

Tibial Plateau Fractures: Overview & Updates

Clifford Jones, MD FACS FAAOS FAOA

Chief, Orthopaedic Surgery, Dignity Medical Group - Phoenix

Professor, Orthopaedic Surgery, Creighton Medical School - Phoenix

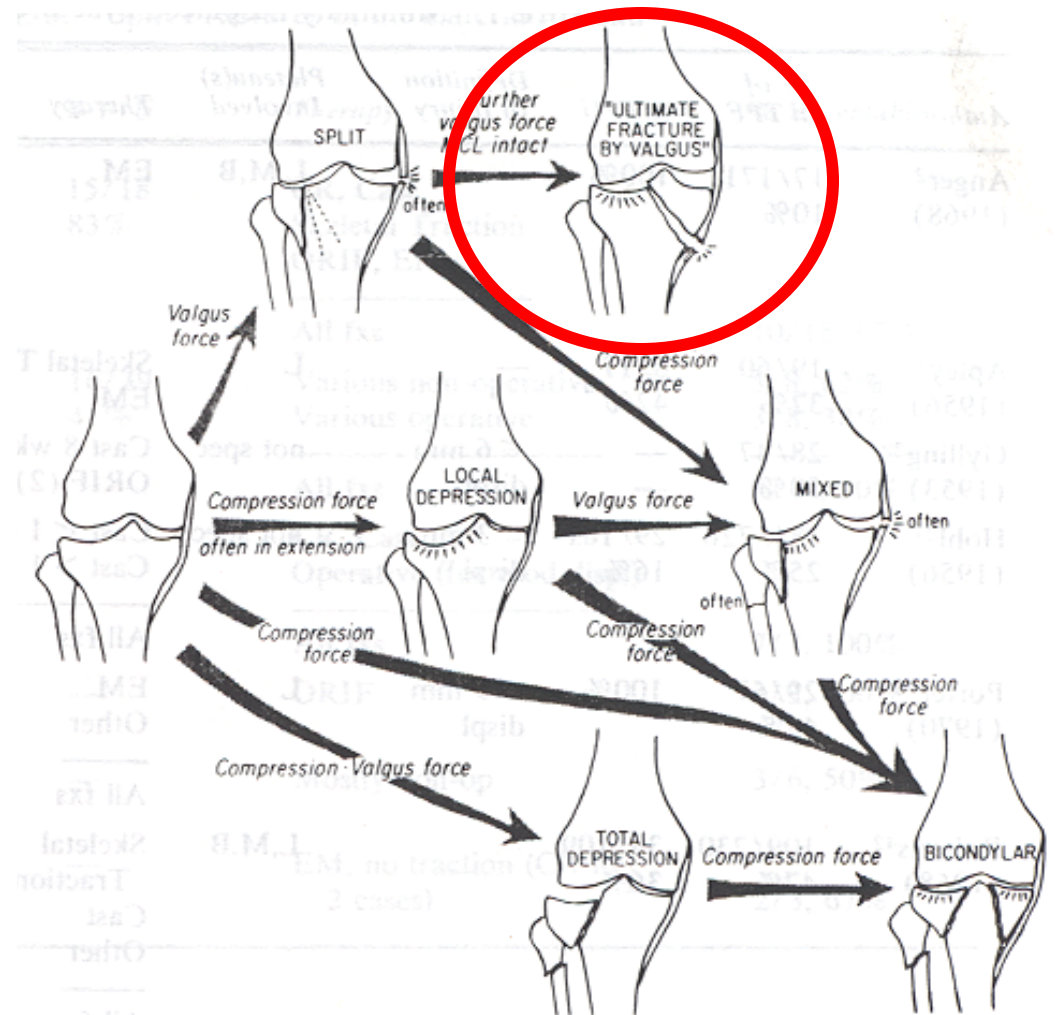


Dignity Health
Medical Group.

Creighton
UNIVERSITY
HEALTH SCIENCES
PHOENIX

Mechanism

Low Energy
High Energy
Complex
Fx - Dislocation



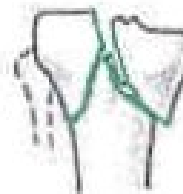
AO Classification



A1
Extra-articular fx,
avulsion



B1
Partial articular fx,
pure split



C1
Complete
articular fx,
articular simple,
metaphyseal simple



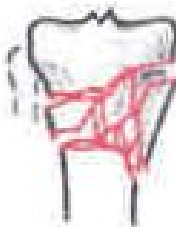
A2
Extra-articular fx,
metaphyseal
simple



B2
Partial articular fx,
pure depression



C2
Complete
articular fx,
articular simple,
metaphyseal
multifragmentary



A3
Extra-articular fx,
metaphyseal
multifragmentary

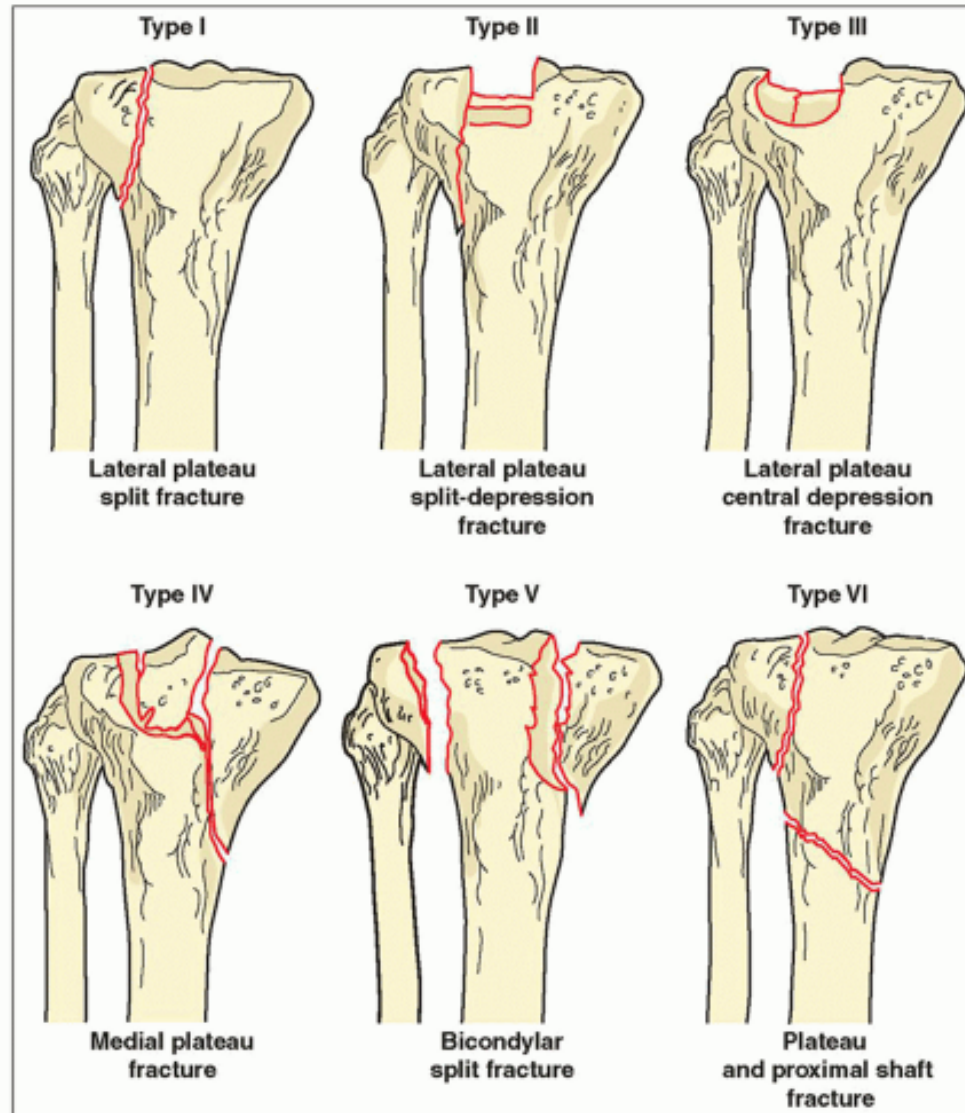


B3
Partial articular fx,
split-depression

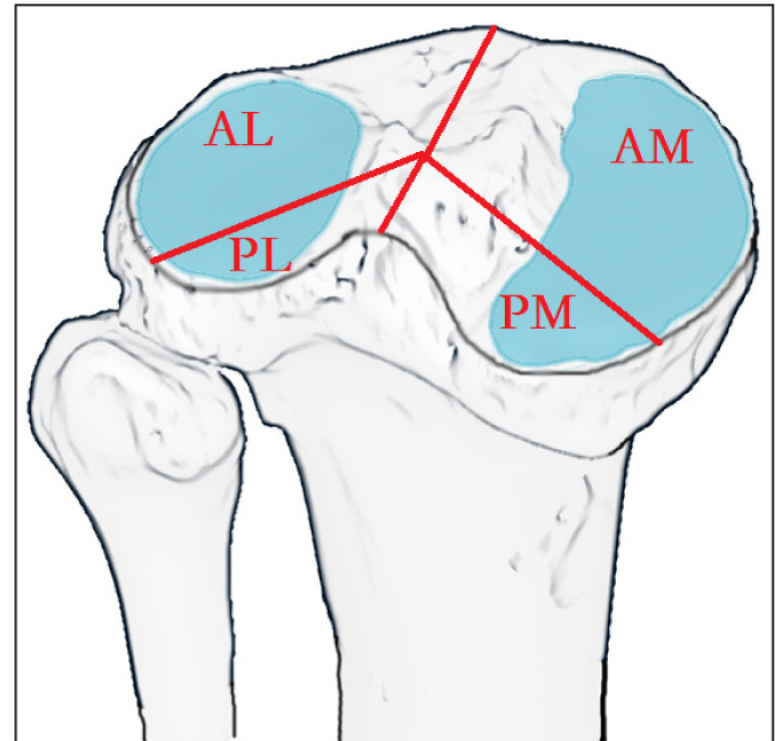
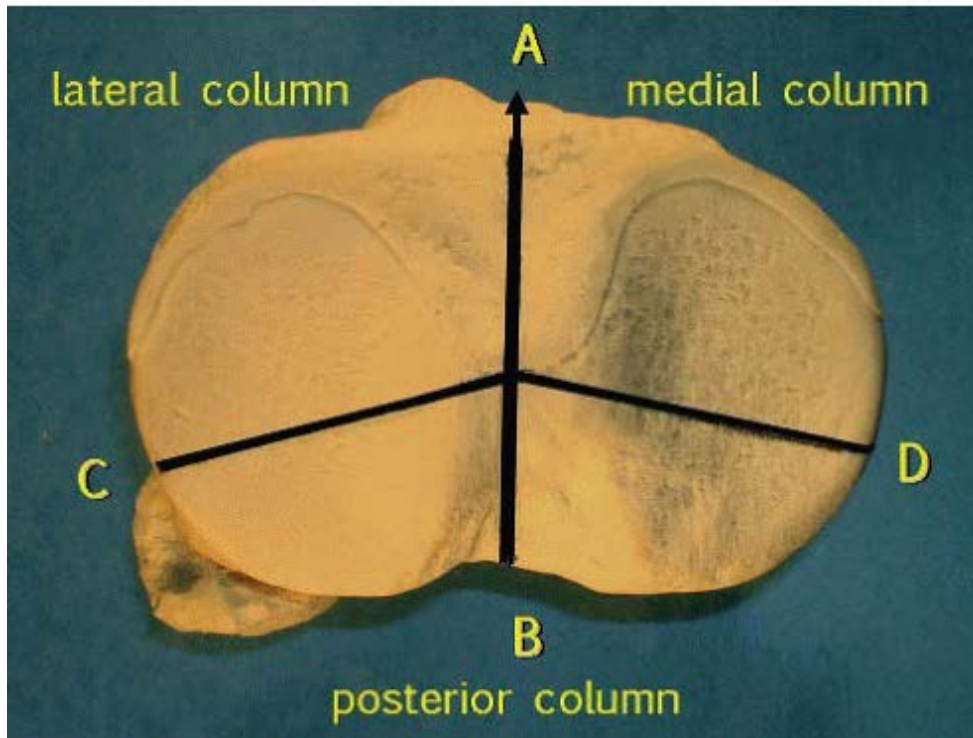


C3
Complete
articular fx,
articular
multifragmentary

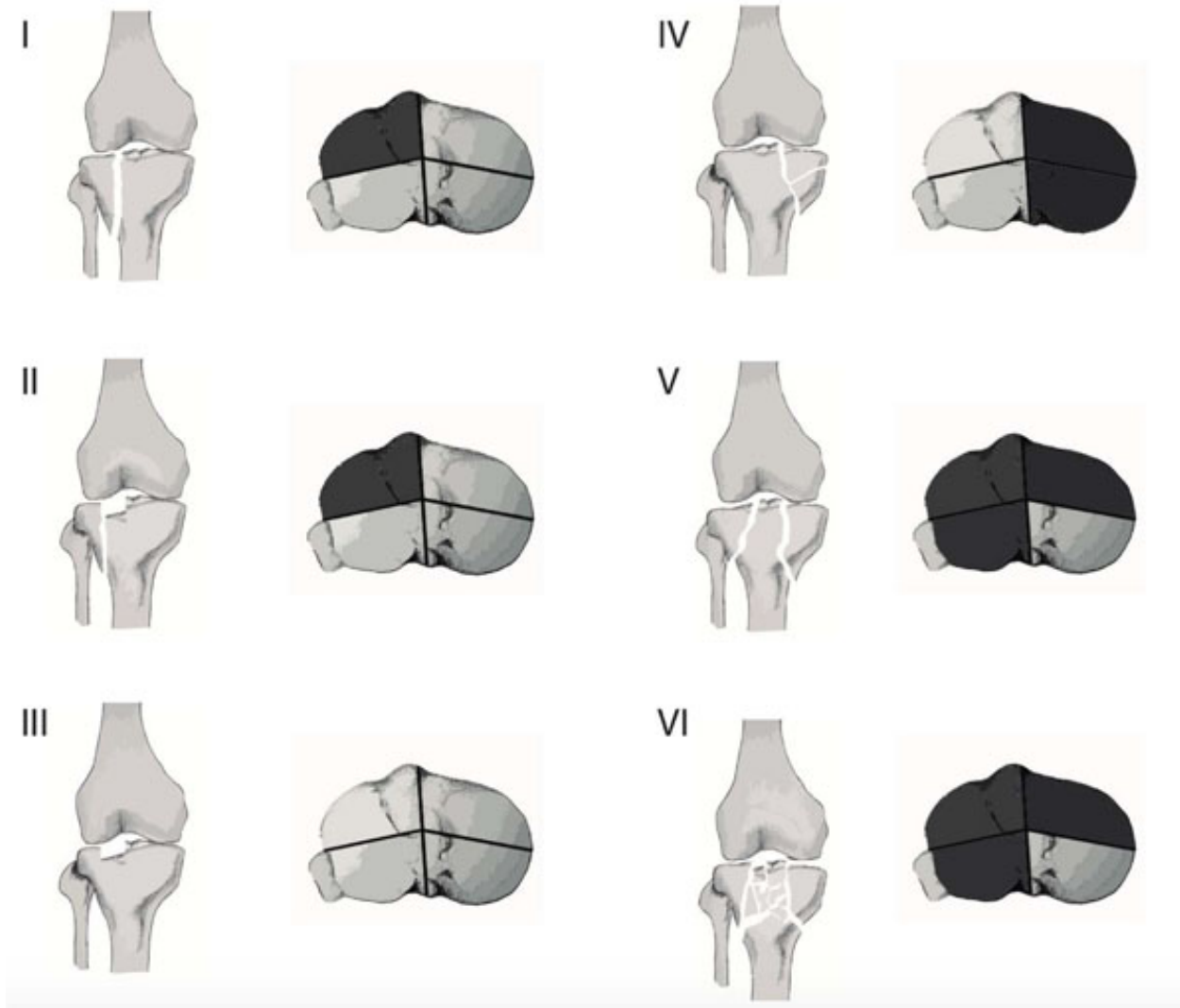
Schatzker Classification



Column Concept Classification



Schatzker & Column Combined



Surgical Goals

- Obtain/Secure Articular Reduction
 - Reduce Condylar Width
 - Restore Axial Alignment
 - Neutralize Meta-Diaphysis
 - Secure Tibial Tubercle
 - Early ROM
- Appropriate Soft Tissue Handling



Surgical Goals

Obtain/Secure Articular Reduction

Direct Visualization

Reduce Condylar Width

Restore Axial Alignment

Radiographically

Neutralize Meta-Diaphysis

Secure Tibial Tubercle

Early ROM

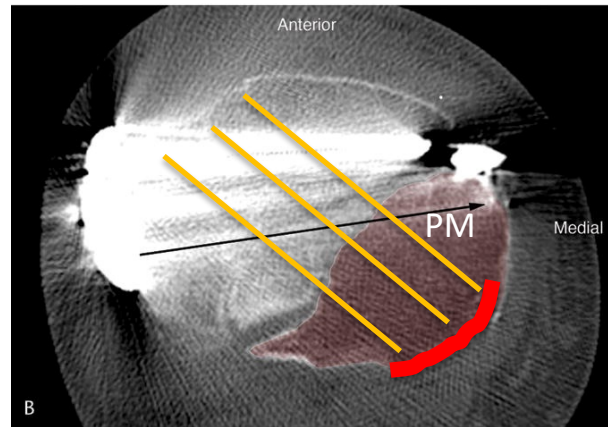
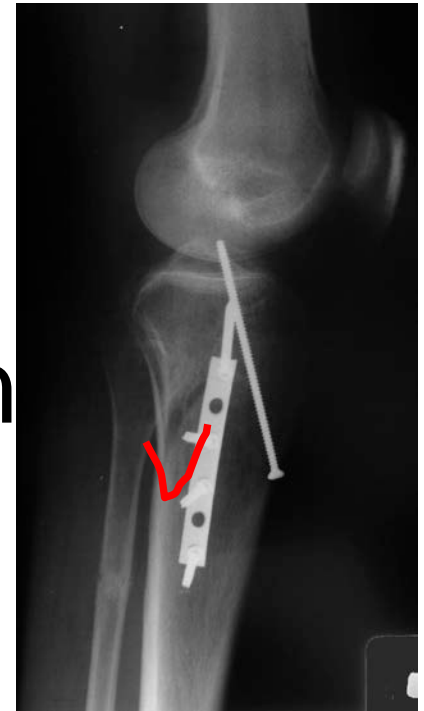
Medial/Lateral Plates
Lateral Plate/Medial ExFix
Lateral Fixed-Angle Plate
External Fixation

Appropriate Soft Tissue Handling

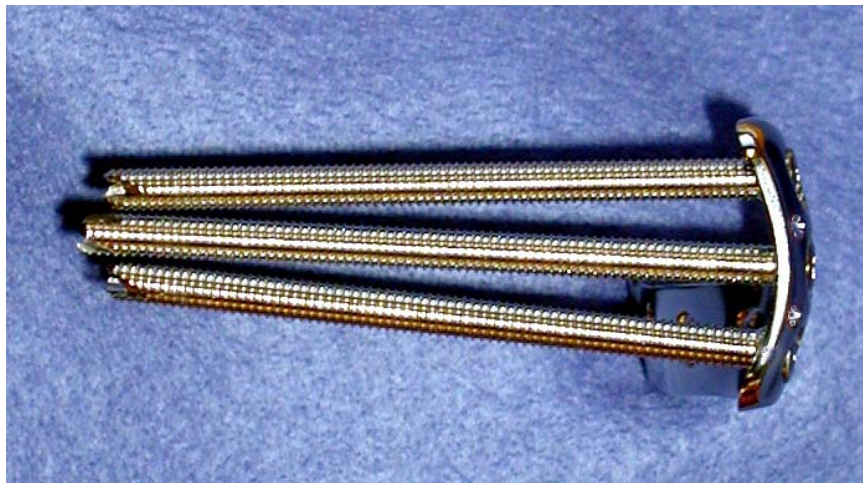
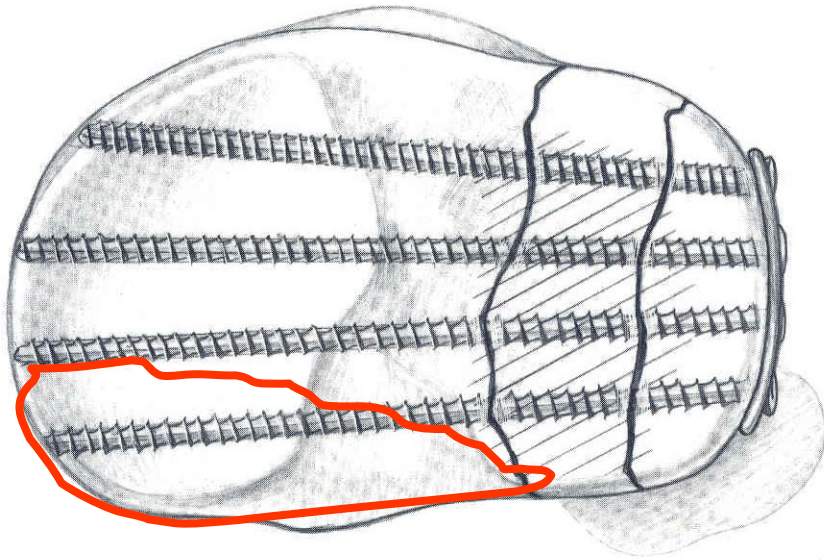
Find the Column

Find The Apex

Fix the Apex/Column



Stable Articular Fixation ?



Associated Injuries

Degloving

NV injury

Meniscus - 50%

Ligament - 25%

Compartment Synd - 10%

Chondral Injuries

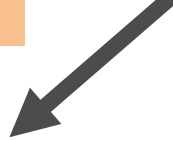
LS spine, pelvis, foot



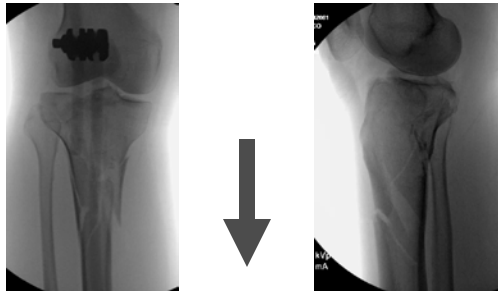
Timing of Imaging

If with:

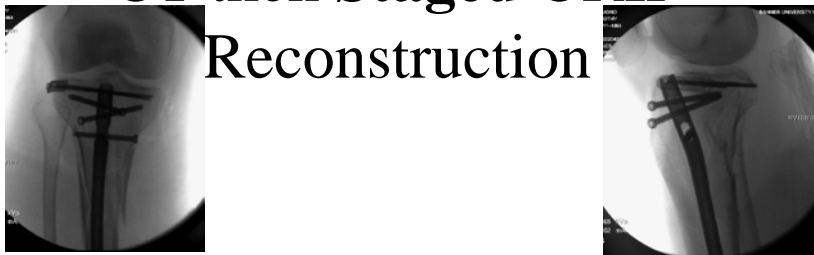
1. Fracture/Dislocation (length unstable)
2. severe soft tissue
3. associated injuries



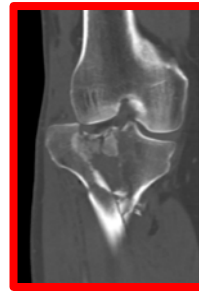
Spanning Ex Fix & Reduction



CT then **Staged ORIF Reconstruction**



CT with reconstructions



Early ORIF reconstruction



Temporary External Fixation



Femur

Anterior or Antero-Lateral

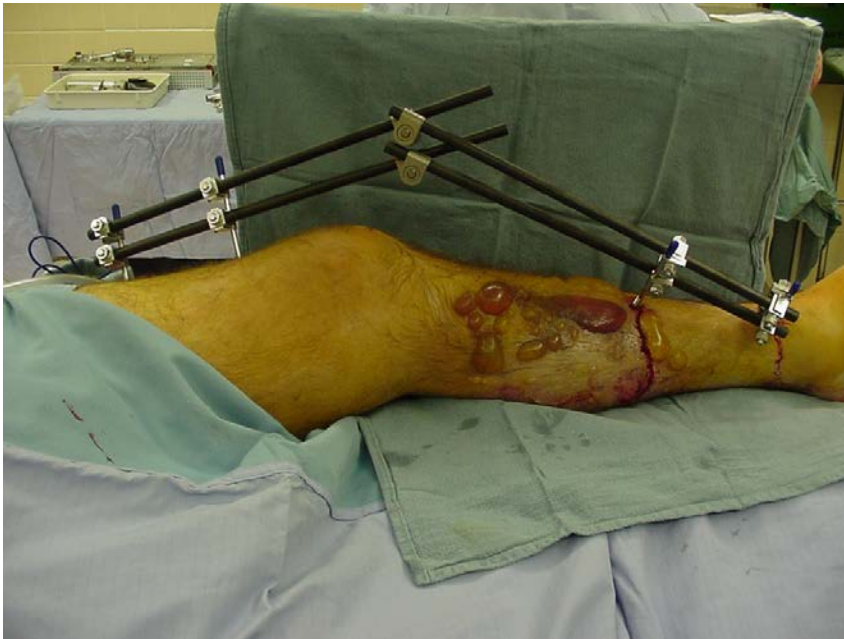
Tibia

Medial or Antero-Medial

Draw Operative Incisions

Place Outside Area of Injury

Spanning External Fixator



Compartment Syndrome

Etiology

Bicondylar Fx (10%)

Crush Inj

Hyperextension Inj

Results

↑ Infection

↓ Soft tissue coverage

↑ **Stiffness**



Alternate Approaches



Timing of Fixation

Severe soft tissue with compartment syndrome

Release compartment & ORIF single stage

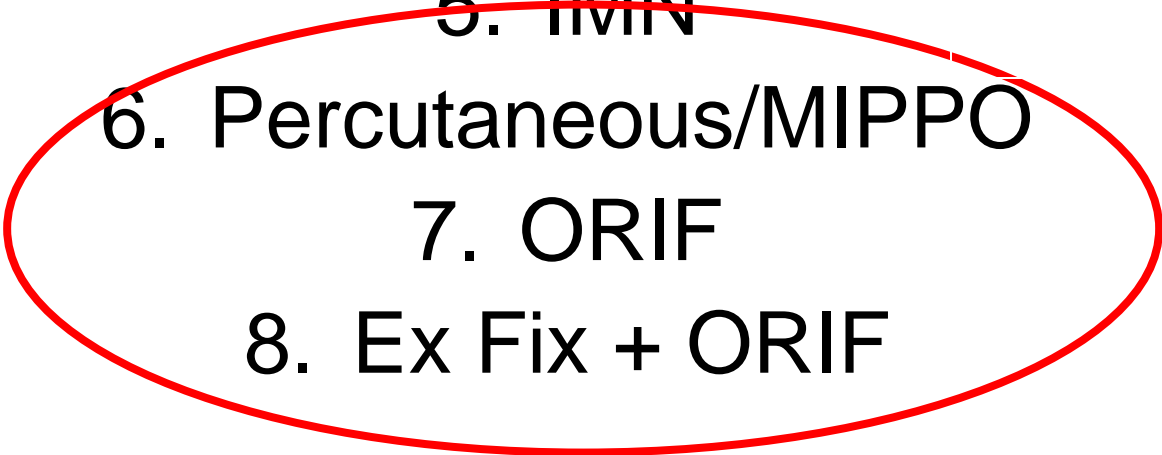
Delayed soft tissue coverage

- OR -

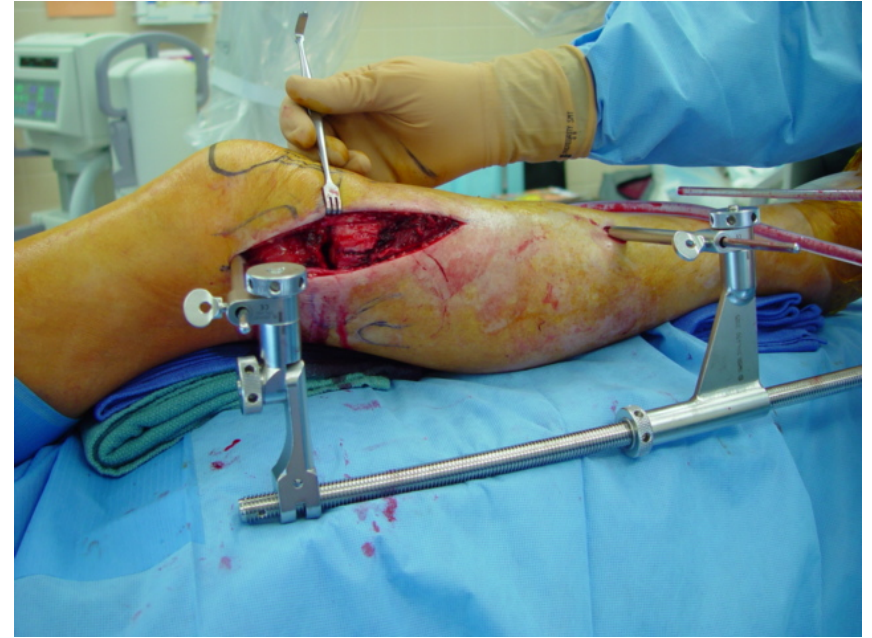
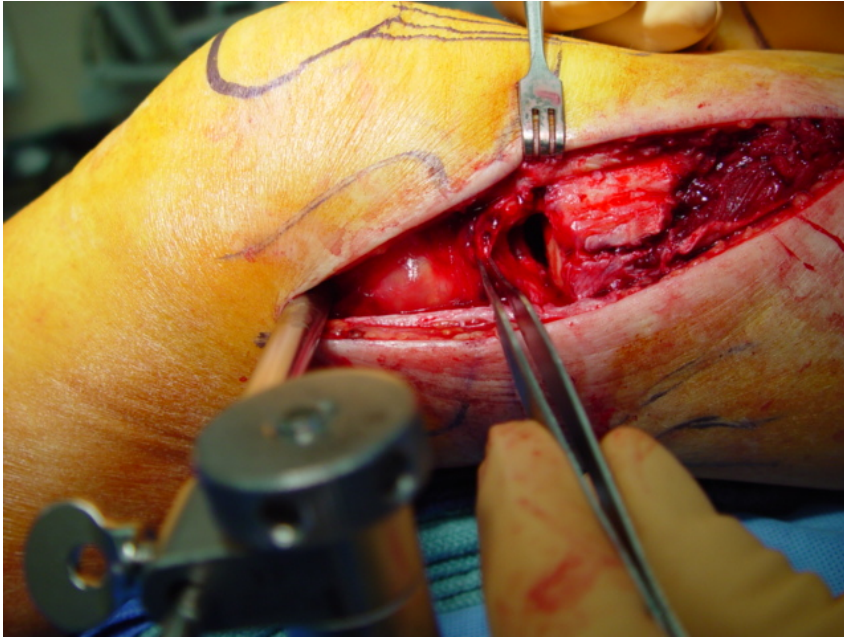
Release compartment & Span with Ex Fix

Staged soft tissue & ORIF

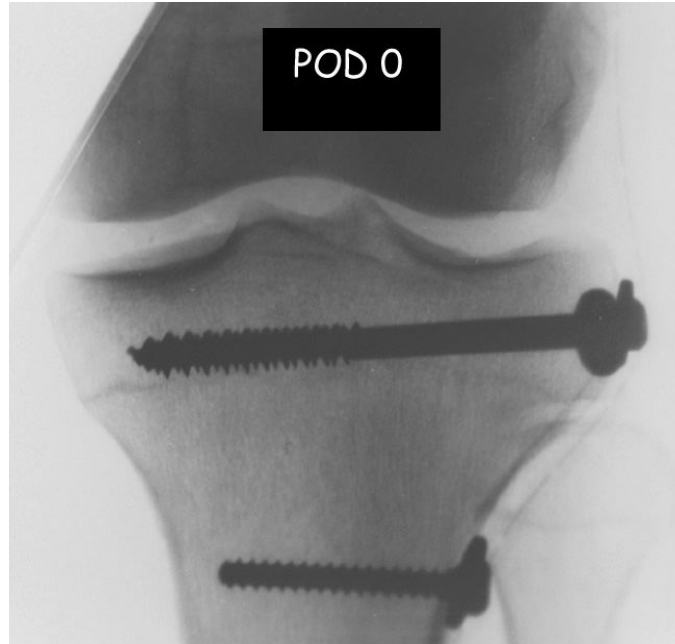
Treatment

1. Non-operative
 2. Casting
 3. Roller Traction
 4. Hybrid
 5. IMN
 6. Percutaneous/MIPPO
 7. ORIF
 8. Ex Fix + ORIF
- 

Lateral Exposure

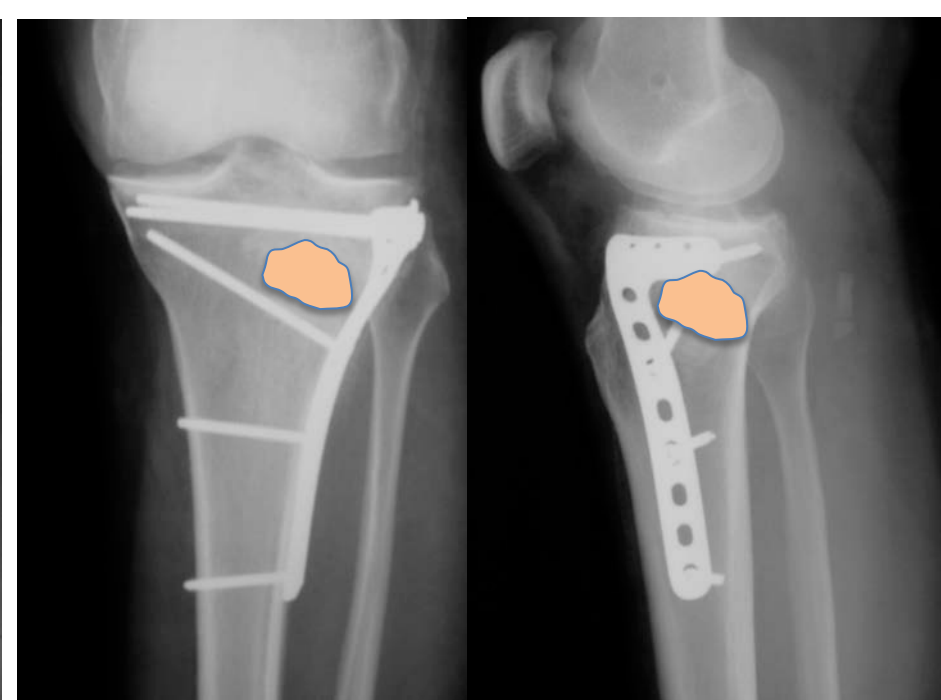
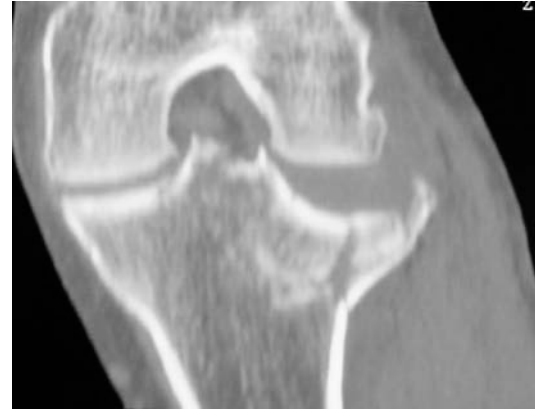
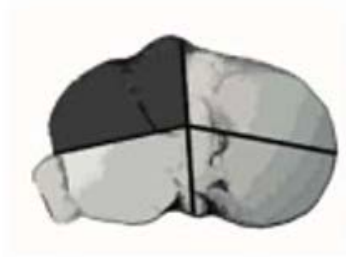


Schatzker 1/AL Injury



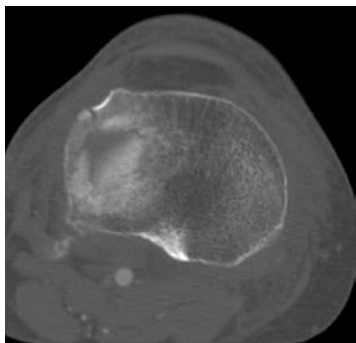
Schatzker II/Anterolateral Injury

II

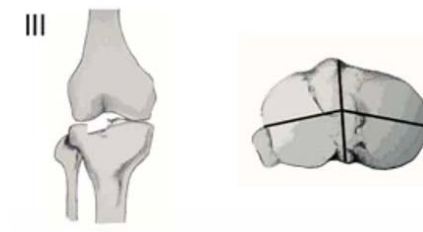


Schatzker III/Anterolateral Injury

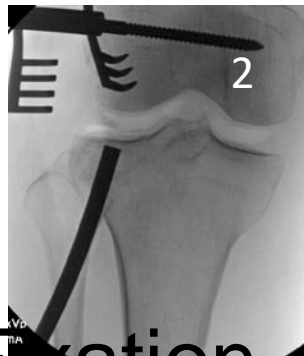
III



1. Distraction



2. Disimpact



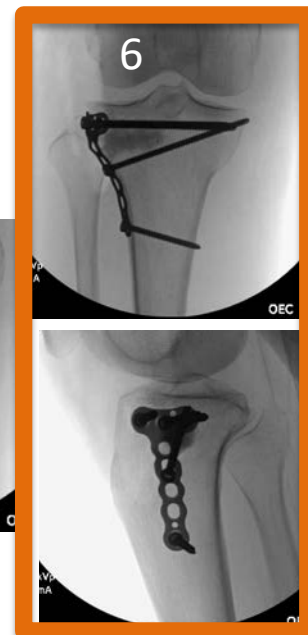
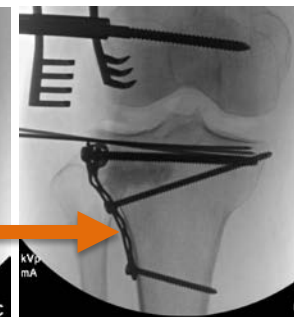
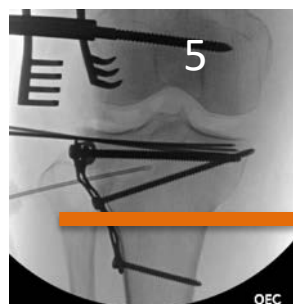
3. Temporary Articular Fixation



4. Final Fixation



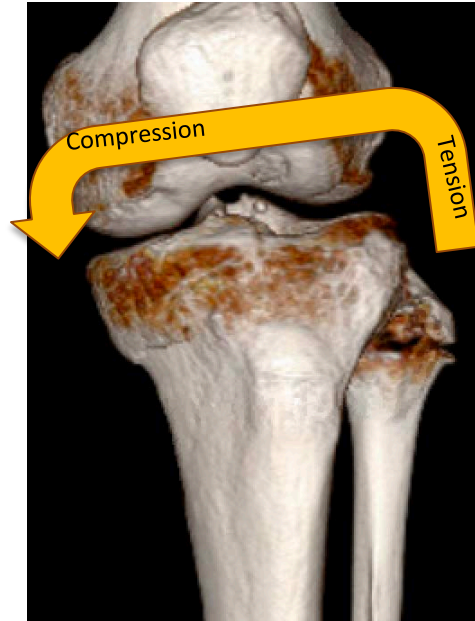
5. Backfill with CaPO₄ Compound



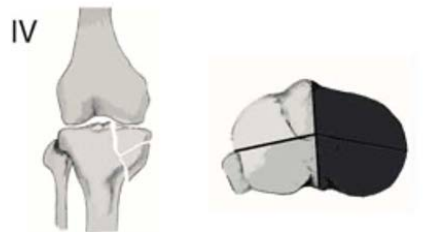
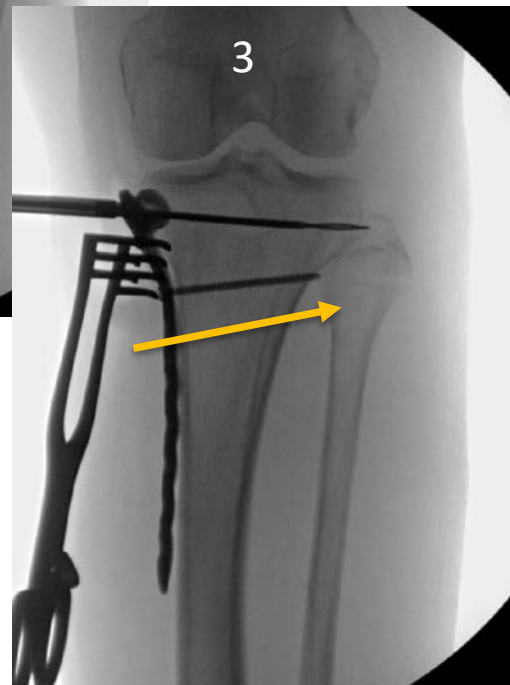
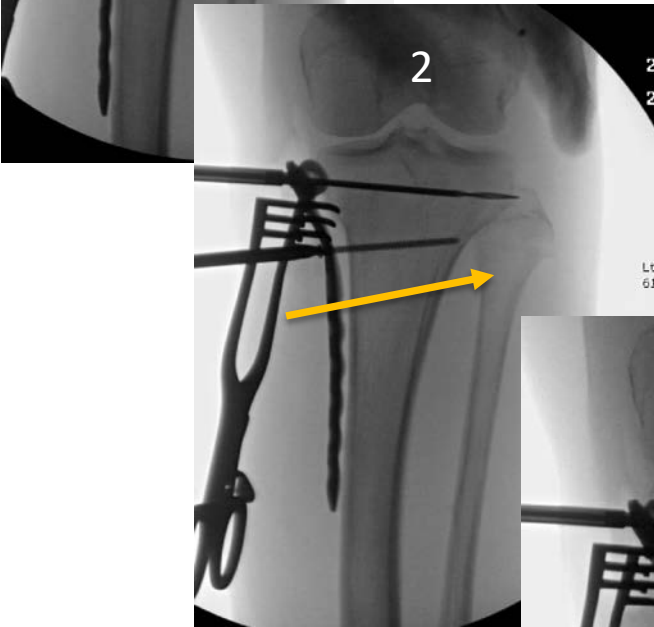
6. Remove Temp Fixation

Schatzker IV/Posteromedial Injury

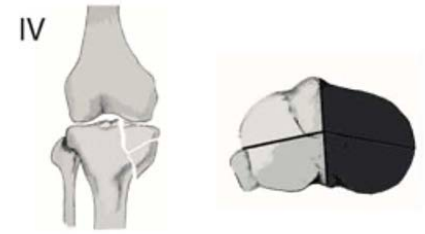
IV

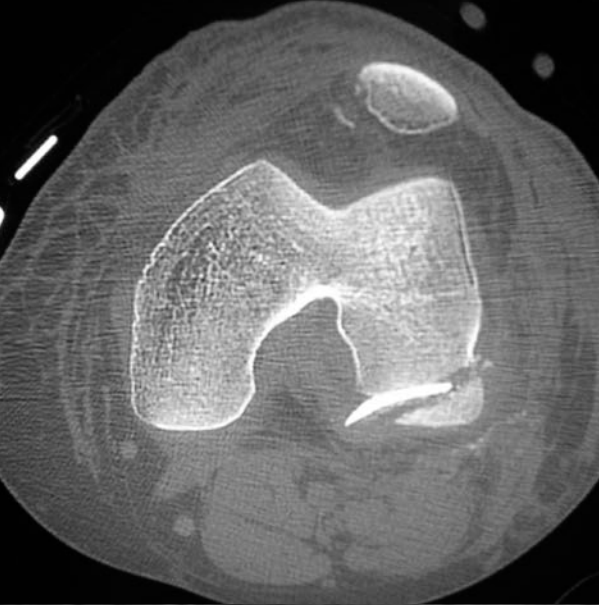


Find Column – Medial Find Apex – Medial Fix Apex/Column



Injury Imaging





Fracture
Dislocation

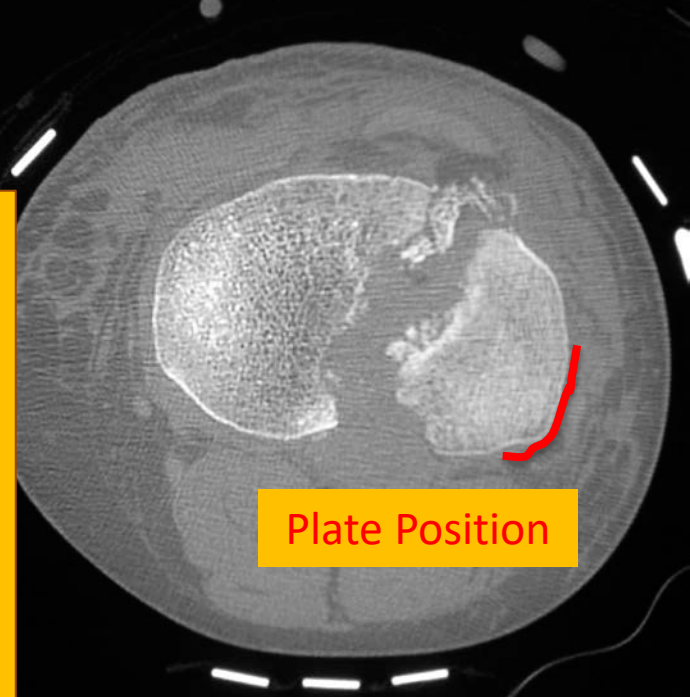


Plate Position

Length Unstable

Spanning Ex Fix

CT & Assess
Injury



Apex



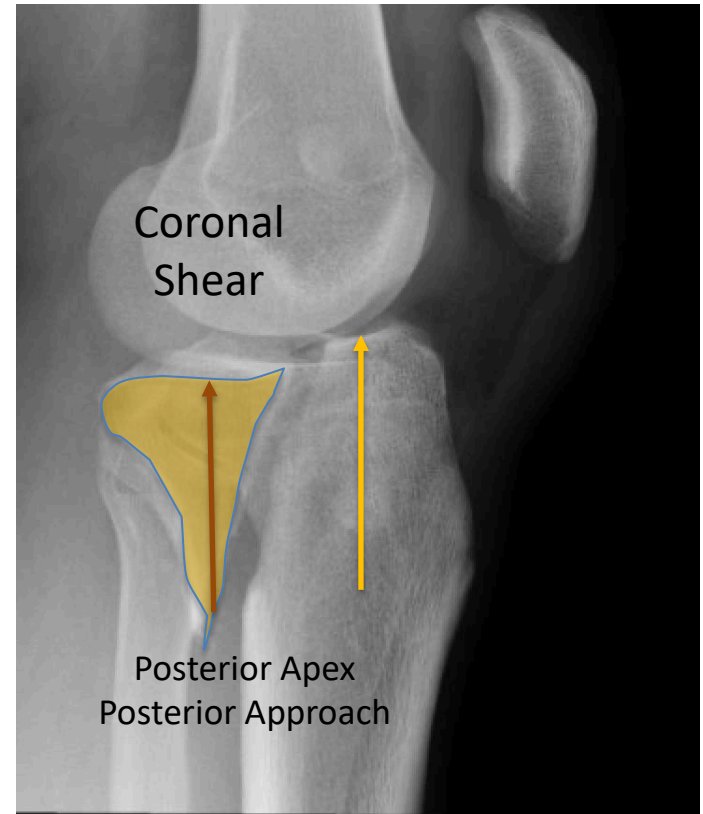
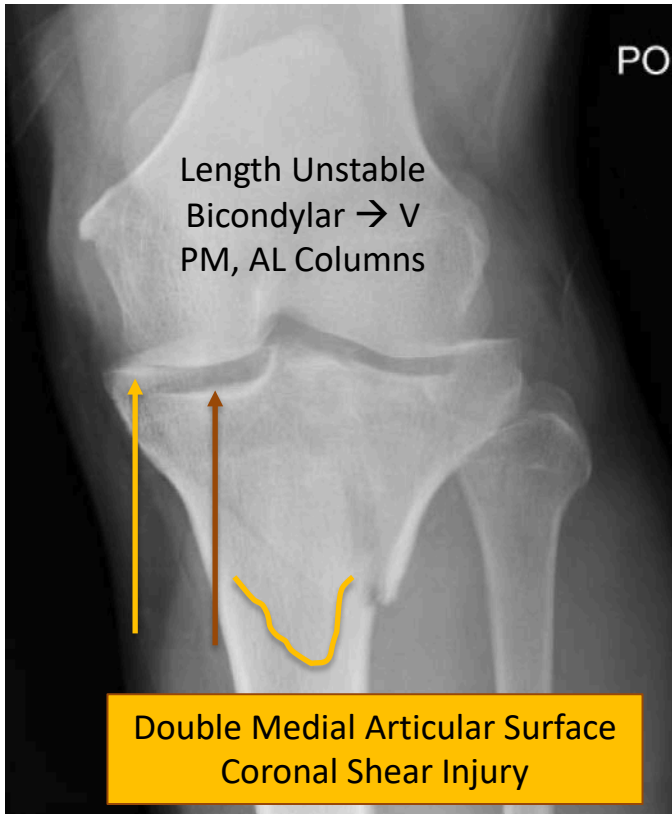
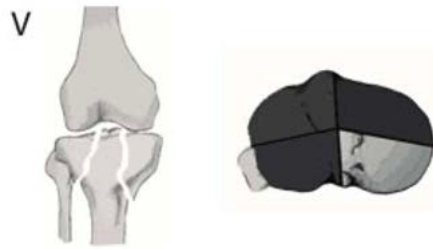
W 220



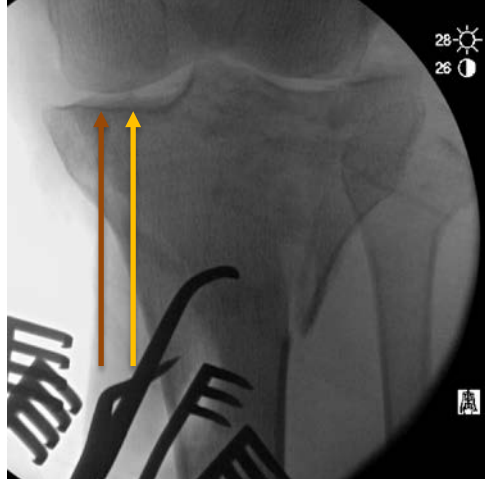
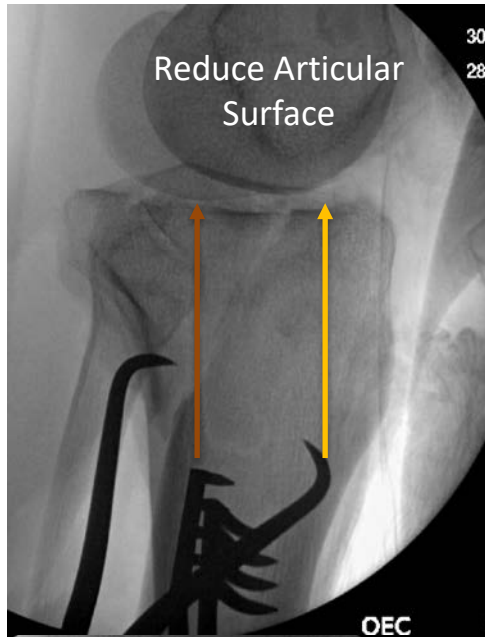
Find Colum - Medial
Fix Apex – Medial
Fix Apex/Column

PCL Screw Fixatin
Lateral Fem Condyle
Lateral Meniscus
Tear/Avulsion

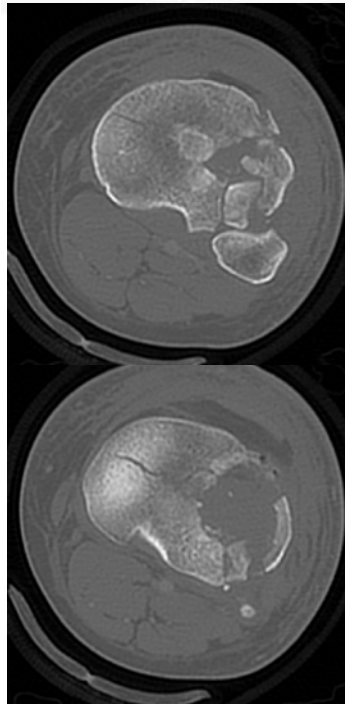
Schatzker V/PM, AL Columns



Prone Posterior Approach



Schatzker VI/AL, PM Columns



Fix AL/PL Columns Schatzker II



Fix the Shaft → IMN





Arthroplasty

TKA, Periprosthetic Plateau



Lateral Locked ORIF



Final ORIF





The Journal of Bone and Joint Surgery

American Volume

VOLUME 55-A, No. 7

1cm Depression
> 10° Angulation

OCTOBER 1973



Stable

Tibial Condylar Fractures

IMPAIRMENT OF KNEE JOINT STABILITY AS AN INDICATION FOR
SURGICAL TREATMENT *

BY POUL S. RASMUSSEN, M.D.†, GOTHENBURG, SWEDEN

From the Department of Orthopaedic Surgery I Sahlgren's Hospital, Gothenburg



Unstable

ABSTRACT: In a series of 260 fractures of one or both tibial condyles, the main indication for surgical treatment was clinical evidence of instability of the extended knee joint. Forty-four per cent of the patients were treated either by closed traction-reduction and internal fixation using a wire loop or by open reconstruction of the joint surface using autogenous bone grafts. Follow-up of 78 per cent of the patients revealed that 87 per cent of them had an acceptable knee function. Post-traumatic osteoarthritis was found in 17 per cent. The relationship between end results and factors such as age, sex, type of fracture, instability, angular deviation, and local deformity of the joint surface is evaluated. The principal factors that led to bad results were residual instability and malalignment.

< 5% TKA

Complications Associated With Internal Fixation of High-Energy Bicondylar Tibial Plateau Fractures Utilizing a Two-Incision Technique

David P. Barei, MD, FRCS(C), Sean E. Nork, MD, William J. Mills, MD, M. Bradford Henley, MD, and Stephen K. Benirschke, MD

J Orthop Trauma • Volume 18, Number 10, November/December 2004

Anatomic Reduction 62%

Infection 8.4%

→ Resolution with 3.3+ Procedures

DVT 19.3%

Conclusion

Appropriate Dx of all Injury Components

(Fracture Fragments, Soft Tissue, Meniscus, Ligament, NV, Asso Inj)

Appropriate Reduction

(Anatomic Articular Reconstruction, Length, Alignment, Rotation)

Stabilize Fx

(Appropriate timing, approach(es), hardware)

WB @ 6-12 weeks

Avoid Complications

Baseline @ 18-24 mo

Thank You



**Dignity Health
Medical Group**



Creighton
UNIVERSITY
HEALTH SCIENCES
PHOENIX