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Proximal femur 31-A1
ORIF

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ORIF: Sliding hip screw

1 Preliminary remarks

Preliminary remarks

The definitive decision for the treatment of an A1.3 fracture will be made after positioning of the patient and reduction of the fracture. Since emergency department x-rays are often of suboptimal quality, verification of the preoperative diagnosis using image intensification is necessary.

The lesser trochanter is the key in the decision making as to the choice of the appropriate fixation device.

In type A1 fractures, the lesser trochanter must be attached to one of the two fragments. In case it is not, we are dealing with another fracture type, and another treatment modality might be a better choice.

A1.1 and A1.2 fractures are generally called stable trochanteric fractures because after anatomic reduction and internal fixation there is little tendency to loss of reduction under physiological loading.

In A1.3 fractures, where the lesser trochanter is attached to the proximal fragment, closed reduction is usually impossible because the pull of the psoas muscle will flex and externally rotate the proximal fragment, and traction will not correct this displacement. Therefore, one usually has to carry out an open reduction.

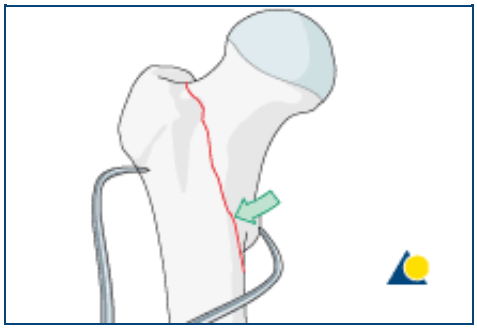
Note

Because of the intrinsic stability of these fractures (A1.1 and A1.2) after reduction, most implants will be adequate to maintain reduction and result in uneventful healing.

Simple extramedullary sliding devices like the DHS are the cheapest and most logical choices for fixation. The general concept of the application of these devices is shown on the next pages with the AO dynamic hip screw (DHS) used as an example.

2 Reduction

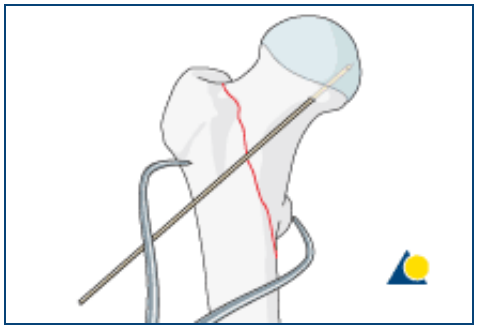
Closed reduction
The patient is positioned supine on the fracture table. The ipsilateral arm is elevated in a sling and the contralateral uninjured leg is placed on a leg holder.
Reduction is usually achieved by first pulling in the direction of the long axis of the leg in order to distract the fragments and regain length.
Next comes internal rotation.
The reduction must be checked in both the AP and lateral with an image intensifier. In case the closed reduction should fail, open reduction will be necessary.
One always starts with an attempt at closed reduction. If a satisfactory reduction is achieved, proceed with fixation as described below.



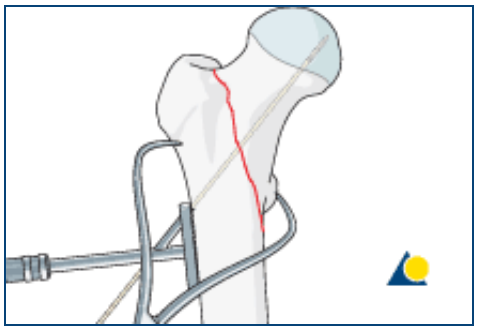
Open reduction
If closed reduction fails, carry out a limited open reduction. The lateral incision is enlarged as necessary by increasing its length and retracting the vastus lateralis anteriorly and medially. Direct visualization of the fracture site is usually unnecessary. Clear the fracture site of interposed soft tissue as needed. Then restore length and correct rotation. Fracture table adjustments are usually required.

Align the corresponding fracture surfaces so they are opposite one another. Then place a pointed reduction clamp so that one point catches the lesser trochanter. Reduction is achieved by closing the clamp.
Confirm the reduction with the image intensifier.

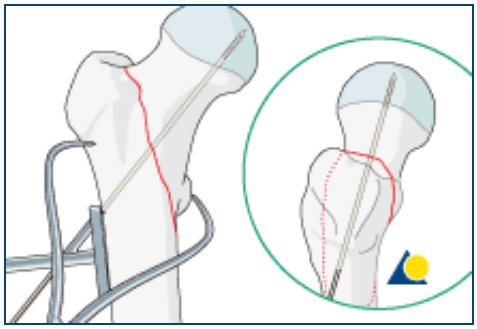
3 Guide wire insertion



Technique of insertion
The first step is to place a guide wire anteriorly on the femoral neck to aid correct placement of the definitive guide wire.
Using the C-arm, position the wire along the femoral neck parallel to its axis. Push it through the hip capsule, slide it along the neck, and gently tap it into the femoral head.
The guide wire demonstrates both femoral neck anteversion and neck-shaft angle, thus confirming appropriate sliding hip screw angle and definitive guide wire anteversion.



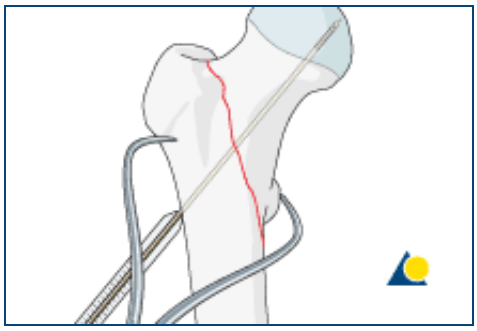
Application of the aiming device
Choose the correct aiming device according to the CCD angle of the neck. Check its position in the AP with the image intensifier.



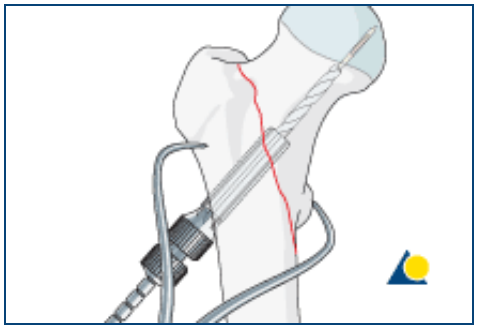
Insertion of a guide wire for the screw
Insert the guide wire through the aiming device, and advance it into the subchondral bone of the

head, stopping 10 mm short of the joint.
Position it so that in the AP it is in the caudal half of the neck and in the axial view in the center of the neck.

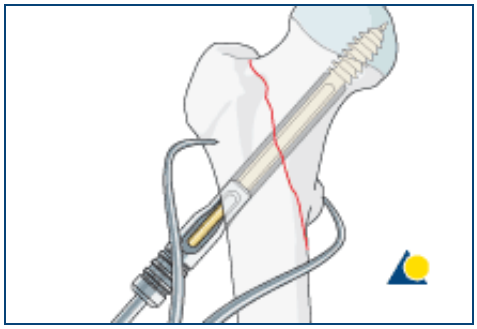
4 Insertion of sliding hip screw



Determination of the length of the DHS screw
Determine the length of the DHS screw with the help of the measuring device. Select a screw which is 10 mm shorter than the measured length.



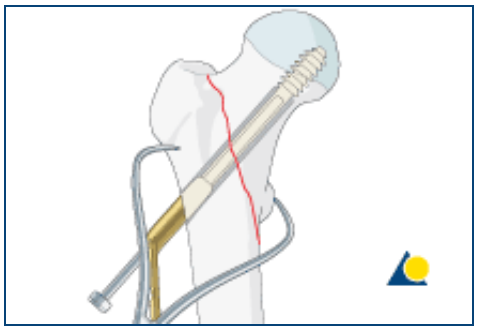
Drilling
Adjust the cannulated triple reamer to the chosen length of the screw.
Drill a hole for the screw and the plate sleeve.



Insertion of the femoral neck screw
The correct screw is mounted on the handle and inserted over the guide wire. By turning the handle it is advanced into the bone. Do not push forcefully or you may distract the fracture.
In young patients with hard bone, it is best to use the tap to precut the thread for the screw. Otherwise the screw may not advance, and you may actually displace the fracture by twisting the proximal fragment as you attempt to insert the screw.
When the screw has reached its final position (checked

with the image intensifier: 10 mm short of the subchondral bone in the AP and lateral) the T-handle of the insertion piece should be parallel to the long axis of the bone to ensure the correct position of the plate.

5 Plate fixation



Application of the DHS plate

Generally, for an A1.1 and an A1.2 fracture, a two hole DHS plate is enough. Take the plate with the correct CCD angle and slide it over the guide wire and mate it correctly with the screw.
Then push it in over the screw and seat it home with the impactor.

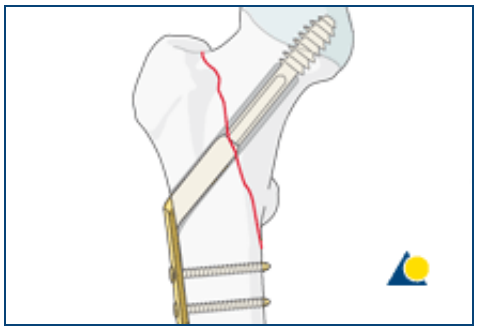


Plate fixation

Fix the plate to the femoral shaft with an appropriate number and size of plate holding cortical screws.

Note

There is no need to use the compression screw. As the patient bears weight, the fracture will impact and compress due to the sliding design of the implant.

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