Ankle and Pantalar Arthrodesis

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- History
- Indications
- Contraindications
- Goals
- Approaches
- Fixations techniques
- Complications
- Cases
History

- As early as 1878
  - Albert, Australian surgeon
- Many methods since the 1930s
- 1958 Charnley
  - First real compression device
- Treatment of choice for DJD ankle
  - Good long term results
- Predictable, durable

Indications

- Pain
- Arthritis
- Deformity
- Instability
- Charcot
- Spastic/paralytic
- Previous failed arthroplasty
Contraindications

- Infection?
- Age?
- Vascular insufficiency
- AVN?
- DJD adjacent joints
- Fusions of other leg

Goals

- Pain relief
- Correction of deformity
- Provide stability
  - For ambulation
  - For transfers
Goals during surgery

- Proper alignment
- Minimize height loss
- Minimize soft tissue damage
- Adequate joint preparation
- Achieve compression

Approaches

- Ankle
  - Lateral
  - Anterior
  - Posterior
  - Mini-open
  - Combined
  - Arthroscopic
Lateral approach

Posterior approach
Arthroscopic

- Less traumatic?
- Quicker fusion rates?
Arthroscopic ankle fusion

- Glick JM, Morgan CD, Myerson MS
  - Ankle arthrodesis using an arthroscopic method: long-term follow-up of 34 cases. Arthroscopy 1996
- 8 year follow up, multicenter
- 35 fusions, 97% fusion rate
- Difficult with deformities

Complications of AAA

- Neurovascular insult
  - During portal placement
  - During arthroscopy
- Infection
- RSD
- Fibular resection
- Tibial nerve injury
- Pseudoaneurysm
Complications of AAA

• In the knee
  – Sherman JBJS 1986
  – Major 4.8%
  – Minor 3.7%
• In the ankle
  – Ferkel, Guhl 518 cases Orthop Trans 1993
  – Overall 9.8%
  – Neurologic 49%

Complications of AAA

• Crosby LA, Yee TC, Formanek TS, et al.
  – Complications following arthroscopic ankle arthrodesis.
  – Foot Ankle Int 1996
  – 42 pts, 55% complication rate
Infection

- For all joints 0.1%
- For ankle alone 1.4-2%
  - Thin envelope
  - Passing instruments many times

Pantalar approaches

- Extensive lateral
- Combined
Combined approach

Fixation techniques

- Internal
  - Screws
  - IM rod
  - Plates
  - Combination
- External
- Combination
Ankle fixation

- 2 vs 3 screws
- Larger screws
Are larger, increased number of screws counter-productive?

Finite talar surface area

• 40 sawbone models
• 6.5, 7.3 screws
• 2 vs 3
• 9% vs 16% of total surface area not significant
• We do not know amount of surface area is required
Initial stability of ankle arthrodesis with three-screw fixation. A finite element analysis

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- 2 vs 3 screws
- In situ vs resectional
- 3rd screw
  - Increased stability
  - Decreased micromotion

- 3rd screw either
  - Anterior
  - Posterior
    - Holt
    - Clin Orthop 1991
Blade plate
The Use of a 95° Blade Plate and a Posterior Approach to Achieve Tibiotalocalcaneal Arthrodesis

- 10 pts
- Many revisional
- No non-unions
- 3 complications

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1991 Clin Orthop

Ankle ex-fix
Talar ring?

- 4th ring?
Full vs. 5/8
In the office

• Adjustable compression with 4th ring
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humeral
Complications

- Infection

Complications

- Mal-union
Complications

- Non-union
  - 10-15%

Considerations

- Reason for fusion
- Previous surgery/hardware
- Previous incisions
- Tissue/bone handling
Positioning of fusion

- Neutral sagittal
- 5 degrees valgus
  - unlocks midtarsal joint
- Neutral to 15° of external rotation
  - match contralateral side
- Posteriorly displace talus under tibia
**Controversy**

- STJ DJD asymptomatic
  - Morrey JBJS, 1990
- Midtarsal joint can compensate 21 degrees
- Loss of 75% sagittal plane motion
- Can compensate with shoe modification

**Biomechanical sequelae**

- Effects on adjacent joints
- Ankle responsible for 70% of foot dorsiflexion
- TN joint
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Arthrodesis
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