Ankle Fractures in the Elderly: How to Deal with Poor Bone Quality

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Ankle Fractures in the Elderly

• The Problem
  – Aging population
  – Multiple comorbidities
  – Poor soft tissue
  – Open ankle fracture in geriatric population has a 10% mortality at 1 year
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• Fracture Specific Issues
  – Osteoporosis
  – Mobilization is challenging as many must weightbear after surgery
  – Fracture fixation requires specific strategies for osteoporotic bone
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• Soft Tissue Envelope
  – Easily compromised due to comorbidities
  – Use principles of chronic wound care to get wounds to heal
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• Fixation Strategies
  – Fibula
  – Medial malleolus
  – Posterior malleolus
  – Anterolateral tubercle
  – Syndesmosis
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• Fracture Assessment
  – X-ray of entire leg
  – Low threshold for CT scan to assess syndesmosis and posterior malleolus
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• Fibula Fixation
  – Weber B pattern is the most common
  – Know where to find the best bone quality for screw fixation
  – In areas of poor bone quality, use alternate fixations strategies
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• Fibula Fixation
  – Best bone: Anterior cortex of proximal fragment
  – Worst bone: Posterior cortex of distal fragment
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- Weber B Fracture
  - Antiglide plate
    - Plate substitutes for the poor bone quality of the posterior cortex of distal fragment
    - Screw threads purchase the anterior cortex where the bone quality is better
    - Mechanical studies show superior rigidity compared to the lateral neutralization plate
    - Also easier to close wound
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• Fibula Fixation
  – Locking plates
    • Helpful when there is comminution
    • Allow smaller screws in distal fragment
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• Fibula Fixation
  – Intramedullary screw
    • Allows less dissection for fixation
    • No hardware to cover
    • Cannot do syndesmosis fixation
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- Fibula Fixation
  - Other methods
    - K-wires/tension band
    - Hook plate
    - Augmentation
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• Medial Malleolus Fixation
  – Metaphyseal bone proximal to fracture may be poor quality
  – Best quality bone in the epiphyseal scar, or the lateral cortex of the proximal fracture
  – Fracture fragment, best tissue may be the ligamentous attachment of the deep deltoid ligament
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• Medial Malleolus Fixation
  – Partially threaded screws
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• Medial Malleolus Fixation
  – Smaller screws in comminuted fractures
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- Medial Malleolus Fixation
  - Tension band in smaller or comminuted fractures
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• Medial Malleolus Fixation
  – Long screw, bicortical fixation provides superior compression
  – Need to be careful with long drill bits—breakage
  – Screws can bend making removal difficult
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• Medial Malleolus Fixation
  – Medial buttress plate
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• Medial Malleolus Fixation
  – Hook plate
    • Make out of a 1/3 tubular plate for low profile
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- Posterior Malleolus Fracture
  - Posterolateral position
  - Attached to the distal tib/fib ligament
  - Oftentimes larger than the appearance on plain x-ray
  - Usually not comminuted
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• Posterior Malleolus Fracture Fixation
  – Direct approach
  – Key is patient positioning
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- **Posterior Malleolus Fracture Fixation**
  - Generally attached to the distal fibula by distal tib/fib ligaments
  - Reducing fibula will help reduce the posterior malleolus BUT don’t block your vision of reduction with hardware on the fibula
  - Fixing posterior malleolus enhances accuracy of syndesmosis reduction
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• Posterior Malleolus Fracture Fixation
  – Screws +/- washer
  – Buttress screw
  – Buttress plating
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- Anterolateral Tubercle
  - Ligamentous attachment to fibula also helps contain fibula and improves reduction of syndesmosis
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• Syndesmosis
  – Accuracy of reduction has been studied extensively
  – Malreduction common
  – Fixing posterior malleolus and anterolateral fragment helps with reduction
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- Syndesmosis Fixation Techniques
  - Screw fixation, one or multiple
  - Suture button
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• Soft Tissue
  – Check for associated flatfoot deformity
  – Check for tight heel cord
    • Associated with flat foot
    • Puts stress on fixation of external rotation generated fractures
      • [Insert JPG]  [Insert JPG]
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• Wound Care
  – Complications/delayed wound healing is common
    • Venous stasis
    • Neuropathy
    • Thin friable skin
    • Vascular insufficiency
    • Chronic lymphedema
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- Wound Care
  - Treat like a chronic wound
    - Compression/edema control
    - Antimicrobial dressing (silver)
    - Leave sutures in for 3+ weeks
    - No staples
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• Immobilization
  – External support to allow some early weightbearing
  – Need to support fixation with foot in a functional position
  – Consider bracing with short molded AFO for 6-12 months
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• Summary
  – Consider alternate fixation methods with poor bone quality
  – Buttress plates can substitute weak cortical bone
  – Slow progression of motion until wounds are stable/healed
  – Evaluate/address associated deformity that can compromise fixation
THANK YOU