Bicondylar Tibial Plateau Fractures
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Tibial Plateau Fractures

• Mechanism:
  – Axial load + varus/valgus stress
• Age:
  – Bimodal: 4th decade (males), 7th decade (females)

Physical Exam

• Skin
  – open?
  – closed / contusion
• Compartment syndrome?
• Vascular
• Nerve
Complex Tibial Plateau Fractures

Associated Injuries

• 31% compartment syndrome
• 31% vascular injuries
• 23% peroneal nerve injuries

Schatzker Classification

• I  split, lateral plateau
• II split-depression, lateral plateau
• III central depression, lateral plateau
• IV split +/- or depression, medial plateau
• V bicondylar fracture
• VI plateau fracture with separation of the metaphysis and diaphysis

Schatzker V

Bicondylar fracture
Schatzker VI
Bicondylar with separation of the metaphysis and diaphysis
• High energy injuries!
• Beware soft-tissue injury
• Compartment syndrome
• Often spanning external fixation and delayed ORIF

Treatment Options
• External fixation:
  – Provisional
  – Staged ORIF +/- manipulation
• Definitive:
  • Hybrid
  • Ilizarov
  • Prior to locked plating, unilateral (medial) to prevent varus collapse

Bicondylar Plateaus: Treatment Options
• Advent of locked plating
• Anatomically-contoured plates
• Submuscular insertion guides
• Fixed-angle fixation from lateral approach only
• Problem?
Medial column joint injury needs to be **REDUCED** before fixation
  - Often requires open reduction

If relying on lateral plate, fixation has to actually capture medial fragment
  - Posteromedial fragment often missed
  - Buttress from medial side most mechanically-advantageous
  - Hanging fragment on “end of diving board” not ideal

Bicondylar Tibial Plateaus

• Dual plating?
  – What about “Dead Bone Sandwich”? 
• Bad results due to approach, not fixation
• Utilitarian midline approach used to facilitate later TKA
Bicondylar Plateaus: Treatment Options

• Even bad plateaus uncommonly need TKA
• By the time they do, previous incisions no longer a factor
• Single midline incision bad due to need for extensive soft-tissue stripping
• Dual, fragment-specific approaches preferred (postero-medial, anterolateral) with minimal stripping

Bicondylar Plateaus: Dual Plating

• When?
  – Is there a posteromedial fragment?
  – Is there displacement of medial joint fragment?
  – If not displaced, will lateral implant capture and stabilize it adequately?
  • Axial CT important
  • Know your implants

Bicondylar Plateaus: Lateral Plating

• Segmental comminution of both lateral and medial columns
  – Bridge plating of both may be advantageous
  – Must be able to restore articular alignment
Bicondylar Plateaus: Lateral Plating

- Without posteromedial fragment, bridge plating from lateral side with submuscular technique and fixed-angle device, reliable healing with callus and no varus collapse can be achieved.

6 Weeks Postop

Bicondylar Plateaus: Dual Plating

- Posteromedial shear fragment needs reduction and buttress support.
Bicondylar Plateaus: Dual Plating

Bicondylar Plateaus: Dual Plating

Bicondylar Plateau: Alternative Means of Medial Support

- 40 year old male MCA
- Transferred from outside hospital after fasciotomies and spanning ex-fix
Bicondylar Tibial Plateau

What they did right:
- Pins well out of zone of definitive fixation

What they did wrong:
- Didn’t reduce the fracture!
- Applying the ex-fix is not enough
- Need to distract across joint and fracture

Taken to OR for revision ex-fix
I&D fasciotomy wounds
Minimal internal fixation
Bicondylar Tibial Plateau

- Large medial metaphyseal fragment allows for lag screw fixation from lateral approach
- Reducible and fixable without medial approach...two key requirements

Bicondylar Tibial Plateau

When skin graft matured, brought back for definitive ORIF (2 months after original presentation)
- External fixator removed
- Manipulation under anesthesia
Bicondylar Tibial Plateau

- 10 months post injury
- Full wt-bearing
- Back at work
- Pain-free