TALUS NECK/ BODY FRACTURES APPROACH & FIXATION 2024

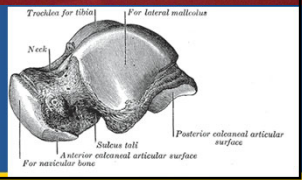
James R Ficke, MD FACS
Professor and Chairman
Department of Orthopaedics
Johns Hopkins Hospital
Baltimore Maryland

THE JOHNS HOPKINS HOSPITAL

1

The Talus (aka Astragalus)

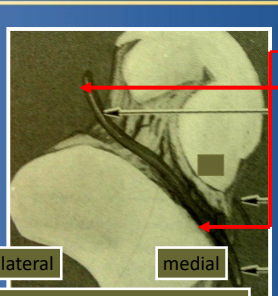
- Roman- Taxillus (Dice)
  - *Horses Talus= "cast lots"*
- Diversity in mammals
- 2nd Largest Tarsal
- 60% cartilage
- No muscular attachment
- Tenuous vascularity



ORTHOPAEDIC SURGERY

2

Blood Supply



4 primary arterial sources:

- Artery of tarsal canal
- Artery of tarsal sinus
- Dorsal neck vessels
- Deltoid branches

lateral medial

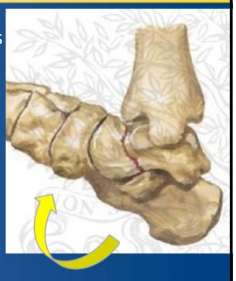
Inferior view of talus, showing vascular anastomosis

ORTHOPAEDIC SURGERY

3

Mechanism of Injury - Neck

- 50 % patients- multiple traumatic injuries
- MVC or fall from height
  - *Hyper-dorsiflexion*
  - *Dorsal Medial impaction*
  - *External Rotation and Adduction*
  - *Lateral tension failure*



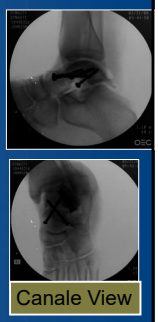
"Aviator's Astragalus" (Anderson 1919)

ORTHOPAEDIC SURGERY

4

Imaging

- Complex 3-D structure
- Multiple views- articular congruity
- AP, Lateral, Broden, & mortise
- Canale view: longitudinal alignment 15° internal oblique to clear calcaneus



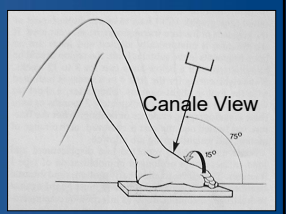
Canale View

ORTHOPAEDIC SURGERY

5

Canale View

- Slight ankle plantarflexion with knee bent to rest foot on the table
- 15 degree pronation
- Xray Tube
  - *15 degree from vertical*

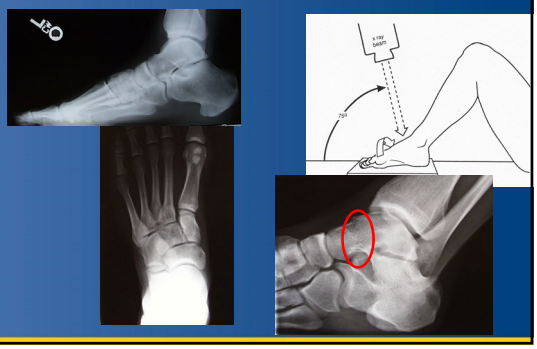


ORTHOPAEDIC SURGERY

6

AP and Lateral Hindfoot

Canale View



ORTHOPAEDIC SURGERY

7

Treatment Principles: Reduction and Fixation

- **Ensure Anatomical Reduction!!!**
- Anteromedial **and** Anterolateral Approach
  - *For optimum visualization and fixation*
- Two screws – lag
- Medial malleolus osteotomy if needed

ORTHOPAEDIC SURGERY

8

Timing of Fixation

- Life threatening injuries/ resuscitation top priority
- Emergent reduction of dislocated joints
- Timing (fixation) has no relation to AVN risk
- Definitive treatment when the soft tissues allow

Vallier 2004

ORTHOPAEDIC SURGERY

9

Goals of Management

- Immediate reduction of dislocated joints
  - *Vascularity*
  - ***Cutaneous tension***
  - ***Vascular compromise***
- Anatomic fracture reduction- timing?
- Stable fixation
- Facilitate union
- Avoid complications

ORTHOPAEDIC SURGERY

10

Definitive Treatment

- Prompt reduction of dislocated joint
  - *AVN is determined at injury*
  - *CAN influence skin compromise*
  - *Foot perfusion*
- Staged Surgery: Dual incisions
  - *Preserve capsular attachment*
  - *Excellent visualization*
- Internal fixation
  - *Screws (A→P, P→A), countersink*
  - *Plates (2.0 mini condylar or T)*

ORTHOPAEDIC SURGERY

11

1st Approach: Anteromedial

- Medial to Tibialis Anterior
- More posterior incision for talar body fractures to facilitate medial malleolar osteotomy
- Permits neck alignment & medial comminution

ORTHOPAEDIC SURGERY

12

1st Approach: Anteromedial

- Views neck alignment & medial comminution
- Extensile distally to talonavicular joint
- Hardware placed distal to proximal
- Countersunk to avoid impingement

ORTHOPAEDIC SURGERY

13

Anteromedial

Anterior Medial Approach to the Hindfoot

Credit: Saam Morshed

14

2nd Approach: Lateral

- Tip of fibula directly anterior
- Sural nerve at risk
- Mobilize EDB as sleeve
- Protect sinus tarsi contents

ORTHOPAEDIC SURGERY

15

2nd Approach: Lateral

- Visualizes Anterolateral alignment and subtalar joint
- Facilitates Placement of "Shoulder Screw" or lateral plate

ORTHOPAEDIC SURGERY

16

Antero-lateral

Credit: Saam Morshed

17

2 incisions: Skin bridge

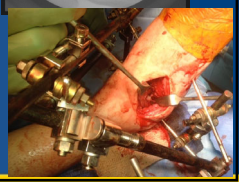
- Skin bridge well tolerated
- "2 to 1" consideration
- Generally less soft tissue complication

ORTHOPAEDIC SURGERY

18

Reduction Aids

- Joy sticks
- Clamps
- Indirect reduction aids
  - *Ex-fix and distractor*



ORTHOPAEDIC SURGERY

19

Anterior Screw Fixation

Screw fixation alone is acceptable for non-comminuted fractures

Consider plate with comminution

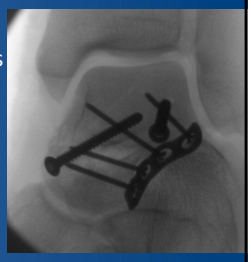
- *Insert under direct visualization*
- *Displaced type 2: 4 A-P screws including medial "buttress" fully threaded cortical screws and lateral "shoulder" screws*

ORTHOPAEDIC SURGERY

20

Plate Fixation

- Useful in comminuted fractures
  - *2.0 or 2.4 mm plates*
  - *Apply to lateral cortex*
  - *Impinge on medial side*



ORTHOPAEDIC SURGERY

21

RESULTS

TALAR NECK #'S ARE BAD INJURIES

- Undisplaced: <13% AVN
  40-50% Unsatisfactory
- Type II: 20-50% AVN
- Type III/IV: 40-100% AVN

ORTHOPAEDIC SURGERY

22

Avascular Necrosis (AVN)

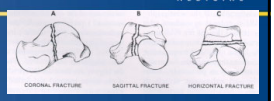
- "Hawkins sign"
  - *Subchondral osteopenia (decreased radiodensity) 6-8 weeks post-injury*
- To weight-bear or not??
  - *General consensus is WBAT, with close F/U*
  - *Ankle Brace*

ORTHOPAEDIC SURGERY

23

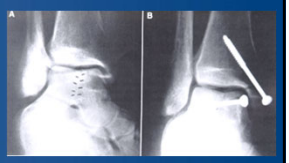
Body Fractures

- Different actor
  - *At issue is **BOTH** articular congruity and vascularity*
  - *Higher percentage of poor result 2° arthritis*
    - 29 vs 64% satisfactory body vs neck fx with dislocation (Mindel, JBJS-A, 1963)



Treatment goal

- *Restoration of anatomy*
- *Use malleolar fractures or osteotomy to reduce fracture*



ORTHOPAEDIC SURGERY

24

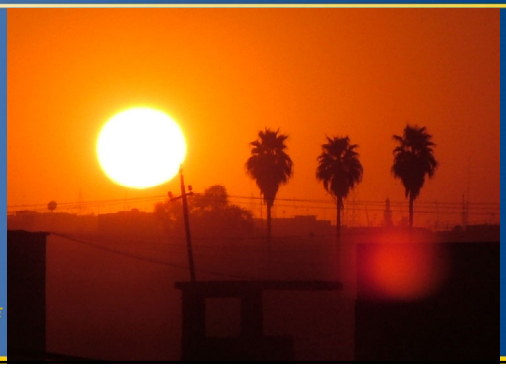
Remember

- Reduction is urgent, but not Fixation
- Consider two approaches for fixation
- Have both direct and indirect reduction aids
- Fixation generally anterior/ fix stability

ORTHOPAEDIC SURGERY

25

Thank you!



ORTHOPAEDIC SURGERY

26