TREATMENT GOALS

Mobile Joint

Distal Tibial Nailing - When & How
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When to Nail

• Gold standard for tibial shaft fractures
• Possible in proximal and distal tibial fractures with appropriate technique
• Reaming accepted for all but Gustilo type 3C open fractures (controversial)
Tscherne III

TIBIA FRACTURES: WHY IMN GREAT?

• MECHANICALLY SUPERIOR
  • Spreads load along endosteum rather than fixed points of screw/plate/cortex interface
  • Load sharing
  • Withstand greater bending forces

• TECHNICALLY FORGIVING
  • Realign fracture secondary to intramedullary position
  • Extensive experience with shaft fractures

• MINIMALLY INVASIVE
  • Historical starting point of trend
  • Soft-tissue friendly

Only for isthmic fractures
Intramedullary Rodding:

- Reduction
- Starting Point
- Entrance Angles
- Ending Point
Starting Point:
- Medial aspect of the lateral tibial spine
- Anterior, adjacent to the joint

Entrance Angle:
Proximal Segment

Ending Point:
- Center of soft tissue
- Center of bones
- Center of talus
ENTRANCE ANGLE:
Distal Segment

Tricks
- Indirect reduction
- Limited open
- ORIF through open wound
- Schanz pins
- Blocking screws
- Multiaxial fixation
- Syndesmosis screws

Indirect Reduction: Femoral Distractor
Indirect Reduction: External Fixator

Percutaneous Shaft Reduction

Type III Open Distal Tibia Fx
Plate through open wound

Keep the plate
Multiaxial Fixation
Retained Plate

Type II Open Fracture

Clamp through open fx
Summary

• IMN Gold Standard
• Reduction Techniques
• Starting Point
• Ending Point
• Entrance Angle

Thank You
TIBIA FRACTURES: Conversion of EF to IMN

EVIDENCE-BASED RECOMMENDATIONS

- Infection rate: 9%
- Union rate: 90%
- Length of EF < 28 days reduces risk of infection by 83%

*EVIDENCE BASED RECOMMENDATIONS*

- Weak evidence, grade C, from level IV studies


EXTERNAL FIXATION

INDICATIONS

- Temporary stabilization of osseous and soft tissue injury
- Definitive fixation of fracture

Puno et al. J Orthop Trauma 1991

TIBIAL SHAFT FRACTURE MALUNION

- Altered joint contact forces at knee and ankle
- Greater degrees of joint malalignment associated with increased symptoms

- Para et al. J Orthop Trauma 1991
CONSERVATIVE CARE: Classic Literature

Both studies together suggest that fractures with soft tissue injuries are less likely to do well with cast treatment

- Sarmiento et al. CORR 1995
- Nicoll EA. JBJS 1964

Degree of initial displacement predictive of degree of final deformity

CONSERVATIVE CARE

Indications for non-operative treatment include low energy fracture with
- Minimal soft tissue injury
- Stable fracture pattern
- Coronal angulation <5 degrees
- Sagittal angulation <10 degrees
- Rotation <5 degrees
- Shortening <1 cm
- Ability to bear weight in cast or functional brace

SUMMARY
Operative Treatment:
Options

- External Fixation
- Plating
- Intramedullary Rodding

PLATING Classic Literature


First and second generation AO plating techniques:
- Low-energy fractures with better results
- Soft tissue complications correlated with higher energy injuries

ADVANTAGES

- Stability
- Alignment
DISADVANTAGES

- Technique intensive
- Infection
- Wound problems
- Delay?

Conservative Care vs IMN:
Summary

- **Cast**
  - Negligible risk of infection
  - Few problems with knee pain
  - No need for HWR

- **IMN**
  - Better control of alignment
  - Ability to institute early ROM
  - Improved mobility
  - Need for less frequent followup
  - Earlier return to work

MECHANICALLY SUPERIOR
Able to withstand bending forces
MECHANICALLY SUPERIOR?
Rotation thru Screw-Rod Interface

TREATMENT GOALS

CONCEPT OF "ACCEPTABLE ALIGNMENT"

"Published alignment parameters are guidelines at best with no substantiated scientific data to support them"
TECHNICALLY FORGIVING?
IMN Facilitates Reduction

Metaphyseal Tibia Fractures:
Be Careful With Nailing

STARTING POINT

McConnell et al. JOT 15: 207/209, 2001
Samuelson et al. JOT 16: 23-25, 2002
TREATMENT OPTIONS

- Conservative care (splinting, fracture brace)
- External fixation
- Plating
- Intramedullary nailing