Complex tibial plateau fractures –ORIF

Markus Parkkinen, MD, PhD

AOT Advanced Principles Course

Tibial plateu fractures

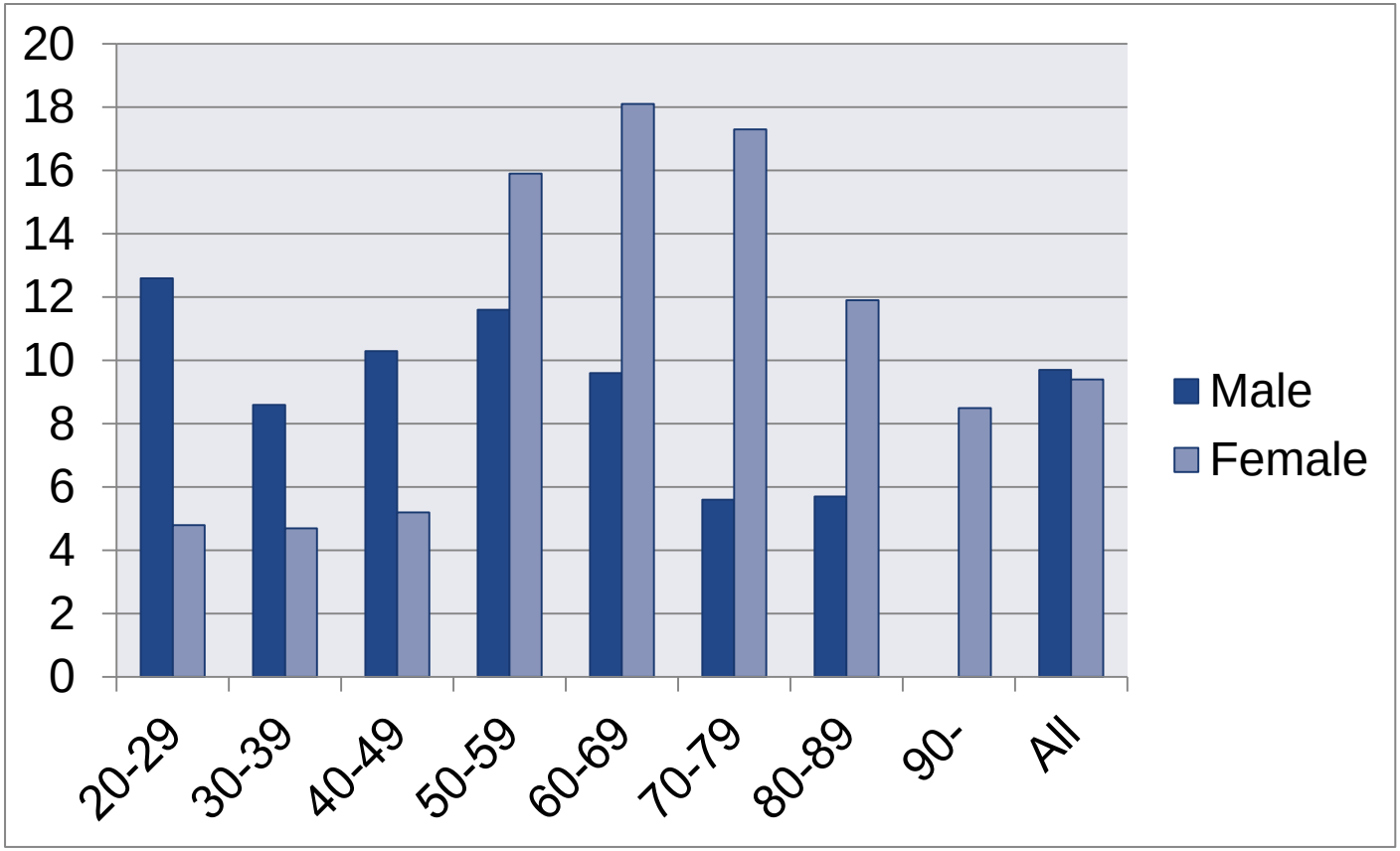
- Relatively uncommon, comprise 1% of all fractures

- Among the most challenging intra-articular fractures to treat

- Goals of ORIF:
  - Anatomical reduction of joint surface, normal rotation and mechanical axis
  - Stable fixation
  - Early mobilization

Injury mechanism

Incidence / 100.000



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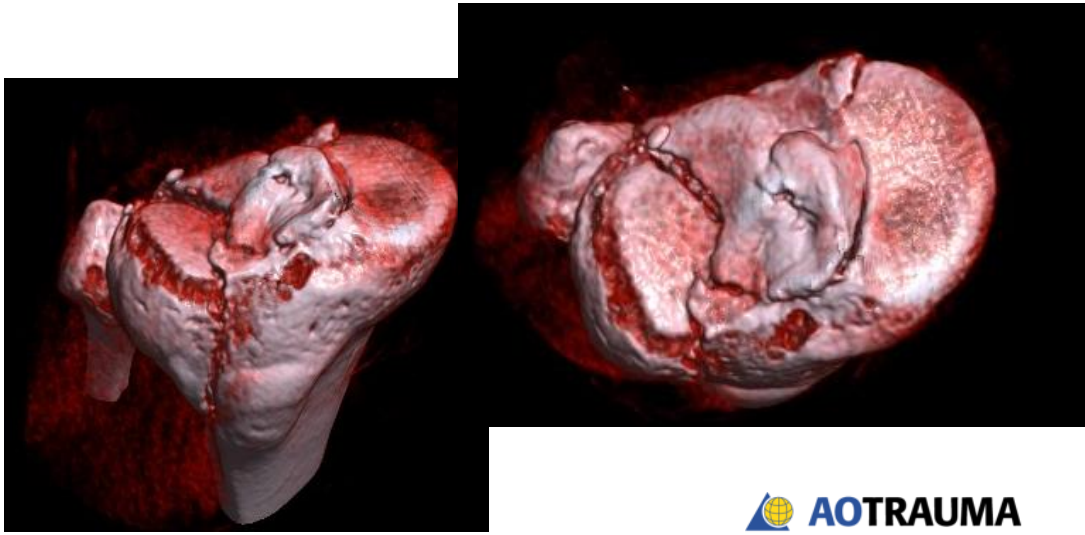
Understand the fracture

- AO Classification
- Schatzker classification
- CT / 3-D construct



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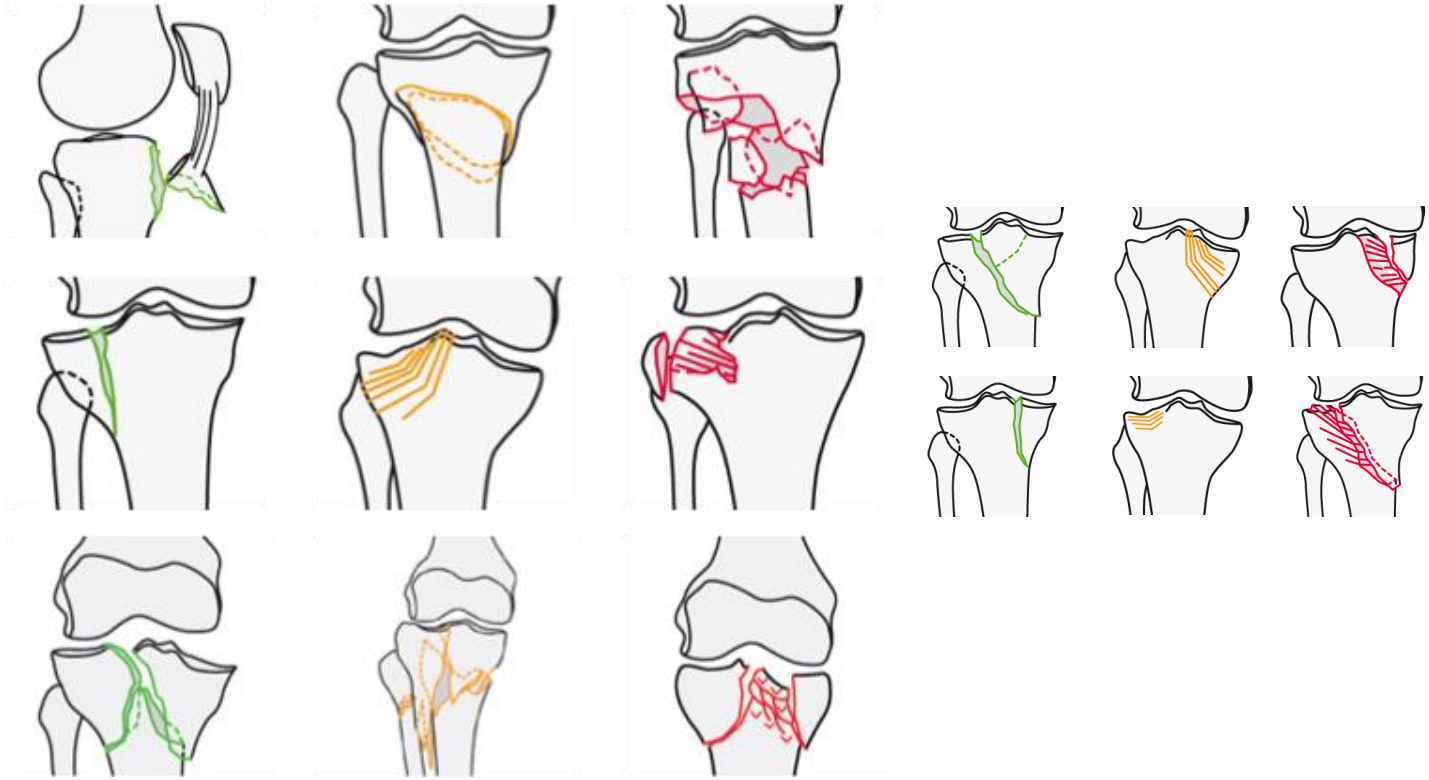
AO classification

A-type

B-type

C-type



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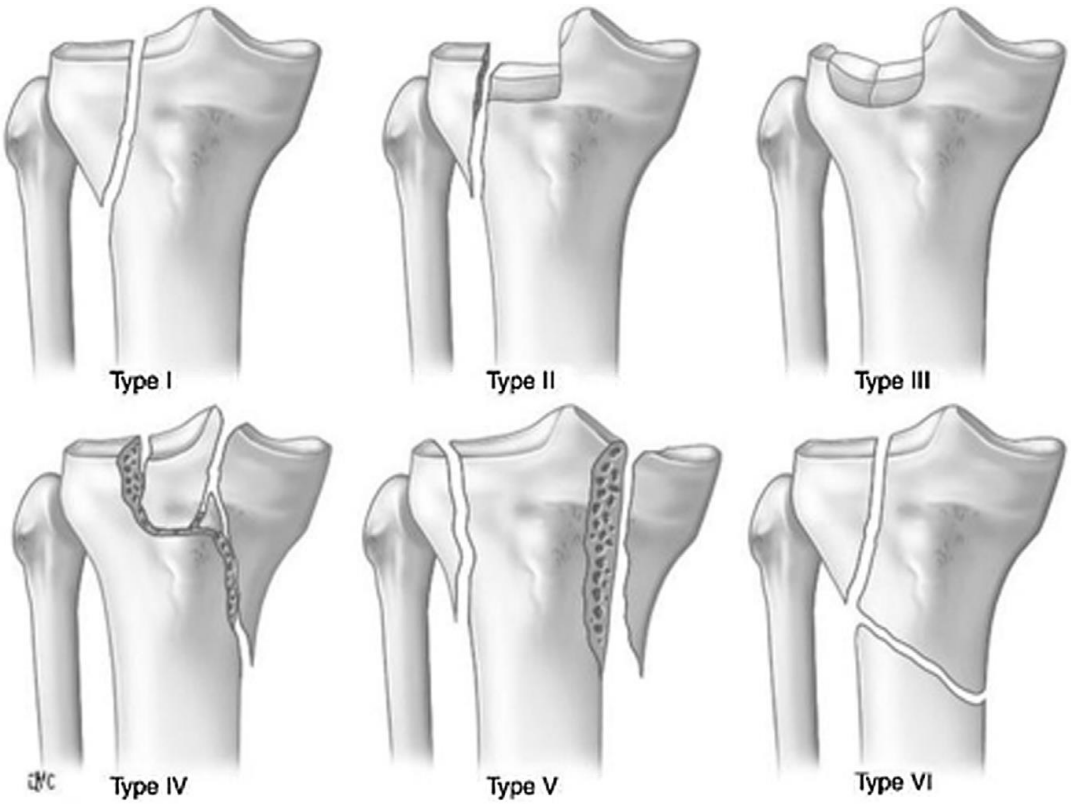
Schatzker classification



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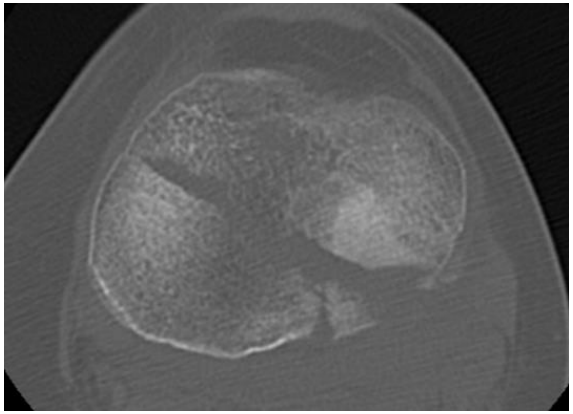
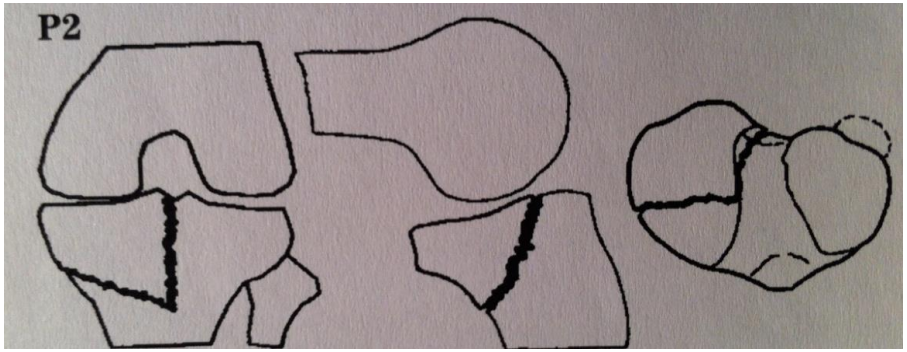
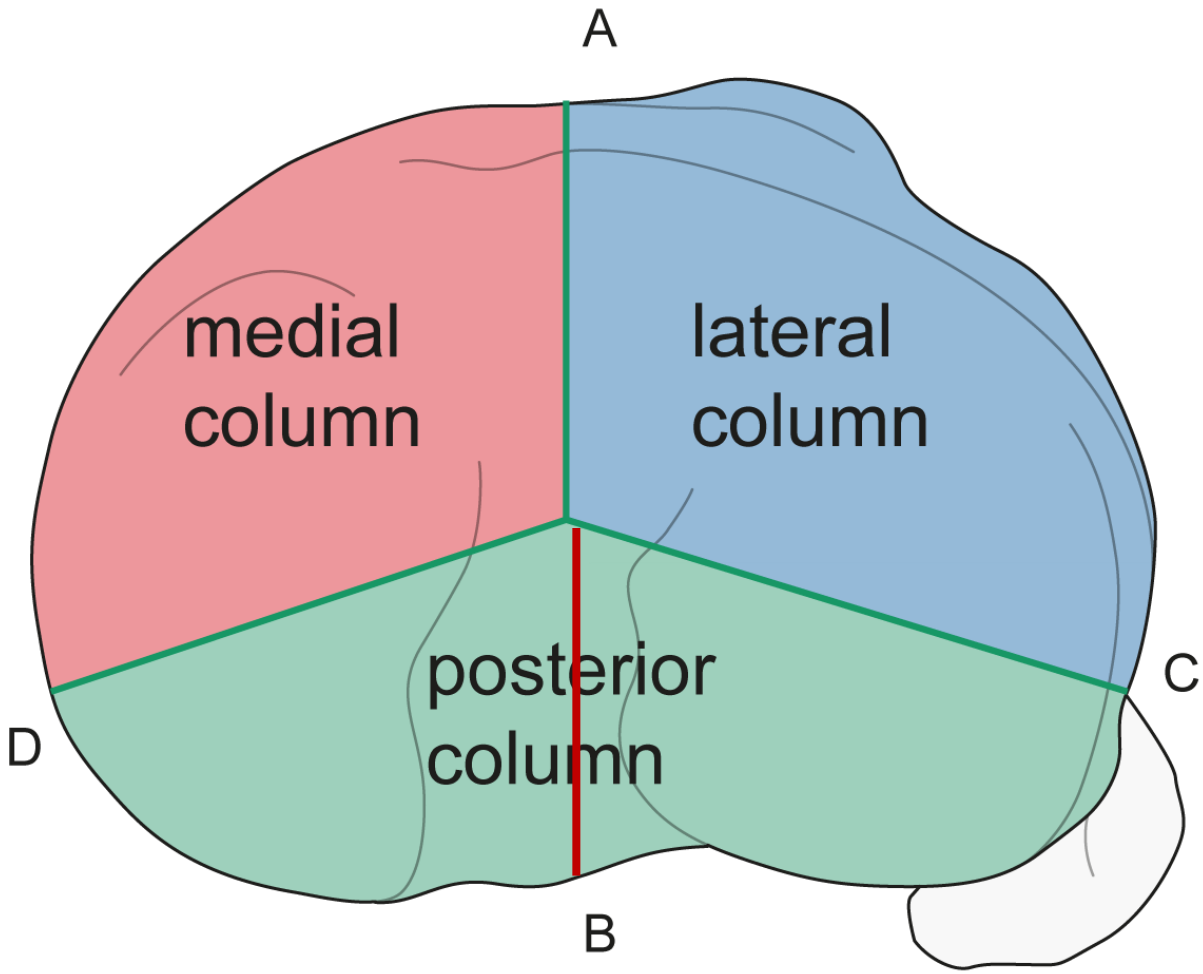
Posterior shearing fracture

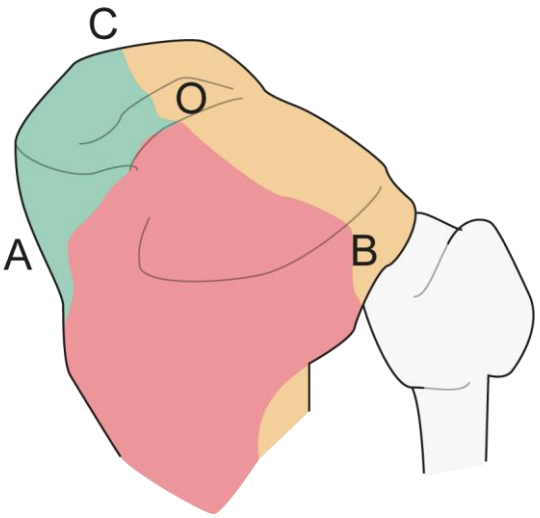




Moore Fracture-dislocation Type I

3-Column concept





Modern techniques to reduce infections

- Staged surgery - Use of temporary spanning external-fixator or splinting

  (Parekh et al. J Trauma 2007, Egol et al. J Orthop Trauma 2005)

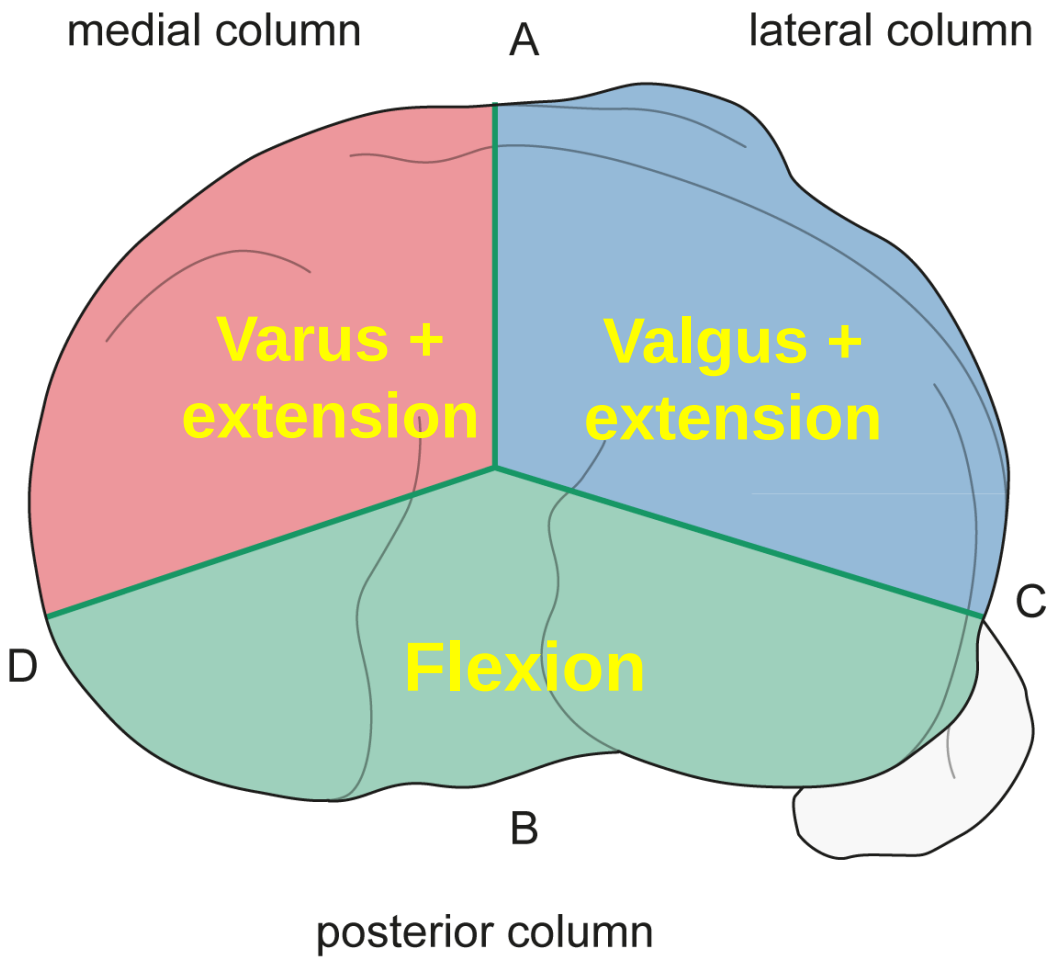
- Dual incision approach for bicolumnar fractures

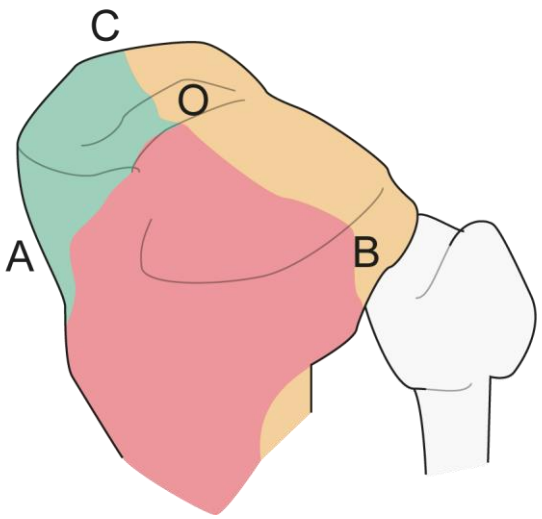
  (Barei et al. J Orthop Trauma 2004)

- Use of antibiotic prophylaxis

- Gentle soft tissue handling

A new way of thinking





Morphology and injury mechanism

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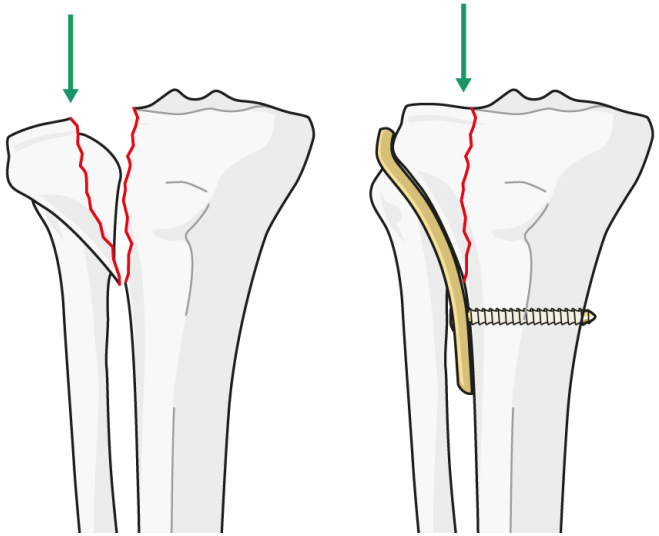
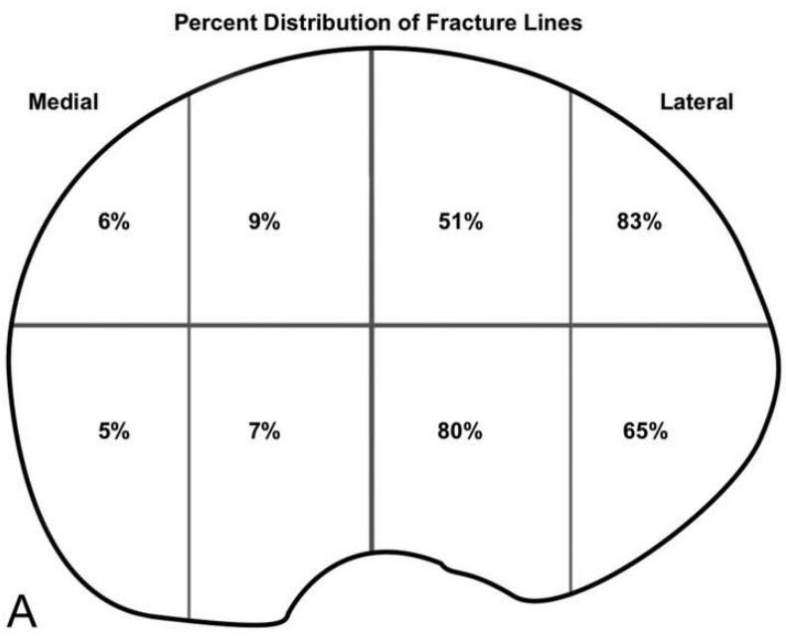
Principles for plate fixation

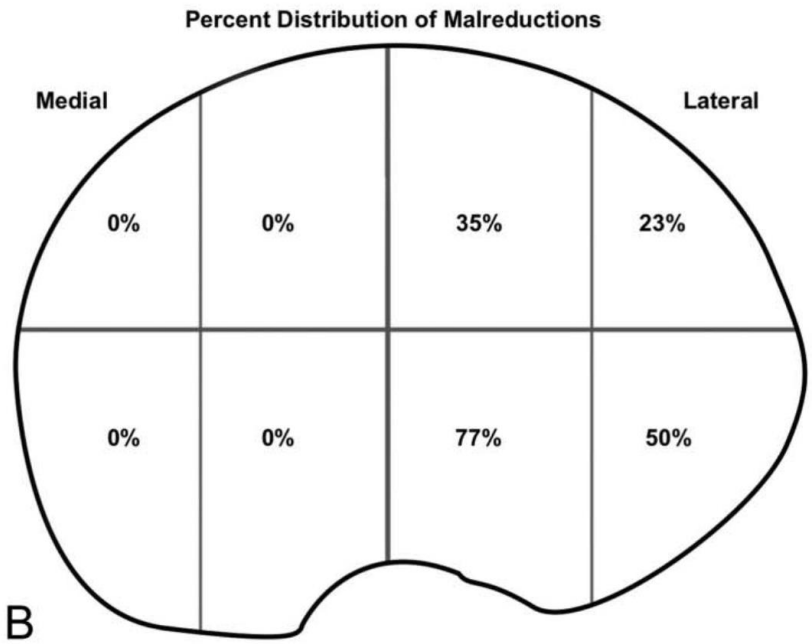
- Buttress fixation is preferred for column fractures
- Main buttress plate is chosen according to the **injury mechanism**
- Bridging is used for comminuted metaphyseal fractures



Risk of Malreduction

- Meulenkamp et al. 2017
- 67 postoperative CT scans
- Fluoroscopic reduction alone was a predictor of malreduction





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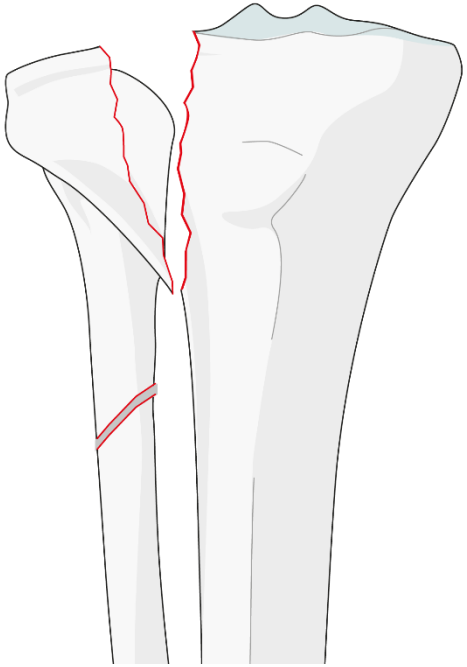
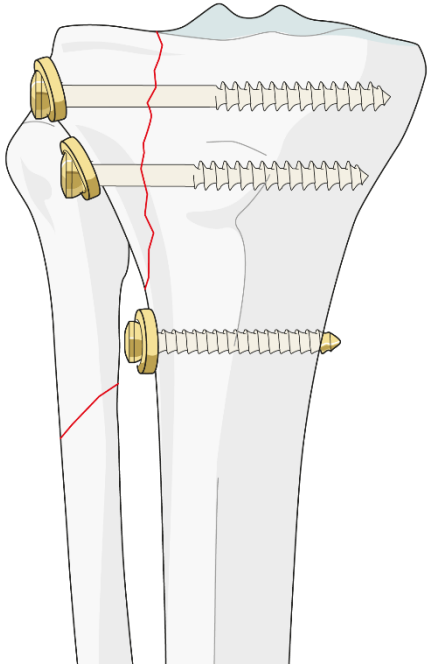
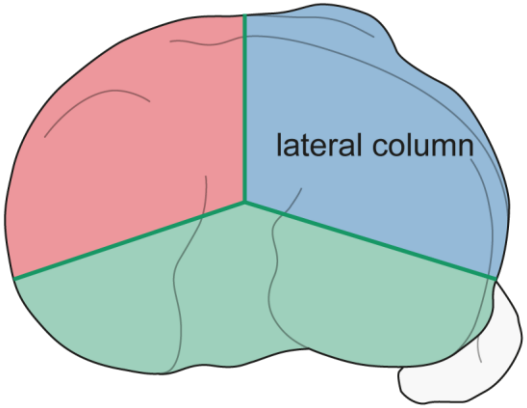
Schatzker type I—Lateral column

Valgus extension mechanism







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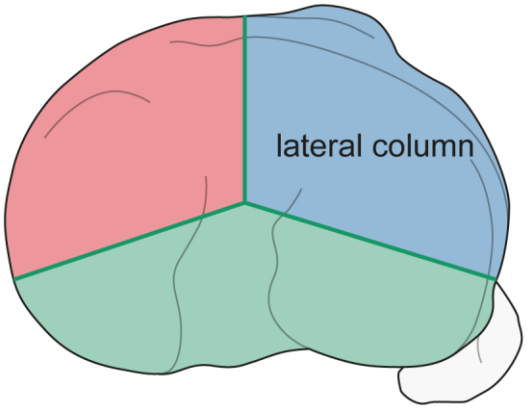
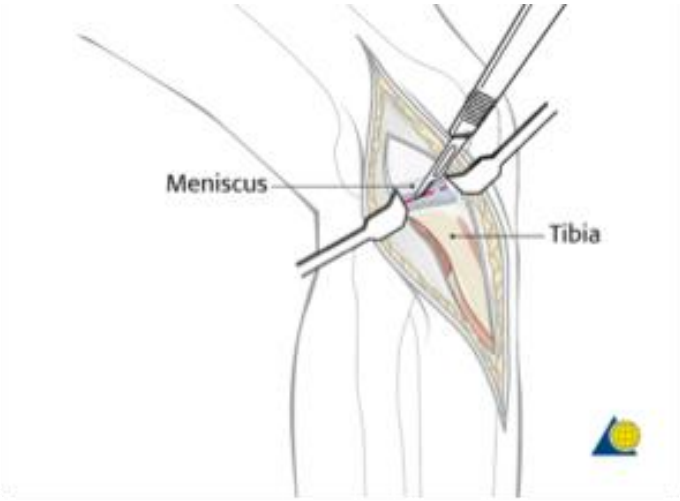
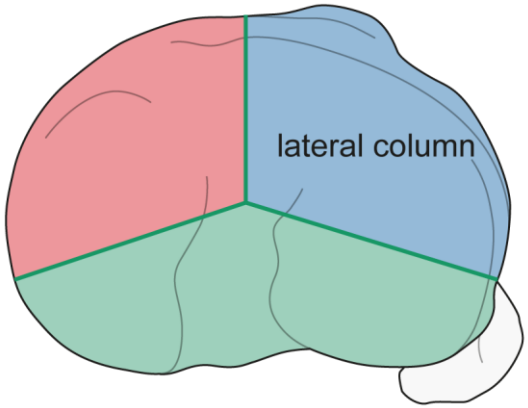
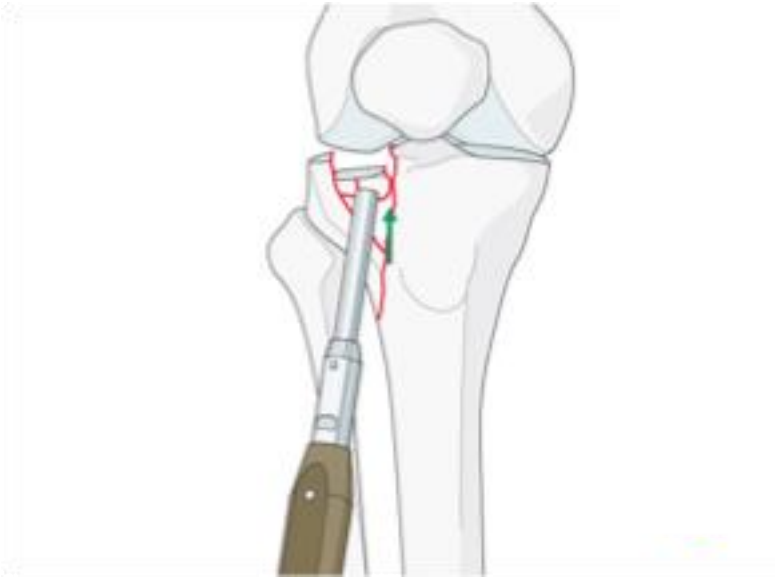
Schatzker type II—Lateral column

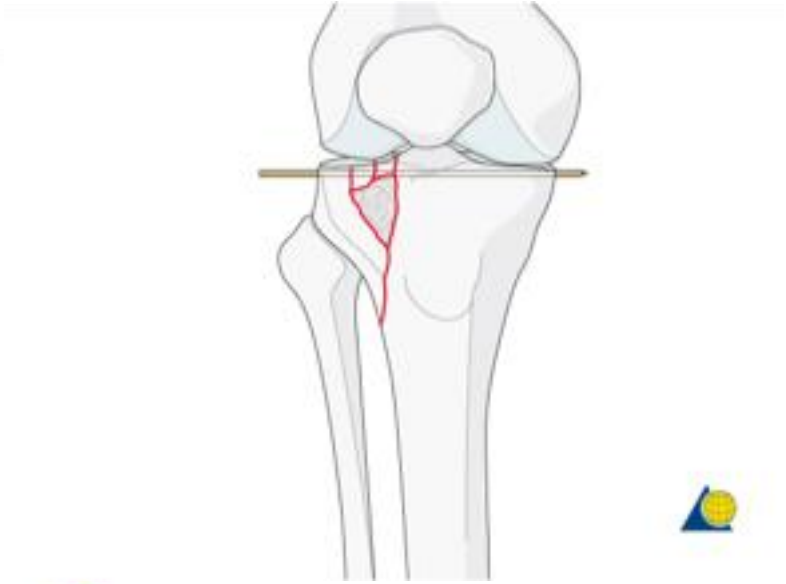


Schatzker type II—Lateral column









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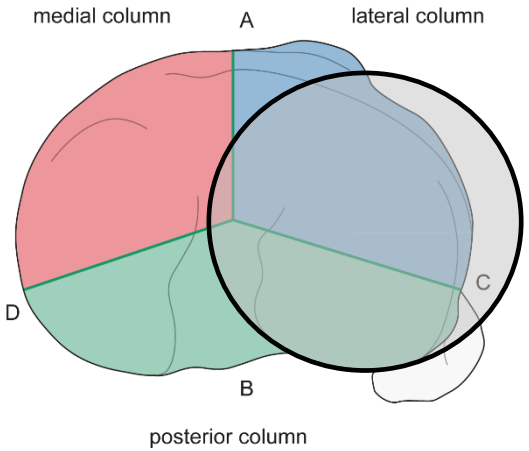
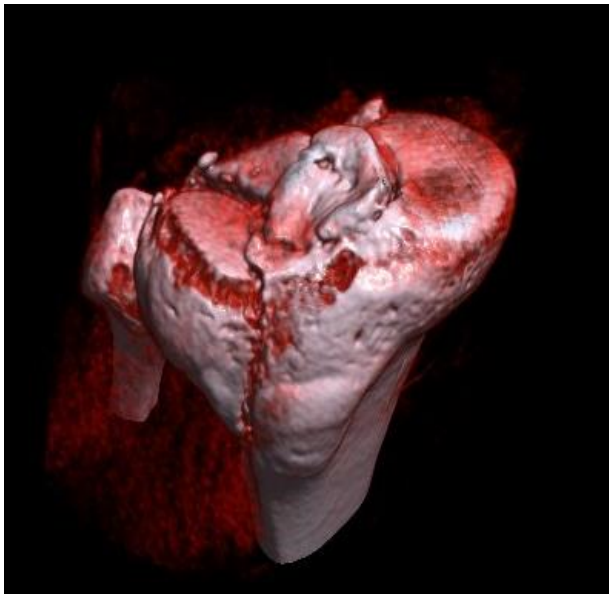
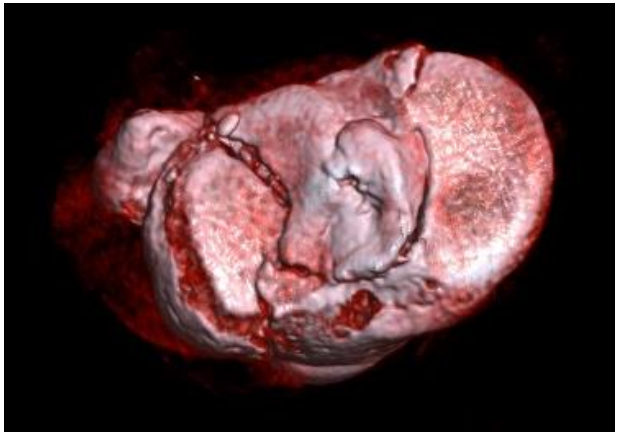
Lateral + Posterior column fracture

Flexion- valgus mechanism







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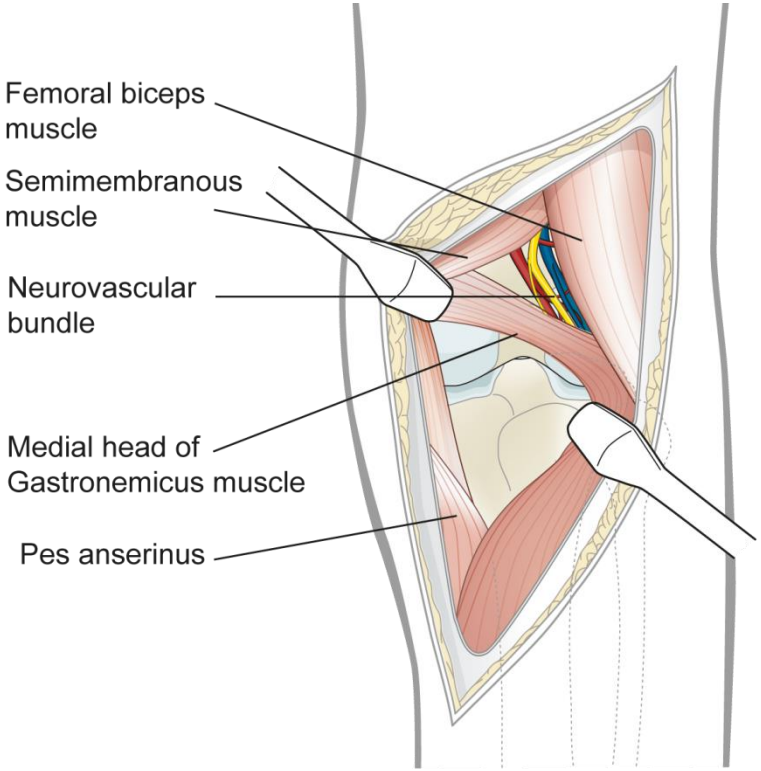
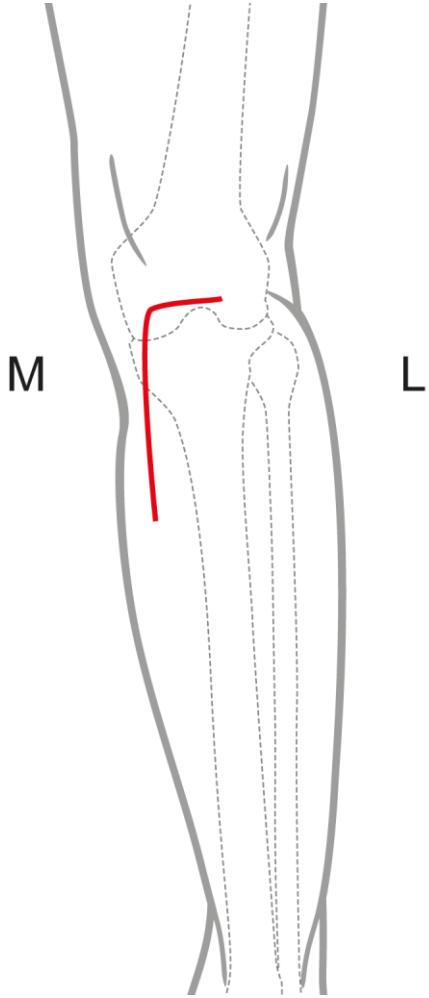
Lateral + Posterior column fracture





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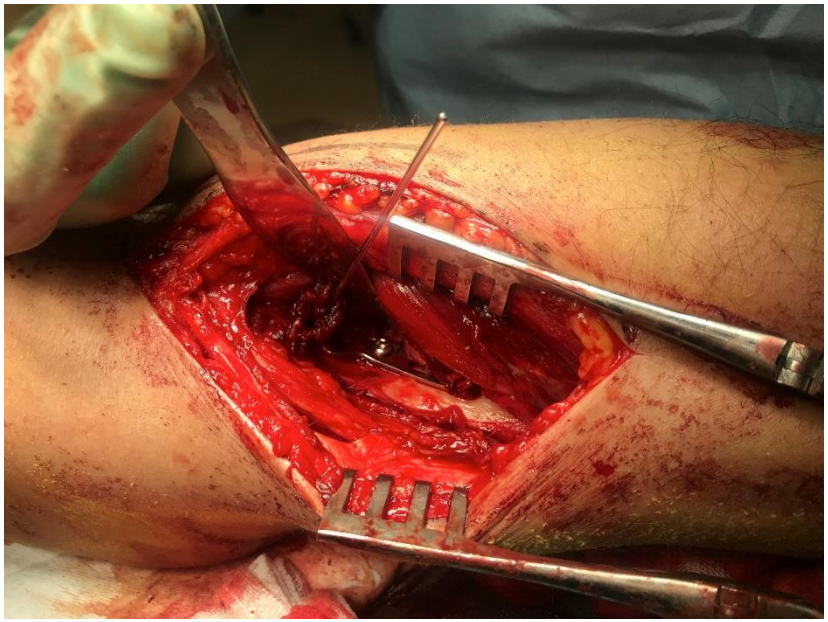
Lateral + Posterior column fracture



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Lateral + Posterior column fracture

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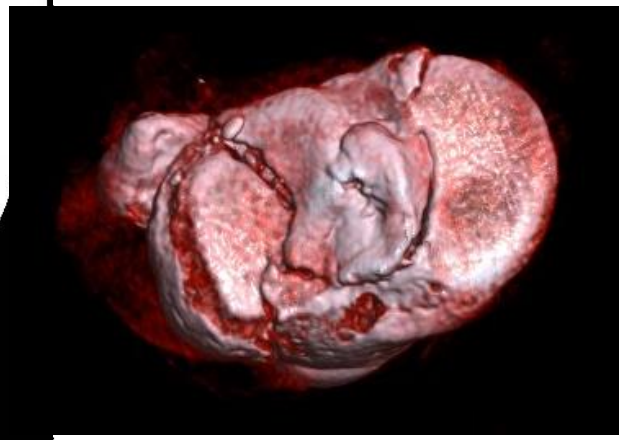

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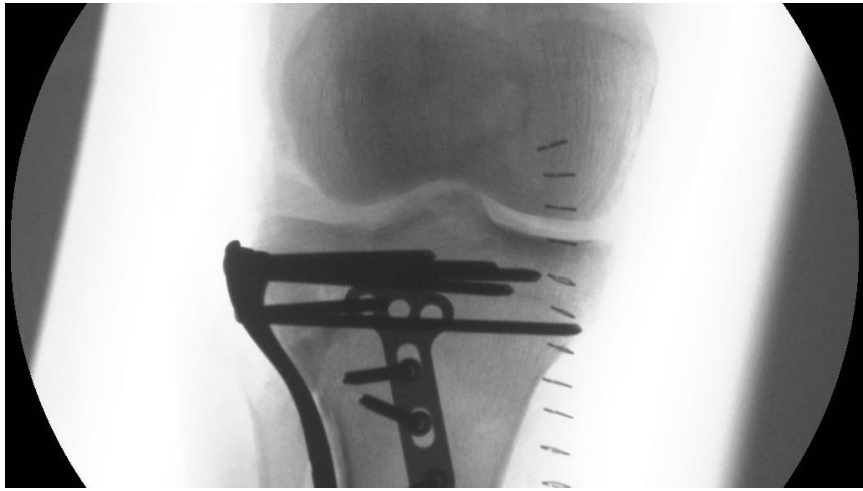
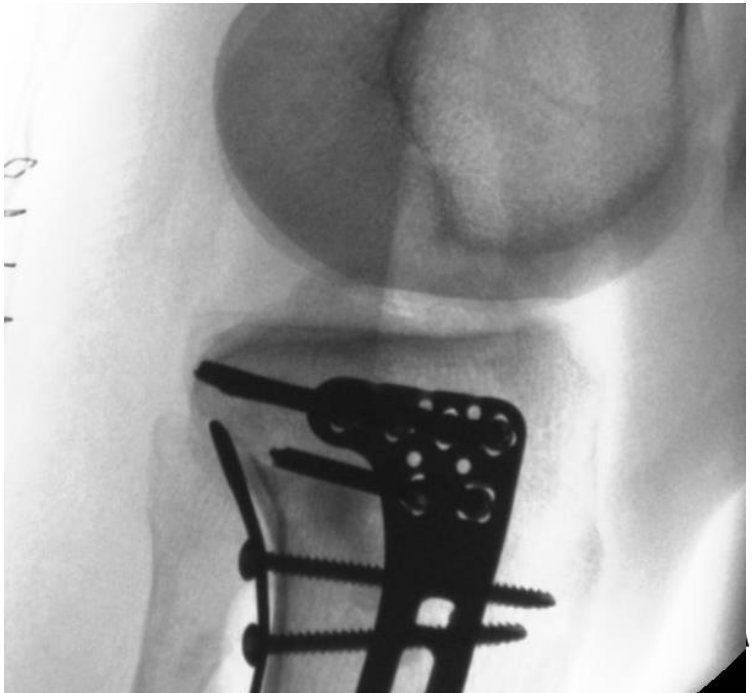
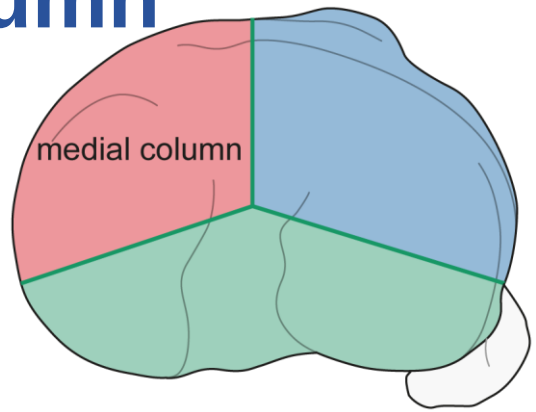
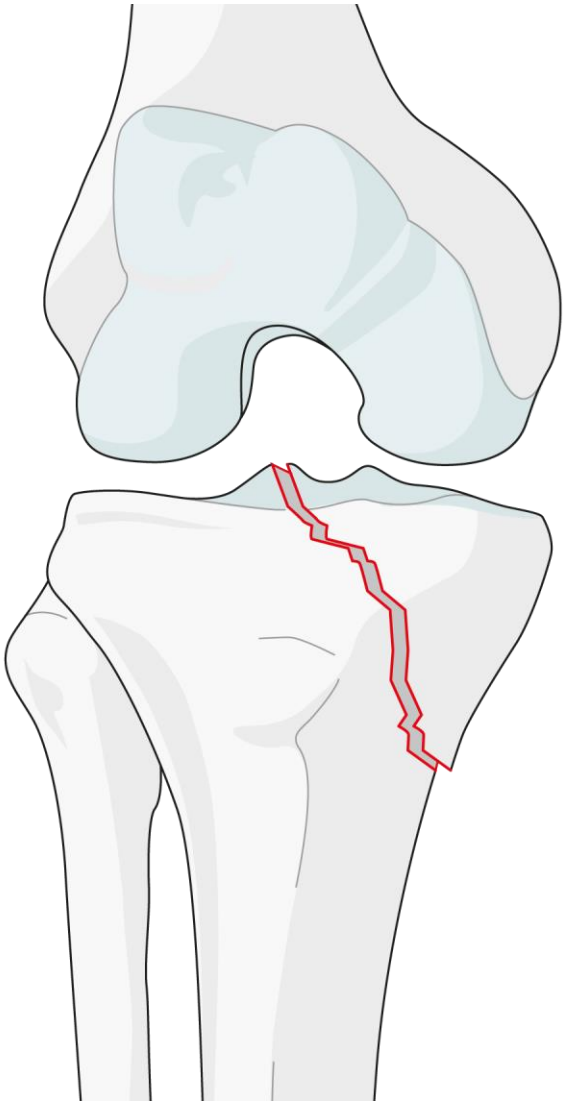




Schatzker type IV—Medial column

Extension varus mechanism





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Schatzker type IV—Medial column

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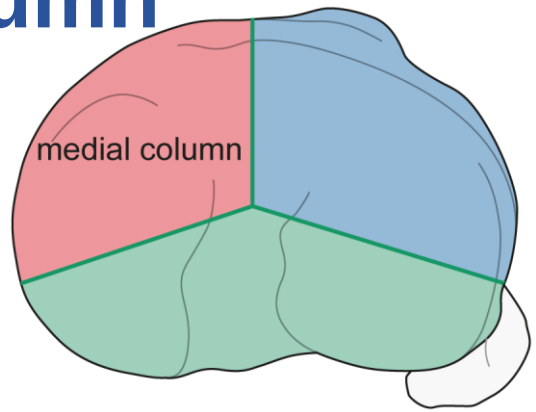

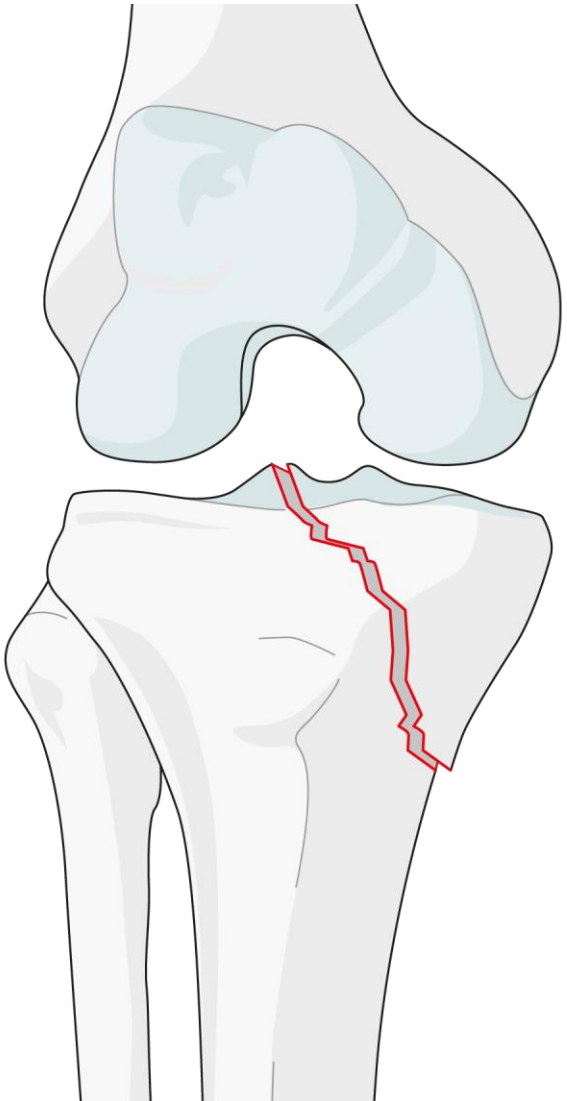

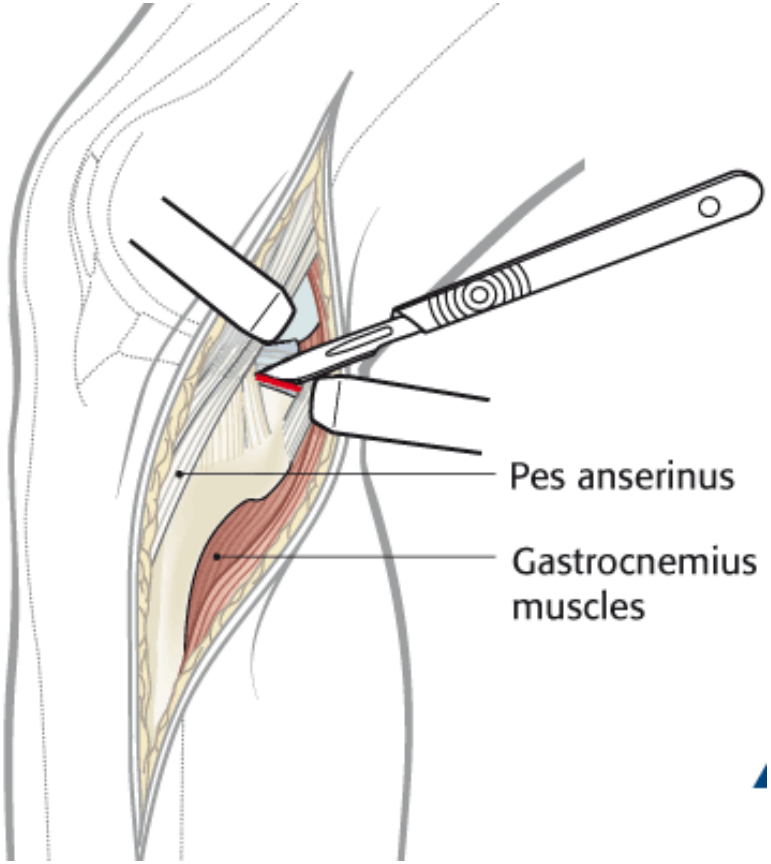

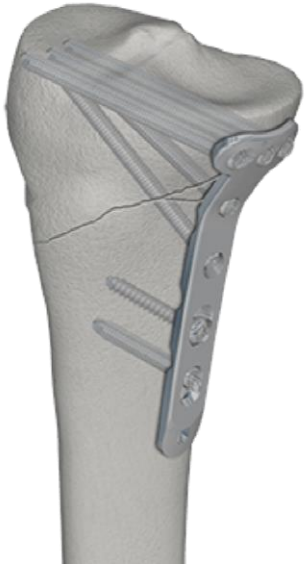

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AP screws to medial plateau split fracture

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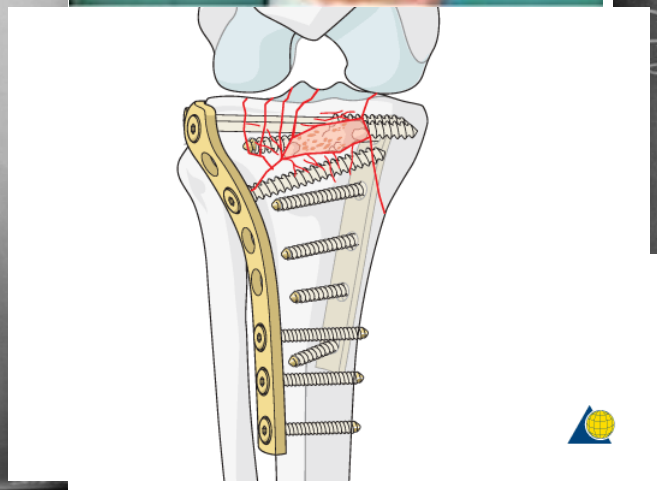
Bicondylar fracture: 3-Column fracture



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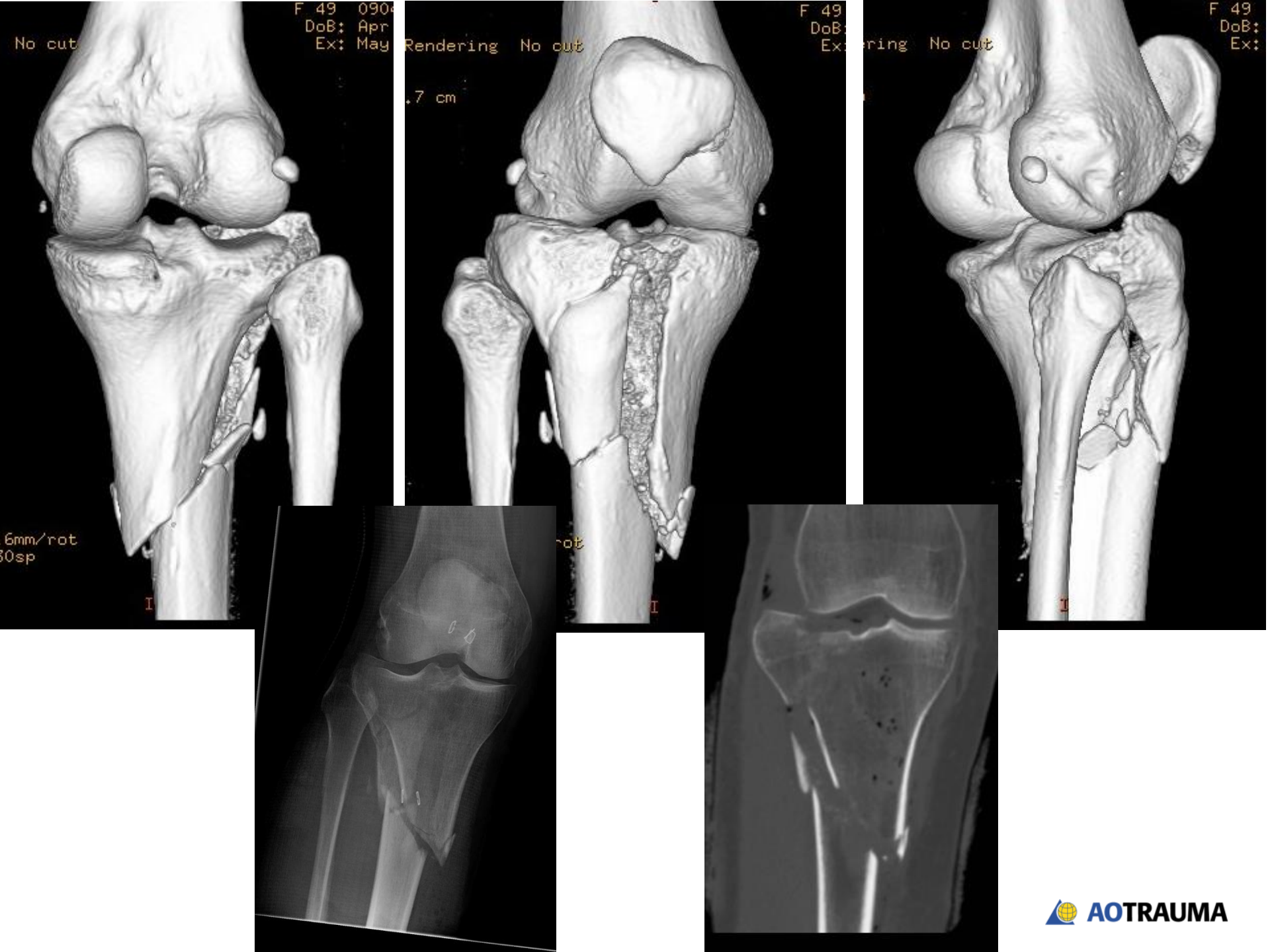

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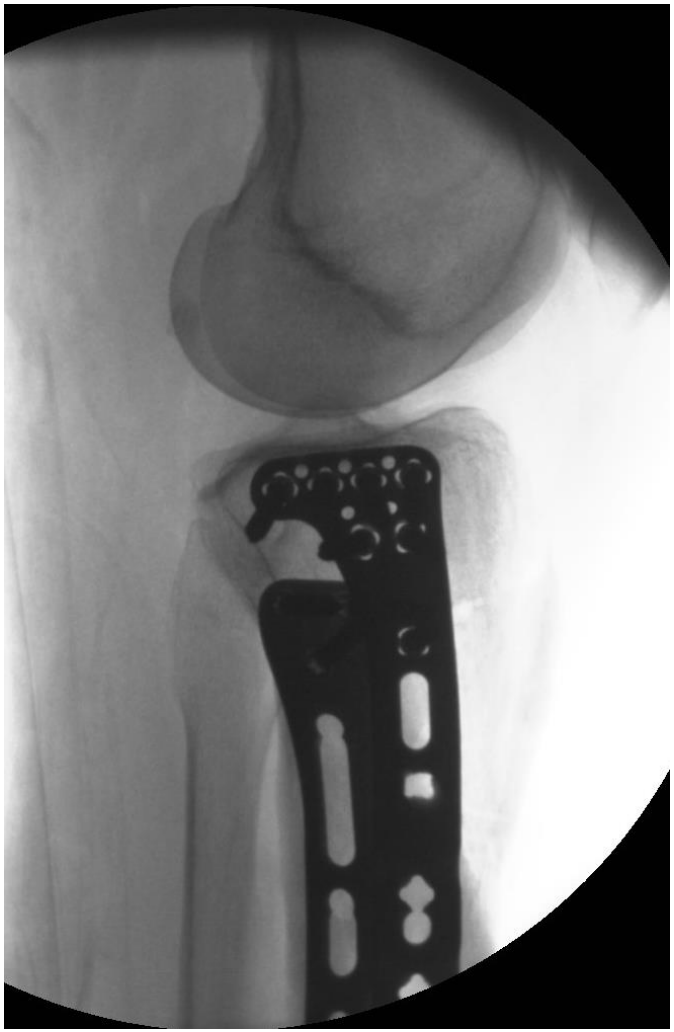
Dual approach: Anterolat and posteromed



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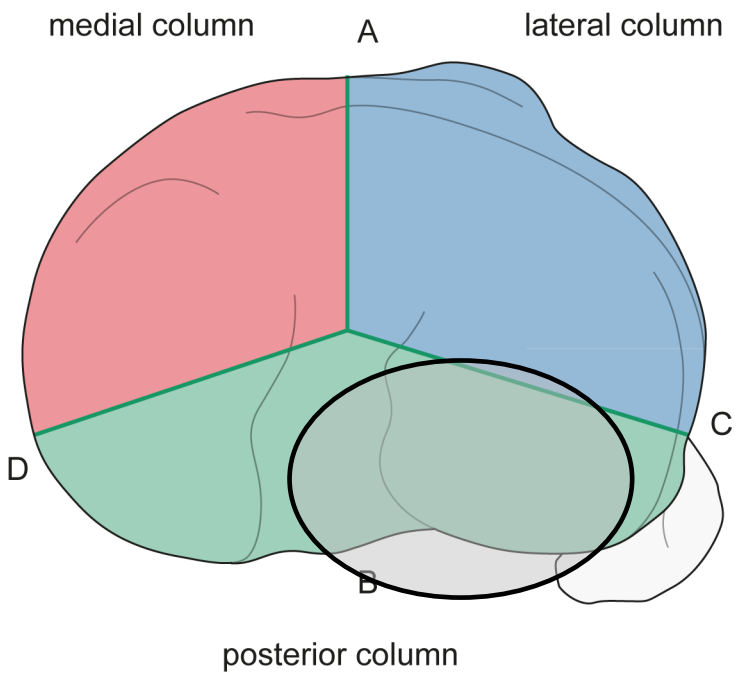
Bicondylar fracture: 3-Column fracture



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Posterior and anterolateral approach

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A comparative study of Less Invasive Stabilization System (LISS) fixation and two-incision double plating for the treatment of bicondylar tibial plateau fractures

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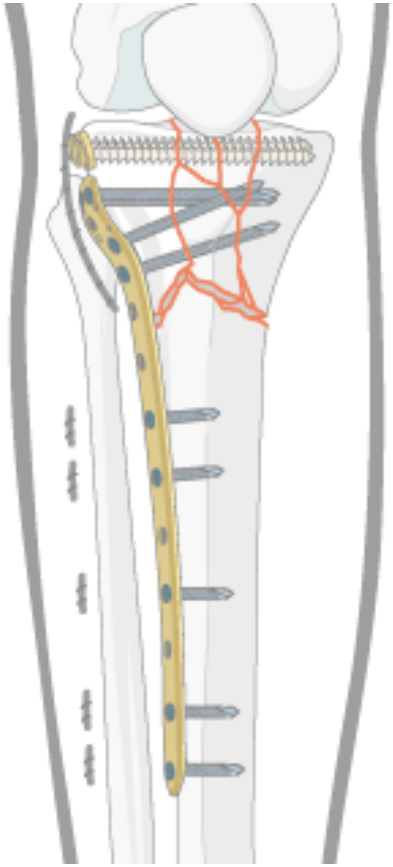
With LISS fixation a significantly higher incidence of postoperative malalignment



Take-home messages

- Fully understanding the fracture is essential for decision making and definitive fixation
- Approach selection and fixation should take into account the soft tissue, mechanism of injury, and 3-D morphology
- 3-column classification provides a new way of thinking for the treatment of tibial plateau fractures – try to recognize posterior column