Periarticular Osteotomies for Fracture Malunion

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Distal Femoral Osteotomy Proximal Tibial Osteotomy

Indications

- Post traumatic deformity with compartment overload and pain
- Diaphyseal malunion
  - Shaft osteotomy and IM fixation
- ***Periarticular malunion***
  - ***DFO or HTO close to the joint***

Diaphyseal

- ***malunion***
  -delayed union

- revision with IM rod

Complications

- ***Late***
  - Infection
  - Nonunion
  - *Malunion*
    - Knee stiffness
    - Posttraumatic Osteoarthritis

Complications of Fractures

Early

- Infection (<1% in closed, approaches 20% in open)
- ***Malreduction***
- ***Fixation failure***
  - Poor bone stock
  - Lack of patient compliance post-operatively
  - Poor surgical plan or poor execution of surgical plan

Malalignment : malunion

- Correct alignment is the most important component of lower extremity reconstruction
- Stiff / arthrofibrotic knee will compromise outcome

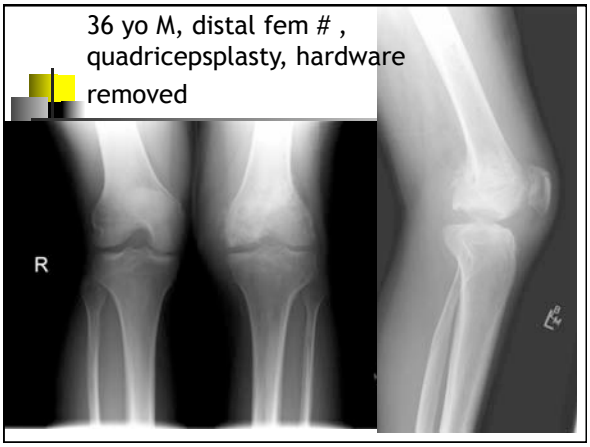
Approach to Malunion

- *"There is nothing that can't be made worse by surgery"*
  Hughston

36 yo M
medial condyle defect
post fracture
varus alignment
ROM 20-40 deg
thigh atrophy

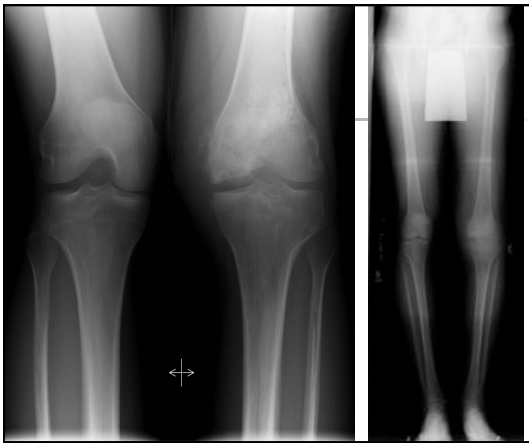
→ Need to align the knee
***But* need motion**

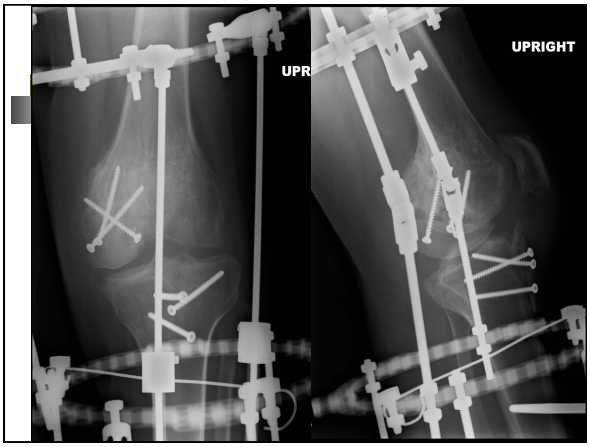
36 yo M, distal fem # ,
quadricepsplasty, hardware
removed

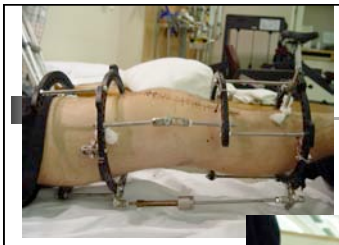


36 yo M
medial condyle defect
varus alignment
ROM 20-40 deg
thigh atrophy

Plan :
•Open medial condyle allograft
•HTO
•Distraction arthroplasty with hinged fixator







- Fixator allows motion
- Relaxes soft tissues, improves motion

Case Report

Case Report

Malunion : approach

1. ***Need a quiet knee if possible***
   - May need to wait despite stiffness
2. ***ROM***
   - Need adequate motion
   - If knee is stiff need to obtain motion first
3. ***Need stable fixation to allow early rehab***

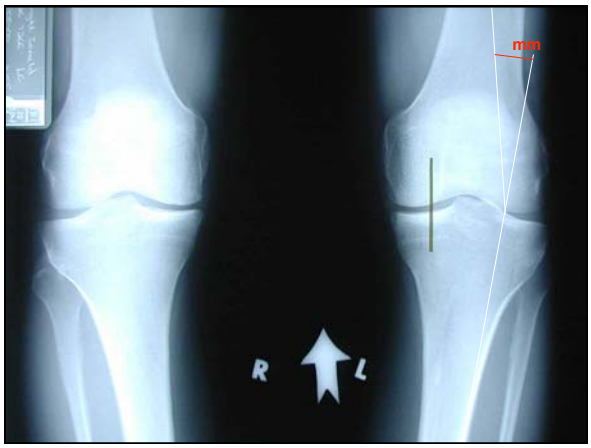
Pre operative evaluation

Routine X-rays

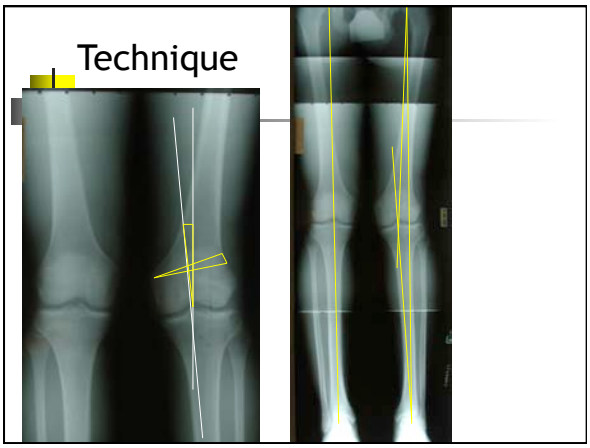
- ***Long leg views***
- ***Standing AP***
- ***Standing tunnel***
- ***Lateral***
- ***Infrapatellar***

Distal Femoral Osteotomy

- ***Pre operative Planning***
  - Standing tunnel view for diagnosis
  - Standing radiographs hips to ankles for alignment
- ***Aim : shift mechanical axis to medial tibial spine***



Technique



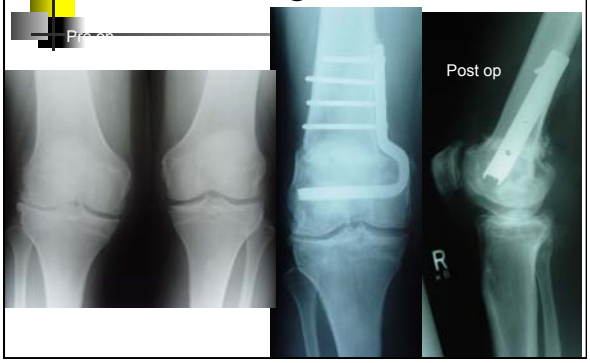
Distal Femoral Osteotomy

- ***Primary choice :Medial closing wedge***

Indications:

- Large corrections
- Moderate to severe OA
- smokers , obese, large corrections

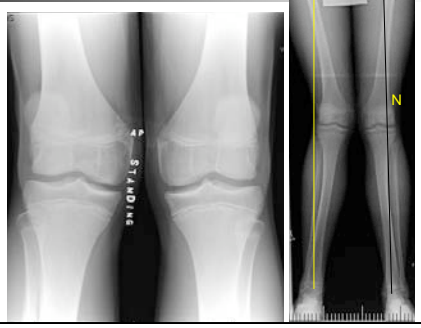
Medial closing DFO



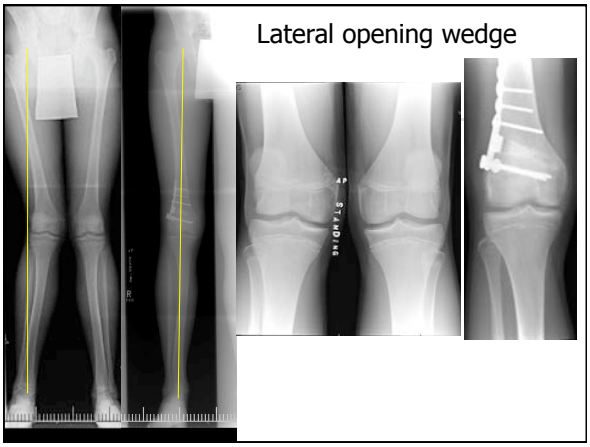
Medial CW DFO: Technique

Medial closing wedge AO plate

14 yo M distal femoral physeal plate injury



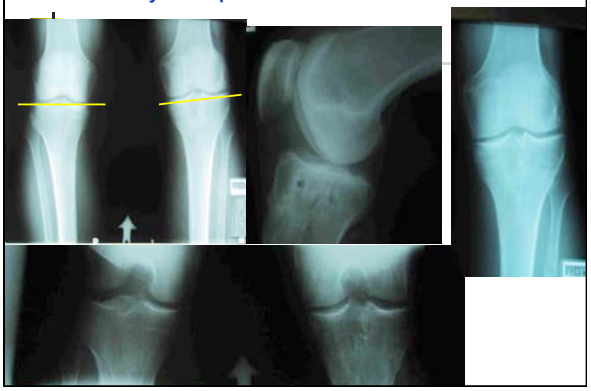
Lateral opening wedge



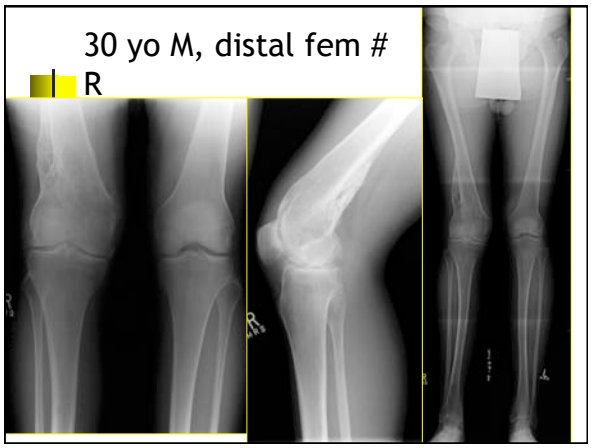
26 yo m
lat condyle #; lateral meniscectomy

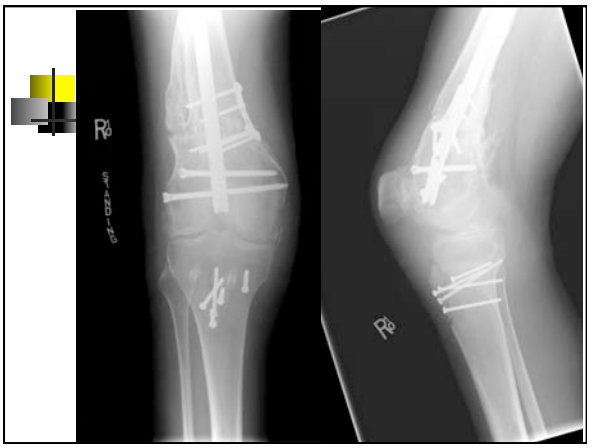
Meniscal transplant+ hto
Tibial osteotomy for small corrections

Mr SM 4 yr FU post hardware removal



30 yo M, distal fem #
R





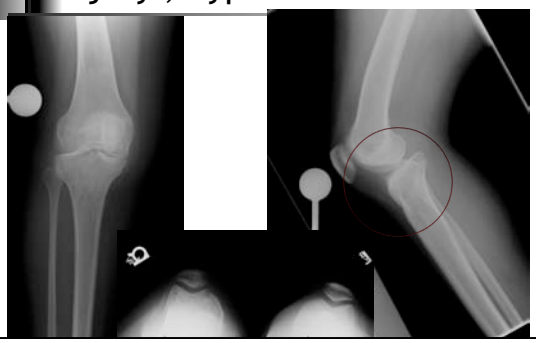
Femoral corrective osteotomy

- **Post operative care**
  - In hospital pain control; CPM
  - Hinged post op brace
  - ROM 0-90 degrees
  - Touch weight bearing (<25 %) for 10-12 weeks

Tibial osteotomy

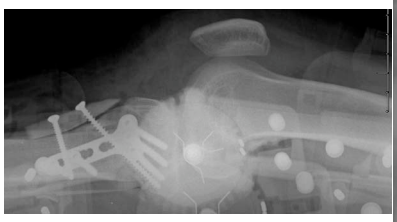
- ***For varus deformity***
- ***Uniaxial , mild to moderate correction***
  - Acute correction and plating
- ***Multiaxail deformity, large correction***
  - External fixation, slow correction

Case 1 : 18 f growth plate injury , hyperxtension varus



Case 1 : flexion osteotomy to correct slope

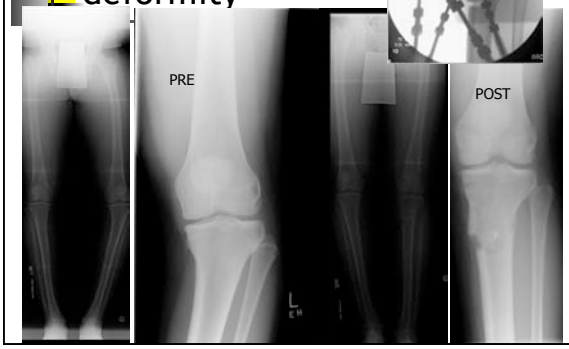
anterior opening wedge tibial tubercle osteotomy



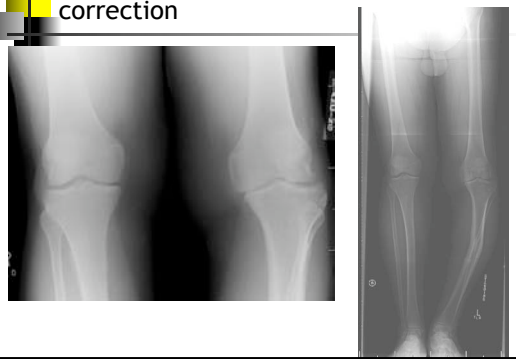
Case 2: 50 yo malunited HTO

Case 2: 50 yo malunited HTO revision OWO to correct slope and valgus ; TTO

Case 3 severe deformity



Case 4 severe deformity
Spatial frame to allow multiaxial correction



Case 4 severe deformity
Spatial frame to allow multiaxial correction

Summary

- *Need to assess alignment in coronal, sagittal and rotational plane*
- *Need a good knee with good ROM for success post osteotomy*
- *Acute correction for mild to moderate deformity*
- *Ex fix (spatial frame) for severe deformity*

Thank you