The Knee: A biological transmission

3 articulating bones
16 ligaments
10 tendon insertions
Soft tissue envelope
Neurovascular structures

Knee Fracture
German Workman Compensation (BG)

16,433 Trauma Victims

- Closed knee Fx. 100,000 €
- Open knee Fx. 170,000 €
- 50% reduced work capability (25% MdE)

Proximal Tibia Fractures

1.2% of all fractures
Same incidence as calcaneus and humerus shaft
Two age peaks:
- young adults
- elderly osteoporotic
Fracture interferes with knee loading and knee kinematics

MHH Unfallchirurgie: 4129 Polytrauma cases

Osteoporosis Fractures

Osteoporosis
AO Classification

B1 Subtypes
B2 and B3 Subtypes

C Subtypes

Schatzker Classification

Type 1
Type 2
Type 3
Type 4
Type 5
Type 6

Proximal Tibia Fractures

Plateau Fractures

Proximal Tibia Fractures
Plateau Fractures
Proximal Tibia Fractures
Plateau Fractures
- Mechanism: Axial impaction load
- Concomm. Injuries: MCL, meniscus lesion
- Risk of compartment, local soft tissue damage
- MHH: 58% of 808 cases

Proximal Tibia Fractures
Fracture-Dislocations
- Mechanism: Rotation / Shear stress
- Concomm. Injuries: Cruciate ligaments, MCL, LCL
- Risk of compartment, local soft tissue damage, neurovascular injuries
- MHH: 42% of 808 cases

Proximal Tibia Fractures
Lysholm-Score
- Plateau-Fx. P1- P3: 84
- Bicondylar Fx. P4: 76
- Fx. Disloc. D1 – D4: 74
- Fx. Disloc. D5: 64

Proximal Tibia Fractures
Fracture-Dislocations
- Type 1: split
- Type 2: entire condyle
- Type 3: rim avulsion
- Type 4: rim impression
- Type 5: four-part

MHH, 808 cases of prox tibia fx

MHH, 808 cases of prox tibia fx
Fracture-Dislocation

T. Moore, CORR 1981

Rim Avulsion
V.H., 50 y.
ACL rupture
MCL rupture
Med. meniscus avulsion
Lat. capsule avulsion

Proximal Tibia Fractures
Fracture-Dislocation

Proximal Tibia Fractures
Fracture-Dislocation

Proximal Tibia Fractures
Fracture-Dislocations

Proximal Tibia Fractures
Rim Avulsion

Proximal Tibia Fractures
Rim impression

G.A., 28 years
LCL rupture
Lat. Meniscus avulsion
ACL rupture
Proximal Tibia Fractures
Fracture-Dislocation

Specific posteromedial approach

Lobenhoffer et al, Unfallchirurg 12/1997

Choice of implant

Bigger is not better

Proximal Tibia Fractures
Approaches

The personality of a fracture
J. Schatzker 1986

Postolateral (transfibular) approach

Lateral / posterolateral blow-out

Tibial Pl Fx. – Osteosynthesis

Lag screws
Anti-glide plates
No advantage of 4,5 mm. plates compared to small fragment plates
Koval JOT 99
AO / Synthes Proximal Posterior Medial Tibia Plate

- Application to Sagittal Fracture Pattern
- Posterior Medial Tibial Pillar

Proximal Posterolateral Tibia Plate

- Buttress plate, angle stable locking screws (3.5 mm)
- Curved more at the proximal lateral edge
- Angle of the screws in the tibia plateau horizontal
- Distal part of the plate close to the bone

„safe zone“ to ensure „one fits for all“

Tibial Plateau Fractures

Metaphyseal bone defect

Risk of instability and loss of reduction

Norian SRS

- Calcium phosphate (mineralic phase of bone)
- Injectable cold-hardening paste
- Compression strength:
  10 Min.: 12 Mpa.
  12 hours: 55 Mpa.

Lobenhoffer, J Orthop Trauma 16, 2003, 143-9
26 cases, 2 y. follow-up

I.K., 62 J., Skiing injury

Conclusions

Difficult fracture – often frustrating results
Classification AO Schatzker Tschene
Recognize fracture-dislocations
Plan your surgery (personality of the fracture)
Use appropriate implants
Address subchondral bone defects
Thank you