Perioperative preparation for an osteosynthesis of an ankle fracture

Group discussion

Acknowledgements

Contributors

Yarek Brudnicki, Poland

Bernadeta Kaluza, Poland

Review

Susanne Baeuerle, Switzerland

Isabel Van Rie Richards, Switzerland

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.
Screw fixation	**Saris D.** Screw techniques. In: Porteous M, Bäuerle S, eds. *Techniques and Principles for the Operating Room.* Stuttgart New York: Thieme; 2010:138–144.
Plate functions	**Hak D.** Plates and plate techniques. In: Porteous M, Bäuerle S, eds. *Techniques and Principles for the Operating Room.* Stuttgart New York: Thieme; 2010:145–152.
Malleolar fractures	**Pesantez R.** Malleolar fractures. In: Porteous M, Bäuerle S, eds. *Techniques and Principles for the Operating Room.* Stuttgart New York: Thieme; 2010:680–693.
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 techniquesI. 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 four AO principles of fracture fixation
- List nursing preparations for the fixation of a closed ankle 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 a third tubular plate and lag screw 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.

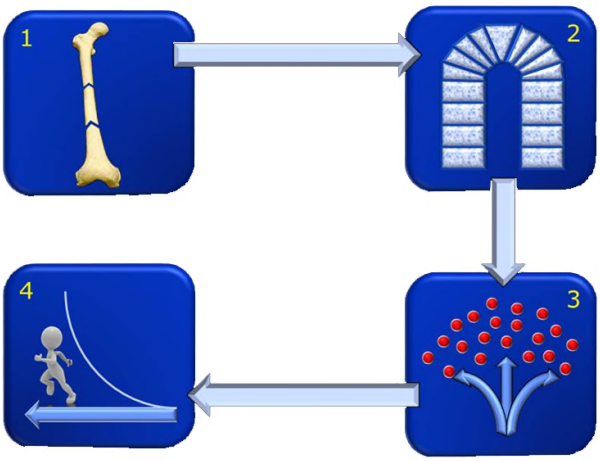
Case presentation

- 36-year-old woman fell while doing sport
- Closed left ankle fracture

Include (exclude) diabetes type 2 with poor skin conditions according to your public.

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 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	Tibia / Fibula
Segment	Distal
Fracture type	Trans-syndesmotic

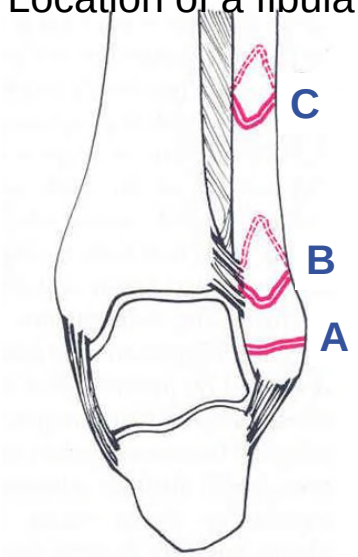
Describe type of malleolar fracture (1/2)

Tibia and fibula are regarded as one bone.

This slide can be included if wished.

Describe type of malleolar fracture (2/2)

Details: Location of a fibula fracture



C
Suprasyndesmotic lesion

B
Transsyndesmotic fibula fracture

A
Infrasyndesmotic lesion

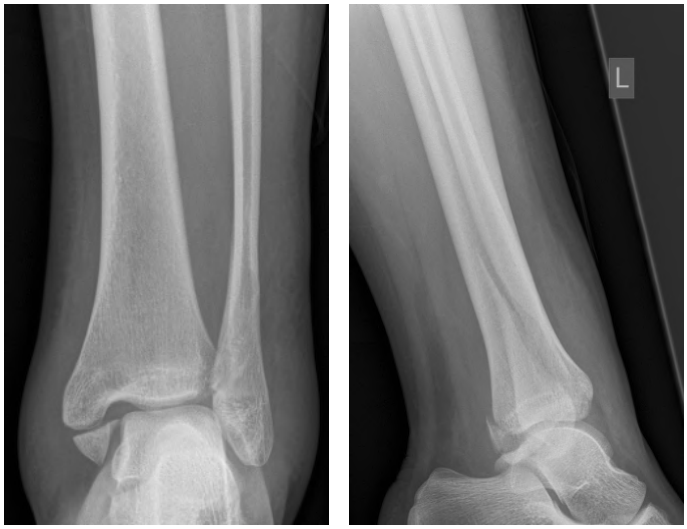
AO

Discuss «syndesmosis» and fracture location of the fibula.

This slide can be included if wished.

How would you reduce the fracture?

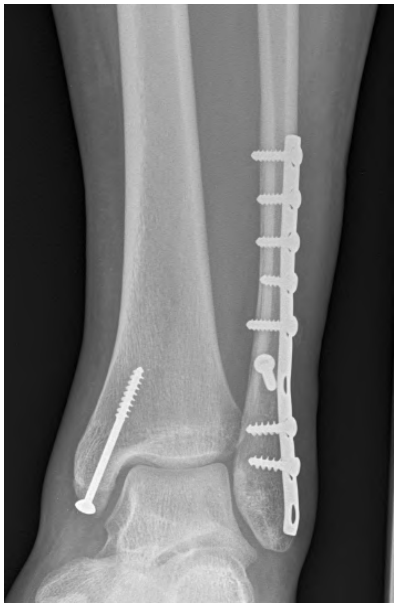
How would you stabilize the fracture?



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 ankle fracture



…a recommended treatment is internal fixation of the fibula with lag screw and 1/3 tubular plate and fixation of the medial malleolus with a lag screw.

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

Another item which can be discussed here is:

1. What is the plate function of the suggested technique? Compression, splinting, buttressing or neutralization?

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

This slide shows only one set of instruments. The following hidden slides with instruments can be used if wished.

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

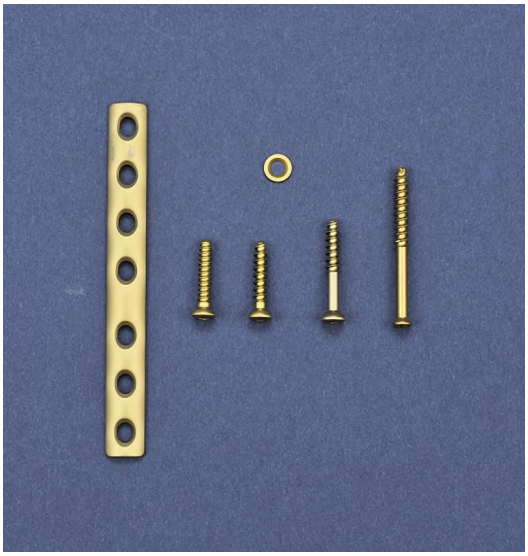
1. Discuss material and equipment necessary for this type of intervention (Image intensifier, etc…).
2. Discuss which specific plates could be used.
3. Discuss which screws could be used (repeat lag screw procedure).
4. Discuss specific instruments for fracture fixation with conventional screws. Note: Not all instruments are on this picture!
5. Discuss use and intra-operative care and maintenance of specific instruments.

Instruments

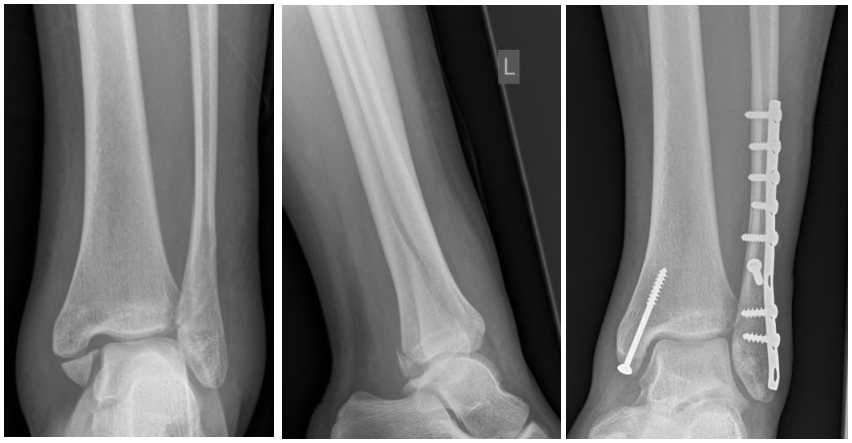
Instruments for cannulated screws if used.

Reduction tools, bending tool

Implants

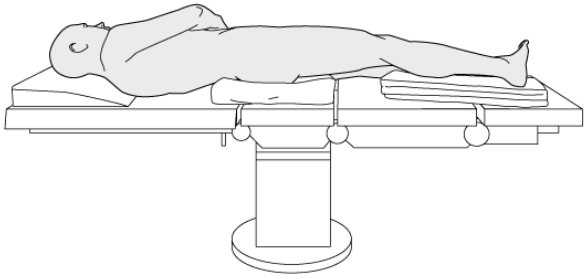


How would you position the patient?



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

How would you position the patient?



Supine position

The patient is positioned supine on a radiolucent table with a sandbag under the ipsilateral buttock.

The injured leg may be placed on a foam block, or on blankets, with the knee slightly flexed. This position allows free access to both the lateral and the medial sides by hip rotation. Moving the leg towards the edge of the table stabilizes the position of leg and ankle.

Alternatively, tilt the table to lower the side of the uninjured leg (approximately 30 degrees).

A well-padded tourniquet may be applied on the thigh. Use of a tourniquet is determined by surgeon's preference.

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

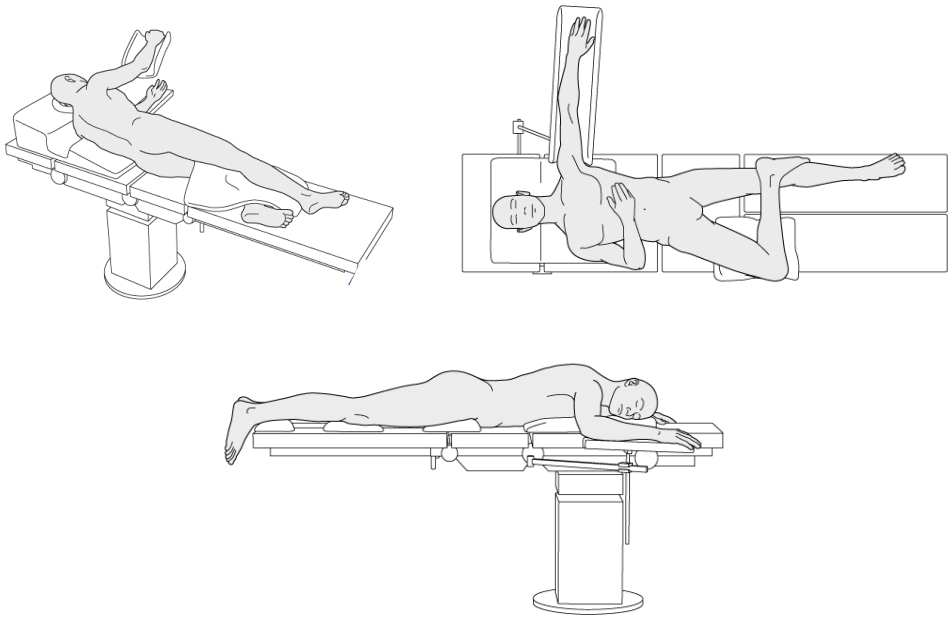
Other item(s) which can be discussed here is/are:

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?

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:

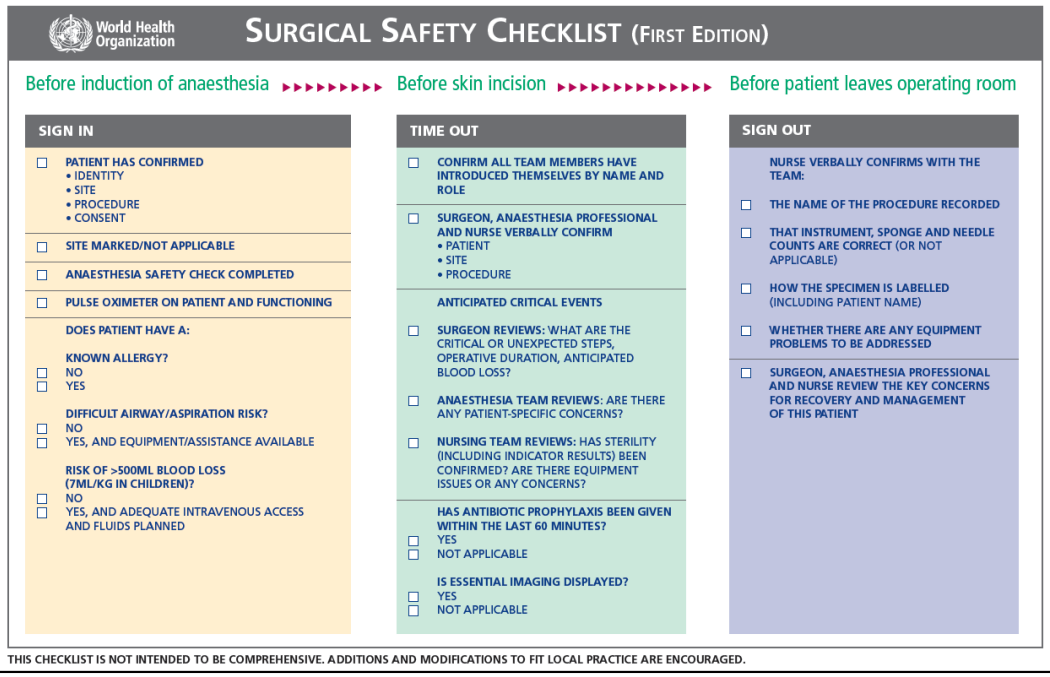
Ask your participants:

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



World Health Organization

SURGICAL SAFETY CHECKLIST (FIRST EDITION)

Before induction of anaesthesia ▸▸▸▸▸▸▸▸▸ Before skin incision ▸▸▸▸▸▸▸▸▸▸▸▸▸ Before patient leaves operating room

SIGN IN

- ☐ PATIENT HAS CONFIRMED
  - IDENTITY
  - SITE
  - PROCEDURE
  - CONSENT
- ☐ SITE MARKED/NOT APPLICABLE
- ☐ ANAESTHESIA SAFETY CHECK COMPLETED
- ☐ PULSE OXIMETER ON PATIENT AND FUNCTIONING
- DOES PATIENT HAVE A:

KNOWN ALLERGY?
- ☐ NO
- ☐ YES

DIFFICULT AIRWAY/ASPIRATION RISK?
- ☐ NO
- ☐ YES, AND EQUIPMENT/ASSISTANCE AVAILABLE

RISK OF >500ML BLOOD LOSS (7ML/KG IN CHILDREN)?
- ☐ NO
- ☐ YES, AND ADEQUATE INTRAVENOUS ACCESS AND FLUIDS PLANNED

TIME OUT

- ☐ CONFIRM ALL TEAM MEMBERS HAVE INTRODUCED THEMSELVES BY NAME AND ROLE
- ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE VERBALLY CONFIRM
  - PATIENT
  - SITE
  - PROCEDURE

ANTICIPATED CRITICAL EVENTS
- ☐ SURGEON REVIEWS: WHAT ARE THE CRITICAL OR UNEXPECTED STEPS, OPERATIVE DURATION, ANTICIPATED BLOOD LOSS?
- ☐ ANAESTHESIA TEAM REVIEWS: ARE THERE ANY PATIENT-SPECIFIC CONCERNS?
- ☐ NURSING TEAM REVIEWS: HAS STERILITY (INCLUDING INDICATOR RESULTS) BEEN CONFIRMED? ARE THERE EQUIPMENT ISSUES OR ANY CONCERNS?

HAS ANTIBIOTIC PROPHYLAXIS BEEN GIVEN WITHIN THE LAST 60 MINUTES?
- ☐ YES
- ☐ NOT APPLICABLE

IS ESSENTIAL IMAGING DISPLAYED?
- ☐ YES
- ☐ NOT APPLICABLE

SIGN OUT

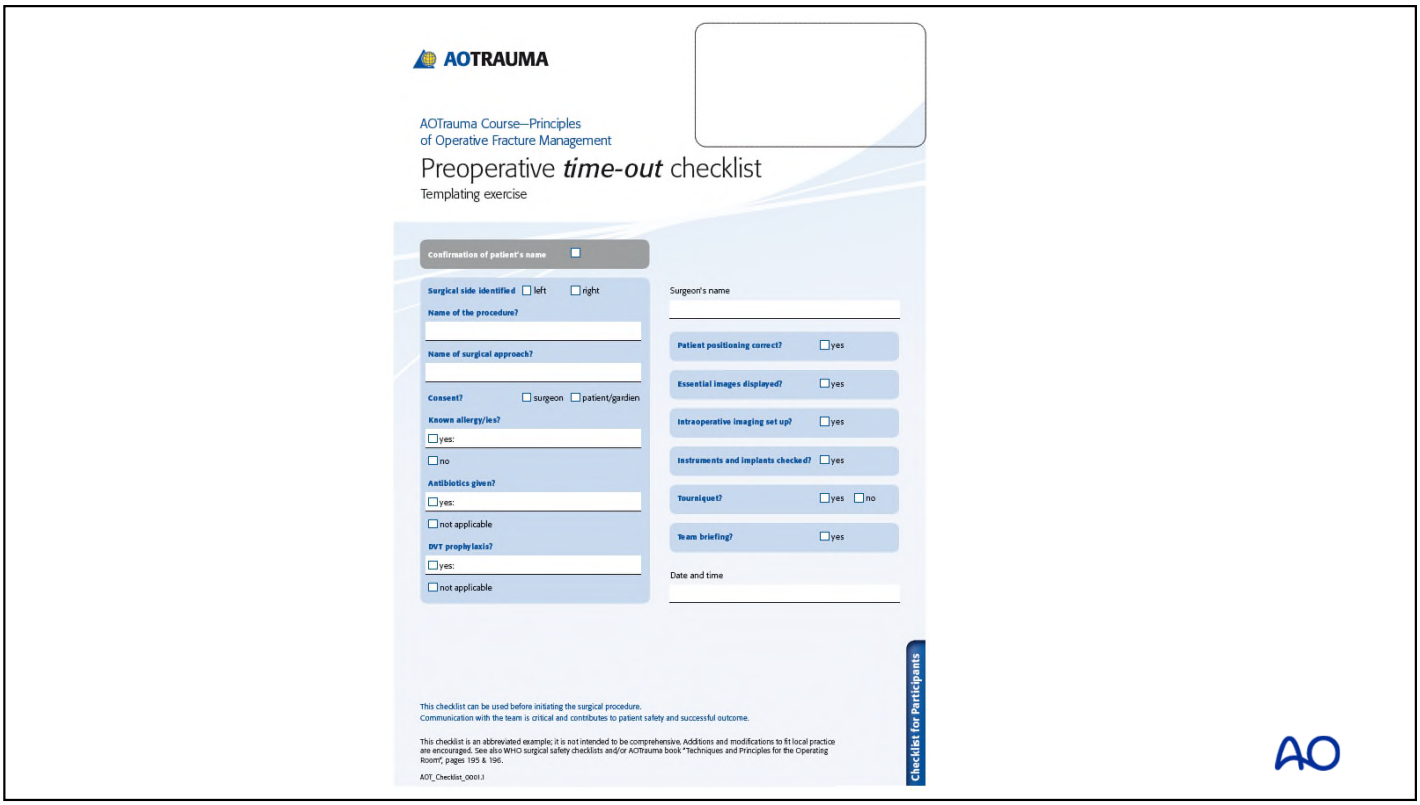
NURSE VERBALLY CONFIRMS WITH THE TEAM:
- ☐ THE NAME OF THE PROCEDURE RECORDED
- ☐ THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE)
- ☐ HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME)
- ☐ WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED
- ☐ SURGEON, ANAESTHESIA PROFESSIONAL AND NURSE REVIEW THE KEY CONCERNS FOR RECOVERY AND MANAGEMENT OF THIS PATIENT

THIS CHECKLIST IS NOT INTENDED TO BE COMPREHENSIVE. ADDITIONS AND MODIFICATIONS TO FIT LOCAL PRACTICE ARE ENCOURAGED.

AO

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

Discuss the WHO checklist if wished.



AOTRAUMA

AOTrauma Course—Principles
of Operative Fracture Management

Preoperative *time-out* checklist

Templating exercise

Confirmation of patient's name ☐

Surgical side identified ☐ left ☐ right

Name of the procedure?

Name of surgical approach?

Consent? ☐ surgeon ☐ patient/gardien

Known allergy/ies?
☐ yes:
☐ no

Antibiotics given?
☐ yes:
☐ not applicable

DVT prophylaxis?
☐ yes:
☐ not applicable

Surgeon's name

Patient positioning correct? ☐ yes

Essential images displayed? ☐ yes

Intraoperative imaging set up? ☐ yes

Instruments and implants checked? ☐ yes

Tourniquet? ☐ yes ☐ no

Team briefing? ☐ yes

Date and time

Checklist for Participants

This checklist can be used before initiating the surgical procedure.
Communication with the team is critical and contibutes to patient safety and successful outcome.

This checklist is an abbreviated example; it is not intended to be comprehensive. Additions and modifications to fit local practice are encouraged. See also WHO surgical safety checklists and/or AOTrauma book "Techniques and Principles for the Operating Room", pages 195 & 196.

AOT_Checklist_0001.1

AO

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

Also AOTrauma has created a time-out checklist as example.

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

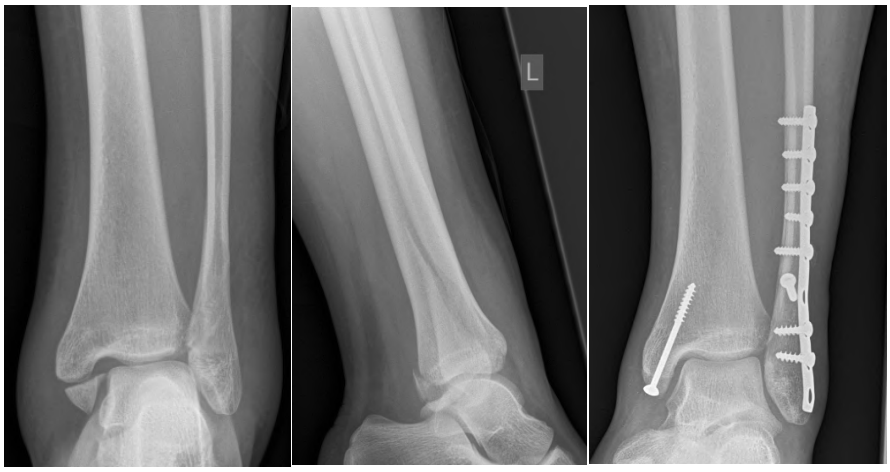
Nursing preparations

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.

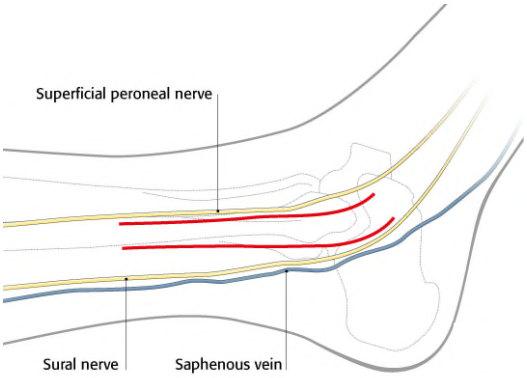
What approach could be done?

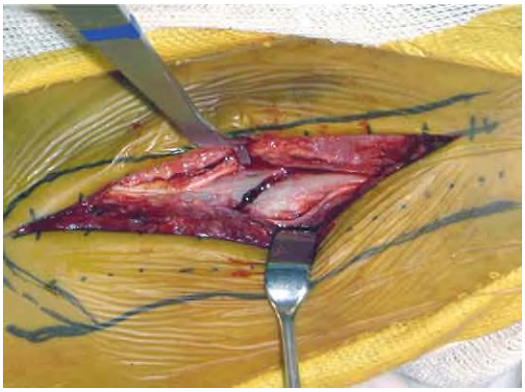


Other items which can be discussed here are:

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

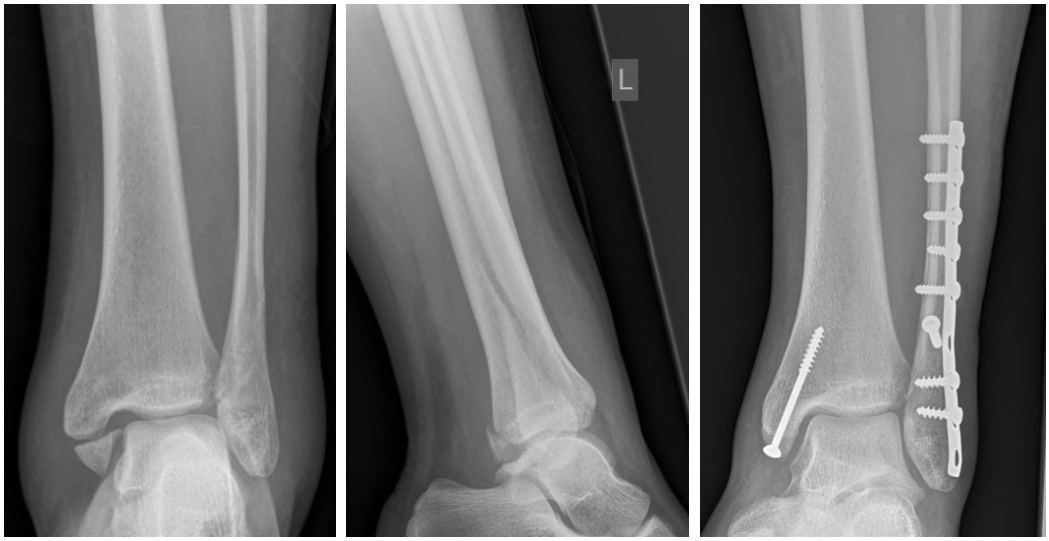
What approach could be done?





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?

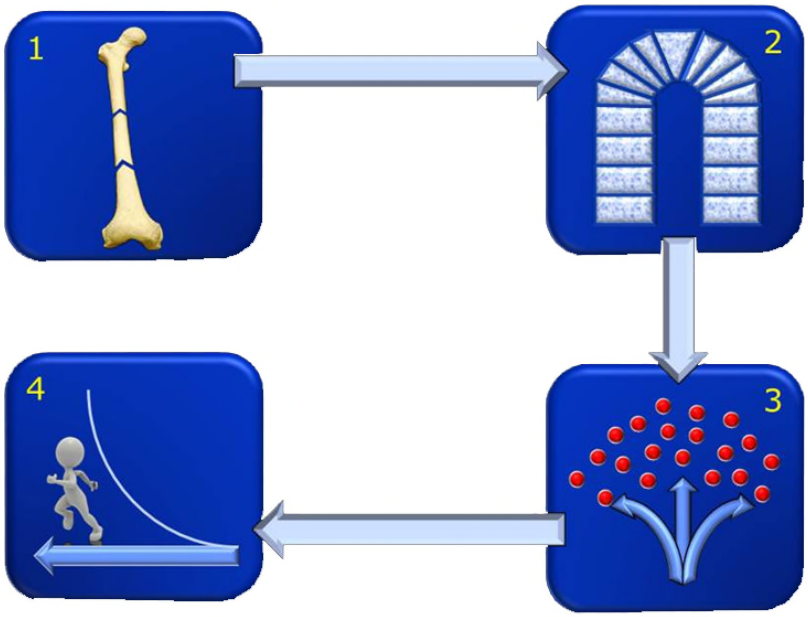
1. Reduction
2. Gliding hole
3. Thread hole
4. Countersink
5. Measure
6. Tap
7. Insert screw

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 36-year-old sporty woman with a closed ankle fracture is treated with lag screws and a neutralization plate.
- Open reduction is performed.
- Internal fixation will provide absolute stability and primary bone healing.
- The case is prepared following «P.I.P.».