**Please click on the following link to watch the lecture online:-**

HTTPS://WWW.YOUTUBE.COM/WATCH?V=YOG2ORTXYAA&LIST=PLUBRB5B7FA_EYBVGZ4XB_AQLGCXLIEYRA&INDEX=7

# Relative stability: biomechanics, techniques, and fracture healing

AO Trauma Basic Principles Course

# Learning objectives

- Define relative stability
- Describe the biological behavior of fractured bone and how it is affected by relative stability
- Define indication for selection of relative stability according to AO principles
- Explain techniques for achieving relative stability

# How stability affects healing

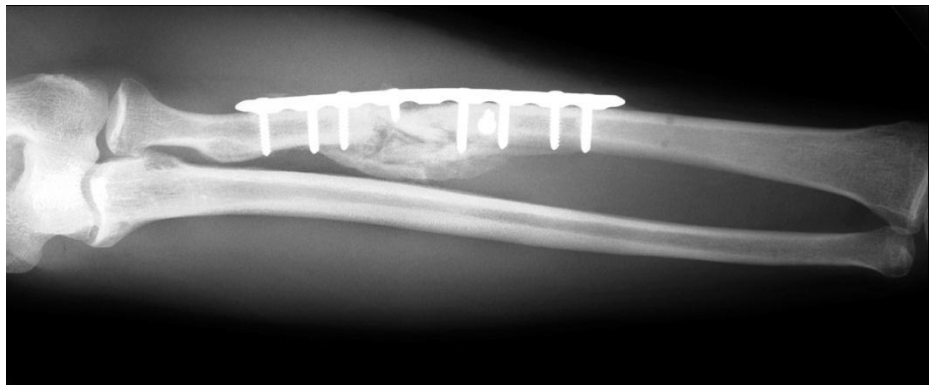
- Fixation of fractures alters the biology of fracture healing
- Method of bone healing depends on:
  - **Type of fracture** (simple or complex)
  - **Type of reduction** (anatomical or alignment)
  - **Type of stability achieved** (absolute or relative)
  - **Type of implant chosen** (providing absolute or relative stability)

# Definition of relative stability

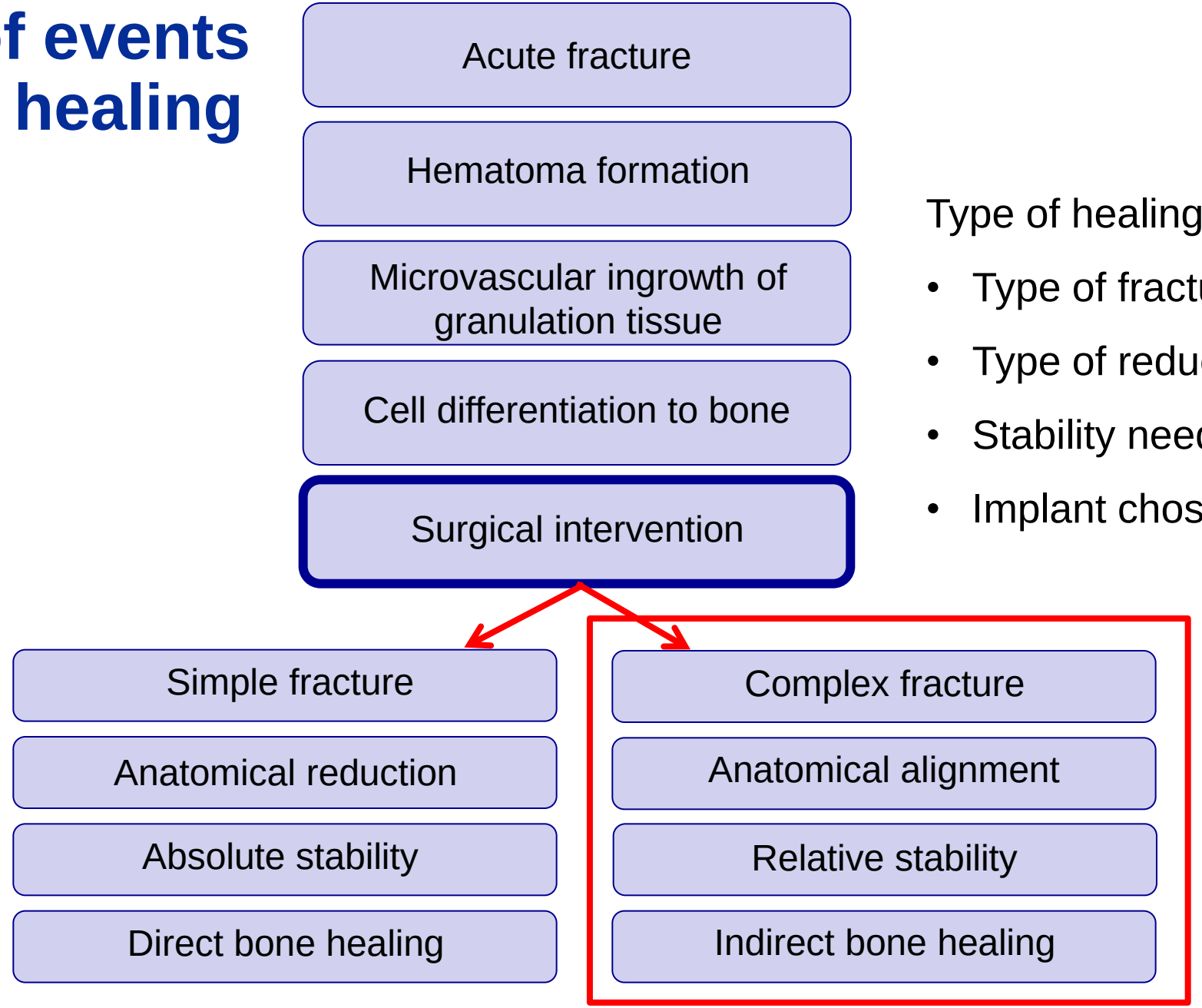
- Indicates there is some motion between fracture fragments
- Motion must be below the limits of tolerance of healing bone tissue (otherwise healing disruption will occur)
- Best methods to produce relative stability include some type of extramedullary or intramedullary splint
- Bones that heal by relative stability are characterized by a callus formation

# Multifragmentary fractures

- Tolerate more motion between the fracture fragments
- Overall motion is shared by several fracture planes, which reduces tissue strain or fracture and deformation at the fracture gap
- Flexible fixation can stimulate callus formation thereby accelerating fracture healing



# Cascade of events in fracture healing




Type of healing depends on:

- Type of fracture
- Type of reduction
- Stability needed
- Implant chosen

# Complex fractures

- Cannot be reduced anatomically
  - Without damaging blood supply
- Needs anatomical **alignment**
- Best done with indirect reduction techniques
- Needs only **relative stability**
- Heals with callus formation

# Types of stability required

- Multifragmentary fractures can tolerate more motion between the many displaced fragments
- Require indirect reduction and only **relative stability**

# Relationship between fracture and stability

- The closer the fracture fragments, the more stability is needed to prevent disruption of healing granulation tissue
- Anatomically reduced fractures require **absolute stability**

# Clinical indications for relative stability

Any non-articular, multifragmentary fracture

# Methods to produce relative stability

- Traction
- Casts
- External fixation
- Internal fixators (fixed-angle devices)
- Intramedullary nailing
- Bridge plating

# Examples of methods for relative stability

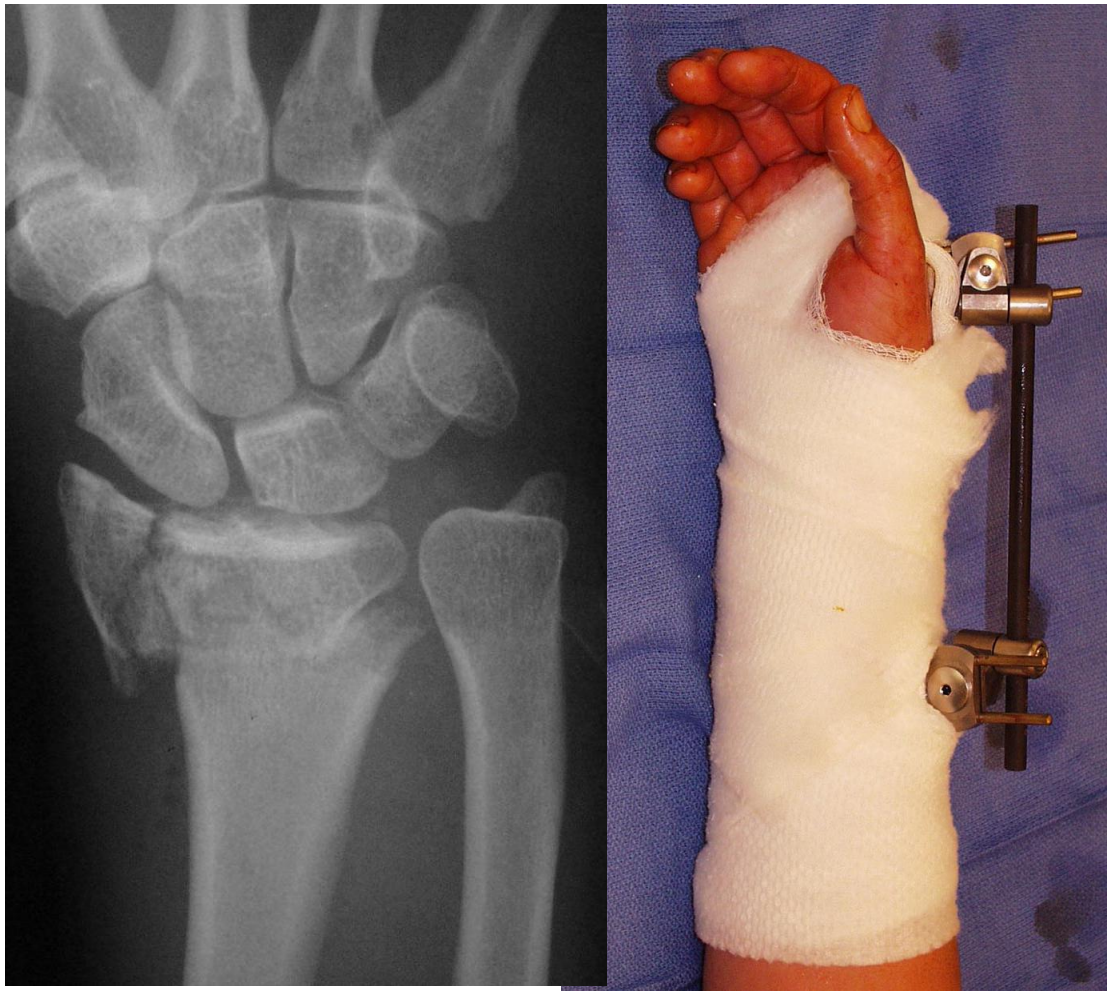
- Traction

# Examples of methods for relative stability

- Casting

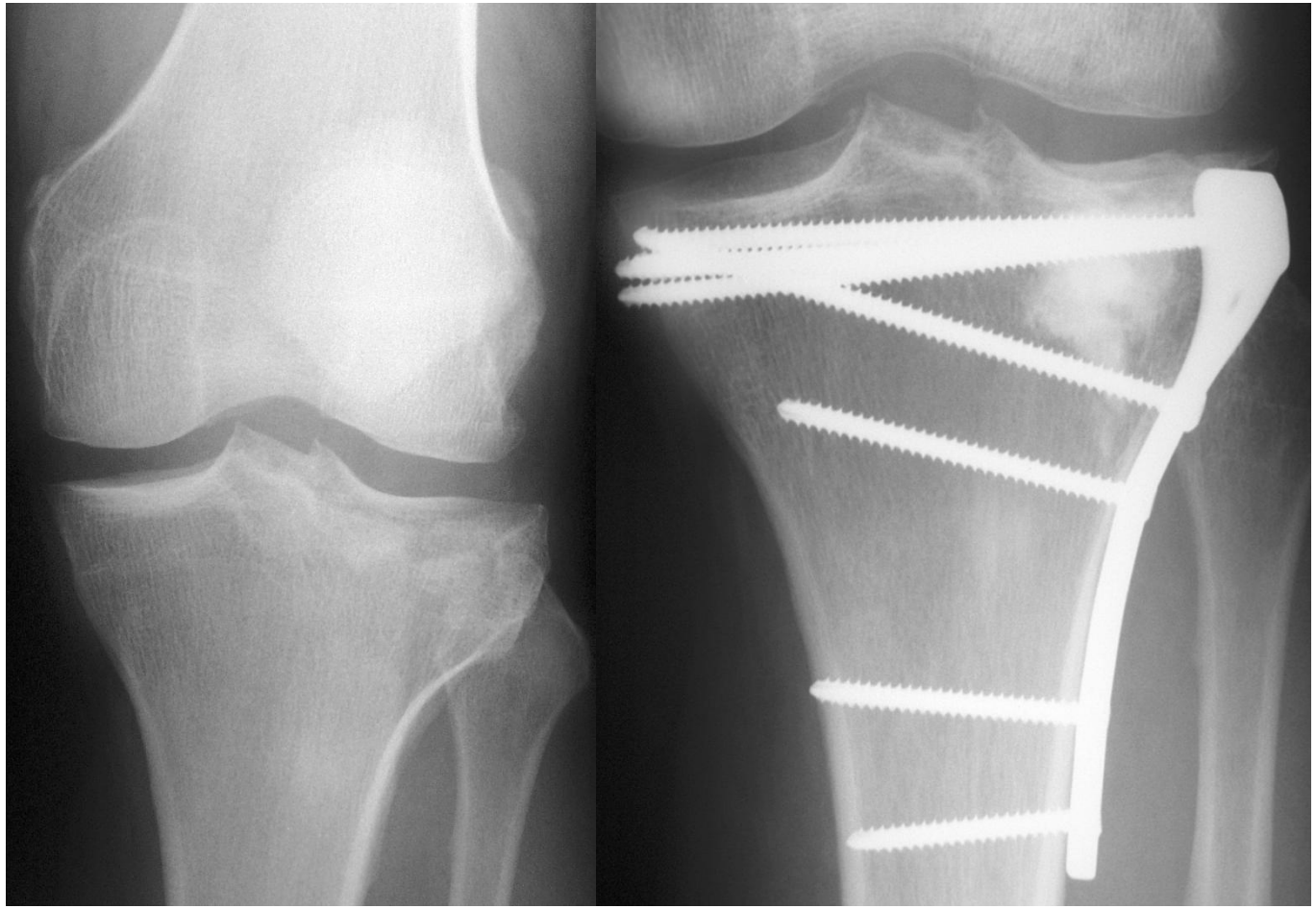
# Examples of methods for relative stability

- External fixation



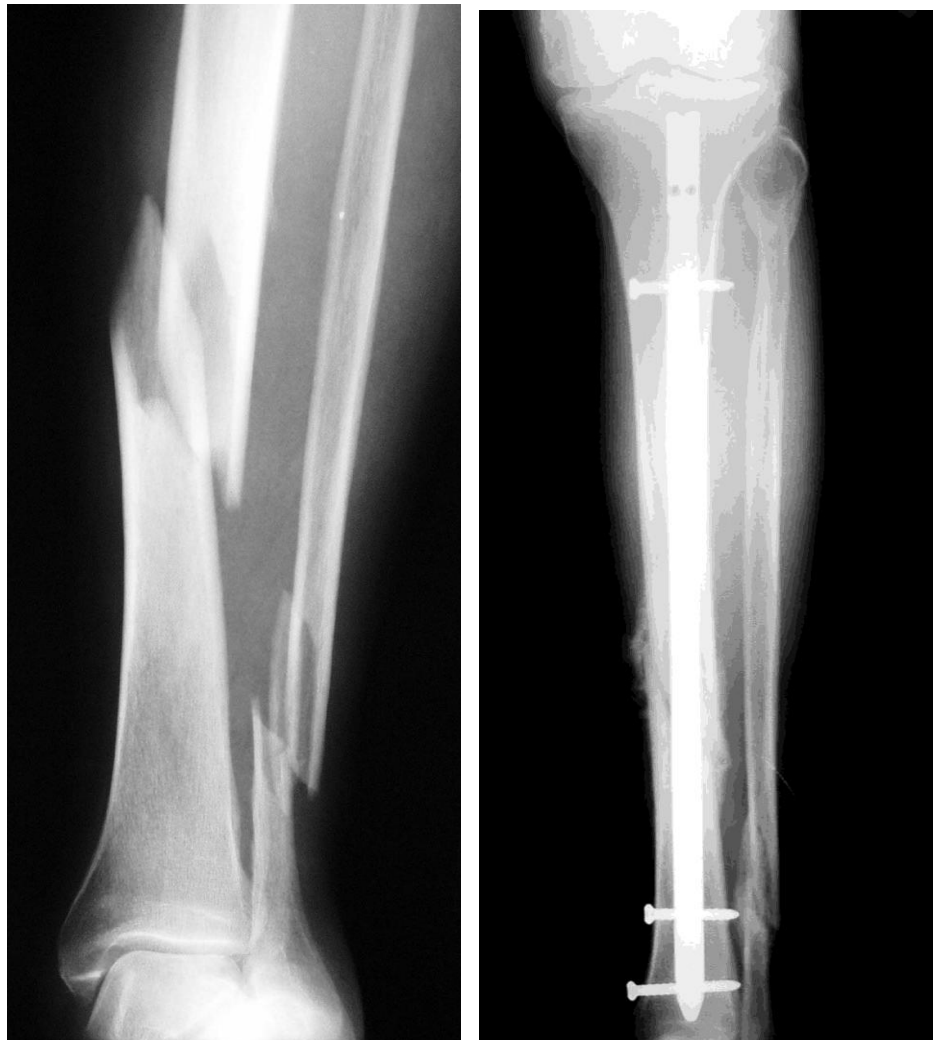
# Examples of methods for relative stability

- Internal fixators



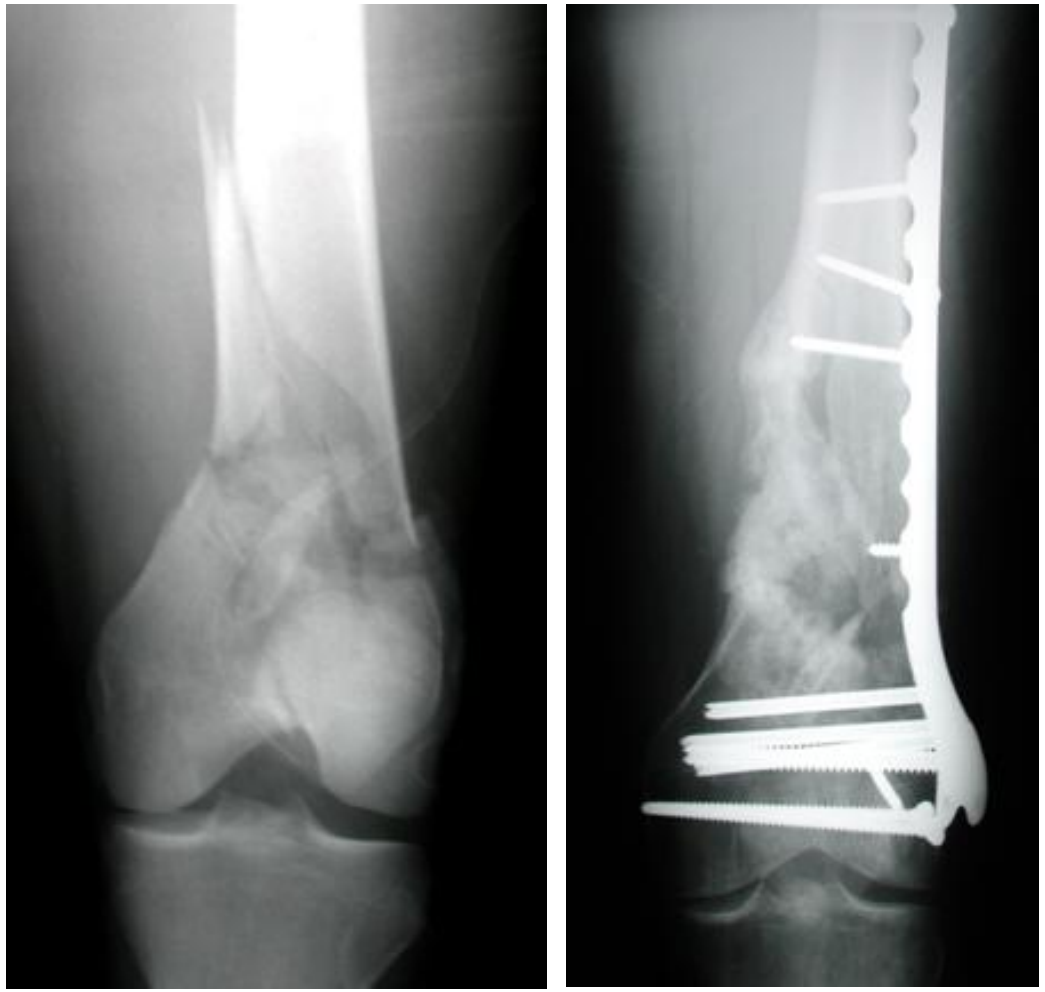
# Examples of methods for relative stability

- Intramedullary nails



# Examples of methods for relative stability

- Bridge plating



# Indirect bone healing with callus

# Take-home messages

- Relative stability indicates that there is a small amount of motion between fracture fragments
- Clinical indication for applying implants for relative stability include all non-articular, multifragmentary fractures
- A small amount of interface with motion will stimulate callous formation and accelerate bone healing
- Common methods for relative stability include traction, casting, external fixation, internal fixation, bridge plating, and intramedullary nails