Injuries around Knee

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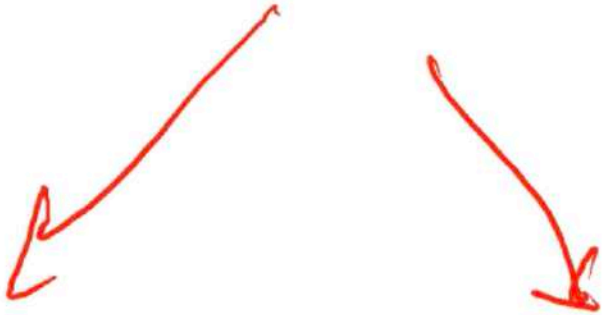
MS, DNB, MNAMS, FIJR (USA)

Faculty, Targetortho

Injuries around Knee



- Distal Femur #
- Tibial Plateau #

(Part 1)

- Knee dislocation
- Patella #

Distal Femur

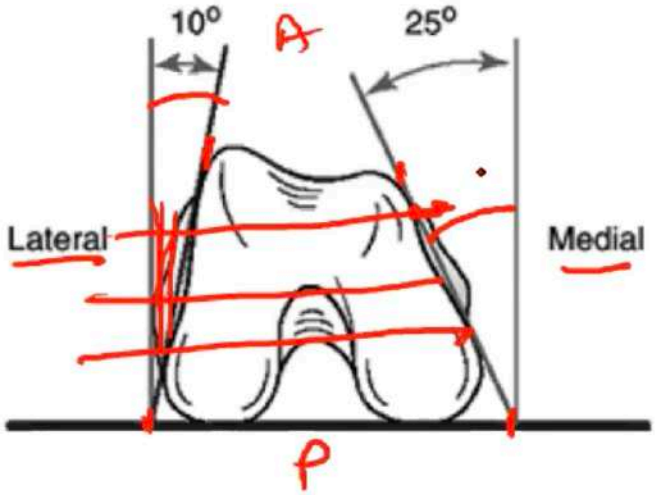
- "Fracture within transcondylar width of knee"

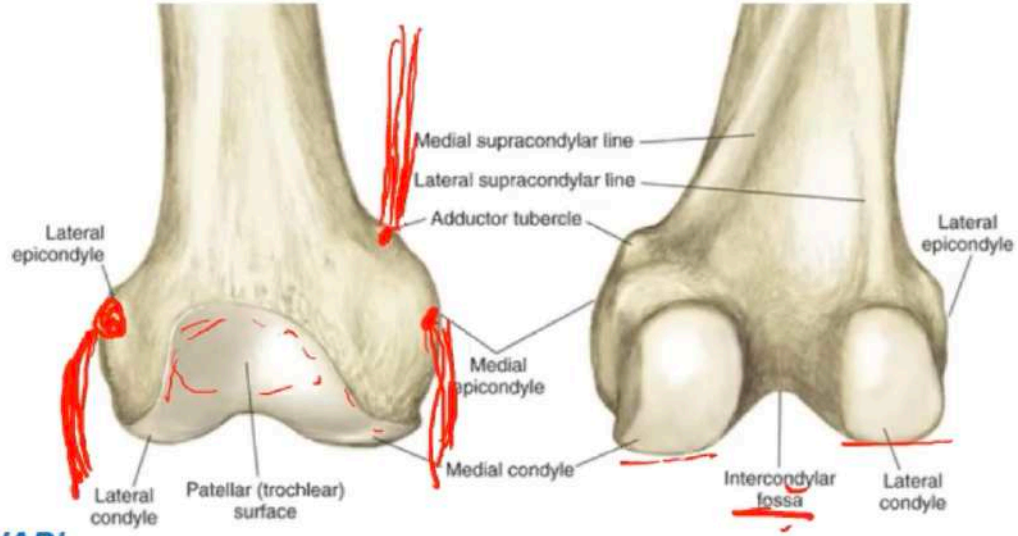
Age distribution — "Bimodal"

- Young males– High energy
- Old females – osteoporosis

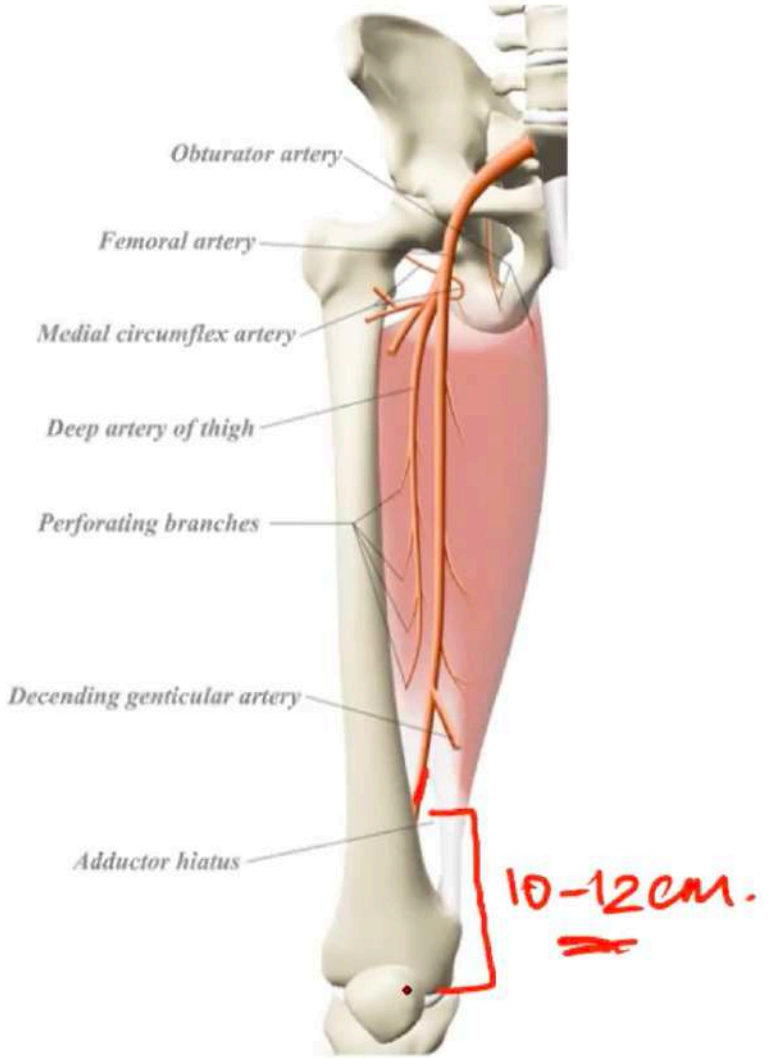
Surgical Anatomy

- Trapezoidal- 10 degree lateral and 25 degree medial
- Medial condyle is more distal as compared to lateral condyle (Valgus)



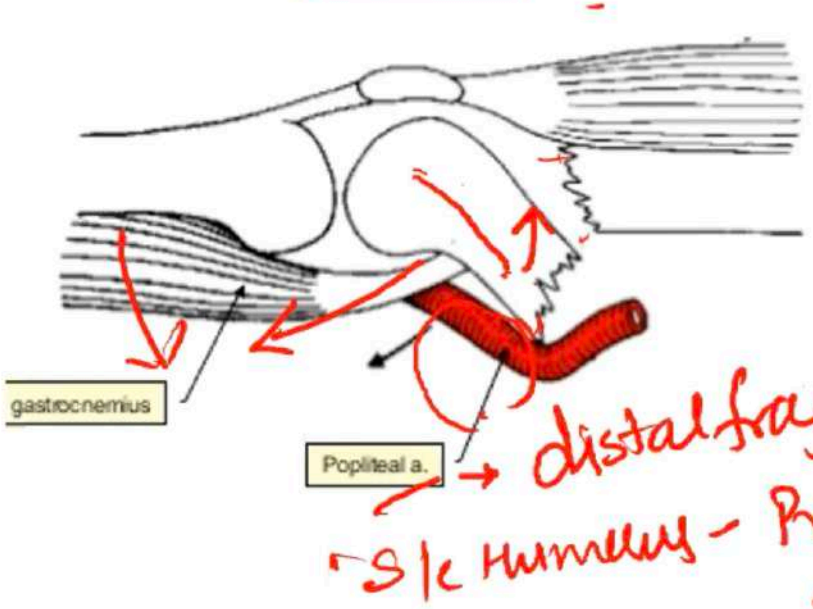


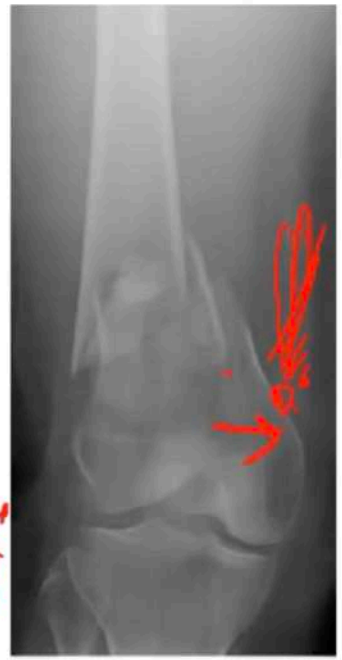
- Femoral vessels pierce adductor magnus 10-12 cm above knee joint and enters posterior compartment



Muscle displacements

- Shortening – Quadriceps and Hamstring
- Apex posterior angulation– Gastrocnemius pull
- Varus- Adduction magnus



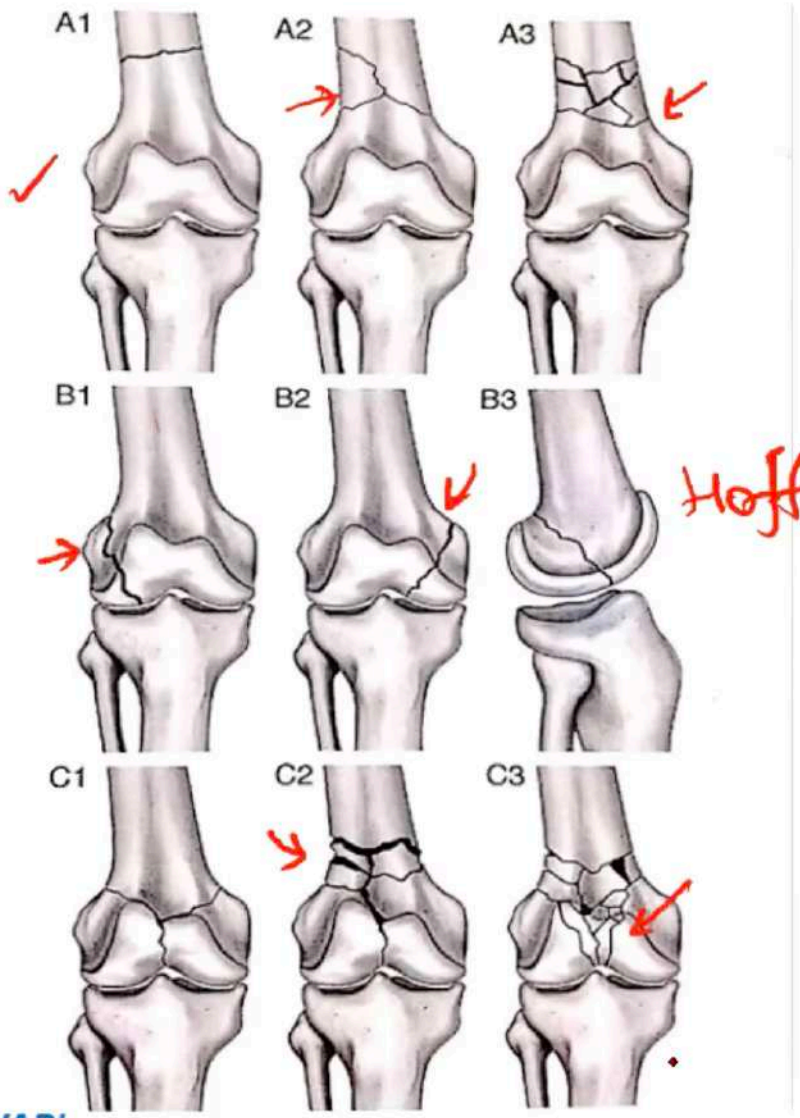


Classification- AO

33 A → Extraart.

B - Partial-articular

C - Complete articular



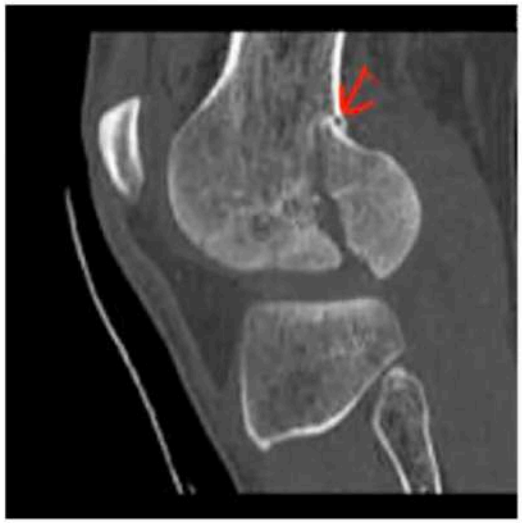
Hoffas

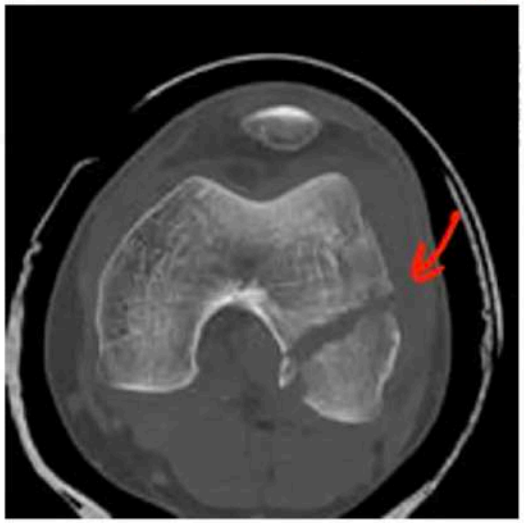
Clinical presentation

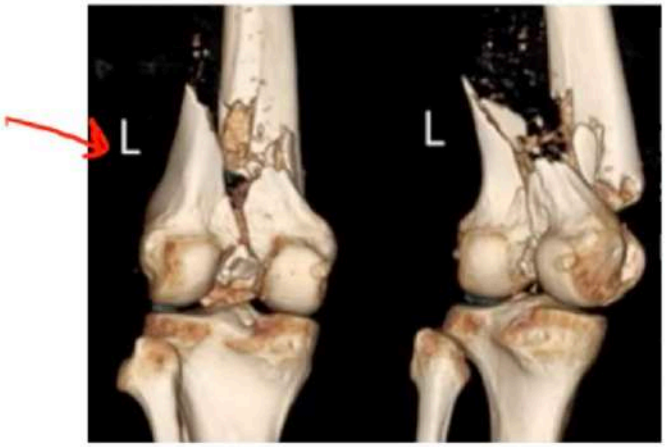
- Pain
- Swelling
- Bruise
- Crepitus
- Tenderness
- Mobility
- Shortening and external rotation

- Neurological examination
- Vascular examination- Distal pulses must be checked
- Open #
- Skin condition – Blisters
  – tense swelling

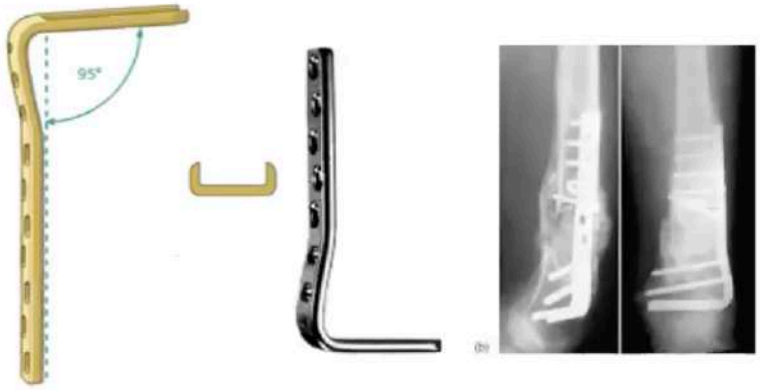
CT







Implant Choice- Plate options



Blade plate-

technically demanding as it require correct placement in three planes

DCS-

4cm of distal femur should be intact

Disadv- More bone is removed.

Bulky- Prominent hardware at ITB band

DFLCP-

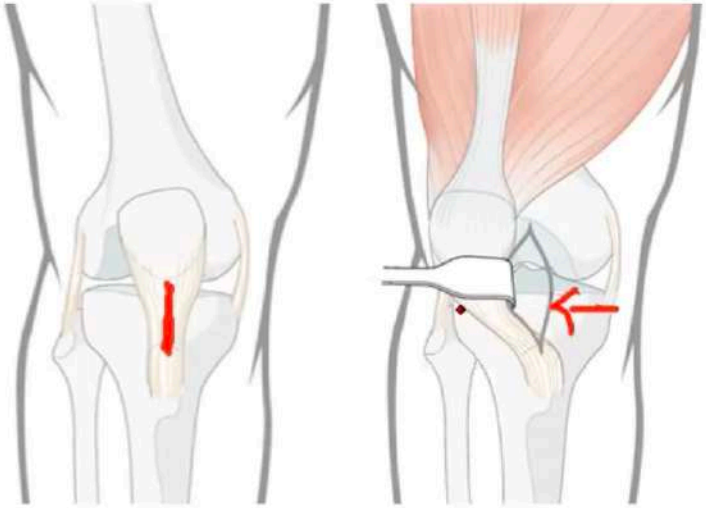
Nail

- For nail-

  "Good reduction and Good entry point is must"

- Approach for nail- Transtendon

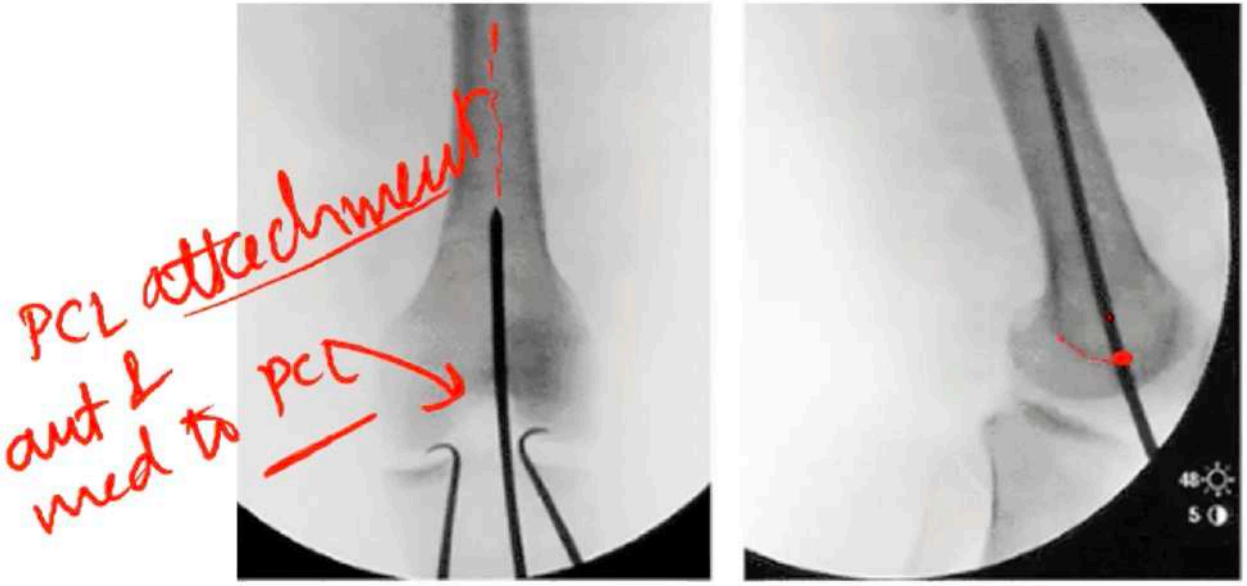
  Medial parapatellar



Advantage of nail over plate

- Less invasive surgical approach
- Less soft tissue dissection- Preserve biology
- Load sharing device
- Intramedullary implant – resist bending forces better than plate

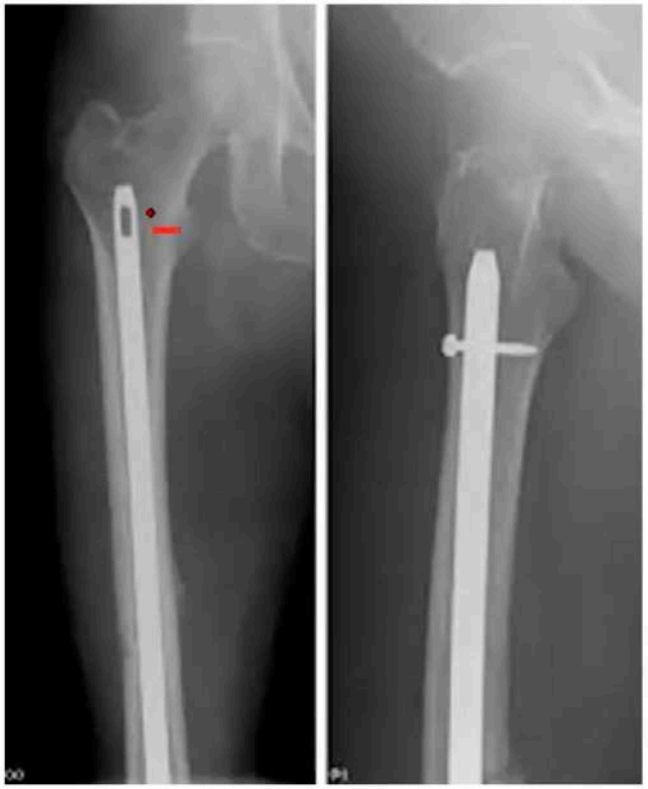
Entry point for nail



Length of nail

- Upto or above the level of LT

long nails.

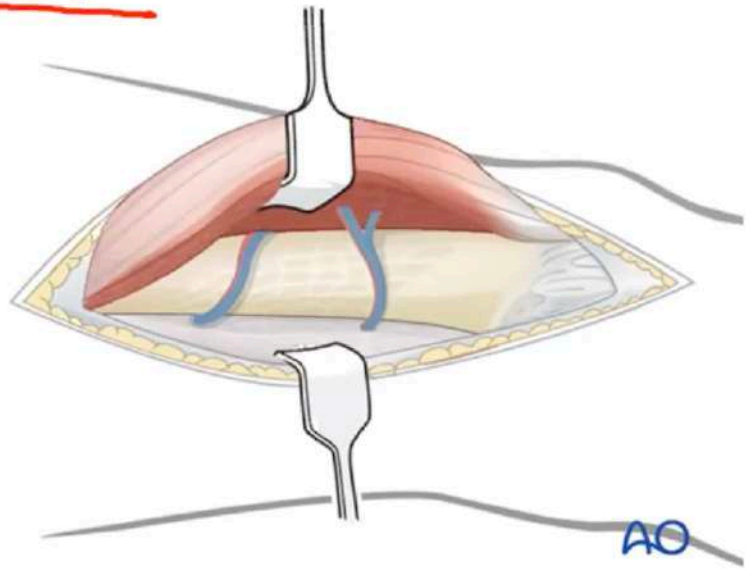


Approaches for plate

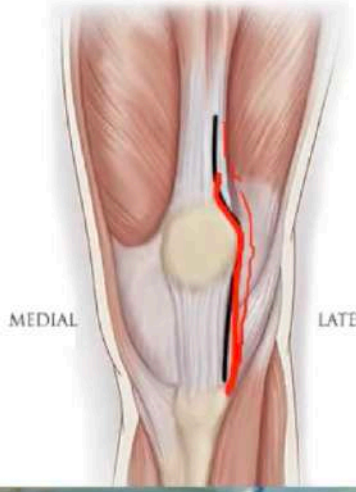
- Lateral approach
- Lateral Parapatellar
- Anterolateral approach (Other name ??)
- Medial parapatellar
- Medial Sub VMO approach

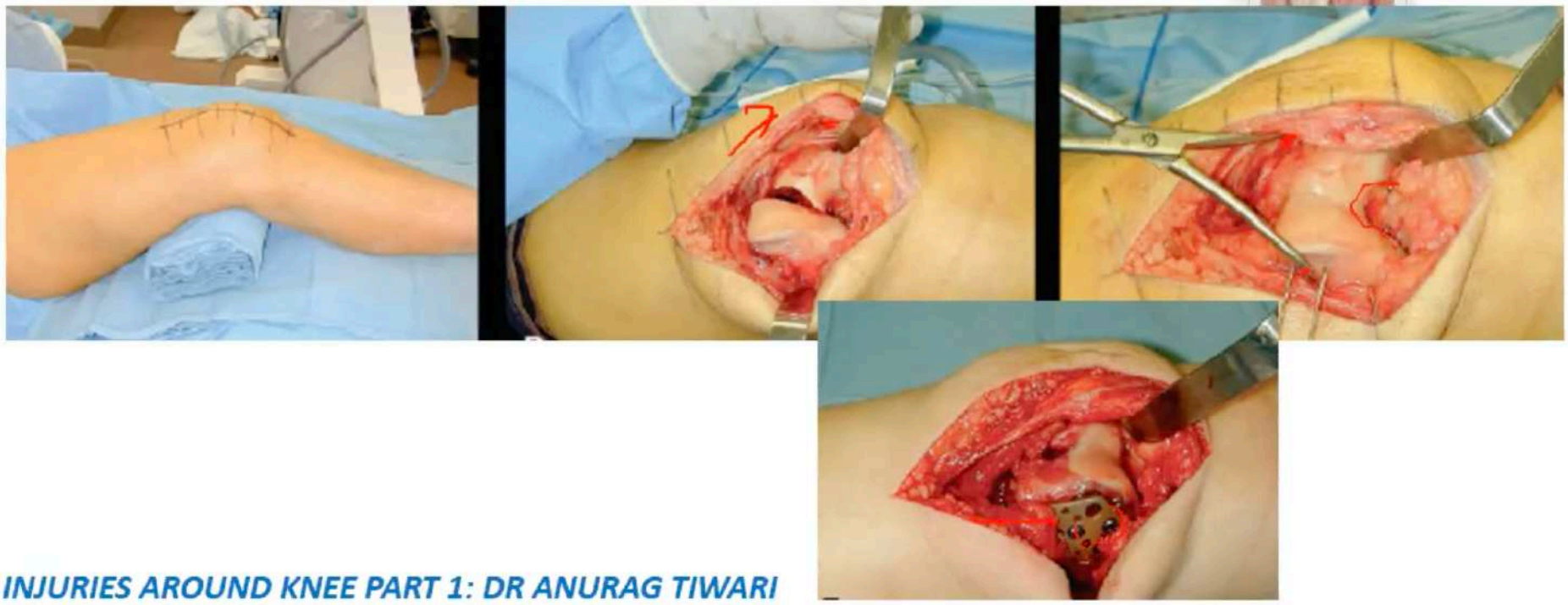
Lateral approach

- Lateral incision centered over lateral epicondyle
- Vastus lateralis is elevated off the intermuscular septum
- Minimal soft tissue stripping
- No soft tissue dissection on medial side

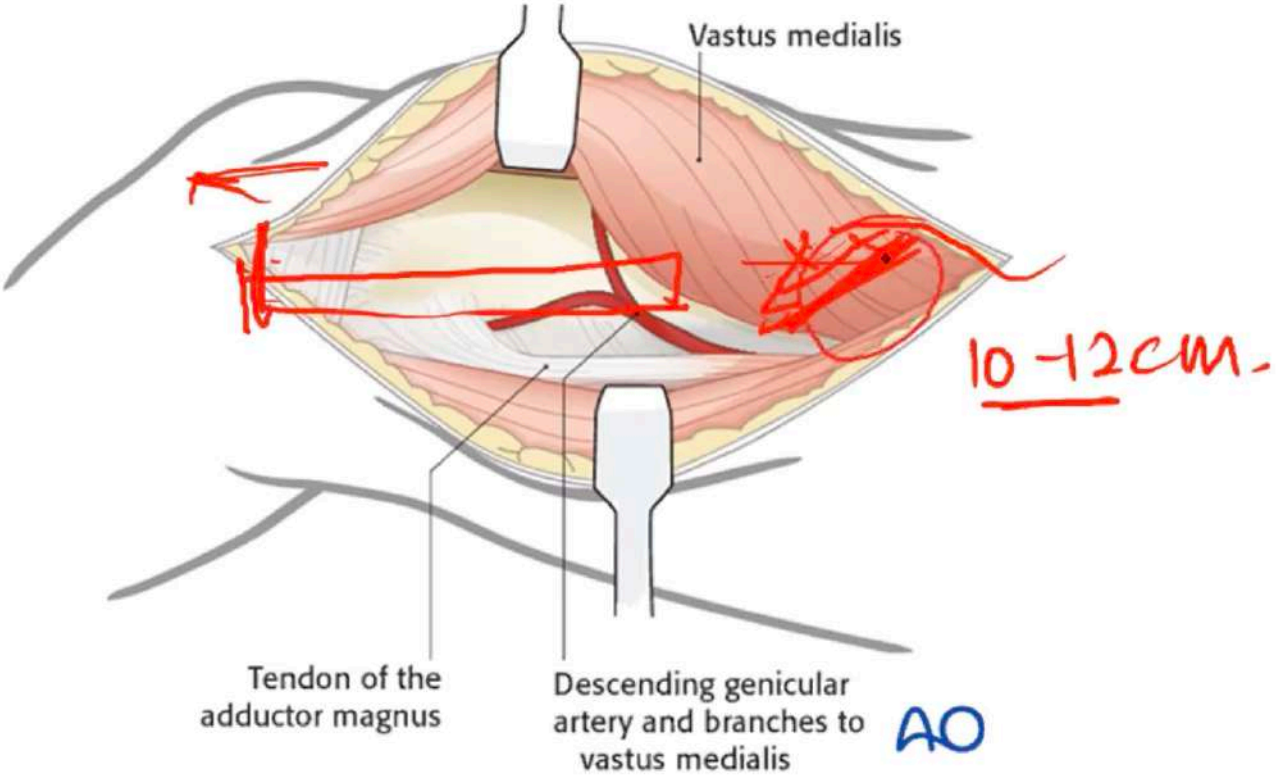


Lateral parapatellar arthrotomy



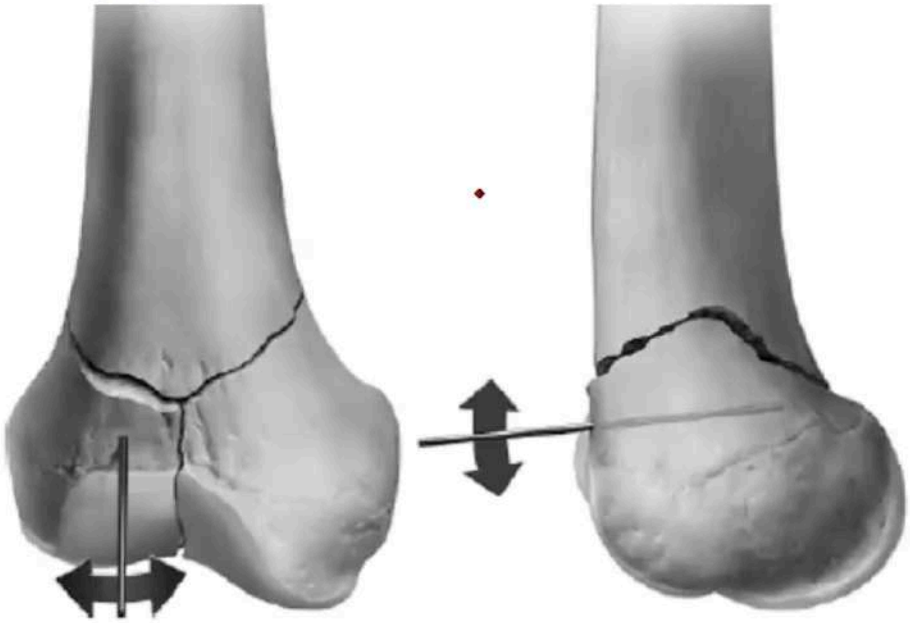


Medial Approach

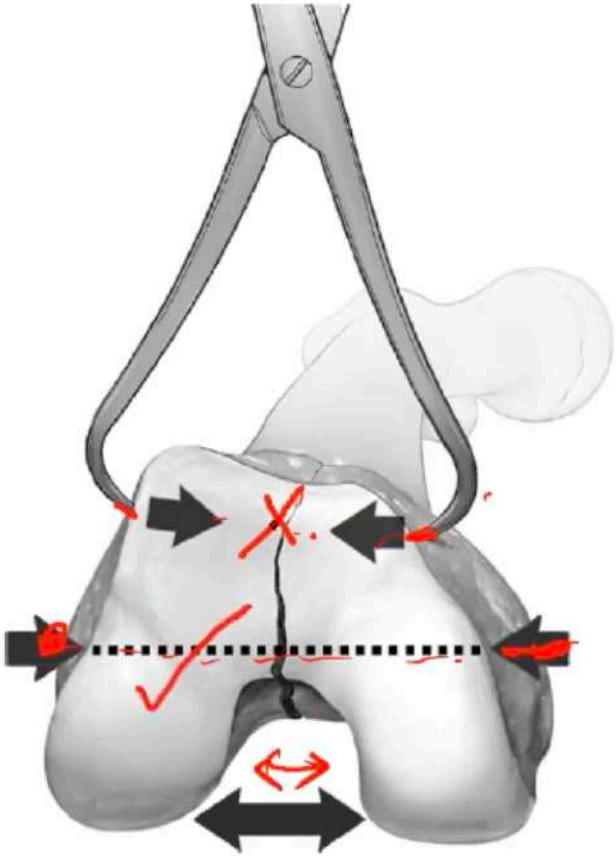


Reduction tips

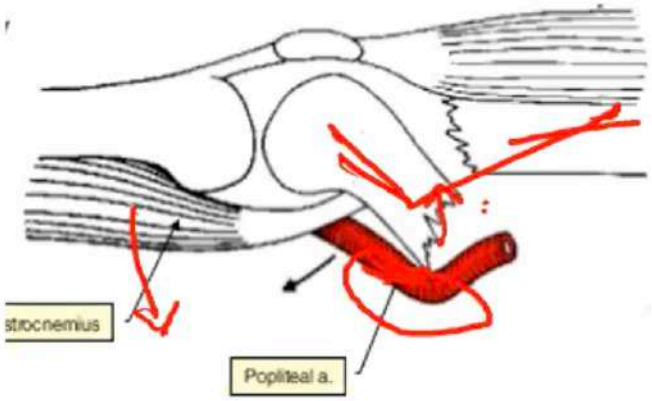
- Use of k wire as joystick

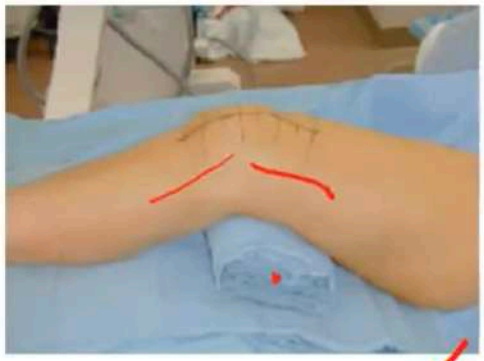


Use of reduction forceps/ clamp

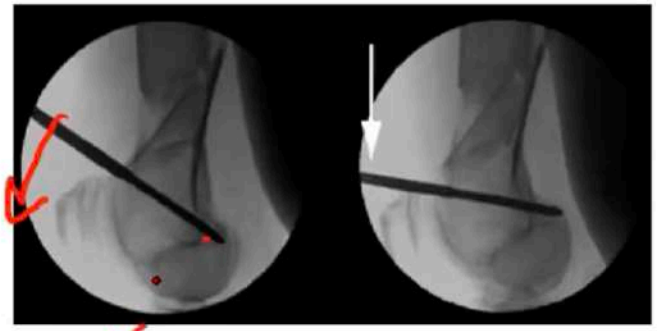


Reducing apex posterior angulation



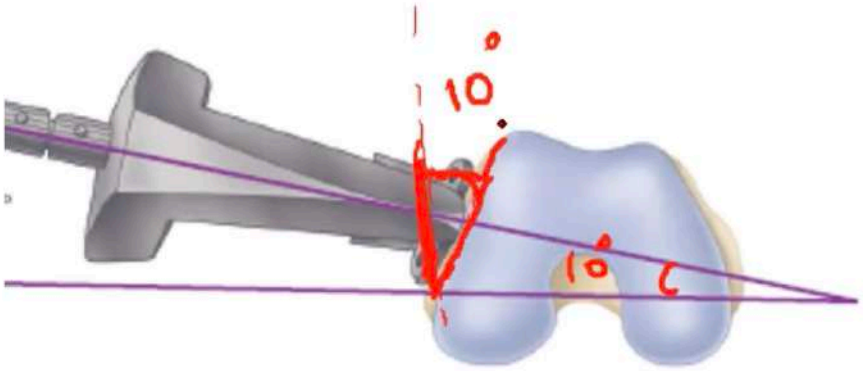


Using bolster/ sheet



Using Steinman pin as Joystick

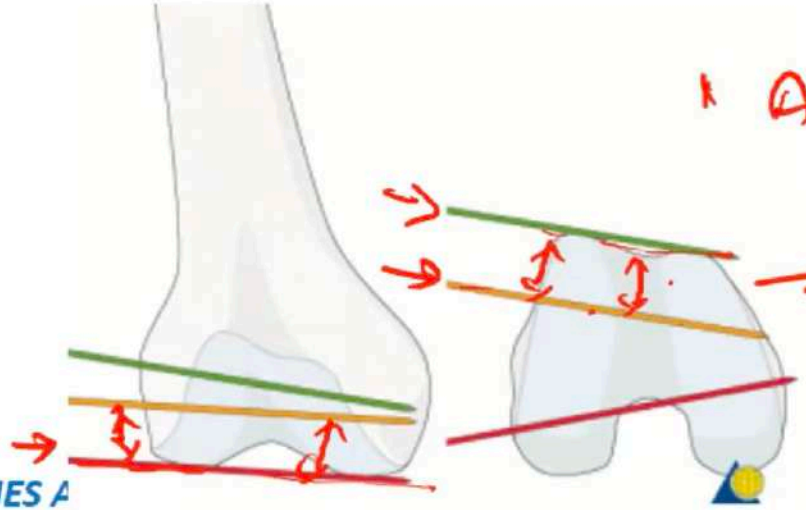
Plate placement

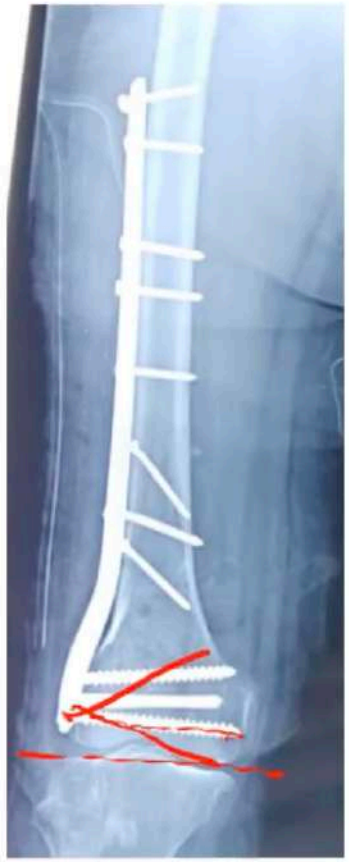


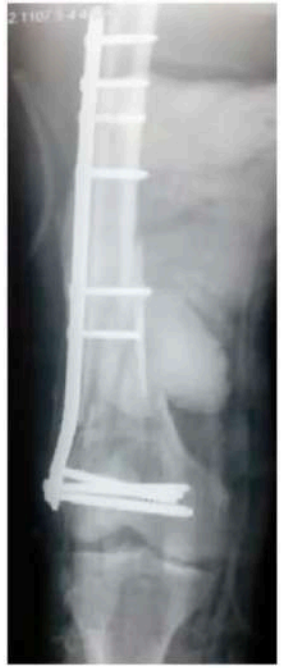
Screw placement

- Coronal plate alignment- put distal most screw parallel to distal articular surface

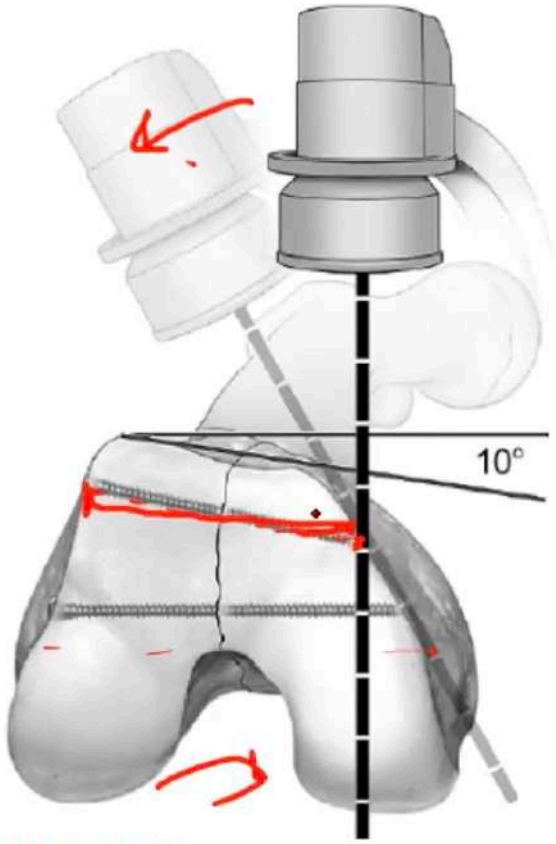
- If non locking and locking both screws are to be used, non locking to be applied first then locking







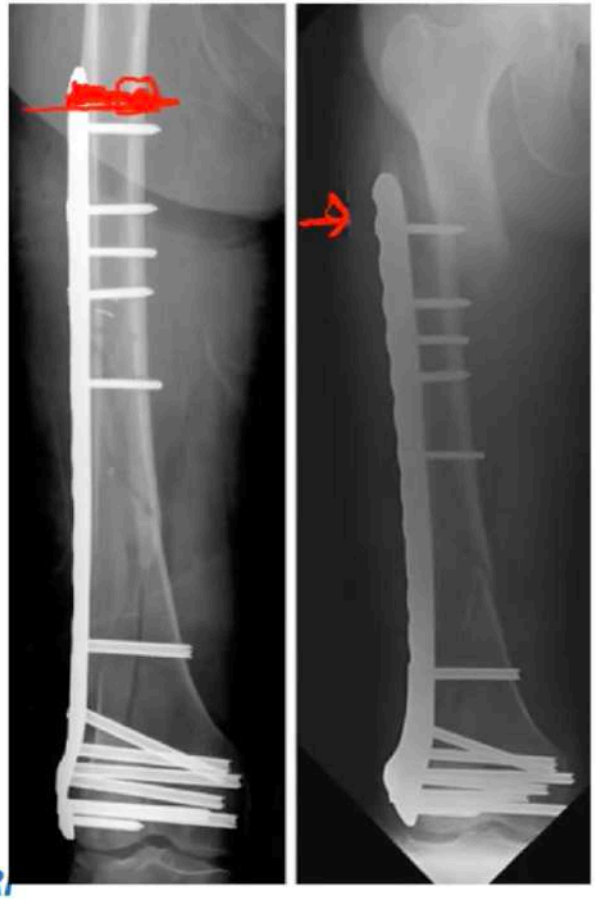
Screw placement



Far Cortical Locking (FCL) screw concept

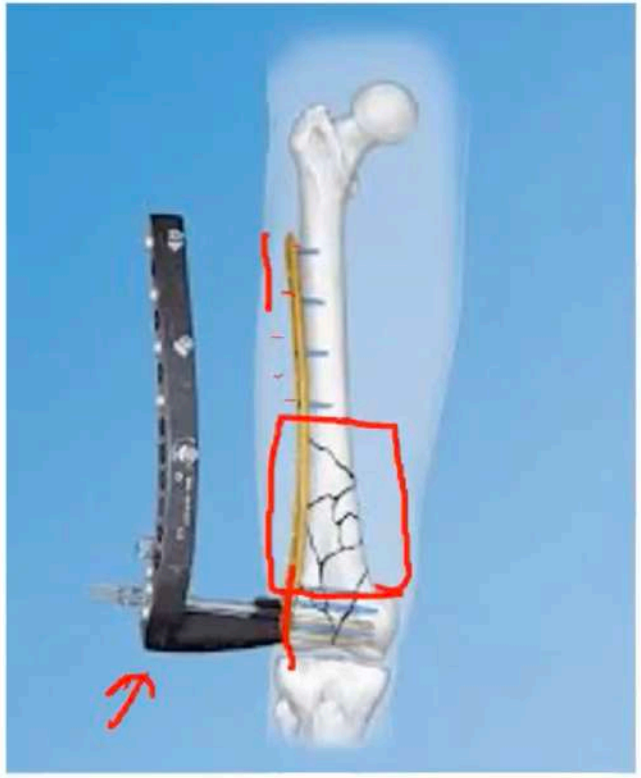
- Far cortical locking
- Decrease construct stiffness
- Increase callus formation

↓ stress riser
↓ rigidity
- relative stability
↑ callus



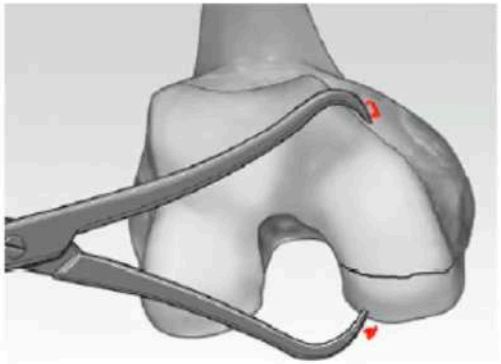
LISS System

"Minimally Invasive"

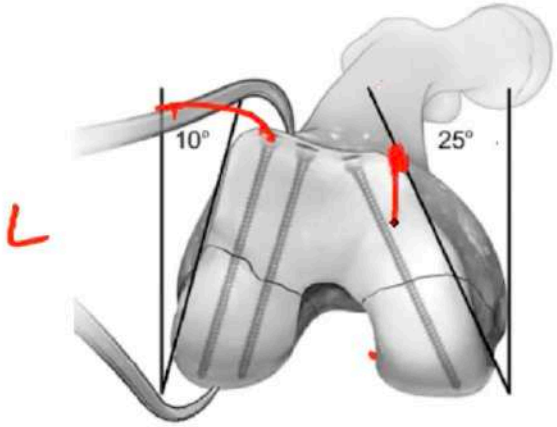


Type B3 # (Hoffa's #)

- Parapatellar arthrotomy



Reduction

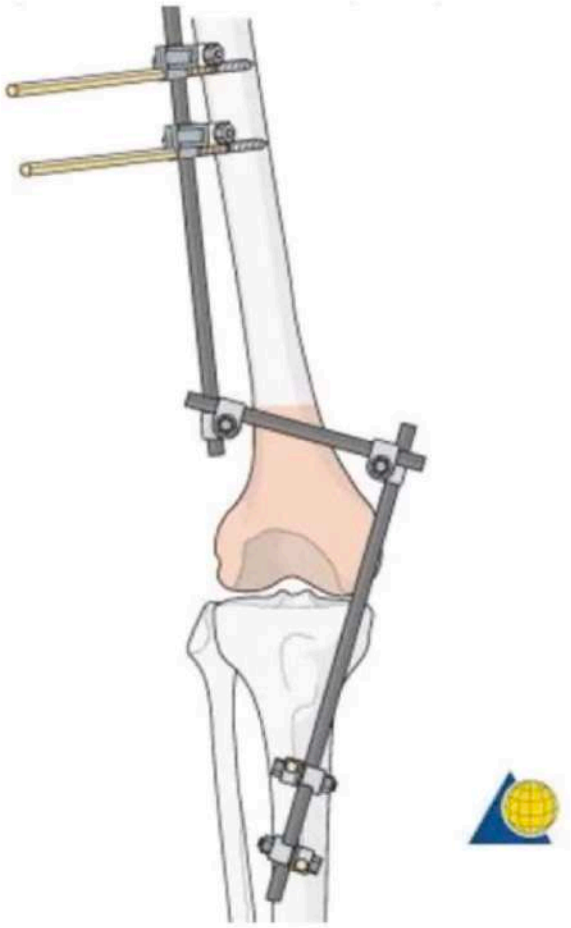


Screw fixation Anterior to Posterior

External fixator

- Damage control orthopaedics
- Grade III Open #
- Fracture Blisters/ Poor soft tissue condition
- Vascular injury

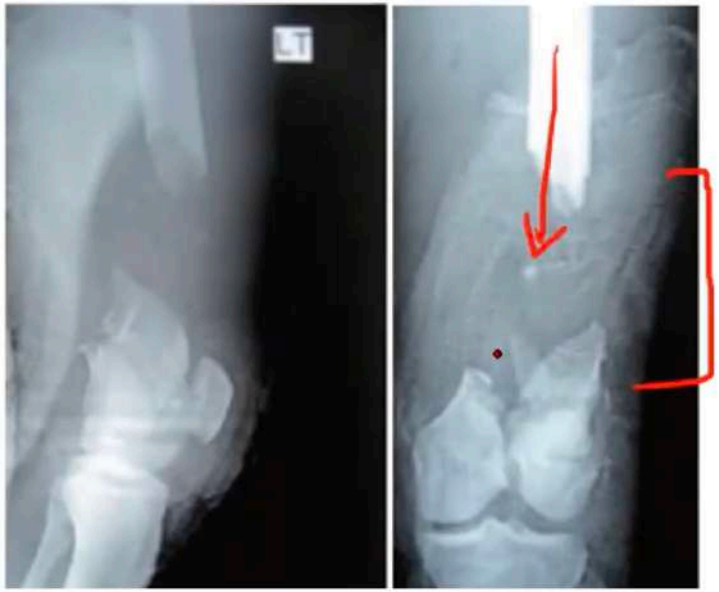
- Pins should be placed as far away from future incision
- After 2-3 weeks, definitive fixation can be done



Exploded femur- Comminution and/or Bone loss

- Options-

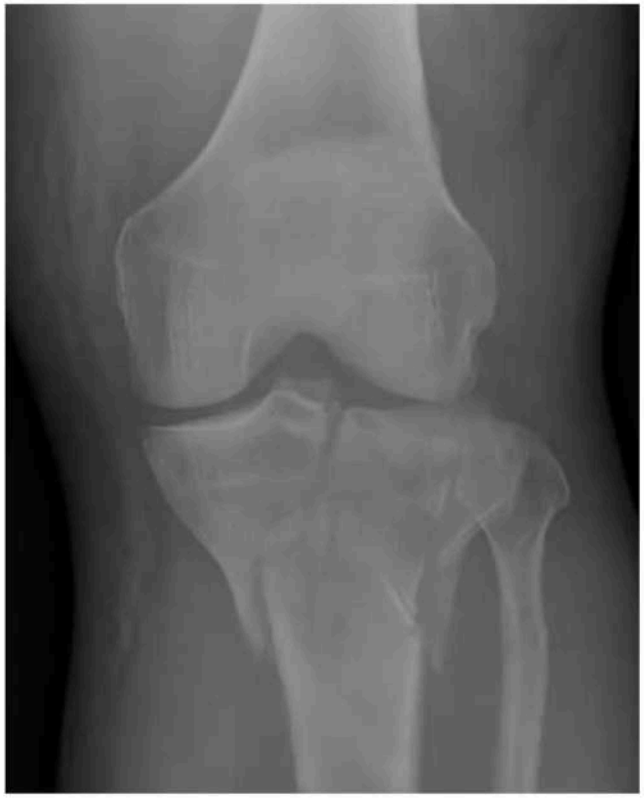
- Cement Spacer then Bone grafting
- Distraction osteogenesis (Bone transport)



Complications

- Malunion
- Symptomatic hardware
- Non union
- Infection
- Implant failure

Tibial Plateau

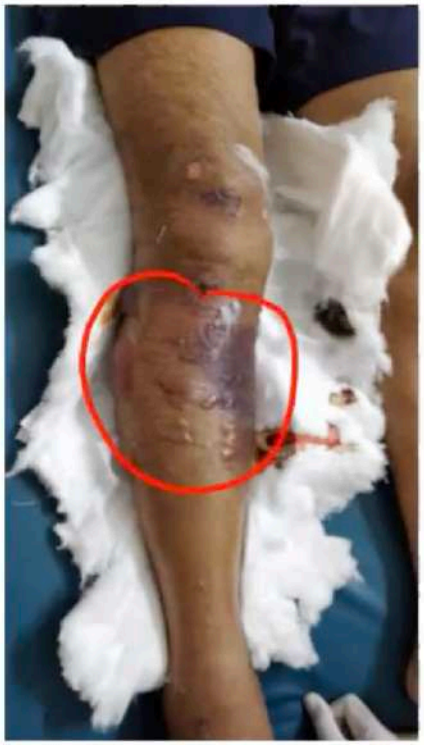


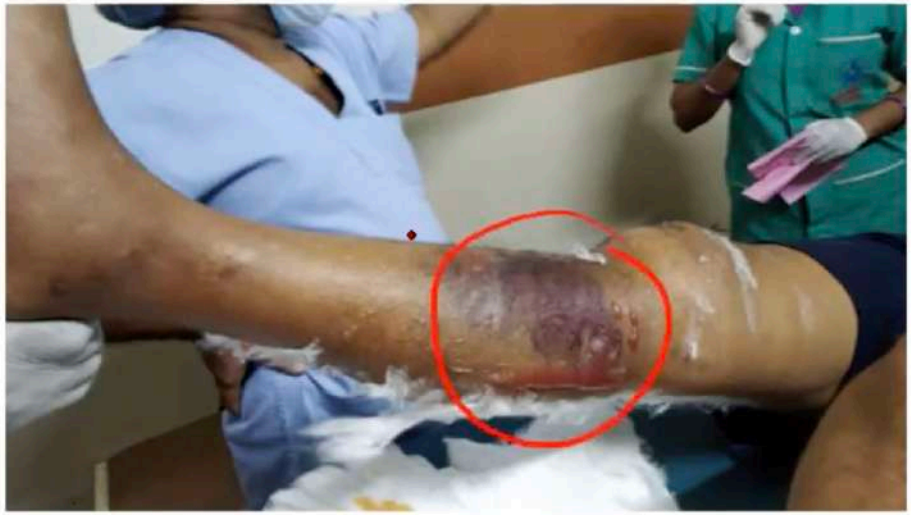
45 yr old male. Fresh injury

Treatment-

a. Intramedullary nailing
b. Lateral plating
c. Medial plate
d. Dual plating
e. None of the above

CT Scan
Soft Tissue
condition



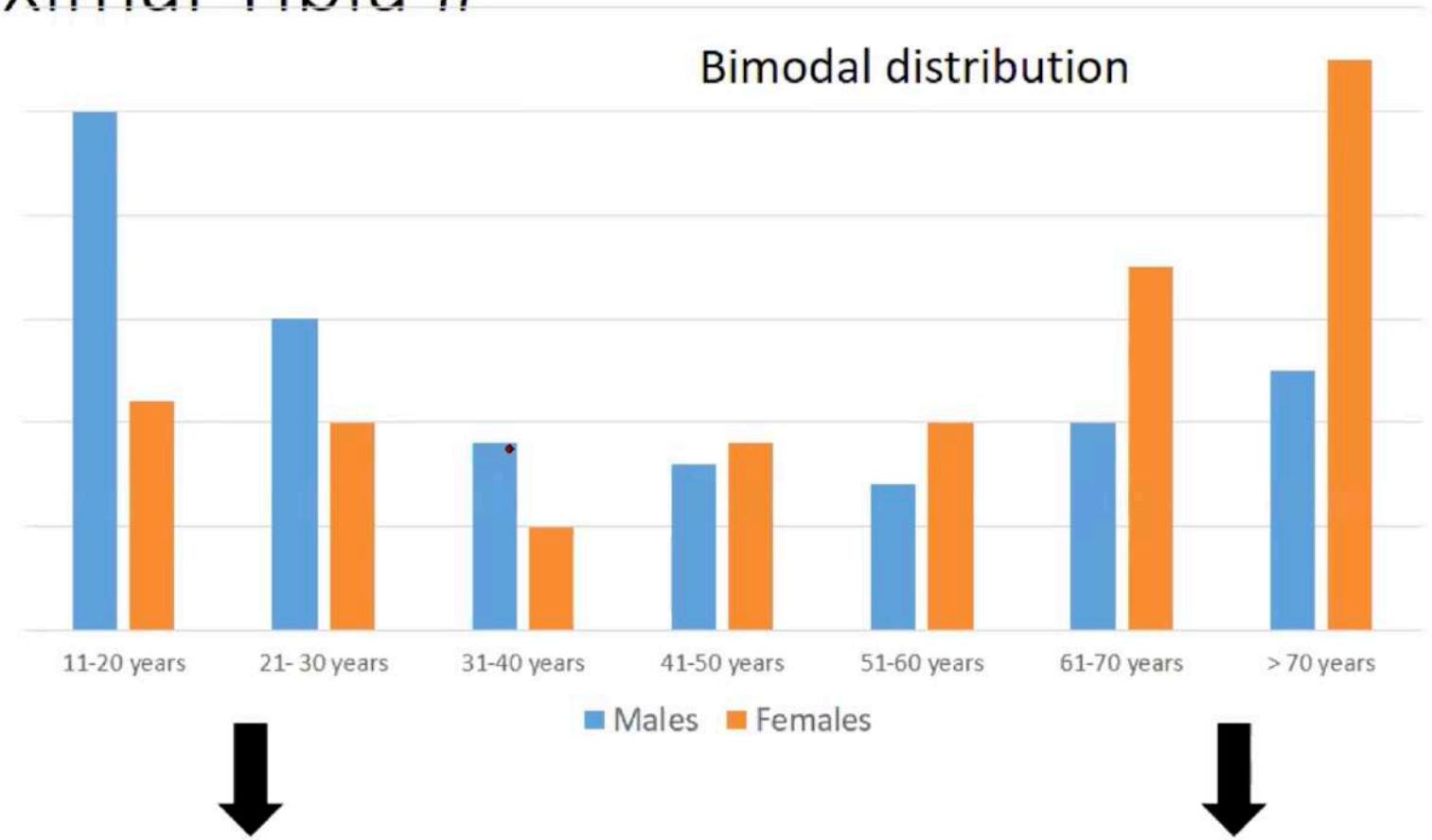


Most important concept

"Tibial Plateau #- Treatment guided by soft tissue status"

Tibial Pilon

Proximal Tibia

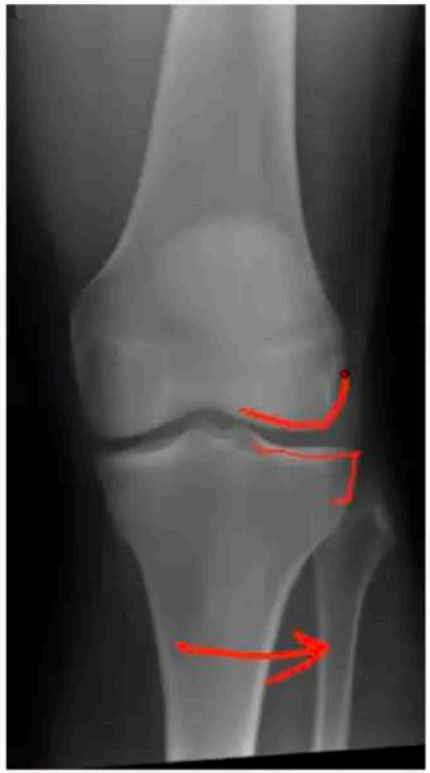


Younger males-
High energy trauma

Older females –
Low energy trauma

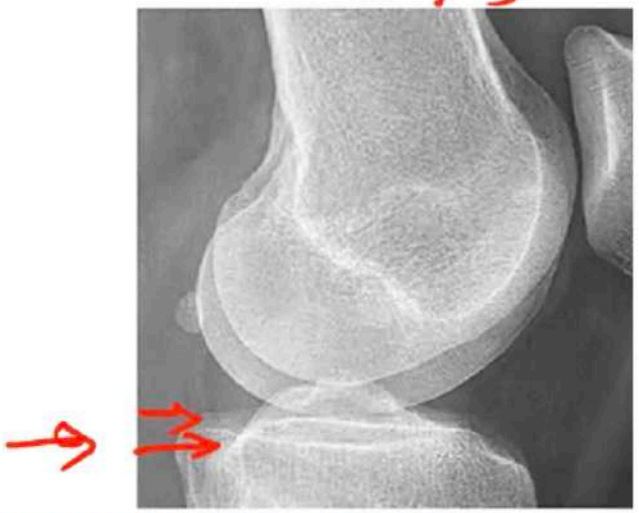
Mechanism of injury

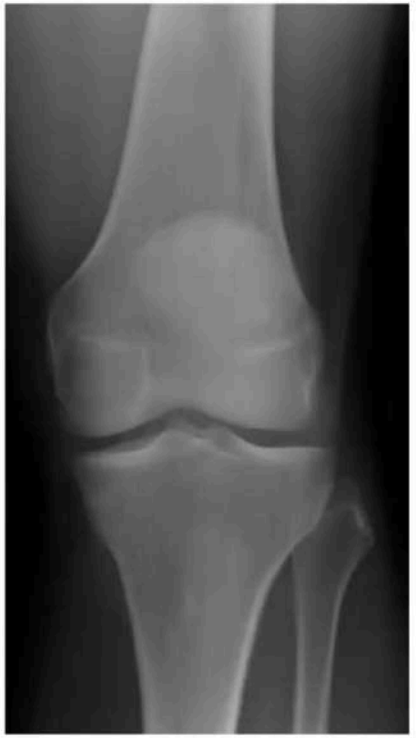
- Valgus and axial – Lateral plateau split-depression
  Depression is more if poor bone quality
- Varus- Medial plateau
- Flexion, Varus and IR- Posteromedial fragment

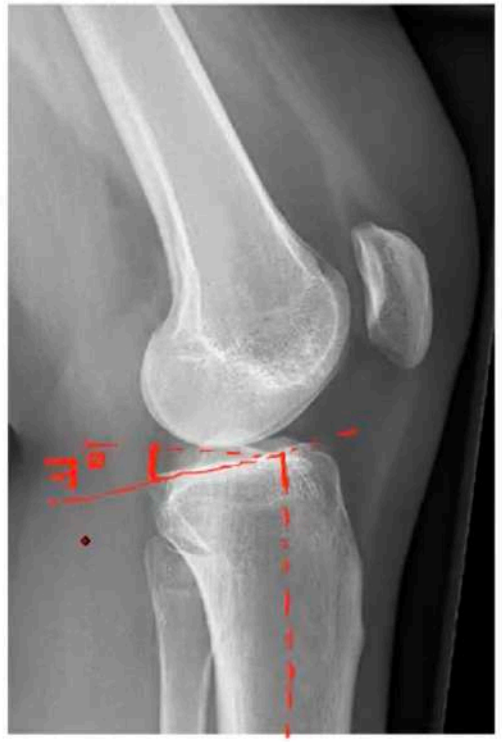


Anatomy

- Lateral plateau is convex and is higher than medial
- Posterior Tibial slope 3- 10 degree (-7°).





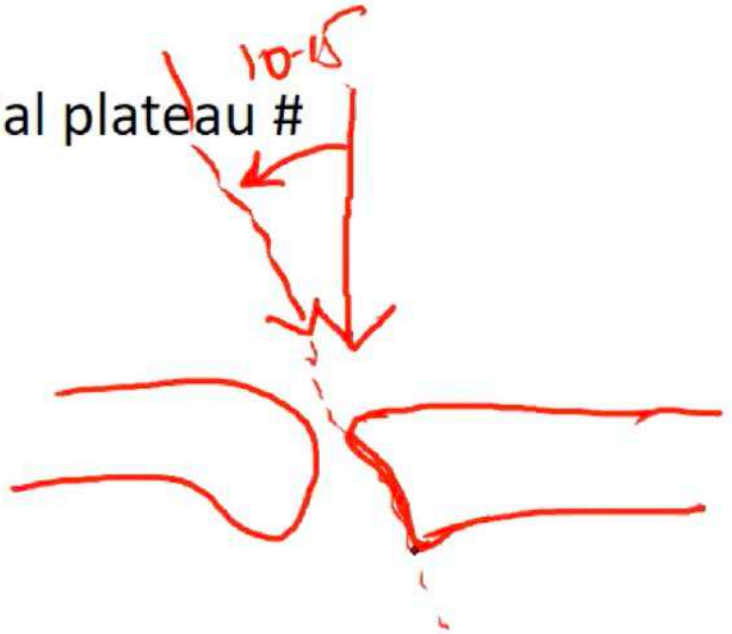


Clinical presentation

- Soft tissue examination is more important
- Open wounds
- Blisters
- Compartment syndrome
- Neurological and vascular examination is mandatory

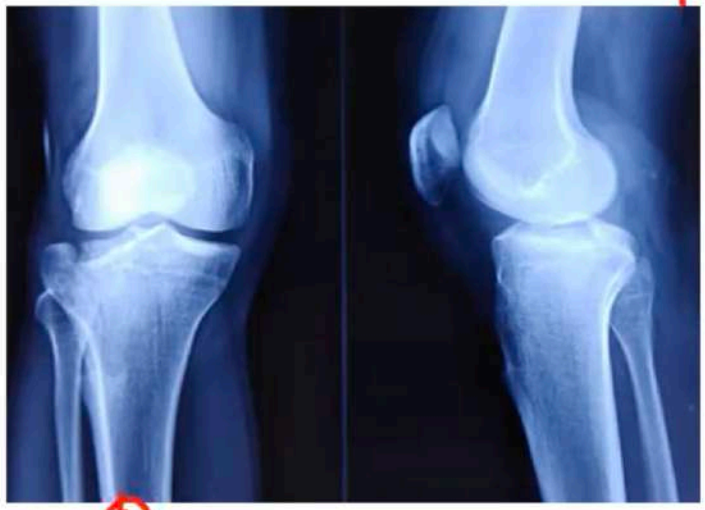
Xray

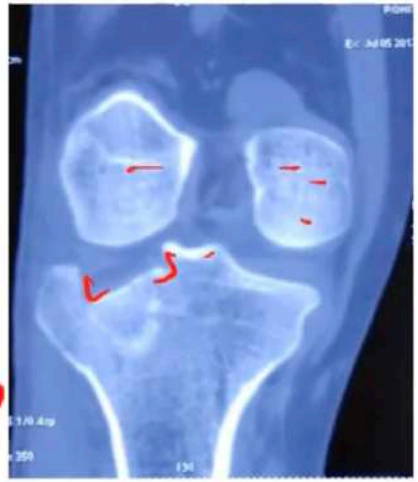
- Best Anteroposterior view for Tibial plateau #

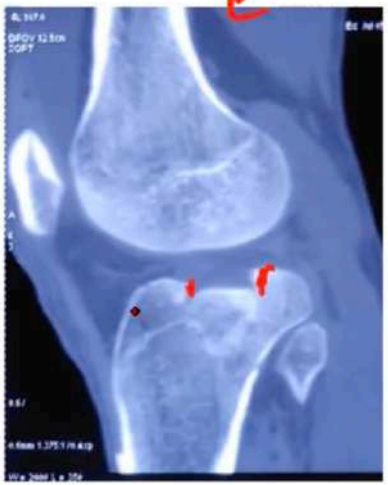


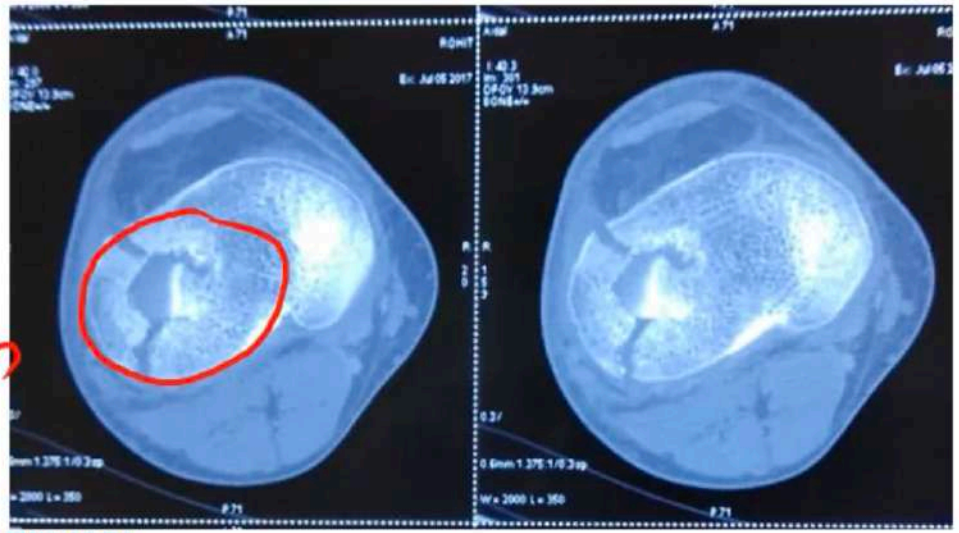
- A. AP view neutral
- B. 10-15 degree caudal tilt
- C. 10-15 degree cephalic tilt
- D. 10-15 degree medial tilt

CT Scan





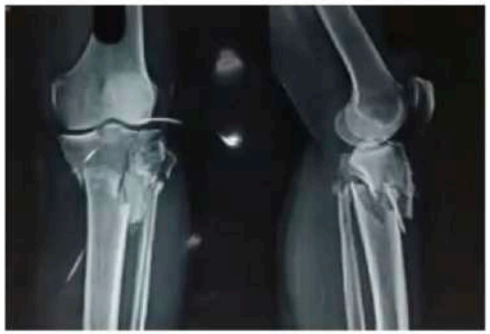


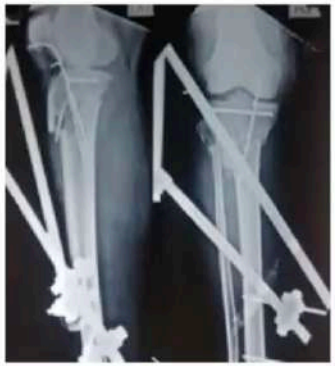


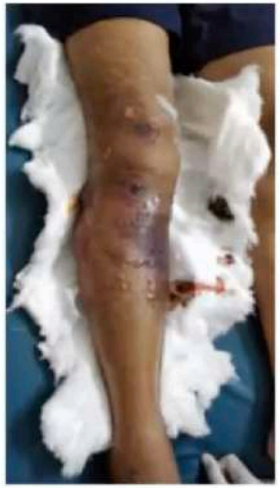
If planning Exfix, when should be CT done

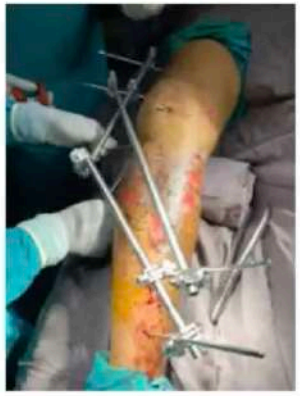
- A. Before Ex fix
- B. After Ex fix

Span- Scan- Plan approach



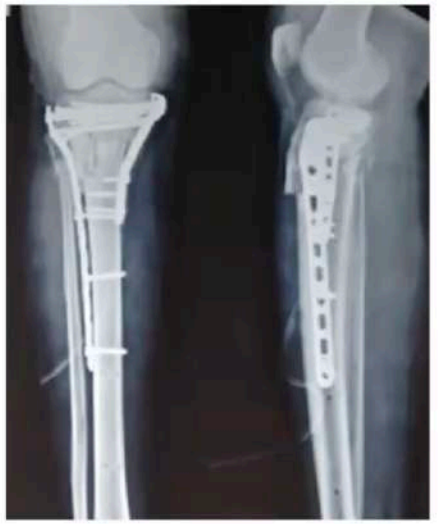






Knee Span

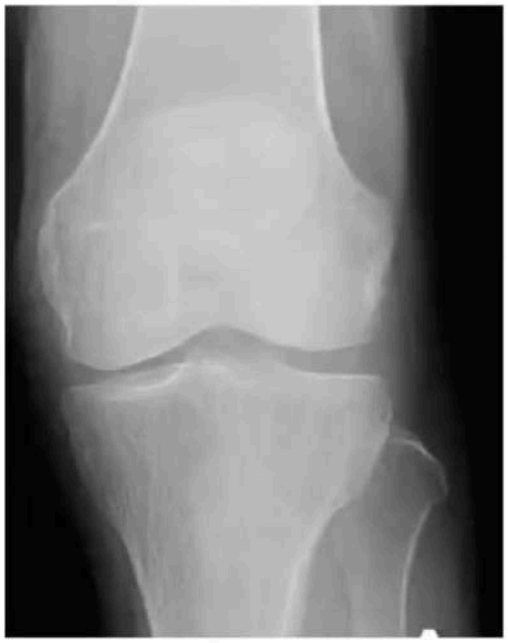
CT Scan

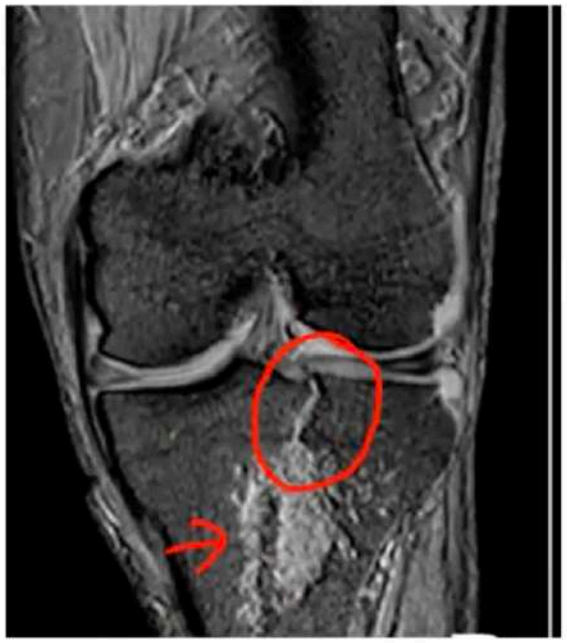


Plan

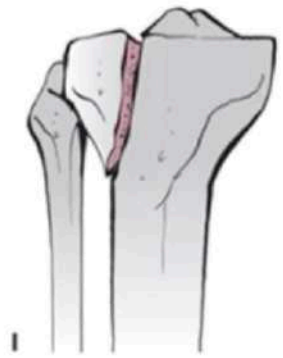
MRI

- Ligament Injuries
- Meniscal Inj
- Occult #

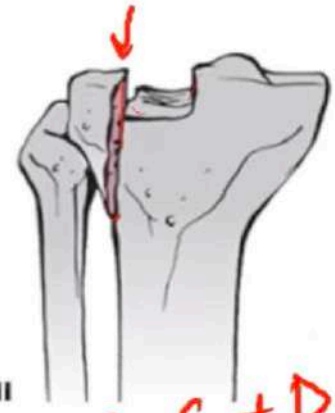




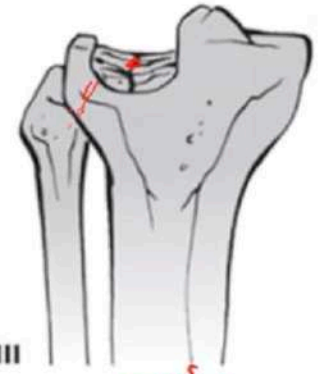
1. Schatzker classification



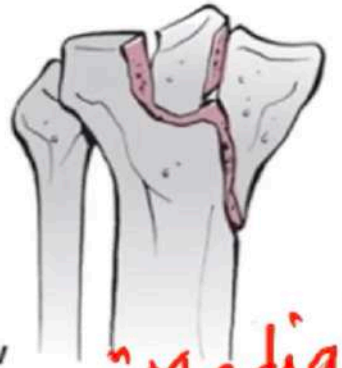
LC-Split-



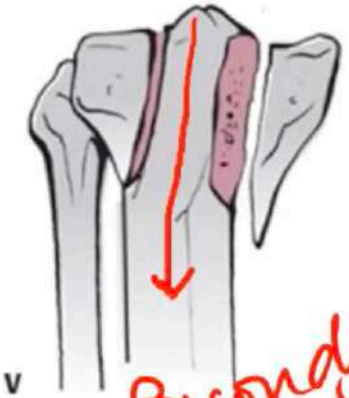
LC-S+D



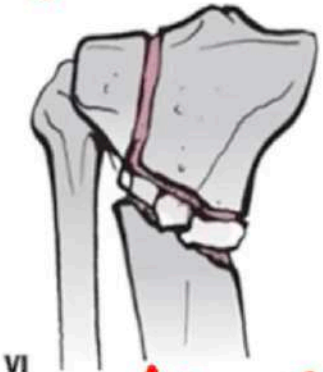
Depression.



Medial condyle



Bicondylar



M-D dissociation

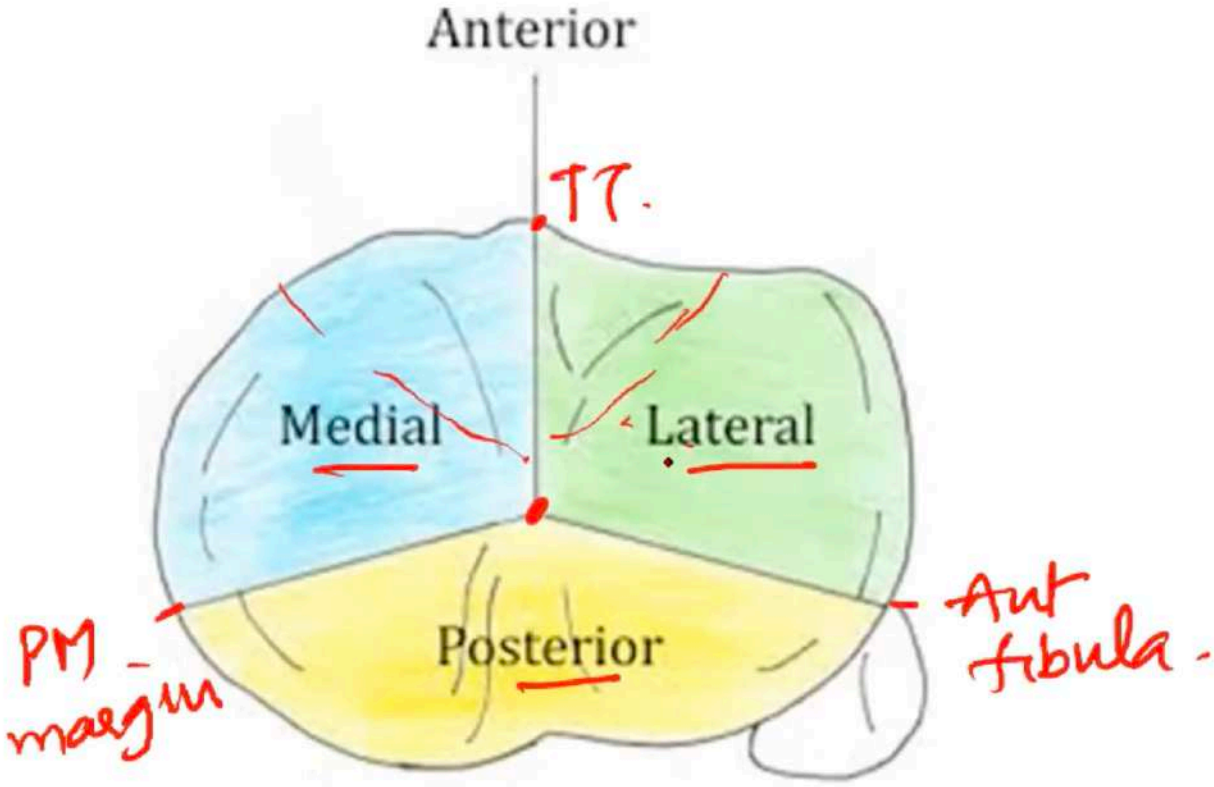
Most common type of

- A. Schatzker type 1
- B. Type 2
- C. Type 4
- D. Type 5

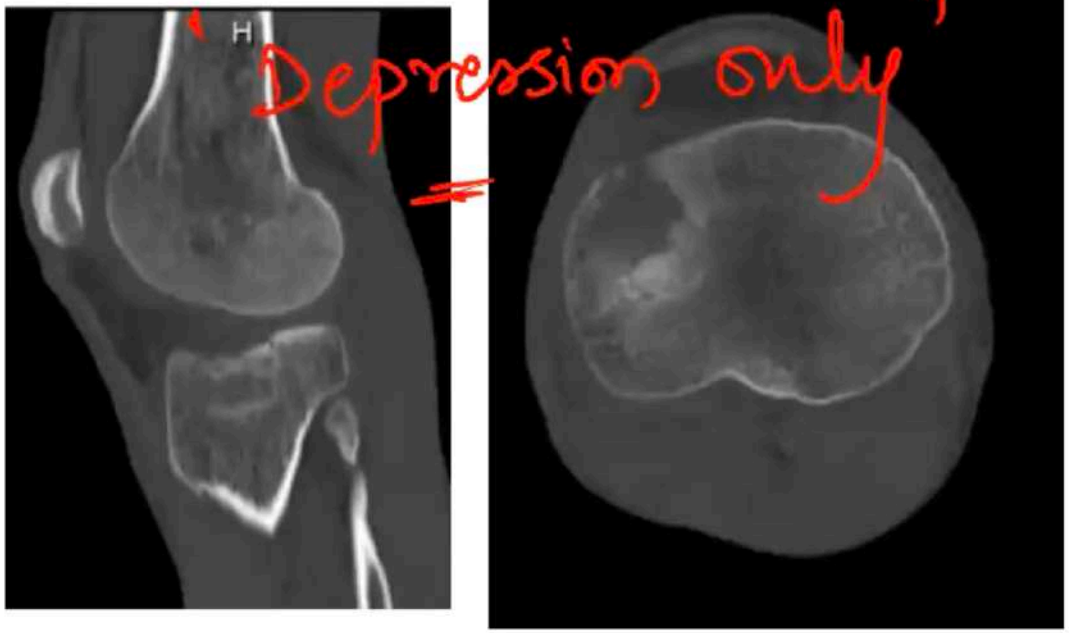
Main drawback of Schatzker and AO classification

- "Posterior" missed. "AP view"
- 'Dislocation"

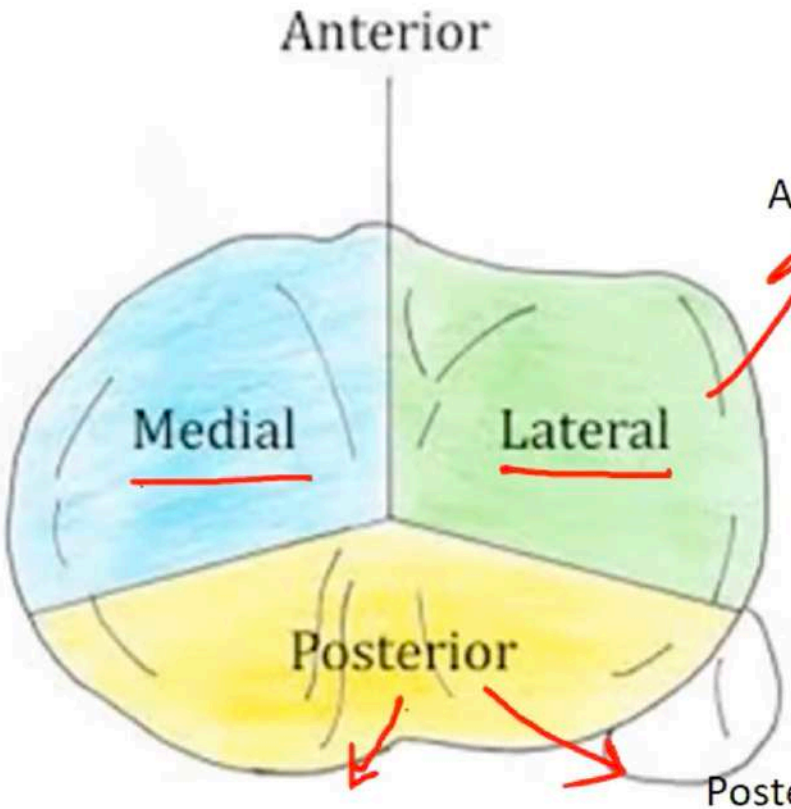
Three column concept- CT based



What is zero column fracture??



Approach on basis of Three column



Anterolateral approach

Posteromedial approach

Posterolateral approach (Frosch)

Posterior approach

Management

'Schatzker"

1- Split only → • Perutaneous CC screw fixation/ Plate

2- Split- depression → • Elevation + Void filler + Plate

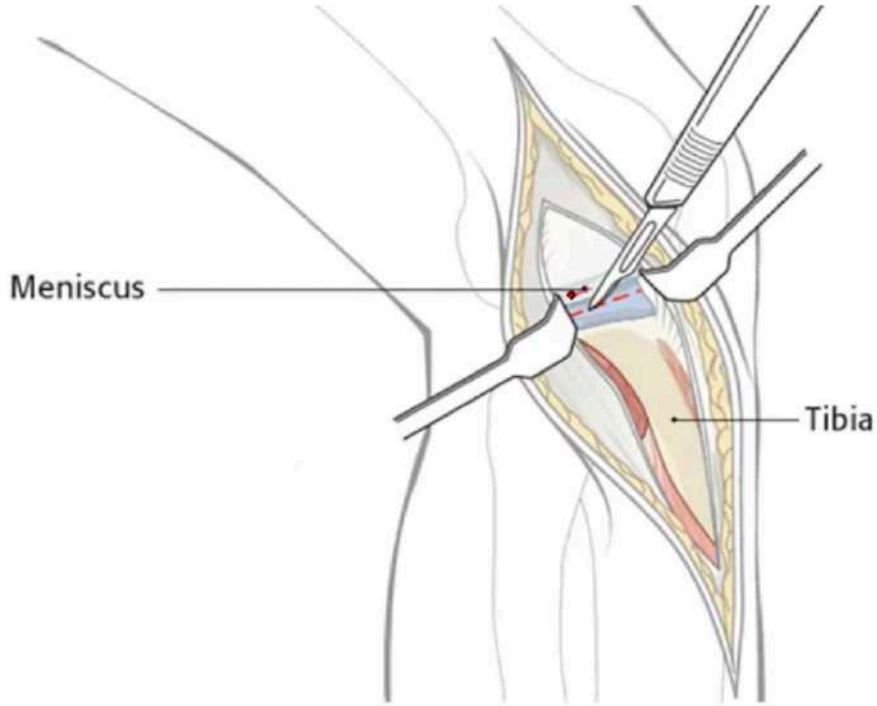
3- Depression only → • Elevation + Void filler + Plate

4- Medial condyle → • Medial Plating

5- Bicondylar → • Dual Plating

6- Shaft dissociation → • Dual Plating

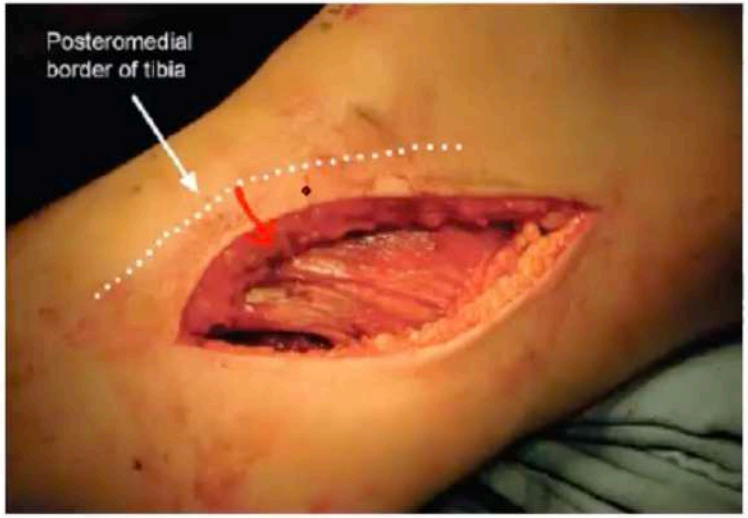
Anterolateral

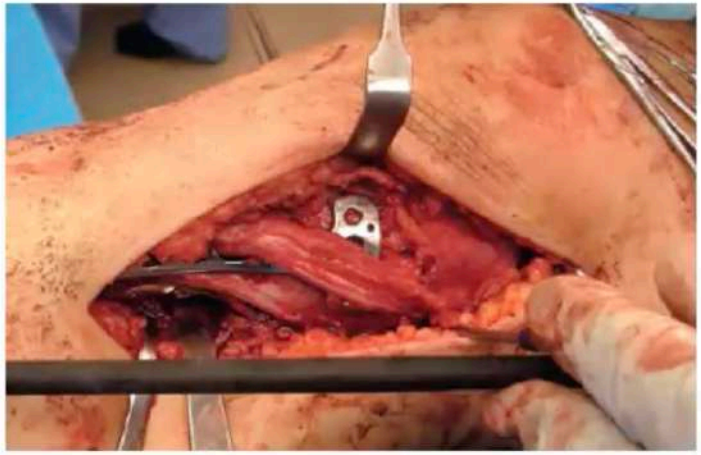


Submeniscal arthrotomy

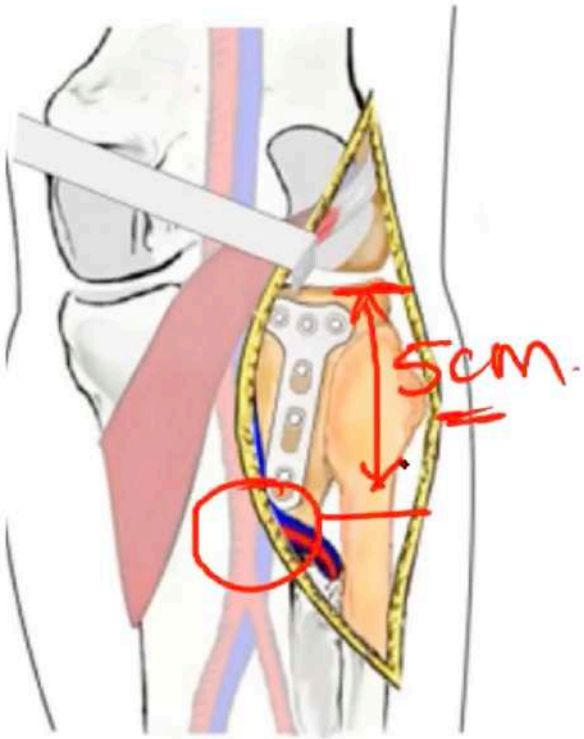
Posteromedial approach

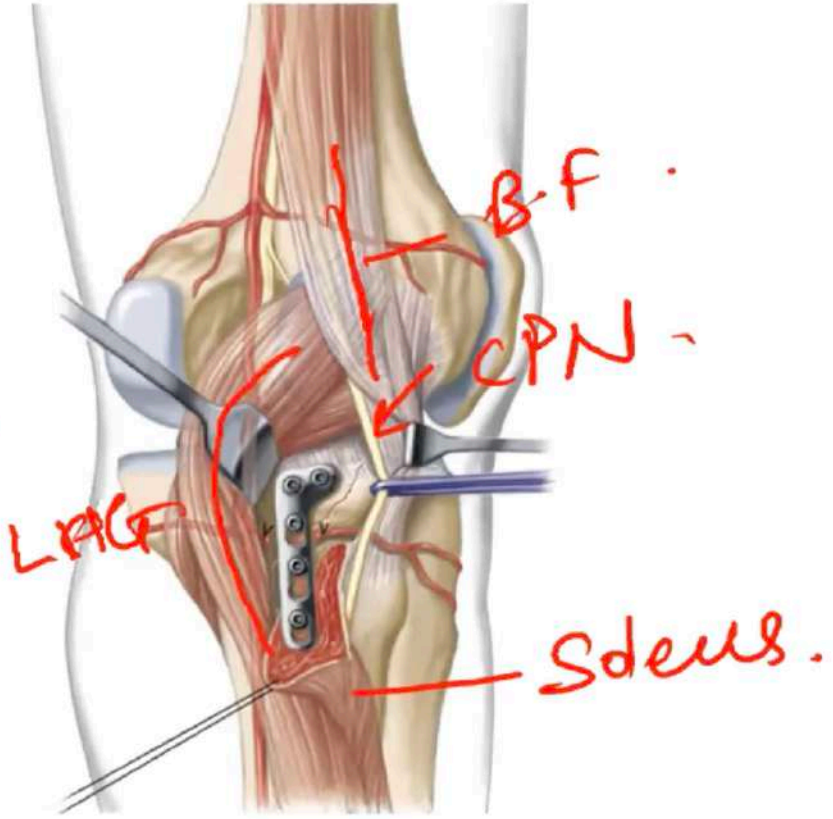
- Knee flexion and External rotation at hip
- Incision- 1-2 cm posterior to posteromedial border of tibia





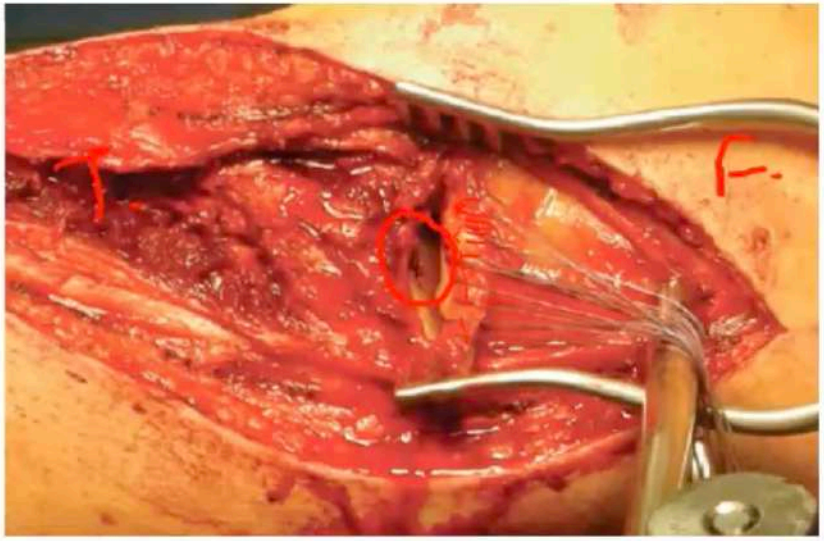
Posterolateral approach (Frosch)

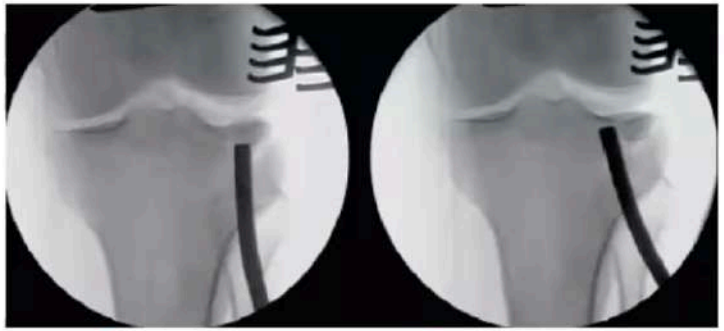




Articular reduction

- Direct reduction- Submeniscal arthrotomy
- C arm guidance
- Arthroscopic





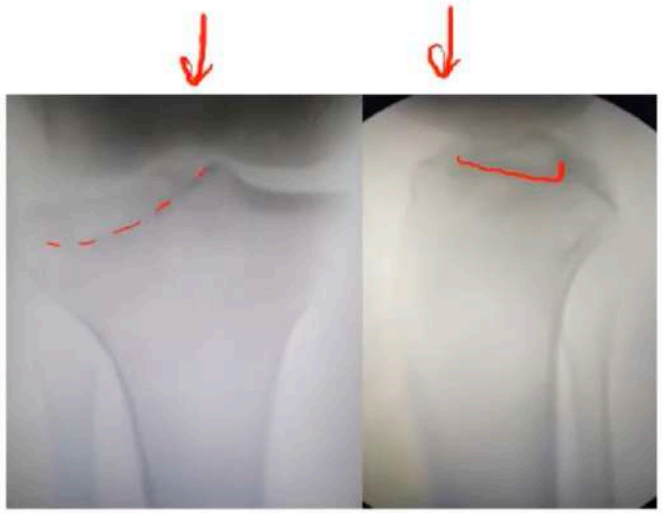
C-arm

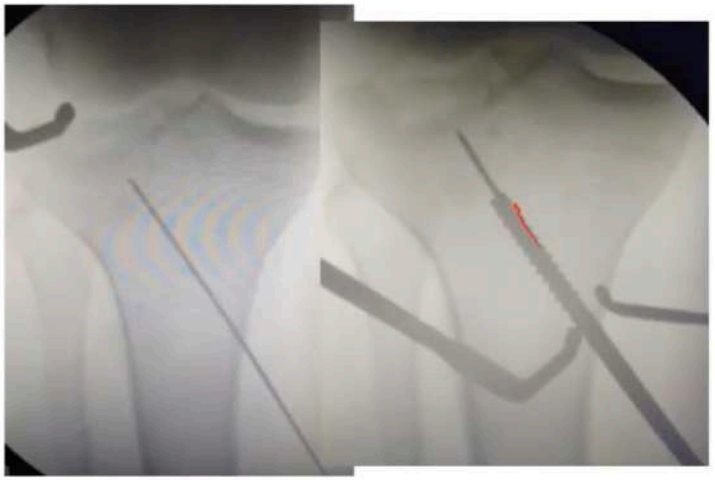
Elevating the depression

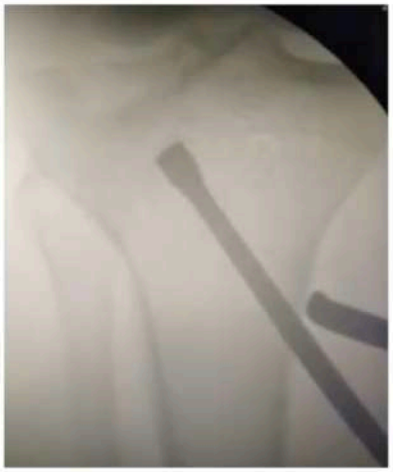
- Autologous bone graft
- Allograft
- Bone substitutes

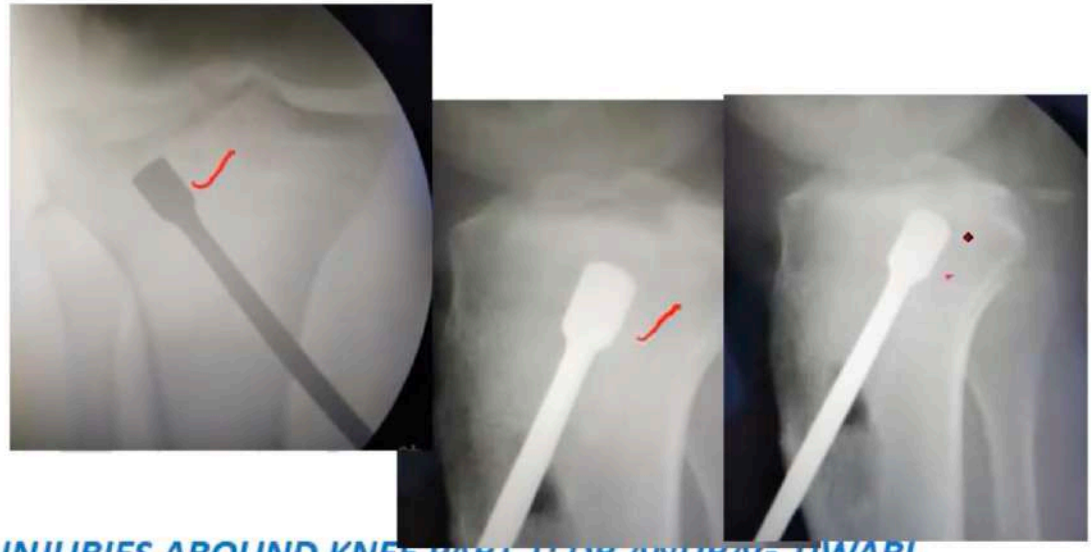
Bone grafts are placed before fixation,

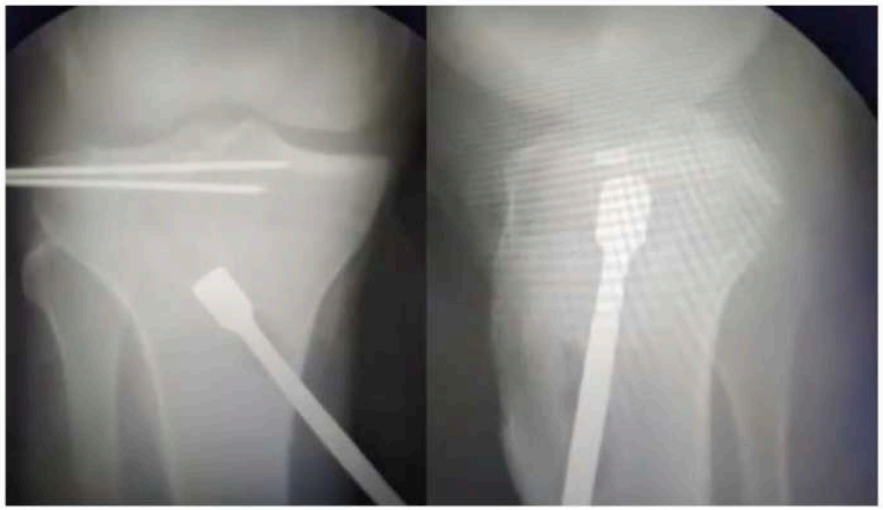
Ca-P material to be placed after fixation.

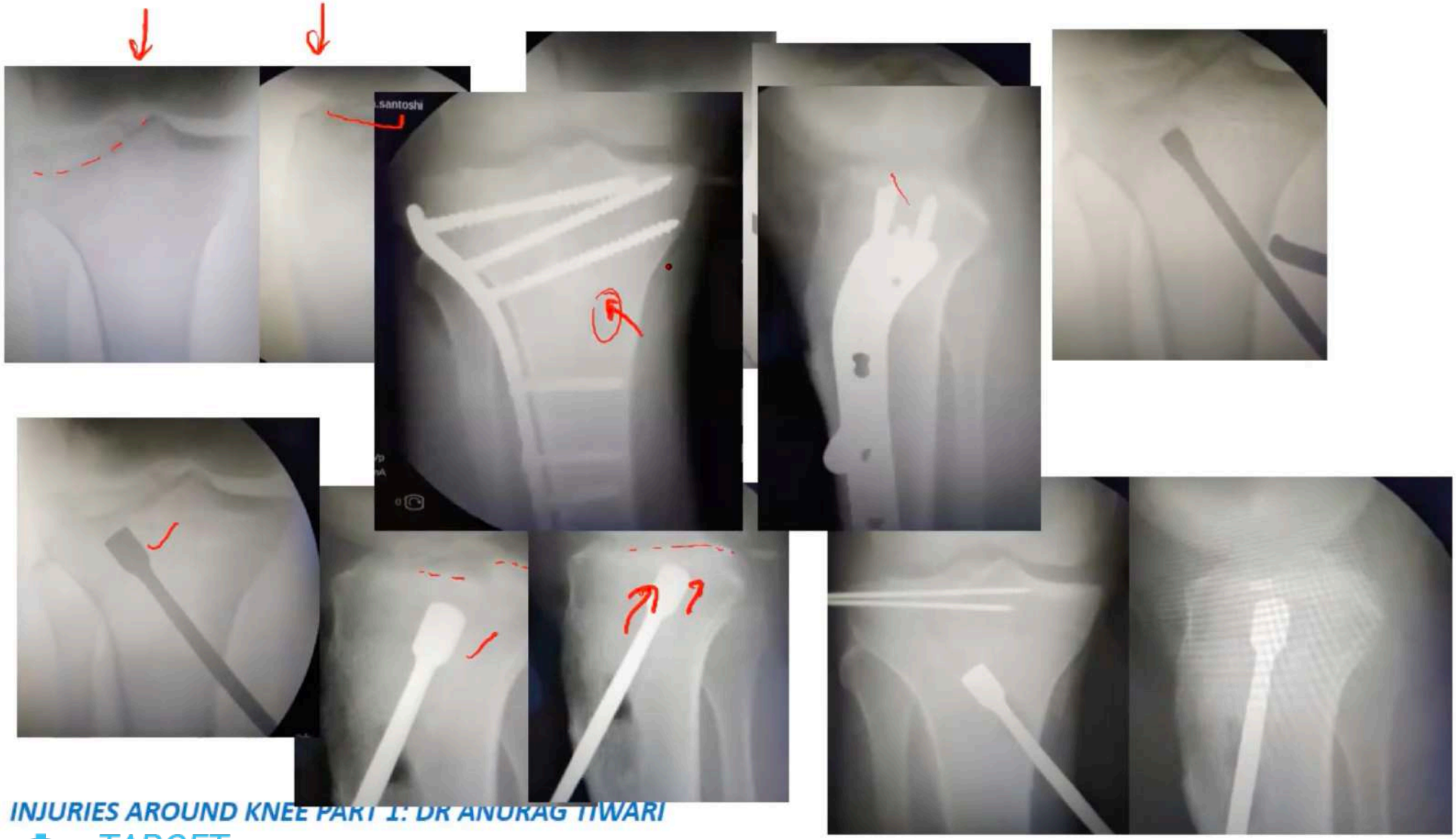












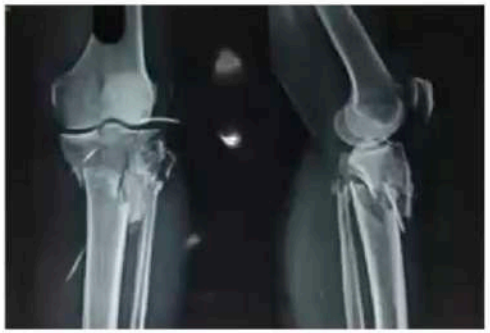
INJURIES AROUND KNEE PART 1: DR ANURAG TIWARI

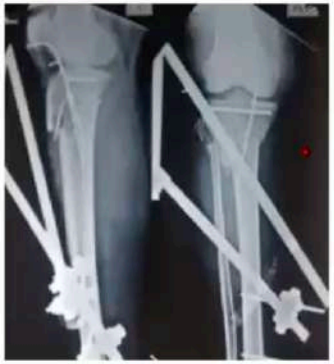
Role of External Fixator

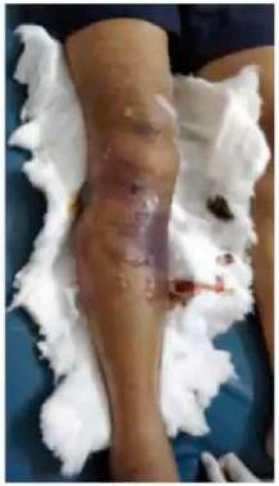
- Indications-
- Swelling
- Open wounds
- Fracture blisters
- Compartment syndrome

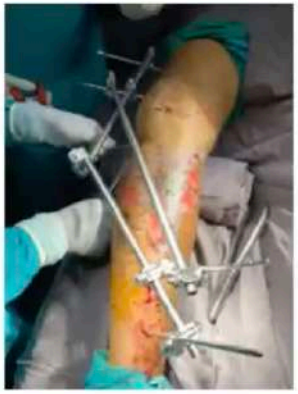
- 2 stage protocol

Span- Scan- Plan approach



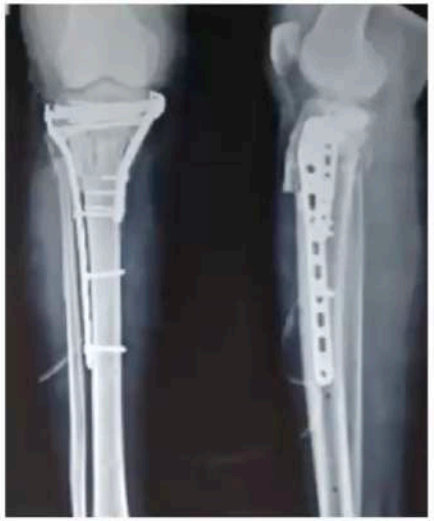






Knee Span

CT Scan



Plan

Complications

- Malunion
- Arthritis
- Compartment syndrome
- Non union
- Stiffness
- Symptomatic hardware
- Infection