PLEASE CLICK ON THE FOLLOWING LINK TO WATCH THE LECTURE ONLINE:-

https://www.youtube.com/watch?v=BvQ49nS_Xlo&list=PLuBRb5B7fa_eyBVgz4xb_AqlGcXLIEyRA&index=8

AO TRAUMA

Management of articular fractures

Primary treatment, reduction and fixation

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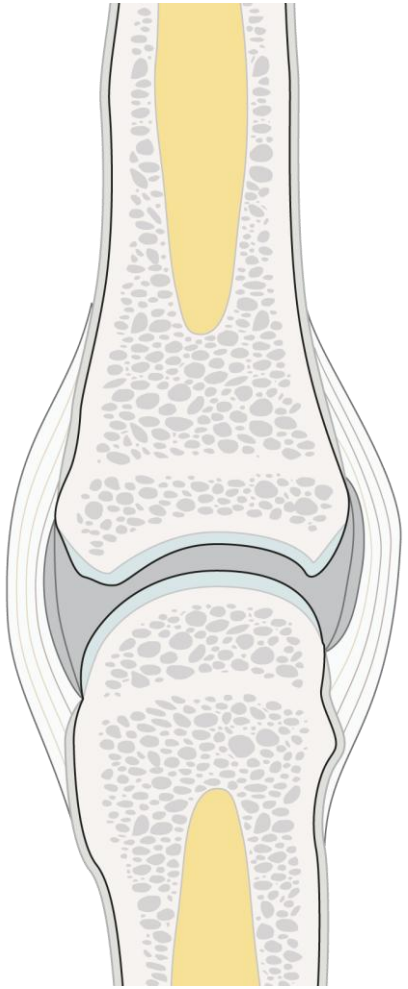
Orthopedic specialist MD

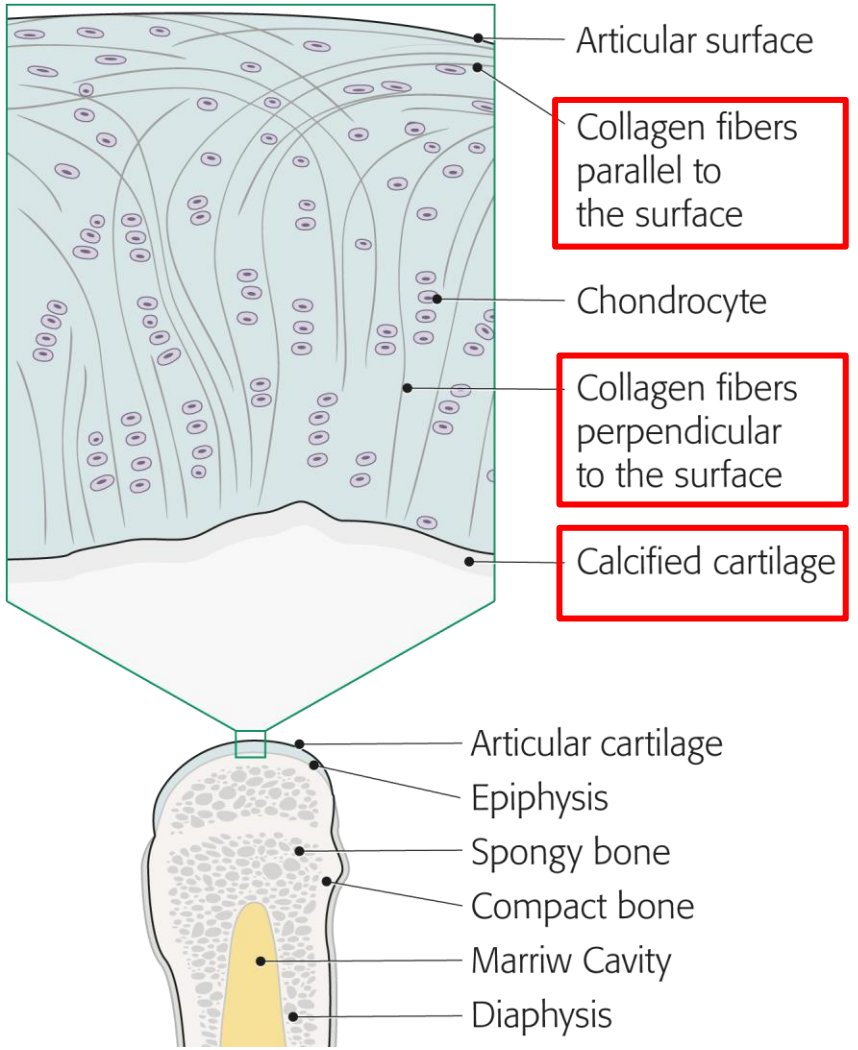
Learning objectives

- Describe how articular cartilage heals.
- Discuss **Early** and **Late** management of articular fractures.
- Assess and manage associated severe soft-tissue injury.
- Appreciate and understand techniques required for articular surface **Reduction** and its **Fixation Principle** .

- Reduction?
- Stability?
- Implants?
- Healing?

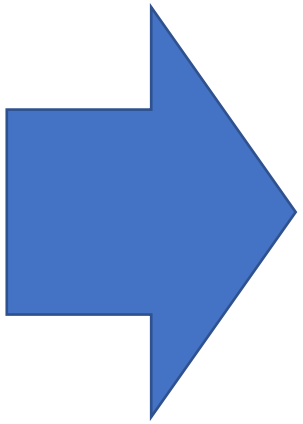
Articular cartilage





Articular cartilage

- **Composition:**
  - **Chondrocytes**
  - **Proteoglycan**
  - **Type II collagen**
  - **Water**
- **Nutrition:**
  - **Avascular**
  - **Synovial fluid**
  - **Movement**



- Resilient
- Elastic
- Low friction
- Distributes load

but

- Sensitive to injury
- Heals poorly
- Fibrocartilage

Principles of treatment

- How to mange this 30 year old

Basketball player after FD 1h ago

?????

Principles of treatment

Assessment the Pt Viability

ATLS

DCO

Principles of treatment

- Understand the injury
- Evaluation of soft tissues

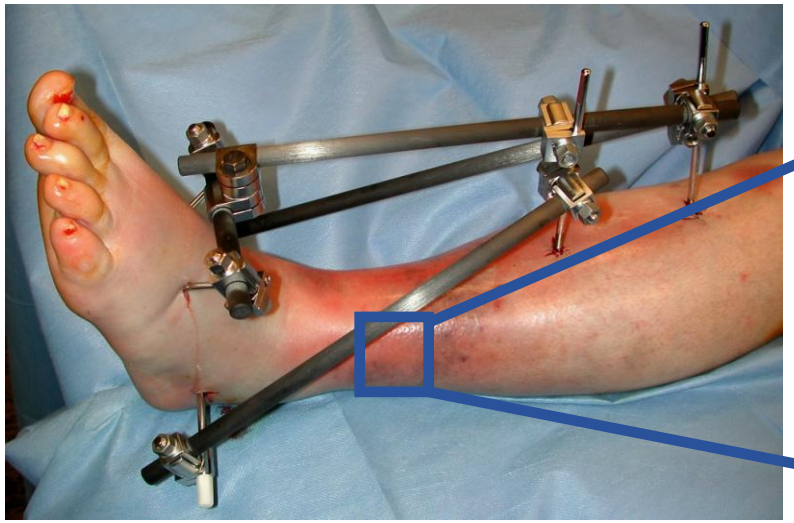
Principles of treatment

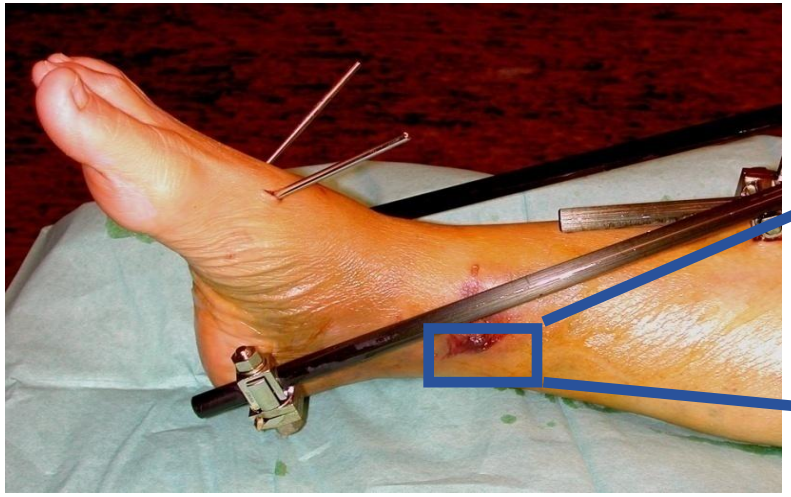
- Timing:
  - Avoid surgery until soft tissues permit

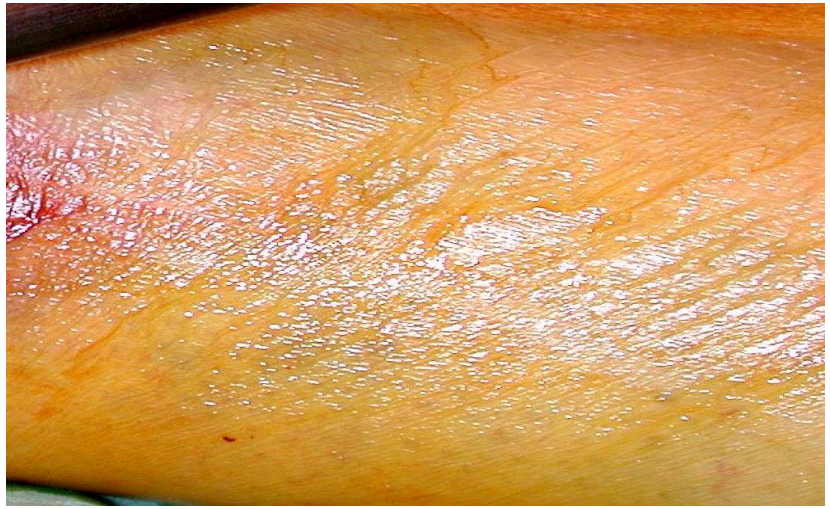
Principles of treatment

DCO

Principles of treatment







Principles of treatment

- Early surgery if:
  - Little edema
  - Good skin condition
  - Recent trauma < 2 days

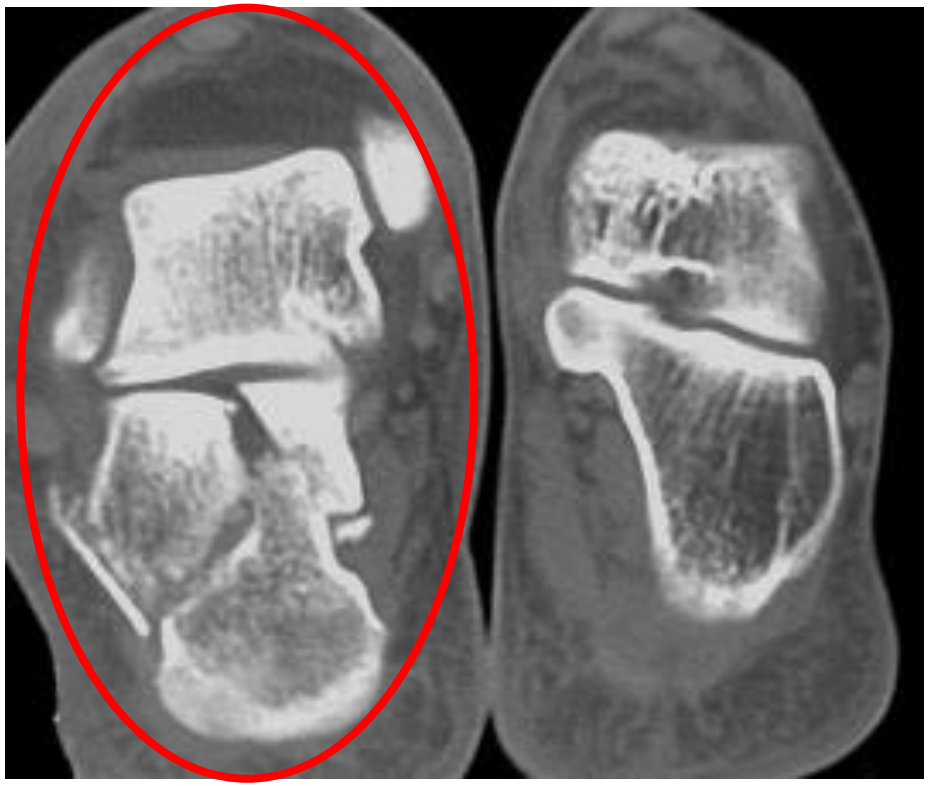
Principles of treatment

- Understand the injury
- Evaluation of soft tissues
- Preoperative planning
- Timing
- Articular reduction/rigid fixation
- Metadiaphyseal reconstruction

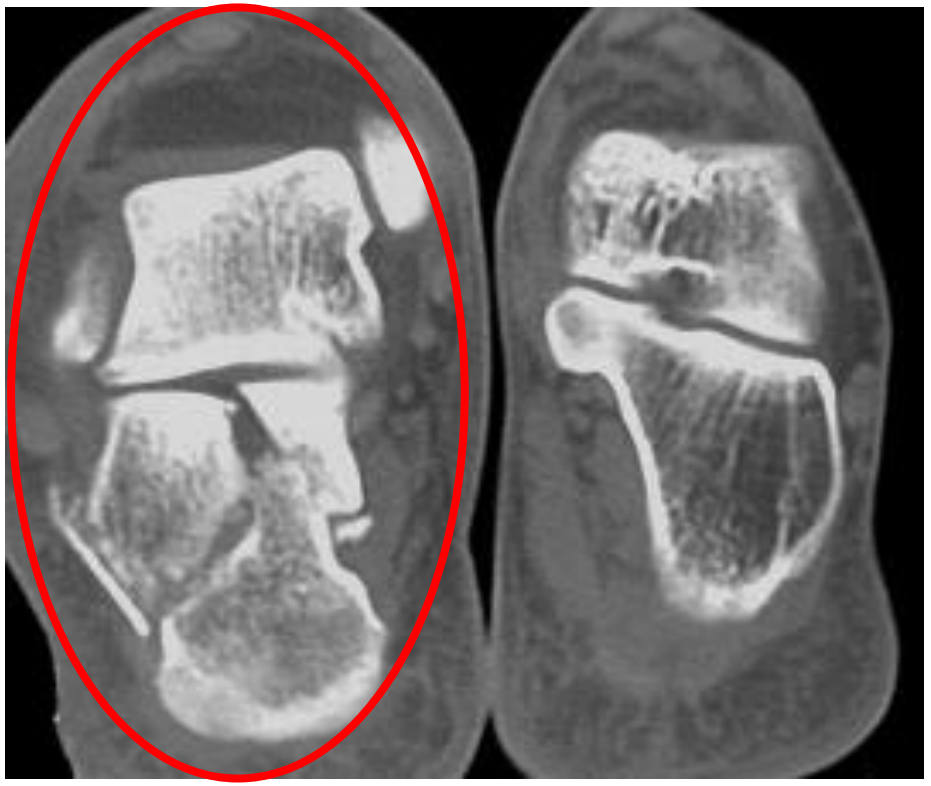
Principles of treatment

- Preoperative planning:
  - X-rays: AP, lateral, oblique
  - Computed tomography (CT)
  - Magnetic resonance imaging (MRI)

- Span, scan, plan



Principles of treatment

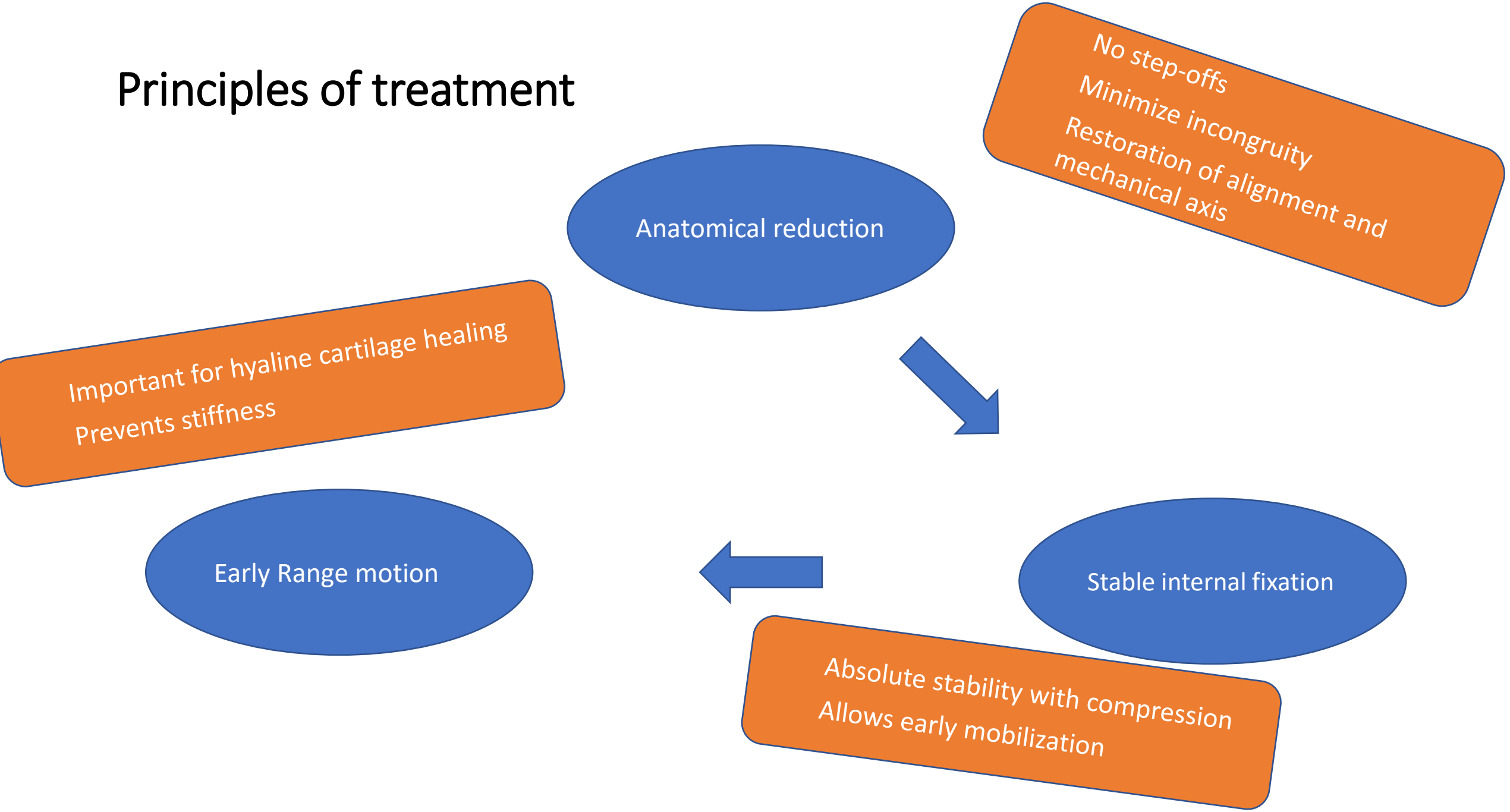


- Preoperative planning:
- Span, scan, plan

- Timing to surgery ,Anesthesia , position , surgical approach

Surgical technique, timing of surgery ,Instrumentation , reduction and fixation and closure and post op rehabilitation etc …..

Principles of treatment

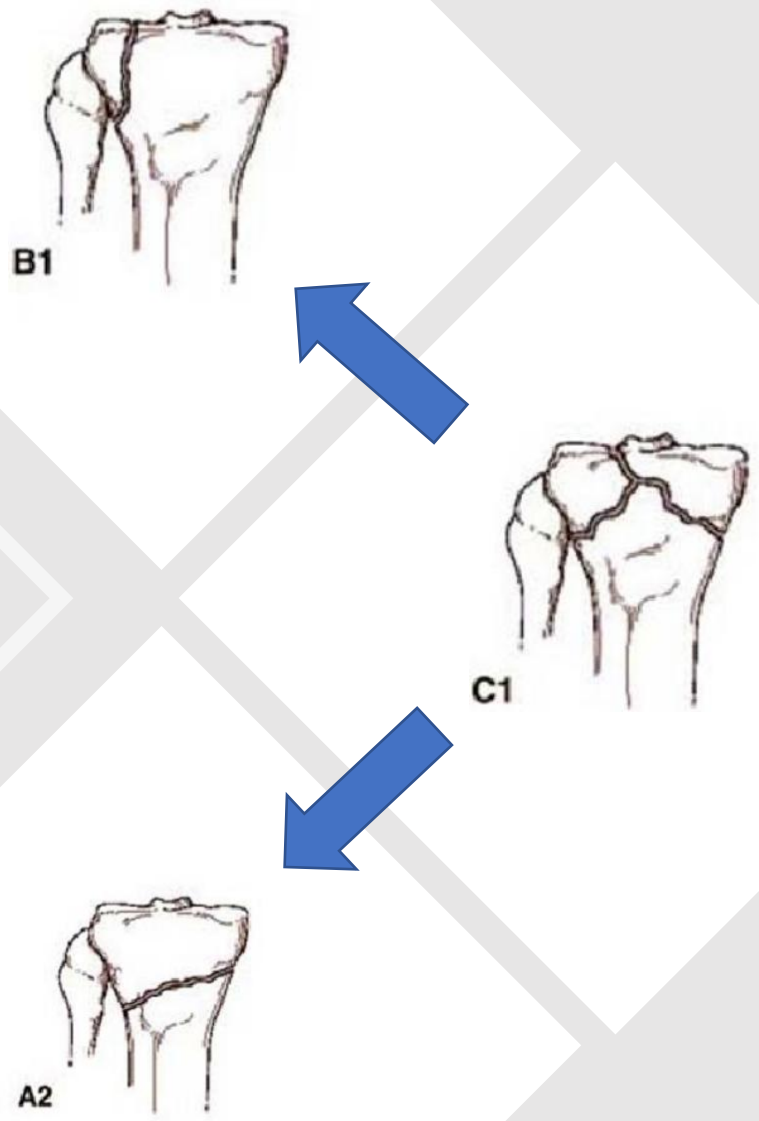


History

Lambotte recommended:

- Anatomical reduction of the articular surface
- Alignment of the diaphyseal/metaphyseal fragments
- Sound fixation of metaphysis to the diaphysis
- Bone graft if necessary to support joint surface

Principles of treatment



Type of reduction

Direct reduction

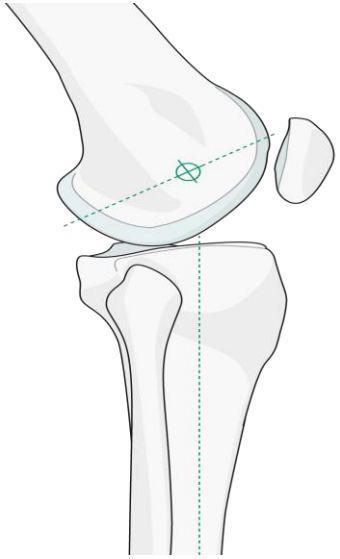
Indirect reduction

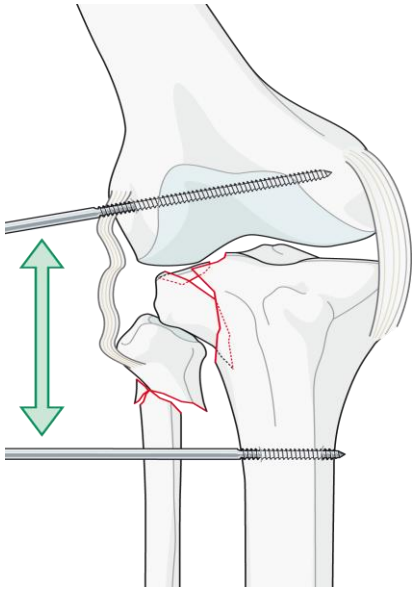
femoral Distractor , EX Fix , skeletal traction, manual traction ,

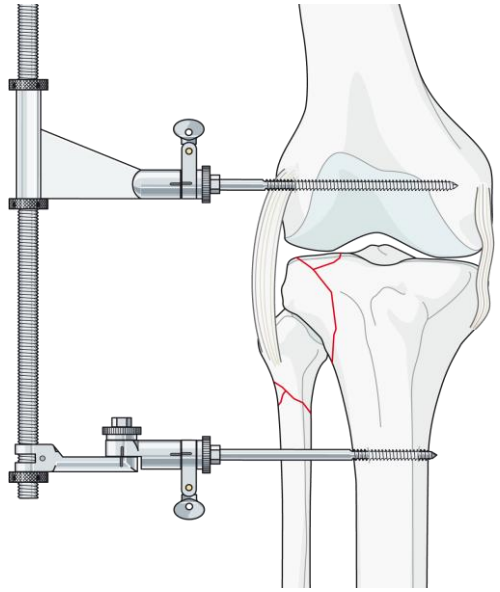
pointed reduction forceps , bone holder , bone spike pusher , k wire

Femoral distractor

Reduction techniques



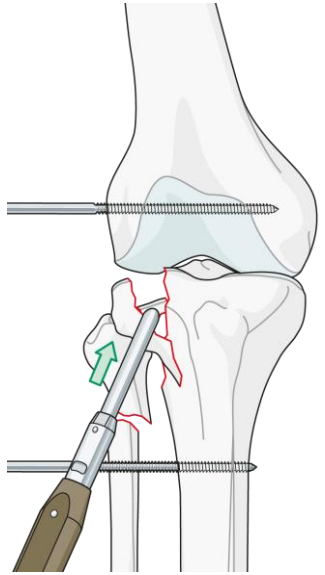


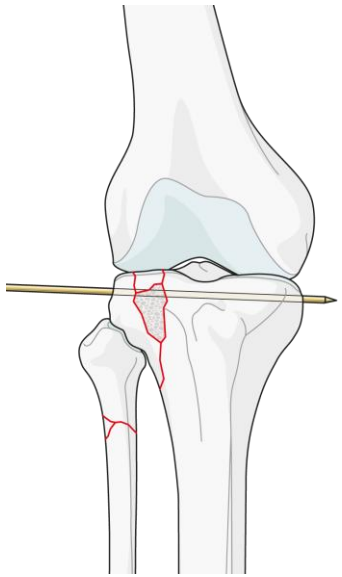


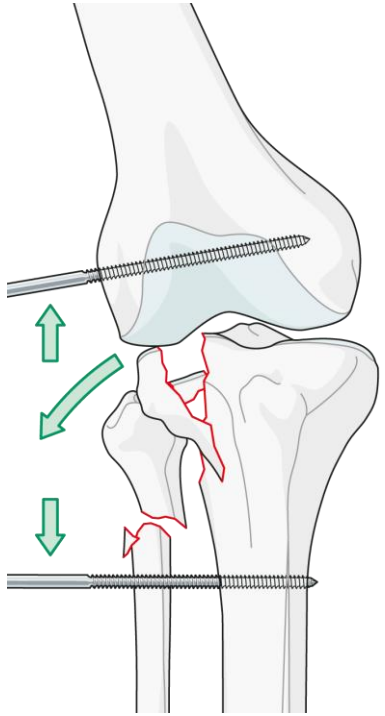
Distraction realigns the metaphysis area by indirect reduction

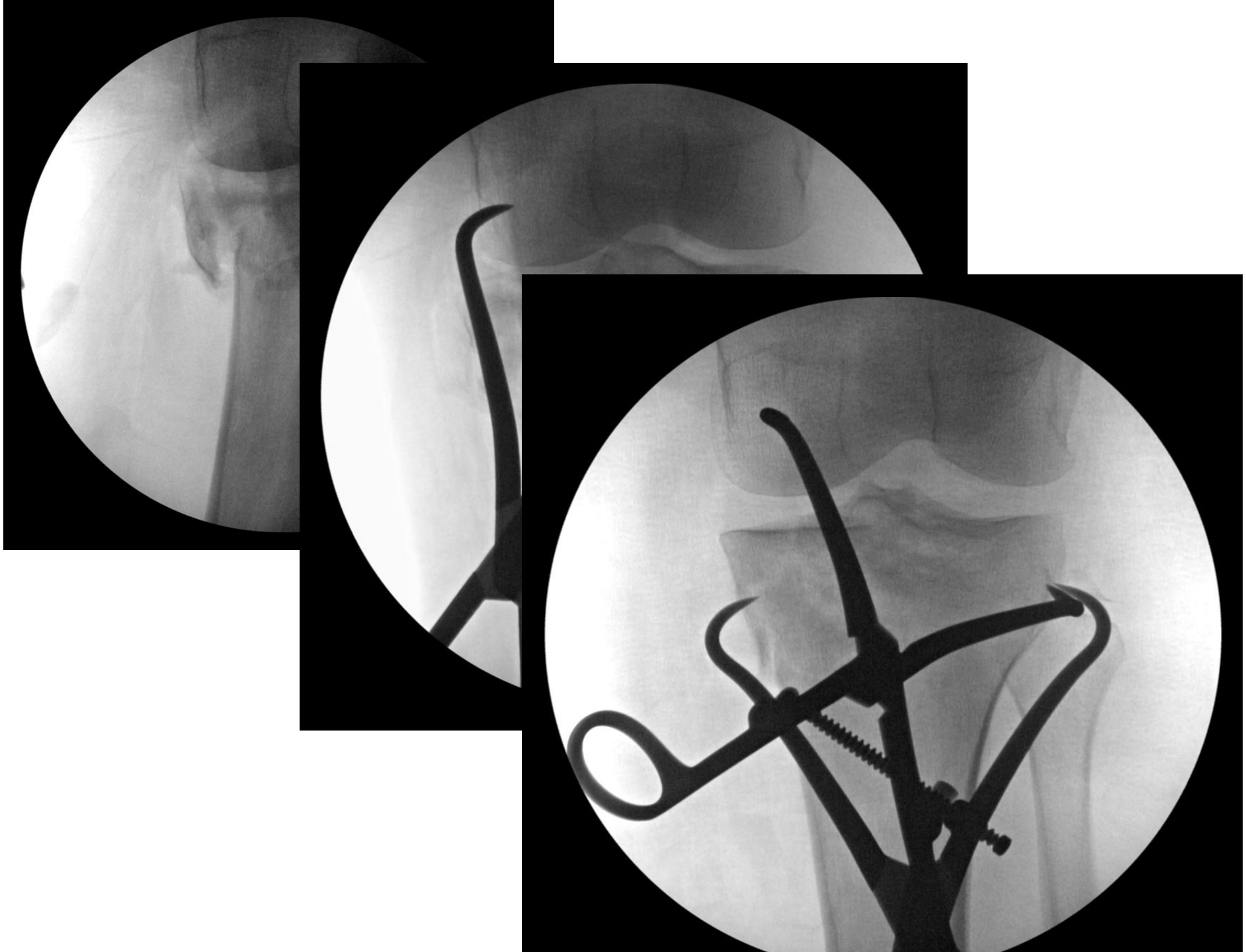
- **Plus** it utilizes residual intact portions of soft-tissue attachments to reshape anatomical structures
- Ligamentotaxis

Principles of treatment

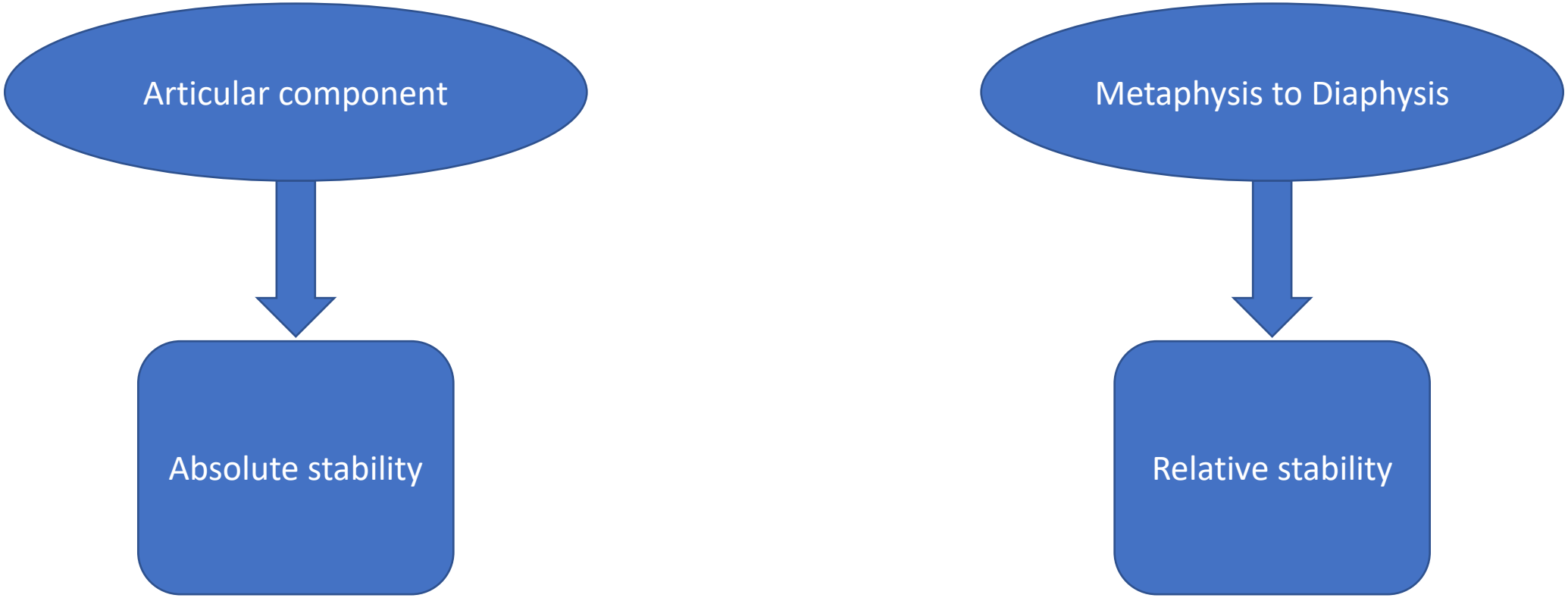






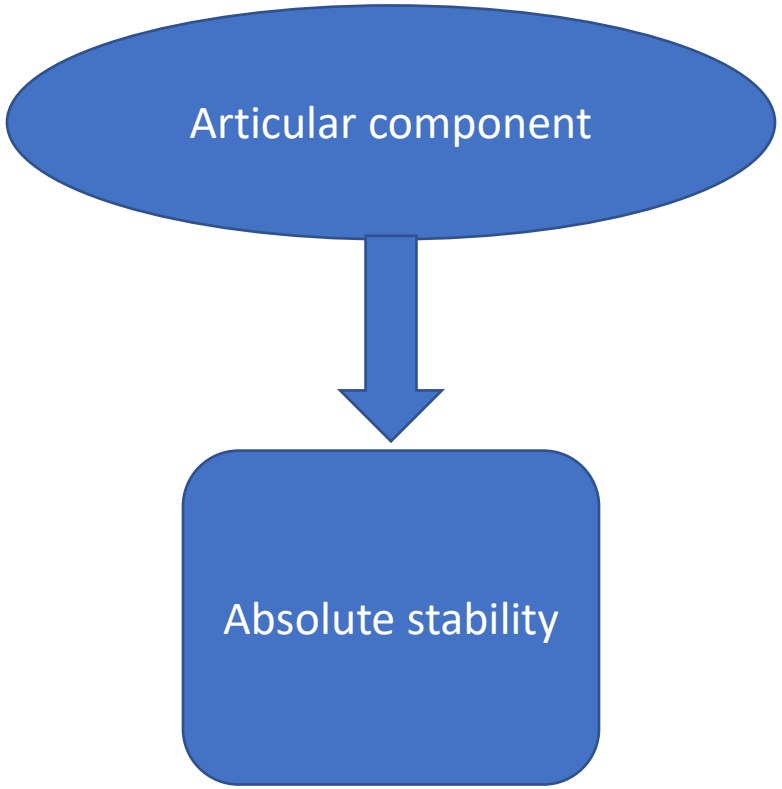


Type of fixation



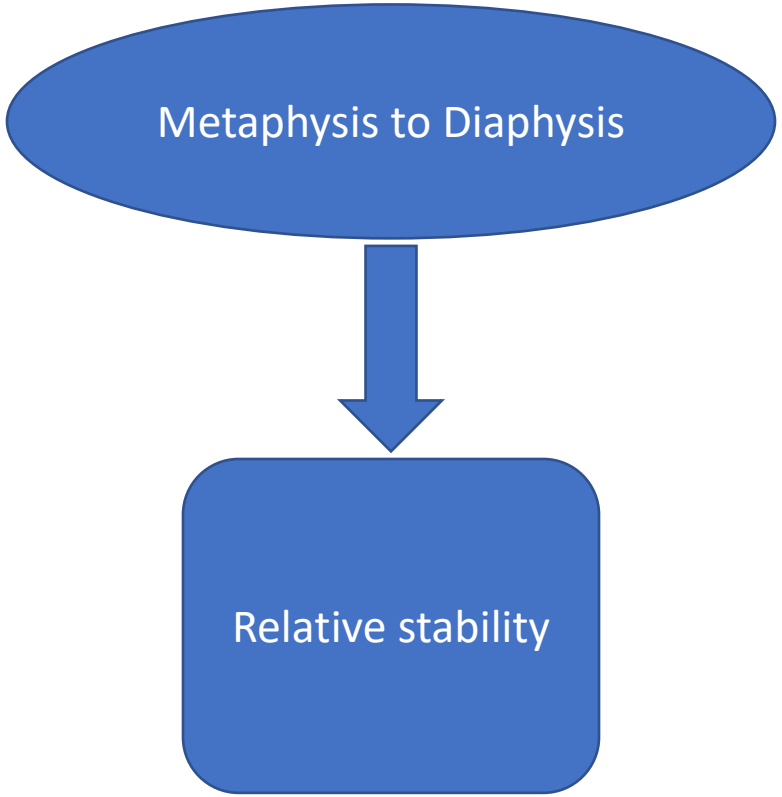
- Motion between the fracture fragments under normal physiological loading
- Open of Closed reduction
- Anatomical or Functional reduction
- Healing Primary , or secondary
- callus

Type of fixation



- **Methods** :
- Lag screw fixation
- Axial compression plating
- Tension band wiring
- Buttress plating

Type of fixation



Methods :

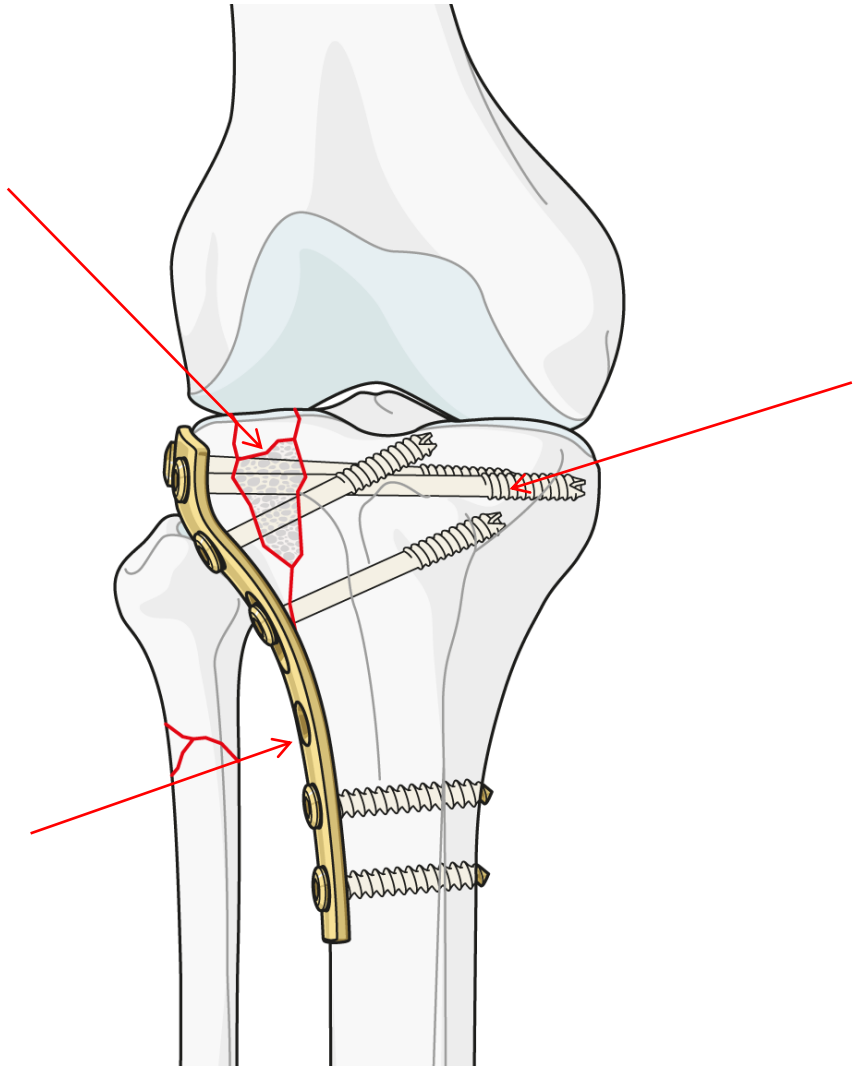
External fixator

Bridge plate

Intramedullary nail

Principles of treatment

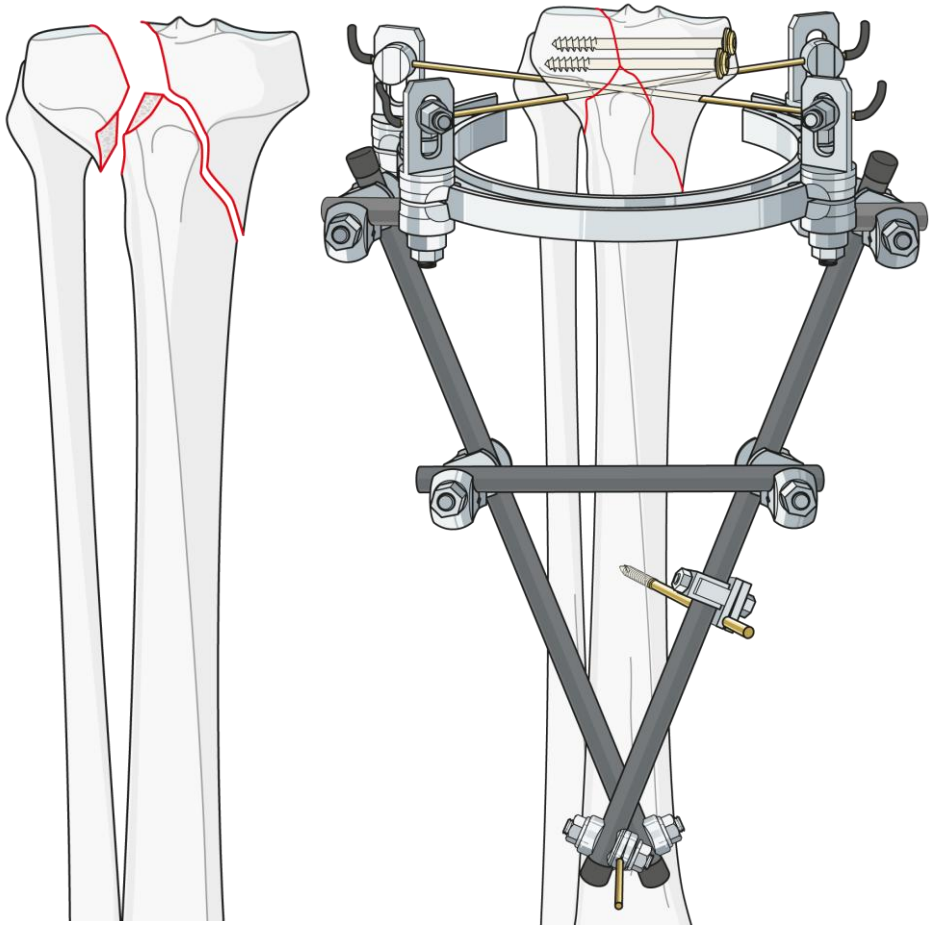
Elevation of joint surface

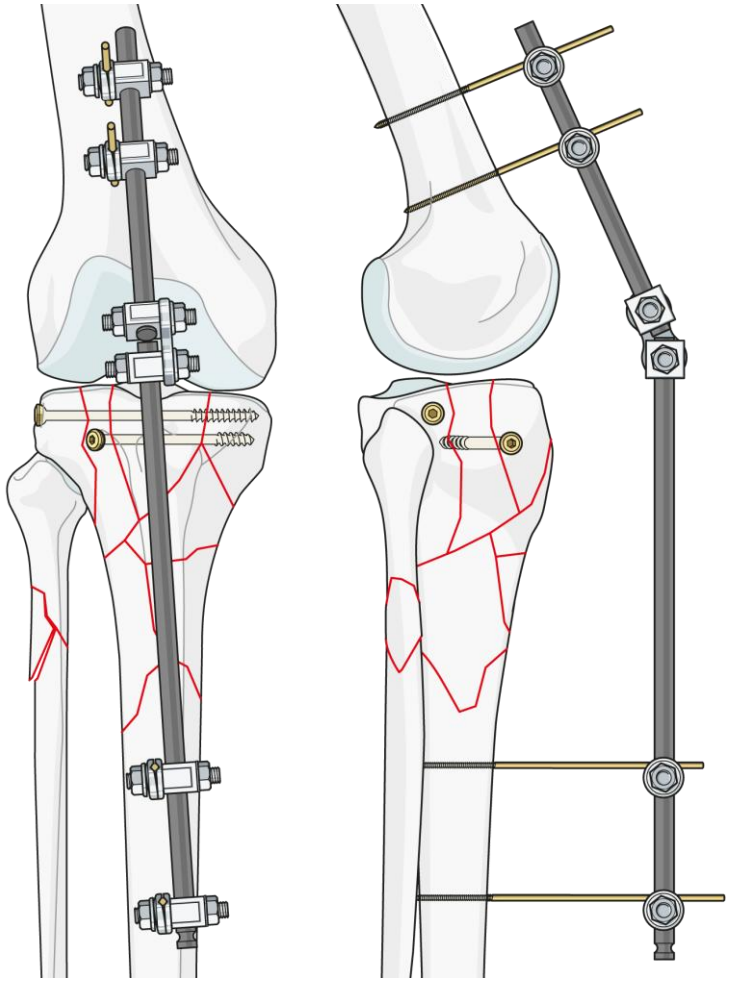


Compression with lag screws

Buttress the fracture

Type of fixation

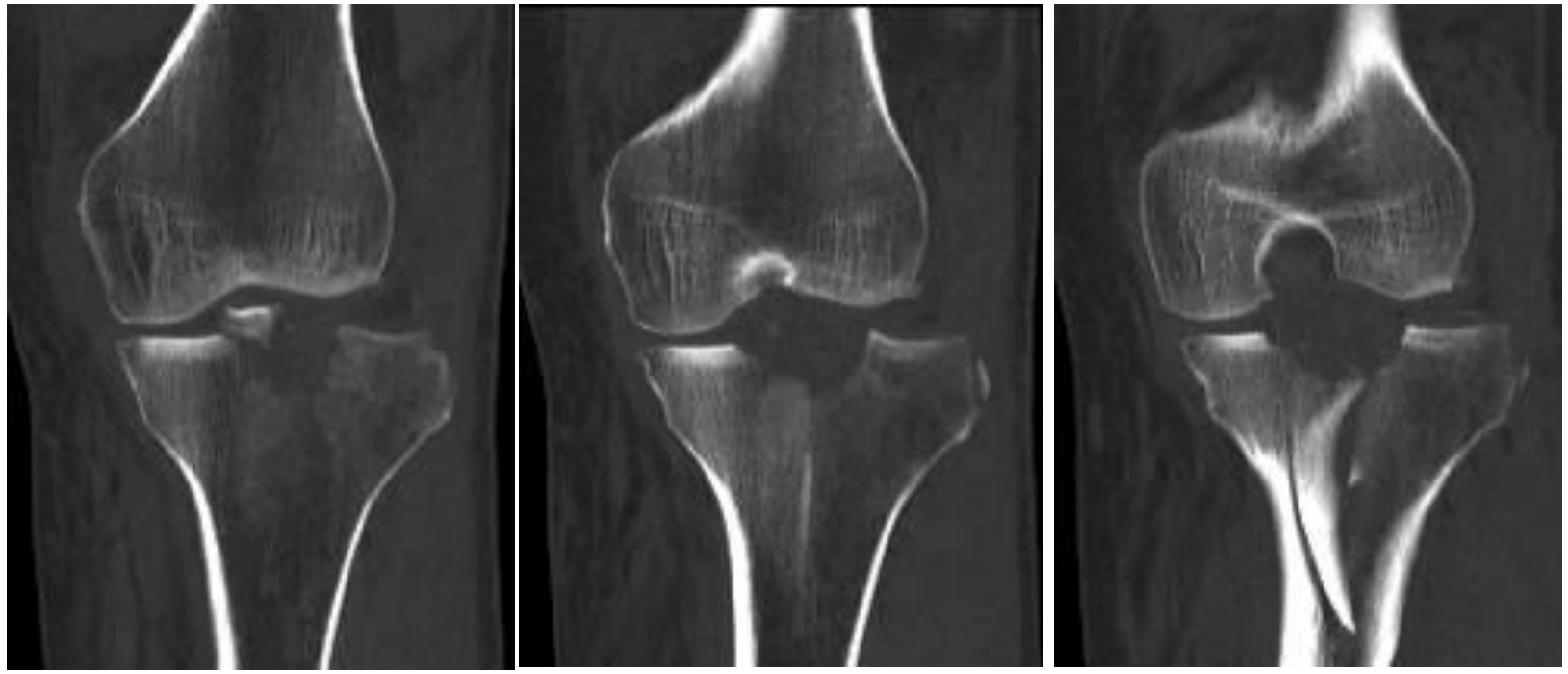


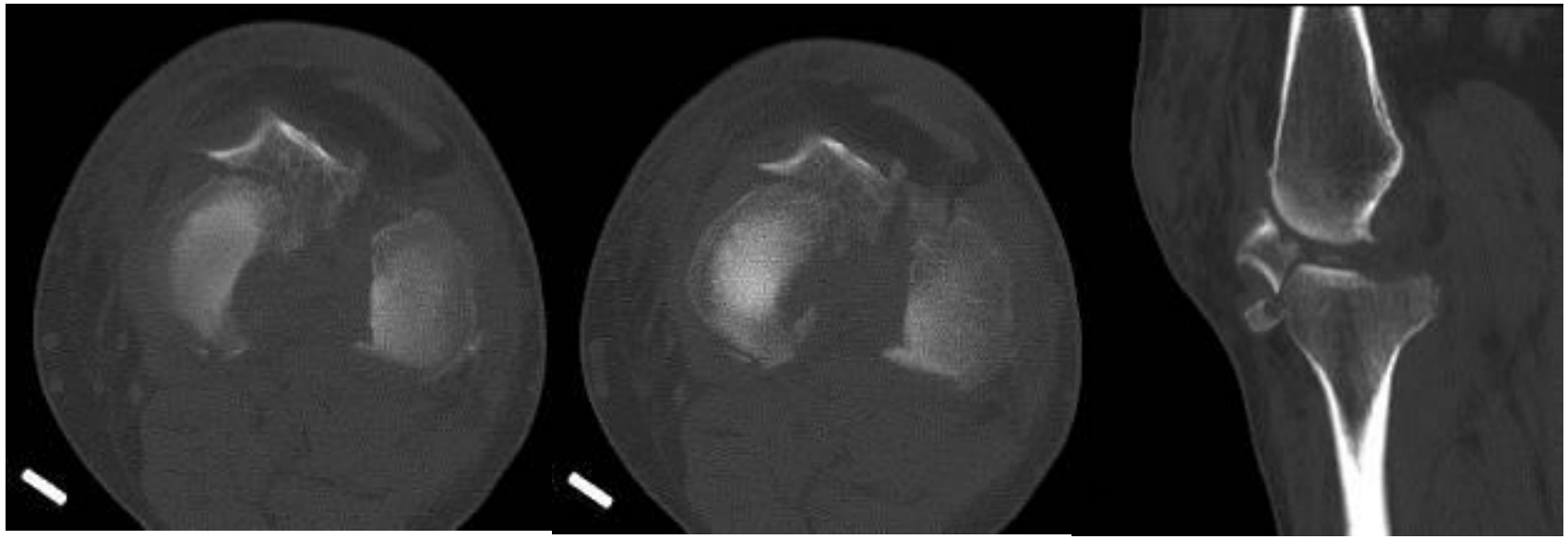


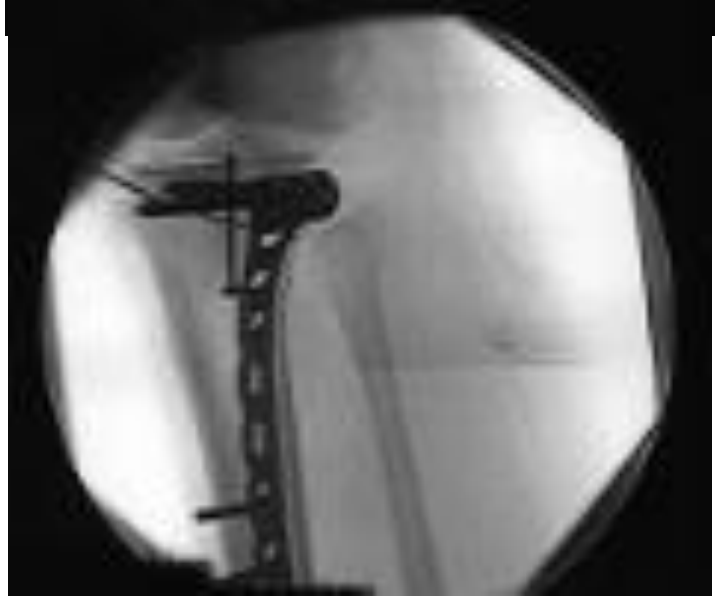
Metadiaphyseal fixation

Metadiaphyseal fixation

Metadiaphyseal fixation







Six weeks postoperative

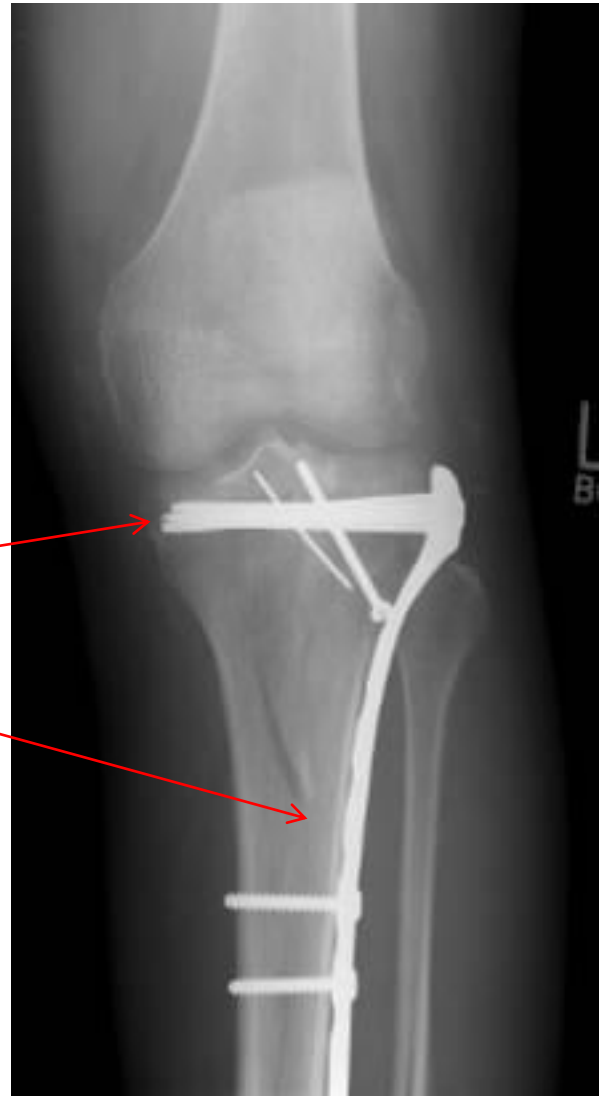
- Reduction?
- Stability?

Six weeks postoperative

- Reduction?
- Stability?

- Absolute stability
- Direct reduction

- Relative stability
- Indirect reduction



Allow Early ROM

- Articular cartilage is Avascular
- Nutrition comes from the synovial fluid
- Flow of synovial fluid requires motion and load
- So to preserve articular cartilage needs :
- Early motion
- Some load

Early ROM

Clinical and experimental evidence

- Immobilization results in joint stiffness
- Immobilization after open reduction and internal fixation (ORIF) results in **much greater stiffness**

Outcome after articular fractures depends on

- Trauma energy—bony comminution/soft-tissue injury
- Residual malalignment—posttraumatic osteoarthritis
- Ligamentous instability—posttraumatic osteoarthritis
- Step-offs in articular surface—posttraumatic osteoarthritis

Take-home messages

Anatomical reduction

+

Absolute stability

+

Early movement

Optimal joint healing and function

Respect soft tissues