Ankle and Foot Fractures What I have learned!! Antiglide plates are your friend!

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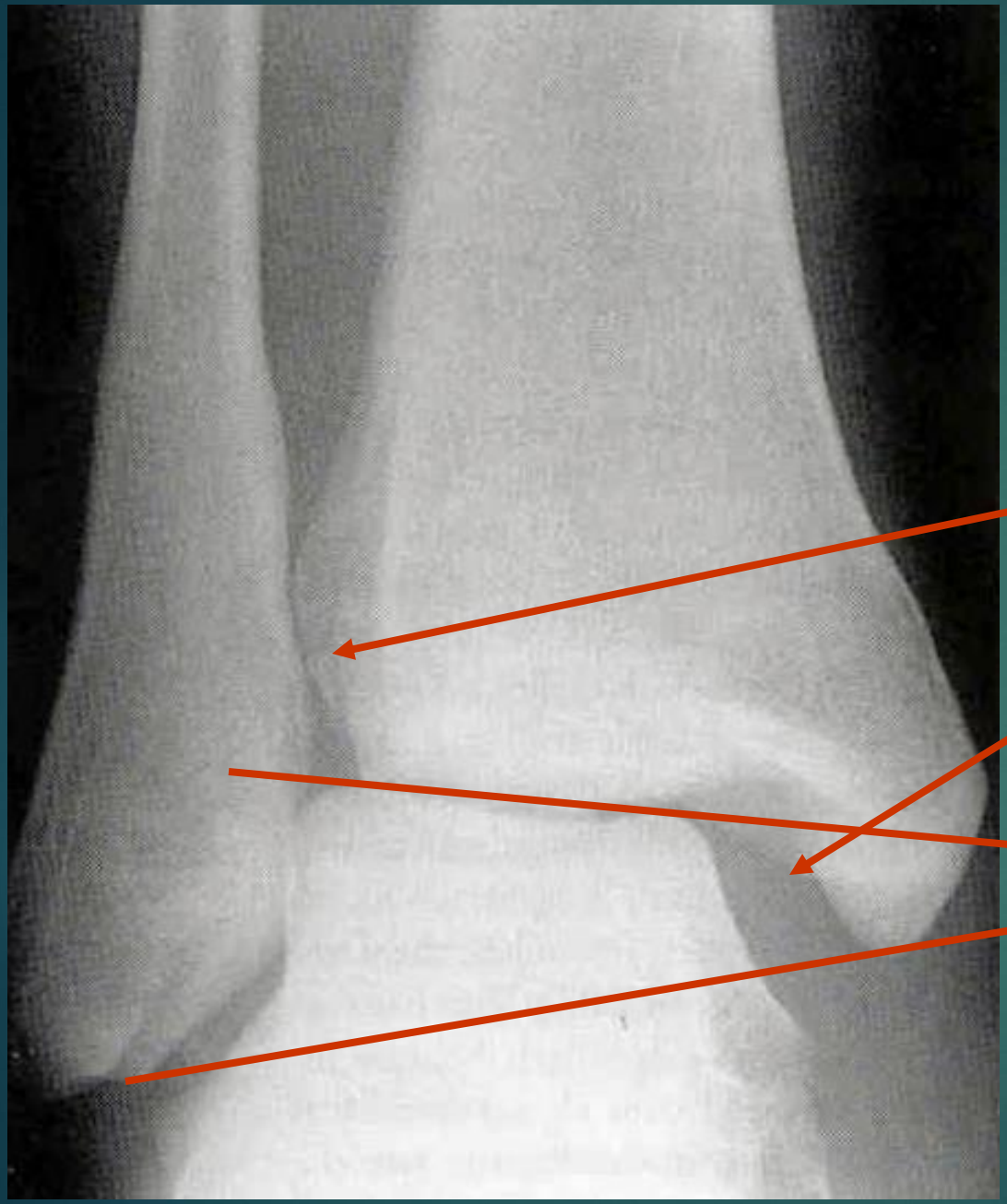
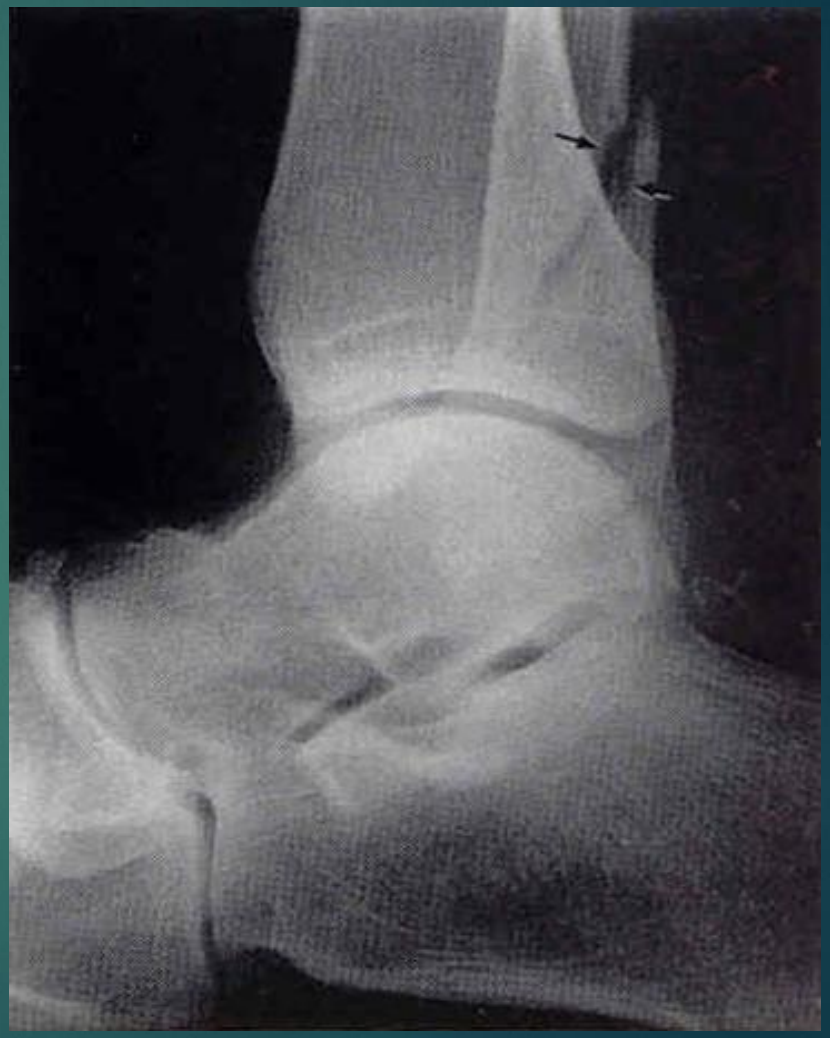
Syndesmotic Injury with Deltoid Ligament Rupture



Lateral View

- Posterior mallelolar fractures
- Anterior/posterior subluxation of the talus under the tibia
- Angulation of distal fibula
- Talus fractures
- Associated injuries



Stress Radiograph

- Performed if mortise reduced on initial films
- No need now!! Based on The Saunders COTS study
- Studies indiate operative and non op treatment are the same
  - No talar subluxation
  - Medial clear space 4mm or less
- Ankle in neutral dorsiflexion
- External rotation stress
  - @ 8 lbs
  - Ankle positioned in Mortise view for stress radiograph

Stress Examination

- Effective method of diagnosing Stable ankle fractures
- 67 x SER …all healed without displacement
- Medial tenderness
  - *NO!!*
- Ecchymosis
  - *NO!!*

Tornetta et al

Initial Management

- Closed reduction (conscious sedation may be necessary)
- Compression dressing, splint, elevate
- May take unstable fracture to OR if soft tissues not overly edematous (i.e. skin wrinkles absent, fracture blisters present).
- soft tissue-Rare to have to wait
- Pain control

Nonoperative Treatment

- Clinical example
  - SER injury
  - Treated in walker boot WBAT
  - Films 4 months post injury show healed stable mortise
  - Less than 3 mm displacement of the isolated fibula fracture with a reduced ankle mortise does not require surgery

Sanders COTS study—Weber B fractures—Winner of the best scientific Trauma Paper of that year

- Patient arrives with fracture and mortise looks reduced
- Stress radiograph shows instability
- Operative versus non- operative treatment
- Outcomes at one year are equal

Surgical Indications

- Instability
  - Talar subluxation
- Malposition
  - Joint incongruity
  - Articular stepoff

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- Instability
  - Talar subluxation
- **Malposition**
  - Joint incongruity
  - Articular stepoff or impaction

Syndesmosis-- how to obtain anatomic reduction everytime

- Make sure you see the articular reduction of the fibula, tibia and talus
- and if that is reduced fix with screws or tightrope
- Trend for tightropes to be better at one year
- Saunders and COTS study
- Both are good if reduction is accurate

Special Fracture with anterior tibial fracture dislocation

If seen early----- definitive fixation that night is possible and safe

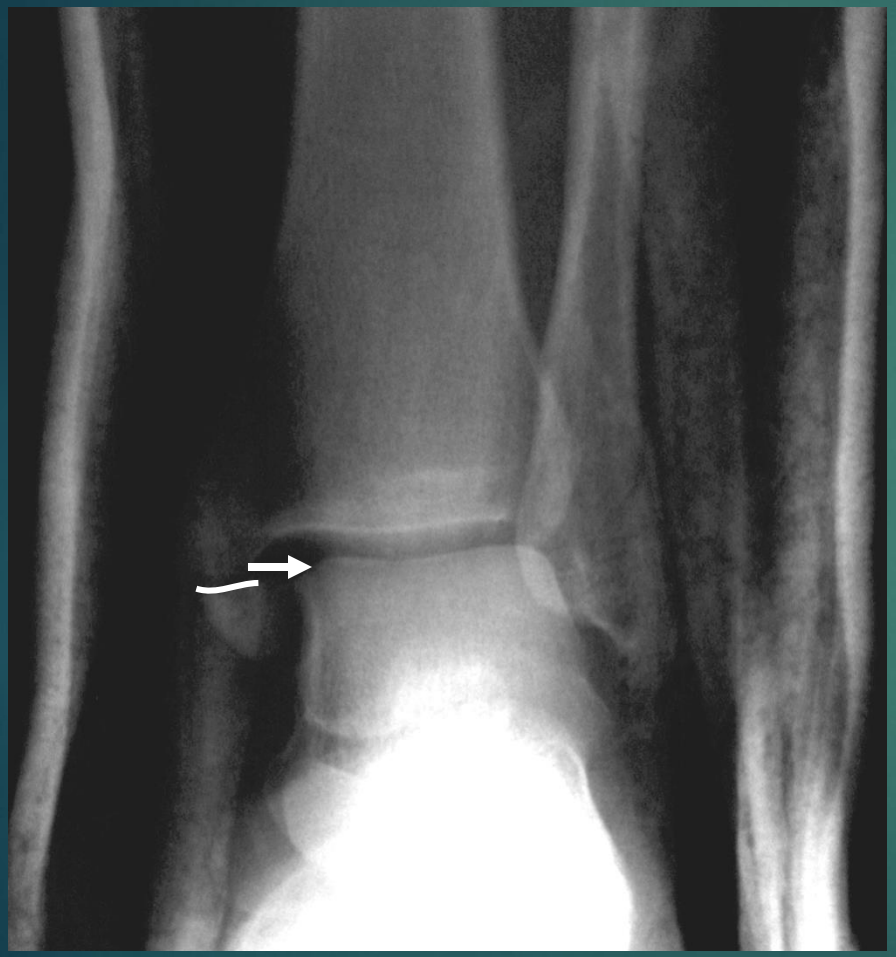
If too swollen or seen late-----
reduce ankle and cast (plus or minus ext. fix.) to maintain reduction and then fix late with anterior antiglide plate

Operative Fixation of a trimalleolar injury

- In general the medial side should be examined thoroughly with open reduction to establish crush injury or abrasion injury of the talus or tibial surfaces
- This requires visualization of the mortise to assess cartilage damage and remove osteochondral fragments.

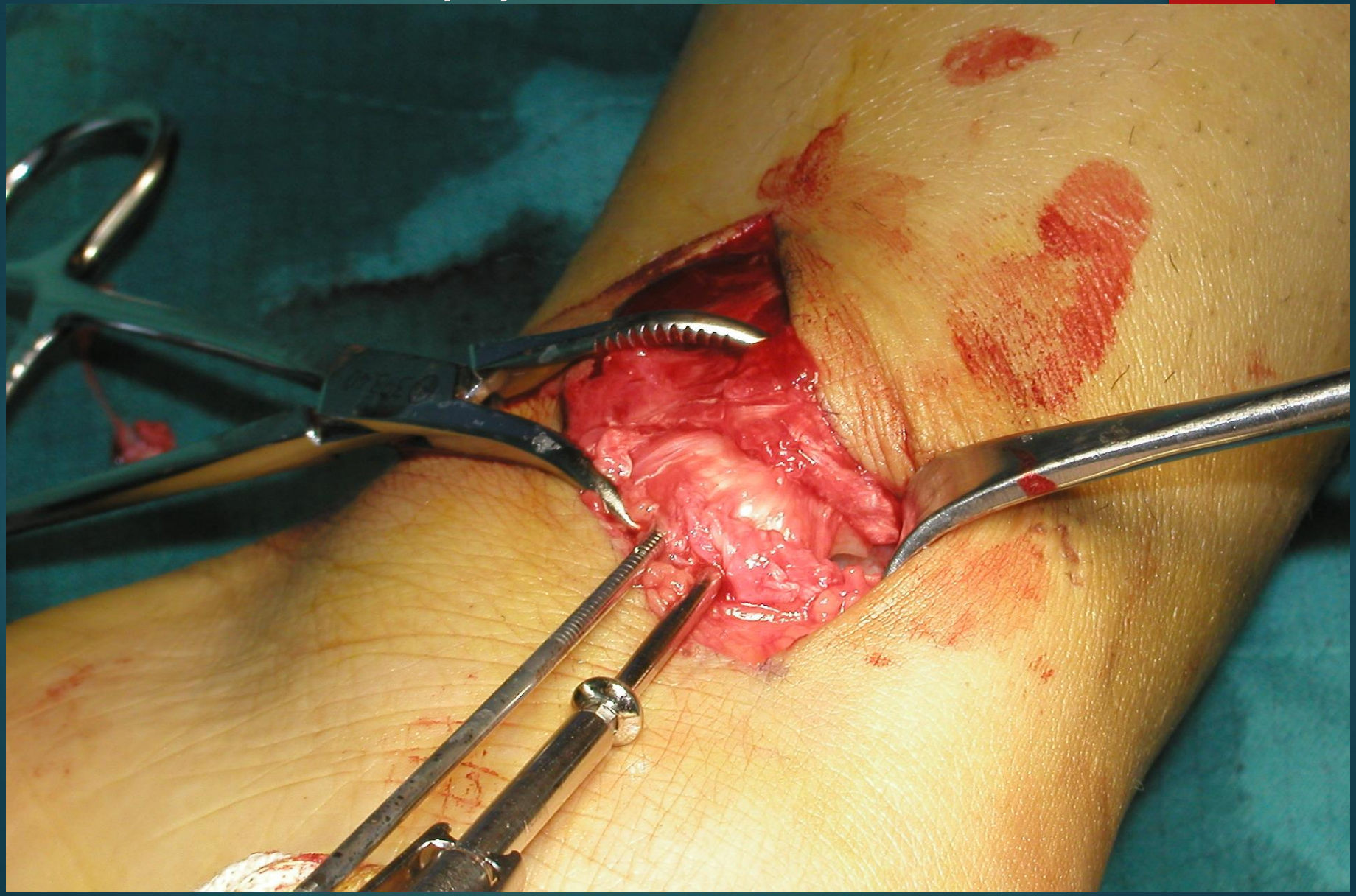
Case Example

20 yo male falls while running - sustains ankle injury

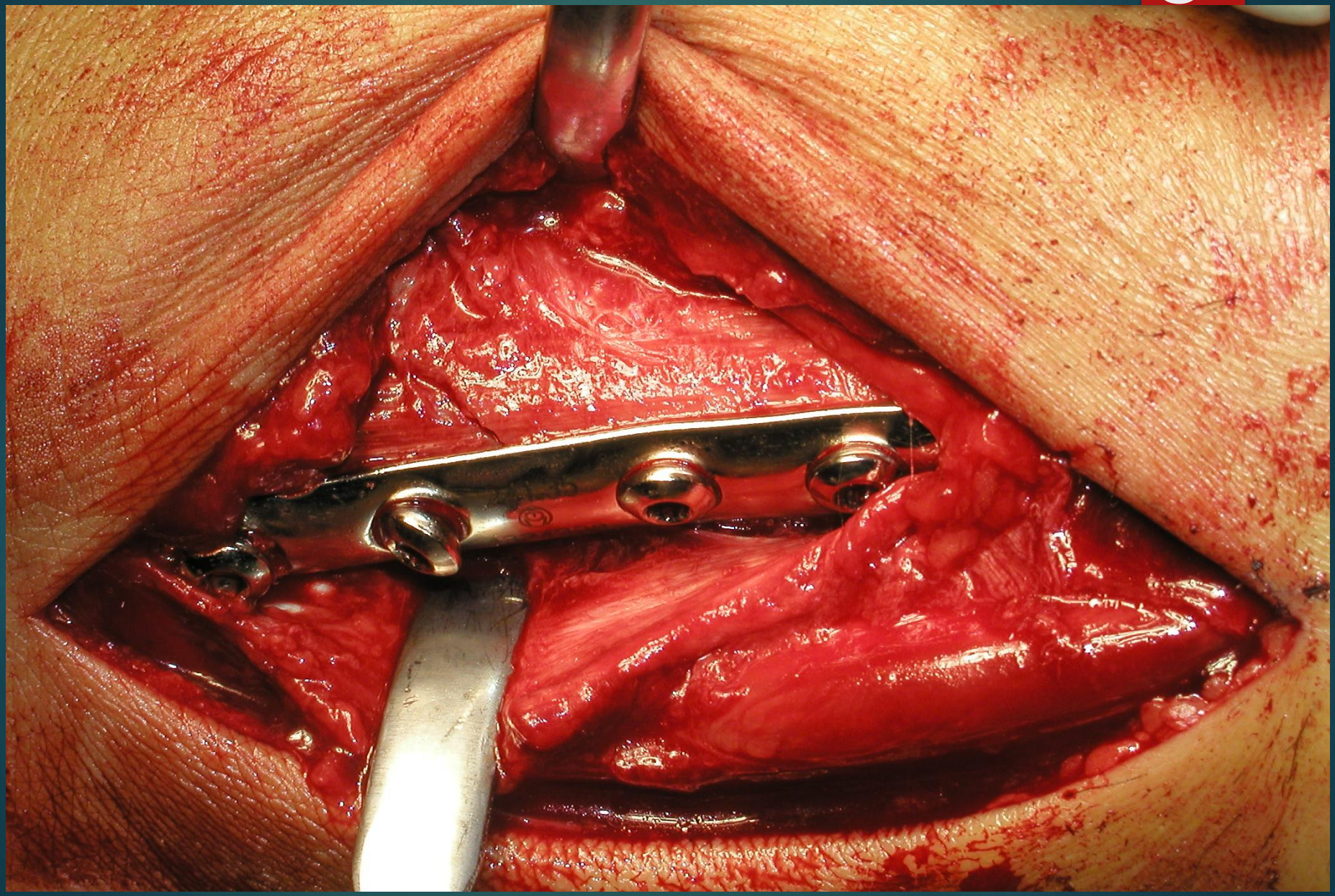


Diagnosis SER

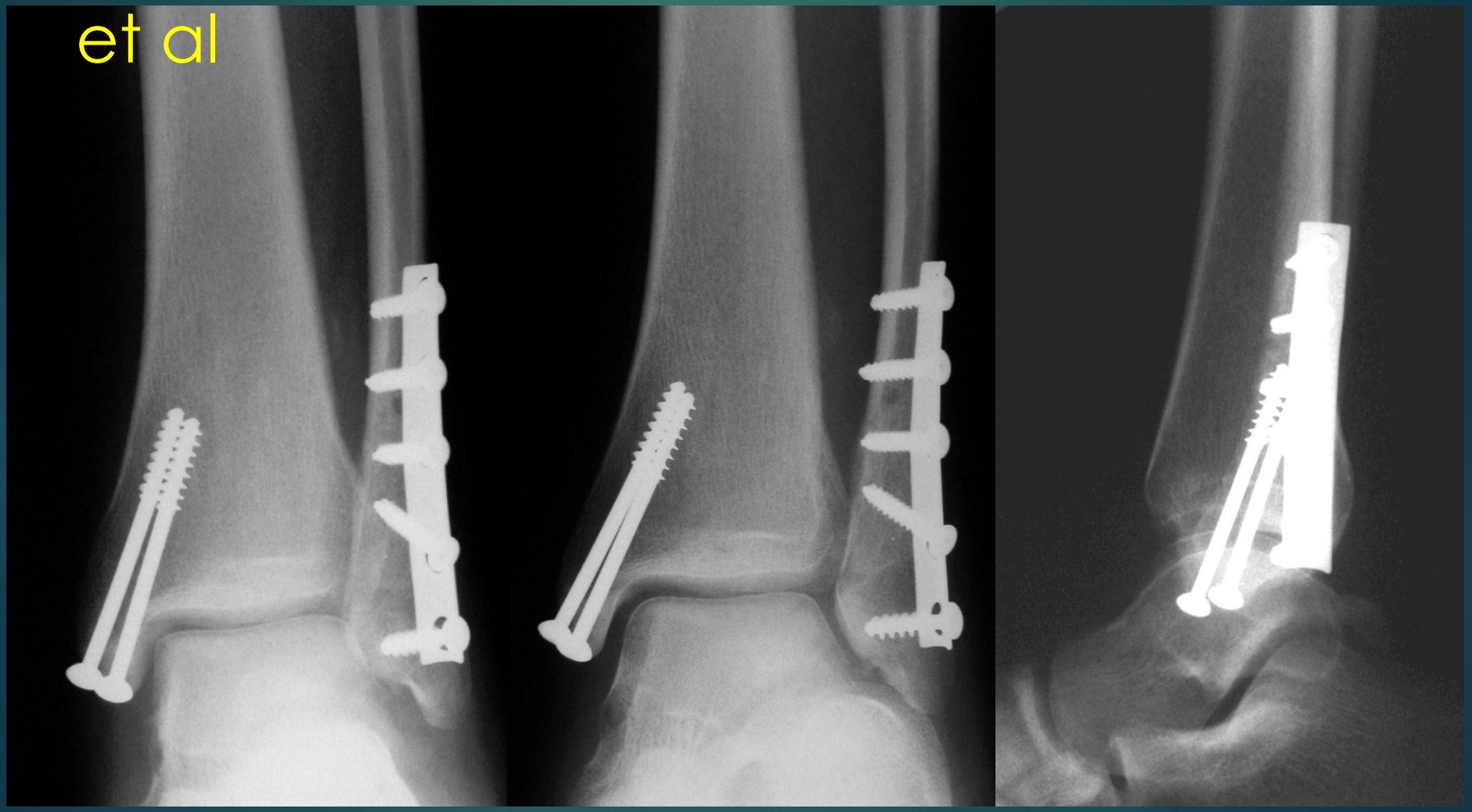
Medial Approach



Postero Lateral Fibula Plating



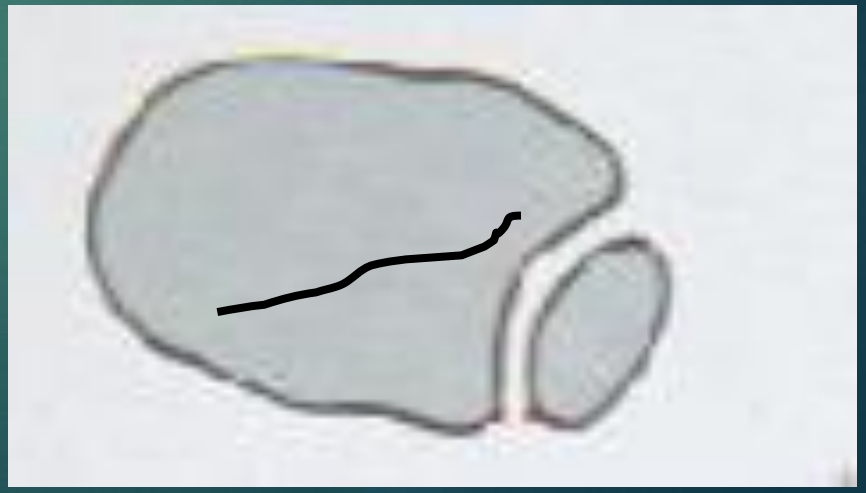
Posterolateral or lateral plating of fibula –equal outcomes and complications---Tornetta, Leighton et al



Posterior Malleolus Fracture

- > 25% of joint surface is the classic but really any instability posteriorly or through the syndesmosis is an indication to place an antiglide plate
- The fracture is nearly always associated with the pull of the posterior tib-fib ligament. So the fragment is nearly always larger laterally than medially, and it is typically obliquely oriented.

The fracture typically involves the incisura, where the fibula articulates with the tibia to form the syndesmosis.



Posterior Malleolus Fracture:

Now there is excellent evidence that the posterior malleolus adds stability to the syndesmosis ligament and thus adds stability to the whole construct

- Therefore if unstable ankle and associated posterior malleolus an antiglide plate is the treatment of choice in the majority of cases
- The controversy is which approach???
- 1)Posterior Lateral
- 2) **Posterior Medial this is really winning**

Posterior Malleolus Fracture:

Now there is excellent evidence that the posterior malleolus adds stability to the syndesmosis ligament and thus adds stability to the whole construct

1)Posterior Lateral

Usually done prone or floppy lateral

Anterior to peroneal tendons for the fibula fixation and posterior to peroneal tendons for the posterior fixation of the posterior tibia

Posterior medial dissection

- Extend the dissection through the base of the Post Tibial Tendon sheath **but many intervals are available**
- Take Post Tibia tendon sheath medial and the rest of the soft tissue laterally
- Bend the knee and flex the ankle and this allows excellent visualization of the whole posterior aspect of the distal tibia except for a small part just medial to the to the fibula border

Posterior Antiglide Plate is required to resist shear forces on this fragment

Case ----Medial shear injury—Needs? Anti Glide plate

Three months later……

At three months……..

- Clinically significant varus and internal rotation of the foot
- What now???

Correction done with osteotomy of both bones and medial fixation

Good correction obtained with opening wedge and medial locking plate

Antiglide Plates

1) ANTI SHEAR DEVICE
2) EXCELLENT REDUCTION TOOL
3) USEFUL IN MULTIPLE ANATOMIC AREAS
4) ALWAYS THE SAME PRINCIPLES
5) SKIN BRIDGE IS IMPORTANT SO PRE OPERATIVE PLANS ARE THE KEY TO SUCCESS
6) MINIMAL SOFT TISSUE DISSECTION SHOULD BE PRACTISED
7) BUT—THIS DOES NOT MEAN MICRO INCISIONS AND POOR REDUCTIONS
8) ALLOWS FOR VERY STABLE FIXATION BASED ON SOUND BIOMECHANICAL PRICIPLES

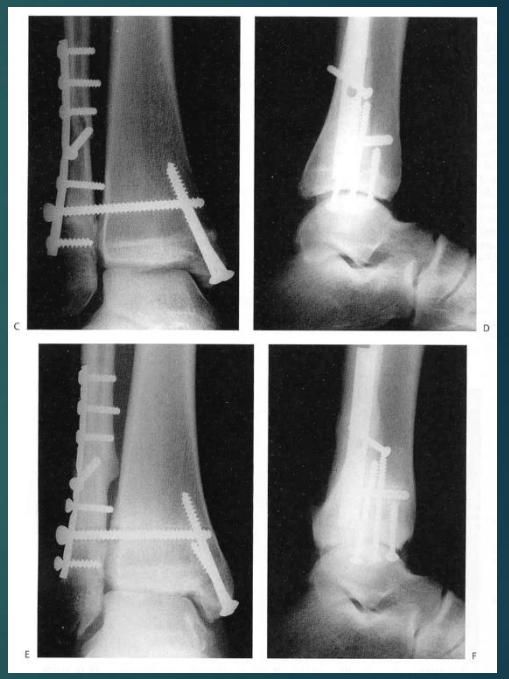
IF USED WELL IT CAN MAKE YOUR REDUCTIONS SEEM MAGICAL !!!

Postoperative Care

- Compression dressing/splint or cast
- Drains are unusual but obviously have their place
- Ice and elevation
- Non weight-bearing for 2 weeks then progression to weight-bearing based on fracture pattern, stability of fixation, patient compliance and philosophy of the surgeon
- Early ROM
- Late removal of symptomatic hardware as needed

Postoperative Care

- Casting vs. Removable Boot with early ROM
  - ?May have some wound problems with boot
  - 2013-Niloofar Dehghan et al with an award winning study has shown an improvement with early progressive motion and weight bearing where possible



This is prefered when the fixation is stable and the patient can comply with post-operative recomendations

There are predictors of poor results

- Bimalleolar fracture
- Anterolateral impaction injuries of the tibial plafond
- Large posterior malleolar fragments
- Talar dome injuries
- Talus fractures
- Associated foot/ankle injuries
- Delay in fixation
- Age > 50 yr
- Diabetes Mellitus

Summary

- Careful clinical and radiographic evaluation
- Restoration of ankle joint anatomy
  - Fibular length
  - Syndesmotic stability
  - Neutral varus/valgus orientation
  - Antiglide plate for posterior malleolar injuries

  Rare to have to delay ankle fractures
- Prepare patient for possible development of post traumatic arthrosis if factors are present that predict a possible poor outcome

Foot surgery –all about this in one case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At three months reconstruction of missing cuneiform


W:30000/L:15000 SI

At 6 months –good healing


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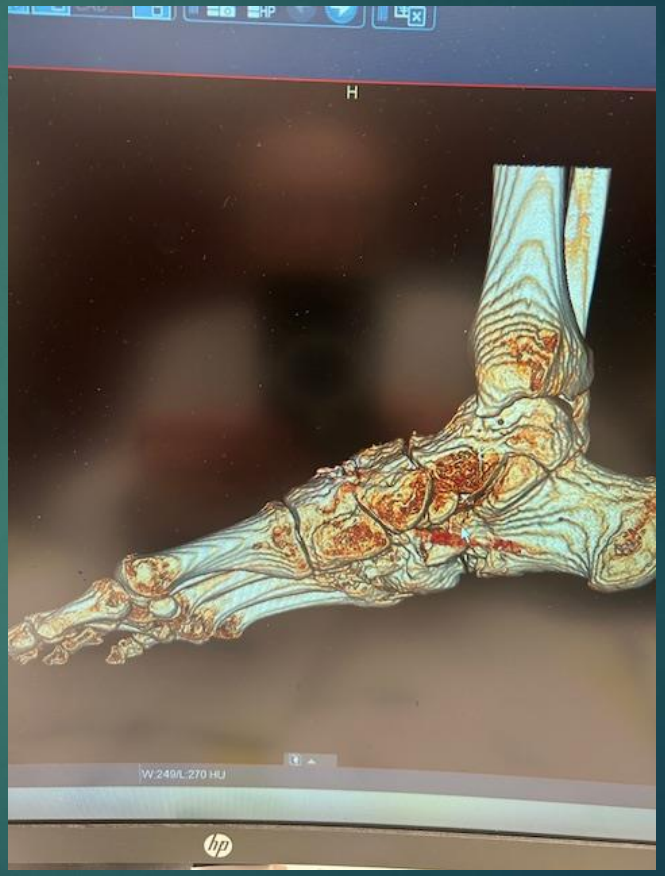
W:249/L:270 HU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At 18 months --- back at class as of 8 weeks and now almost enough hours to become a commercial pilot

Thanks For Your Attention

QE II HSC HALIFAX N.S.

SAN FRANCISCO, 2026