BASIC PRINCIPLES OF FRACTURE MANAGEMENT

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DESCRIBING THE FRACTURE

- Pattern
- Open vs closed
- Location
LANGUAGE OF FRACTURES

How would you describe this fracture pattern?

- A. Spiral
- B. Transverse
- C. What fracture?
LANGUAGE OF FRACTURES

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- A. Spiral
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- C. What fracture?
LANGUAGE OF FRACTURES

- Fracture Pattern
  - Transverse
LANGUAGE OF FRACTURES

- Fracture Pattern
- Comminuted
LANGUAGE OF FRACTURES

- Open
LOCATION OF FRACTURE

- Shaft
LOCATION OF FRACTURE

• Where is the location of this fracture?
  • A. Radial shaft
  • B. Proximal Humerus
  • C. Distal radius
LOCATION OF FRACTURE

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FRACTURES 101

Location/Pattern + bone quality

Dictates treatment options

Directs rehabilitation plan

Affects long term outcomes and expectations
TYPES OF BONE HEALING
TYPES OF BONE HEALING

- Determined by mechanical stability
- Primary
  - When strain is less than 2% : Rigid
  - Direct or end to end healing
    - To restore a smooth joint surface
  - Plates/screws
TYPES OF BONE HEALING

- Determined by mechanical stability
- **Secondary**
  - Strain 2-10%
  - Non rigid fixation
  - Callous formation
  - Casts, Rods, Braces
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  - Strain 2-10%
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INTRA-ARTICULAR FRACTURES

Pose a unique set of challenges and goals!

- Injury to joint surface and cartilage
  - Risk of post traumatic arthritis
- Requires primary bone healing
- Absolute stability
- Small fragments
- Limits fixation
CHOICE OF FIXATION FOR INTRA-ARTICULAR INJURIES

- Load bearing implants
  - Load of force transfers to implant
  - Plate(s) & screws
  - Often around articular and peri-articular injuries
• Would you allow this patient to be WBAT immediately post op?

• A. Yes

• B. NO
• Would you allow this patient to WBAT immediately post op?

• A. Yes
• B. NO
INTRA-ARTICULAR FRACTURES

• *Restoring and maintaining congruity is critical for limiting post traumatic arthritis.*
POST TRAUMATIC ARTHRITIS

- Osteoarthritis caused secondary to trauma
- Compromised bone health
- Inadequate reduction/stabilization
- Poor blood supply
  - Tobacco
  - DM

Important to maintain a good joint
INTRA-ARTICULAR FRACTURES

- Articular Fractures
  - Distal Femur
INTRA-ARTICULAR FRACTURES

- Articular Fractures
  - Acetabular Fractures
INTRA-ARTICULAR FRACTURES

- Articular Fractures
  - Wrist fractures
SUMMARY

- *Intra-articular fractures represent significant trauma with both acute and potential long term issues for the joint and patient overall health*
- Anatomic, rigid fixation
- Optimal joint reconstruction to achieve optimal outcomes
LONG BONE FRACTURES
WHAT ARE THE LONG BONES?

- Humerus
- Femur
- Tibia + Fibula
LONG BONE FRACTURE
LOCATION MATTERS

• Shaft
  • Surgical Goals
    • Re-establish stable axial alignment
  • Rehabilitation Goals
    • Mobilization
    • Strength
  • Long Term Goals
    • Restoration to preinjury state
FEMUR FRACTURES

- Common injury due to major violent trauma
- 1 femur fracture/ 10,000 people
- More common in people < 25 yo or >65 yo
- Motor vehicle, motorcycle, auto-pedestrian, aircraft, and gunshot wound accidents are most frequent causes
FEMUR FRACTURE MANAGEMENT

• Initial traction with portable traction splint

• Timing of surgery is dependent on:
  • Resuscitation of patient
  • Other injuries - abdomen, chest, brain
  • Isolated femur fracture
FEMUR FRACTURE MANAGEMENT

• Most Shaft fractures are managed by intramedullary nailing
FEMUR FRACTURE TECHNIQUE

- Retrograde Intramedullary Nailing
TIBIA FRACTURES

• Most common long bone fracture

• 492,000 fractures yearly
RADIOGRAPHIC EVALUATION

• Full length AP and Lateral Views
  • Check joint above & below

• Oblique views may be helpful in follow-up to assess healing
NON-OPERATIVE TREATMENT INDICATIONS

- Minimal soft tissue damage
- Stable fracture pattern
- Ability to bear weight in cast or fx brace
  - Requires frequent follow-up
  - Schmidt ICL 52, 2003
Surgical Options

- Intramedullary Nail
- ORIF with Plate
- External Fixation
- Combination of fixation
ADVANTAGE OF IM NAIL

- Less malunion
- Early weight-bearing
- Early motion
SUMMARY
LONG BONE FRACTURES

- Injury can occur at any location
- Shaft fractures unique to long bones
- IM nailing allows early WB
- Restoration of alignment and function
Thank You!