

# Tibial plateau fractures



# The problem

- Large WB joint
- Aetiology varies
  - Osteoporotic
  - High energy
- Associated injury
  - Menisci
  - Ligaments
  - neurovascular

# Aims

- Restore motion
  - No POP
- Stability
  - #
  - joint
- Anatomical restoration articular surface
- Accurate alignment



# Failure

- Displacement
- Malalignment / incongruity
- Instability
- Pain
- Stiffness



?

# How many tibial plateau fractures do you deal with / year ?

- 1      0
- 2      <5
- 3      5 – 10
- 4      >10

# Assessment

- History
- Exam
  - ST envelope
  - Neurovascular
  - ligaments

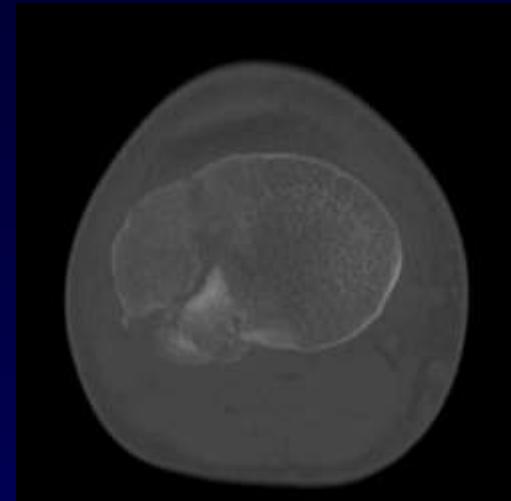
# Assessment

- Radiology
  - AP/Lat
  - Medial - concave
  - Lateral - convex



# Assessment

- Radiology
  - Oblique
  - Intra-op



# Assessment CT

3-D



# Assessment

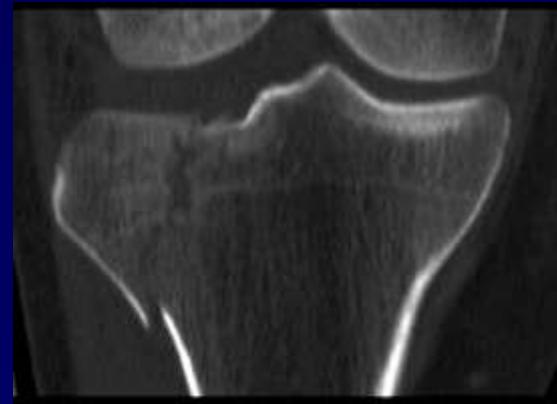
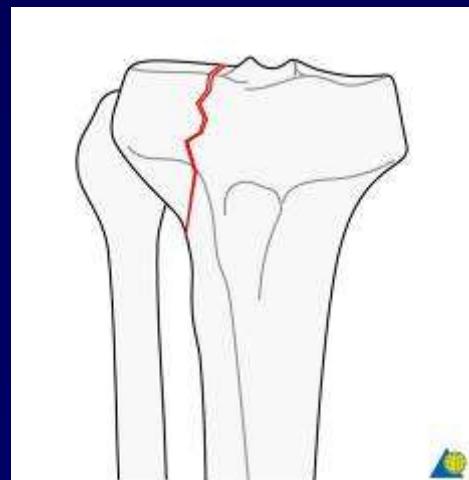


# Classification

- Schatzker
- 6
  - Aetiology
  - Pattern
  - outcomes

# Schatzker I

- Age < 40
- MCL 36%
- Meniscal



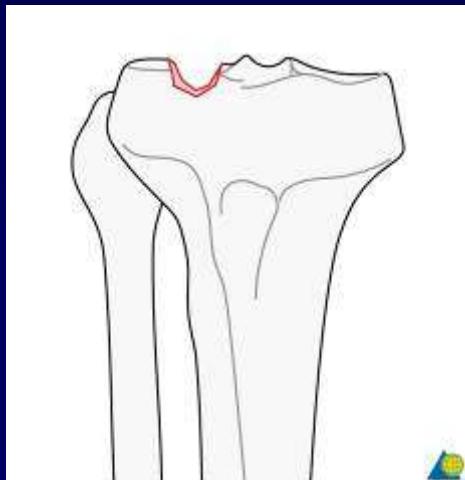
# Schatzker II

- MCL 36%
- Meniscus ? 90% Gardner 2005



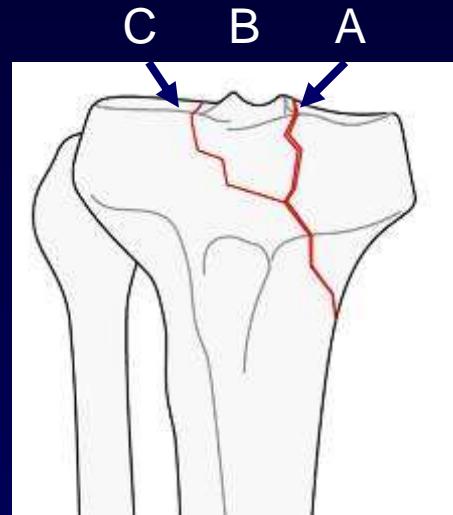
# Schatzker III

- Osteoporosis
- Low energy
- Rare



# Schatzker IV

- ACL / PCL 60%
- LCL 57%
- Peroneal n

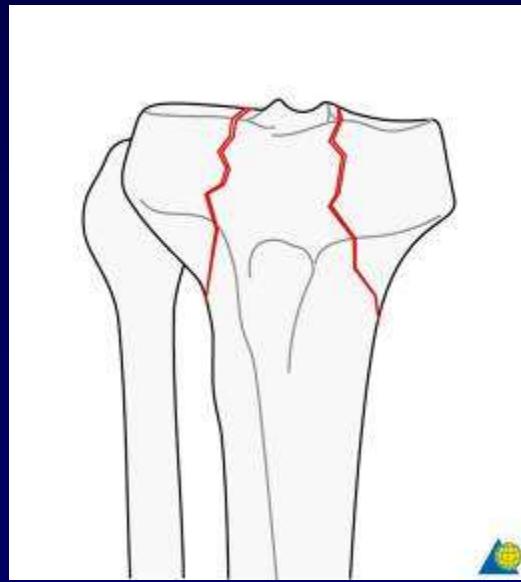


# Schatzker IV



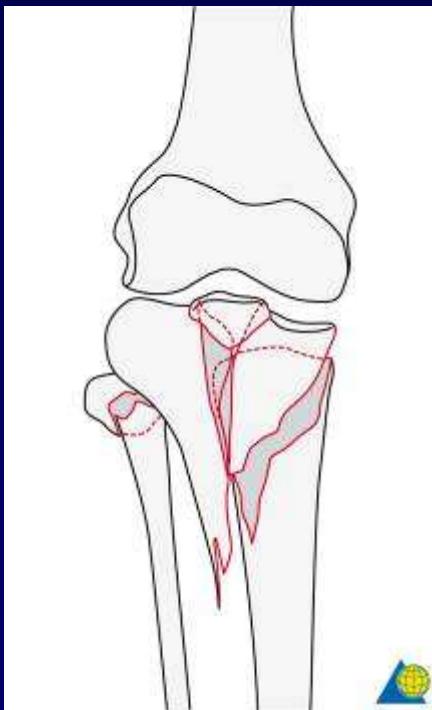
# Schatzker V

- Metaphysis / diaphysis intact



# Schatzker VI

- High energy
- metaphyseal / diaphyseal dissociation

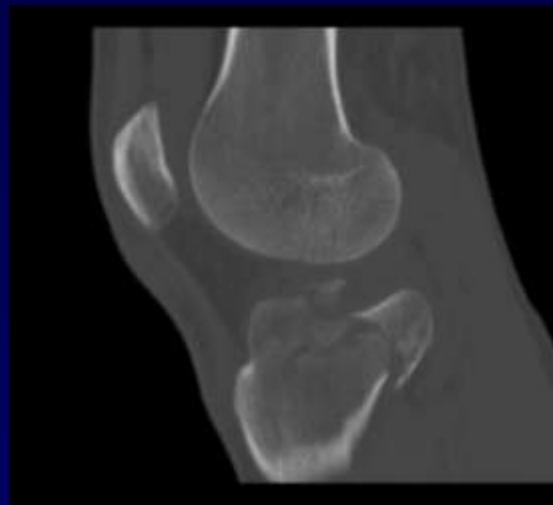


?

# How many Schatzker V - VI fractures do you deal with in 6 years of training ?

- 1      0
- 2      <5
- 3      5 – 10
- 4      >10

# Non- Schatzker Posterior shear #s



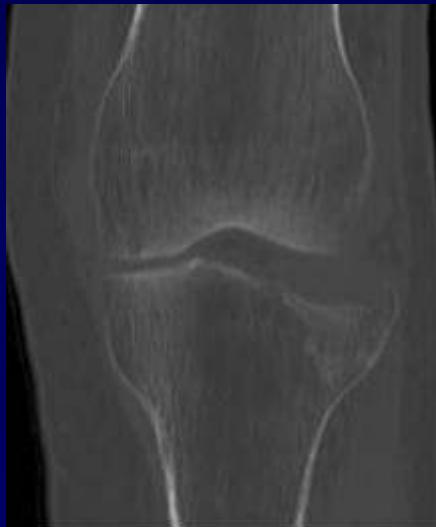
# Non- Schatzker Posterior shear #s

- Posterior approaches
- Fibular osteotomy



# Non- Schatzker Antero-medial compression #'s

- PCL
- Postero-lateral corner



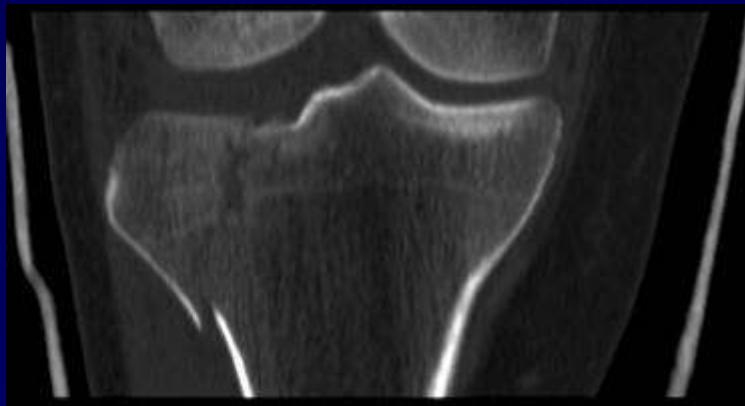


# Management



# Schatzker I

- Meniscus
- MCL



?

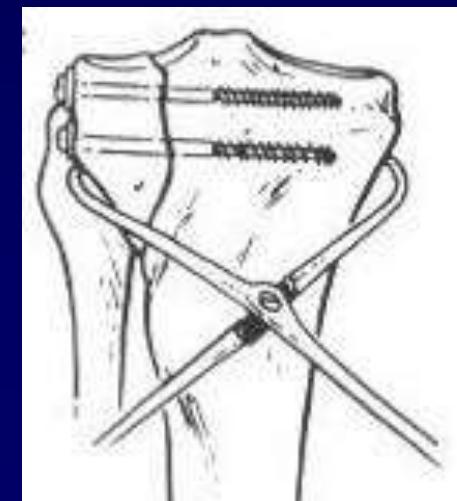
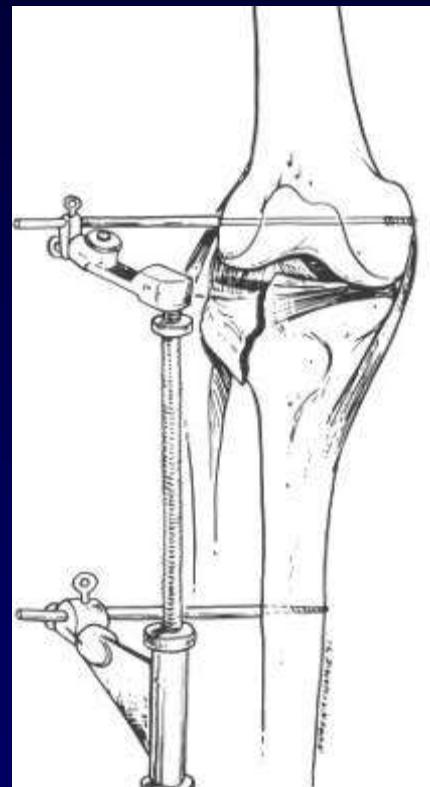
# How would you treat this # ?

- 1 Conservatively / brace etc
- 2 ORIF lag screws
- 3 ORIF buttress plate
- 4 MIPO 2 screws
- 5 MIPO 2 screws / antiglide screw



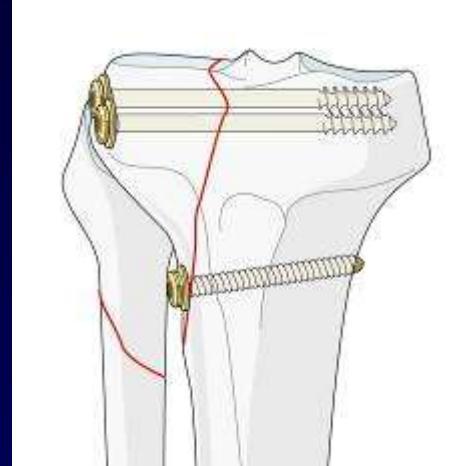
# Schatzker I Management

- Ligamentotaxis



# Schatzker I Management

- Lag screws +  
antiglide
- 2 biomechanically  
superior



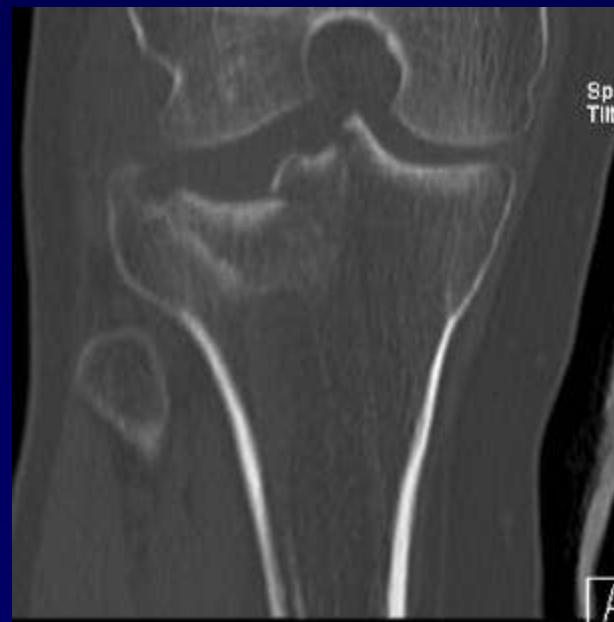
Koval 1996

- ? buttress

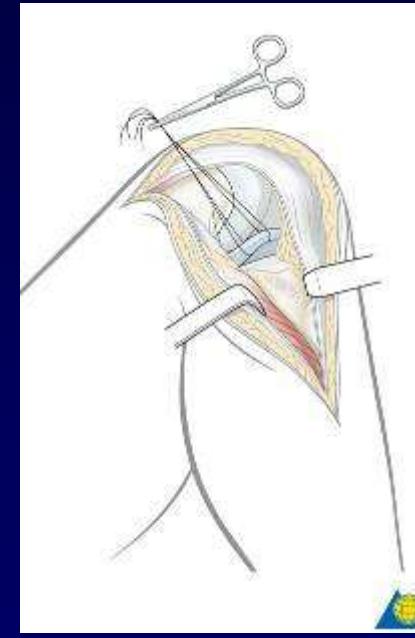
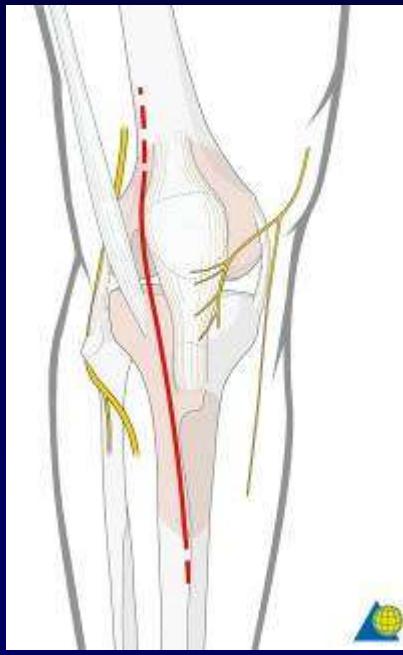


# Schatzker II management

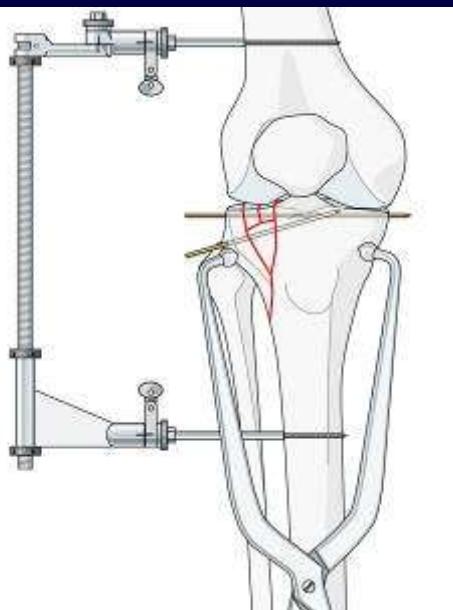
- Osteopaenia
- comminution



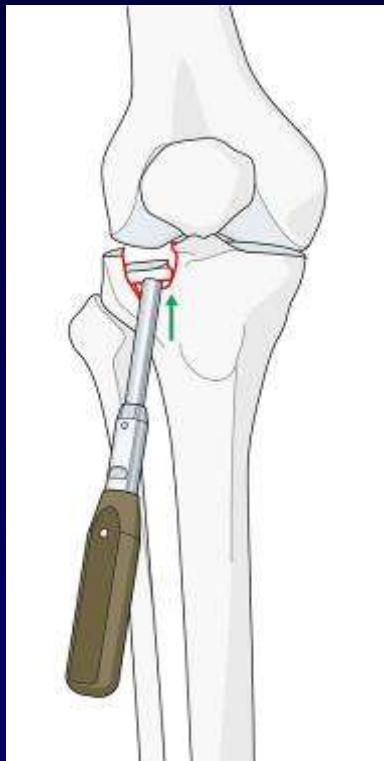
# Schatzker II Management



# Schatzker II Management



30° flexion



Bone graft



# Schatzker II Management

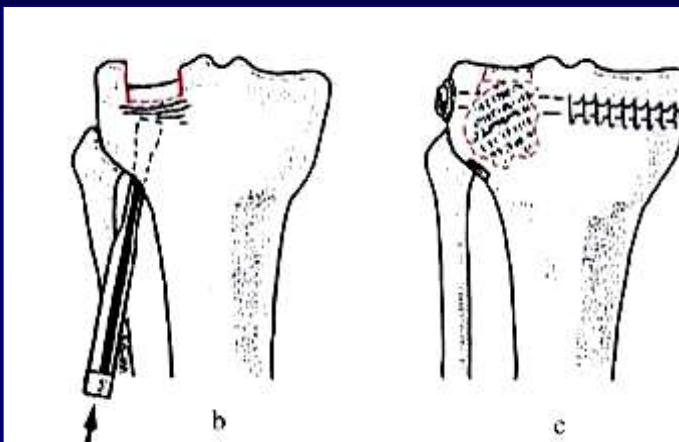


# Schatzker III

- Osteopaenia
- Comminution
- Low demand



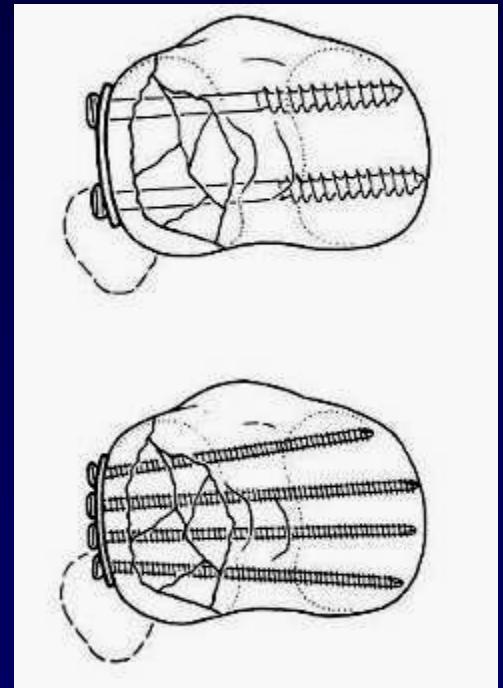
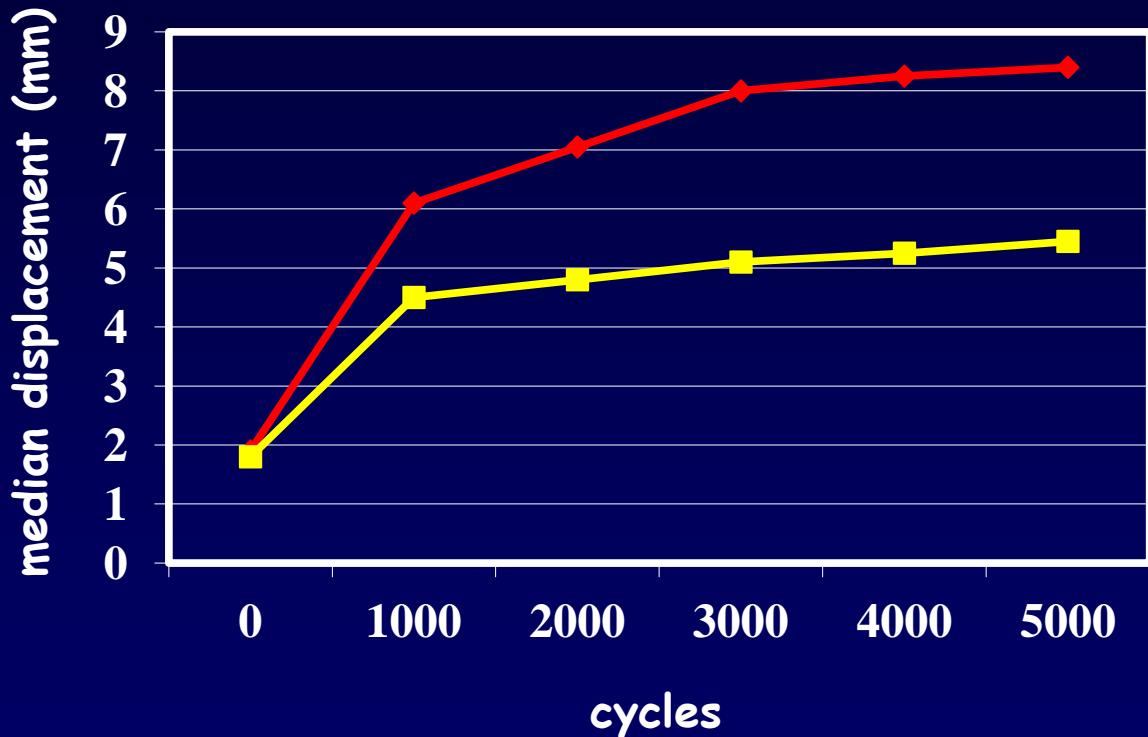
# Management



# Management



# Management



Patil / Port 2006

# Management

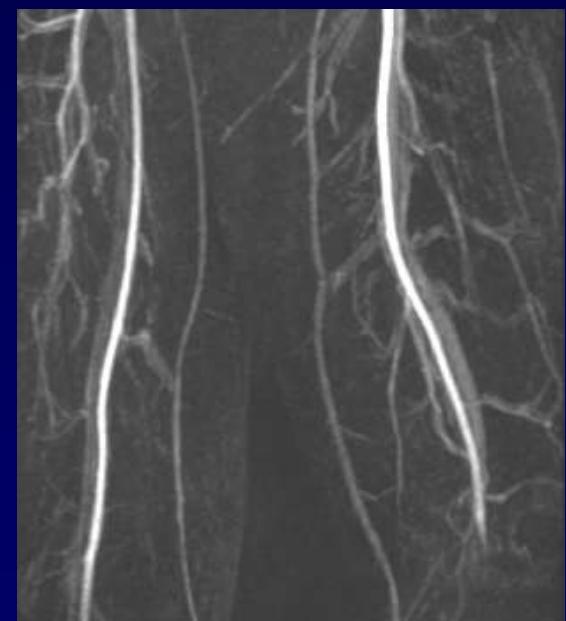
- EUA

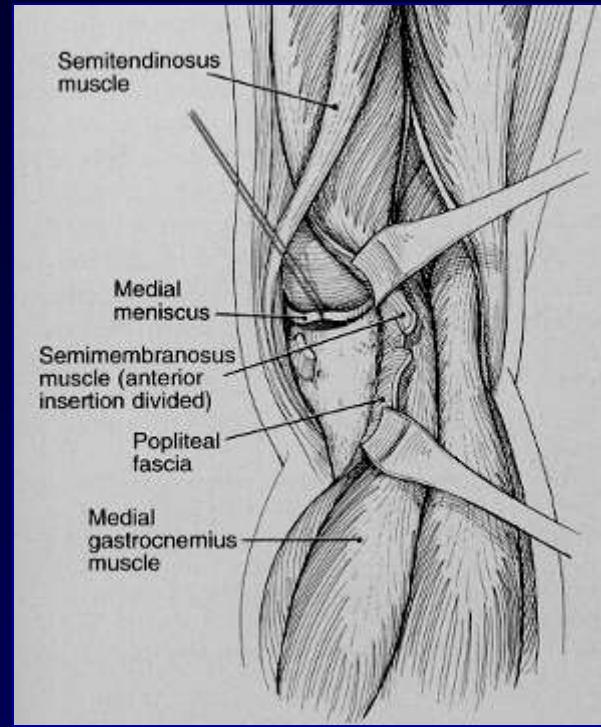
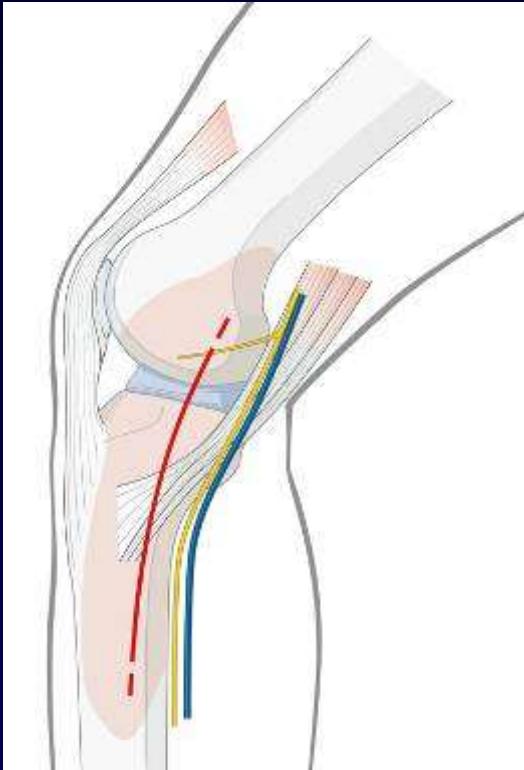


# Complex



# Schatzker IV





# Schatzker V - VI

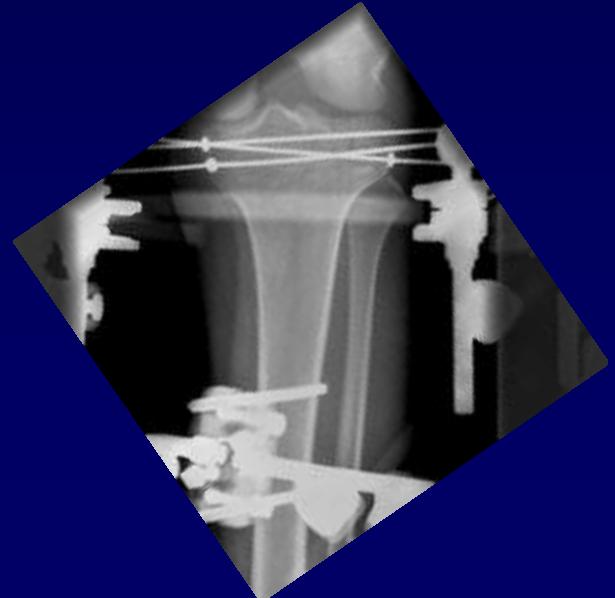
- High energy
- ST !!!!



# Schatzker V - VI

## Management

- ORIF
  - Single
  - Double
- LISS
- Ex Fix



# Schatzker V – VI complications

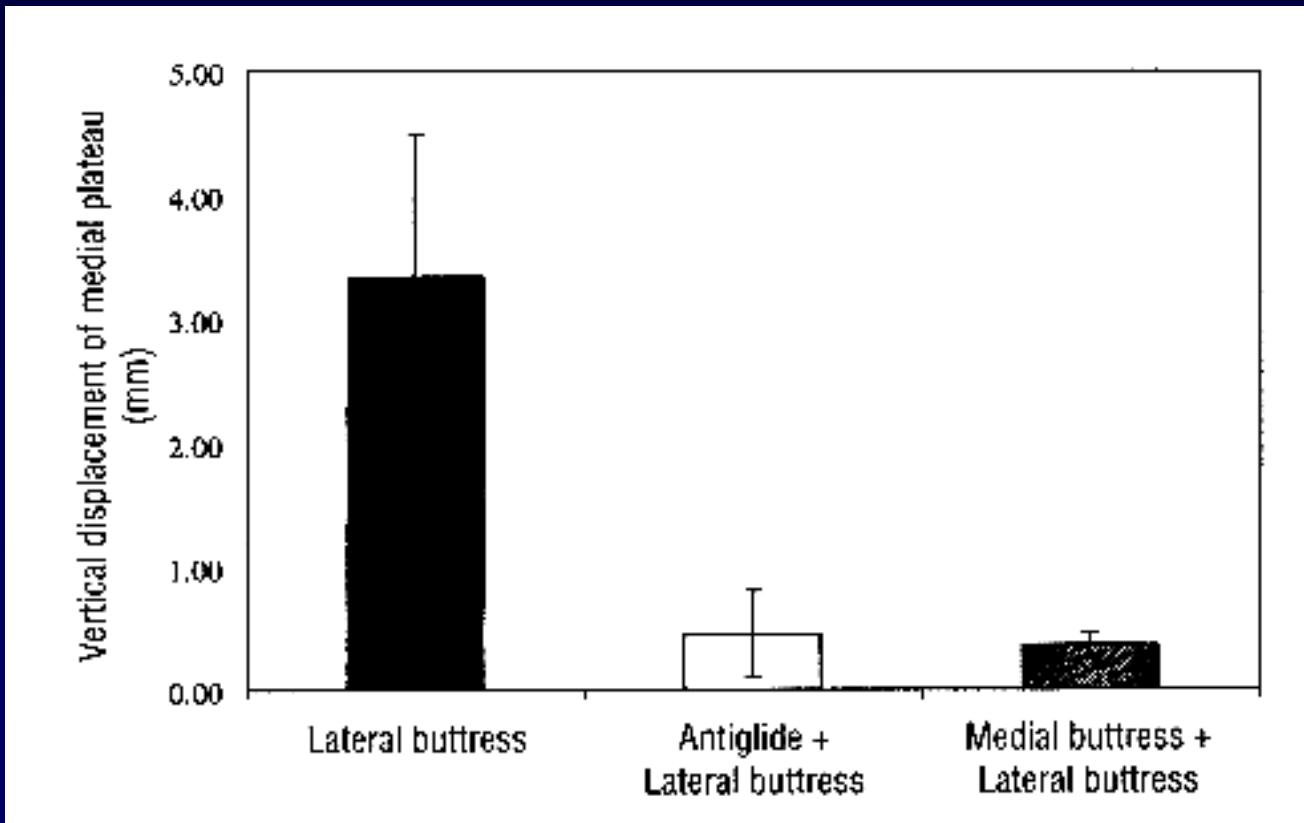
- wound dehiscence
- infection
- articular collapse
- malunion



# Schatzker V – VI single plate



# Schatzker V - VI management



# Schatzker V - VI

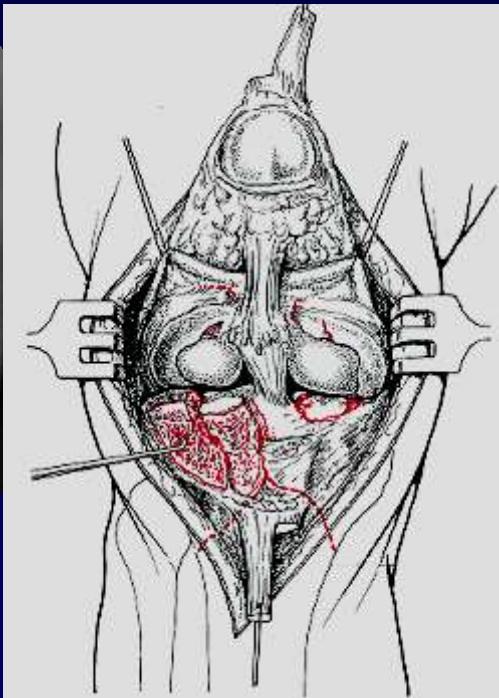
## double plating

- Infection
  - 20% Canadian OTS 2006
  - 10% Marti 2007
  - > 80%
- Reduction
  - 93% Marti 2007
  - 55% Mills 2006 ( 2mm)



# Schatzker V - VI

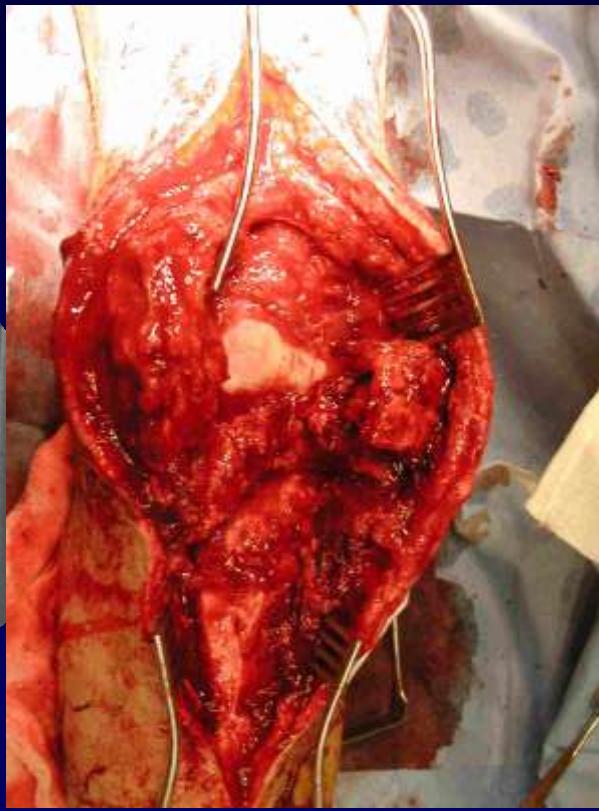
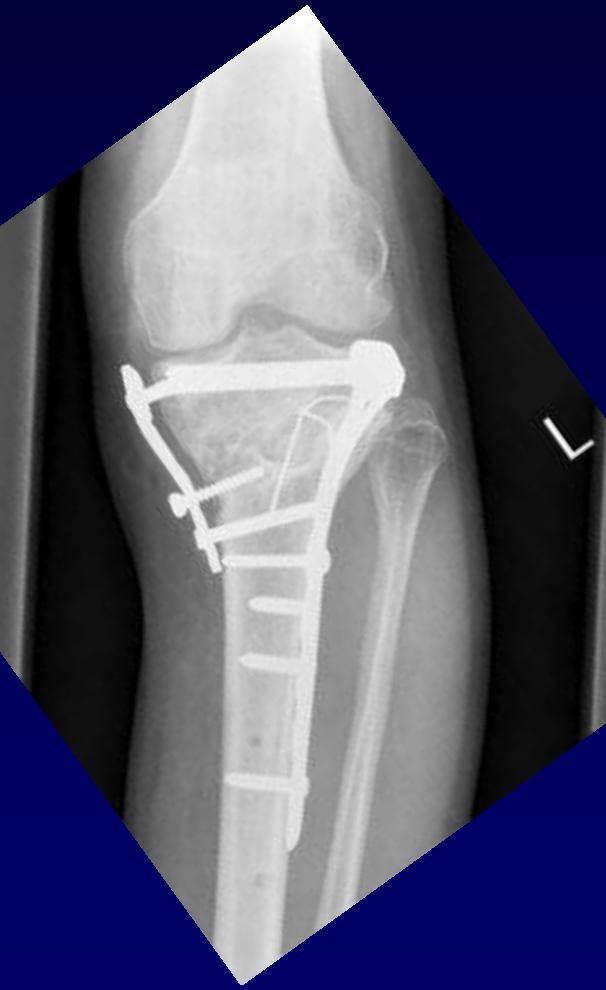
## double plating



# Spanning fixator

- The incision was placed to avoid the blisters!!!!!!
- The wound was closed in layers under tension







# Schatzker V – VI

## locked plate

- benefits
  - soft tissue
  - infection
    - 1% Gosling 2005
    - 4% Cole 2003 inj.
- healing

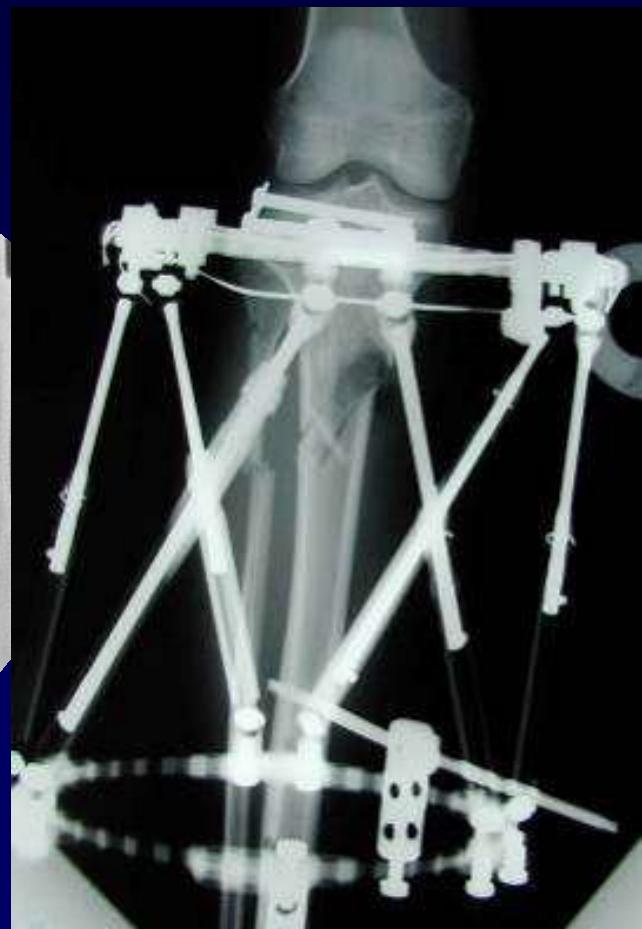


# Schatzker V – VI locked plate

- Malalignment
  - 20% Gosling 2005
- Loss of reduction
  - 14 %

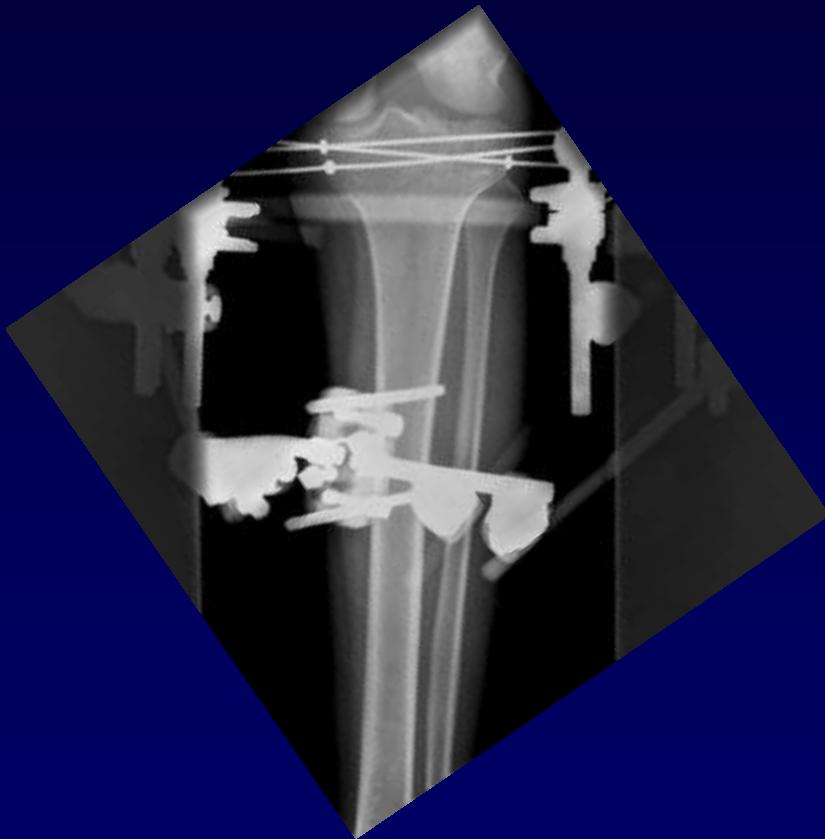


# Schatzker V - VI ring fixator



# Schatzker V - VI ring fixator

- Soft tissue
  - Infection
    - 5% Canadian OTS
  - Union
- ↓ hospital stay



# Schatzker V - VI ring fixator

- anatomical reduction 80%
- delayed union 17%
- pin infection 67%

– Chan 1997

- Stiffness
- Loss of reduction



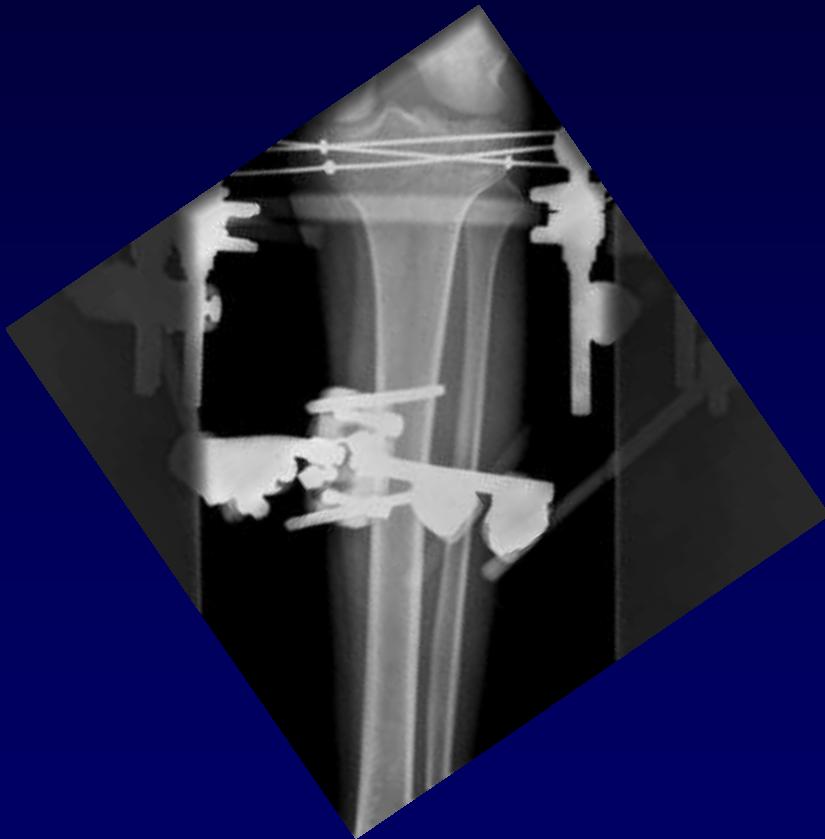
# Schatzker V - VI Canadian OTS ring fixator vs double plate

- ROM
- WOMAC
  - Pain
  - Stiffness
  - Function

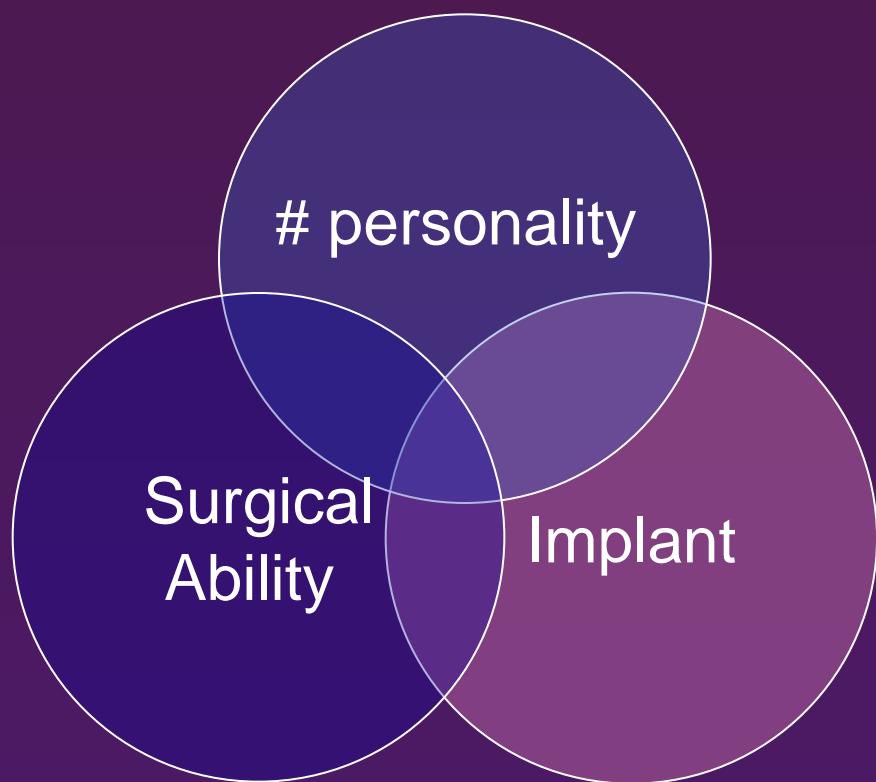


# Schatzker V - VI Canadian OTS ring fixator vs double plate

- 18% deep infection  
repeat surgical  
interventions      ORIF
- ↓ hospital stay      ex-fix



# Factors for success



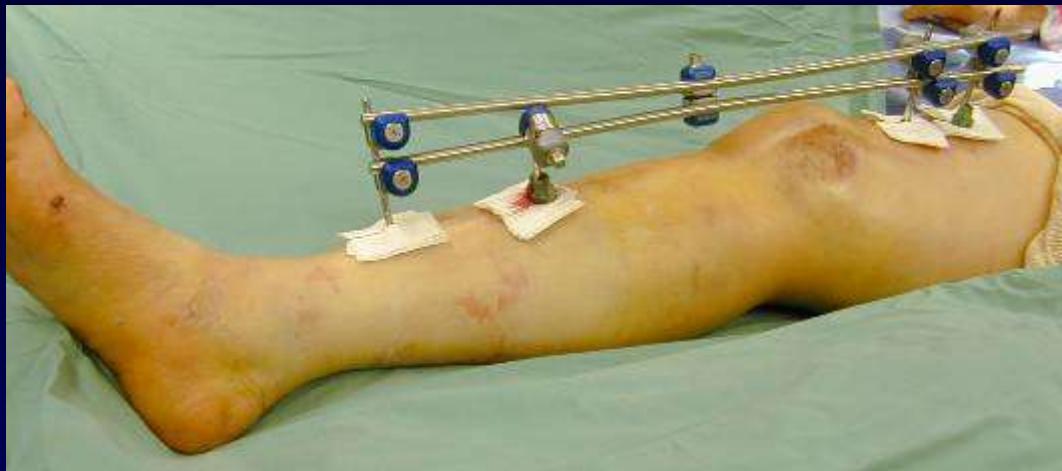
# Schatzker V - VI

## ring fixator vs double plate

- Severe soft tissue
- Metaphyseal-diaphyseal comminution
- # extension into shaft
- Less intra-articular displacement
- Extensive intra-articular displacement
- Large medial fragment
- Coronal split medial fragment
- Forgiving ST envelope



# Management



# Outcome

- 1971 80% good up to 10mm!!
- Schatzker 80% 4mm
- Mills 2006 - 2mm
- OTS 2006 40% OA
- Outcomes vary widely
- Comparison of types not available





# Summary

- Anatomic reduction of articular surface
  - Absolute stability
- Stable fixation
  - Allow movement
- Restore alignment
- Restore stability



# Summary

- Know your limits
- Range of personality
  - #
  - Pt
  - Surgeon
- Be aware of complications relevant to # personality
- Avoid complications

