Perioperative preparation for an osteosynthesis of a forearm 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.
Forearm shaft fractures	**Bonczar M.** Forearm shaft fractures. In: Porteous M, Bäuerle S, eds. Techniques and Principles for the Operating Room. Stuttgart New York: Thieme; 2010:350–361.
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 fixation of a forearm 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 LCP and screws is discussed.
    - Focus on peri-operative preparations for this particular treatment.

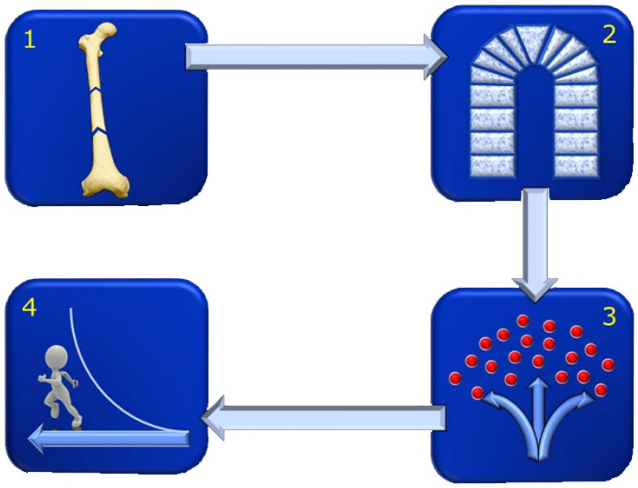
If available, use the workshop instruments to allow hands on individual instruments and to discuss and/or try out functionality of instruments.

Case presentation

- 11-year-old boy fell from bike
- Closed displaced forearm fracture

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:

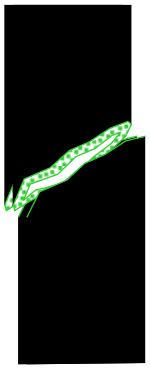
1. What x-rays, images are required? (Both x-ray views (lateral and AP) are needed. Both joints are checked.)
2. Which bone(s) is(are) broken?
3. Which segment is broken?
4. Which fracture type is this?
5. Are there fractures which involve the joint? What about the growth plates?
6. Is this an open fracture? (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	Radius/Ulna
Segment	Diaphyseal
Fracture type	Simple

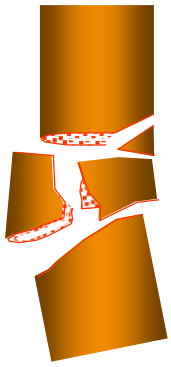
Describe type of forearm fracture

A
Simple fracture



B
Multifragmentary, wedge fracture

C
Multifragmentary, complex fracture



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 diaphyseal forearm fracture…

…a recommended treatment is plating with LC-DCPs and conventional screws.

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.

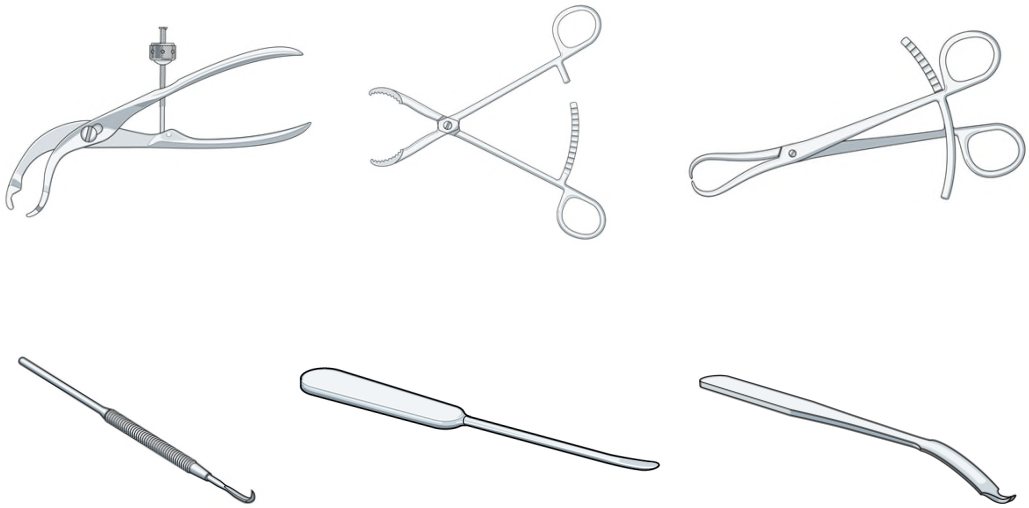
Instruments

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 LCP+LHS. Note: Not all instruments are on this picture!
5. Discuss use and intra-operative care and maintenance of specific instruments.
6. Ask the participants if the torque limiting screwdriver is also used for implant removal. Why not? (The torque limited screwdriver is too expensive for this purpose.)

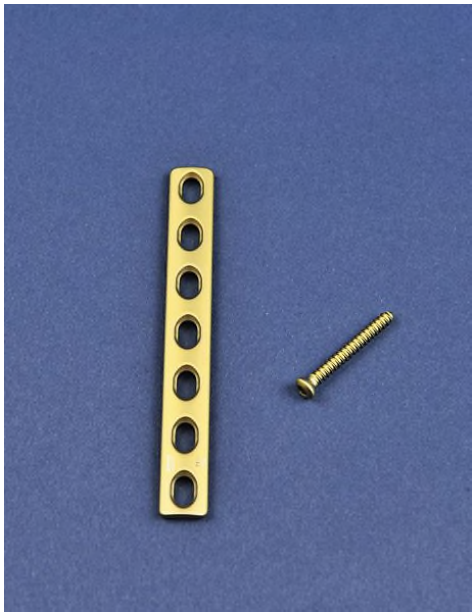
Reduction (distraction) tools



Discuss the size of the reduction tools for this type of fracture.

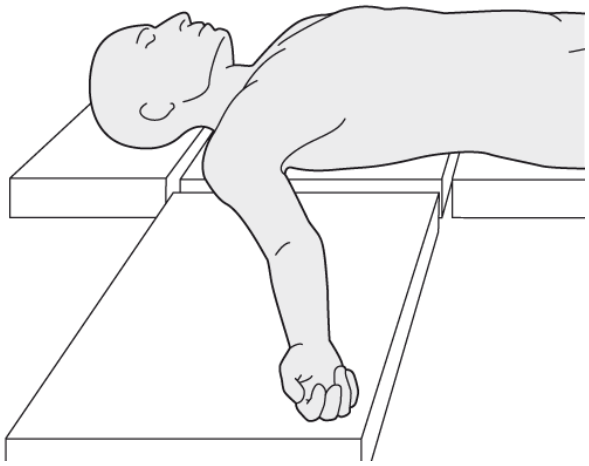
Instruments, bending tools

Implants



How would you position the patient?

How would you position the patient?



Place the abducted arm on the operating side table with the forearm in either pronation or supination.

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?

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:

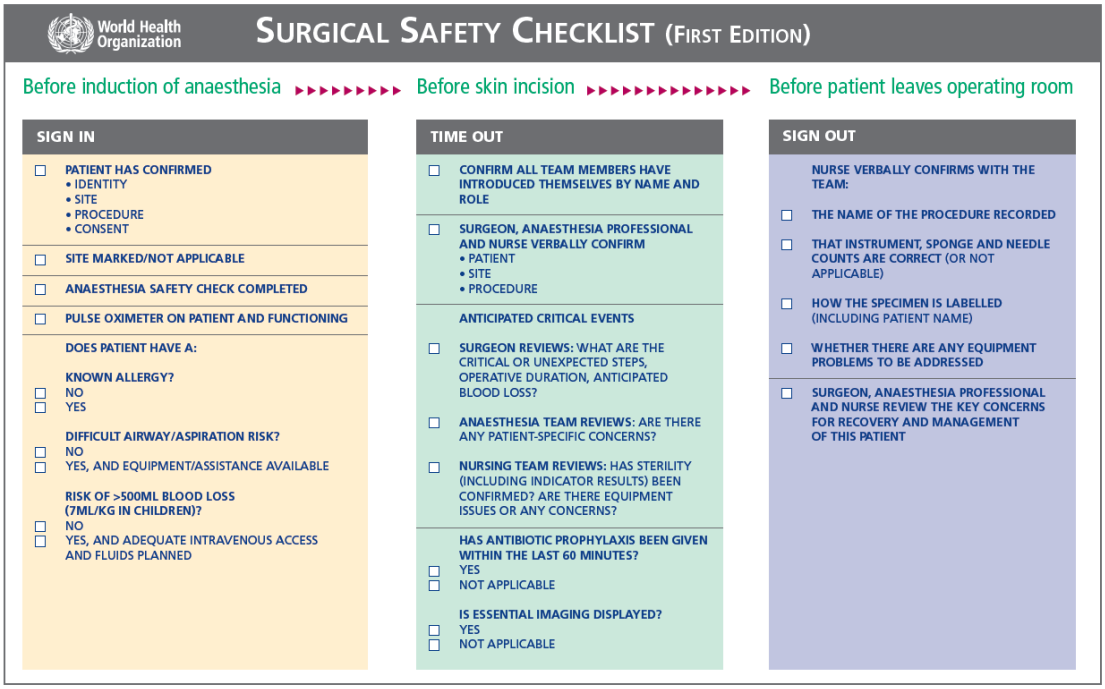
Ask your participants:

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

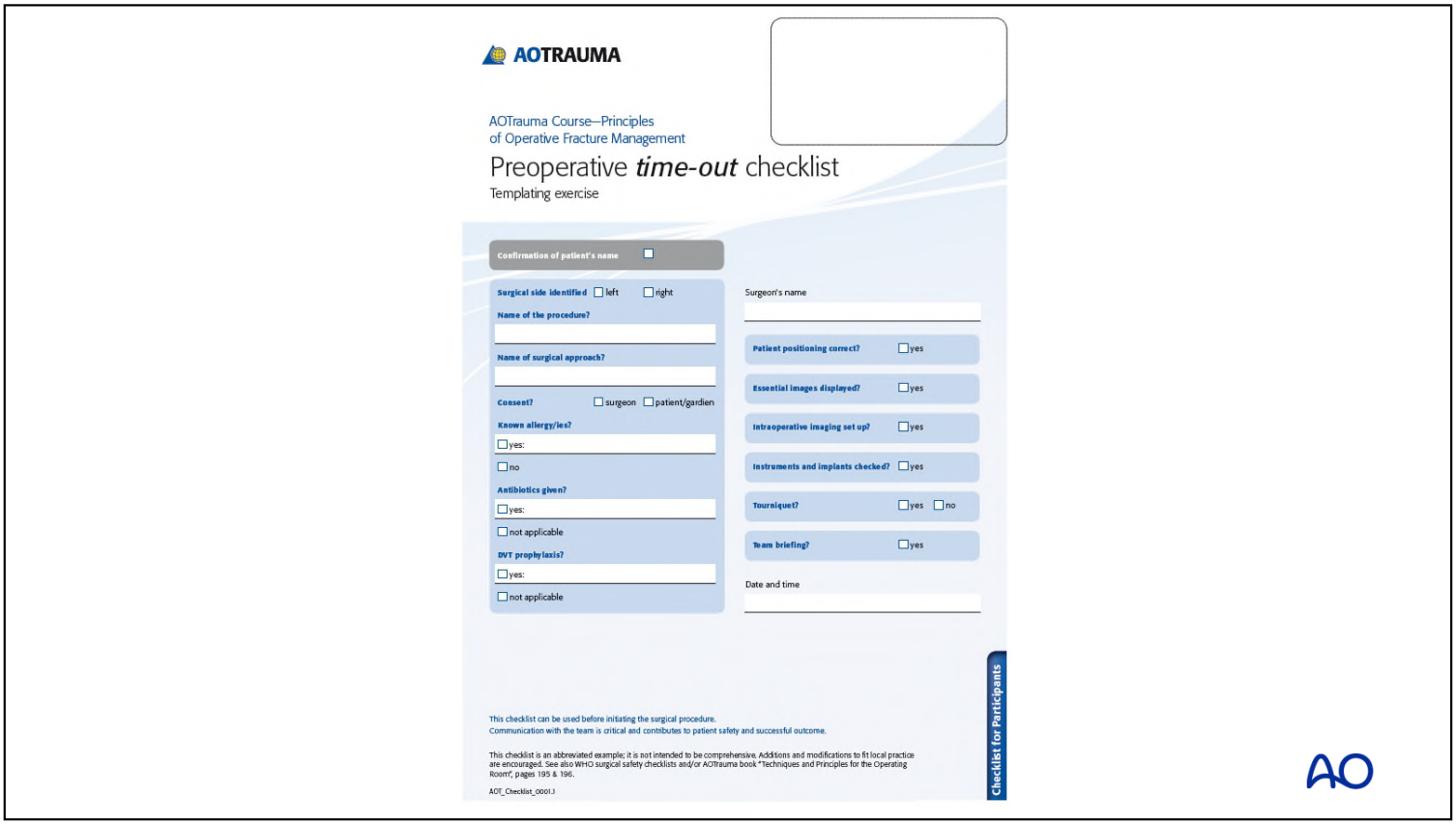
NURSE VERBALLY CONFIRMS WITH THE TEAM:
- ☐ THE NAME OF THE PROCEDURE RECORDED
- ☐ THAT INSTRUMENT, SPONGE AND NEEDLE COUNTS ARE CORRECT (OR NOT APPLICABLE)
- ☐ HOW THE SPECIMEN IS LABELLED (INCLUDING PATIENT NAME)
- ☐ WHETHER THERE ARE ANY EQUIPMENT PROBLEMS TO BE ADDRESSED
- ☐ SURGEON, ANAESTHESIA PROFESSIONAL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

Discuss the WHO checklist if wished.

Note: This might have been discussed in previous discussions.



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

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

Also this slide might have been discussed in previous discussions.

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.

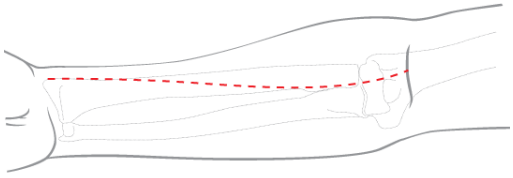
What approach could be done?

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?

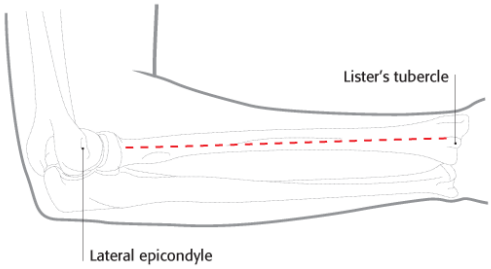
Anterior approach



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

What approach could be done?

Posterolateral approach



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?

- Reduction
- Gliding hole
- Thread hole
- (Countersink)
- Measure
- Tap
- Insert screw

This slide is complementary to the previous one, in case some points were not covered.

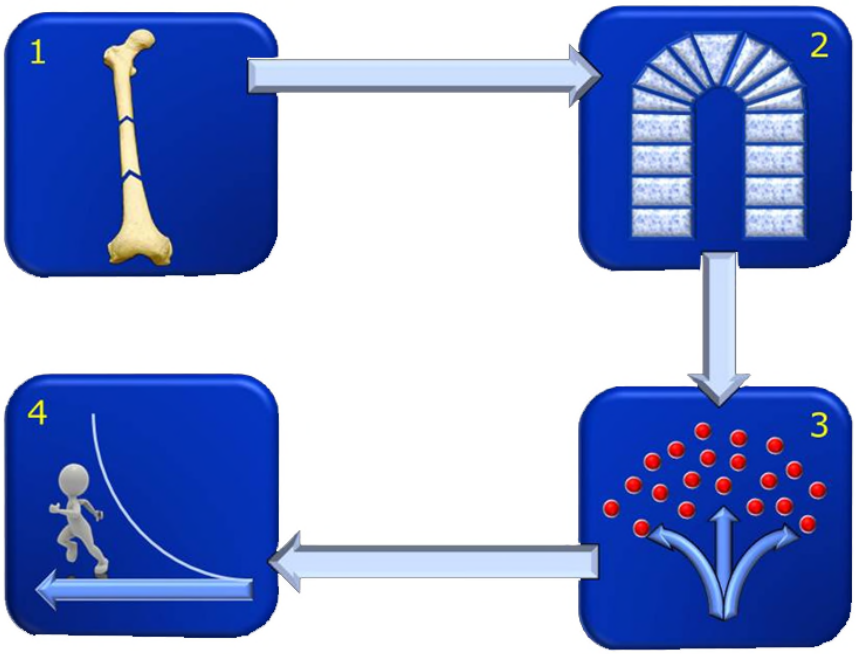
Only the lag screw technique is mentioned on this slide. Please also discuss the compression plate function and fixation, lag screw technique through plate, etc.

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 11-year-old boy with a radial and ulnar fracture is treated with compression plates and conventional screws.
- Open reduction is performed.
- Internal fixation will provide absolute stability and direct bone healing.
- The case is prepared following «P.I.P.».

This slide is complementary to the previous one, in case some points were not covered.