

**ORTHOPAEDIC
— TRAUMA —
ASSOCIATION**

Tibial Plateau Fractures

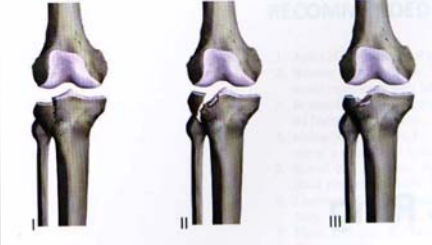
Resident Comprehensive Fracture Course



Objectives

- Identify and Classify the fractures
- Treatment Algorithm
 - Why, How, When to treat...
- Understand predictors of treatment success / failure


Classification



Primarily Low Energy Fractures


Schatzker I

- Solitary lateral condyle fracture line
- Lateral articular surface depression




Schatzker I

- **Coronal plane stability**
 - ~10 degrees of instability is significant
 - Strong relative surgical indication
- **Articular Depression**
 - 3 – 10mm



Schatzker II

Split and Depressed lateral unicondylar fracture



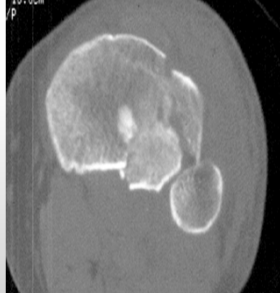
- CT Scan
 - Condylar fracture orientation / location
 - Depth of articular impaction
- **Condylar Widening**
 - 5mm
- Meniscal entrapment

Articular Fracture Assessment

Depression depth



Fracture location / orientation



Schatzker III

Isolated depression of the lateral plateau articular surface



- Metaphyseal void
- Intact cortical rim
 - Arthroscopic reduction assistance
 - Balloon-aided metaphyseal augmentation

Operative Tactic - Unicdylar

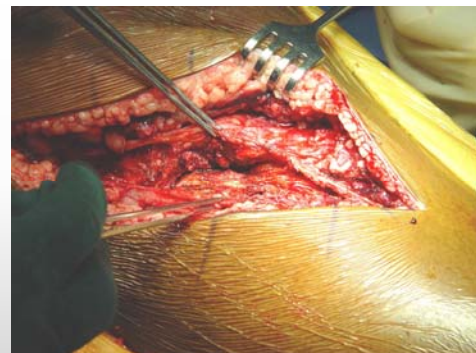
- Restore joint stability / mechanical alignment
- Visualize and reduce articular surface
- Support the articular reduction
 - Fill metaphyseal defect (autograft, allograft, bone void fillers)
 - Buttress support of cortical surface
 - Rafting screws for articular surface

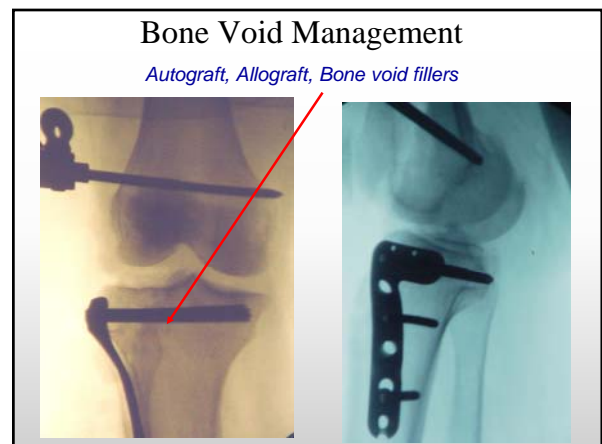
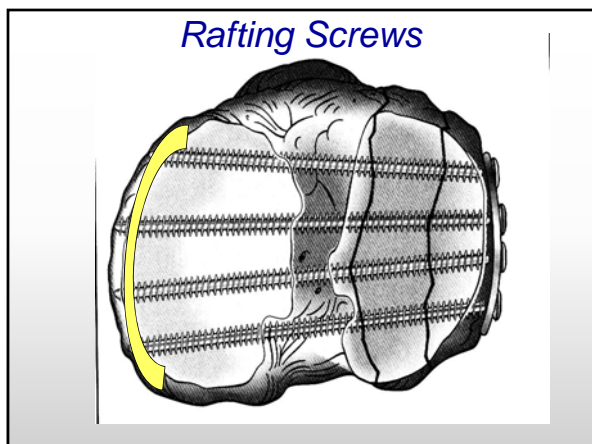
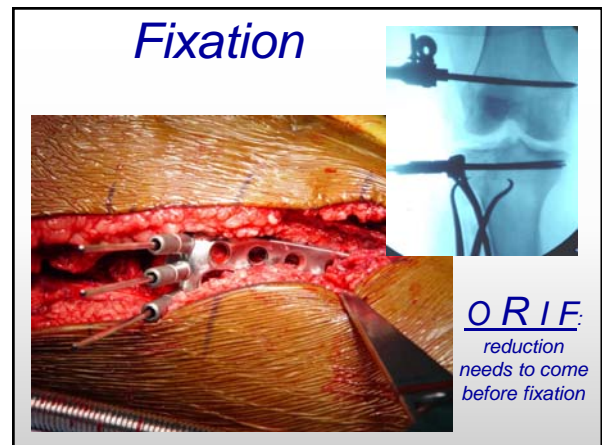
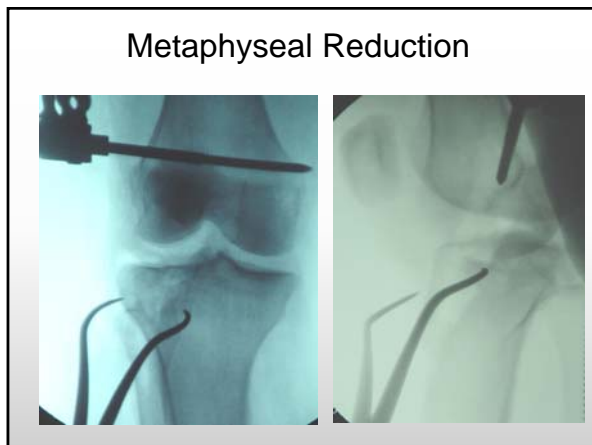
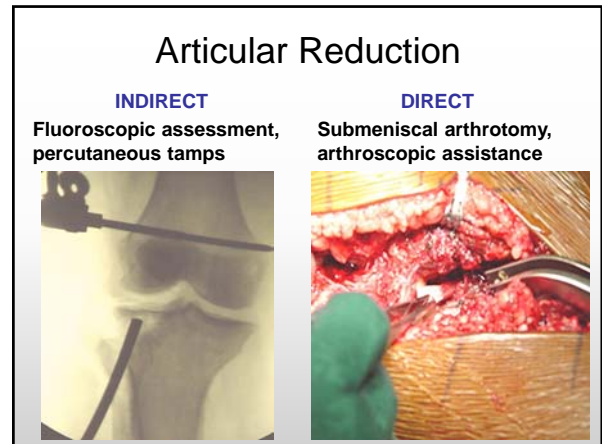
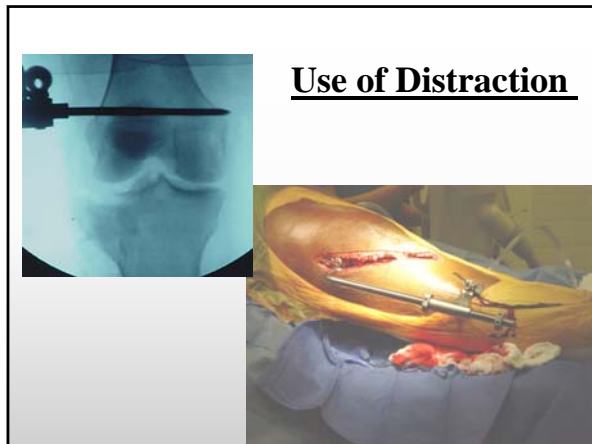
Set Up in OR

- C arm opposite side
- Bump under knee
- Traction via external fixator/distractor



Incision





Classification

IV V VI

Primarily High Energy Fractures

Treatment Algorithm

IV V VI

**Compartment Syndrome?
Vascular Injury?**

Schatzker IV

A B

- Never underestimate this injury
 - High energy pattern
 - Never just a “medial condyle fracture”
- Association with dislocation and vascular injury
- Never just “lag screw” fixation

Bicondylar Fracture Evaluation

Schatzker V and VI

- Lateral fracture
 - Articular impaction
 - Metaphyseal comminution
 - Meta-diaphyseal extension
- Tubercle Integrity
- Cortical Rim Continuity

Bicondylar Fracture Evaluation

- Medial Metaphyseal Medial Component
 - Apex location, comminution, displacement
 - CT Scan (after distraction)

BEWARE: Coronal Plane Fracture Lines

Treatment Considerations

Soft tissue management?

Surgical timing?


Locking?

One or two plates?

Screws: uni or bi cortical


High Energy Fracture Considerations

- Fasciotomies?
- Spanning External Fixator
- Distraction CT scan
- Surgical Planning
 - Must wait until soft tissues stable




Spanning Fixation

- Length and alignment restored → No hurry to fix
 - 10-20 day delay for soft tissue stabilization
- Consider transfer to traumatologist

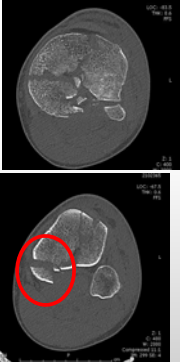


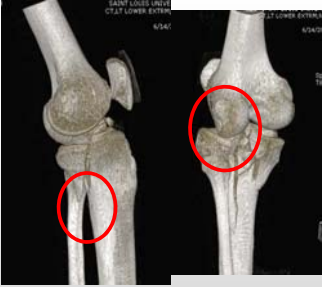
1 Plate or 2

- Apex reductions with medial fracture with
 - Direct cortical contact
 - Minimal comminution
- *Lateral locking plate only is OK*




Distraction CT





High Energy Fracture Considerations

- Surgical approach and fixation dictated by:
 - Fracture Pattern
 - Soft tissue envelope
- Anterolateral
- Posteromedial
- Posterior
- Midline?



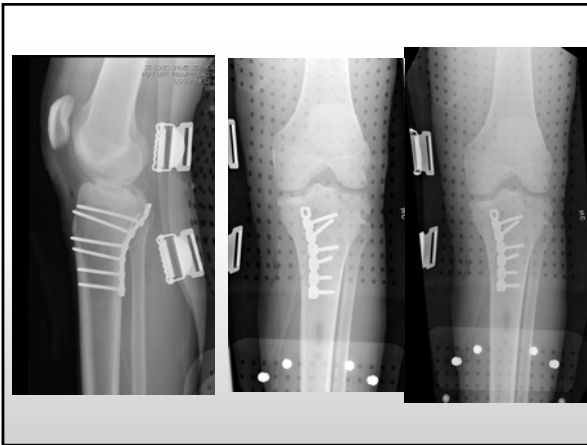
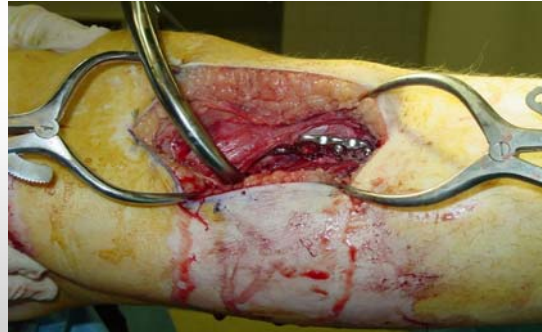
Medial Surgical Fixation



- Posterior medial
- Direct posterior

GOAL: Place plate at apex of medial condyle fracture

Posterior Medial Approach



Direct Posterior

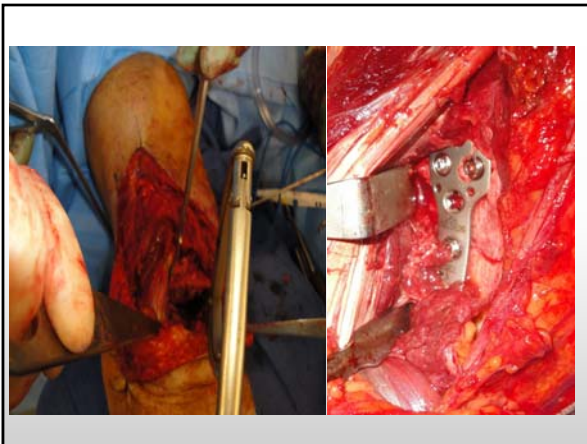
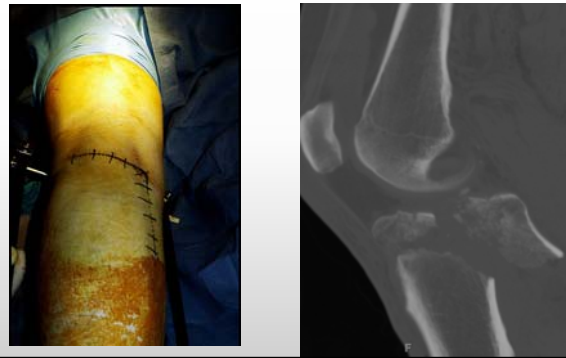
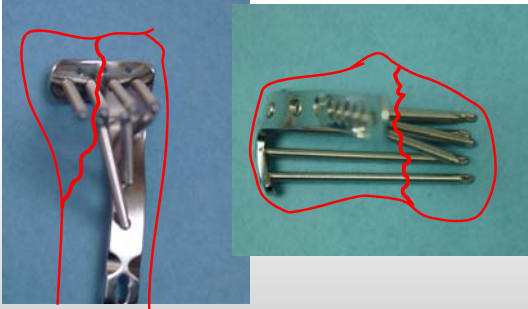


Plate Selection and Screw Position

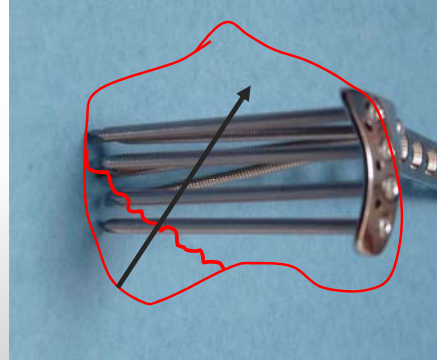


- Orientation of Fracture Line
- Comminution of base
- Size of fragment

Understand the Fracture in All Planes



Will This Plate Hold This Fracture

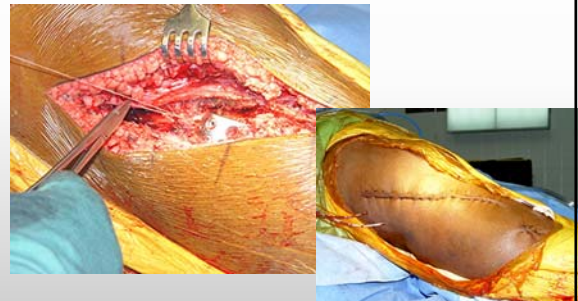


Locking Plate Indications

- Poor bone quality
- Extensive articular comminution
- Meta-diaphyseal extension
- Bicondylar fracture pattern with undisplaced medial cortex

Closure

Often this is the time to repair meniscus



Careful Soft Tissue Handling



MRI?




Assess Meniscus and ACL
(ACL disrupted in ~25% of Shatzker VI fractures)

Summary

Make A Plan

- Timing
- Approach(es)
 - Considering **fracture pattern** and **soft tissue envelope**
- Reduction
 - **Joint alignment #1**
 - Articular #2
 - Only hardware reps benefit from **OIF** management
- Hardware
 - Bone void management



Predictors of Poor Outcomes

- Altered Joint line
 - 5 degree alteration of joint mechanical axis
- Ligamentous instability
- Meniscectomy

Restoration of joint stability is greatest predictor of long term outcome

