Tibial plateau fracture: case based and surgical techniques

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360 Degrees Surgical Approach for Tibial Plateau Fractures

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• In selected case
  – Intraarticular bone fragments (ACL avulsion, loose bone fragments, etc.)
  – Entrapped meniscus which prevents accurate reduction of bone fragments
  – Pure depressed plateau fragment
How to choose which approach?

• Soft tissue condition dictates treatments
• If good soft tissue: prefer either medial or lateral approach to reduce and create stable column then “reattach” the more unstable column back
• Posterolateral lesion around popliteal corner may needs direct posterolateral approach or fibular turn-up
ANTEROLATERAL APPROACH
Anterolateral approach

• Most familiar
• Main surgical approach

Indications
  – Reduction of fractures involving lateral condyle; split, joint depression
  – Direct visualization & reduction of articular surface

Extension
  – Distal to tibial shaft
  – To posterolateral corner of knee
  – Proximal to distal femur
Anterolateral approach
Anterolateral approach
Open menisco-tibial ligament

- Anterolateral ligament (ALL) is the thickening part of anterolateral capsule (also part of menisco-tibial ligament) and help in reduce anterolateral instability of knee – so try repair

Anterolateral ligament
Anteromedial to posteromedial

MEDIAL APPROACH
Medial/posteromedial Approach

• Most familiar
• Main surgical approach

Indications

– Reduction of fractures involving medial condyle; split, joint depression, buttress
– Direct visualization & reduction of articular surface
  (tight capsular structures may limit joint visualization compared with lateral)

Extension

– Distal to tibial shaft
– Posterior approach to tibial plateau
Posteromedial Approach
Medial/posteromedial Approach

- Pes anserinus
- Gastrocnemius muscles

Insertion
POSTERIOR APPROACH
Posterior Approach

Indications
- Reduction and fixation of posterior column fractures, PCL avulsions

Extension
- Distal to tibial shaft
- Posterior approach to tibial plateau

Problems
- Less familiar to most surgeons
- Proximity of vital structures: n/v
- Limit direct joint visualization
- Difficulty of implant placement
- Awkward patient position: supine/floppy/prone
- Future implant removal for arthroplasty?
what are your options???
Extended posteromedial

• Inverted L-shaped approach
• go between medial gastrocnemius & posterior crest
Extended posteromedial

• Interval medial gastrocnemius & posterior crest
• Lift up medial gastrocnemius, identify popliteus m.
• Subperiosteal dissection of popliteus m.
Extended posteromedial

• Expose posterior cortex, PCL insertion
Approach to posterolateral corner

• Difficult to access
  – Fibula head, peroneal n., posterolateral ligamentous structure

• For posterior coronal fracture patterns

Current available options

– Posterolateral approach with fibula osteotomy
  • Lobenhoffer et al. 1977
  – Modified by Frosch et al. 2010 to preserve the fibula head
  – Inverted L-shaped extended posteromedial approach

• Lobenhoffer P, Gerich T, Bertram T, Lattermann C, Pohlemann T, Tscheme H. Particular posteromedial and posterolateral approaches for the treatment of tibial head fractures. Unfallchirurg 1997;100(12):957
Fibular osteotomy
Identify common peroneal n.
Posterolateral approach

m. biceps femoris
tractus iliotibialis
lateral head of the m. gastrocnemius
m. soleus

(J Orthop Trauma 2010;24:515–520)
Karl-Heinz Frosch, MD,
Posterolateral without fibular osteotomy

(J Orthop Trauma 2010;24:515–520)

Karl-Heinz Frosch, MD,
Posterior Approach

Most of the cases!

May need in some difficult cases
Case 1

• A 46-year-old gentleman twisted his right knee while playing football 2 hr.
• He had pain & swelling and limit of motion of his knee
• Distal N&V : intact
Post op 0, 3 months
Case 2

• 45-year-old gentleman got injury to his right knee from motorbike accident
• He got closed right knee injury, closed fracture right distal radius
• Distal N&V : intact
• Bi-plateau fracture with more comminution on posterior-lateral
• Displaced eminence fracture
• Associated shaft fracture
Take Home Messages

• Anterolateral & medial/posteromedial approach works well for most fractures
• Posteromedial approach to buttress medial condyle
• Posterior & Posterolateral approach is crucial in some difficult cases
• Meniscus and soft tissue entrapment is not uncommon

Know yourself!
Thank you for your attention