AO TRAUMA

MIO
Indications & Techniques

(Mio min Mio)

AO Trauma Course
Advanced Principles of Fracture Management

Marianne Vestergaard Lind
Ovelæge, Rigshospitalet

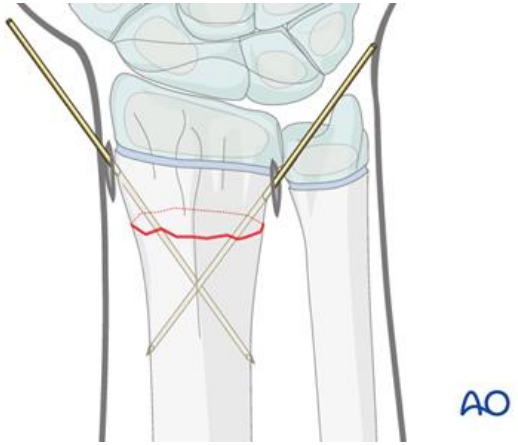
Fredericia, Denmark
April 25-28, 2002

Learning objectives

To Identify

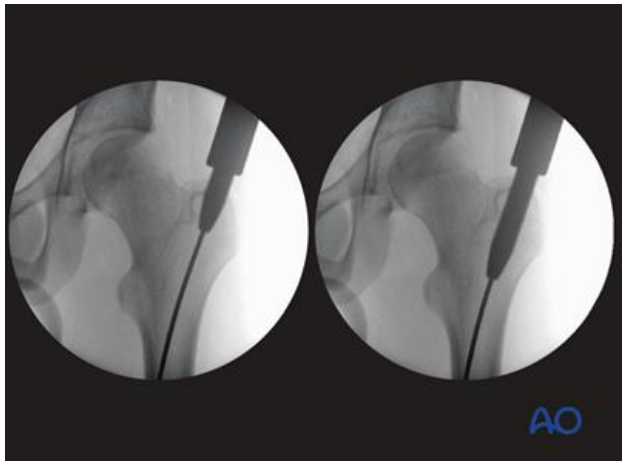
- The indications
    - The WHAT – Which fractures type and anatomy, soft tissue issue
    - The WHEN – Preparations, tools, timing
    - The HOW – Techniques for reduction and fixation
- The advantages, disadvantages and limitations

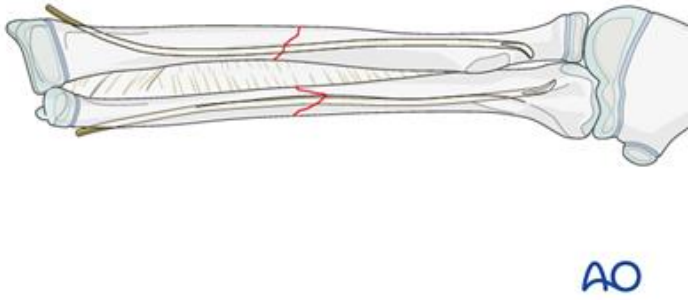
Definitions

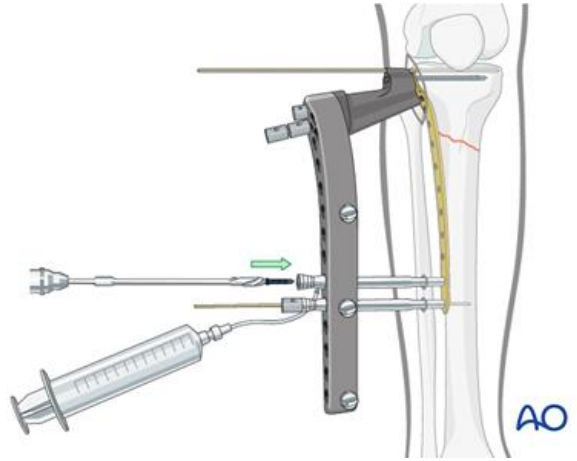


- **MIO** (Minimally Invasive Osteosynthesis)

Any fracture fixation undertaken using small skin incisions and designed to limit the deeper soft-tissue surgical trauma. Examples include percutaneous K-wiring, external fixation and closed intramedullary nailing as well as minimally invasive plate osteosynthesis (**MIPO**).



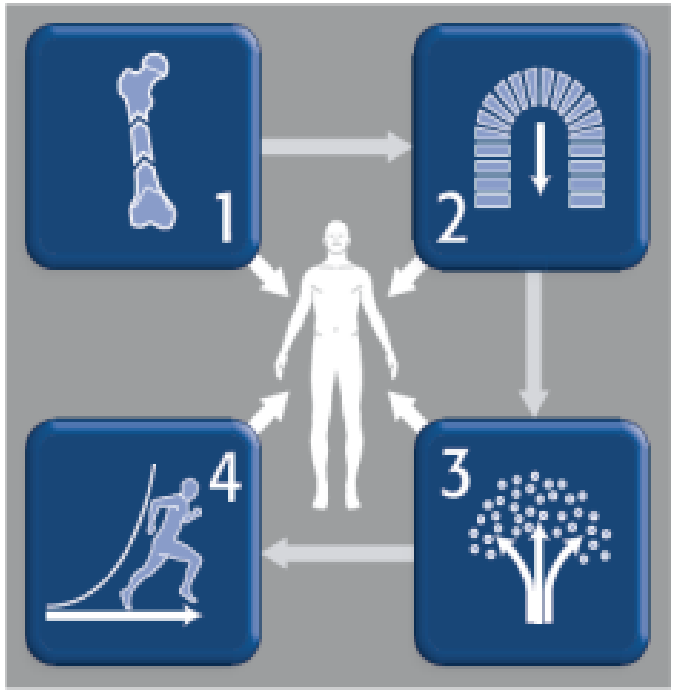




Indications – Why?

The AO Principles of fracture management

Fracture reduction and fixation to restore anatomical relationships.



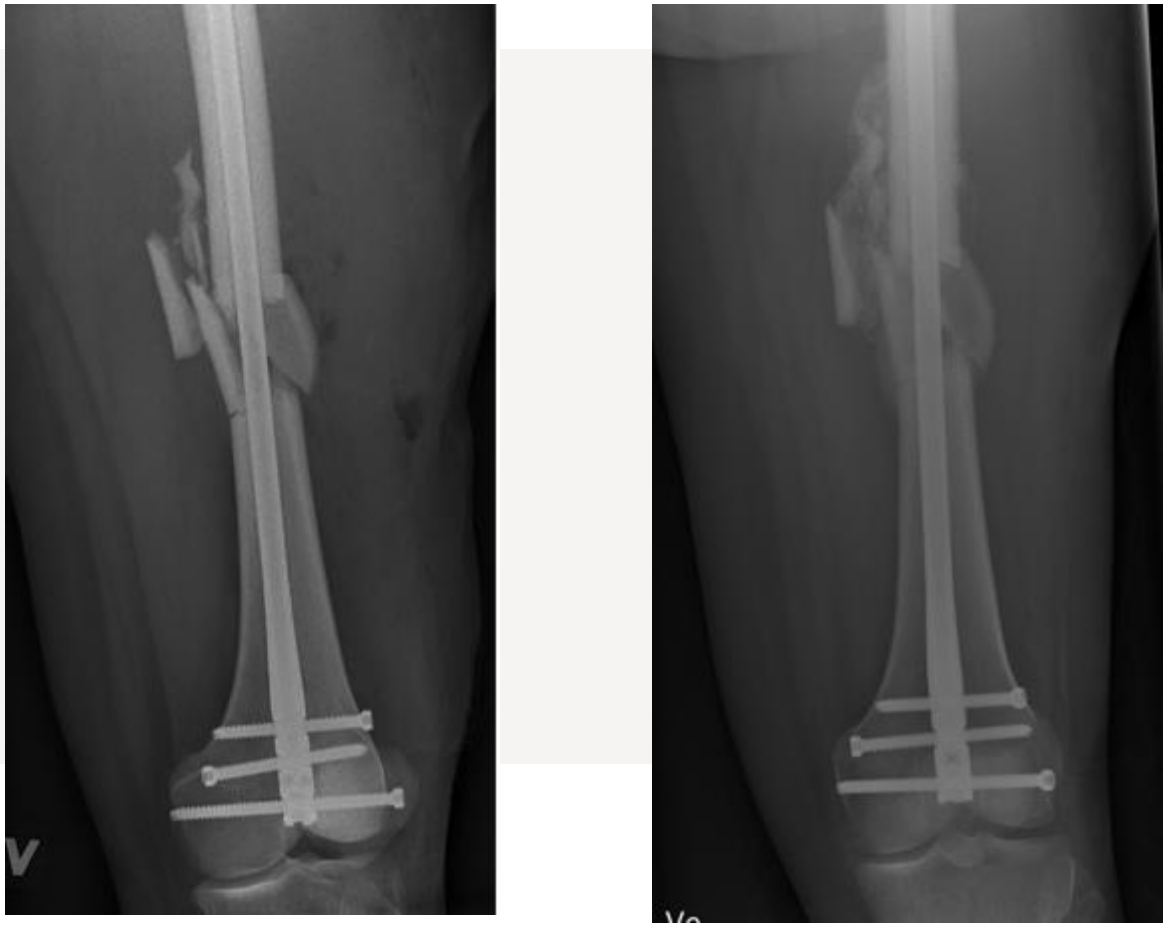
Fracture fixation providing absolute or relative stability, as required by the "personality" of the fracture, the patient, and the injury.

Early and safe mobilization and rehabilitation of the injured part and the patient as a whole.

Preservation of the blood supply to soft tissues and bone by gentle reduction techniques and careful handling.

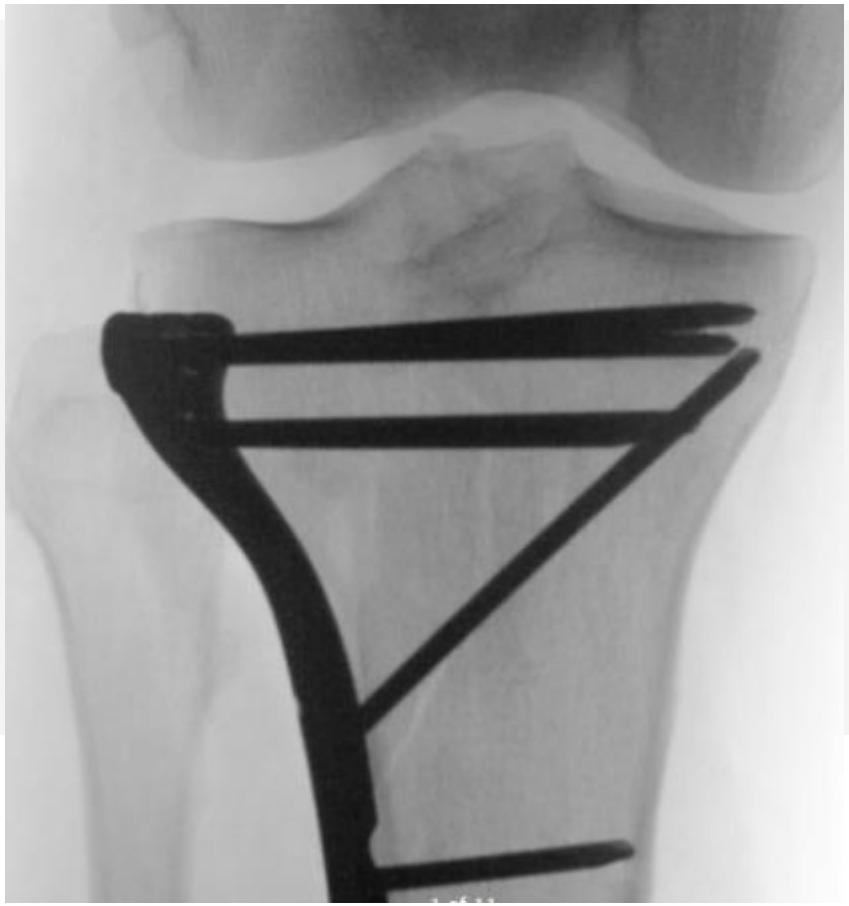
- Preserve/spare soft tissue
- Reduces risk of infections
- Reduces risk of wound healing problems
- Cosmesis

Indications – What?



- Extraarticular fractures of the meta- og diaphysis where relative stability is required, and where you can achive restoration of length, rotation and axis in a closed or percutaneous way

Indications – What?

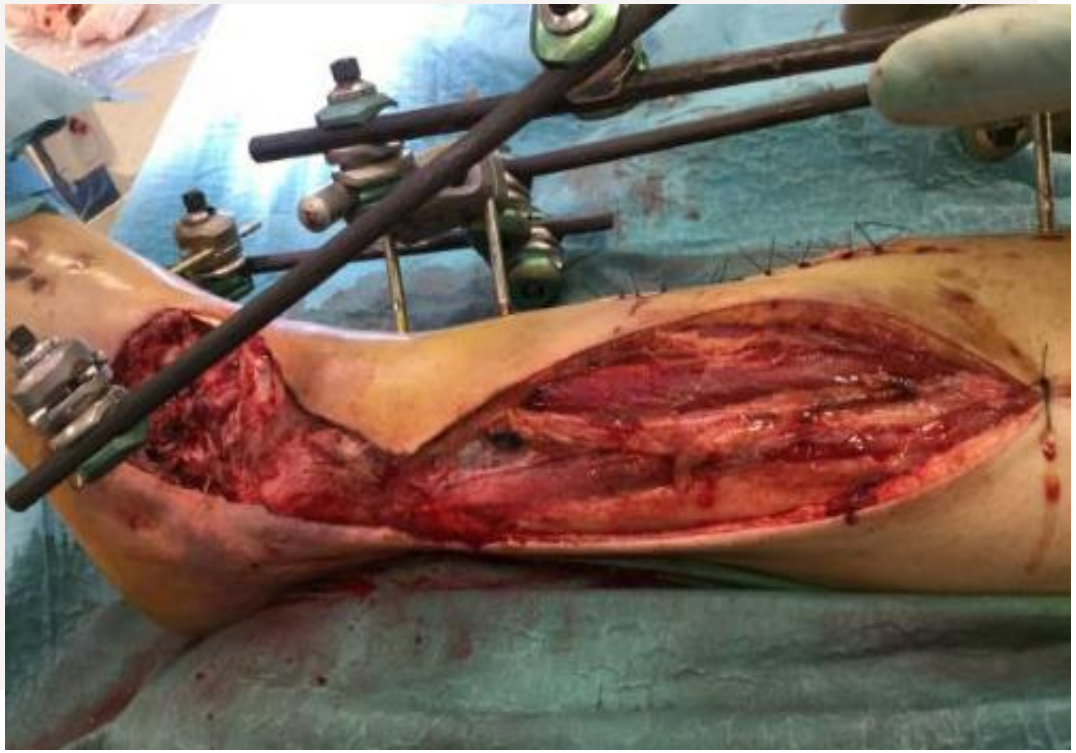


- Intraarticular fractures where you kan achieve anatomical reduction and absolute stability using a small incision

Indications – What?

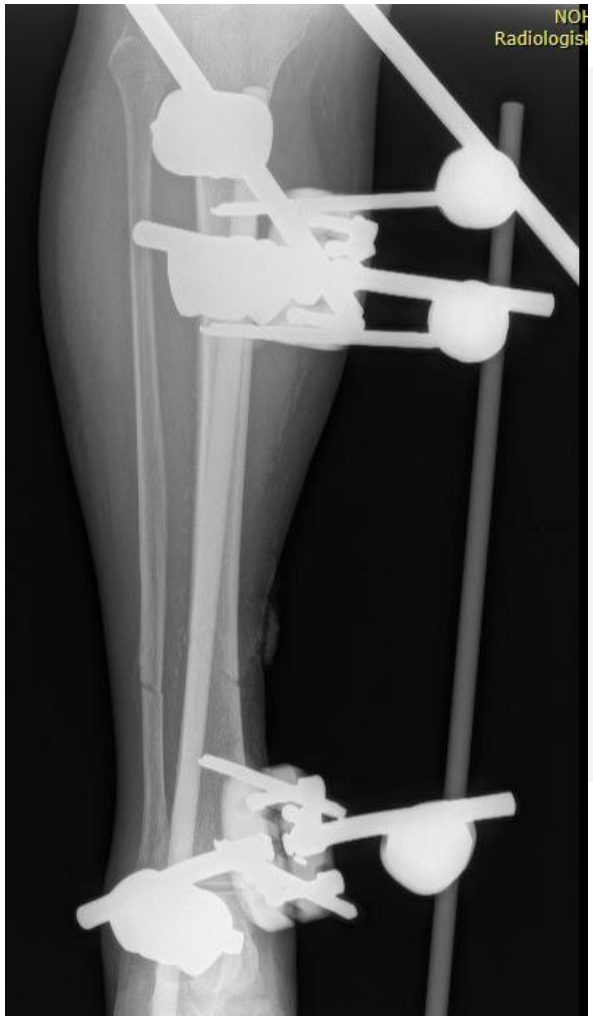
- Pediatric fractures

Indications – What?



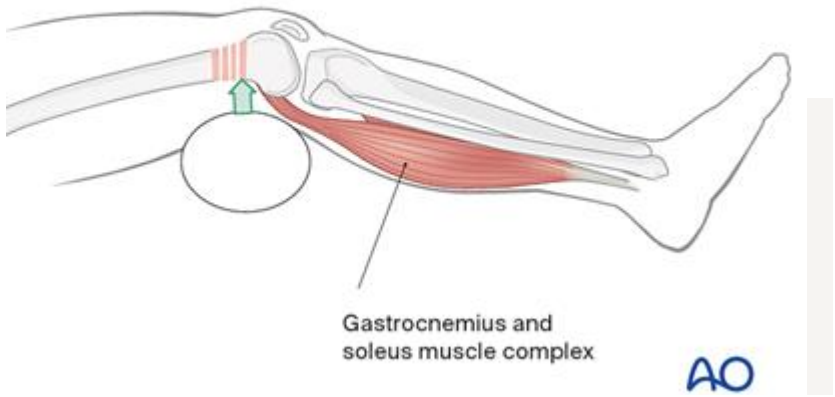
- DCO
- Soft tissue compromise

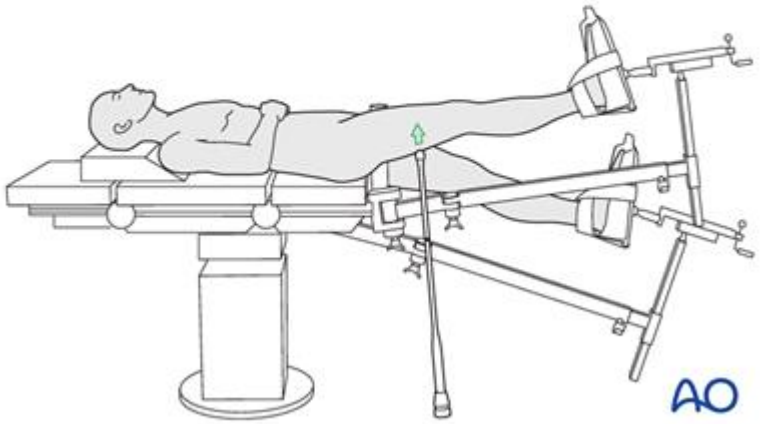
Preparations



- Radiographs
- CT – 3D-reconstructions
- MRI?

Preparations



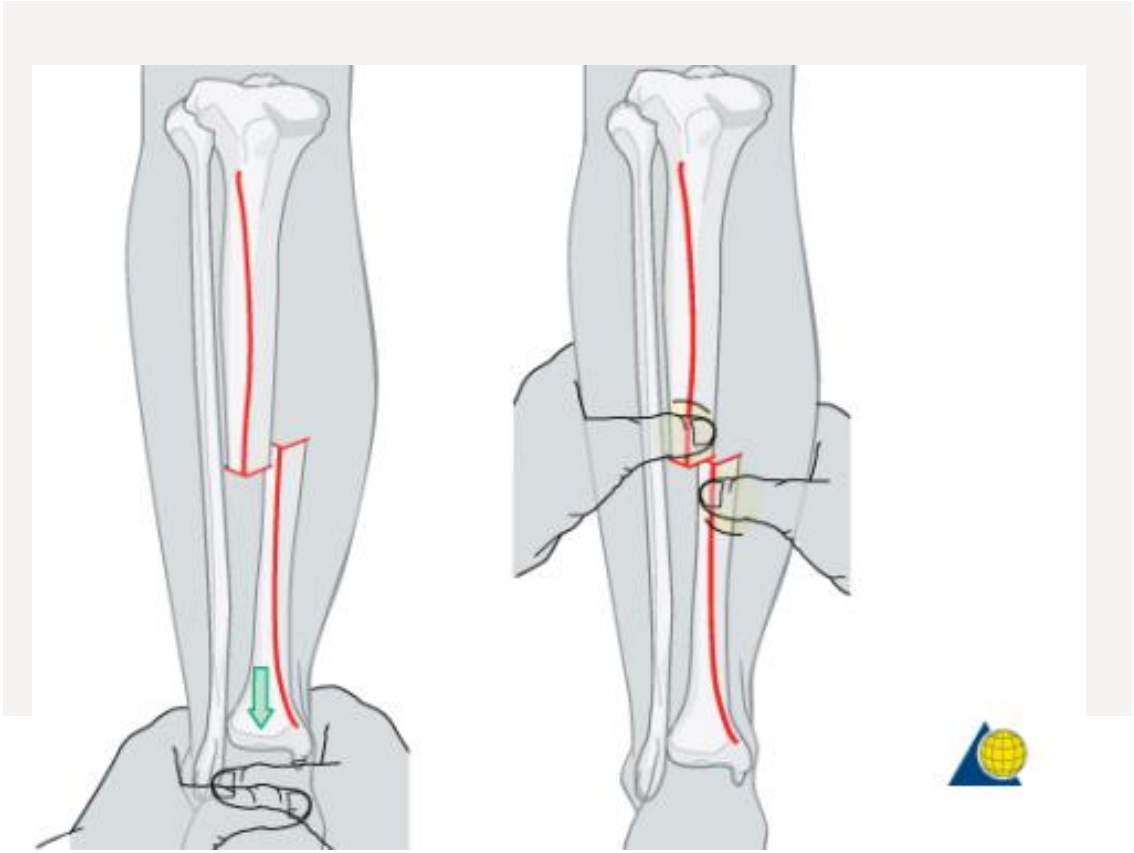


- Implant
- Reduction devices?
- Positioning of the patient
- Image intensifier
- Need for assistant/more hands

  Operationtable

  - Traction?
  - Carbon?
  - Beach chair

Direct/indirect Reduction



Direct reduction

Direct force application at the fracture site – open or percutaneously

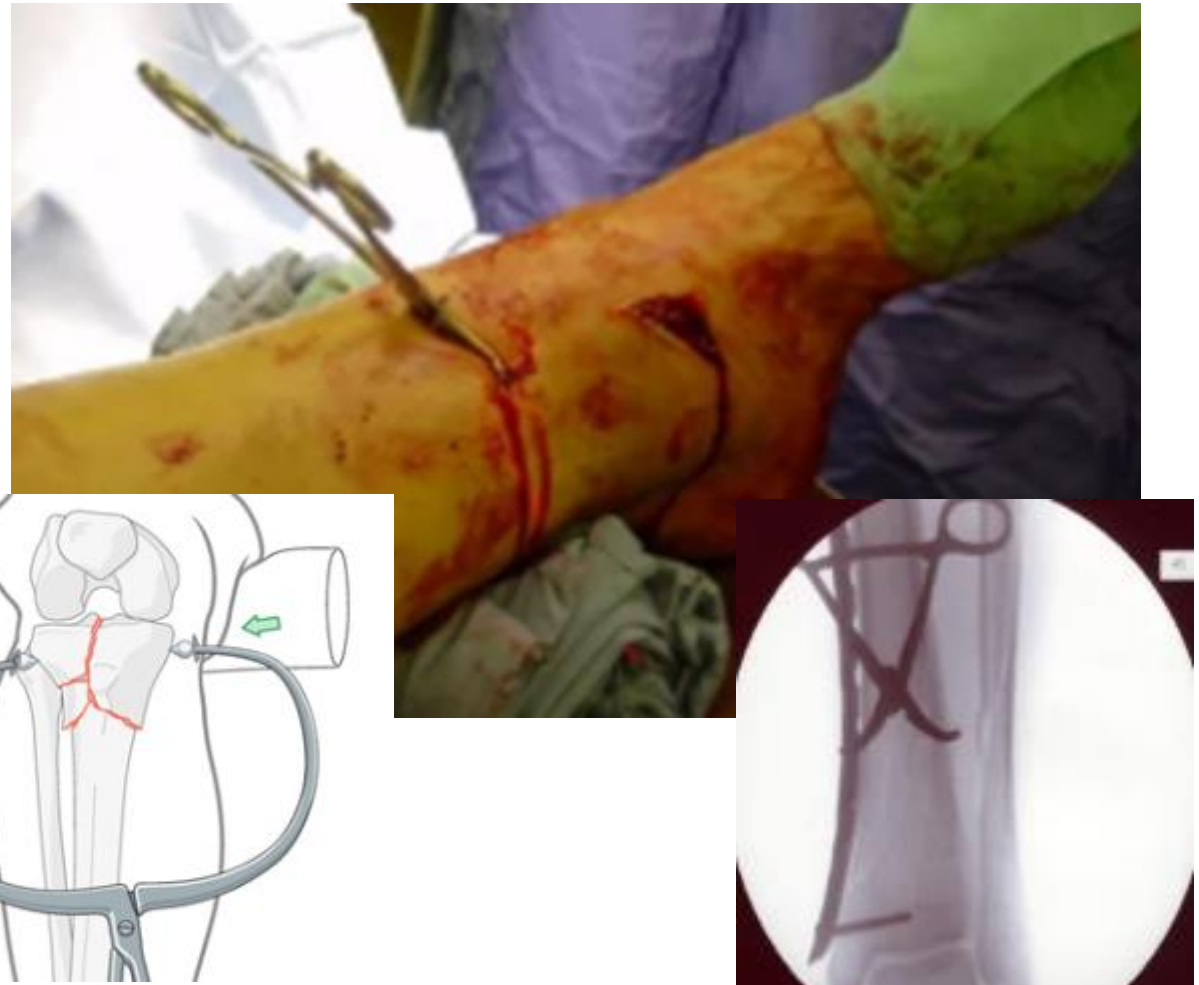
Indirect reduction

Traction along the axis of the limb

Direct force application away from the fracture site

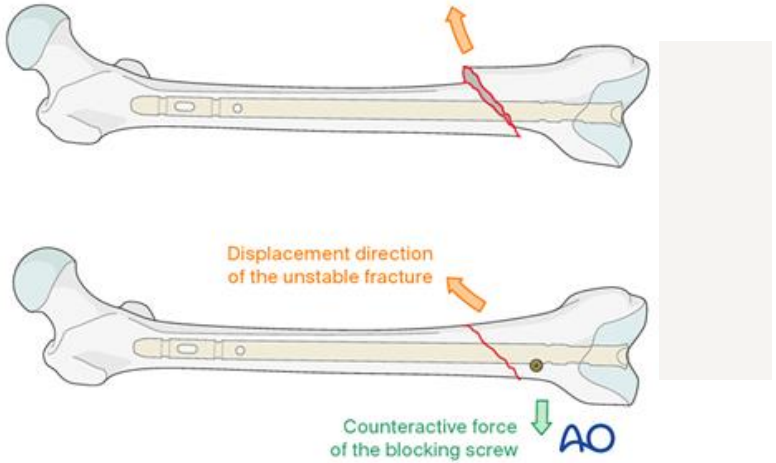
Ligamentotaxis

Direct reduction

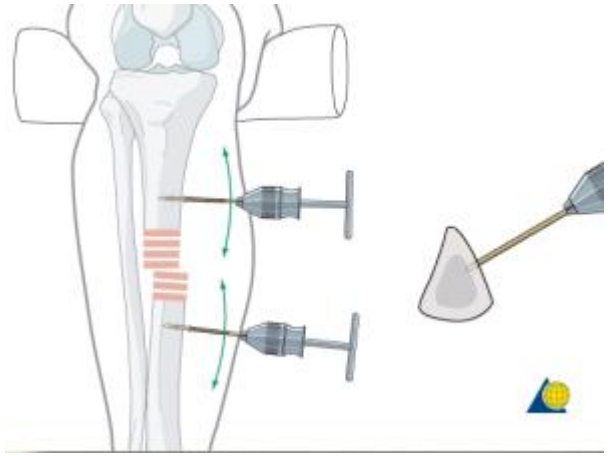


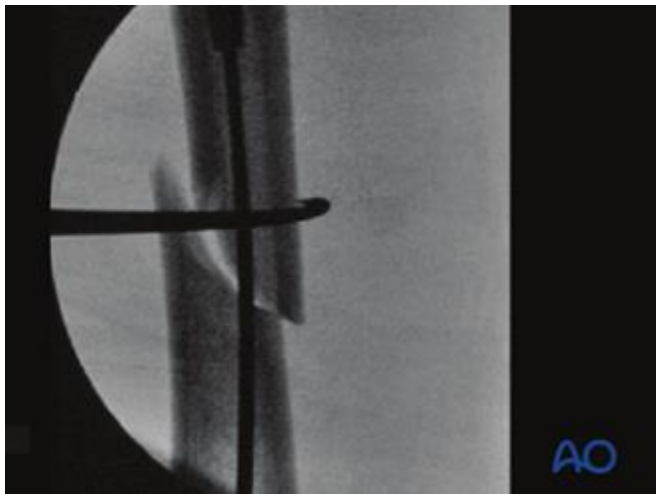
- Radiografic or direct visualization of the fracture
- Percutaneuous or open reduction and fixation using
  - Clamps
  - Cerclage
  - Lag screw
  - Retractors

Indirect reduction



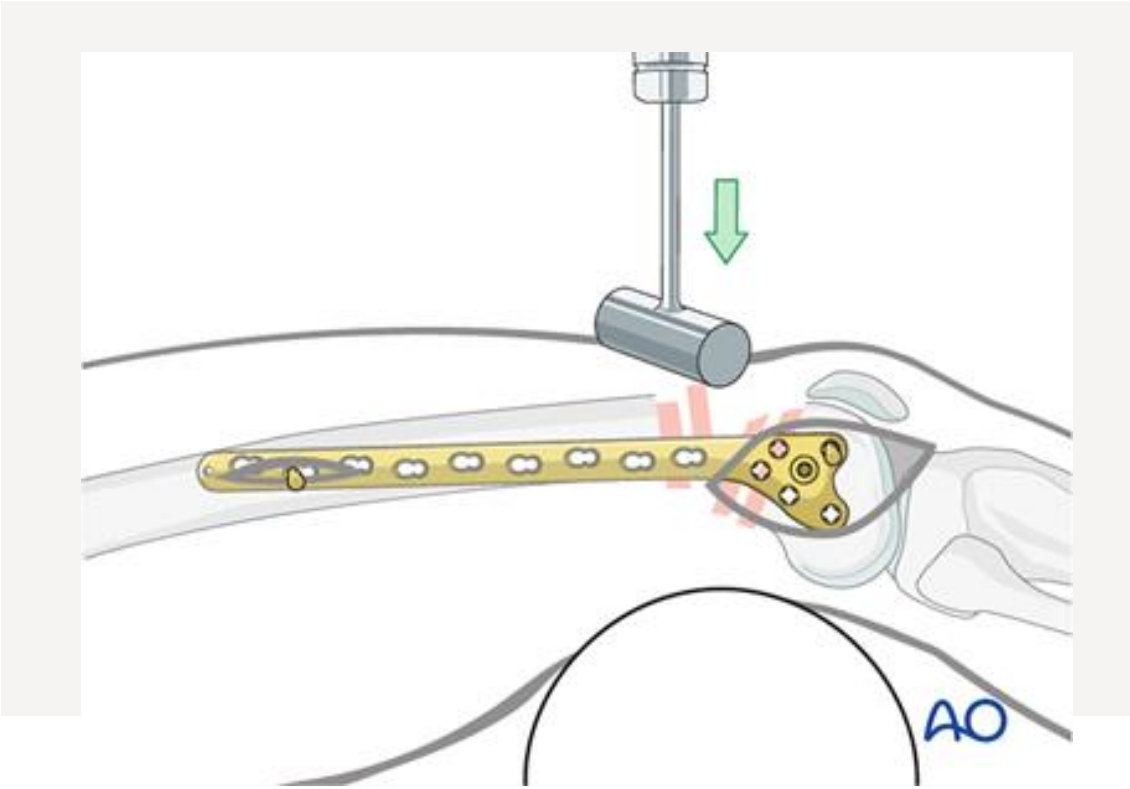
- Manual traction
- Fracture table/traction table
- Distractors
- ”Joy sticks”
- External fixator
- Poller screws/K-wires





MIO is NOT an excuse for poor reduction

Advantages



- Preserve/spare soft tissue
- Reduces risk of infections
- Reduces risk of woundhealing problems
- Reduces need for bone grafting
- Cosmesis

Disadvantages

- Technical demanding
- Increased C-arm time
- Malalignment
- Neurovascular damage
- Older fractures 2-3 weeks

Take-home messages

- MIO/MIPO whenever possible
- Plan plan plan
- Basic principles of ORIF still apply
- Anatomy is still the same (the nerve is there eventhough you don’t see it)

TAK