Tibial Plateau Fractures:

Evaluation, Assessment and Treatment

Thuan V. Ly, MD
Ohio State University

Objectives

- Recognize the anatomy of the proximal tibia
- Describe initial evaluation and management
- Identify common fracture patterns
- Apply treatment principles and strategies
    - Partial articular fractures
    - Complete articular fractures
- Discuss rehabilitation, complications, and outcomes
- Illustrate selected tibial plateau cases

Epidemiology
(burden of disease/cost to society)

- Tibial Plateau
  - Articular surface proximal tibia
  - +/- metaphyseal /diaphyseal extension
- Account for 1.2% of all fractures
- Lateral Plateau: 55-70% of fractures
- Medial Plateau: 10-20% of fractures
- Bicondylar Plateau: 10-30% of fractures

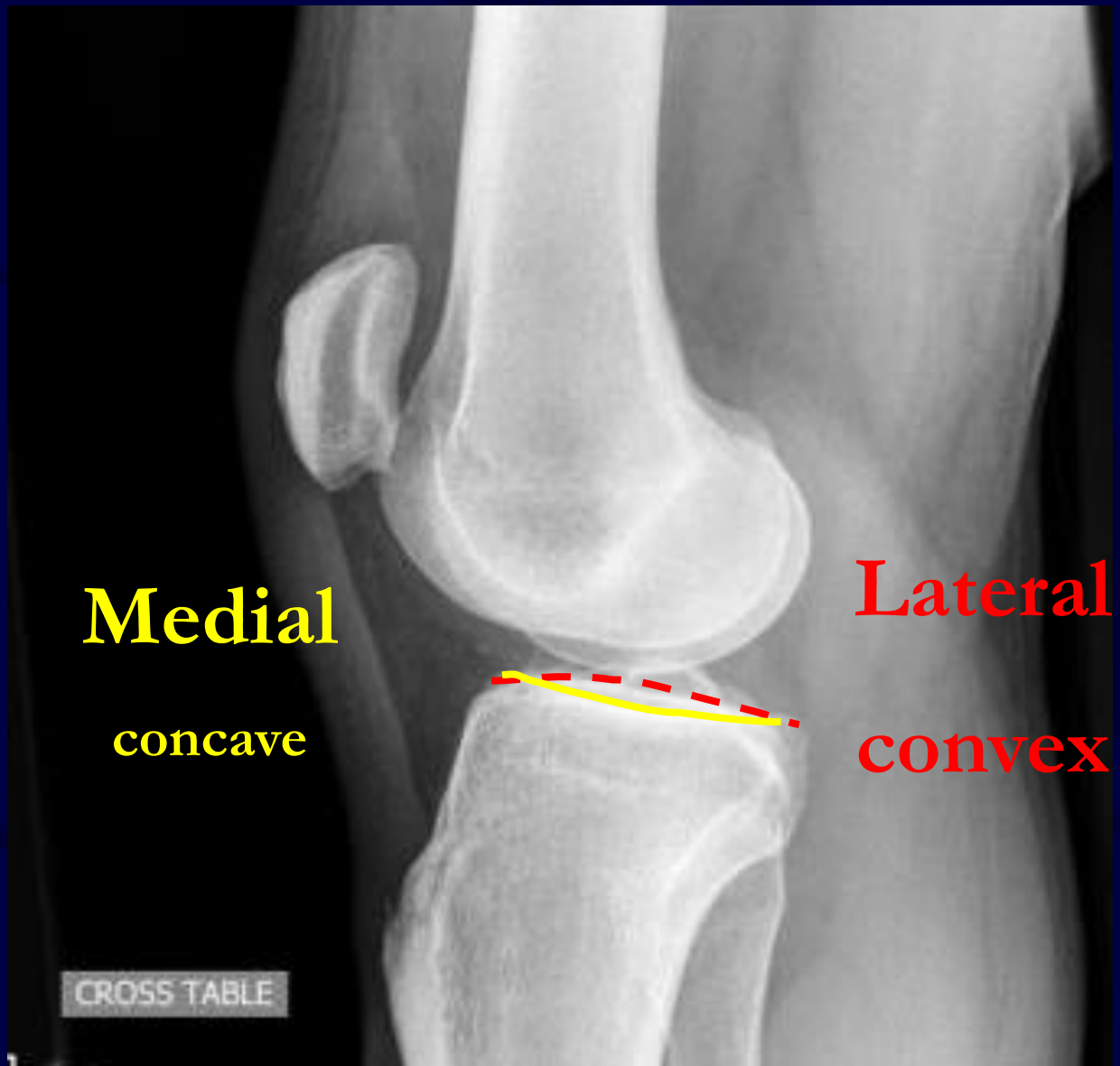
Epidemiology
(burden of disease/cost to society)

- Bimodal distribution
  - Young adults: high energy mechanism
    - Highest in 5th decade
    - Male > Female
  - Elderly: low energy mechanism
    - Osteoporotic bone
    - Female > Male
- Significant functional impairment
  - Joint incongruity, malalignment, instability
  - Post-traumatic arthritis

Anatomy

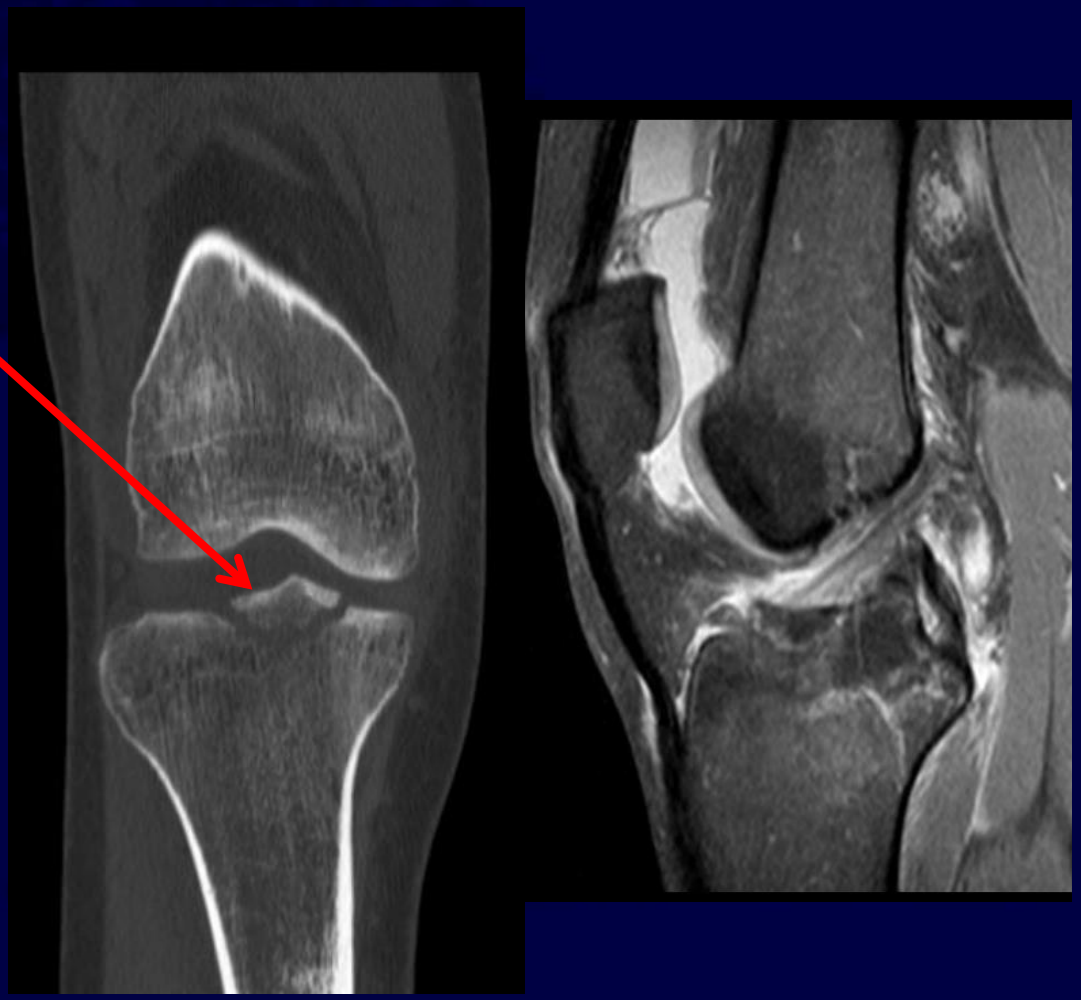
- Consist of medial and lateral plateau
  - Medial larger
  - Medial lower (concave)
  - Medial bone harder (thus less likely to fracture)
  - Lateral higher (convex)
  - Lateral cartilage thicker (3 vs.. 4 mm)

Anatomy



Anatomy

- Bony prominences
- Intercondylar eminence (menisci & cruciate ligaments attachment)
- Tibial tubercle (patellar tendon)
- Gerdy's tubercle (Iliotibial band)
- Tibia slope: 10 degrees posteroinferior



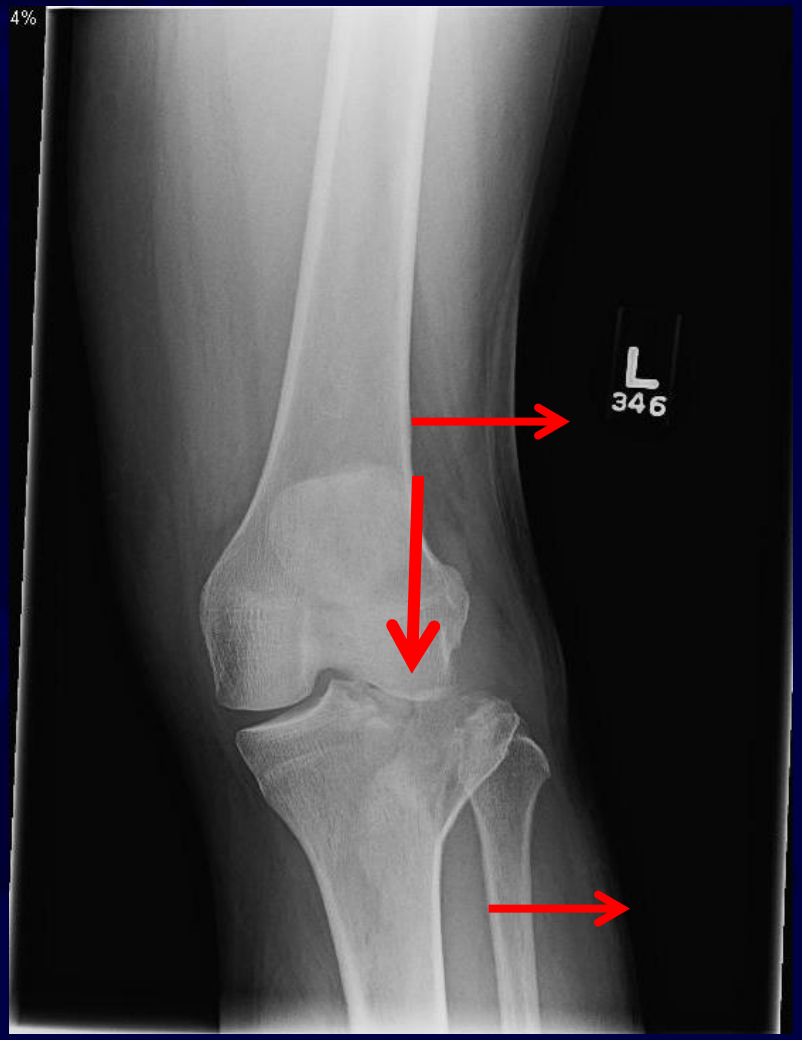
Anatomy

- Lateral Meniscus
  - Larger (cover more articular surface)
  - Commonly torn with lateral plateau fracture
- Medial Meniscus
  - "C" shaped

Lateral Medial

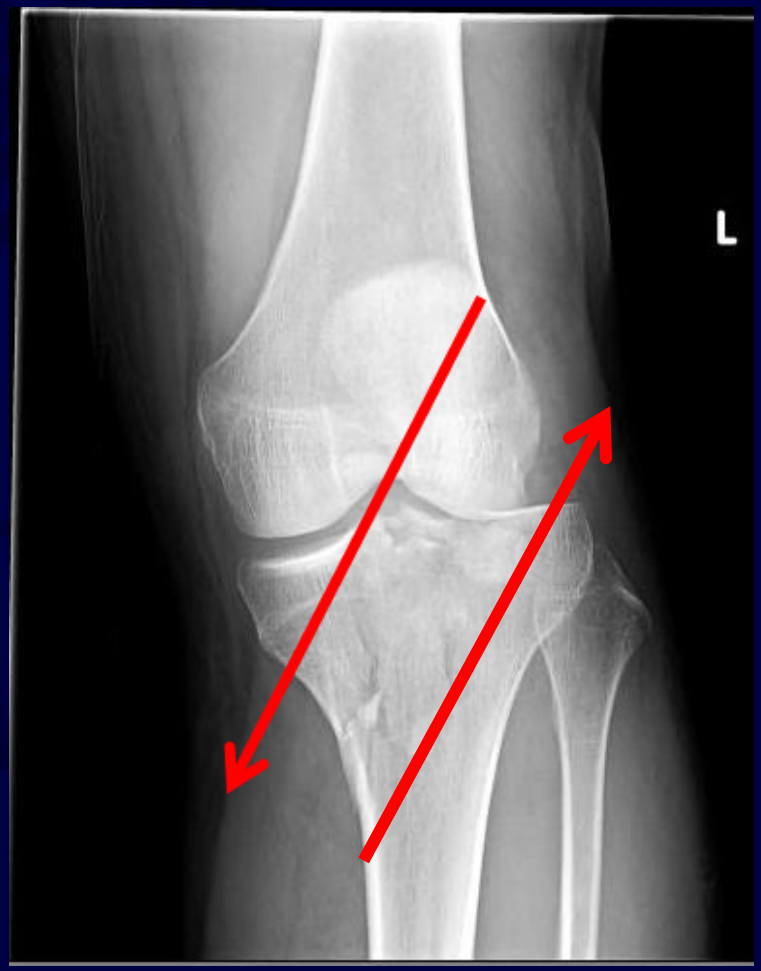
Mechanism of Injury

- Valgus producing force
  - Lateral plateau
- Varus producing force
  - Medial plateau
- Axial compressive force
  - Bicondylar plateau
- Combination
  - High energy
  - Bicondylar plateau
  - Soft tissue injury



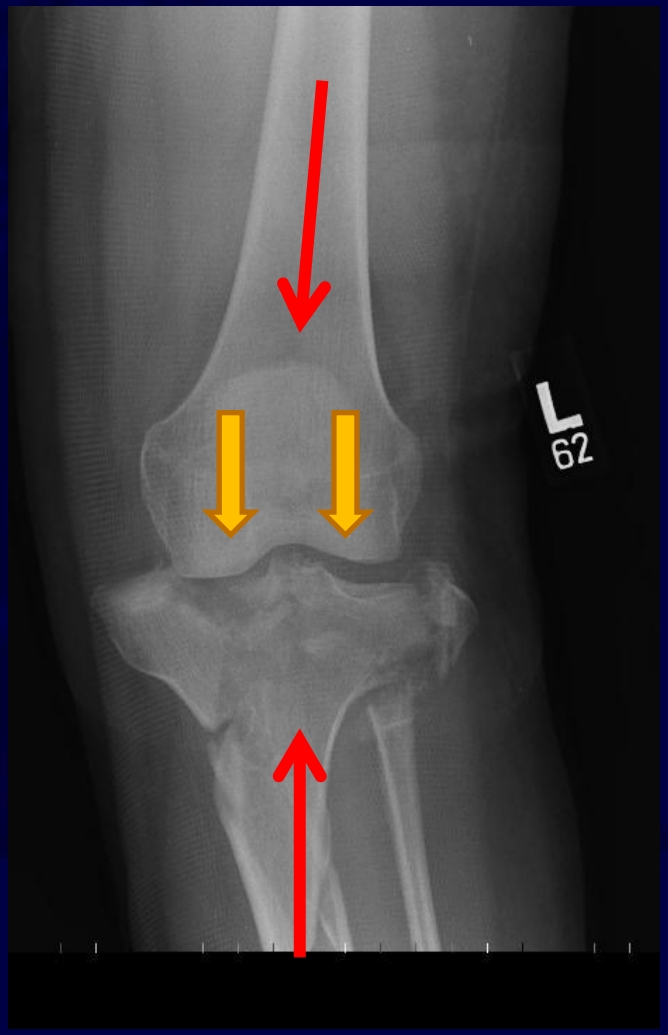
Mechanism of Injury

- Valgus producing force
  - Lateral plateau
- Varus producing force
  - Medial plateau
- Axial compressive force
  - Bicondylar plateau
- Combination
  - High energy
  - Bicondylar plateau
  - Soft tissue injury



Mechanism of Injury

- Valgus producing force
  - Lateral plateau
- Varus producing force
  - Medial plateau
- Axial compressive force
  - Bicondylar plateau
- Combination
  - High energy
  - Bicondylar plateau



Mechanism of Injury

- **Low energy**
  - Split depression
  - Increasing age
  - Poor bone quality
- **High energy**
  - Pedestrian vs.. car (bumper)
  - Fall from height
  - Motor vehicle accident
  - Axial load (knee extended)
  - Bicondylar fracture
  - Associated injuries

Associated Injuries

- Ligaments
  - MCL, LCL
  - ACL, PCL
- Menisci
  - Lateral meniscus likely if:
  - > 5mm depression
  - > 6mm condylar widening
  - Gardner J Trauma 2006
- Popliteal artery
- Peroneal nerve
- Compartment syndrome

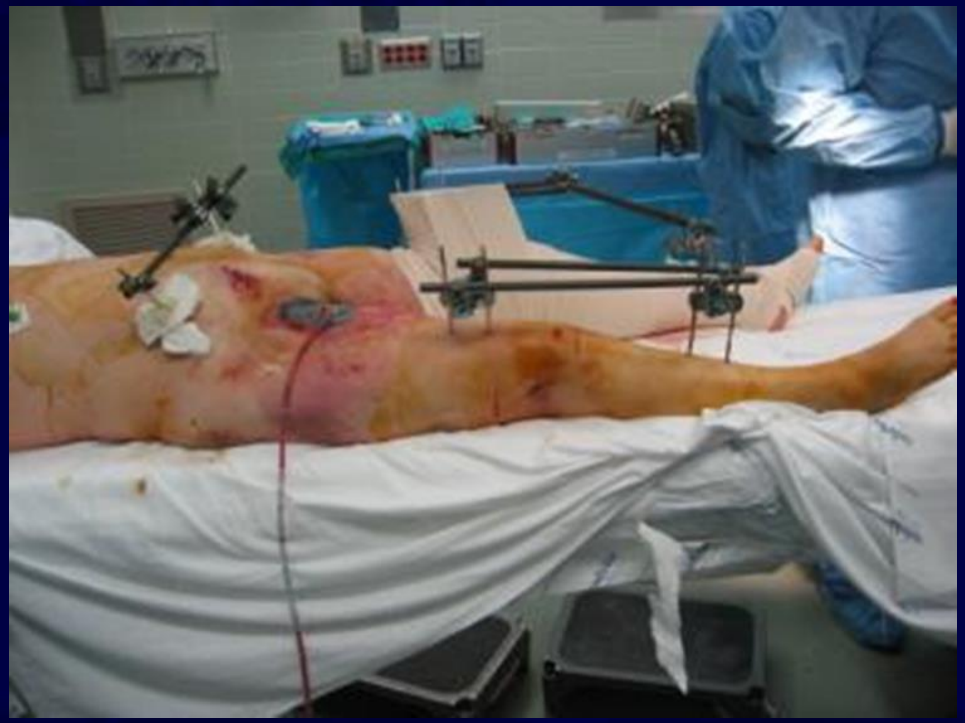
MCL tear

Associated Injuries

- Lateral plateau
  - Tear of meniscus
  - MCL / ACL tear
- Medial Plateau
  - Fracture / dislocation variant
  - Popliteal artery injury
  - Peroneal nerve injury
- Bicondylar
  - Open injury
  - Compartment syndrome

Evaluation - History

- Mechanism of injury
- Injury factors
  - Soft tissues
  - Fracture patterns
  - Associated injuries
- Patient factors
  - Age
  - Bone quality
  - Comorbidities
- Previous level of activity
  - Function demands



Evaluation – Physical Exam

- Initial Inspection
  - Skin integrity
  - Soft tissue swelling
  - Open fracture
  - Gross deformity
  - Shortened limb
  - Neurovascular status
- Document the Exam!!!

Evaluation – Physical Exam

- **Low energy mechanism**
- Knee swelling
- Limited knee ROM
- Tender to palpation
- Able to assess knee stability
  - Varus/valgus stress
  - 0 and 30 degrees
  - Lachman's exam for ACL deficiency

Evaluation – Physical Exam

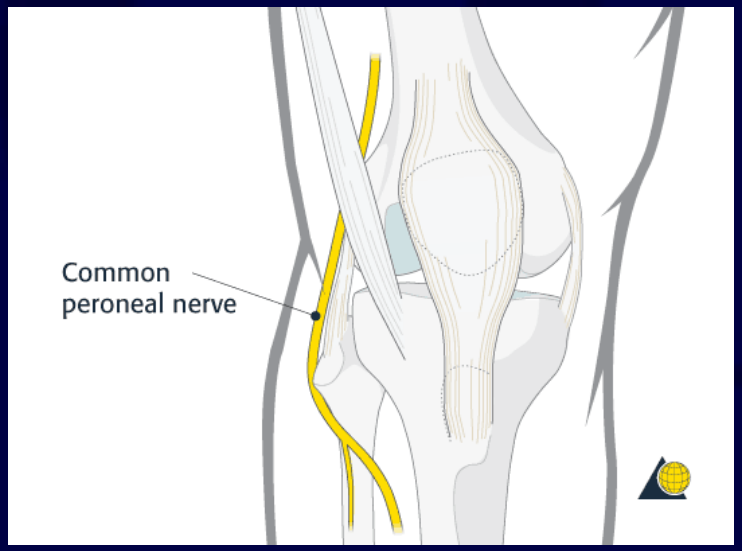
- **<u>High energy mechanism</u>**
- Advanced Trauma Life Support (ATLS)
  - Resuscitation
  - Limb threatened
- Soft tissue integrity
  - Open fracture
  - Abrasions
  - Blisters
- Compartment syndrome
- Knee stability exam
  - Difficult to perform

Evaluation – Physical Exam

- Soft tissue assessment
- Know
  - Gustilo & Anderson open fractures classification
  - Tscherne - closed fractures classification
- Avoid missing compartment syndrome
- Determine timing of surgery
  - Skin wrinkles present?

Evaluation – Physical Exam

- Document NV status
- Neurologic
  - Peroneal nerve
- Vascular
  - Ankle-Brachial Index
  - ABI > 0.9



Evaluation – Physical Exam

- **ABI**
- Screening test
  - LE injuries with concerns for vascular injury
- Obtain systolic pressure
  - Uninjured upper extremity (Brachial)
  - Injured LE limb (Ankle)
  - BP cuff just proximal to the ankle
  - DP or PT pulse

Evaluation – Physical Exam

- ABI < 0.90
  - Predictable of arterial injury
  - Vascular consult
  - Proceed with arteriogram
- ABI > 0.90
  - Admit for observation
  - Followed with serial noninvasive exam

- Johansen et al J Trauma
  - Injured Extremities
  - ABI
  - Sensitivity = 95%
  - Specificity = 97%
- Mills et al J Trauma 2004
  - Knee dislocation
  - ABI
  - Sensitivity and Specificity = 100%

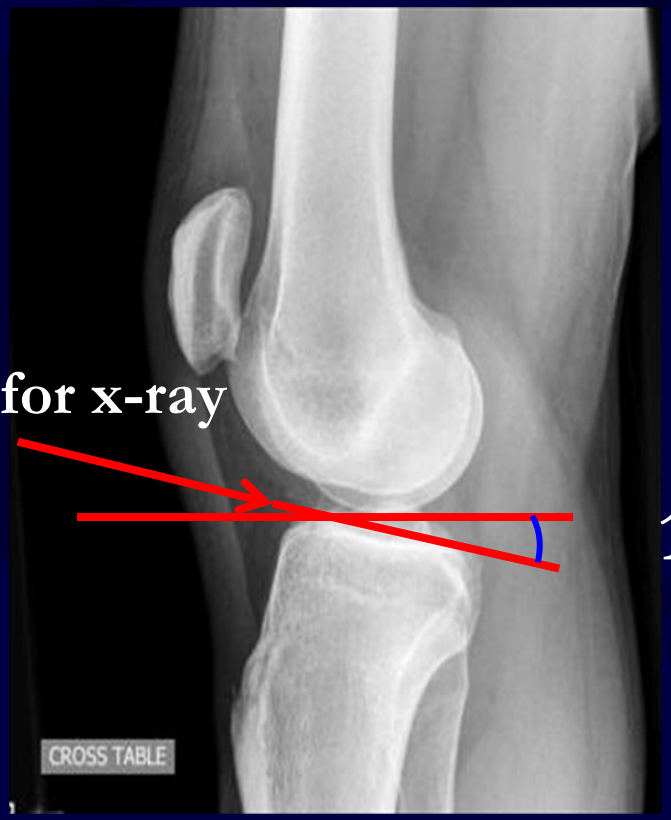
Evaluation - Radiographic

- Plain X-ray knee/tibia
  - AP
  - Lateral

  - Obliques of knee
  - Internal or external rotation

Evaluation - Radiographic

- Tibial plateau view
- Normal tibial slope
  - 10 degrees posteroinferior

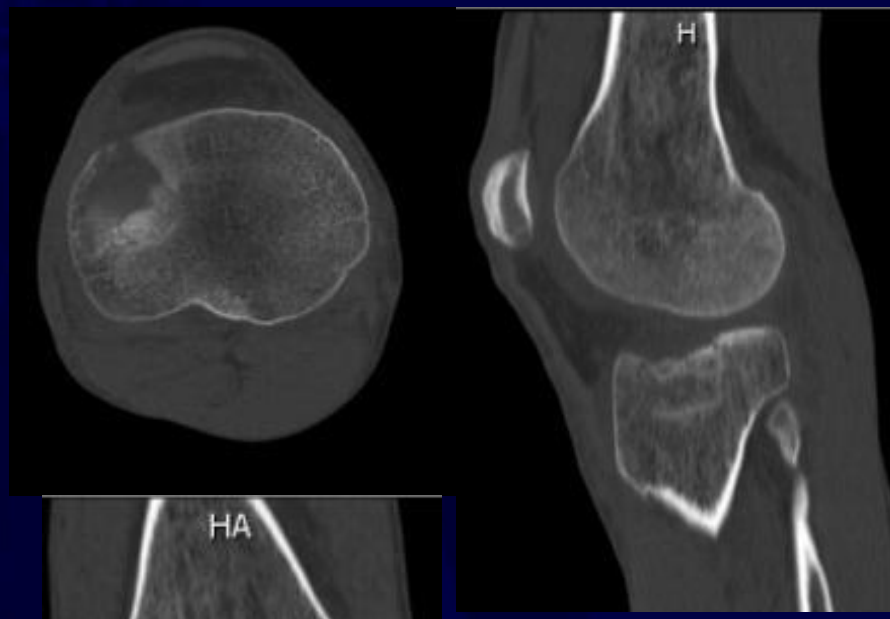


Angle for x-ray

10 degrees

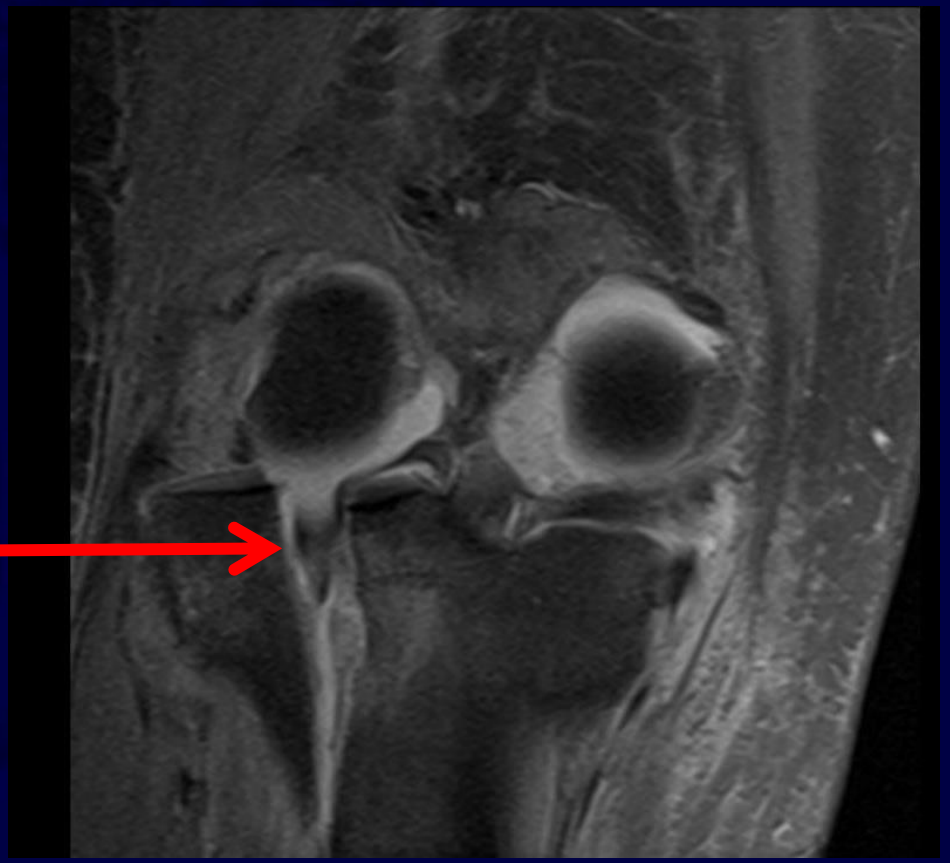
Evaluation - Radiographic

- **CT scan**
  - Surgical consideration exists
  - Complex fractures to assist in surgical planning
  - Assessing
    - Depression
    - Comminution
    - Fracture line (coronal split-medial side with bicondylar plateau)
- Obtain CT <u>after</u> applying traction (ex fix)



Evaluation - Radiographic

- MRI scan?
- Subtle nondisplaced fracture line
- Gardner JOT 2005
- Noted high associated soft tissue injuries
  - Lat. meniscus: 91%
  - Med. Meniscus 44%
  - ACL
  - PCL



Classification

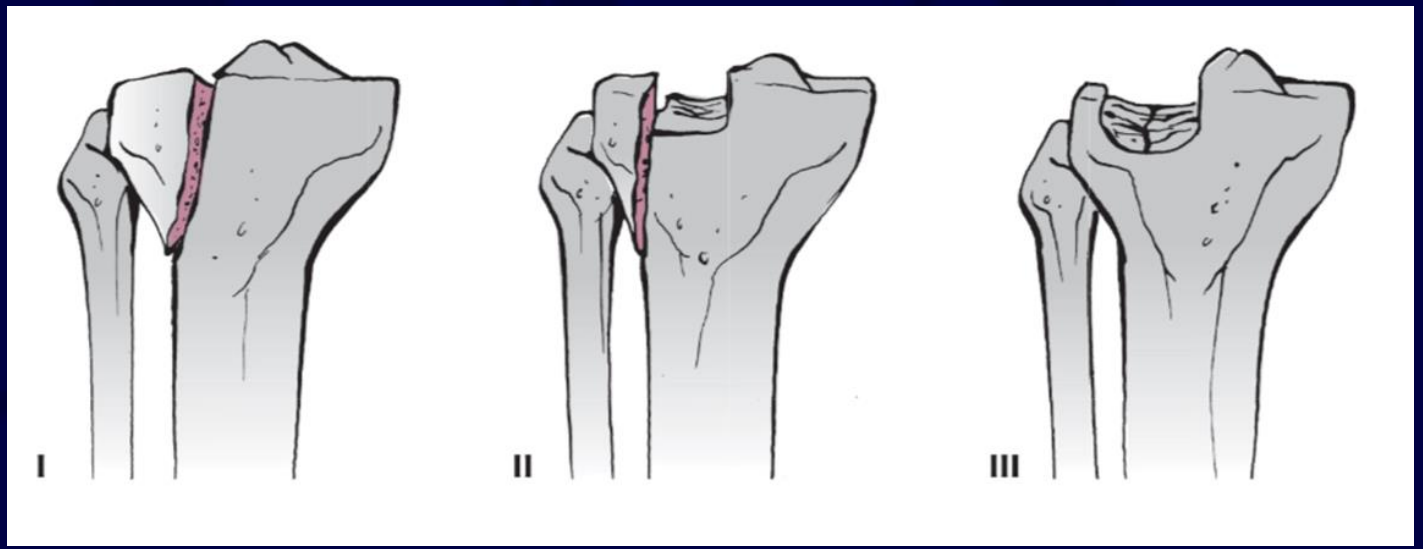
- **Schatzker**
- Type I: Split fracture of the lateral plateau
- Type II: Split depression fracture of the lateral plateau
- Type III: Pure depression fracture of the lateral plateau
- Type IV: Medial plateau (possible fracture / dislocation)
- Type V: Bicondylar plateau fracture
- Type VI: Plateau fracture with metaphyseal / diaphyseal dissociation

Classification

- **AO / OTA** (41- Proximal section)
- Type A: Extraarticular fracture (41-A)
- Type B: Partial articular fracture (41-B)
  - B1: Pure split
  - B2: Pure depression
  - B3: Split depression
- Type C: Complete Articular fracture (41-C)
  - C1: Simple articular, Simple metaphyseal
  - C2: Simple articular, Multi-fragmentary metaphyseal
  - C3: Multifragmentary articular

Classification

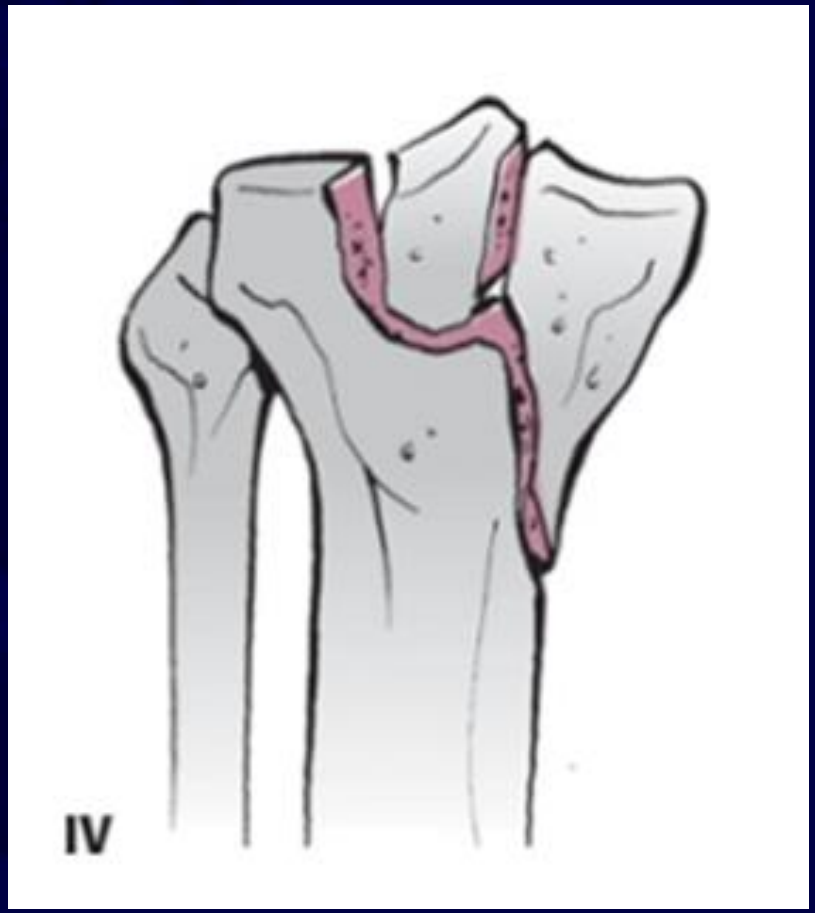
- Unicondylar fracture
- Schatzker I, II, III
- AO/OTA (41-B)
  - Partial articular



Split Split-depression Central depression

Classification

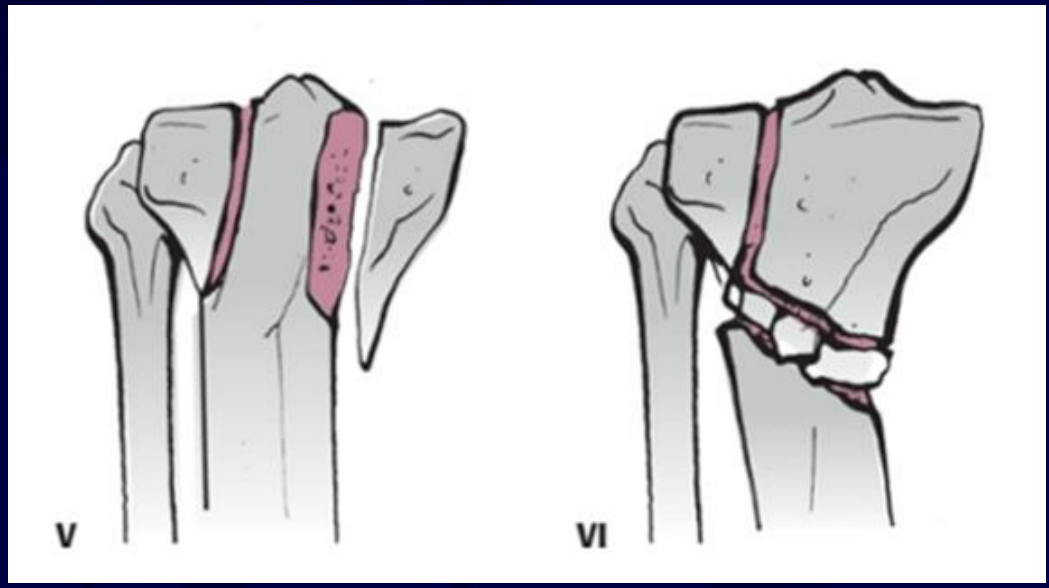
- Unicondylar fracture
- Schatzker IV
- AO/OTA (41-B)
  - Partial articular
  - Medial plateau
  - Fracture / dislocation
  - Displaced, higher energy
  - Vascular injury concern



Split fracture, medial plateau

Classification

- Bicondylar fracture
- Schatzker V, VI
  - V: Medial tibial plateau split and Lateral split depression
  - VI: Plateau with metadiaphyseal dissociation
- AO/OTA (41-C)
  - Complete articular



Bicondylar fracture

Metadiaphyseal dissociation

Treatment Principles

- Soft tissue management
  - Surgical timing is important
  - Wringles in the skin
- Temporary Stabilization
  - Staged protocol
  - Barei et al. JOT 2004
  - Egol et al. JOT 2005

Treatment Principles

- Anatomic reduction of articular surface
  - Obtain and maintain
- Reduce condylar width
- Address meniscal injuries
- Restore mechanical axis
  - metadiaphysis
- Stable fixation
- Early ROM

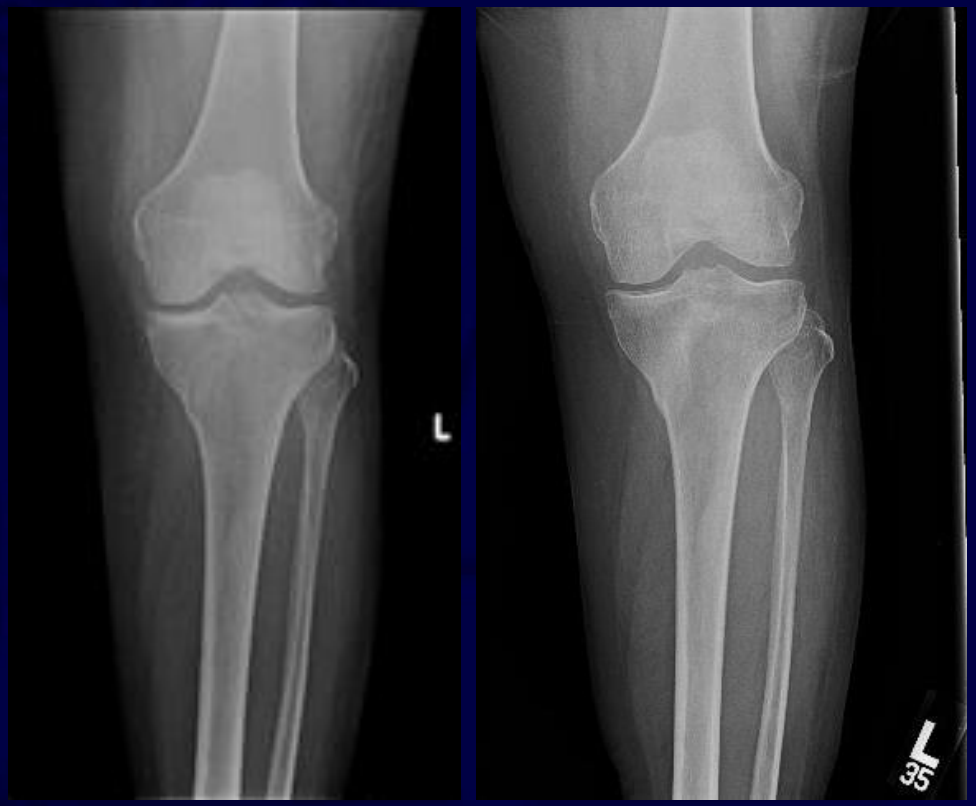
Treatment Options: Nonsurgical

- Patient factors
  - Elderly
  - Nonambulatory
  - Pre-existing arthritis
- Injury factors
  - Articular incongruity
  - <5 mm, elderly, sedentary activity
  - Stable Varus / Valgus stress
    - < 5 -10 degrees instability

71 y/o male, multiple med. comorbidities

Nonsurgical – Technical Pearls

- Immobilize 1-2 weeks
- Knee immobilizer or hinge knee brace
  - Locked in extension
- Start ROM
  - Controlled motion
  - Start 0-30 degrees and advance as tolerated
  - Goal- 90 degrees at 4wks
- NWB 6-8 weeks



Radiographic F/U
Weekly for first 3 weeks

Indications for Surgery

- Absolute indications
- Open tibial plateau
- Associated compartment syndrome
- Associated vascular injury

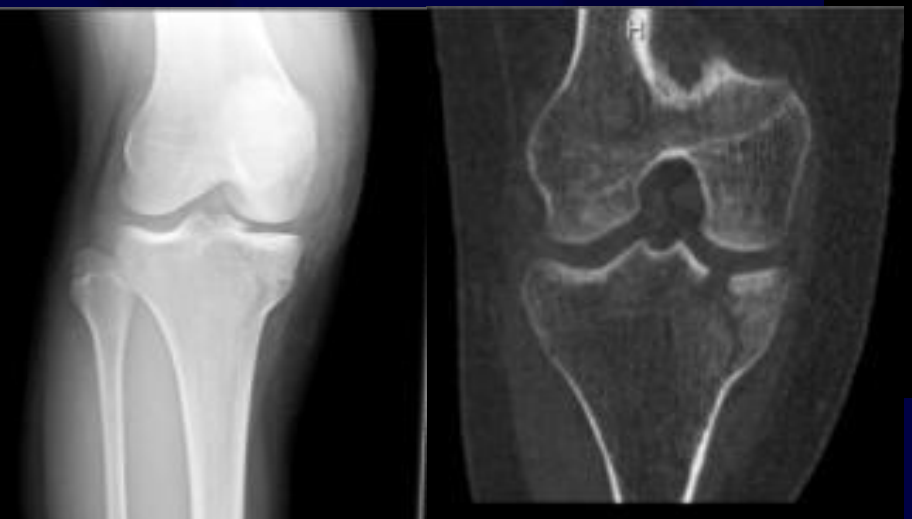
Indications for Surgery

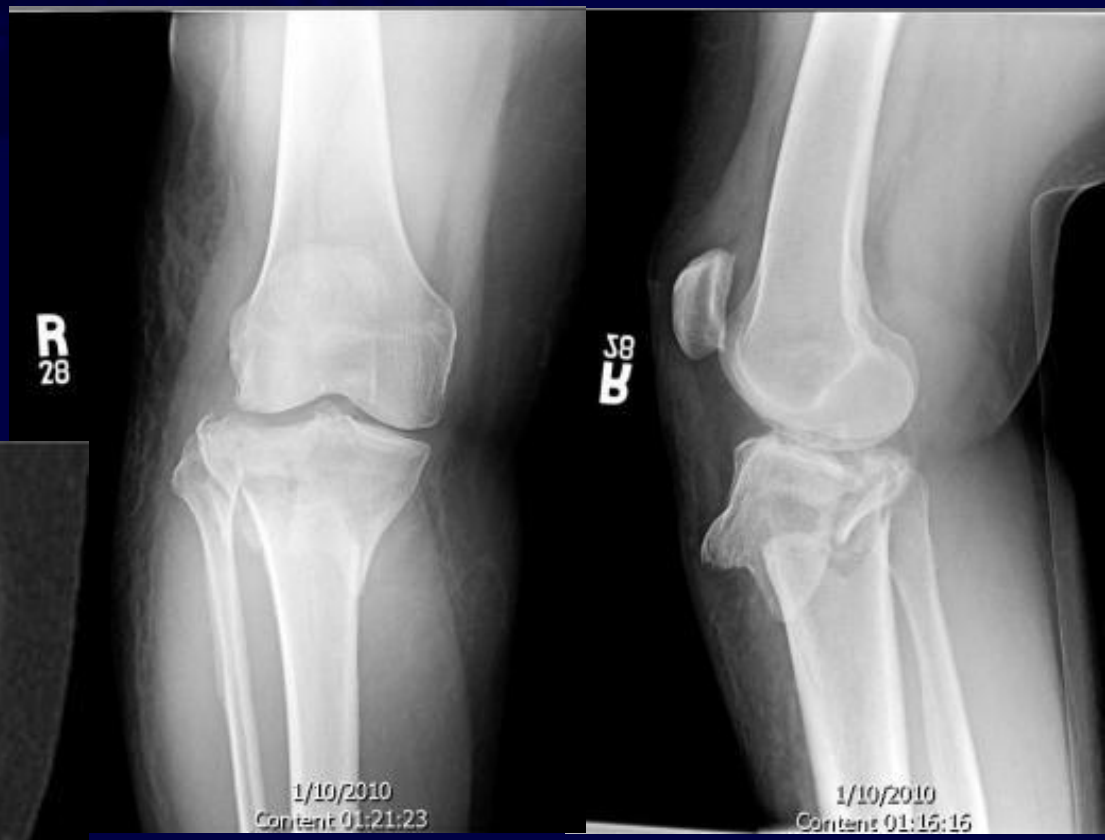
- Relative indications
- Axial malalignment
  - Instability in full extension

- Articular incongruity
  - >3mm in young, active
- Condyle widening

Indications for Surgery

- Displaced bicondylar
- Most if not all medial plateau





Timing of Surgery

Low Energy:
Fixed electively and early

High Energy:
Be patience

Temporary External Fixation

- Knee spanning external fixation
- Ligamentotaxis
- Improve fracture fragment gross alignment
  - Length and alignment
- Minimize further damage to articular surface
- Soft tissue assessment and wound care

Temporary External Fixation

- Candidates for external fixation
- Axially unstable tibial plateau fracture
  - Bicondylar fracture
  - Schatzker type V and VI
- Fracture / Dislocation
  - Schatzker type IV

External Fixation: Patient set up

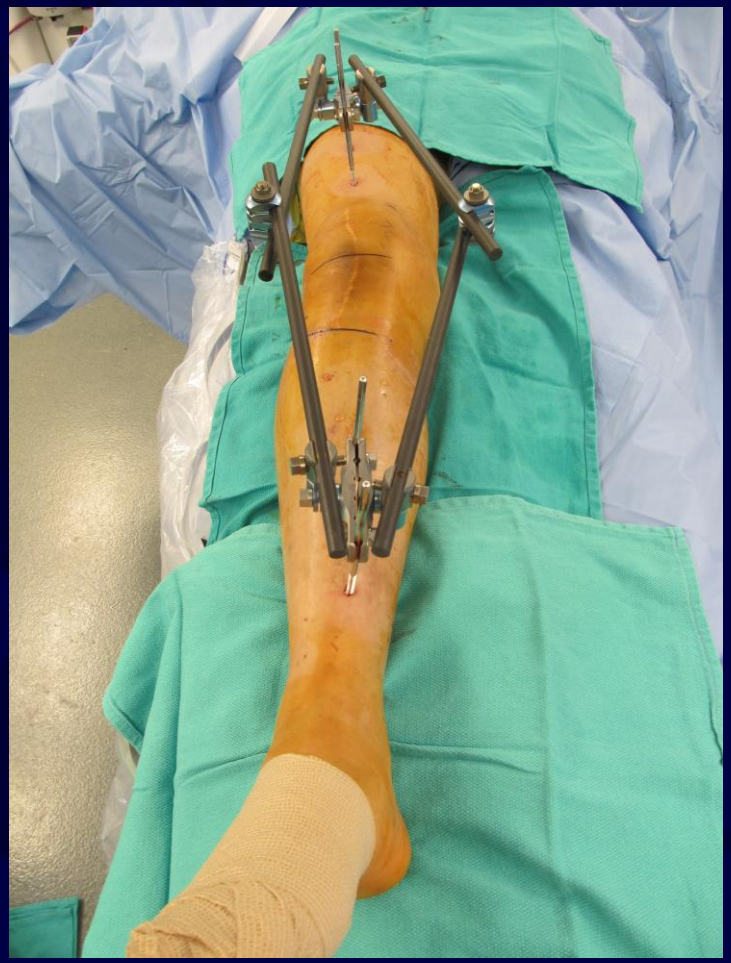
- Supine
- Radiolucent operating table
- C-arm fluoroscope
  - Contralateral side
- Sterile towel bump
  - Allow 5-10 degrees knee flexion
- 2 pins in femur
  - Anterior or lateral
- 2 pins in tibia
  - Antero-medial

Implants – External Fixation

- Large external fixator system
- 5 mm half threaded schanz pins
  - Self drilling
  - Different length available
- Connecting rods and Clamps
- Compressive dressing
  - Ext. fix sponges
  - Retention clip

External Fixation - Pearls

- Mark knee joint and fracture sites
- Schanz pins placement out of zone of future surgical incisions
- Pre-drilling for good bone quality
- Avoid skin tension by pins
- Pin spread to improve construct stability



External Fixation - Pearls

- Placement of metal clamps
  - Away from knee joint and fracture zone
  - Allows better imaging
- Padded prefabricated posterior splint
  - Offload heel
- Compressive dressing
  - Stabilize pin-skin interface
  - Minimize pin-skin motion

Temporary Stabilization-Case Example

- Staged protocol
  - Knee spanning external fixation
  - Restore length, alignment, rotation
- Definitive ORIF 10-21 days
- Wait for soft tissue
- CT scan
- Preop plan

ORIF- Patient Set Up

- Radiolucent operating table
- C- arm fluoroscope
  - Contralateral side of injured limp
  - Exception: Medial plateau- ipsilateral side
- Buttock bump
- Tourniquet
- Extremity positioners
  - Sterile towel bump
  - Leg ramp
  - Radiolucent for imaging

Patient Set Up- Technical Pearls

- IV bag pump- buttock bump
  - Deflated allows easier access to posteromedial tibia

Patient Set Up- Technical Pearls

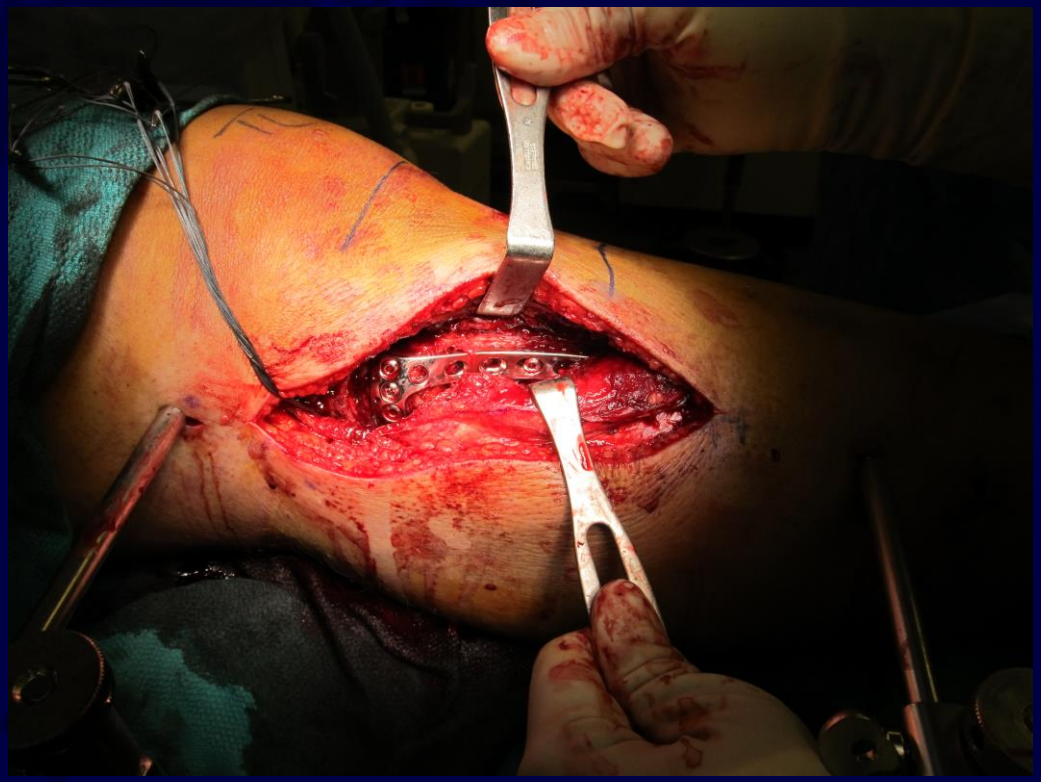
- IV bag pump-buttock bump
  - Inflated allows neutral leg alignment for anterolateral approach

ORIF- Equipment

- Headlamps
- Femoral distractor
- Osteotomes
- Bone tamps
- Fracture reduction instruments
- K-wires

ORIF- Implant options

- Unicondylar fracture
- Conventional non-locking plate
  - "L" or "T" plate
  - Buttress
- Pre-contoured periarticular plates
- Raft screws alone
  - 3.5mm or 4.5mm
- Locking plate
  - Osteoporotic bone

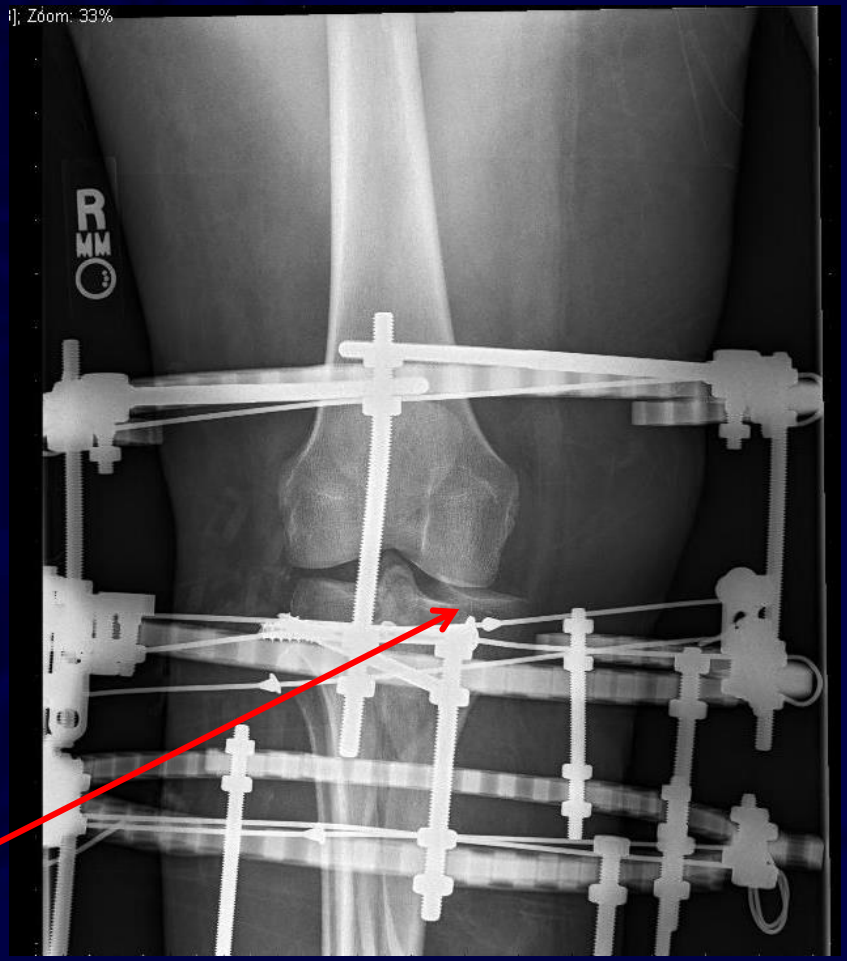


ORIF- Implant Options

- Angular stable (Locking) implants
- Precontour for proximal tibia
- Bicondylar tibia plateau with metadiaphyseal involvement
- Spanning or bridging across fracture zone
- Selected fracture, allows stabilization of medial plateau

External Fixation

- Limited internal fixation
  - Small incisions or percutaneous
- Thin-wire ring fixators
  - Connect to the shaft
  - Fixation distally with 5mm half-pins
- Advantages
  - Minimize soft tissue injury
- Still need to reduce articular surface!!!

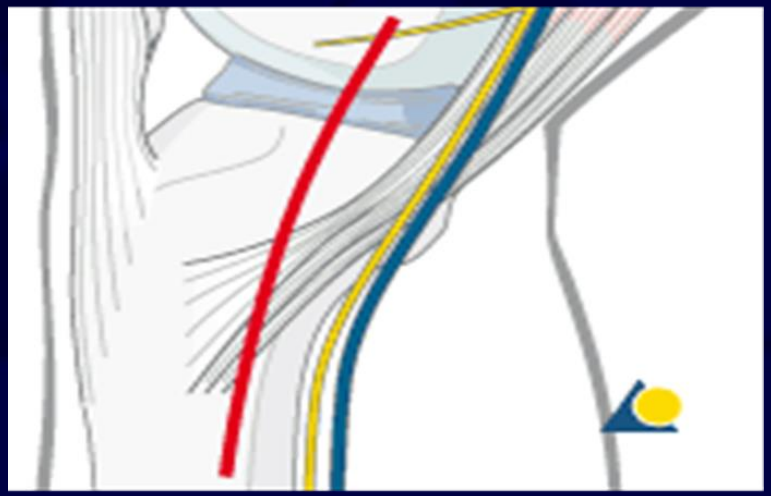


ORIF- Fixation Summary

- Fixation based on fracture type
- Type I, II, III: Buttress plates with raft screws
- Type IV: Medial plate (buttress)
  - Be cognizant of any impaction of lateral joint line
- Type V, VI:
  - Important to understand plate function
  - Pattern dictates fixation
  - Single lateral base fixed angle implant
  - Dual plating (lateral and posteromedial)

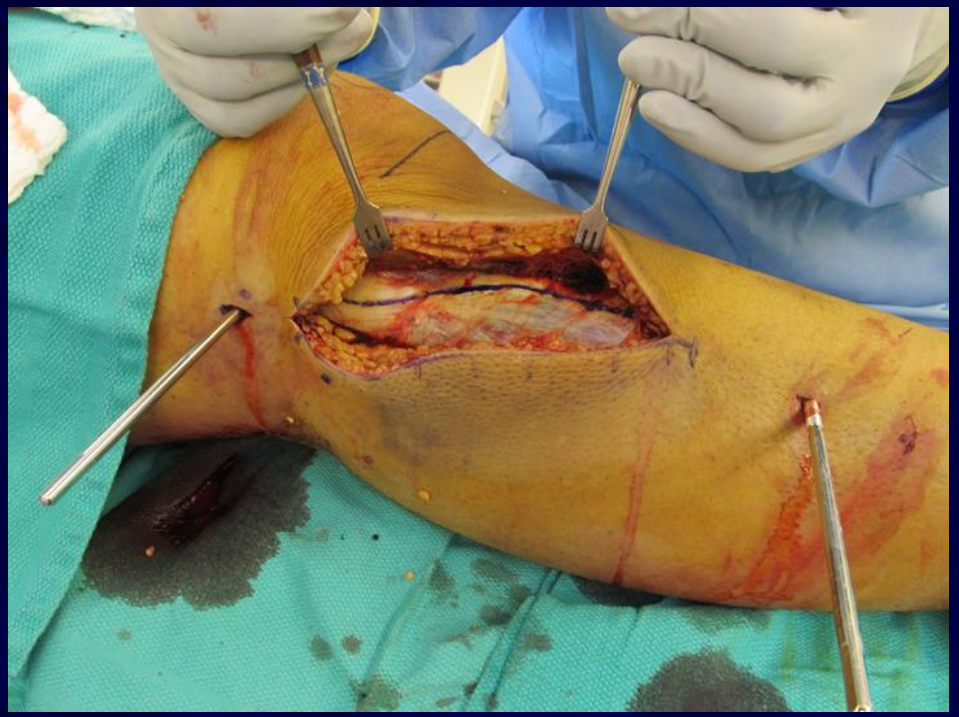
Surgical Approaches

- Anterolateral
  - Lateral plateau involvement
  - Combination with medial for complex plateau
- Posteromedial
  - Medial plateau
  - Coronal split
- Posterior
- Dual approaches
  - Anterolateral
  - Posteromedial



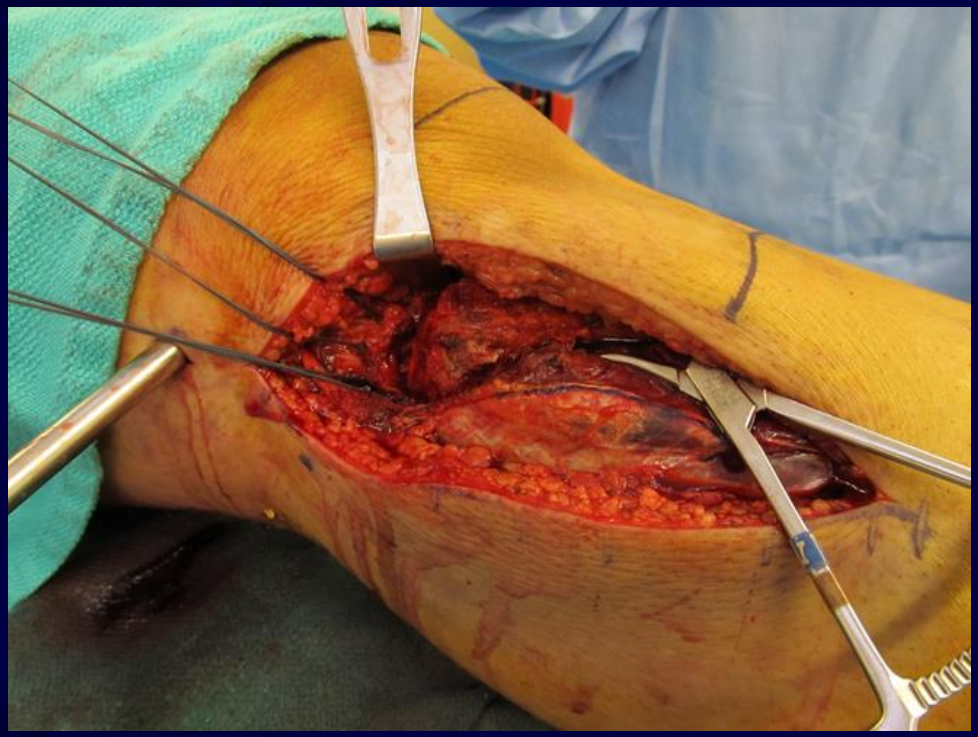
Surgical Approach: Anterolateral

- Most common approach
- Lazy S or Inverted L
- Curvilinear incision centered over Gerdy's tubercle
- Extend distally of the anterior compartment fascia
  - 1 cm off tibial crest
  - Subperiosteal elevate muscle
- Extend proximally midaxial line of knee joint
- Full thickness skin flaps



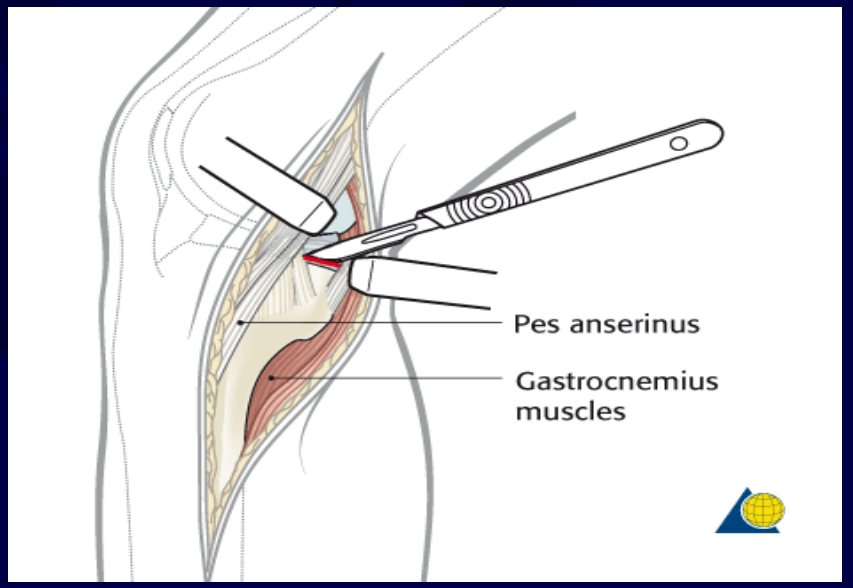
Surgical Approaches: Anterolateral

- Incise and elevate IT band and anterior compartment fascia
- Subperiosteal dissection off lateral tibial crest and not thru compartment muscle
- Submeniscal arthrotomy
- Inspect the meniscus
  - Tag
  - Repair as needed



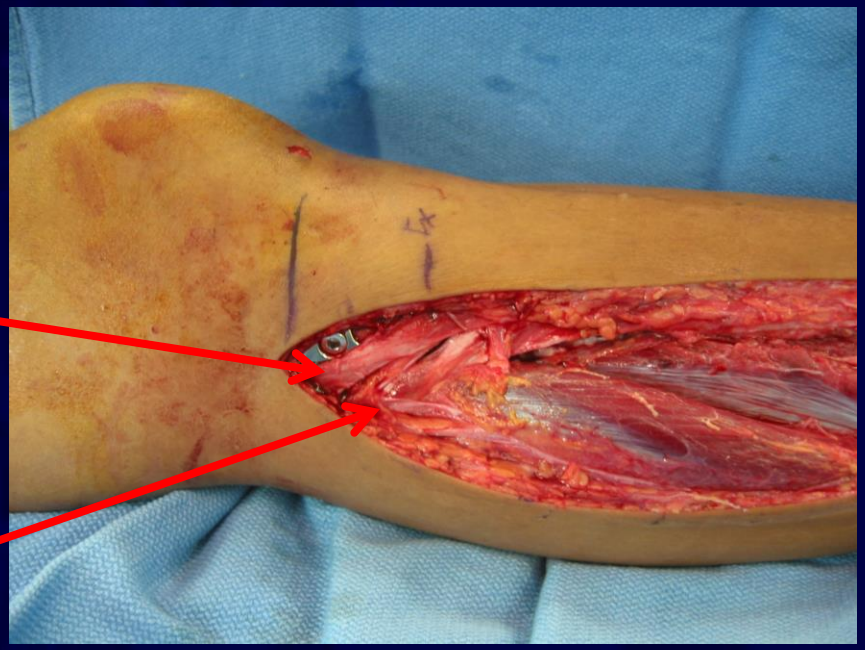
Surgical Approach: Posteromedial

- Straight incision
  - Posterior border of proximal tibia
- Avoid Saphenous nerve and vein
- Interval between Medial head gastrocnemius and hamstrings (Pes anserine tendons)



Surgical Approach: Posteromedial

- Interval between
- Hamstrings (Pes anserine tendons)
- Medial head gastrocnemius



Surgical Approaches: Posteromedial

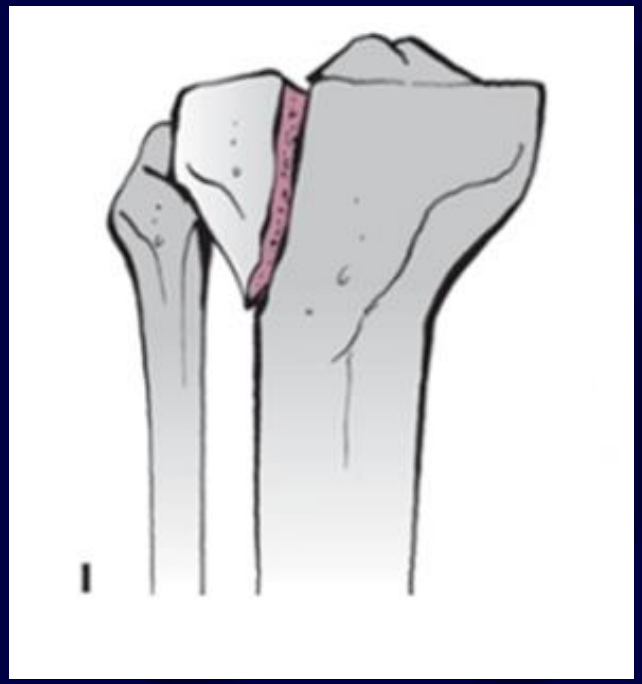
- Pes anserine tendons
  - Retracted
  - Tagged and divided for more exposure
- Posterior to superficial MCL
- Medial gastroc muscle elevated off tibia
- Subperiosteal elevate popliteus and soleus muscles

Surgical Approaches

- Other surgical approaches
- Direct medial or midline parapatellar anterior
  - Isolated medial tibia fractures
- Direct posterior approach
  - Posterior shear fractures
  - Prone
  - Inability to treat anterolateral fracture

Treatment of Specific Schatzker Fractures Types

Schatzker Type I Split

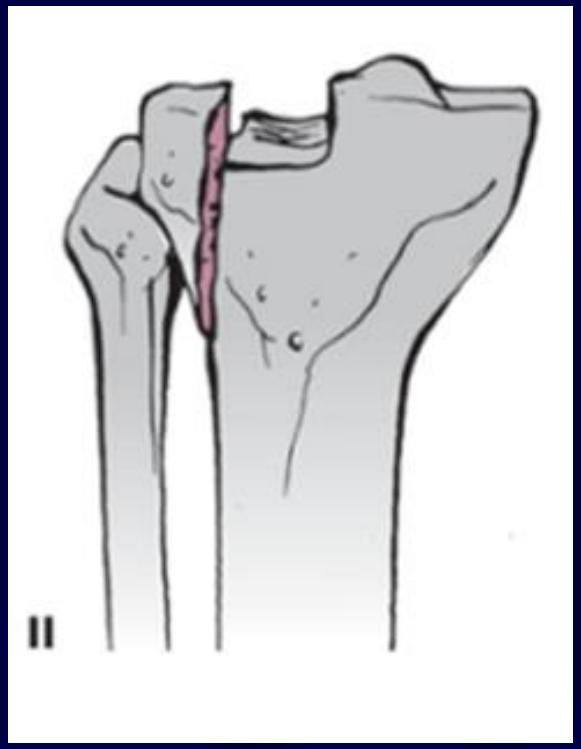


Split

Schatzker Type I Split

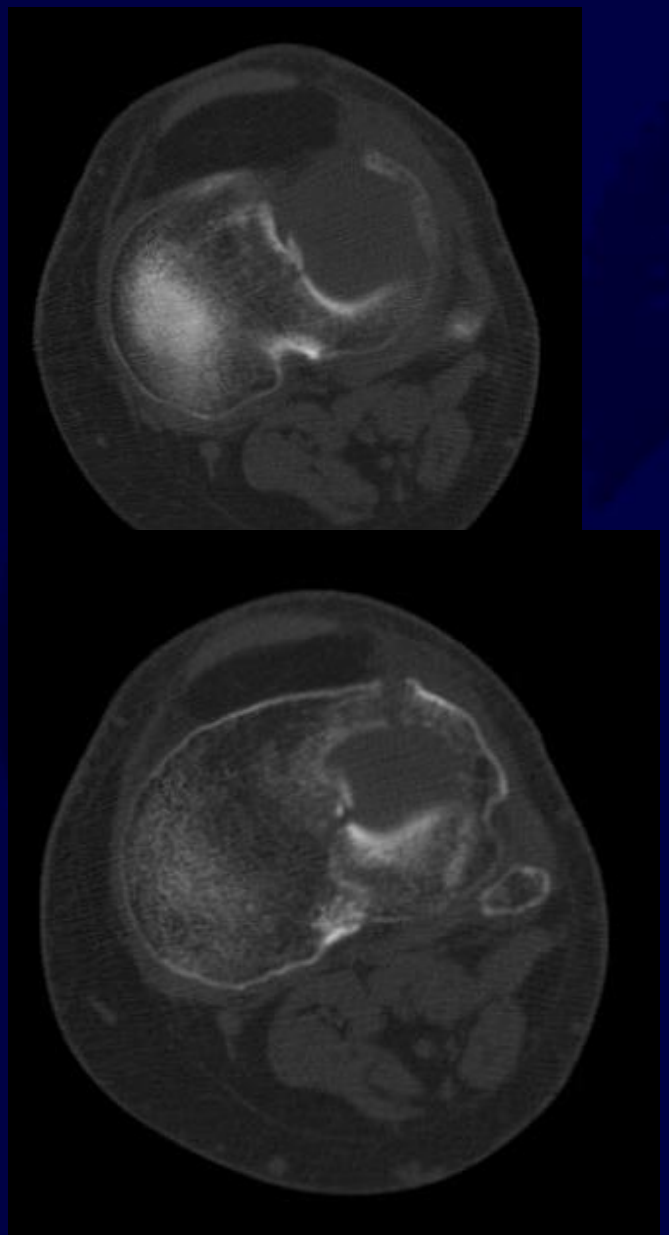
- Goals:
  - Restore articular congruity
    - Articular step off
    - Condylar widening
- Open vs.. percutaneous
- Fixation
  - Lag screws
  - Buttress plate

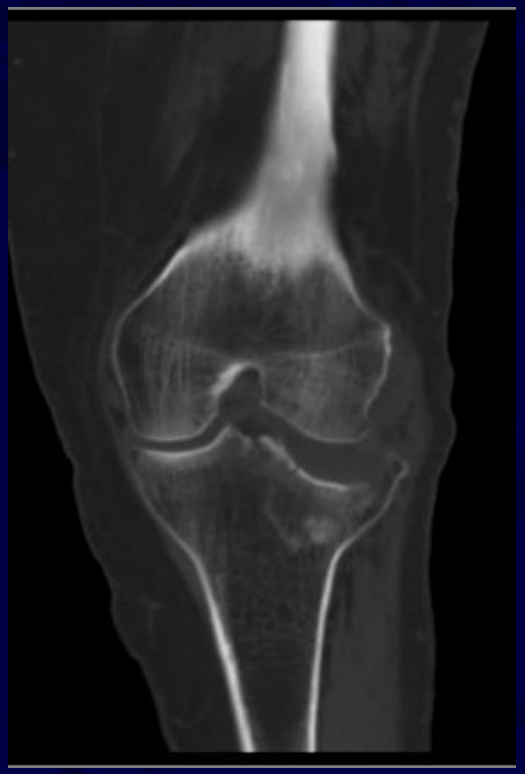
Schatzker Type II Split-Depression

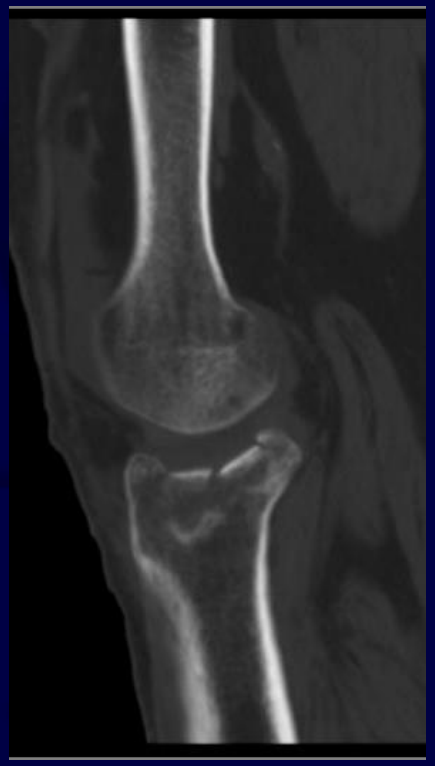


Split-depression

Schatzker Type II Split-Depression





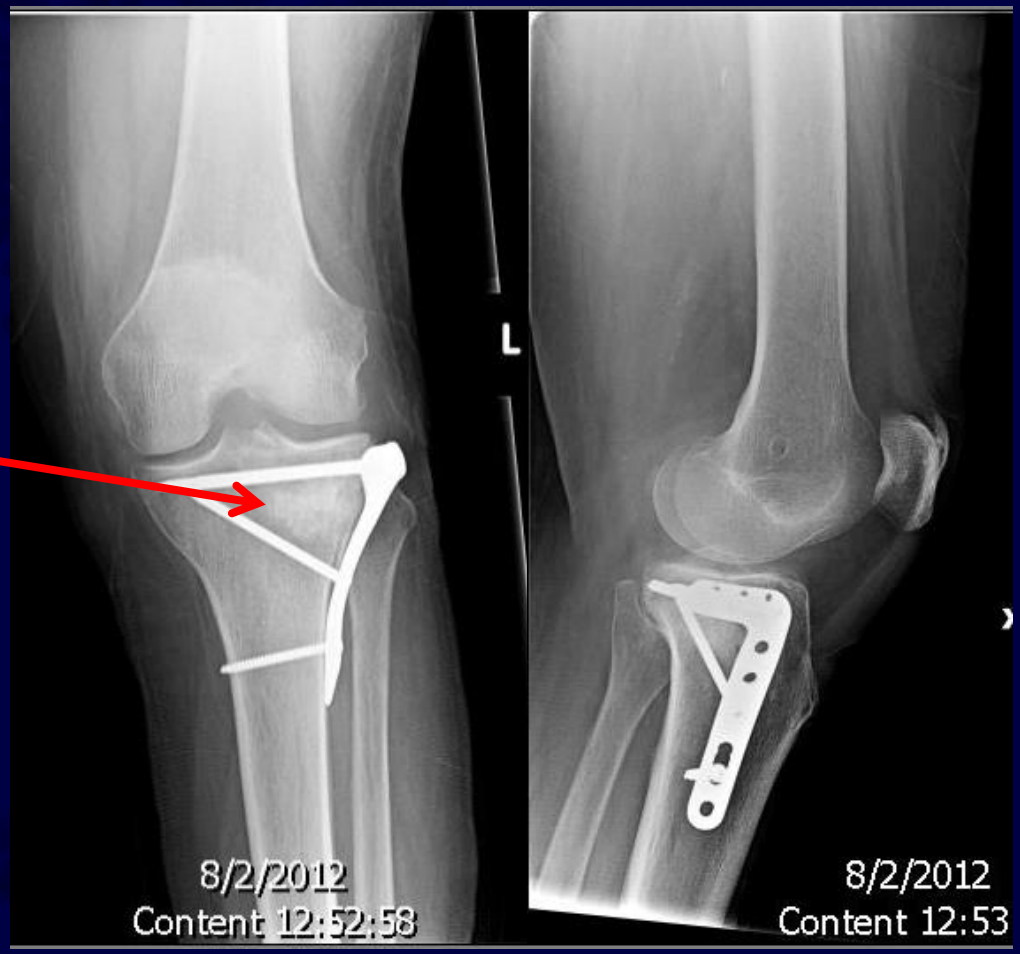


Schatzker Type II Split-Depression: Surgical Tactics

- Submeniscal arthrotomy
- Full visualization of articular surface
- Repair lateral meniscus
- Femoral distractor
- Elevate articular depression
- Reduce condylar widening
  - Large pelvic reduction clamp
- Temporary K-wires

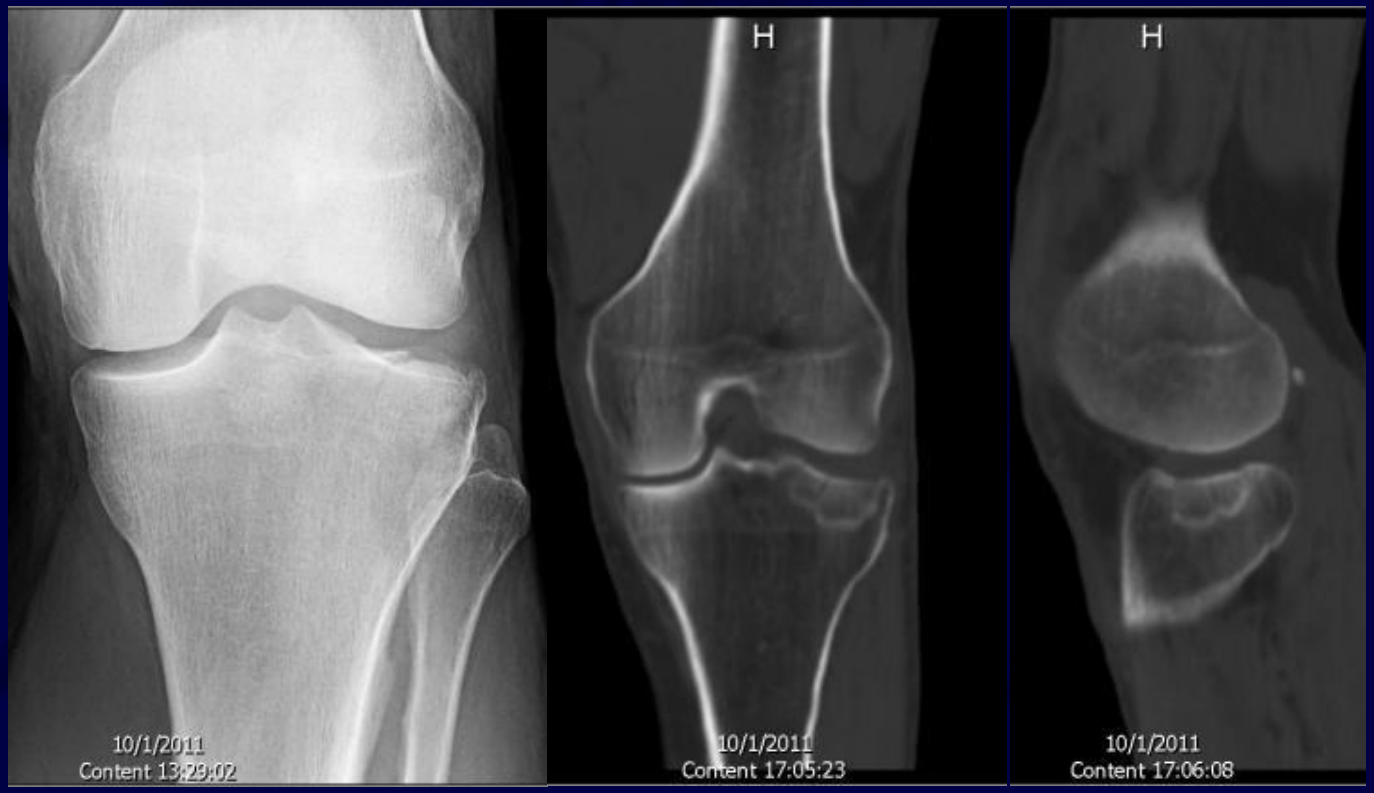
Schatzker Type II Split-Depression

- Fill defect
  - Allograft
  - Autograft
  - Bone substitutes
- Buttress plate
  - Nonlocking: Most
  - Locked: osteoporotic bone
- Subchondral raft screws



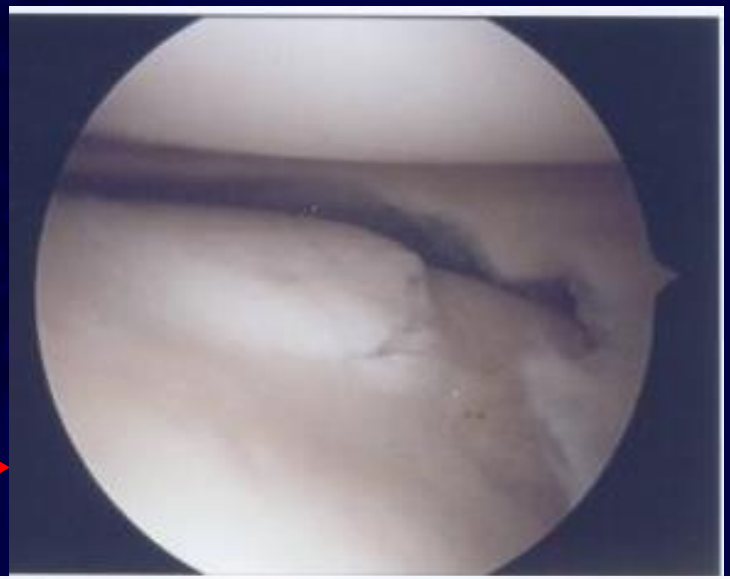
Schatzker Type III Pure Depression

Central depression



Schatzker Type III Pure Depression

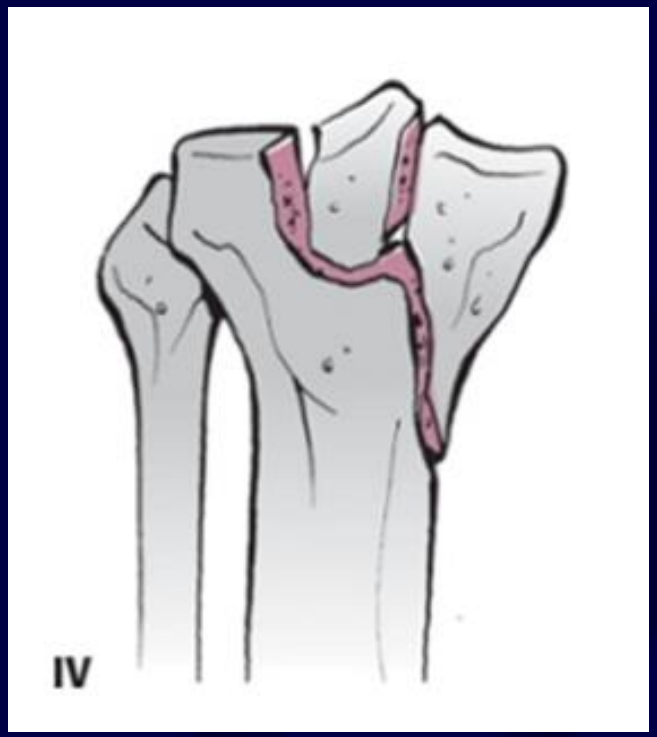
- Surgical technique
  - Open approach
    - Submeniscal
  - Arthroscopic
- Elevate depressed fragment
- Fill defect
- Stabilization
  - Subchondral raft screws



Schatzker Type III Pure Depression

- Surgical technique
  - Submeniscal
  - Arthroscopic
- Elevate depressed fragment
- Fill defect
- Stabilization
  - Subchondral screws

Schatzker Type IV Medial plateau

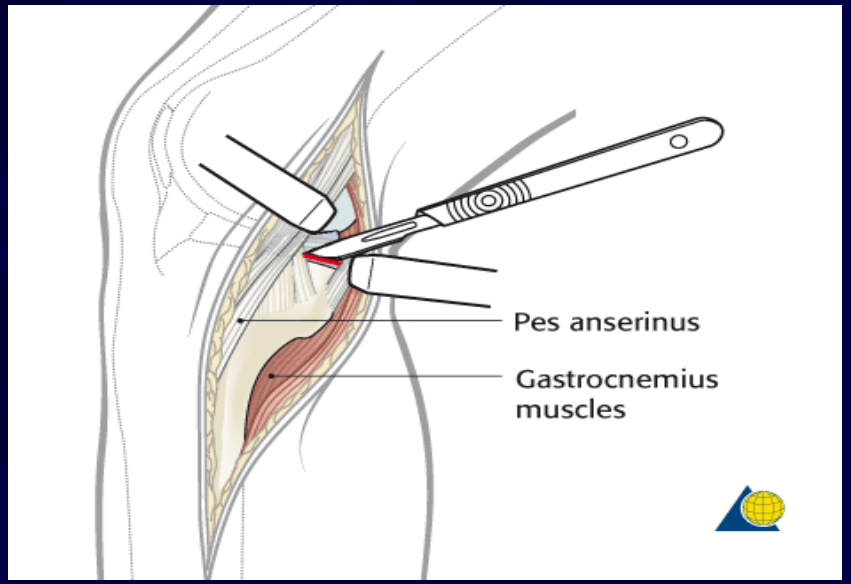


Split fracture,
Medial plateau

CT post ext. fix

Schatzker Type IV Medial plateau

- Surgical approach
- Posteromedial
  - Interval between
  - Pes anserine tendons and Medial head gastrocnemius



Schatzker Type IV Medial plateau

- Don't forget about possible lateral plateau depression
  - Bone tamp to elevate
  - May need anterolateral incision to reduce depression

Schatzker Type IV Medial plateau

- Fixation
  - Straight medial plating
  - Posteromedial plating
  - Combination

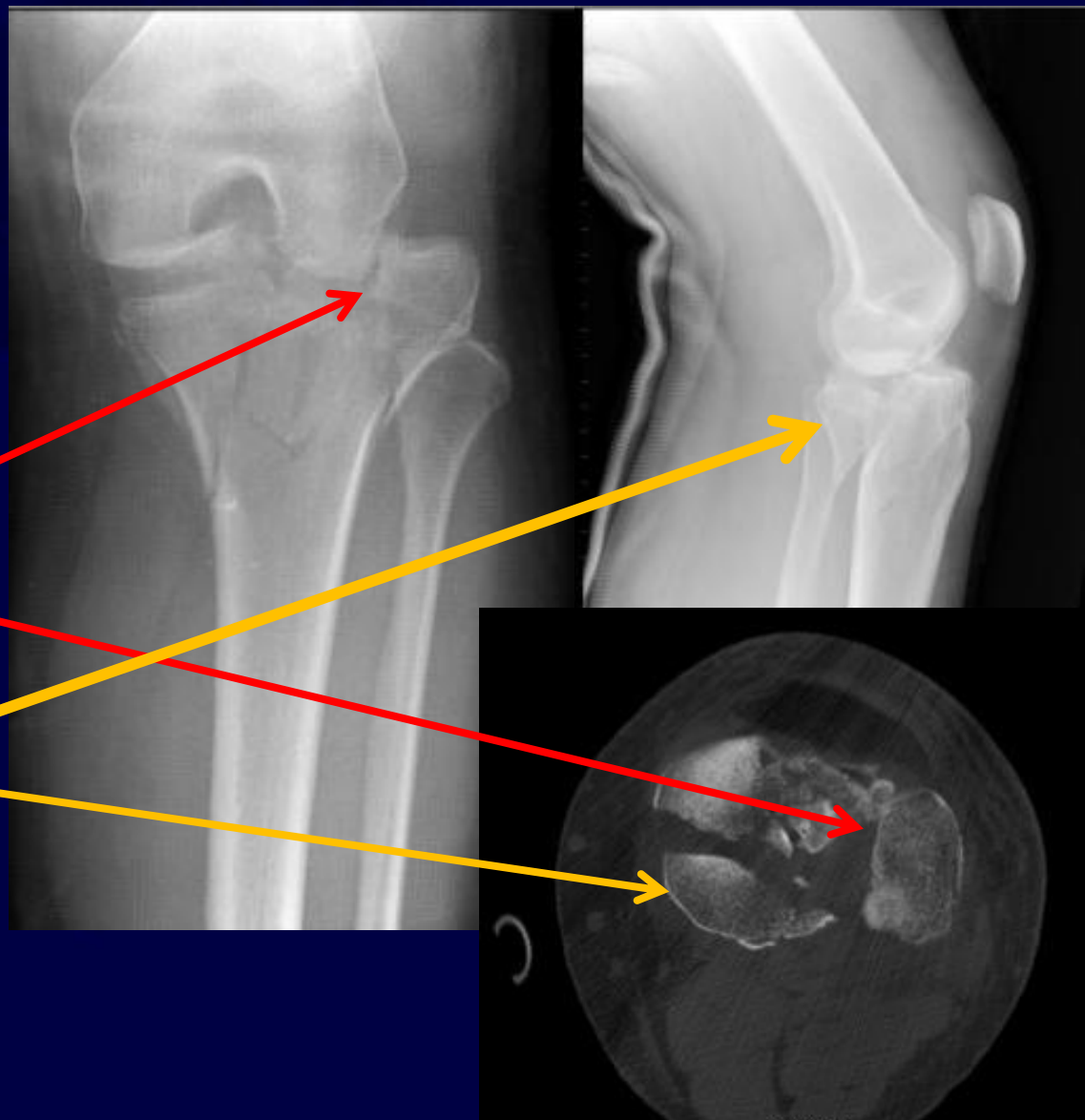
Schatzker Type V, VI Bicondylar

Bicondylar fracture

Metadiaphyseal dissociation

Classic Fracture Pattern

- Bicondylar Fxs
  - 2 classic components:
  - Lateral split depression
  - Posteromedial / coronal split

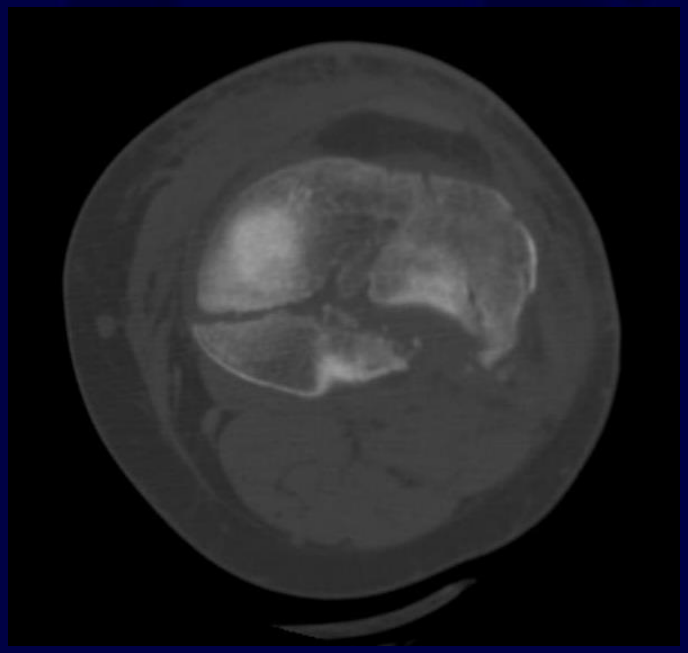


Schatzker Type V, VI Bicondylar

- Preop plan is important
- Review x-rays and CT scan
- Identify all fractures

Schatzker Type V, VI Bicondylar

- Preop plan is important
- Review x-rays and CT scan
- Identify all fractures



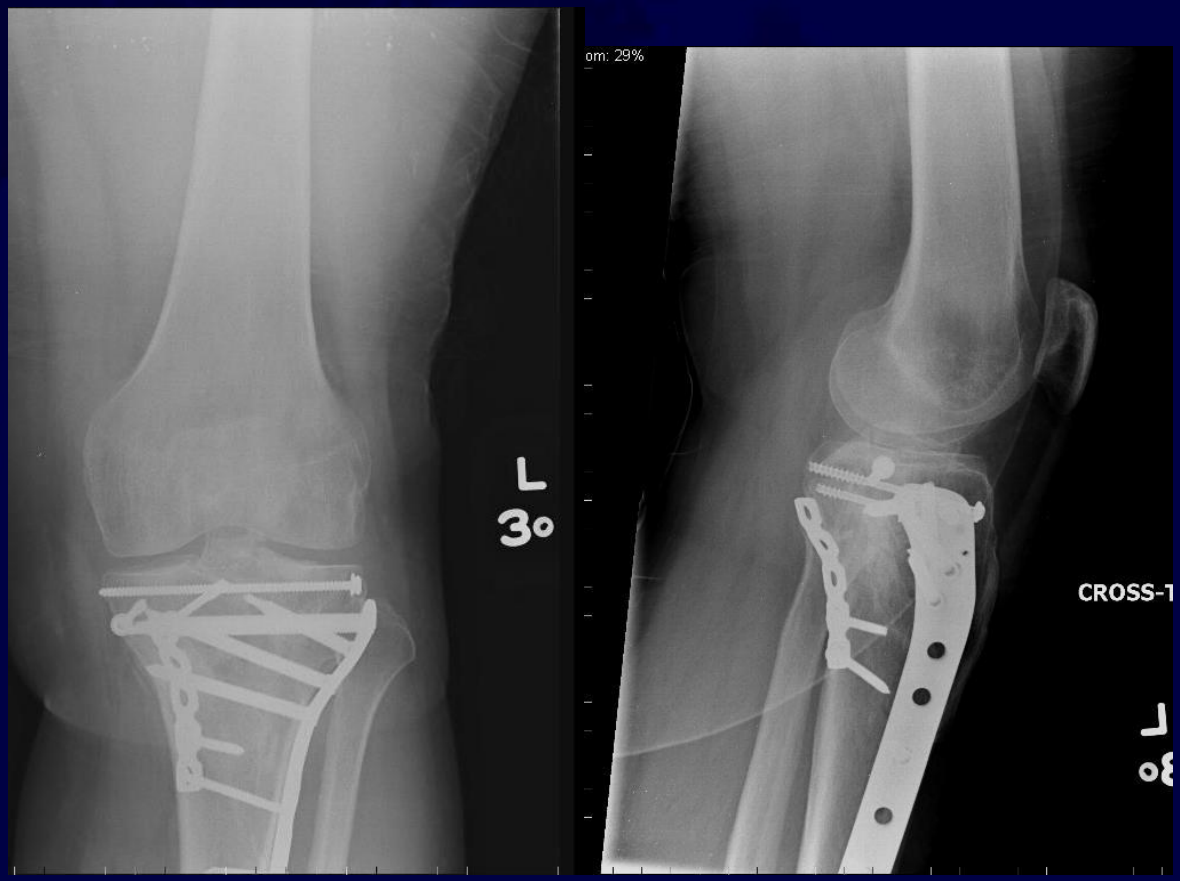
Schatzker Type V, VI Bicondylar

- Dual incisions
- Reduce medial plateau
  - K-wires
  - Antiglide plate
- Reduce lateral plateau

  Tamp up depression
- Restore condylar width
  - Large king tong clamp
- Connect articular block to diaphysis

Schatzker Type V, VI Bicondylar

- Maintain reduction
  - Dual plating



Schatzker Type V, VI Bicondylar

- Restore mechanical axis
- Cannot accurately assess with fluoro
- Often need intraoperative plain films

Schatzker V, VI Bicondylar

- Single lateral fixed angle implant
  - Ability to capture medial condyle with laterally based implant
  - Medial apex cortical contact with minimal comminution

Rehabilitation

- Postoperative Care
- Antibiotic x 24 hours
- +/- drain
- Knee brace
  - For comfort until able to do straight leg raise (SLR)
  - Associated ligamentous injuries
- Elevate leg
- NWB 10-12 weeks

Rehabilitation

- Physical therapy
- Early ROM
- CPM
- Strengthening
  - Isometric quad sets
  - Heel slides
  - SLR
- Gait training
  - Crutches
  - D/c crutches when able to walk without limp and pain

Complications

- Infection
  - Surgery timing is important
  - Careful soft tissue handling
  - Prolong operative time
- Nonunion
  - Aseptic
    - Metadiaphyseal junction
  - Septic
  - Opened fracture

Aseptic Nonunion

Revised with ICBG

Complications

- Contractures
  - Arthrofibrosis
  - Encourage early ROM and physical therapy
  - May require knee manipulation
  - Arthroscopic lysis of adhesion
- Post Traumatic Osteoarthritis

4 yr.. F/U

Outcomes

- Lansinger et al. JBJS Am 1986
- 102 fractures, 20 yr.. F/U
- 90% excellent or good results
  - Despite some incongruity
- 10% fair or poor
  - > 10mm depression persisted
- Conclusion
  - Instability (lateral or medial with knee extended)
  - Should be operative

Outcomes

- Honkonen JOT 1995
- 131 fx, 7.6 yr. mean F/U
- 76 operative, 55 nonoperative
- Risk factors for post-traumatic arthritis
  - Increase age
  - Removal of meniscus
  - Articular incongruity
  - Instability
  - Malalignment

Outcomes

- Stannard et al. JOT 2004
- 34 AO/OTA type 41C
- Mean F/U 21 mo.
- LISS implant
- All healed, mean 15.6 weeks
  - 1/34 malalignment, 0 deep infection, 2 superficial
- 18% implant related pain
  - Careful attention to detail can decrease painful HW

Outcomes

- Barei et al. JBJS Am 2006
- Retrospective
- Eval dual incisions and dual plating
- 83 AO/OTA Type 41C3
- Mean F/U 59 mo.
- Correlated with outcomes
  - Age, polytrauma, articular reduction
- Residual dysfunction is common

Outcomes

- Rademakers et al JOT 2007
- 109 fractures, Long-term F/U (5-27 yr.)
- 69% unicondylar, 31% bicondylar
- Mean ROM 135 degrees
- Functional results (Neer, HSS knee scores)
  - Unicondylar had better results vs.. bicondylar
- 31% post-traumatic arthritis, most are tolerable
- Malalignment > 5 degrees correlated with increased DJD
- No differences with patient's age

Outcomes

- Canadian Orthopaedic Trauma Society JBJS Am 2006
- Level I evidence PRCT
- ORIF vs. Circular fixator
- Displaced Bicondylar (AO/OTA type 41 C1-3)
- 2 yr. F/U, similar results
  - Quality of reduction
  - Residual limb-specific and general health deficits
- Circulator fixator
  - Less EBL, less inpatient hospital stay
- ORIF with higher complication rate

Outcomes

- Katsenis et al. JOT 2009
- Limited internal fixation and circular fixation
- Retrospective, 3 and 5 yr. F/U
- Knee function and Post-traumatic arthritis
- 129 fx
- Excellent or good
  - 82% at 3 yr.. 78% at 5 yr..
- High incidence of post-traumatic arthritis at 5yr
  - Functional results still satisfactory

References

- Barei DP. *J Bone Joint Surg Am* 2006;88(8):1713-1721.
- Barei DP. *J Orthop Trauma* 2004;18(10):649-657.
- Barei DP. *J Orthop Trauma* 2008;22(3):176-182.
- Canadian Orthopaedic Trauma Society. *J Bone Joint Surg Am* 2006;88(12):2613-2623.
- Egol KA. *J Orthop Trauma* 2005;19(7):448-455.
- Gardner MJ. *J Orthop Trauma* 2005;19(2)79-84.
- Gardner MJ. *J Trauma* 2006;60(2):319-323.
- Higgins TF. *J Orthop Trauma* 2007;21(5):301-306.
- Higgins TF. *J Orthop Trauma* 2009;23(1):45-51.
- Honkonen SE. *J Orthop Trauma* 1995;9(4):273-277.
- Honkonen SE. *Clin Orthop Relat Res* 1994;302:199-205.
- Johansen K. *J Trauma* 1991;31(4)515-519.

References

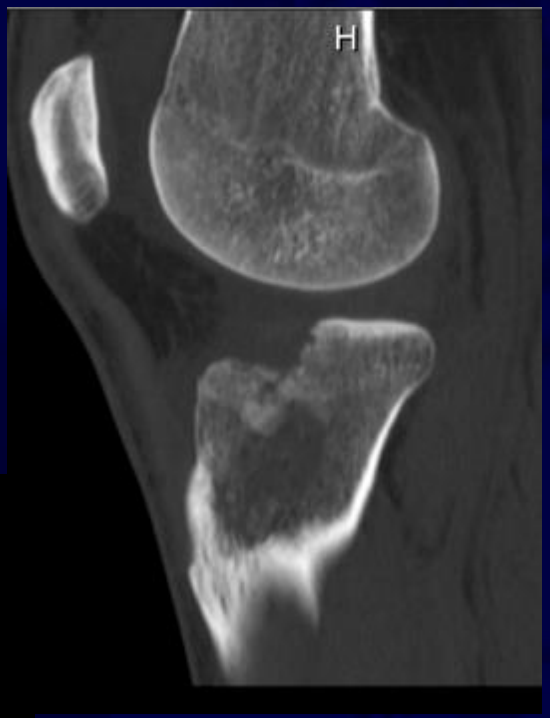
- Katsenis D. *J Orthop Trauma* 2009;23(7):493-501.
- Lansinger O. *J Bone Joint Surg Am* 1986;68(1):13-19.
- Rademakers M.V. *J Orthop Trauma* 2007;21(1):5-10).
- Schatzker J. *Clin Orthop Relat Res* 1979;138:94-104.
- Stevens DG. *J Orthop Trauma* 2001;15(5):312-320.
- Weigel DP. *J Bone Joint Surg Am* 2002;84(9):1541-1551.
- The Schatzker Classification Figure 55-9. Court-Brown C, Heckman JD, McKee M, et al. Rockwood and Green's Fractures in Adults Philadelphia: Lippincott Williams & Wilkins, 2014.
- Hansen, Matthias; Pesantez, Rodrigo. AO Surgery Reference: Online reference in clinical life.

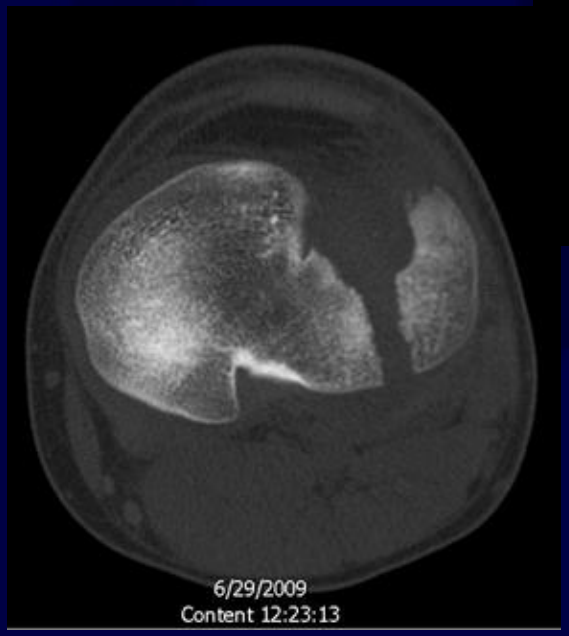
Selected Cases

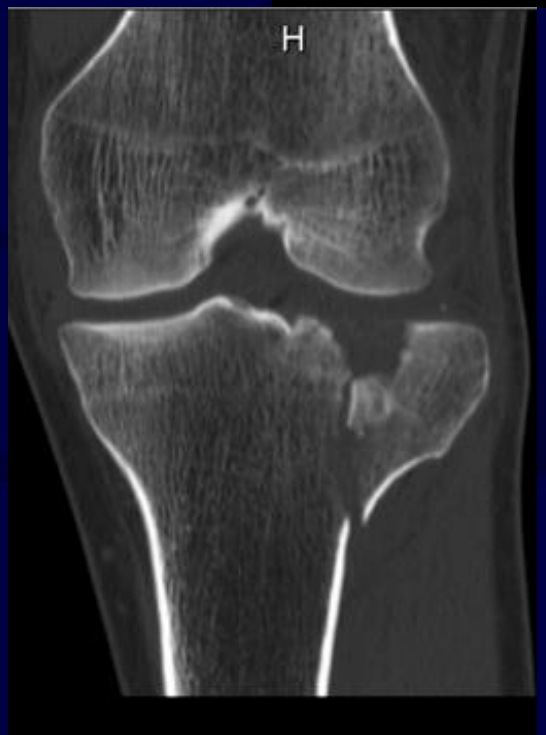
- Schatzker II

Selected Cases

- Schatzker II







Selected Cases

- Schatzker II
- ORIF
- Buttress plate
- Raft screws

Selected Cases

Bicondylar with metadiaphyseal fracture

Selected Cases

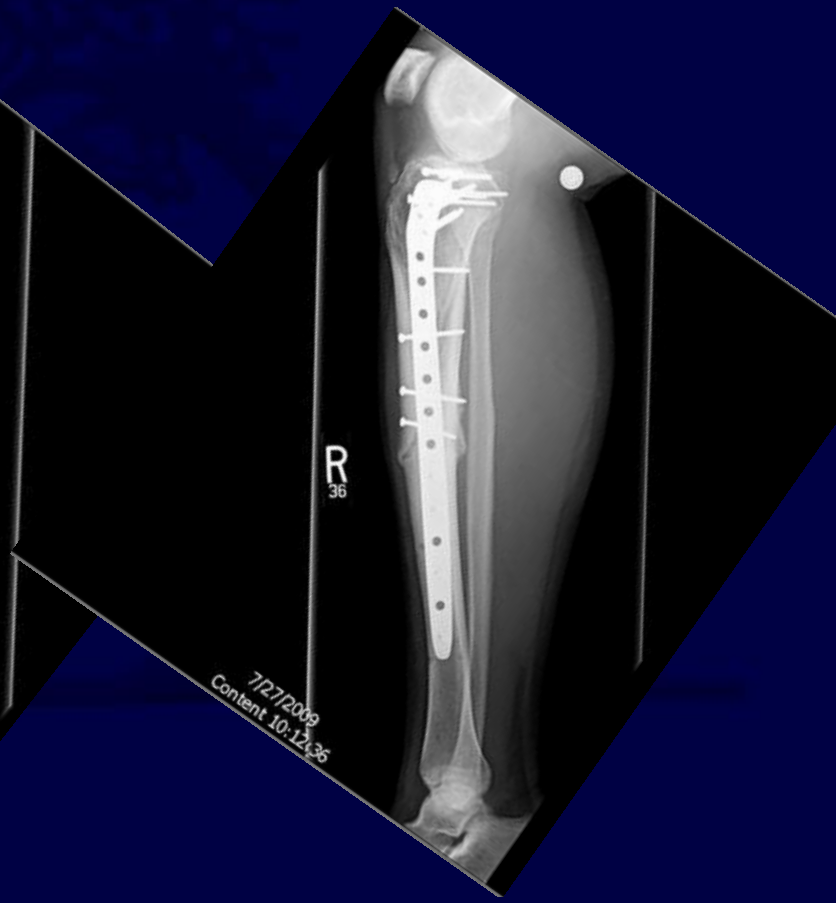
Bicondylar with metadiaphyseal fracture

- Ext Fix

Selected Cases

Bicondylar with metadiaphyseal fracture

- ORIF



Selected Cases

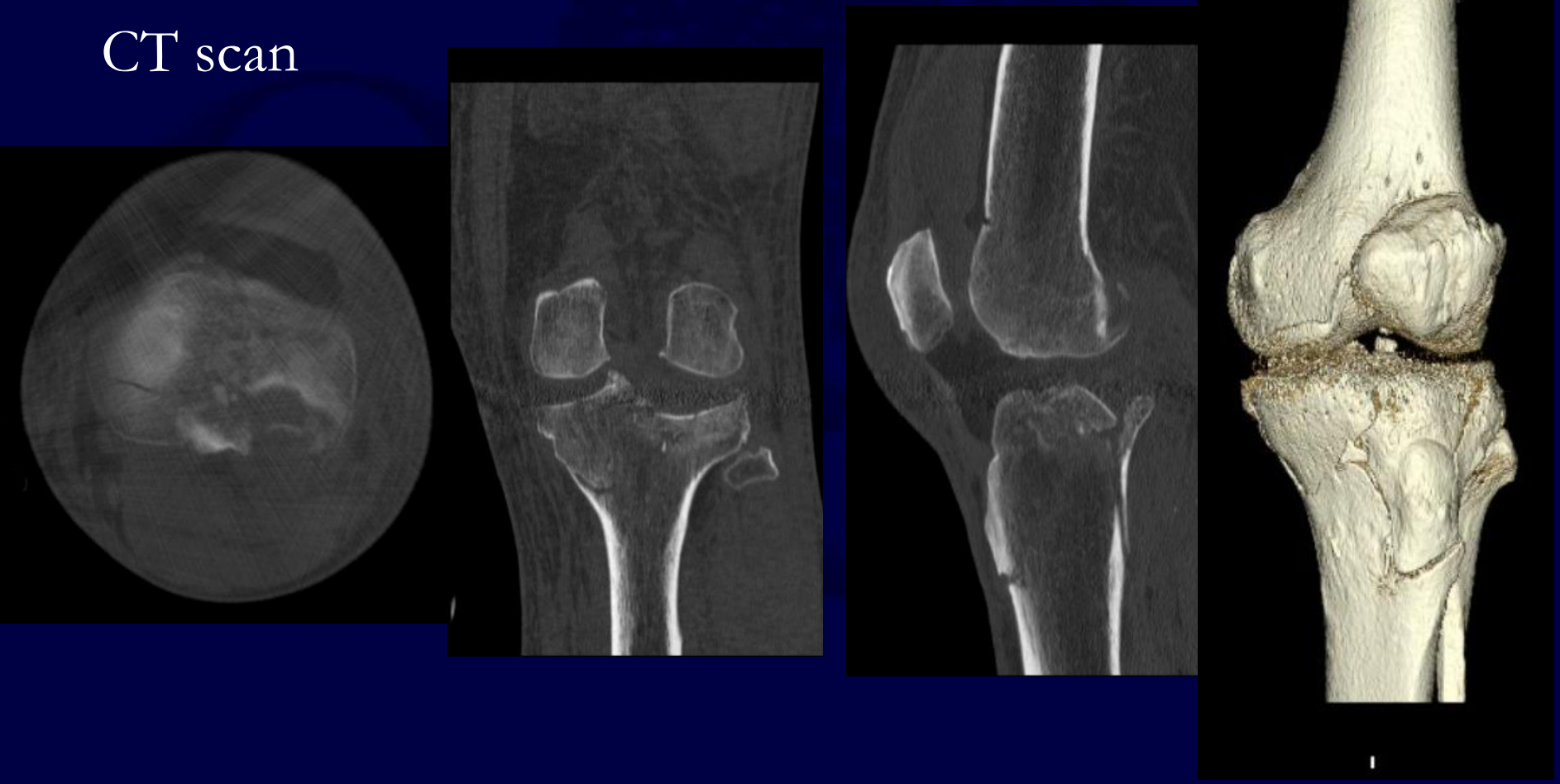
Bicondylar with tibial tuberosity fracture

- Must address tuberosity
  - Allow early ROM
- Options for tuberosity fixation
  - Lag screws
  - Plates/screws

Selected Cases

Bicondylar with tibial tuberosity fracture

CT scan



Selected Cases

Bicondylar with tibial tuberosity fracture

- ORIF
- Posteromedial approach
  - 3.5mm recon plate
  - Buttress
- Anterolateral approach
  - Precontour plate
- ORIF tuberosity
  - Percutaneous
  - Lag screws

Selected Cases

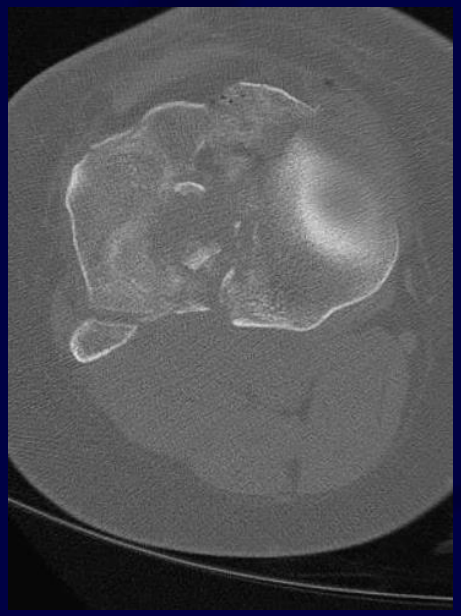
Bicondylar with tibial tuberosity fracture

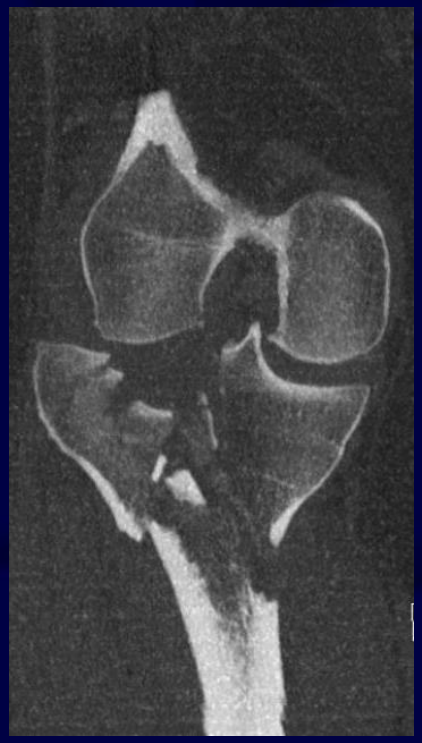
Temporary Ext. Fix

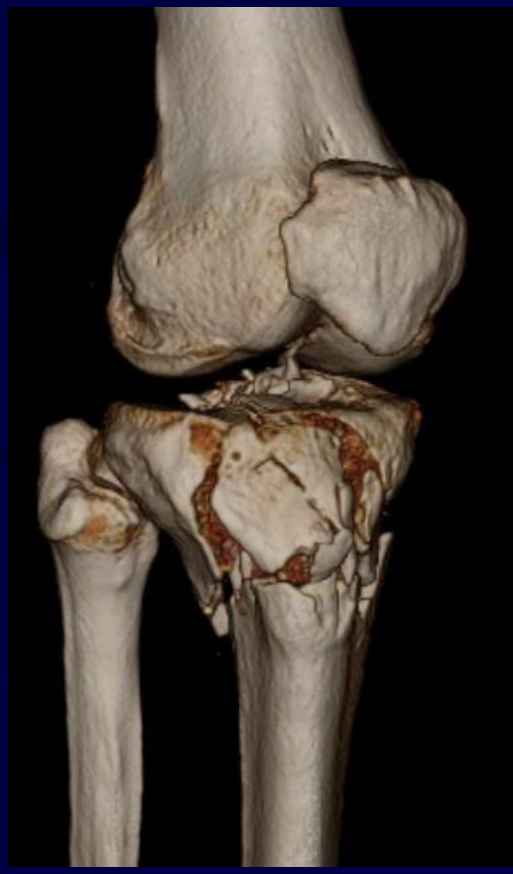
Selected Cases

Bicondylar with tibial tuberosity fracture

CT scan



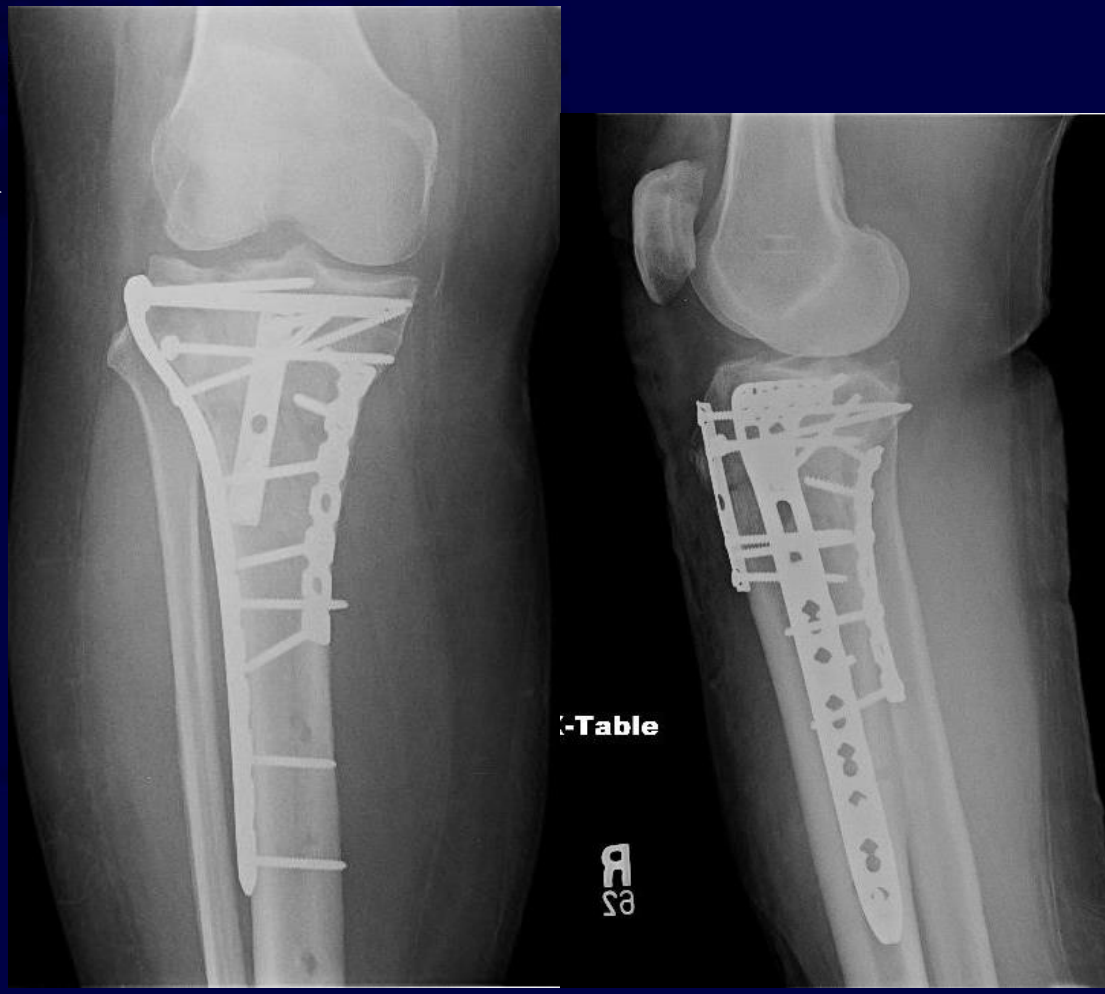




Selected Cases

Bicondylar with tibial tuberosity fracture

- ORIF
- Posteromedial approach
  - 3.5mm recon plate
  - Buttress
- Anterolateral approach
  - Precontour plate
- ORIF tuberosity
  - 1/3 tubular plate



Summary: Tibial Plateau Fractures

- Understand the fracture pattern
- Respect the soft tissues
- Partial articular (Schatzker 1-3)
  - Buttress: plates and/or interfragmentary screws
- Beware of medial plateau (Schatzker 4)
- Complete articular (Schatzker 5,6)
  - External fixation
  - Preop plan
  - ORIF
    - Obtain and maintain

THE OHIO STATE UNIVERSITY
WEXNER MEDICAL CENTER

THANK YOU