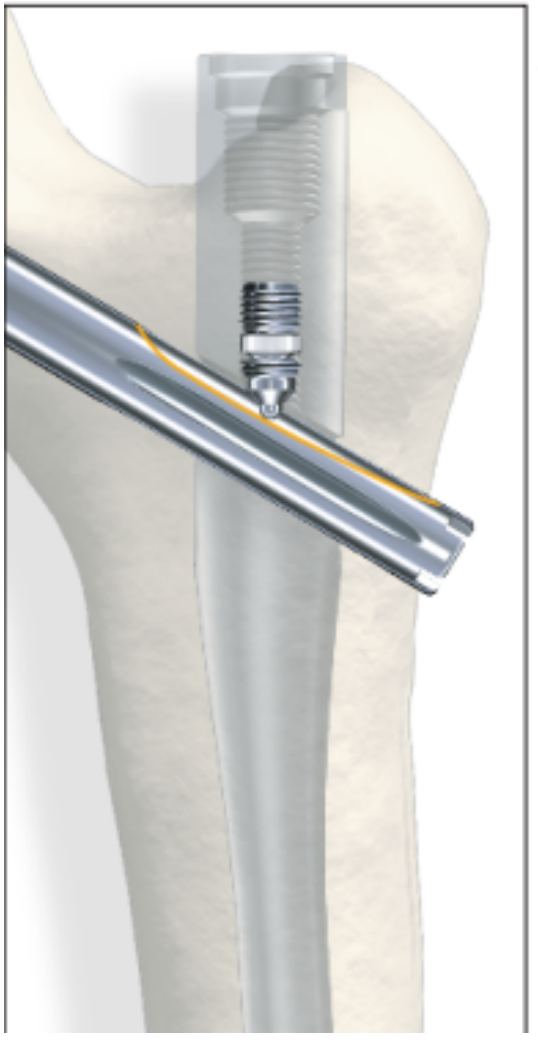


Fig. 61
Set screw insertion

Lag screw fixation

- To verify the correct position of the set screw, try to turn the lag screwdriver gently clockwise and counterclockwise .
- If it is not possible to turn the lag screwdriver, the set screw is engaged in one of the grooves .



Distal screw locking

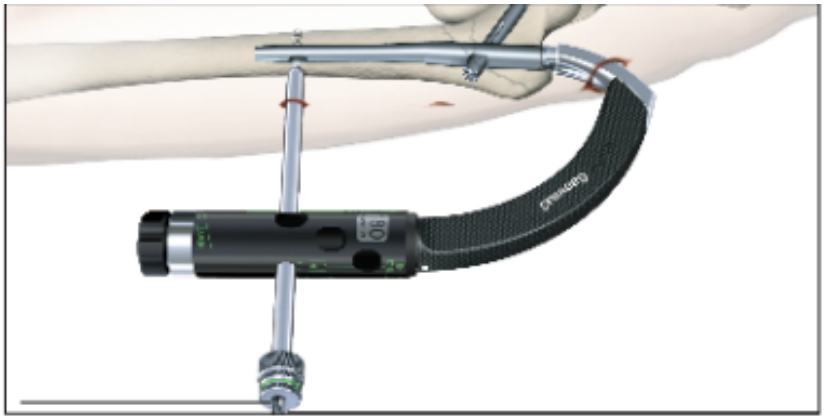
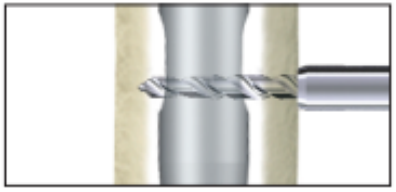


Fig. 66



+5mm

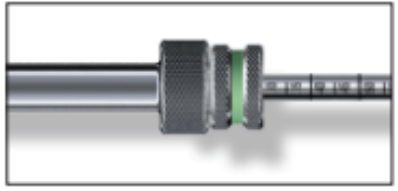
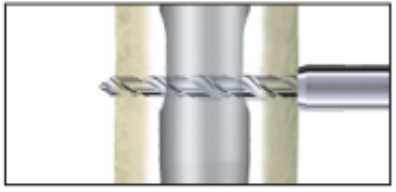


Fig. 66a



direct read out

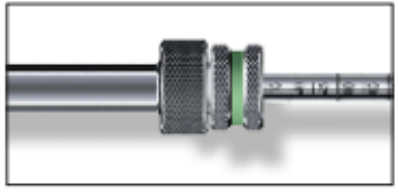


Fig. 66b

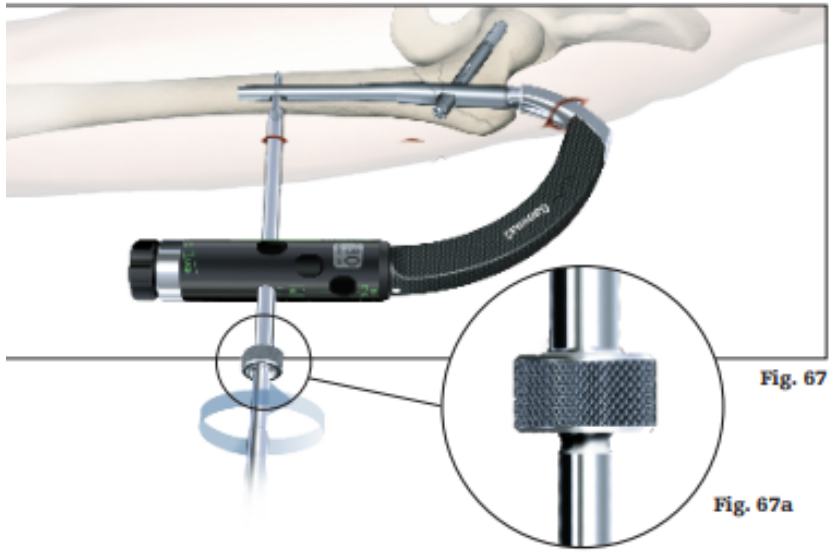


Fig. 67

Fig. 67a

Thank you