AO TRAUMA

Perioperative preparation for an osteosynthesis of a proximal femoral fracture

Group discussion

Acknowledgements
This presentation is based on the PFNA presentation but adapted with corresponding X-rays and instruments for TFNA.
Contributors for PFNA-presentation:
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Review
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How to use this discussion?

Before the course

- Go through the presentation and make it your own. Add relevant pictures e.g. of drapes, material if you wish.
- Rehearse and make sure that the content is known.
- If you are two moderators (ORP and surgeon), decide on who will take the lead for which content.
- Some slides contain slide questions (titles).
- Other slides contain questions in the notes section which can be used.
- The hidden slides can be activated and discussed if wished.
- The reference list (slide 3) contains information for further reading.

During the course

- Lead the discussion by asking questions.
- Do not give another lecture!
- Motivate all participants to come up with the content.

Reference list

Topic	Reference
Patient preparation	**Orson J, Rusell-Larson D.** Patient. In: Porteous M, Bäuerle S, eds. *Techniques and Principles for the Operating Room.* Stuttgart New York: Thieme; 2010:17–31.
Intramedullary techniquest	**Wong MK.** Intramedullary techniques. In: Porteous M, Bäuerle S, eds. *Techniques and Principles for the Operating Room.* Stuttgart New York: Thieme; 2010:157–161.
Proximal femoral fractures	**Smith M, Porteous M .** Proximal femoral fractures. In: Porteous M, Bäuerle S, eds. *Techniques and Principles for the Operating Room.* Stuttgart New York: Thieme; 2010:440–497.
Diagnostic methods	**Guirguis R.** Diagnostic methods. In: Porteous M, Bäuerle S, eds. *Techniques and Principles for the Operating Room.* Stuttgart New York: Thieme; 2010:184–189.
Pre-operative planning	**Schelkun S.** Preoperative planning for ORP—the team approach. In: Porteous M, Bäuerle S, eds. *Techniques and Principles for the Operating Room.* Stuttgart New York: Thieme; 2010:190–197.
Reduction techniques	**Szypryt P.** Reduction techniquesl. In: Porteous M, Bäuerle S, eds. *Techniques and Principles for the Operating Room.* Stuttgart New York: Thieme; 2010:206–215.
Positioning, approach, reduction and other techniques	**Wolinsky P, Stephen D.** Femur, shaft. In: Rüedi T, Buckley R, Moran C, eds. *AO Principles of Fracture Management*, 2nd exp. Edition. Stuttgart New York: Thieme; 2007:767–785
Information WHO Surgical Safety Checklist on	http://www.who.int/patientsafety/safesurgery/ss_checklist/en/

Learning outcomes

At the end of the discussion the participants should be able to:

- Describe the fracture briefly
- Review the 4 AO principles of fracture fixation
- List nursing preparations for the internal fixation of a proximal femoral fracture

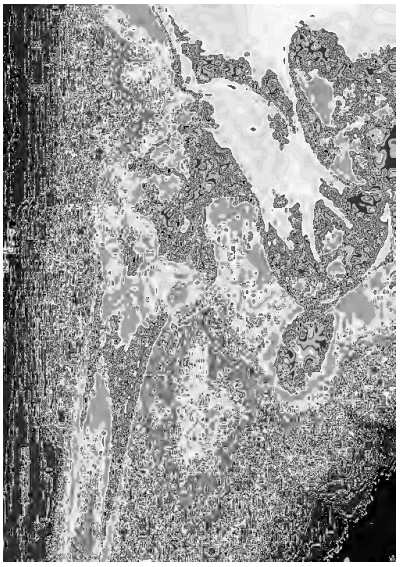
How to use the ppt?

- Focus on the 3 learning outcomes.
- The participants
    - Describe briefly the fracture.
    - Discuss possible treatment(s). In this discussion the treatment with TFNA is discussed.
    - Focus on peri-operative preparations for this particular treatment.

If available, use the workshop instruments to allow hands on individual instruments and to discuss and/or try out functionality of instruments.

Case presentation

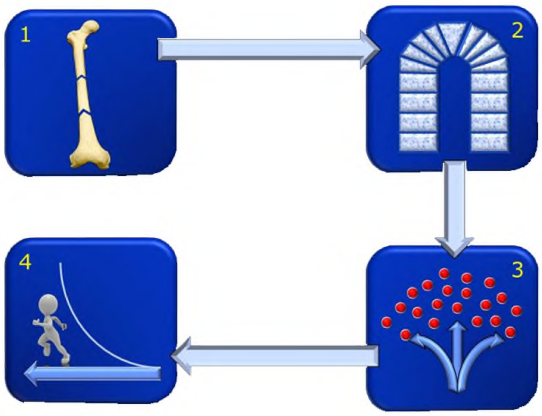
- 81-year-old man fell from staircase
- Right proximal femoral fracture



Include demention, obesity, diabetes type 2 as possible extra conditions for more advanced course participants. Adapt case and discussions accordingly.

This slide can be printed for the participants in case you wish them to follow the case during the discussion.

4 Principles of fracture fixation—Review



Briefly review the four principles of fracture fixation (if required). The participants have learned about this in a previous lecture. Explain that the entire case including preparation, treatment and after-care is based on these four principles.

Describe the fracture

Bone
Segment
Fracture type

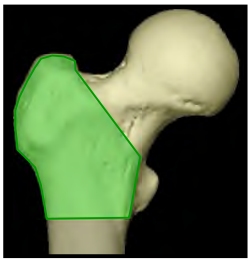
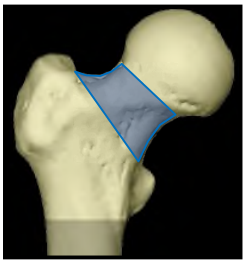
Other item(s) which can be discussed here is/are:

1. What x-rays, images are required? (Both x-ray views (lateral and AP) are needed. Both joints are checked.)
2. Which bone(s) is(are) broken?
3. Which segment is broken?
4. Which fracture type is this?
5. Is the fracture simple, wedge, or comminuted? What is the pattern of the fracture?
6. Is this fracture „stable“ or „unstable“?
7. Does the fracture go into the joint?
8. Is this an open fracture? (An open fracture is suspected when the bone sticks out, black bubbles are present (which indicates air) and/or dirt is visible (e.g. metal).

Describe the fracture

Bone	Femur
Segment	Proximal
Fracture type	Trochanteric

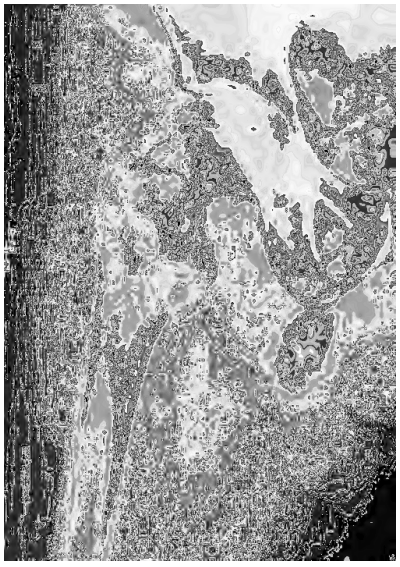
Describe type of proximal femoral fracture

A	B	C
Trochanter	Neck	Head
		
Extraarticular, trochanteric	Extraarticular, neck	Intraarticular, head

This slide can be included if wished.

How would you reduce the fracture?

How would you stabilize the fracture?



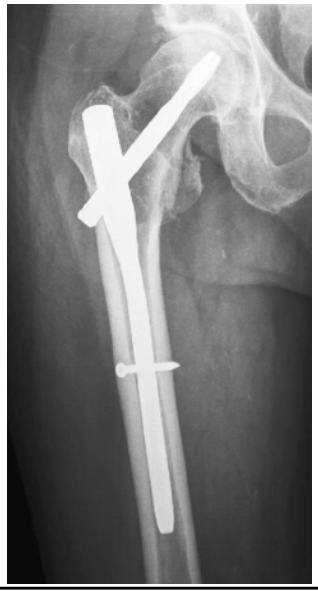
Other items which can be discussed here are:

1. What type of reduction will be performed? (direct or indirect, open or closed)
2. What are the principles of stabilization? (absolute or relative stability)
3. How could the fracture be fixed?
4. What healing is expected? (direct or indirect bone healing, primary or secondary bone healing)

For this unstable proximal femoral fracture…

…a recommended treatment is

internal fixation with a cephalic femoral nail (eg, PFNA, TFNA)



AO

This suggested treatment (see slide) will be discussed further in this discussion.

Other options, eg, cephalic screw-plate device (eg, DHS).
Discuss difference between the two devices:
- PFNA/TFNA load sharing allowing early weight bearing
- DHS load bearing, which usually does permit early weight bearing in an unstable fracture

Stable or unstable fracture (1/3)

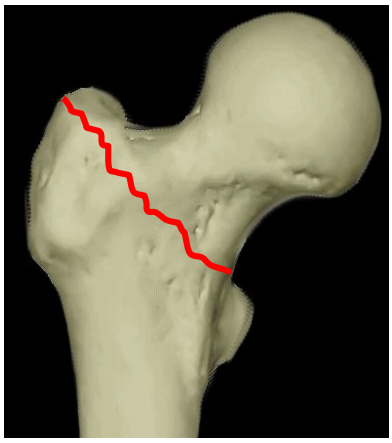
Include this slide if wished

A stable pertrochanteric fracture of the femur allows for an anatomical reduction especially of the medial buttress (calcar). If this has been achieved, the DHS is the ideal implant and allows immediate partial weight bearing. As soon as there is a fragmentation of the medial support, corresponding to an A2/3 type, the DHS risks to break due to fatigue.

Stable or unstable fracture (2/3)

Stable
after reduction

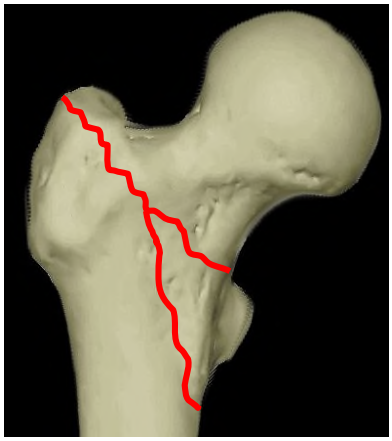
31 A.1

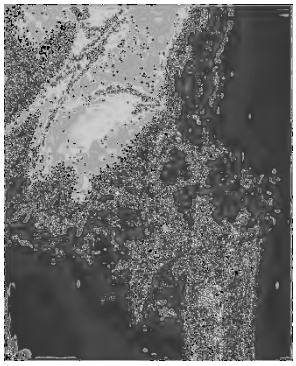


Include this slide if wished

Stable or unstable fracture (3/3)

31 A.2/3





Unstable

Include this slide if wished

Nursing preparations

Pre-, intra and post operative process

1. **P**lanning
2. **I**nstrument- and implant check
3. **P**rocedure

Discuss the nursing preparations related to this case.
In the next slides the following will be discussed in more detail:

1. Planning (including positioning, preparing of equipment etc. and draping)
2. Instrument- and implant check (including WHO-checklist)
3. Procedure (including approach and technique)

We use «P.I.P.» to facilitate the three steps (PIP of Planning, Instruments and Procedure).

Nursing preparations

Pre-, intra and post operative process

1. **P**lanning
2. **I**nstrument- and implant check
3. **P**rocedure

Starting with the planning process….

What do you need to prepare?

- Instruments
- Implants
- Equipment

…what do you need to prepare?

Please discuss with your participants the following items. The participants should come up with items for each bullet point. The following slides are **some** illustrations of what should be prepared.
You are free to include more slides with pictures if deemed required.

Instruments

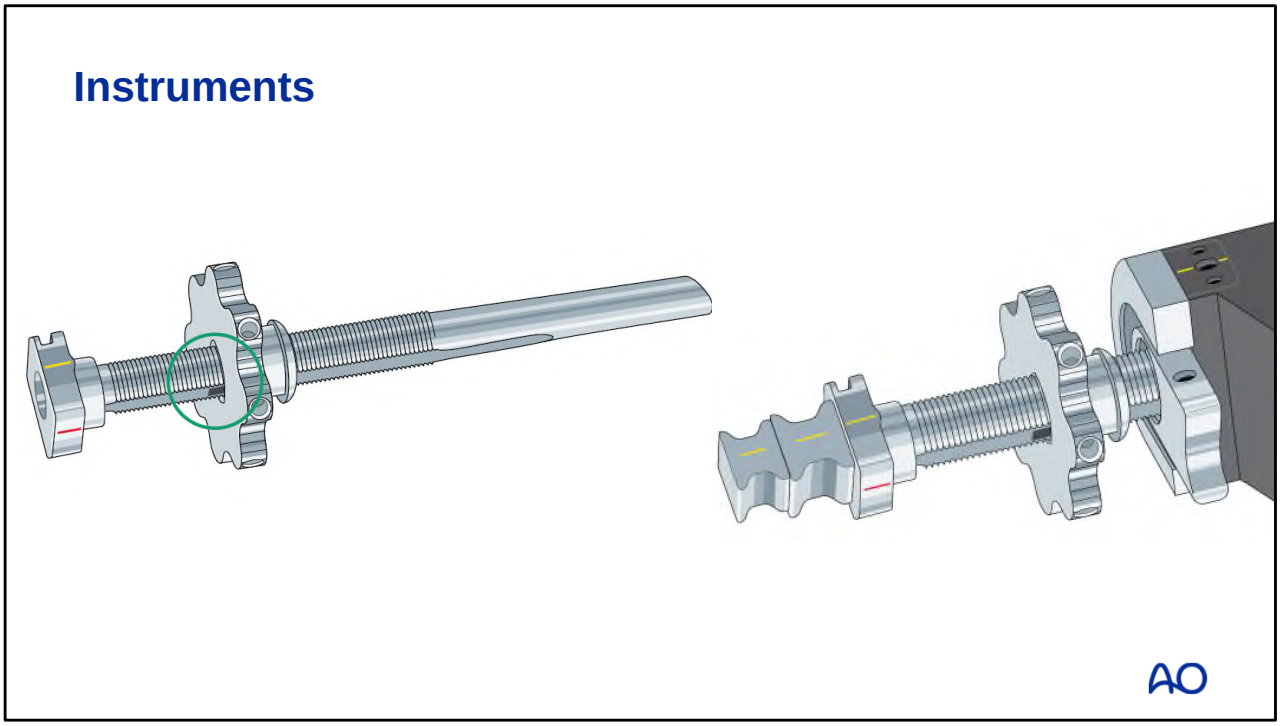
- Many instruments are similar to PFNA instruments

Most instruments for TFNA are very similar to the instruments for PFNA; opening of intramedullary canal, insertion of nail, locking, etc. The design of the instruments have changed, the purpose and use are still the same. Discuss with the participants what these instruments are and what the steps of technique are.

The following hidden slides are specific instruments for TFNA insertion.

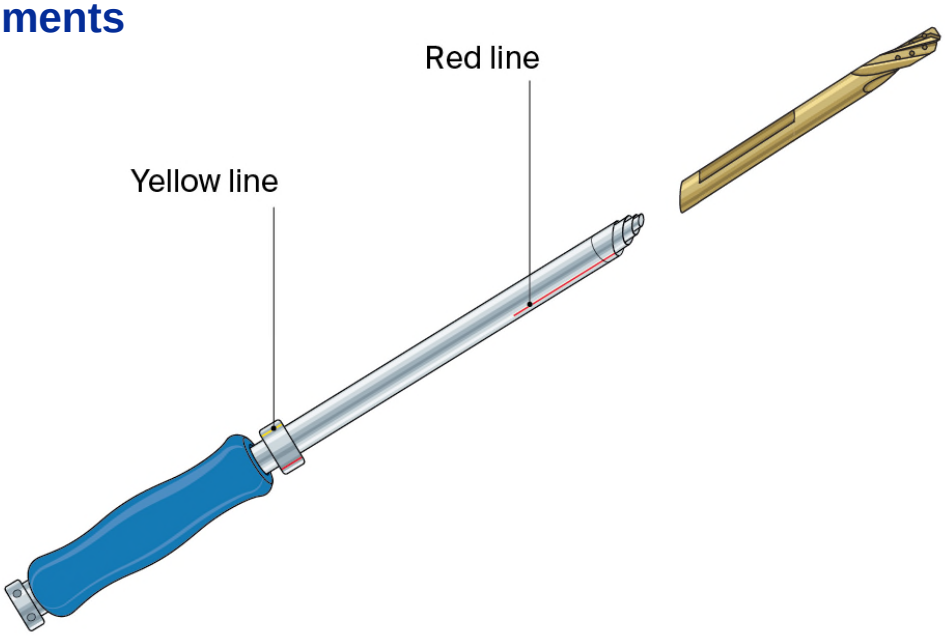
If available, use the workshop instruments to allow hands on individual instruments and to discuss and /or try out functionality of instruments.

1. Discuss material and equipment necessary for this type of intervention (Image intensifier, etc…).
2. Discuss specific instruments for fracture fixation with TFNA.
3. Discuss use and intra-operative care and maintenance of specific instruments.

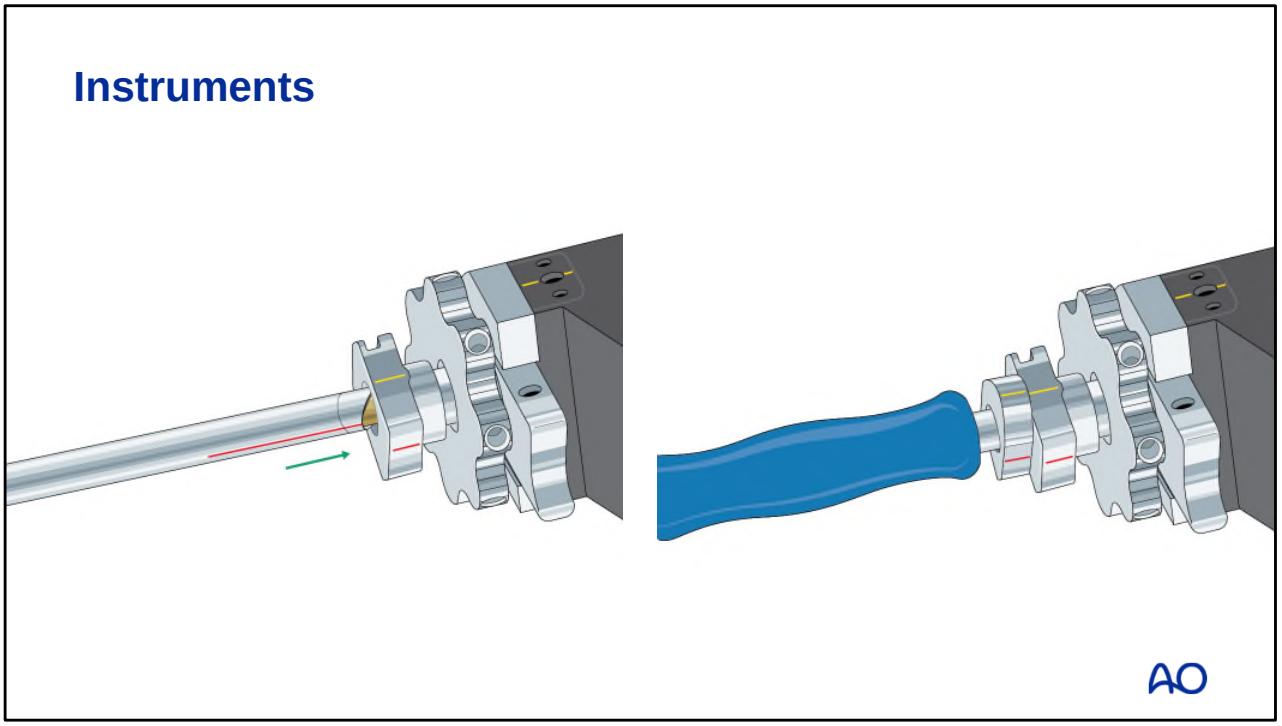


4-part trocart for insertion of blade.

Instruments

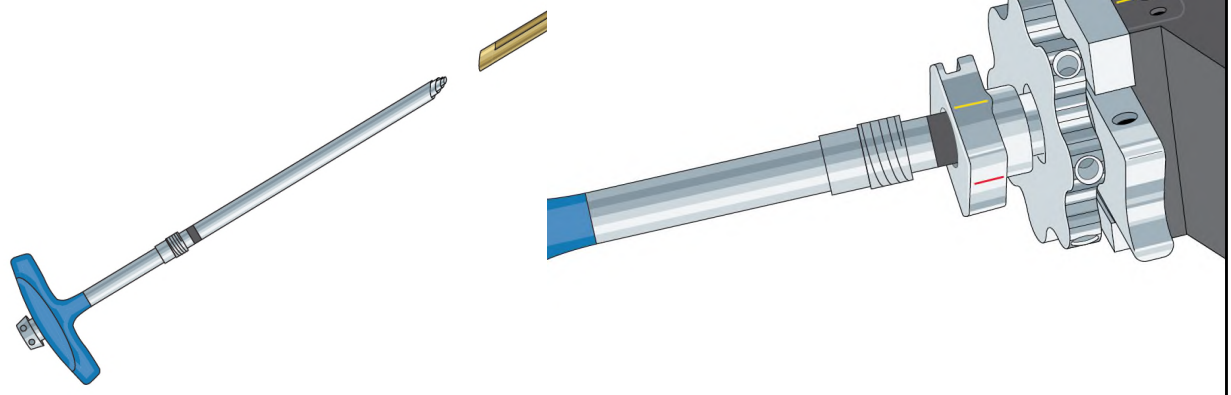


Inserter for blade



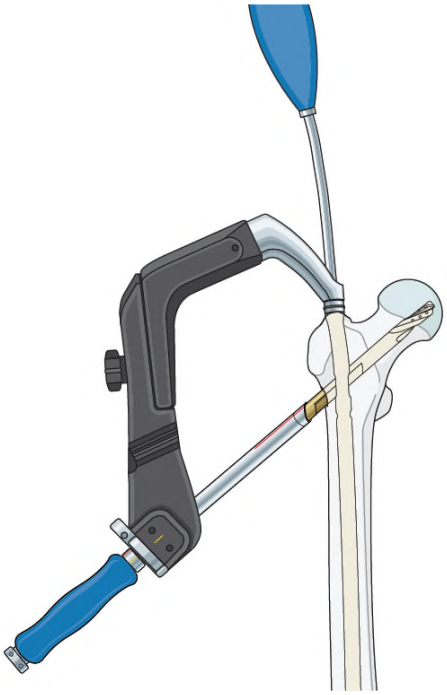
Blade insertion

Instruments



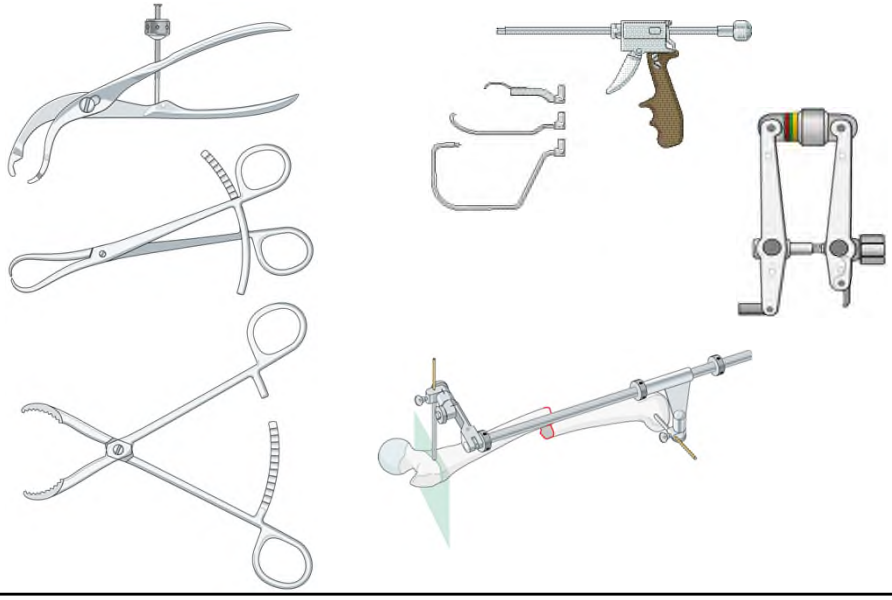
Screw insertion

Instruments



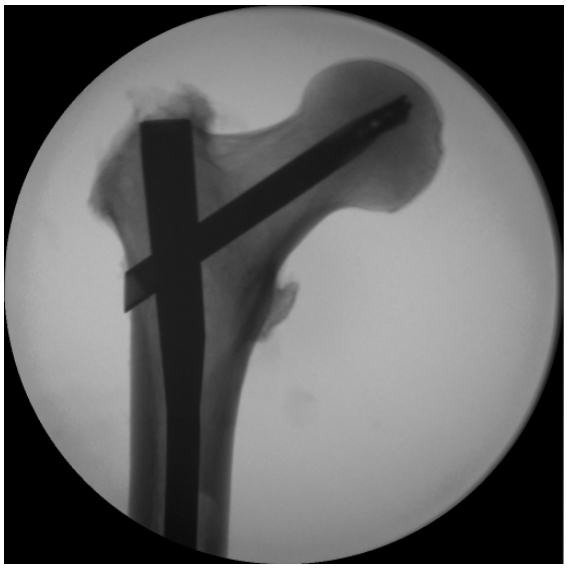
Locking of blade

Reduction (distraction) tools

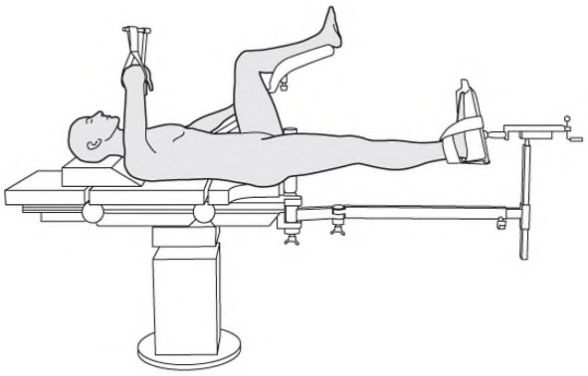


Implants

How would you position the patient?



How would you position the patient?

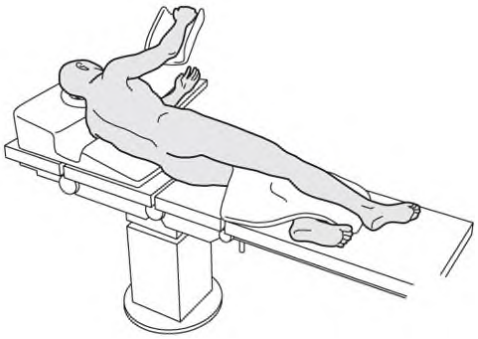


Other items which can be discussed here are:

1. Which possibilities for positioning exist?
2. Discuss safe positioning for the patient (accessories, OR-table, etc…).
3. Discuss tips and tricks.
4. Which complications might occur?
5. How can these complications be prevented?

Reference: https://www2.aofoundation.org/wps/portal/surgery

What about these possibilities?



Reference: https://www2.aofoundation.org/wps/portal/surgery

How would you drape for this case?

Nursing preparations

Pre-, intra and post operative process

1. Planning
   - Preparing (Equipment, instruments and implants)
   - Positioning
   - Draping
2. **Instrument- and implant check**
3. Procedure

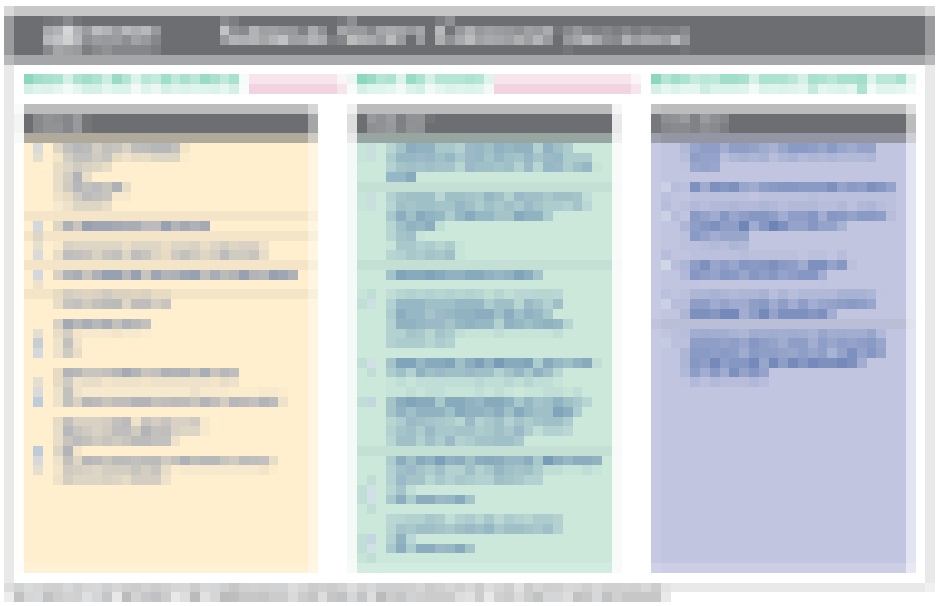
Only repeat this if deemed required. This subject is possibly already discussed in the previous discussion.

Questions which can be asked are:

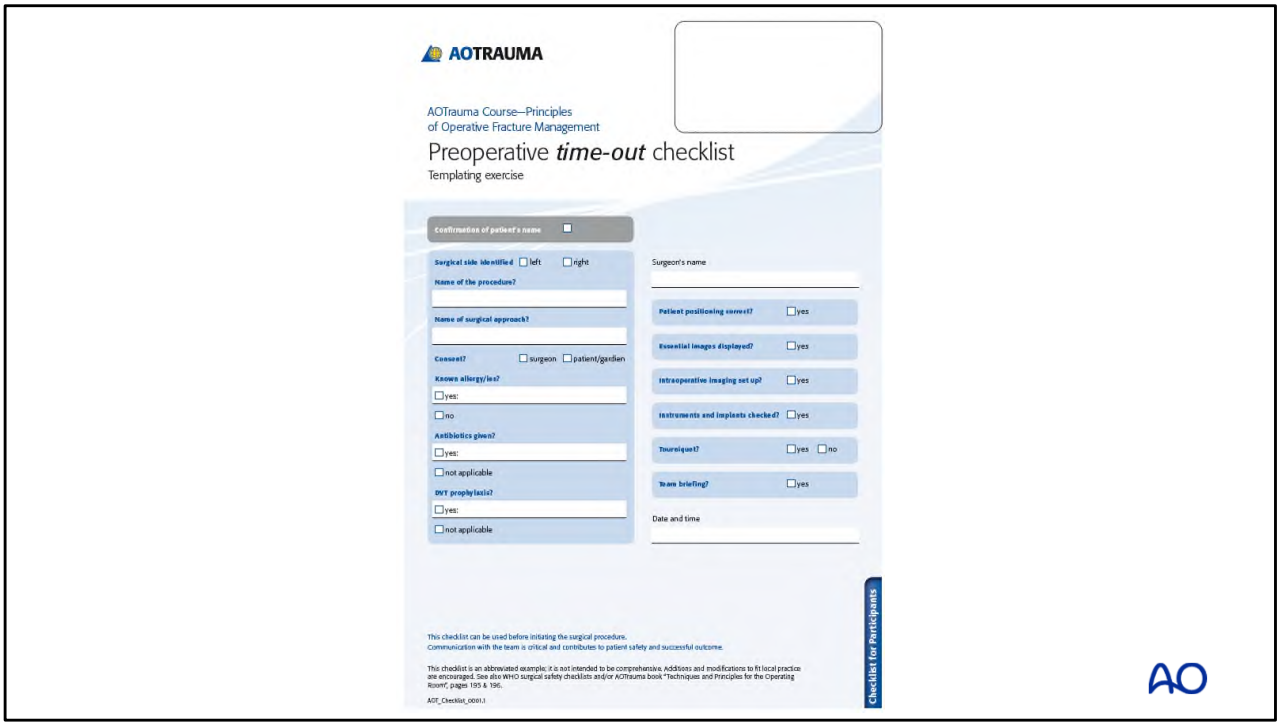
1. What is the final check before skin incision? (refer to Surgical Safety Checklist, see next slides)
2. Who does this systemically?
3. What is exactly checked? (availability of instruments and implants or more)

Ask those participants who perform systematically a safety check:
1. If they use a checklist adapted to their hospital?
2. If they use a general type of list (see WHO-checklist, AOTrauma checklist)?

WHO-checklist



This is probably discussed in previous discussions. Discuss this slide if wished and required.



This is probably discussed in previous discussions. Discuss this slide if wished and required.

Note that the time-out is only 1 part of the surgical safety checklist.

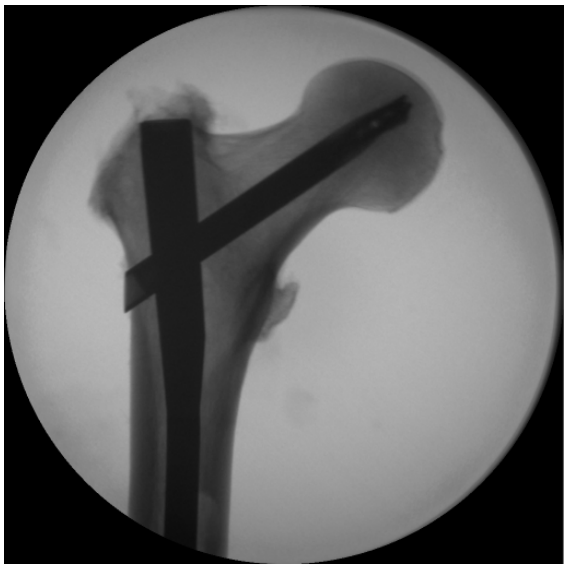
Nursing preparations

Pre-, intra and post operative process

1. Planning
   - Positioning
   - Preparing (Equipment, instruments and implants)
   - Draping
2. Instrument- and implant check
   - WHO-checklist/AOTrauma-checklist
3. **Procedure**
   - Approach
   - Technique

Discuss the procedure step-by-step starting with the approach.

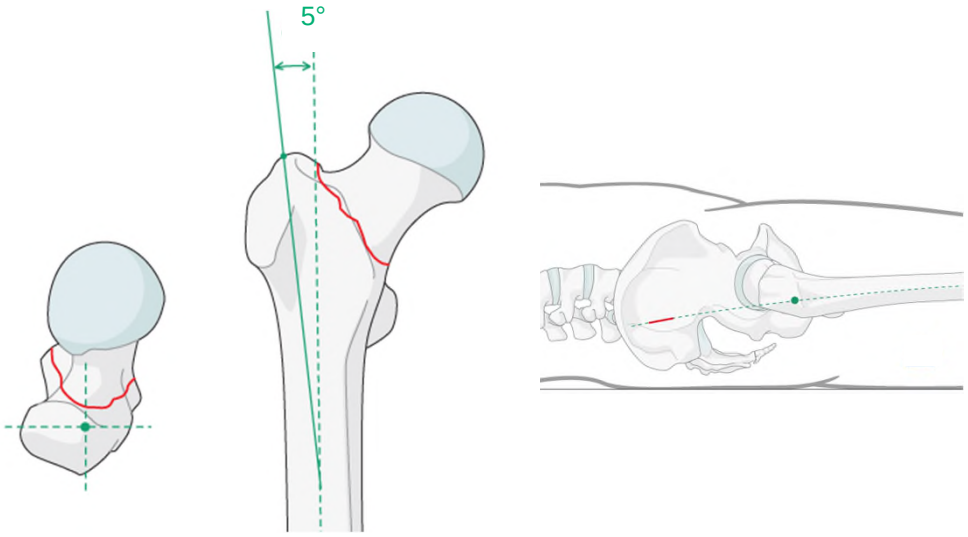
What approach could be done?



Other item(s) which can be discussed here is/are:

1. Discuss the open, closed and/or minimally invasive approach.
2. What is the impact regarding the soft tissues?

What approach could be done?



1. Determination of the entry point

Note that IM nails for A-type proximal femur fractures enter through the greater trochanter and not the trochanteric fossa.

The precise entry point in the greater trochanter depends upon the design of the nail. The surgeon must be familiar with the selected implant system.

Fracture deformity (typically flexion and/or abduction) may make it difficult to locate the desired entry point. Realigning the proximal femur with a Schanz screw and/or ball-spike, placed percutaneously, are helpful solutions.

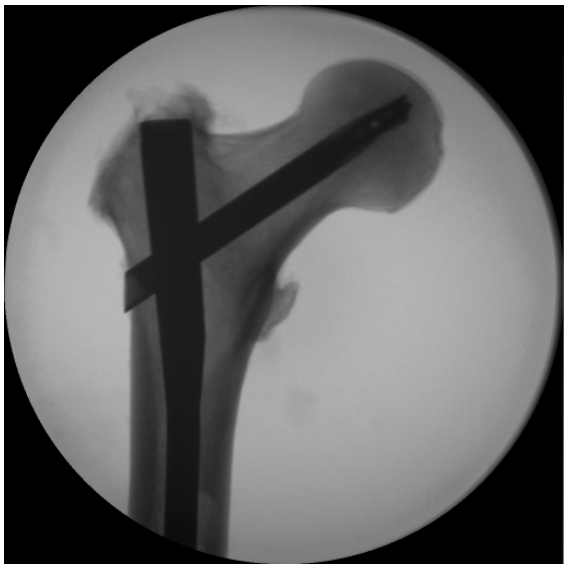
Particularly for long nails, it is important that the incision and entry point lie somewhat posteriorly, on the “axis” as described above.

2. Incision

Make a 3-5 cm skin incision several centimeters proximal to the tip of the greater trochanter. As shown, this lies on the proximal extension of the bowed axis of the femoral shaft. The exact location of the skin incision depends on the type of insertion handle / type of nail used.

Reference: https://www2.aofoundation.org/wps/portal/surgery

What are the steps of procedure?



Participants come up with the steps of procedure. The next slide is a reminder and help which can be used once the participants have given their input.

What are the steps of procedure?

1. Reduction
2. Opening of intramedullary canal
3. Insertion of nail
4. Insertion of blade
5. Locking of nail

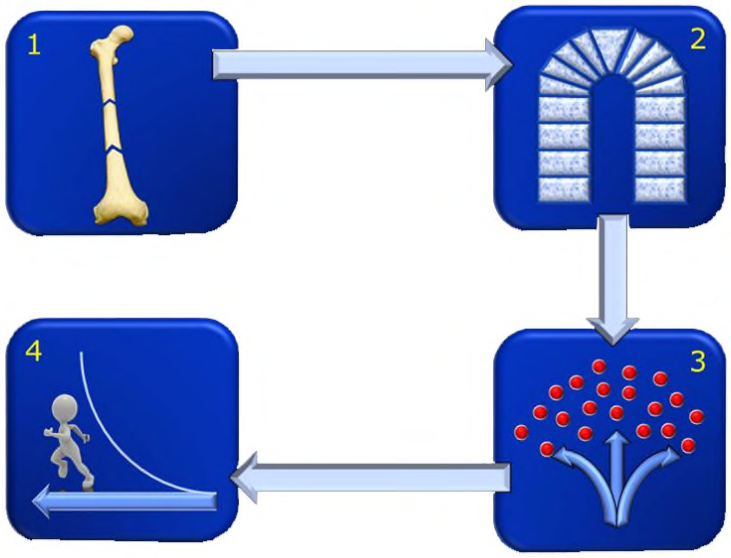
Participants come up with the steps of procedure. The next slide is a reminder and help which can be used once the participants have given their input.

What kind of mobilization after surgery is aimed for?

Other items which can be discussed here are:

1. Discuss the mobilization after surgery. (Movements of injured limb, weight bearing, …)
2. What are available community resources in your country to help mobilize the patient so that they get back home quicker?
3. How does the diabetes influence the healing process?

Summary—The 4 AO principles



Let a participant make a summary on hand of the four AO principles of fracture fixation. Relate/Refer to the case discussed!

1. Type of reduction (direct or indirect, open or closed)
2. Principles of stabilization and fixation (absolute or relative stability) with healing expected
3. Impact of soft tissue (approach)
4. Expected mobilization after surgery (limb, patient as a whole, weight bearing)

Conclusion

- The 81-year-old man with a proximal femoral fracture is treated with a TFNA.
- Closed reduction is performed on a fracture table.
- Internal fixation will provide relative stability and secondary bone healing.
- The case is prepared following «P.I.P.».