



LYON KNEE
SCHOOL of SURGERY

SANTY

MEDICAL
INNOVATION
IN MOTION

How I fix a split fracture

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Lyon, France

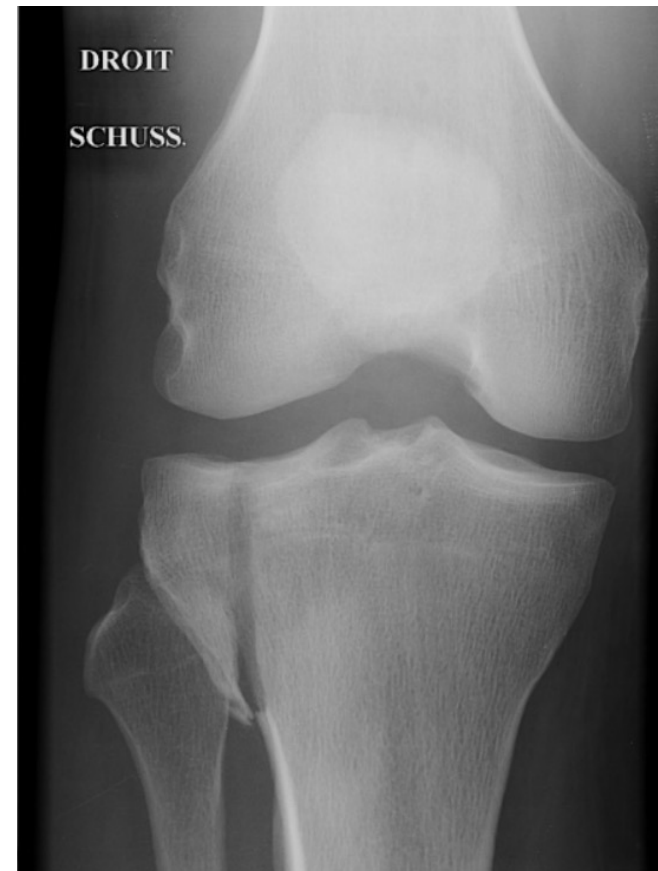
Disclosure

- Consultant: Arthrex, NewClip Technics
- Royalties: NewClip Technics, X Nov

- Split fracture = vertical shear involving articular surface.

40-45% all tibial plateau fractures

Chen et al. J Orthop Surg Res. 20



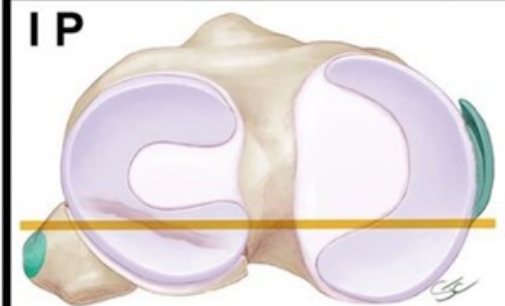
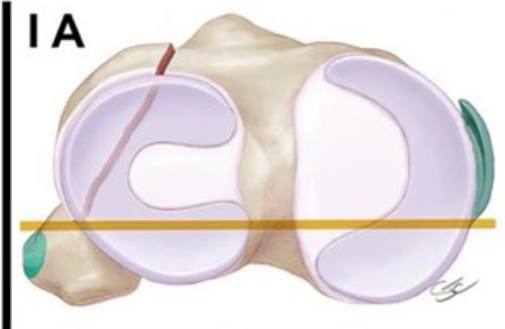
Lateral plateau

- Schatzker type I
3.5%-9%
Younger patient

Type I - Split Wedge



Schatzker - 1974



Kfuri & Schatzker - 2018

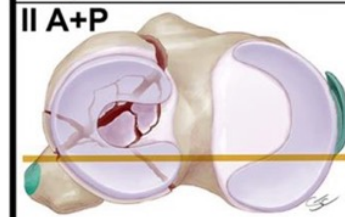
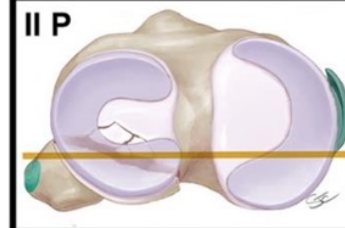
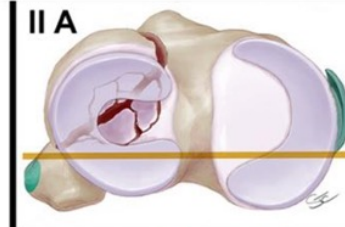
Lateral plateau

- Schatzker Type II
Commonly associated with articular depression and meniscal detachment.

Type II - Split Wedge Depression



Schatzker - 1974



Kfuri & Schatzker - 2018

Medial plateau

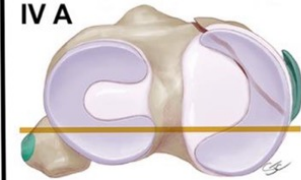
- Schatzker IV

Type IV - Medial Condyle

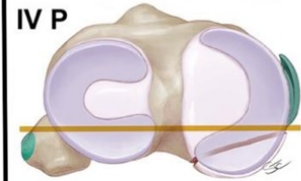


Schatzker - 1974

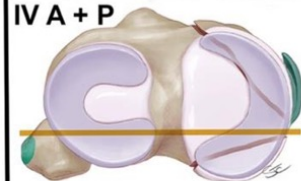
IV A



IV P



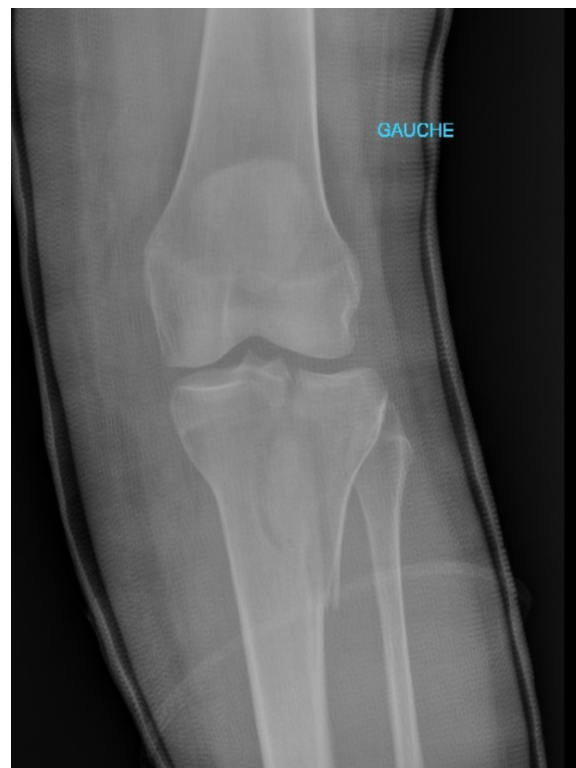
IV A + P



Kfuri & Schatzker - 2018

Preop planning

- Standard X rays
- High resolution CT scan
- MRI?



Preop planning

- Standard X rays
- High resolution CT scan
- MRI?



Preop planning

- Standard X rays
- High resolution CT scan
- MRI?

80% meniscal tears

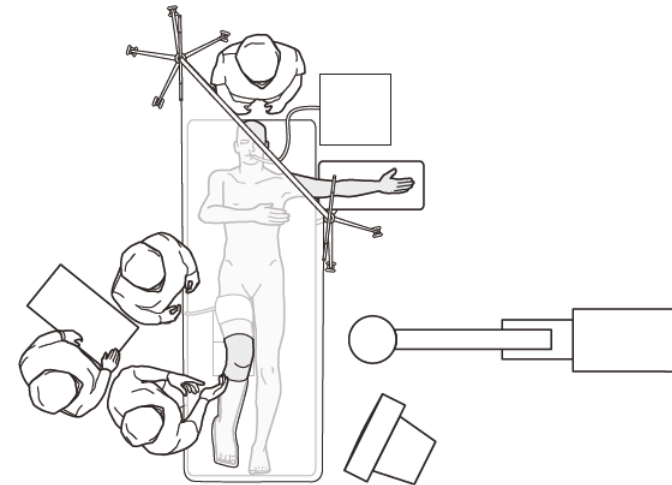
40% ligament injury....



Surgical technique

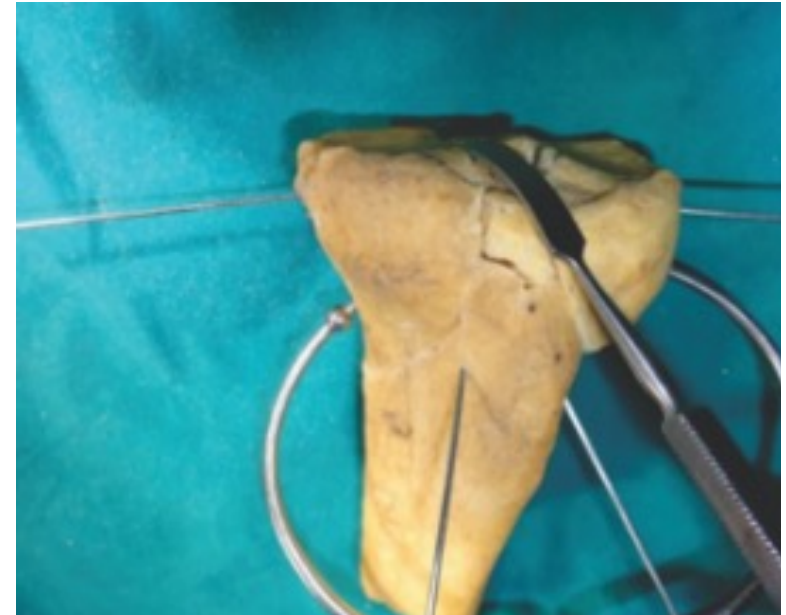
- **Positioning:**

- Supine position with a knee bump.
- Fluoroscopic C-arm positioned for AP and lateral views.



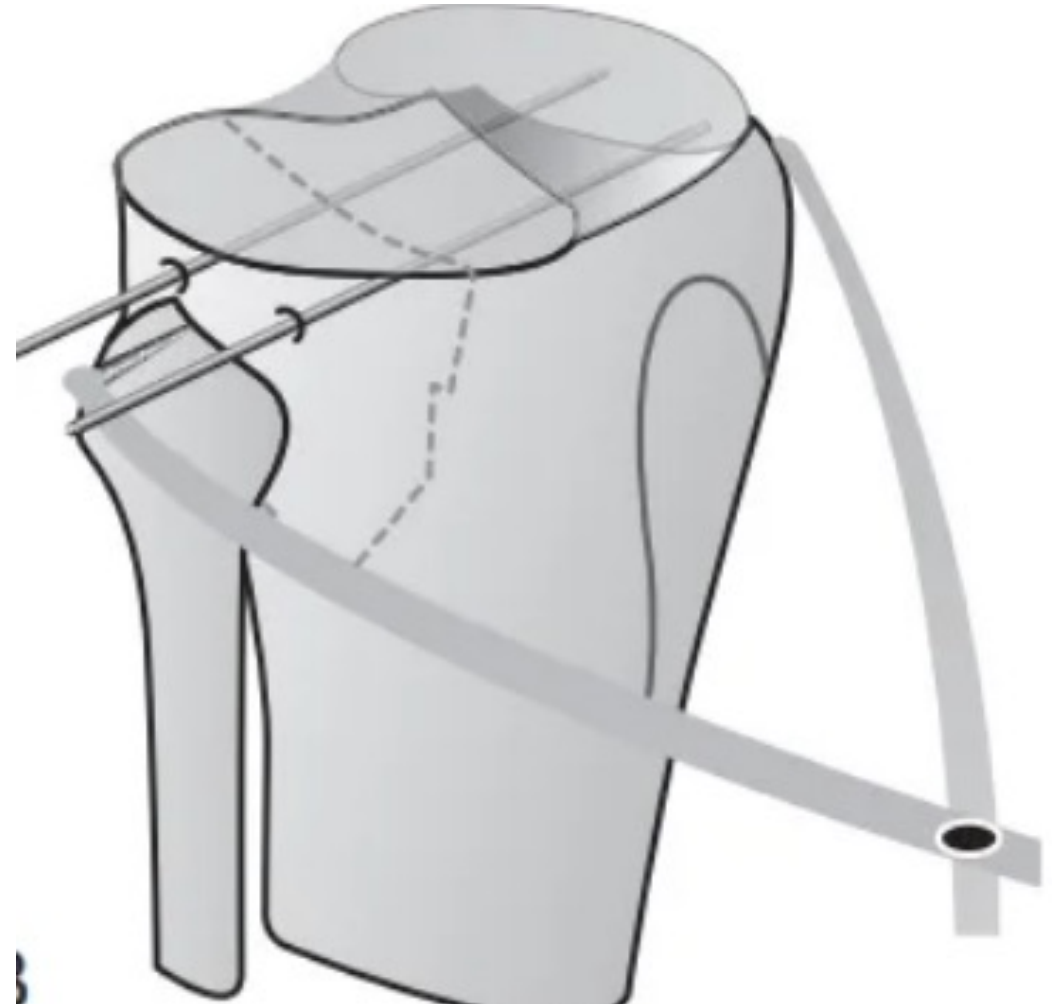
Surgical technique

- **Articular Surface Reduction:**
 - Reduction clamps or "joystick" techniques
 - Elevation of depressed fragments with bone tamp or impactor.



Surgical technique

- **Temporary Fixation:**
- Use K-wires for provisional stabilization.
- Confirm reduction with intraoperative fluoroscopy.



Type I - Split Wedge



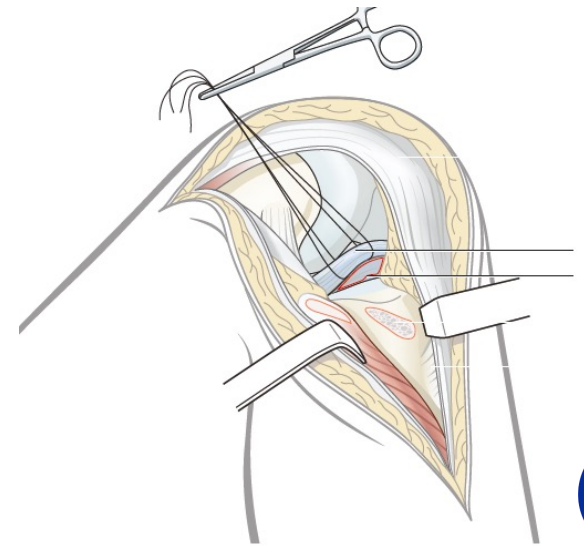
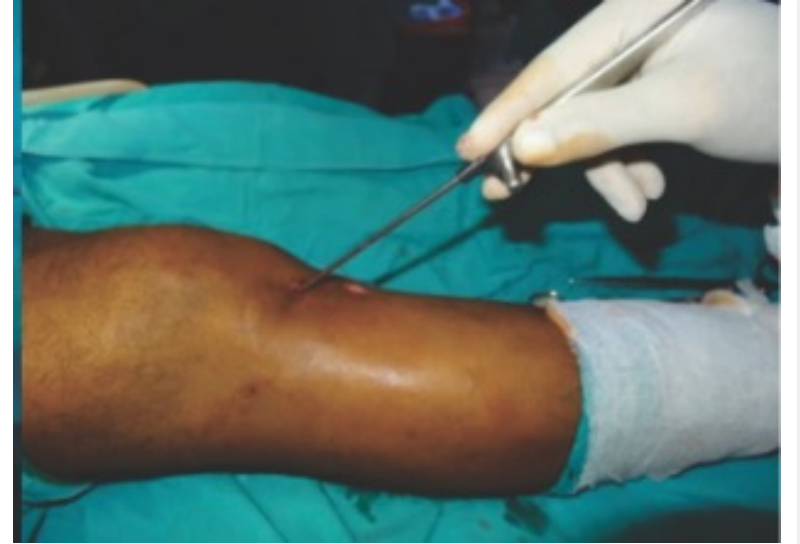
Type II - Split Wedge Depression



Schatzker I-II

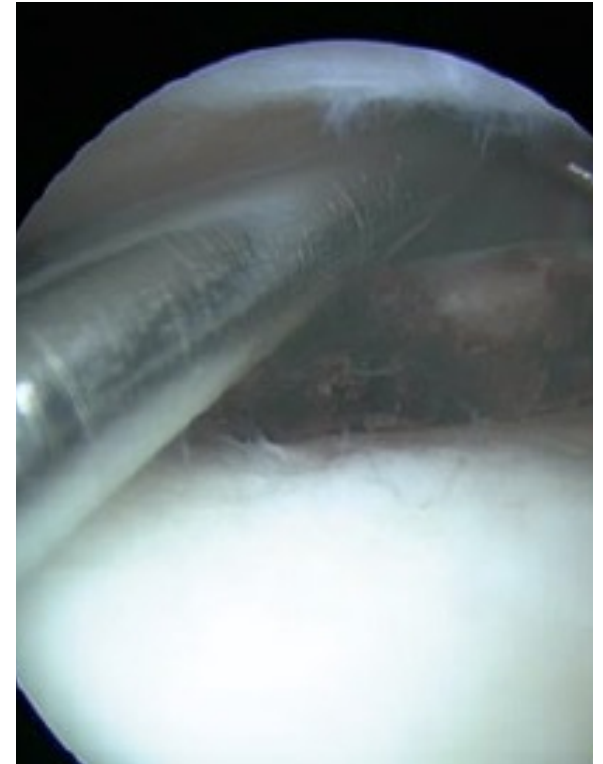
Open treatment

- **Incision and Exposure:**
- Percutaneous
- Standard anterolateral approach.
 - Submeniscal arthrotomy
 - Protection of the lateral meniscus.



Arthroscopic Treatment

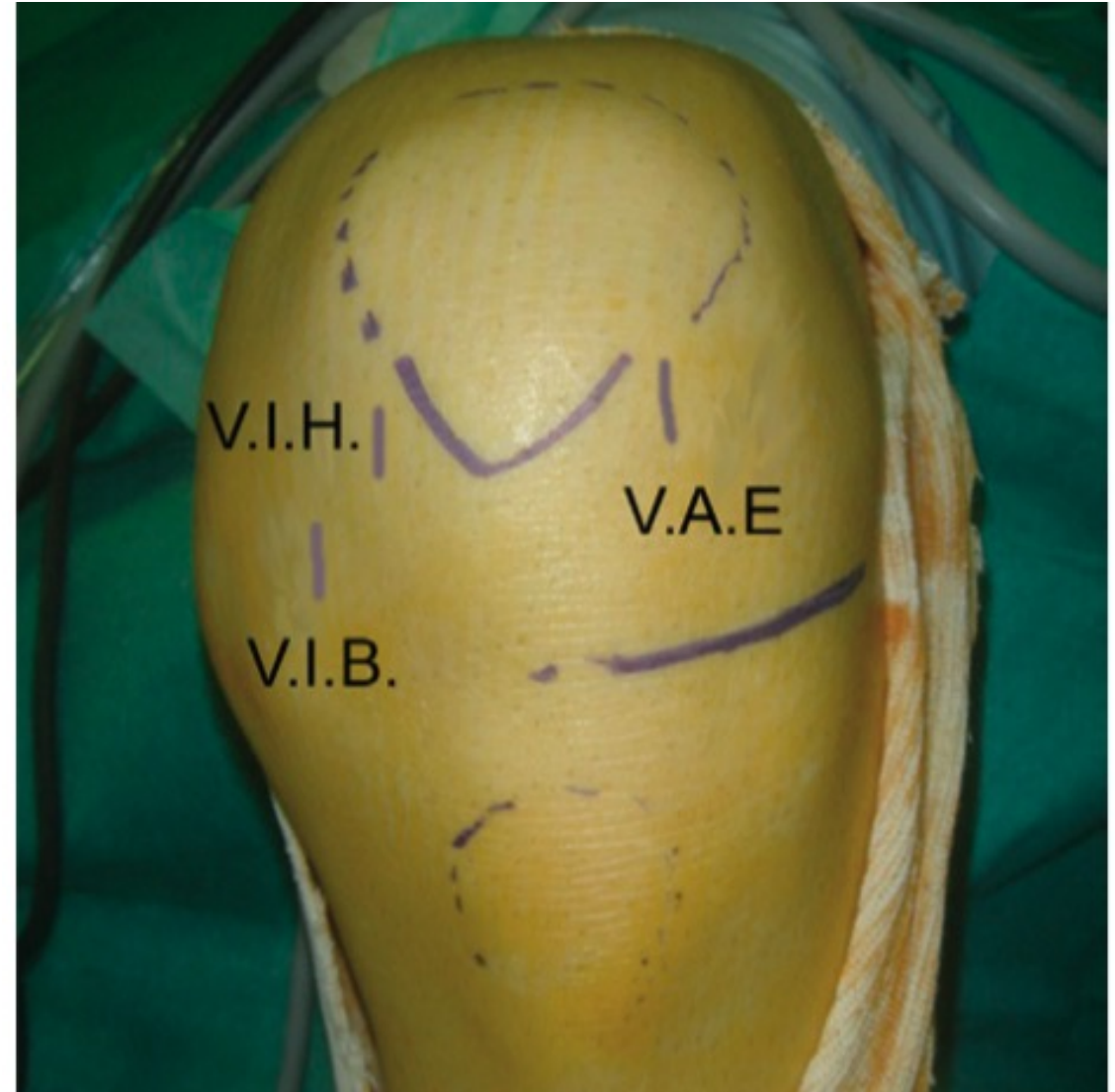
- **Advantages:**
- Direct visualization of articular surface.
- Precise reduction and treatment of intra-articular injuries.



Arthroscopic Treatment

- **Key Steps:**

1. Standard anterolateral and anteromedial portals.

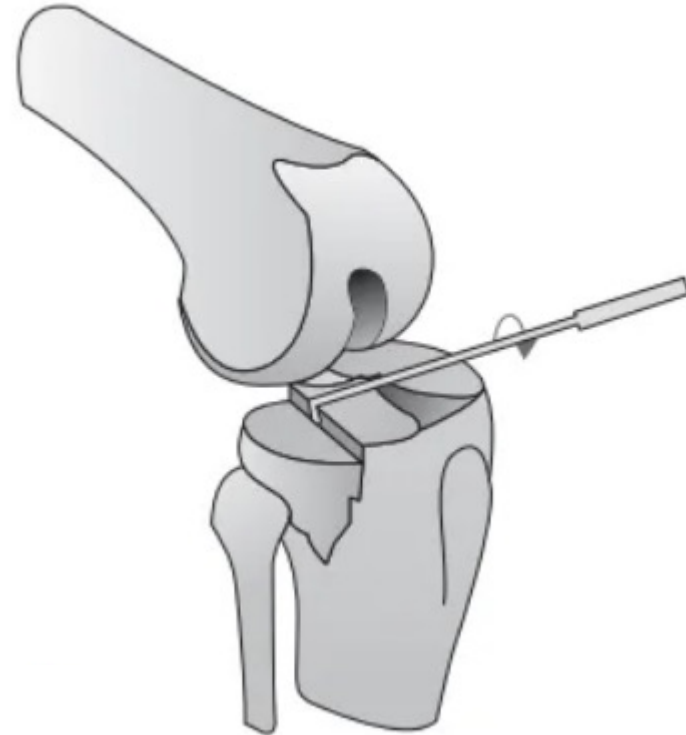


Arthroscopic Treatment

- **Key Steps:**

2. Confirm reduction

Elevate fragments under arthroscopic guidance.

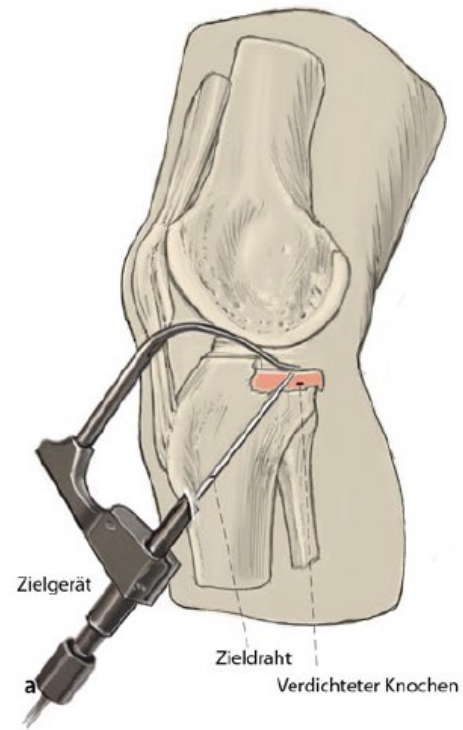


Arthroscopic Treatment

- **Key Steps:**

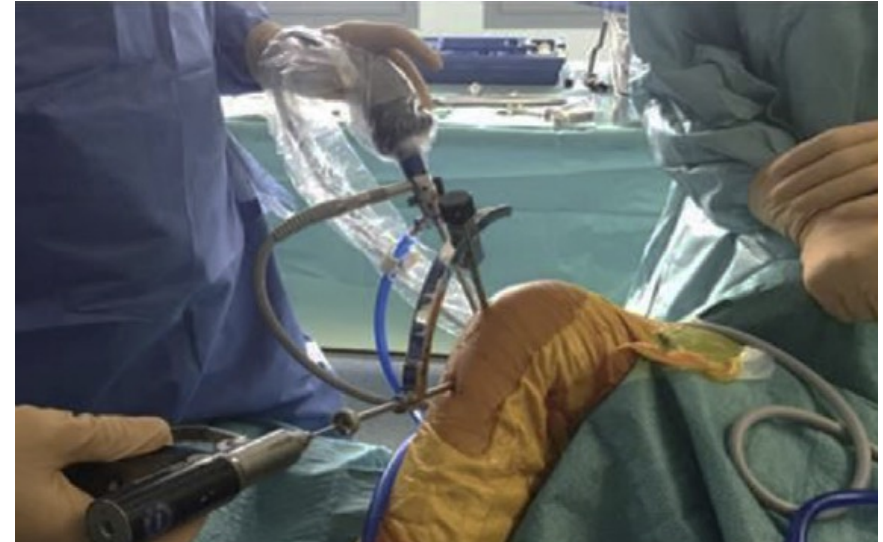
2. Confirm reduction

Elevate fragments under arthroscopic guidance.



Arthroscopic Treatment

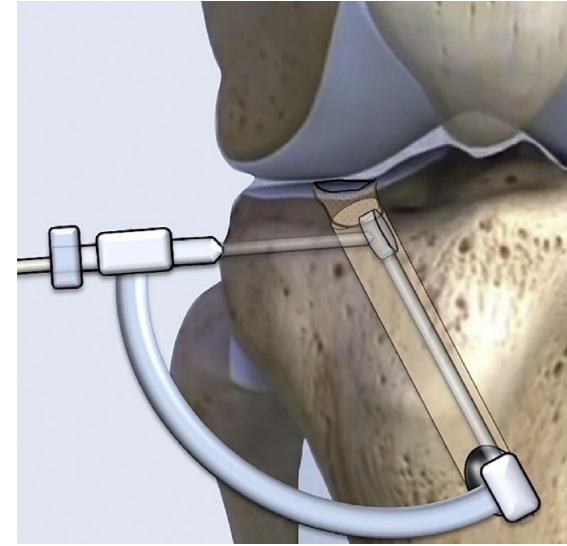
- **Key Steps:**
 2. Elevate fragments under arthroscopic guidance (Schatzker II).



Arthroscopic Treatment

- **Key Steps:**

3. Percutaneous screws or small plates for fixation.



A Fluoroscopy-Free Technique for Percutaneous Screw Positioning During Arthroscopic Treatment of Depression Tibial Plateau Fractures

Mathieu Thauvat, M.D., Nuno Camelo Barbosa, M.D., Sanesh Tuteja, M.D.,
Nicolas Jan, M.D., Jean Marie Fayard, M.D., and Bertrand Sonnery-Cottet, M.D.



Arthroscopic Treatment

- **Key Steps:**

3. Percutaneous 6.5mm screws or small plates for fixation.
Subchondral raft screws to support articular surface.
Avoid intra-articular screw penetration using fluoroscopic guidance.



Plate and Screw Choice:

- Screw at apex of fracture

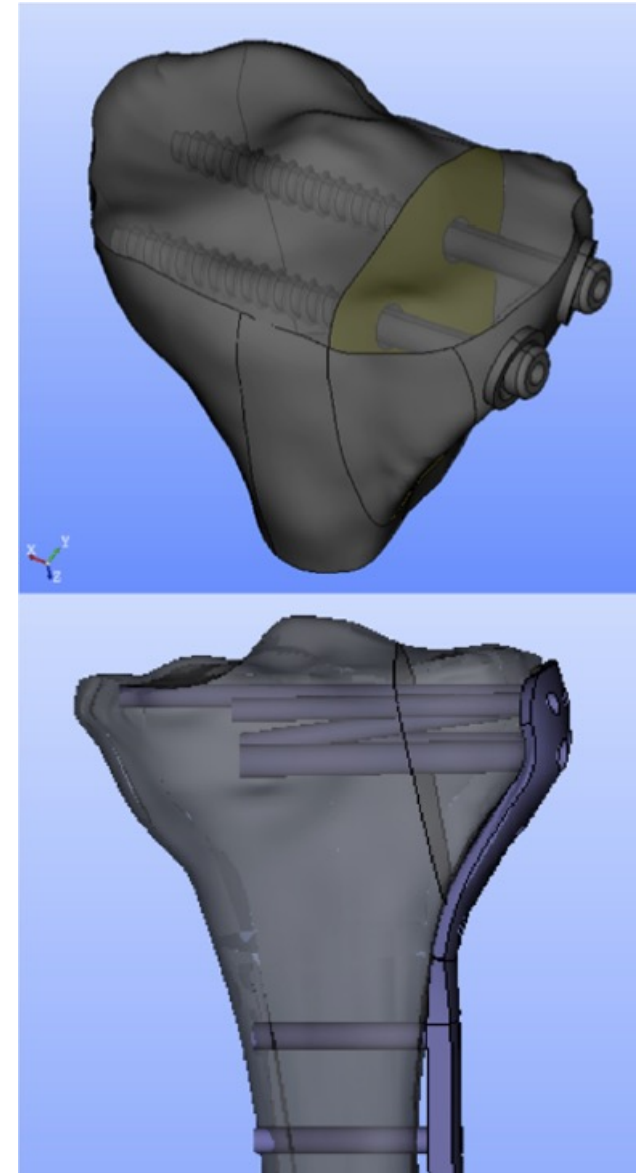


Prevents axial displacement
(long split or distal comminution)



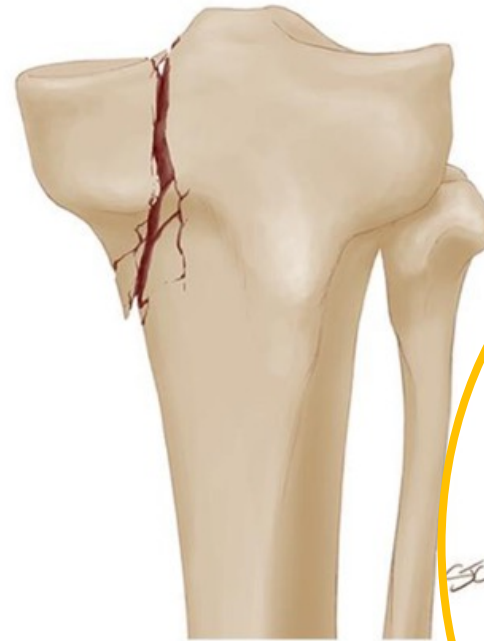
Plate and Screw Choice:

- **Locking screw plate:**
 - higher mechanical stability than cannulated screw fixation
 - Allow earl weight bearing
 - Porotic bone



Schatzker IV

Type IV - Medial Condyle

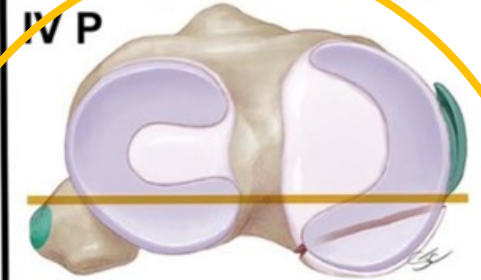


Schatzker - 1974

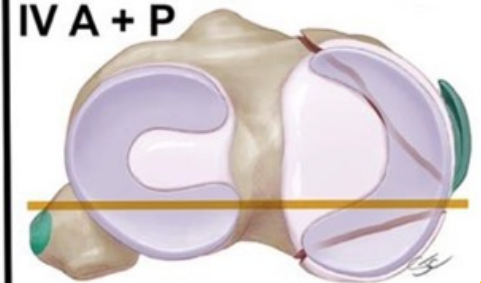
IV A



IV P



IV A + P



Kfuri & Schatzker - 2018

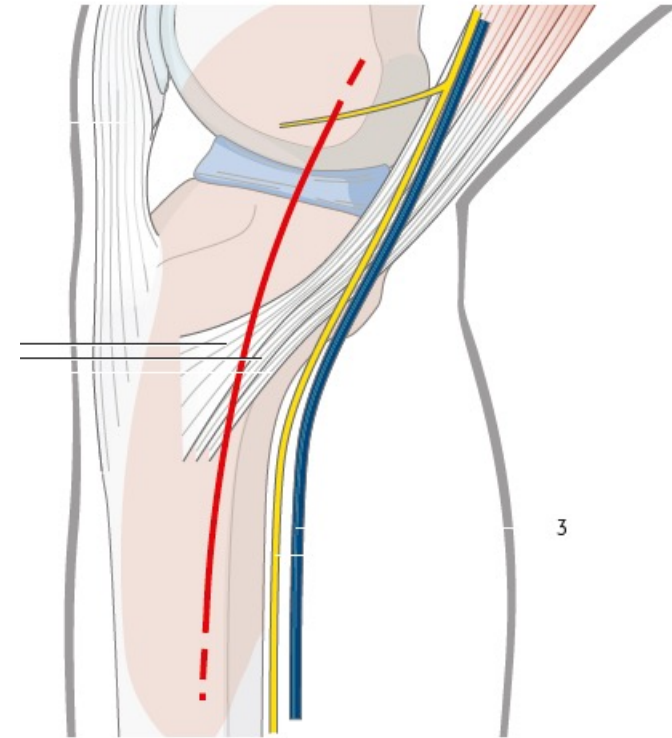
Posteromedial Fractures

- less common
- often associated with ligament injuries
- difficult access through anterior approach (extensive+++)



Posteromedial Fractures

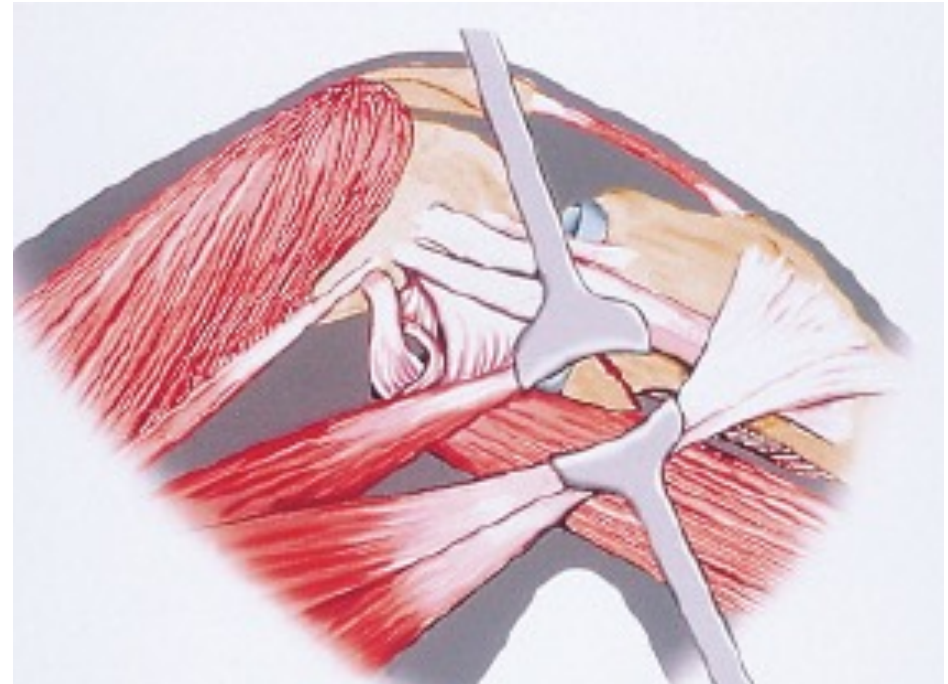
- **Approach:**
- Posteromedial incision to directly visualize and access the fracture.



Lobenhoffer et al. Unfallchirurg 1997

Posteromedial Fractures

- **Lobenhoffer approach:**
- Between medial gastrocnemius-pes anserinus-semi membranous



Lobenhoffer et al. Unfallchirurg 1997

Posteromedial Fractures (Moore I)

- **Approach:**
- Avoids neurovascular structures.



Lobenhoffer et al. Unfallchirurg 1997

Posteromedial Fractures (Moore I)

- **Posteromedial approach:**
- Allows anatomic reduction and fixation
- Temporary Kirschner wire then buttress plate



Lobenhoffer et al. Unfallchirurg 1997

Conclusion

- Preop planning (CT scan)
- Arthroscopy : articular reduction/
associated lesions
- Lateral split fractures :
ACL guide to treat concurrent
depression
6.5 mm screws
- Posteromedial split:
Posteromedial approach
Buttress plate



Thank you