

Tibial Plateau Fractures – Initial Management Guidelines (especially for nighttime consults)

Classification

- Shatzker I – Lateral split (Figure 1)
- Shatzker II – Lateral split with associated articular depression (Figure 2)
- Shatzker III – Articular depression without split (Figure 3)
- Shatzker IV – Medial split, may have subluxation (Figure 4a)
 - Commonly associated with knee fracture-dislocation (Figure 4b)
- Shatzker V – Bicondylar fracture (Figure 5)
- Shatzker VI – Bicondylar fracture with metaphyseal/diaphyseal dissociation (Figure 6)

Initial Assessment

- Is a full trauma assessment necessary? Based upon:
 - Mechanism of injury
 - Loss of consciousness
 - Associated injuries
- Patient assessment:
 - Evaluation of soft tissue
 - Open injury
 - Amount of swelling
 - Any skin compromise present
 - Signs of compartment syndrome
 - Pain out of proportion or escalating pain not controlled with narcotics
 - Numbness or paresthesias (plantar, dorsal web space, dorsal foot)
 - Pain with passive stretch of toes
 - Decreased pulses/cap refill
 - Tight/non-compressible compartment
 - Neurovascular assessment
 - Neuro: SPN, DPN, Tibial, Saph, Sural
 - Peroneal nerve especially with valgus force
 - Vascular: palpable/dopplerable PT/DP, cap refill
 - Close attention with medial plateau fractures
 - Palpable pulses does not exclude popliteal injury
 - If vascular exam abnormal or different from contralateral side → ABI/PVR
 - Abnormal ABI: $ABI < 0.9$
 - If ABI/PVR abnormal → Needs vascular team involvement and urgent vascular imaging (CT angiography)
 - Thorough secondary survey for other injuries

- Imaging:
 - AP and Lateral Xray of knee
 - Internal rotation view: shows posterolateral fragment
 - AP and Lateral Xray of tib/fib
 - Traction views if needed
 - Careful assessment of Xrays:
 - Assess overall alignment
 - Assess amount of shortening
 - Assess joint congruity
 - Shatzker IV fractures may be equivalent to fracture/dislocation. Medial tibial condyle may displace with femur, but incongruity will exist on lateral side and lateral Xray
 - CT scan
 - If plan for ORIF as definitive management → obtain pre-op
 - If plan for ex-fix initially → obtain after ex-fix.
 - Shatzker IV fracture/dislocations → may be managed with initial ORIF if soft tissues allow, so beneficial to obtain CT scan following closed reduction
 - If significant soft tissue injury exists so that ORIF not possible, wait on CT until after ex-fix

Initial Management/Plan in ED

- Shatzker I, II and III fractures
 - Normal alignment: well padded knee immobilizer, elevation, Ice
 - Abnormal alignment: closed reduction, long leg splint, elevation, Ice
 - Minimal soft tissue swelling
 - Consider admission for formal ORIF
 - Normal alignment, significant soft tissue swelling, no signs of compartment syndrome or skin compromise, NVI
 - Consider ED discharge with close f/u, plan for ORIF when soft tissues amenable
 - Abnormal alignment, concern for skin compromise
 - Urgent ex-fix overnight
 - Any fracture with concern for compartment syndrome should be admitted for observation
 -
- Shatzker IV, V and VI fractures
 - Normal alignment: long leg splint, elevation, Ice
 - Abnormal alignment/dislocation: closed reduction, long leg splint, elevation, Ice

- If closed reduction unsuccessful (especially in Shatzker IV fracture-dislocations, will need urgent OR for closed vs. open reduction and ex-fix vs. internal fixation)
 - Plan for admission for NV checks (at minimum) of Shatzker IV, V and VI
 - Acceptable alignment, minimal soft tissue swelling/injury (rare for high energy fracture patterns)
 - Consider ORIF acutely in the morning, although likely will need ex-fix given expected amount of swelling
 - Acceptable alignment, significant swelling/injury
 - Plan for ex-fix in the morning
 - Unacceptable alignment (following reduction)
 - Urgent ex-fix (should not wait for the morning)
- Open fractures
 - Irrigation in ED
 - Ancef for Grade I injuries
 - Ancef and Gent for Grade II and III injuries
 - Add PCN if soil contamination present
 - Tetanus
 - Grade I and II open fractures: At discretion of attending, may wait for the morning for formal I&D, only if acceptable fracture alignment obtained, compartments soft, NVI
 - Grade III injuries: Urgent formal I&D and ex-fix
- Compartment syndrome: Emergent fasciotomy and ex-fix
- Vascular injury
 - Emergent vascular team involvement (bypass vs. repair)
 - Emergent ex-fix
 - Emergent fasciotomy following re-vascularization

All admissions need close monitoring and serial examinations of compartments.
Exam needs to be well documented

Figure 1: Shatzker I

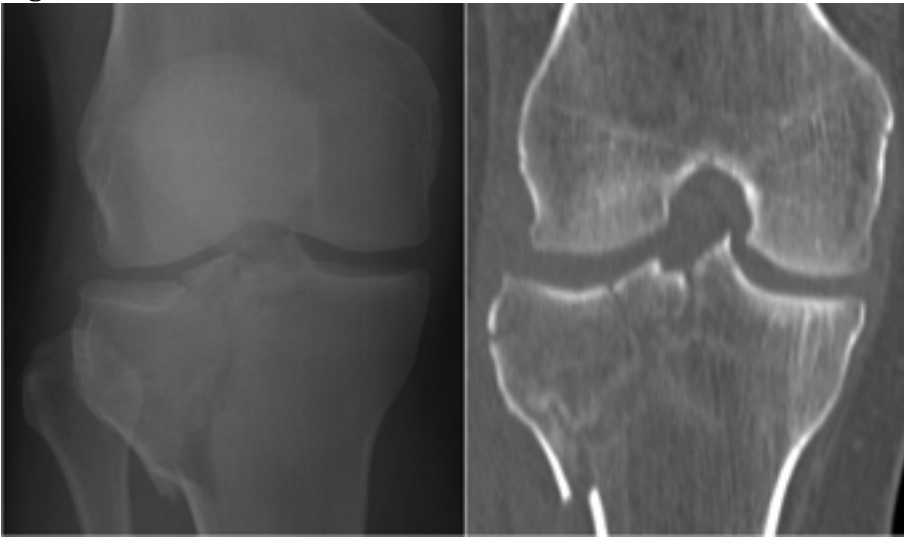


Figure 2: Shatzker II

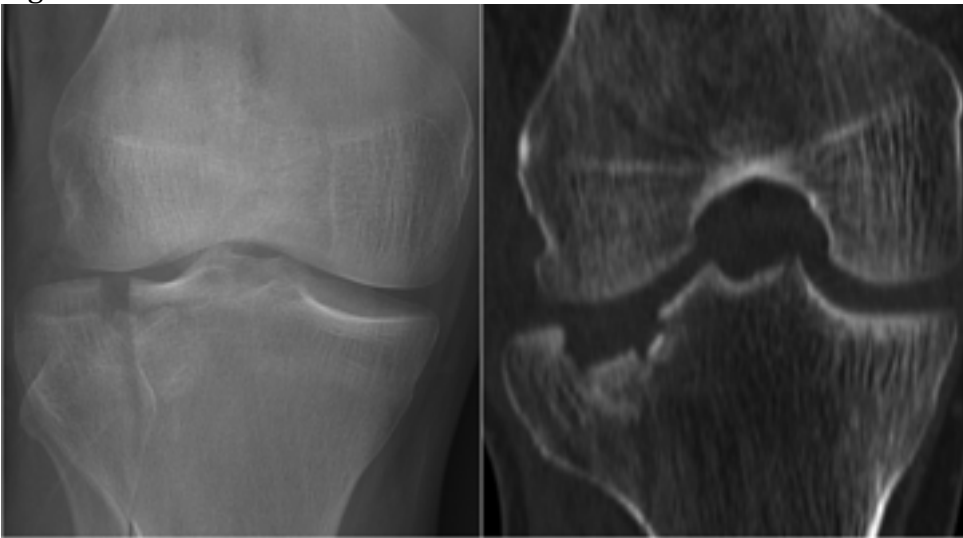


Figure 3: Shatzker III

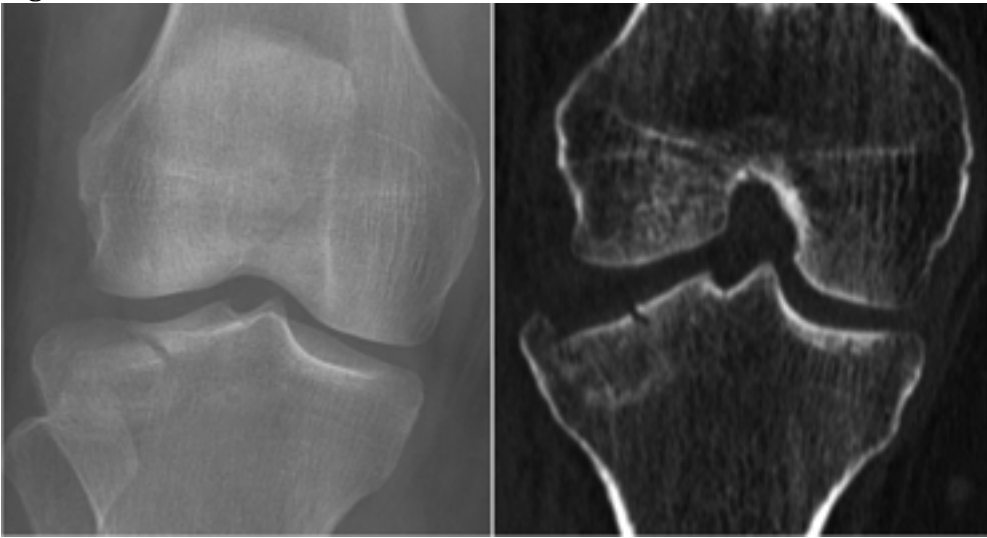


Figure 4a: Shatzker IV with knee subluxation

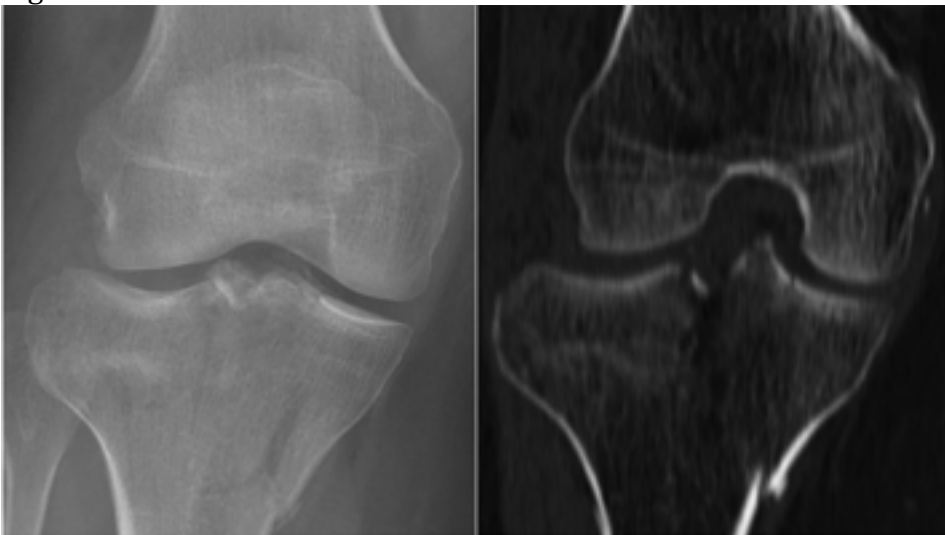


Figure 4b: Shatzker IV with knee dislocation



Figure 5: Shatzker V

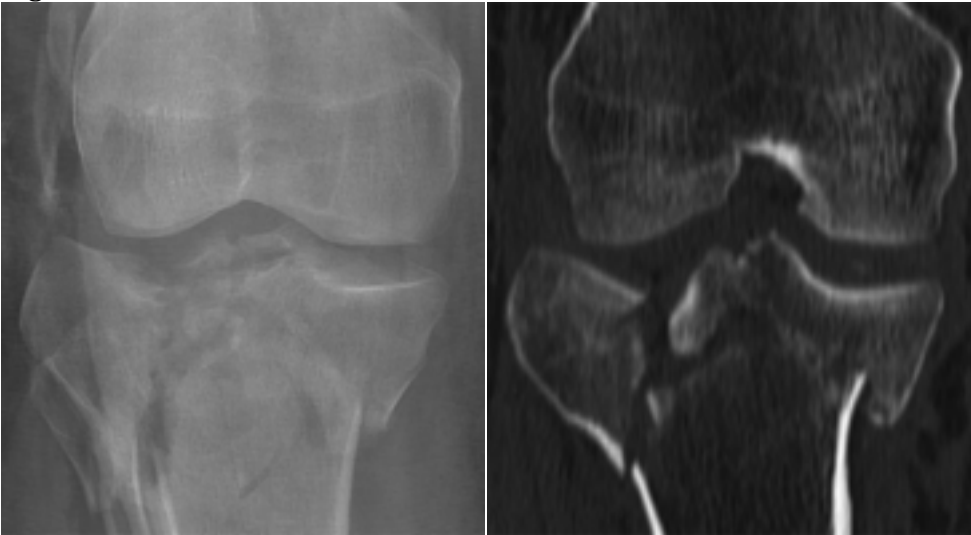


Figure 6: Shatzker IV

