

Foot Injuries

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Overview

- Dramatic impact on the overall health , activity, and emotional status
- More attention and aggressive management
- Difficult appendage to study and diagnose.
- Aim- a stable platform for weight transference and suppleness to various irregular surfaces.

Fractures

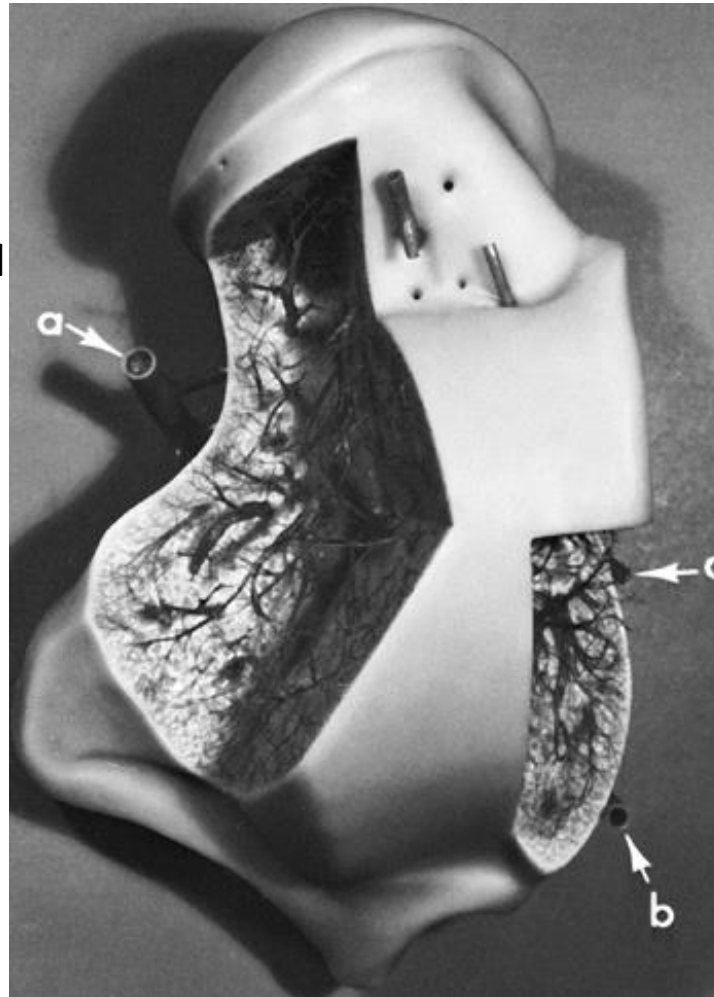
- Fracture of Hindfoot
 - Talus
 - Calcaneum
- Fractures of midfoot - Cuneiforms, cuboid
 - Navicular
- Fractures of forefoot-Metatarsals and phalanges

Fractures of the talus

- Difficult injuries to treat.
- Talus is in weight transmission across the ankle joint
- Its blood supply is tenuous
- 3/5th of the bone is covered by articular cartilage
- Talus has no musculo-tendinous attachments.

Applied Anatomy

a) artery of the tarsal sinus



c) Additional arteries enter dorsally through the neck and on the medial surface of the body

b) the artery of the tarsal canal

CLINICAL Relevance

- Body receives most of its blood supply from the anastomotic sling in the tarsal canal and sinus.
- Undisplaced fractures of the talar neck often lead to nonunion/avascular necrosis.
- major arterial supply to the talar body is disrupted.

**DISPLACED FRACTURES OFTEN LEAD TO
NONUNION/AVASCULAR NECROSIS**

UNDISPLACED FRACTURES



A



Displaced fracture



Signs and Symptoms

- Intense pain in the foot and ankle.
- Significant swelling can occur
- Concomitant subluxation or dislocation- normal contours of the ankle and hindfoot are distorted.

Treatment

- undisplaced fractures are stable injuries- by knee cast immobilization
- Nonweight bearing for 8 to 12 weeks
- clinical and x-ray signs of fracture healing are present.



Minimally displaced /DISPLACED fractures

- Closed reduction which is accomplished by manipulation
- Followed by below knee cast immobilization
- Non weight bearing



DISPLACED FRACTURES

- CLOSED
REDUCTION/OPEN
REDUCTION
- RIGID INTERNAL
FIXATION



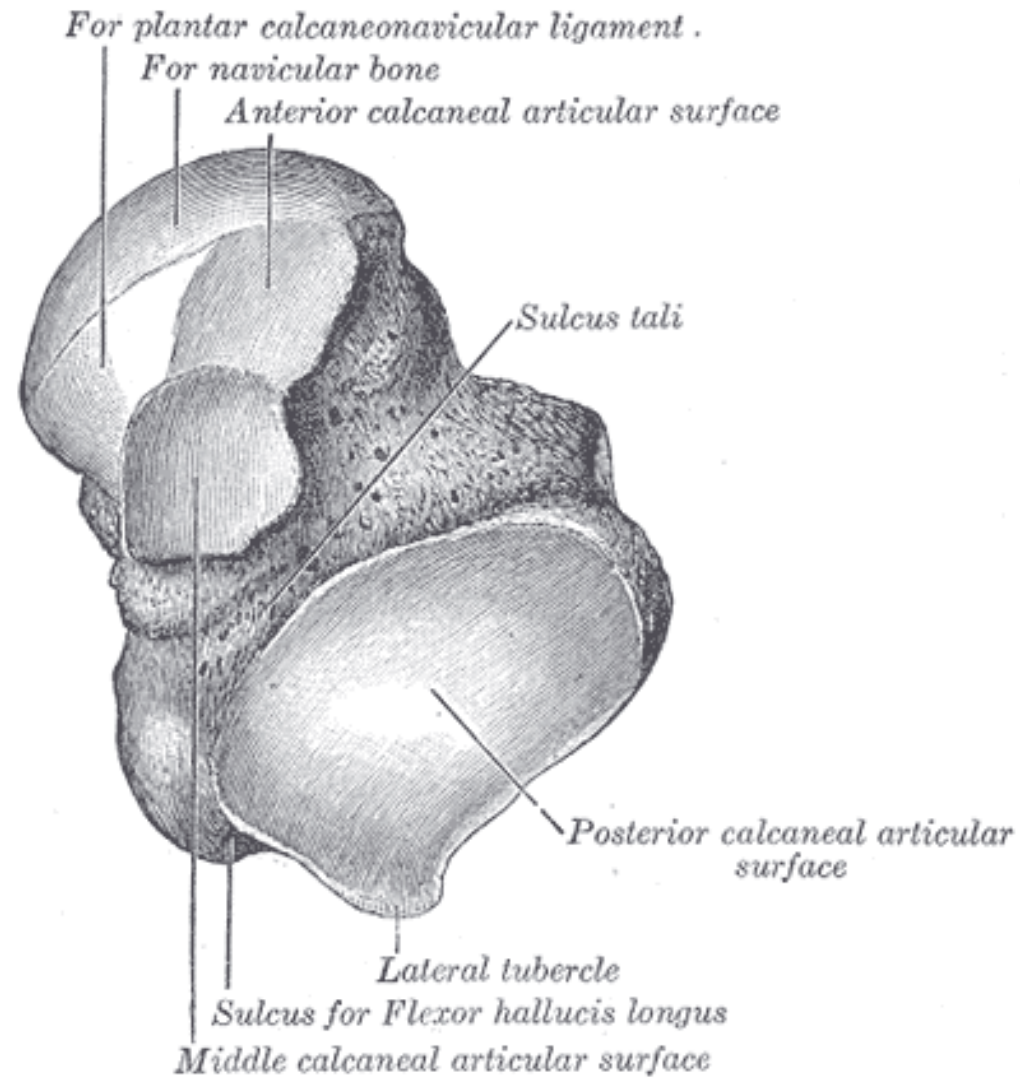
FRACTURES OF THE CALCANEUS

- Calcaneum is the most commonly fractured of all the tarsal bones.
- Provides support for weight bearing and transmits weight to the sole.
- It also acts as a lever to improve the efficiency of the calf muscles.
- Calcaneal fractures produce significant disability and impairment of gait.

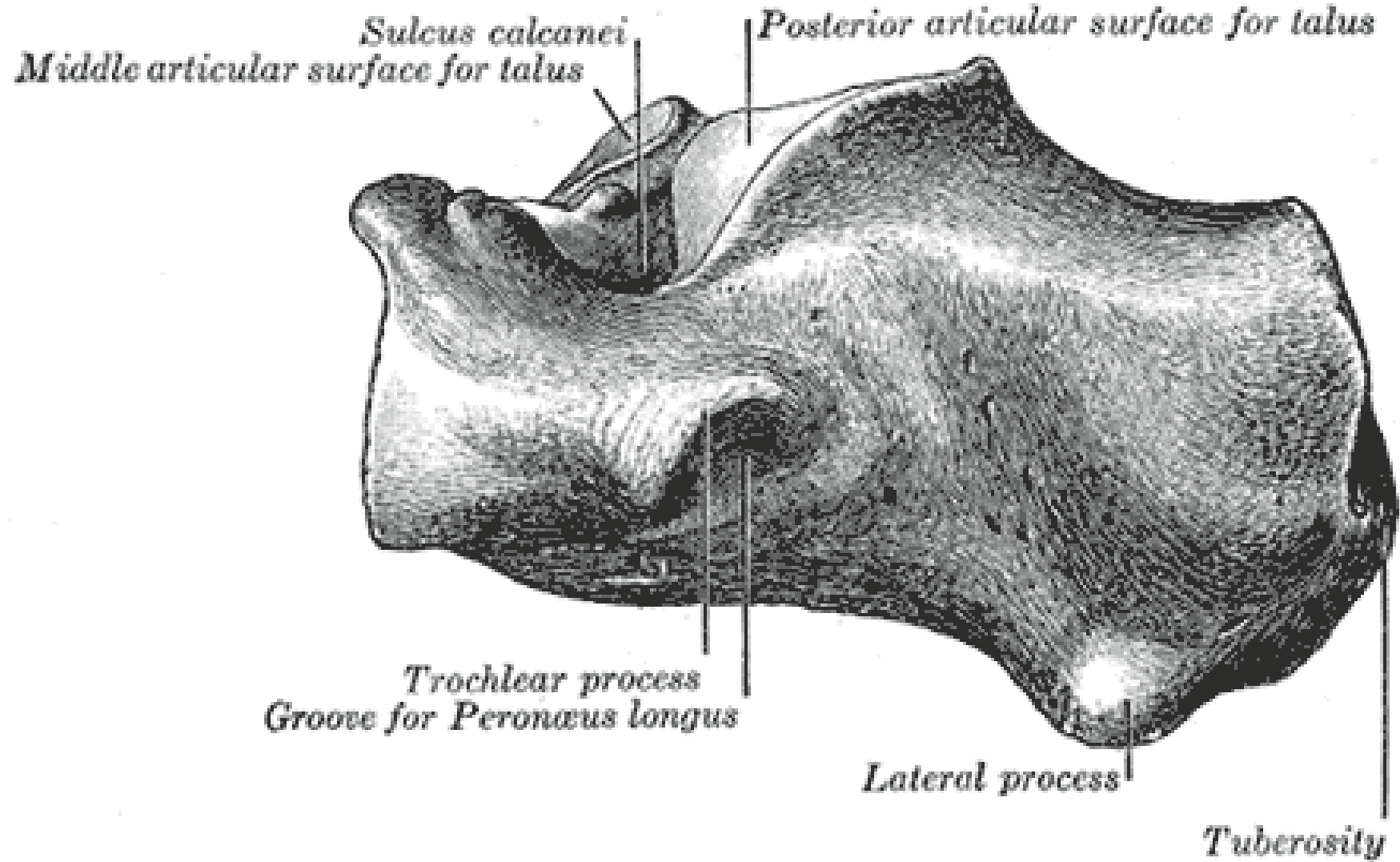
ANATOMY OF THE CALCANEUS

- Superior structure of the calcaneum resembles the lower surface of the talus –Mirror Images
- Supports the weight of the body being transmitted from the under surface of the talus.
- Contributes to the posterior aspect of the longitudinal arch.

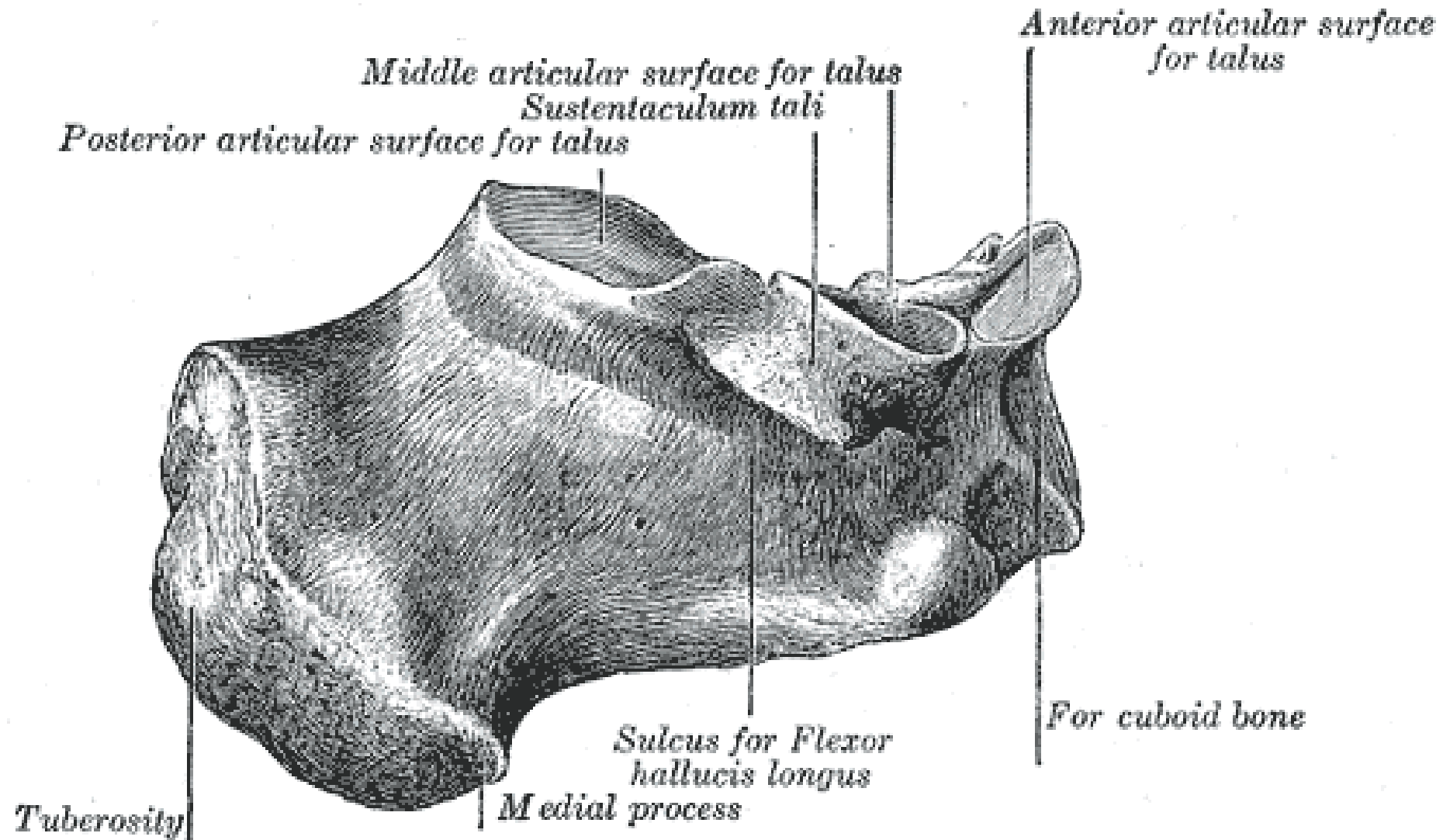
Left talus, from below



Left calcaneus, lateral surface



Left calcaneus, medial surface



CLASSIFICATION

Extraarticular fractures

- Anterior process fractures
- Fractures of the midportion of the calcaneus (sustentaculum tali),
- Fractures of the body of the calcaneus
- Fractures of the posterior aspect of the calcaneus.

Intraarticular fractures

- Subtalar joints including the posterior, middle, and anterior facets.

Classify this Calcaneal Fracture based on this CT image?

- a) Fracture of the Sustentaculum Tali
- b) Fracture of calcaneal tuberosity
- c) Fracture body of calcaneum
- d) Fracture posterior facet



Extra-articular Fractures

- Most can be treated by casts
- Non weight bearing for 6 weeks



SOME –Require surgery

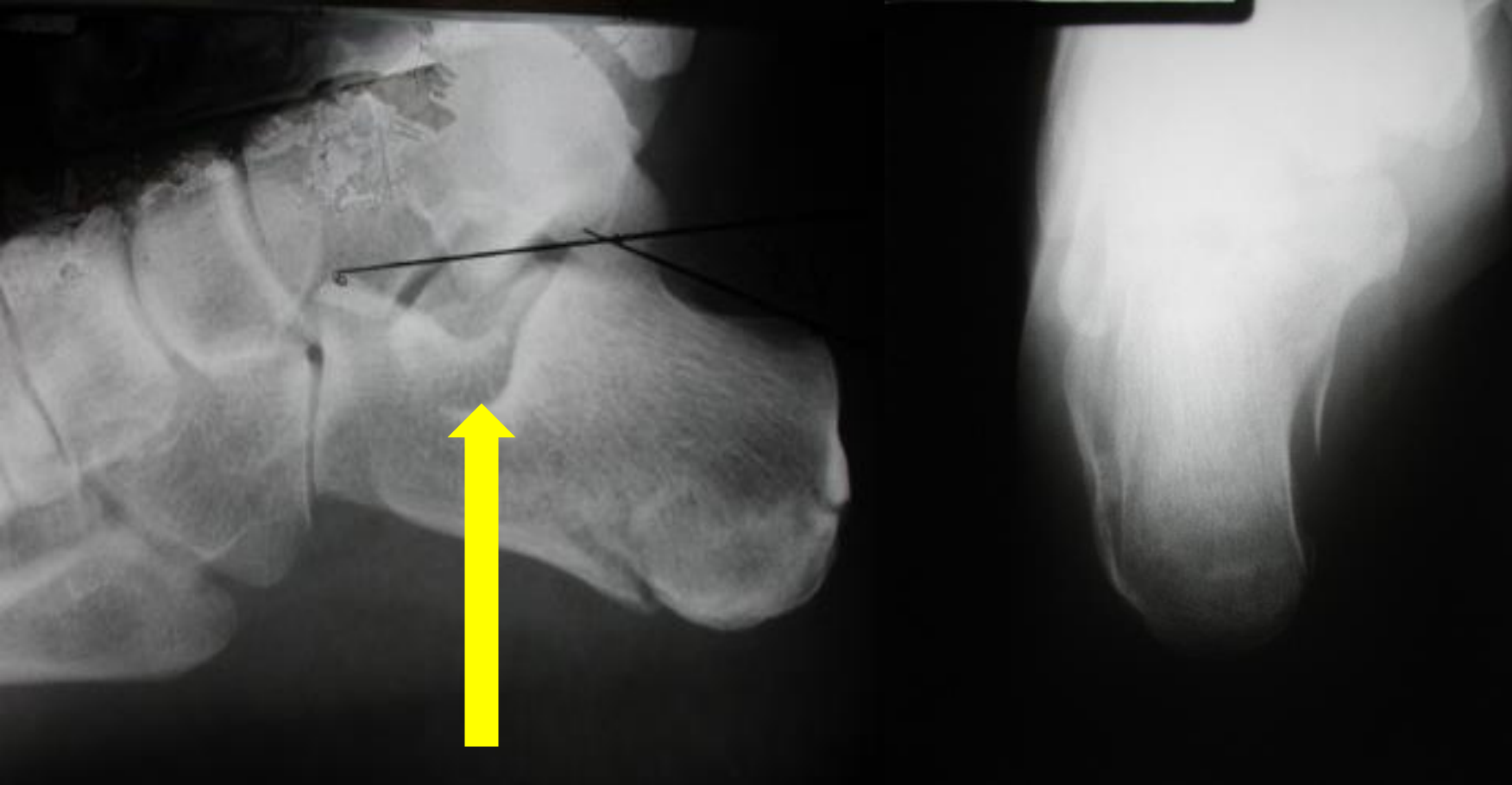


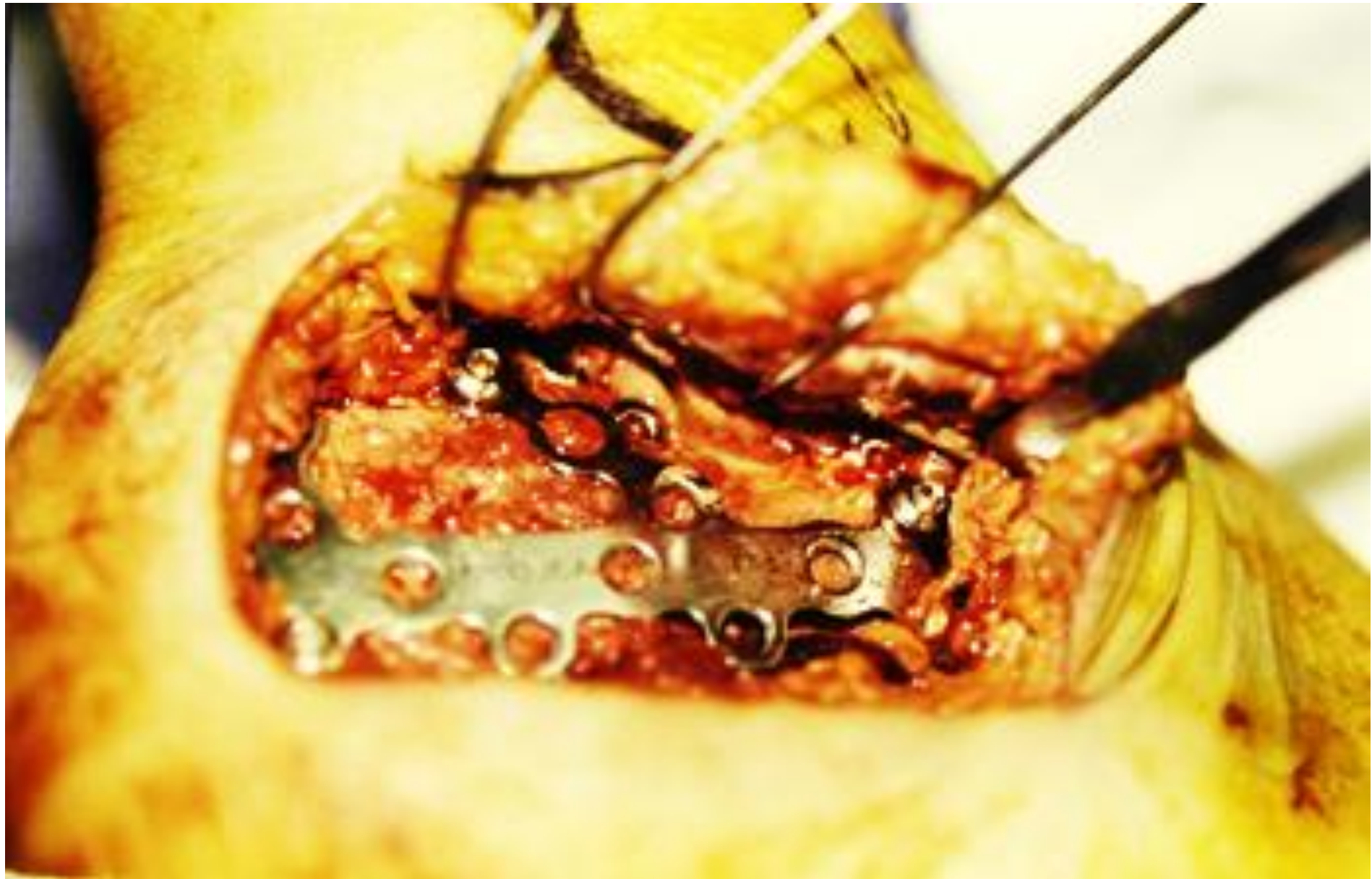
Intra-articular Fractures-Displaced

- Result of high energy trauma, such as a fall from a height or a motor vehicle accident.
- Most require surgery
- Open reduction and internal fixation

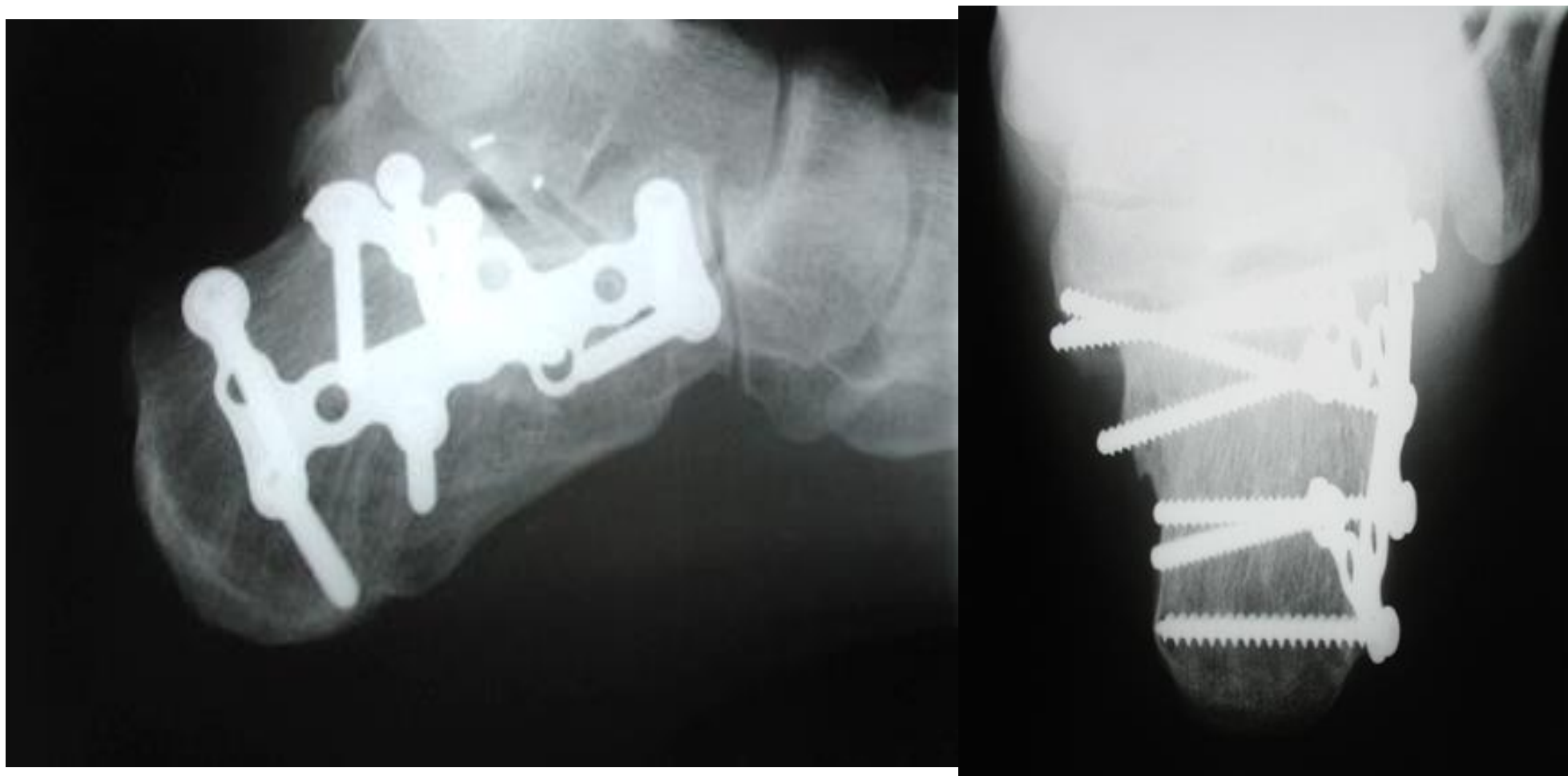
Operative Treatment

- All displaced intraarticular fractures - consider Open reduction
- Should be performed within 2-3 weeks
- Should not operate until skin wrinkles
- Foot pump- helps reduce swelling

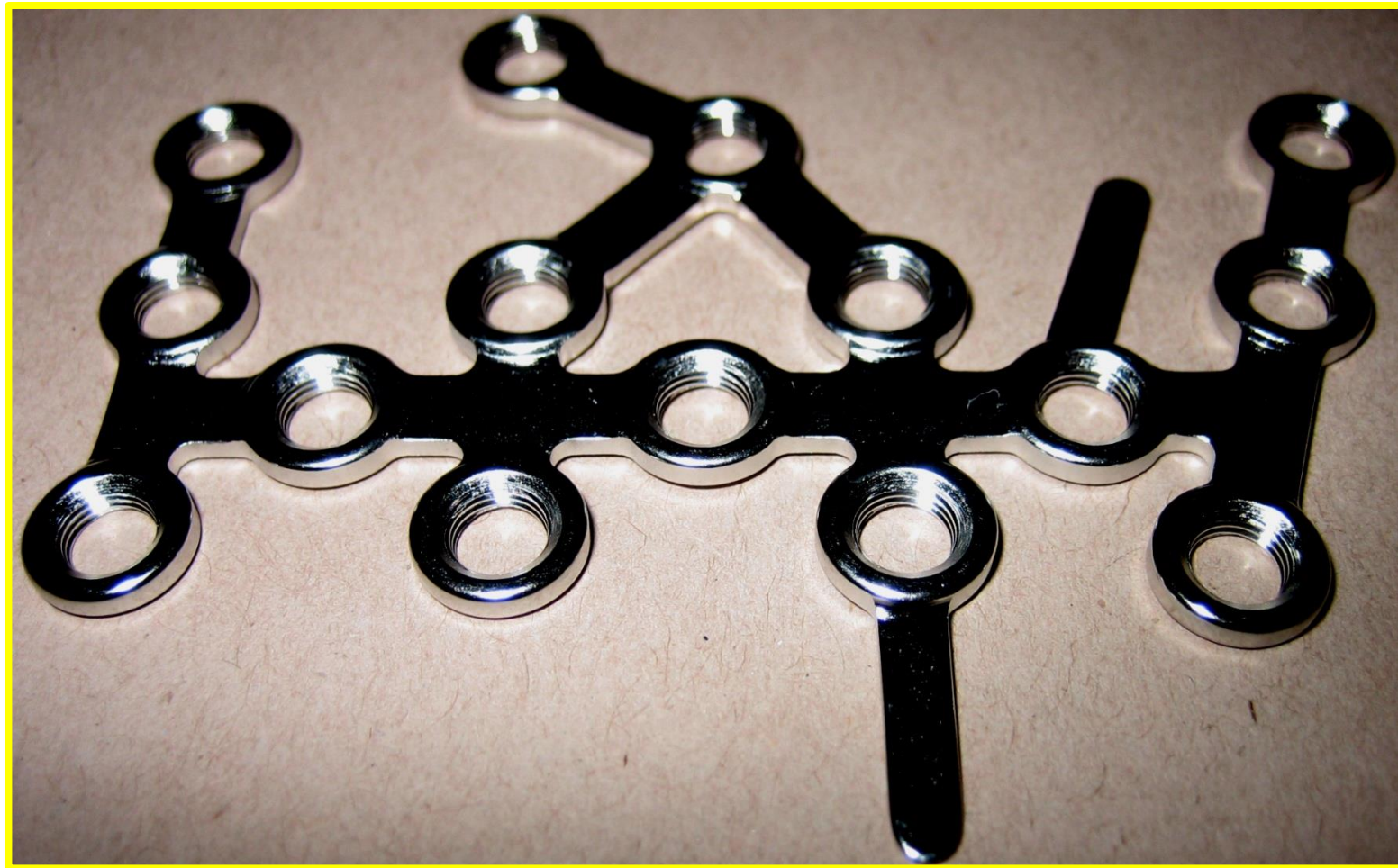




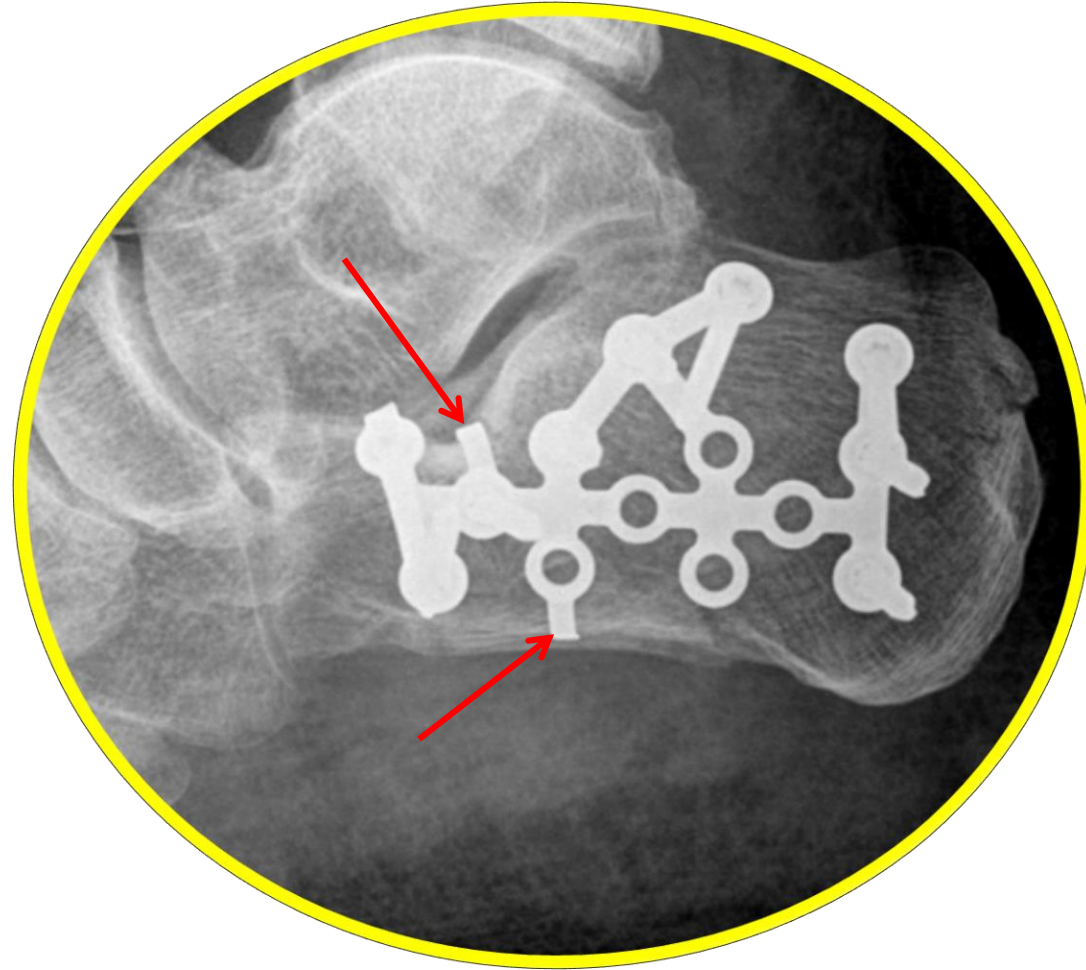
POST OPERATIVE



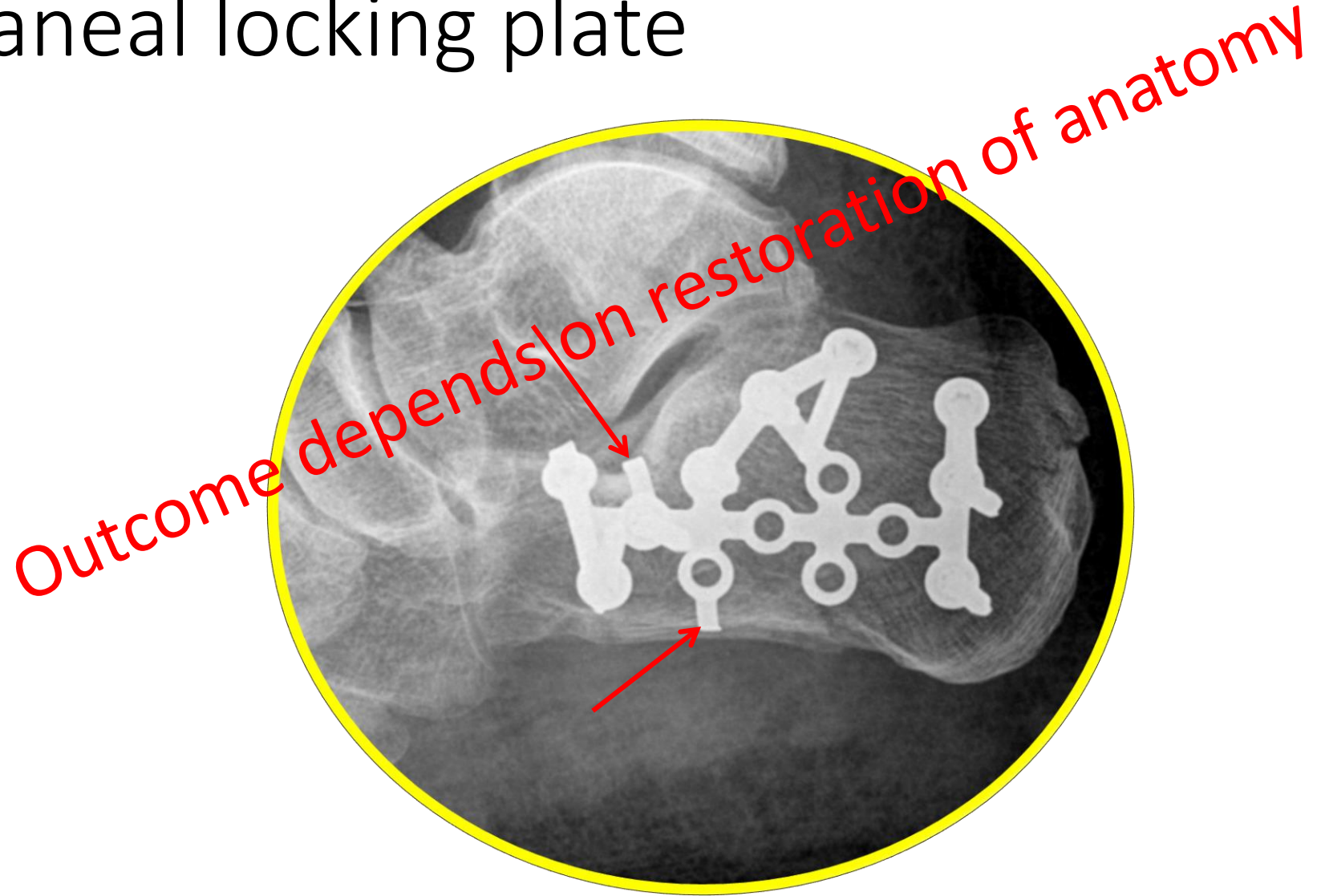
Calcaneal locking plate



Calcaneal locking plate



Calcaneal locking plate

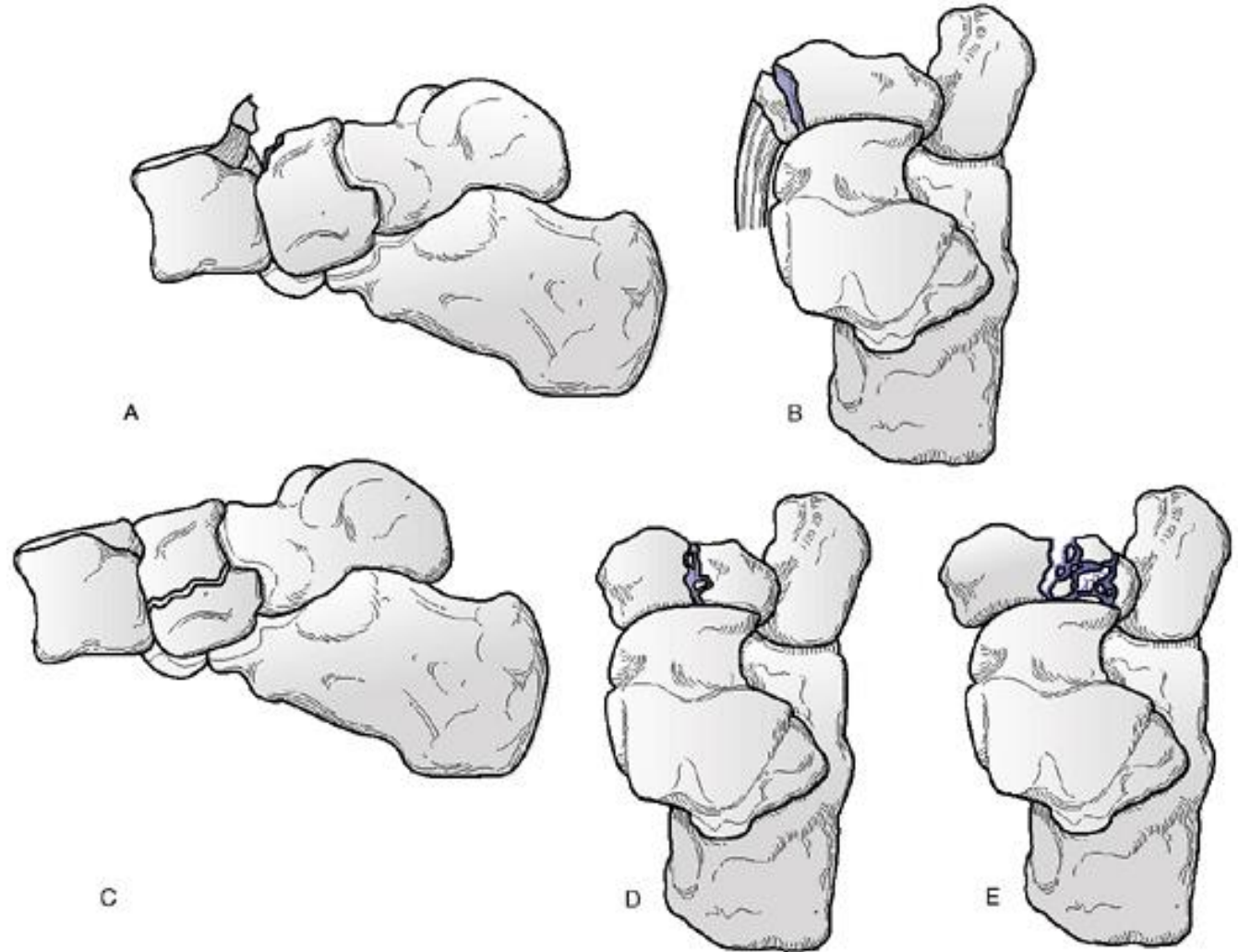


Post op protocol

- Strict elevation
- Mobilisation of ankle and subtalar joints started on 1st post op day
- Wound inspection at 48 hrs
- Non weight bearing mobilisation for 8-12 weeks
- Clinic review 2 wk, 6 wk, 3 mth, 6 mth, 12 mth, then every 6 mth

Fractures of the Navicular

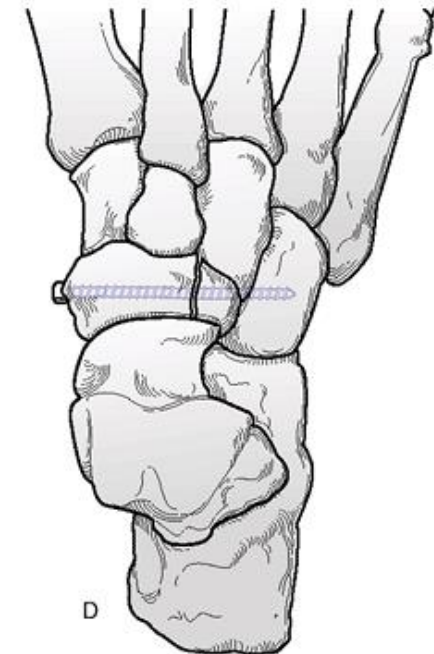
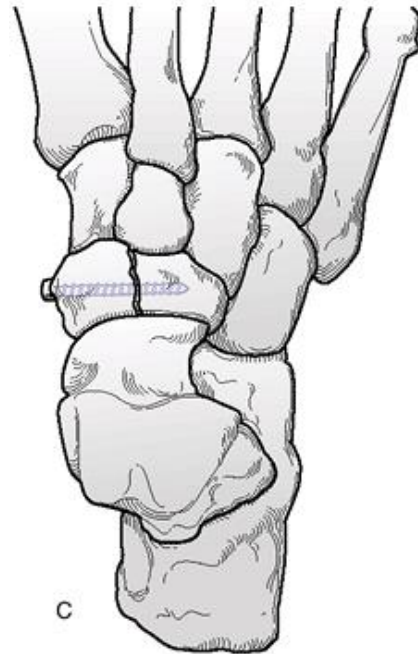
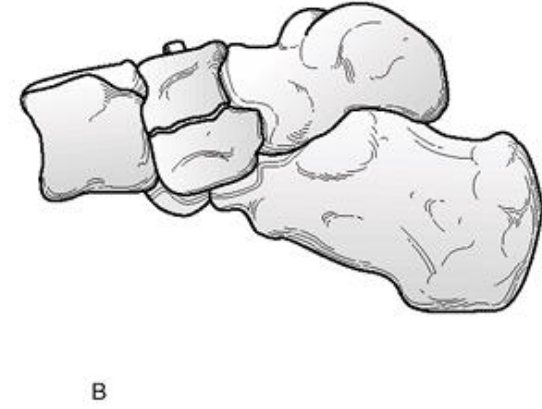
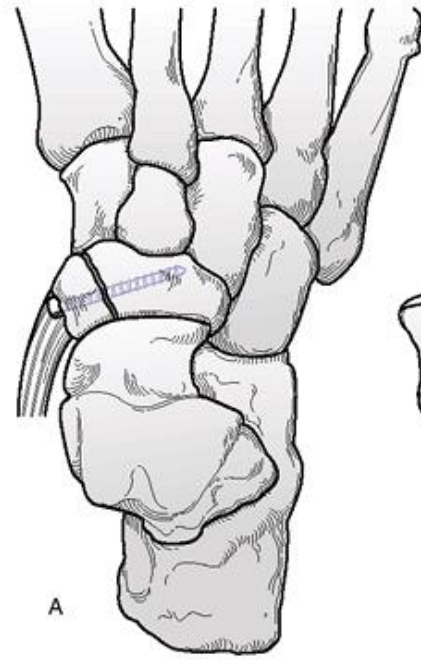
- A Avulsion fractures
- B Tuberosity fractures
- C Body fractures



Treatment

- Isolated nondisplaced fractures of the navicular - short leg cast with non-weight-bearing for 6 to 8 weeks
- Unstable fractures usually need surgery

Screw fixation is required



Injury foot unable to bear weight- Diagnosis?



Further Investigation?



Treatment of choice?

- a) Below knee cast for 6 weeks
- b) Closed reduction and K wire fixation
- c) External fixation with closed reduction
- d) Open reduction and internal fixation



Injuries to the Cuneiforms

- Three cuneiform bones sit in the middle of the foot
- Provide the rigid support for the medial longitudinal arch.
- They constitute the apex of the transverse arch that provides a stable conduit for the plantar musculotendinous and neurovascular structures

Treatment

- Stable, non-displaced cuneiform fractures- below knee cast.
- Structural displacement or instability - open reduction through a dorsal approach combined with rigid internal fixation.

INJURIES TO THE FOREFOOT

- The forefoot as a unit it provides a broad plantar surface for load sharing.
- Four lesser metatarsal heads share an equal amount of the forefoot load in normal gait.
- The platform is structured to also be mobile in the sagittal plane.
- This provides the forefoot with the ability to alter the position of the individual metatarsal heads to accommodate uneven ground.

Metatarsal Fractures

- Common injuries that usually result from the direct blow of a heavy object dropped onto the forefoot.
- Direct force can result in the fracture of any metatarsal at any point.
- Indirect forces, particularly twisting the body with the toes fixed producing fractures of the metatarsal shafts, particularly spiral fractures

Diagnosis

- The presence of pinpoint tenderness
- Palpable nonpitting edema
- Crepitance
- Deformity is readily apparent.

23 years old a heavy object fell on his foot



23 years old a heavy object fell on his foot

What are the four ways of primary treatment of this patient?



Isolated stable Injuries

The best definitive treatment for this patient is

- a) Compression bandage and NSAIDS
- b) Non weight bearing for 6 weeks
- c) Closed reduction and below knee cast
- d) Below knee cast with plaster shoe for weight bearing



23 years old a heavy object fell on his foot

Write a prescription for this patient



UnStable
Injuries
require K wire
fixation

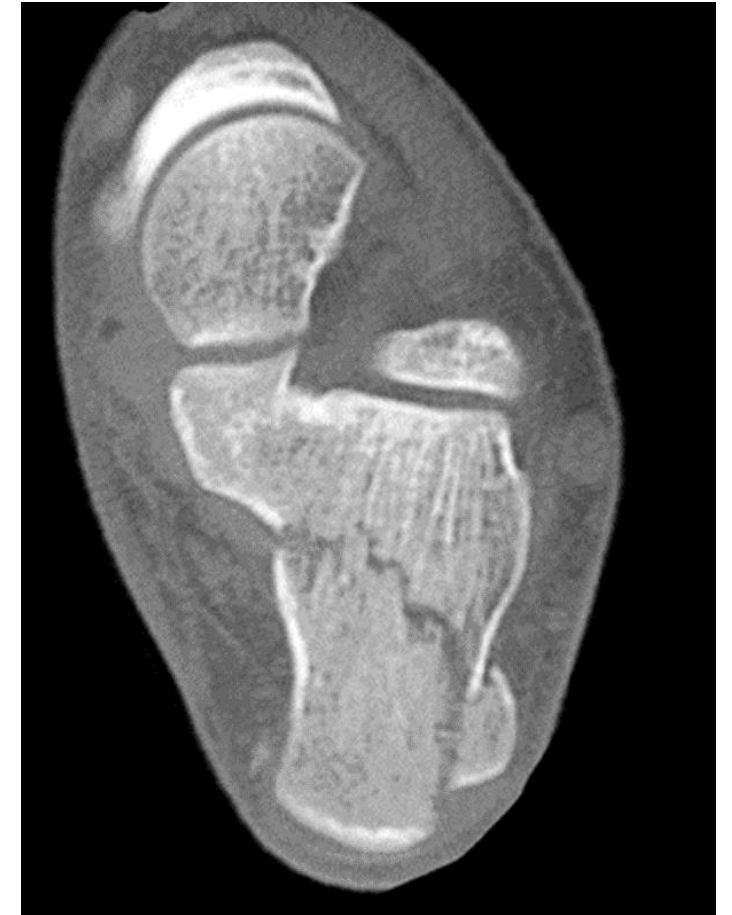


Phalangeal Injuries

- Most phalangeal injuries are isolated injuries
- Easy to diagnose
- Most can be treated by buddy taping

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- c) **Fracture body of calcaneum**
- d) Fracture posterior facet



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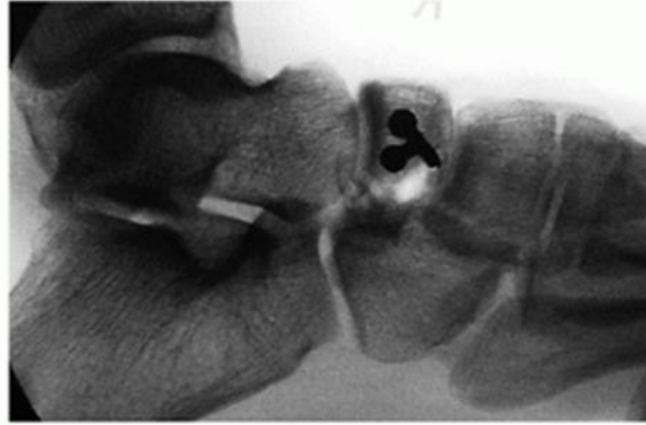


Treatment of choice?

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- d) Open reduction and internal fixation**



ORIF –Anatomical restoration is the key!



Conclusion

- Foot fractures require careful consideration
- Knowledge of fracture patterns is essential
- Diagnosis is straight forward
- Use care in hindfoot fractures – Malunion can be very disabling
- Carefully done surgery – Improves outcomes

THANK YOU