Ankle Malleolar Fractures

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Malleolar Fractures

- Common
- Articular
- Subcutaneous

- You will have to deal with them
- You must get it right
- The soft tissues may not forgive you
Ankle Anatomy - Ligaments

- Lateral Collateral Complex
Anterior Talo-Fibular Ligament (ATFL) Injury
Ankle Anatomy - Ligaments

• Medial Collateral Complex
Ankle Anatomy - Ligaments

• Inferior Tib-Fib Comp ("syndesmosis")
Ankle Anatomy - Joints

- Talus is in close contact with mortise
- Close contact important for load distribution
- Talus slides, rotates & translates within mortice
- Fibula translates/rotates with ankle movement
Anatomy – Foot/Ankle Coupling

- Coupling/torque conversion from foot to ankle
Pathology – Mechanism of Injury

• Foot position
• Direction of deforming force
• Magnitude of deforming force
• Coupling/torque conversion from foot to ankle
Classification of Injury

- **Lauge-Hansen 1948, 1949**
  - Cadaveric studies, foot position and direction of injuring force
  - Useful for closed manipulation

- **Danis 1949, Weber 1972 and AO**
  - Injury level relative to syndesmosis
  - Useful for fibular fracture fixation
Infra-syndesmotic Injury – Type A

- Supinated foot
- Adduction
- Injury below level of syndesmosis

- Further adduction
- Injury below level of syndesmosis
- Vertical “push off” medial malleolus
Trans-syndesmotic Injury – Type B

- Supinated foot
- Axial load
- External rotation of talus (foot inverts)
- Injury at level of syndesmosis
- Posterior fibular displacement
- Further external rotation of talus
- Posterior fibular displacement
- Volkmann posterior lip fracture
Supra-syndesmotic Injury – Type C

- Pronated foot
- External rotation of talus
- Fibula twists
- Syndesmosis ruptures anteriorly
- Further external rotation of talus
- Tibia displaces medially
- Fibula fractures proximally
Surgical Steps

- Incongruity is poorly tolerated
- Early movement is good for the joint
- Timing of surgery depends on soft tissue envelope
- Position
  - Tourniquet
  - Imaging
- Approach
  - Respect nerves
Surgical Steps

- Medial approach
  - Respect nerve
  - Open joint
  - Reduce
  - ORIF malleolus
Fixation – Type A

• Tension band on lateral malleolus
  – Plate
  – Wires
Fixation – Type B

• Lateral malleolus
  – Lag screw & plate
  – Neutralise
  – Buttress

• Medial malleolus
  – Screws
  – Tension band wire
Fixation – Type B

- Posterior malleolus (>25% artic surface)
  - *Lag screw*
  - *Front to back*
  - *Back to front*
Fixation – Type C

- Fibula shaft
  - Lag screw
  - Plate

- Assess Syndesmosis
  - Hook and pull
Fixation – Type C

- Unstable Syndesmosis
  - 3.5mm cortical screw
  - Not lagged
  - (3 cortices)
  - (Leave in situ and tell patient)
Postoperative Care

- Early Active Mobilisation
- Protected weight bearing for 6 weeks
- Consider syndesmotic screw removal
Rehab Problems

Mechanical Instability due to poor ligamentous healing - arthroscopic findings
Rehab’ Problems

- Missed intra-articular injury
Summary

• Assess the bony pattern of injury
• Consider the potential benefits of anatomical reduction and early mobilisation
• Don’t neglect the soft tissues