Subtalar Joint Fusion

K Thomason FRCS
Countess of Chester Hospital
Agenda

• Where is the subtalar joint (STJ)?
• What does it do?
• What is the effect of fusing it?
• Why would you fuse it?
• How do you decide when to fuse it?
• How do you fuse it?
• How do you rehab the patient post-op?
Subtalar Joint

Tibia bone
Ankle Joint
Talus bone
Subtalar joint
Function of the Subtalar joint

[Images showing anatomical views of the subtalar joint and movements of the foot in different positions: neutral, pronation, and supination.]
Effect of subtalar joint fusion

- Transverse tarsal motion decreased 40%
- Ankle dorsiflexion decreased 30%
- Talonavicular motion decreased 74%
- DJD at ankle or transverse tarsal joints in 1/3
Indications for fusion

- End-stage arthritis OA or Inflammatory
- Most commonly Post-traumatic arthritis
  - Talus fractures – ankle or subtalar or both
  - Calcaneus fractures – usually subtalar but might need a triple fusion.
  - Ankle fractures – usually an ankle fusion but revision may require a tibiotalocalcaneal fusion or hindfoot nail.
Post-traumatic STJ Arthritis

- Talar Fracture
- Calcaneal Fracture
- Ankle fracture
Post-traumatic STJ Fusion

- 4% calcaneal fractures treated operatively and 18% calcaneal fractures treated non-operatively require STJ fusion.

- Talar neck fractures have an incidence of arthrosis of 30% to 90%, mostly subtalar.

- The rate of STJ fusion following fixation of a talus fracture ranges from 10% to 15%.
To fuse or not to fuse?

- Is the pain coming from the ankle or the subtalar joint or both???
Diagnostic subtalar injection

- Between distal fibula and ant proc calc
- Invert foot (lateral position, put a towel roll under the medial ankle)
Diagnostic ankle injection

- Between tib ant and medial malleolus
- Plantarflex foot
Prerequisites for fusion

• Preoperatively ensure that:
  – No infection – CRP, ESR, white count
  – Skin OK
  – Reasonable goals
Techniques for fusion

- Open technique
- Arthroscopic (key hole)
Setup / Approach

• Supine with bump – prep out iliac crest
• Tip of fibula towards base of 4th metatarsal
Approach
The Subtalar Joint

Top view

Anterior facet
Middle facet
Posterior facet

Medial view

Lateral view
Joint Preparation

• Excise cartilage / subchondral bone
• Posterior, middle, and anterior facets
• Osteotome to shingle cortex / fishscale nonarticular surfaces
• Resect more lateral or medial bone to correct varus or valgus deformity
Joint preparation
Joint preparation
Fixation – cannulated screws

E. Subtalar joint perforated with micro osteotome and indirectly from below with K-wire

F. Allograft wedge

G. Two cannulated screws placed over guide wires, across subtalar joint and into the talus

H. Postoperative view
Fixation

Anterior-to-posterior screw

• Medial to tibialis anterior
• Start in talar neck and aim slightly lateral, towards heel

• Advantage:
  – longer threaded screws

• Disadvantage:
  – Talar AVN
  – Impingement on tibia with DF
Fixation

Posterior-to-anterior screw

• Advantage:
  – Avoid ankle impingement

• Disadvantage:
  – Shorter threads
Fixation

AP Plane

• 2 screws
• Lateral screw first – up into the talar dome
• Medial screw second – up into the talar neck
Screw placement
Rehabilitation

- 6/52 NWB in BK POP with crutches
- 6/52 P to FWB in Walker boot
Special considerations for prior calcaneus fractures
Approach – previous scars

*Standard sinus tarsi incision*

*Previous “L” calcaneal incision*
Option 1: Bone block
Option 1: Bone block
Option 1:
Bone block
Option 2:
In Situ
Option 2:  
In Situ
Option 2: In Situ
Option 2: In Situ
Heel widening

Normal
Heel widening

Calcaneal malunion

- Subfibular impingement
- Shoewear issues
- Peroneal tendon irritation
Heel widening

Approach: Lateral wall ostectomy
Lateral wall exostectomy

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Lateral Wall Ostectomy

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Peroneal tendon subluxation
Peroneal tendon subluxation
Peroneal tendon subluxation
Coronal Malunion Deformity

VARUS  VALGUS
Correcting Coronal Deformity

Two choices of correction with an arthrodesis:

- At the arthrodesis site
- At the calcaneus
Correcting varus malunion

- Pain on lateral border of foot
- Resect more bone laterally at the fusion
- Valgising calcaneal osteotomy
Correcting valgus malunion

• Arch pain
• Resect more bone medially at the fusion
• Medialising calcaneal slide
Complications

• Nonunion
• Malunion
  – Varus
  – Valgus
Risk of non-union

• Patient factors
  – Obesity, DM, RA, NM problems
  – Smoking (inc risk non-union factor of 16)

• Surgical factors
  – Severe deformity requiring tendon transfers/ bone blocks
Summary

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Any Questions?