Ankle Fracture Update

OTA RESIDENT CORE CURRICULUM LECTURE SERIES

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Objectives

Following this session, you should be able to:

1. Understand normal versus abnormal radiographic parameters
2. Indications for surgical fixation of ankle fractures
3. Define articular pathology associated with the Lauge-Hansen classification
4. Define common posterior malleolus pathology
5. Indications for posterior malleolus fixation
6. Understand syndesmosis evaluation and treatment principles

Outline

- Evaluation: Clinical and Radiographic
- Classification: Weber Lauge-Hansen
- Specific Problem Areas: Posterior Malleolus and Syndesmosis
- Outcome
- Diabetic Ankle Fractures

Evaluation: Clinical

HISTORY

- Mechanism
- Timing
- Soft-tissue Injury
- Bony Quality
- Comorbidities
- Associated Injuries

PHYSICAL EXAM

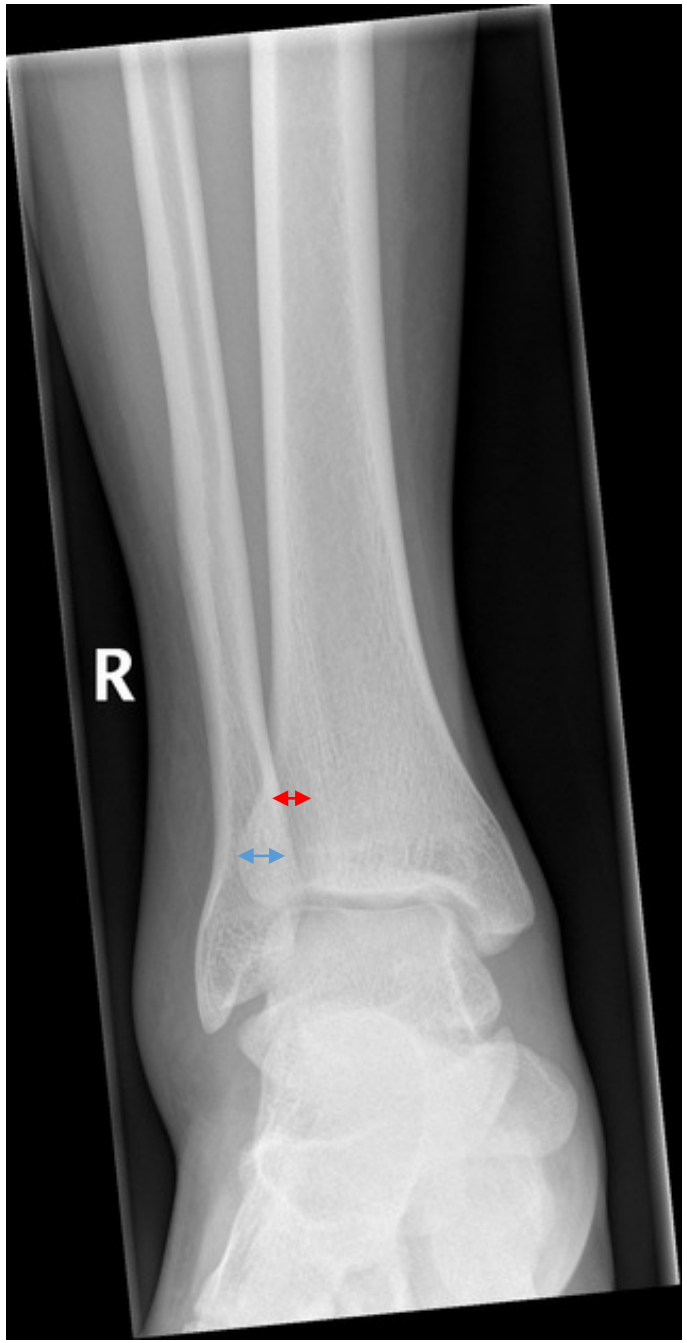
- Skin
- Nerves
- Vasculature
- Pain
- Deformity
  - Instability: Does the ankle easily re-dislocate?

Physical Exam

- Look at the soft tissue!
- Open versus tenting versus closed

Radiographic Evaluation

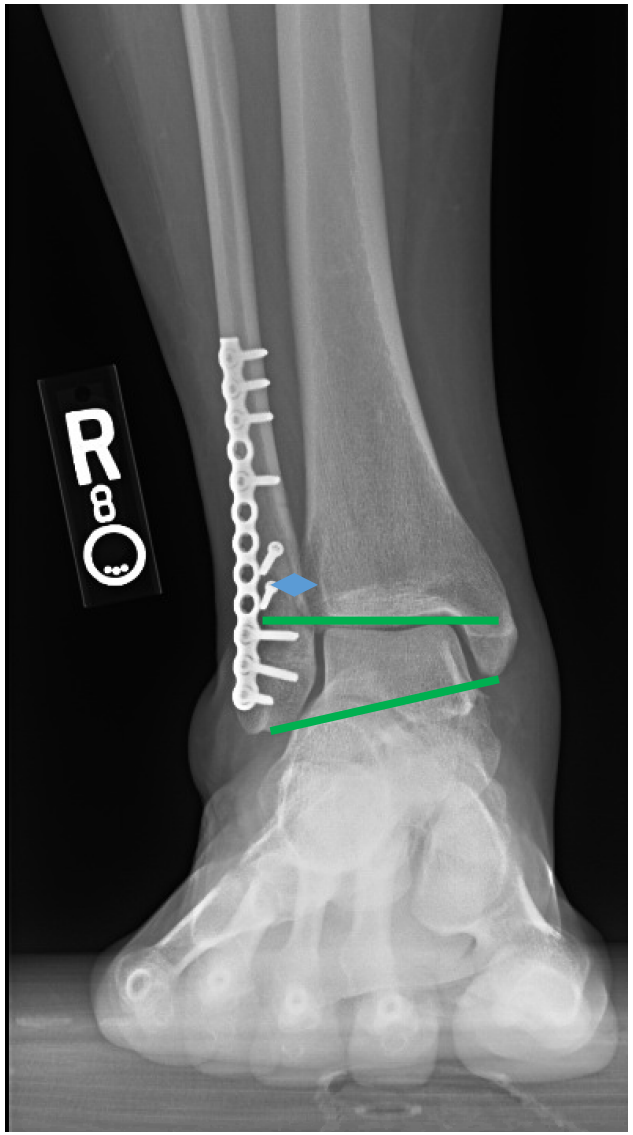
- Ensure adequate films
  - Joint above and below
  - Ankle series (AP/LAT/MORTISE)
  - Special films
    - Manual stress
    - Gravity stress
- CT
  - For specific pathology



AP Ankle

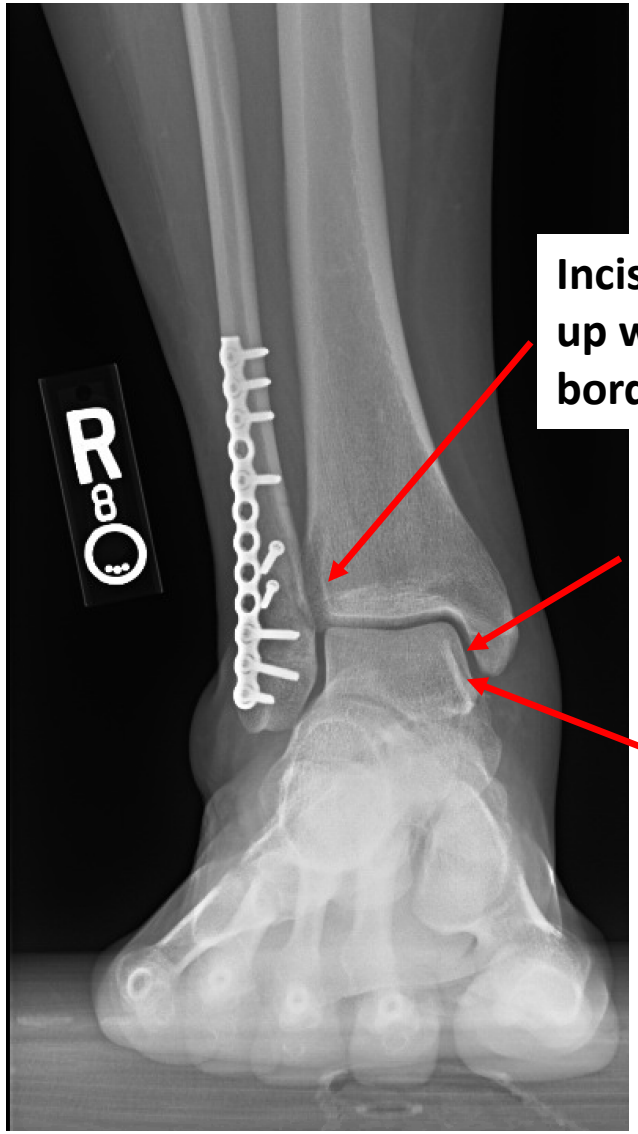
- Tib/Fib overlap: ~10 mm
- Tib/Fib clear space: <5 mm
- End on view of fibula
  - Can evaluate if screw through fibular plate going into incisura or not

Mortise View



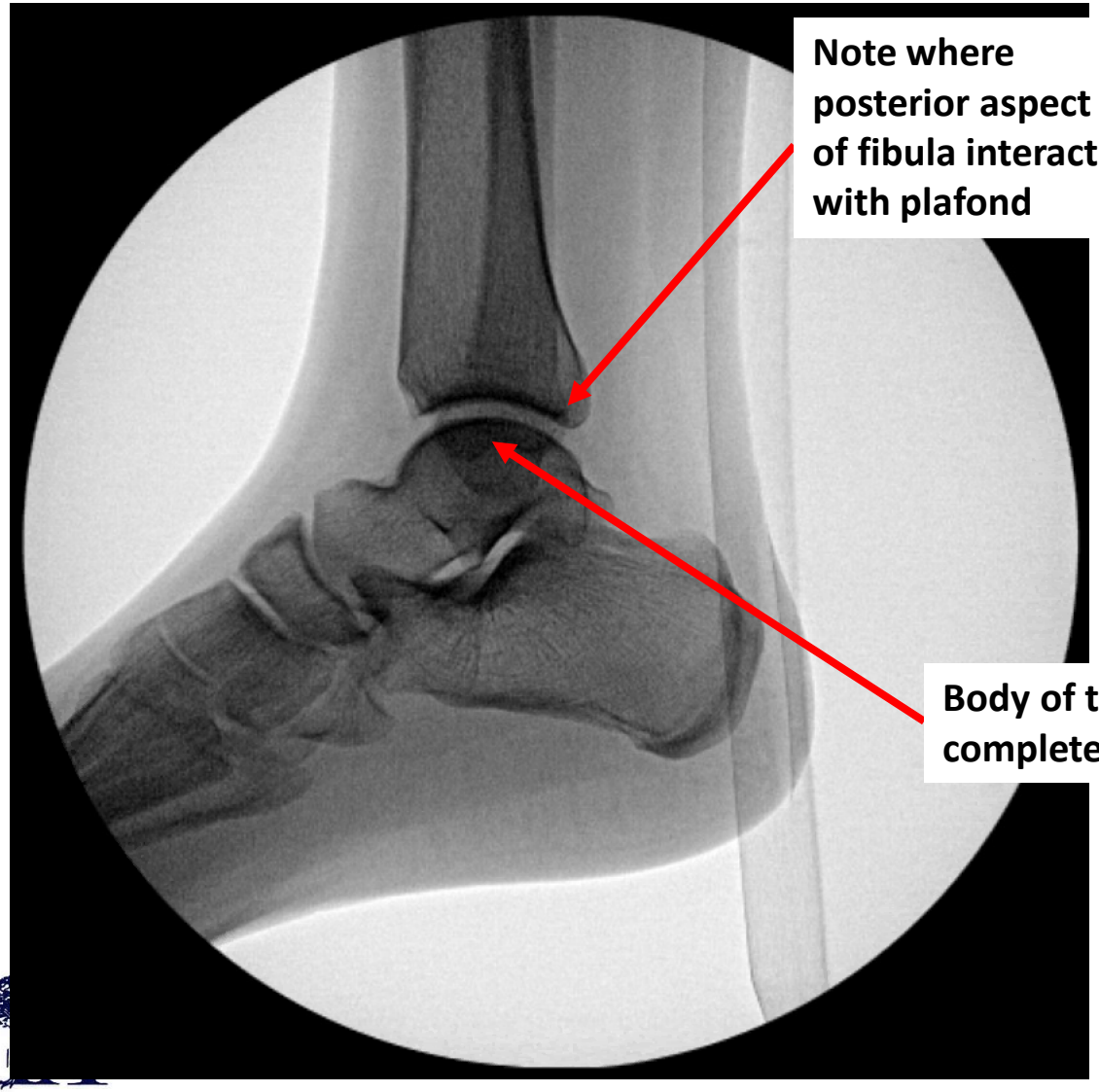
- Tib/fib overlap: >1 mm
- Talocrural angle: <8 or >15 degrees

Mortise View



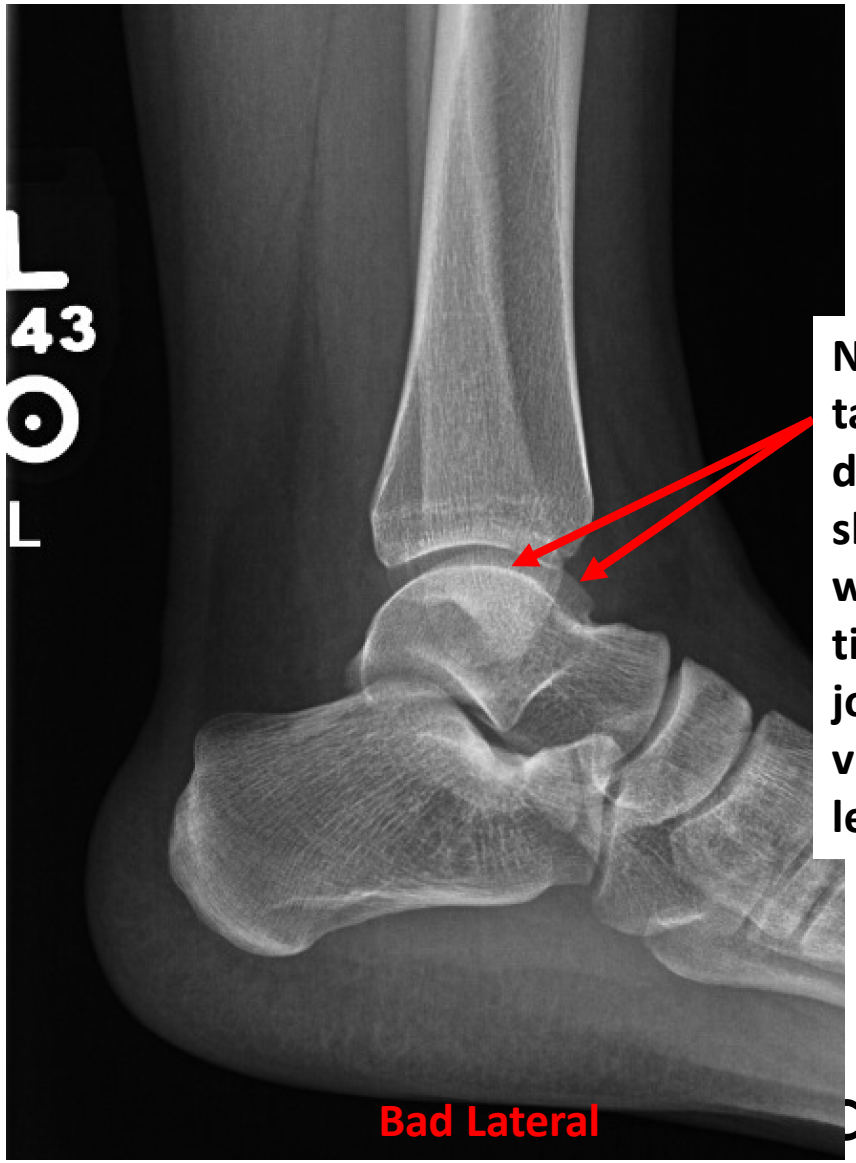
- 10-15 degrees of IR
- Medial articular surface in tangent to beam, with posteromedial and posterolateral borders of talus visualized

Lateral Ankle



- Perfect lateral of ankle will have the talar body perfectly overlapped
- Useful to visualize where posterior aspect of fibula aligns with plafond

Good Lateral Ankle Vs Bad Lateral Ankle



Note how talar body double shadow seen, which makes tibiotalar joint visualization less clear

Other Imaging Abnormalities

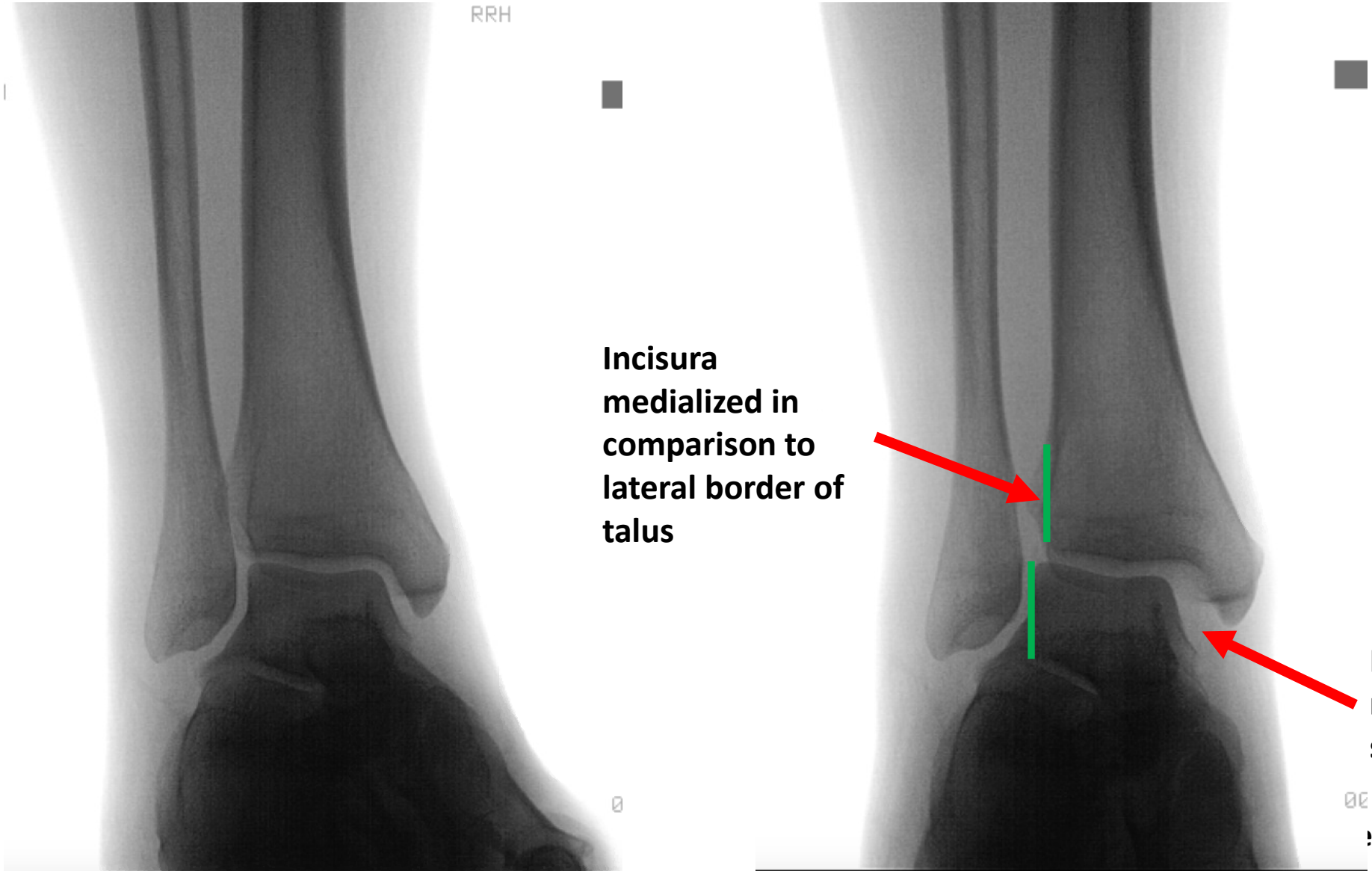
- Stress Views
  - Comparison views (for surgical purposes)
  - Gravity
  - Manual
  - Weight bearing mortise view
- CT
  - Articular involvement
  - Posterior malleolus characterization
- MRI
  - Ligament and tendon injury
  - Talar dome lesions
  - Syndesmotic injuries

Comparison Films

Manuel Stress Views

- Indications
  - To evaluate DELTOID ligament
- MORTISE view
- Foot must be DORSIFLEXED
- Apply EXTERNAL ROTATION force on foot with tibia stabilized

Manual Stress



Gravity Stress View

- Ensure LATERAL aspect of foot is down

Gravity Versus Manual Stress

Comparison of Manual and Gravity Stress Radiographs for the Evaluation of Supination-External Rotation Fibular Fractures

By J. Brian Gill, MD, MBA, Timothy Risko, MD,
Viorel Raducan, MD, J. Speight Grimes, MD, and Robert C. Schutt Jr., MD

- Prospective study of 25 patients comparing gravity versus manual stress
- No difference in determination of deltoid ligament injury

Weight Bearing Films

CT

The Role of Computed Tomography in Surgical Planning for Trimalleolar Fracture. A Survey of OTA Members

Peter D. Gibson, MD, Micheal J. Bercik, MD, Joseph A. Ippolito, BA, Jacob Didesch, MD, John S. Hwang, MD, Kenneth L. Koury, MD, Michael Sirkin, MD, Mark Adams, MD, and Mark C. Reilly, MD

- Survey of 10 trimalleolar cases (5 where PM fixation occurred, 5 where did not) to OTA members
- 25% of members (430/1710) changed operative techniques after review of CT

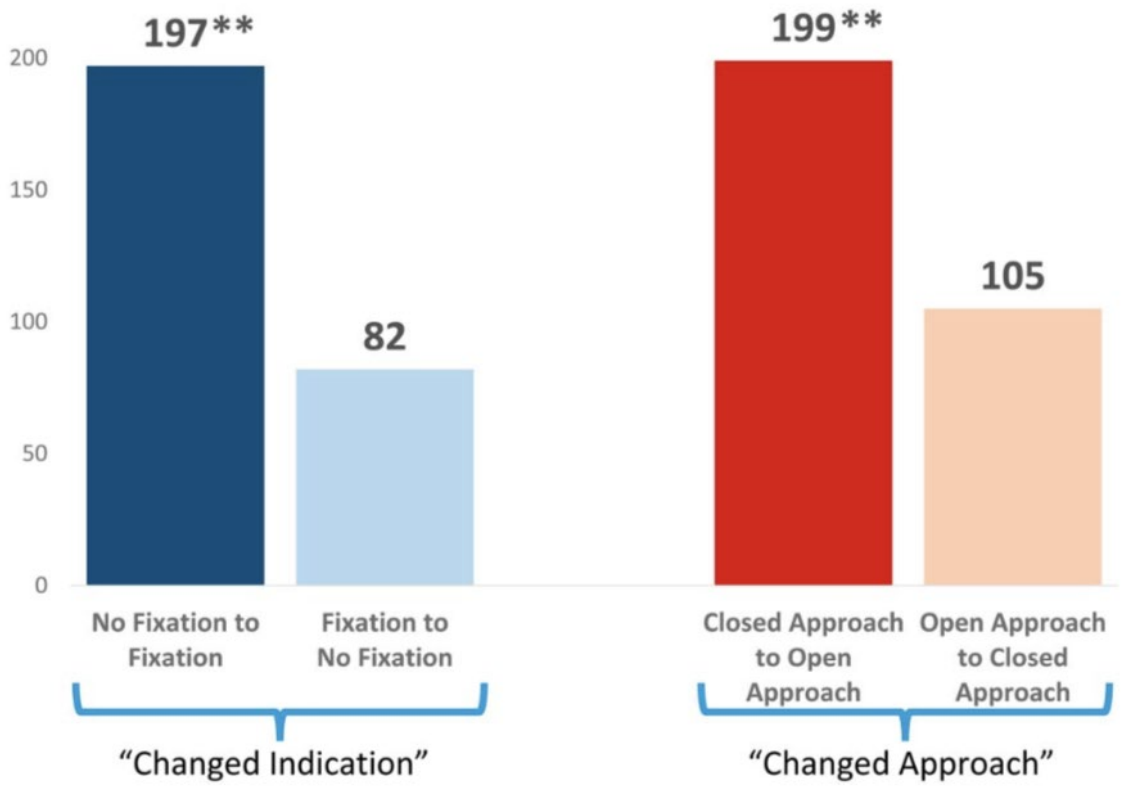
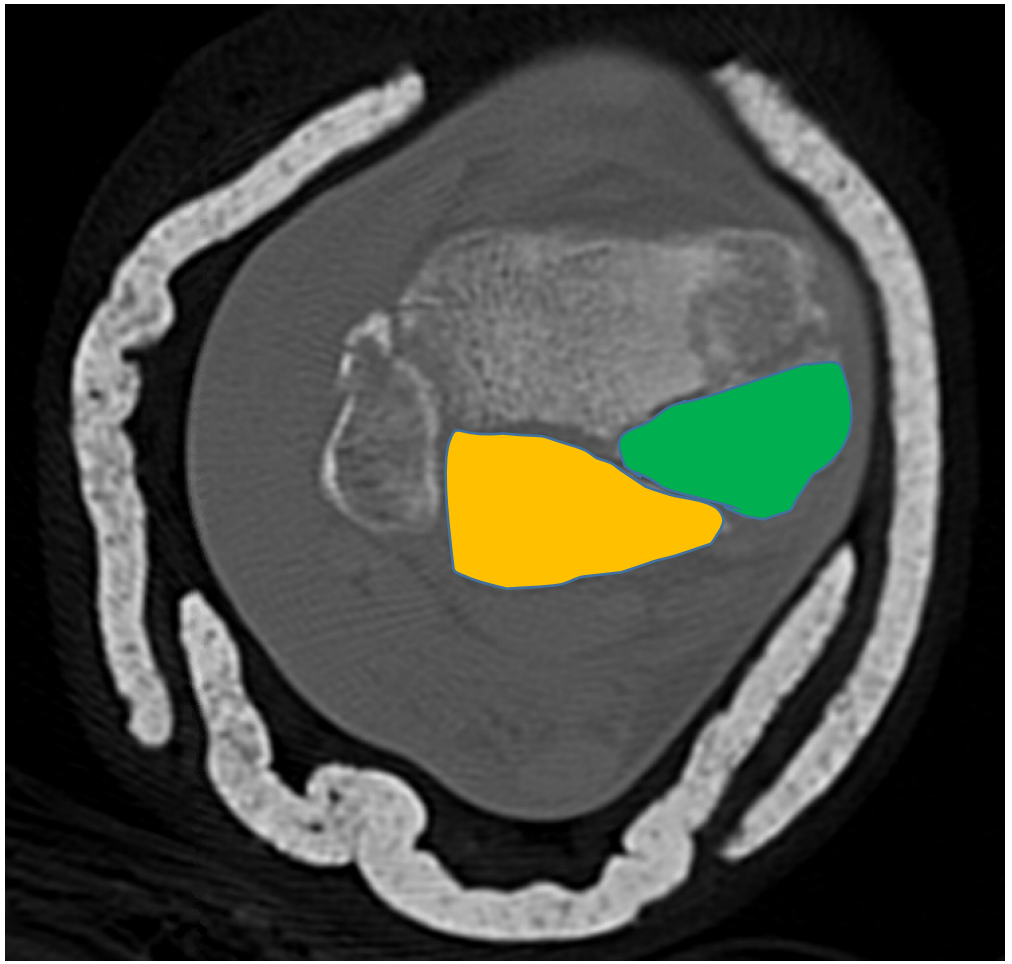


FIGURE 3. Numeric breakdown of those individuals who "changed indication" and "changed approach" preferred operative technique of individuals who "changed technique." Comparing results before and after CT is shown. Statistical significance—$P < 0.05$ (**).

Gibson PD, et al. The role of computed tomography in surgical planning for trimalleolar ankle fracture: A survey of OTA members. J Orthop Trauma. 2017 Apr; 31(4)e116-e120

CT– Does It Change Operative Strategy?



Reliability of Radiologic Assessment of the Fracture Anatomy at the Posterior Tibial Plafond in Malleolar Fractures

Lorenz Büchler, MD, Moritz Tannast, MD,* Harald M. Bonel, MD,† and Martin Weber, MD**

- Conclusion: Plain radiographs not sufficient to evaluate comminution and impaction of posterior fracture
- Recommend CT evaluation for ALL trimalleolar ankle fractures

Buchler L, Tannast M, Bonel HM, Weber M. Reliability of radiologic assessment of the fracture anatomy at the posterior tibial plafond in malleolar fractures. J Orthop Trauma. 2009 Mar;23(3):208-12.

ED Management

- Address open wounds
  - IV antibiotics
  - Betadine soaked gauze over wound
- Closed reduction
  - Conscious sedation versus intraarticular block
- Splint application
  - Well padded
  - Stirrups and posterior slab

Intra-Articular Block Compared with Conscious Sedation for Closed Reduction of Ankle Fracture-Dislocations

A Prospective Randomized Trial

By Brian J. White, MD, Michael Walsh, PhD, Kenneth A. Egol, MD, and Nirmal C. Tejwani, MD

Investigation performed at the Department of Orthopaedic Surgery, Jamaica Hospital Medical Center and Bellevue Hospital, New York, NY

- Randomized prospective study of 42 patients that underwent closed reduction of ankle fracture dislocations and received conscious sedation versus an intra-articular block
- Similar degree of analgesia and sufficient analgesia to achieved closed reduction

Outline

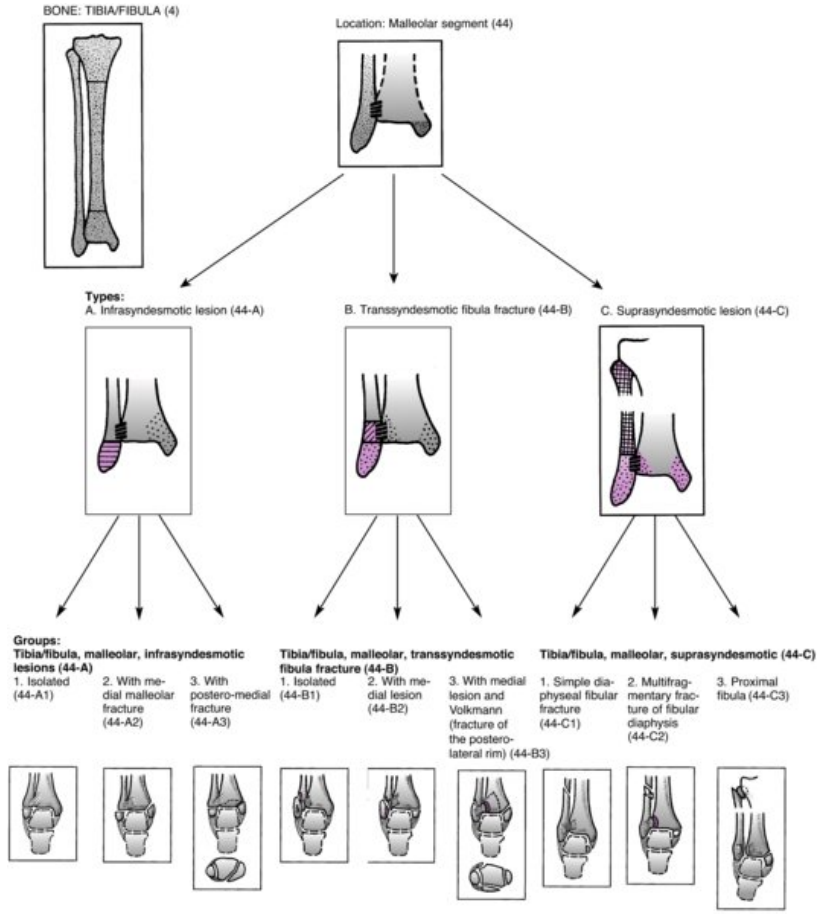
- Evaluation: Clinical and Radiographic
- Classification: Weber/AO-OTA, Lauge-Hansen
- Specific Problem Areas: Posterior Malleolus and Syndesmosis
- Outcome
- Diabetic Ankle Fractures

Weber/AO-OTA Classification

Original Danis-Weber

- Type A: Below plafond
- Type B: At level of plafond
- Type C: Above plafond

AO-OTA



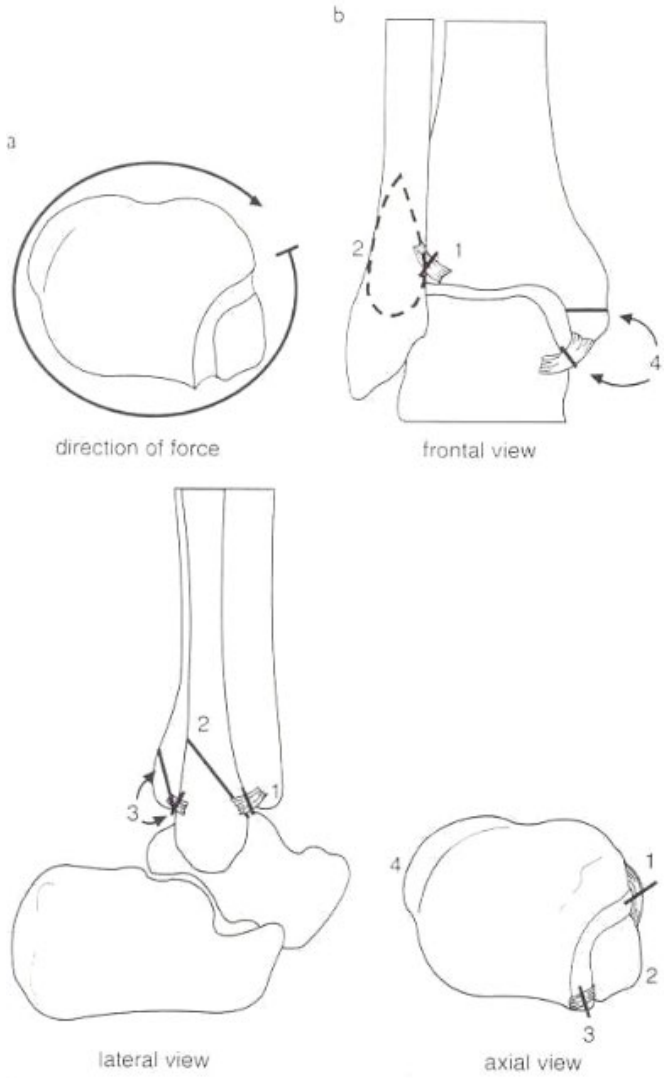
Meinberg A, Agel J, Roberts C, et al. Fracture and Dislocation Classification Compendium – 2018, J Orthop Trauma 32(1);Suppl, Jan 2018

AO-OTA Fracture Compendium

Lauge-Hansen

- Based on position of foot at time of fall

Supination-External Rotation



- Stage 1 – AITFL
- Stage 2 – Oblique fibula fx (posterior superior to anterior inferior)
- Stage 3 – PITLF or posterior malleolus
- Stage 4 – Deltoid or medial malleolus

SER II

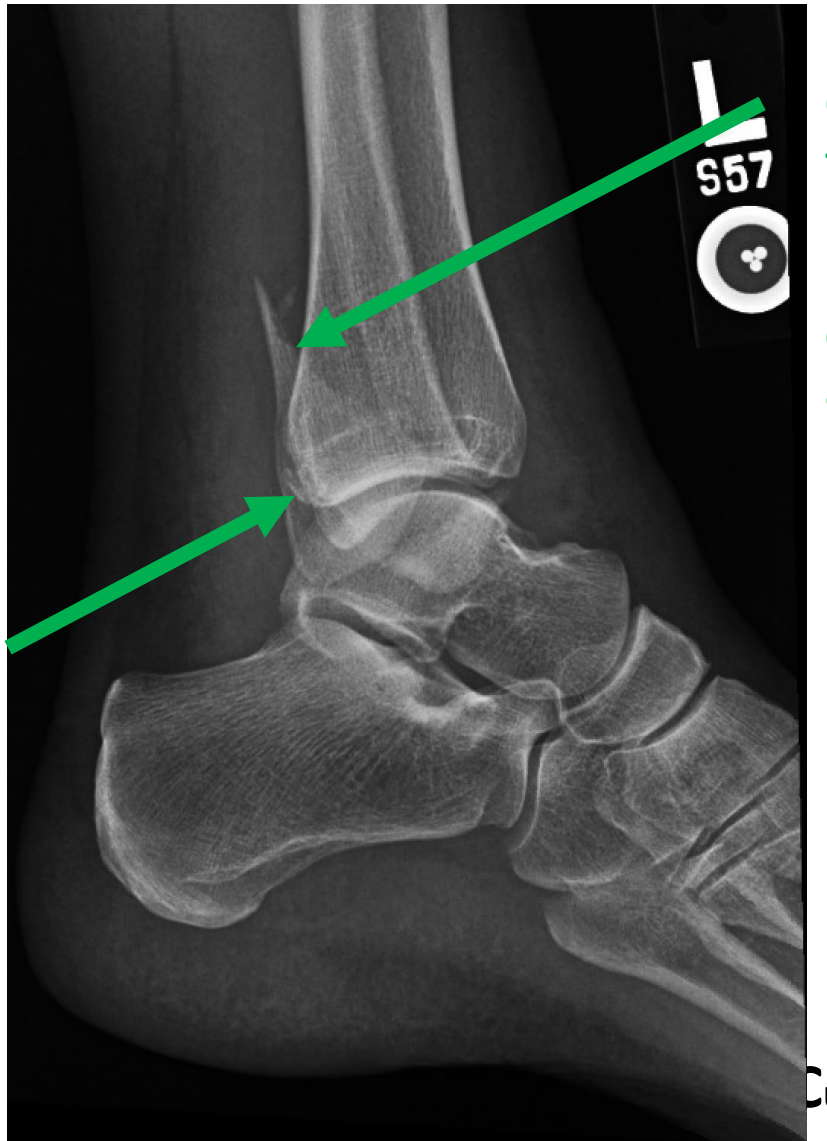
Intact medial stability

Typically a posterosuperior to anteroinferior fibula fracture

SER IV - Bony

Medial malleolus fracture

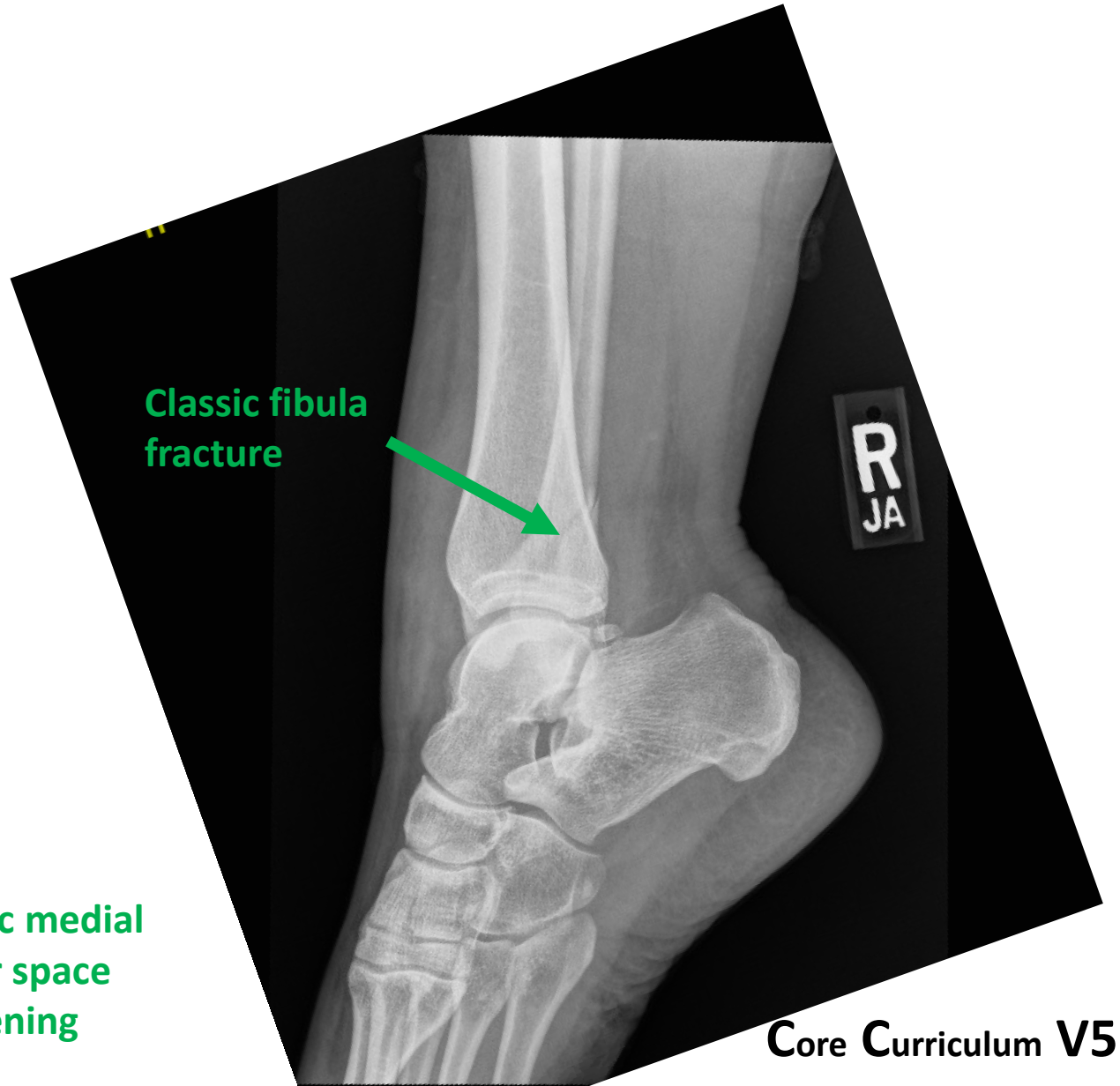
Small posterior malleolus fracture



Classic fibula fracture pattern, posterosuperior to anteroinferior

SER IV - Ligamentous

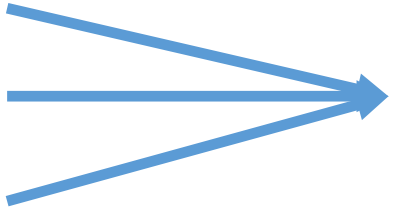
Static medial clear space widening



SER II versus SER IV – How to Decide?

- Goal: Determine medial stability

- Medial tenderness
- Medial swelling
- Medial ecchymosis



Not indicative of medial stability

Michelson, CORR 2001
McConnell, JBJS 2004
Egol, JBJS 2004

Why Does Differentiating Between an SER II and SER IV Matter?

Closed treatment of ankle fractures

Stage II supination-eversion fractures followed for 20 years

- 94 SER II ankle fractures followed for 16-25 years
  - 89 with good results, 5 with medium
  - No cases required salvage for posttraumatic arthritis

Thirty-year follow-up of ankle fractures

- 49 SER II ankle fractures
  - Minimal signs of arthrosis in only one of these patients

Are SER IV Stress Positive Ankles An Indication to Operate?

Operative Versus Nonoperative Treatment of Unstable Lateral Malleolar Fractures: A Randomized Multicenter Trial

David W. Sanders, MD, MSc, FRCSC, Christina Tieszer, MSc, CCRP,**
and Bradley Corbett, PhD,† on behalf of the Canadian Orthopedic Trauma Society

- 41 operative, 41 nonoperative
- No functional differences at any time interval
- Nonoperative group complications
  - 8 with medial clear space $\geq$ 5 mm, 8 with delayed/nonunion (though all united at 1 year)
- Operative
  - 5 with SSI, 5 that required HWR

Why the controversy?

- Biomechanical concern over increased pressure on cartilage with shift
- No long-term studies

Changes in Tibiotalar Area of Contact Caused by Lateral Talar Shift

BY PAUL L. RAMSEY, M.D.*, AND WILLIAM HAMILTON, M.D.†, WILMINGTON, DELAWARE

From the Alfred I. duPont Institute, Wilmington

- Mean decrease in contact area of tibiotalar joint of 42% with one millimeter of lateral talar displacement

Decision Tree

- 1. Fibular fractures associated with a stable ankle mortise heal without significant functional consequence.
  - Keep the talus under the tibia

- 2. Fibular fractures associated with an unstable ankle mortise heal with significant functional problems…assuming that this instability will cause talar shift
  - Question to consider: Do ALL stress positive but statically congruent SER IV ankle fractures heal with some talar shift without surgery?

Are SER IV Stress Positive Ankles Still An Indication to Operate?

Correlation of Weightbearing Radiographs and Stability of Stress Positive Ankle Fractures

C. Max Hoshino, MD; Edward Kazuhisa Nomoto, MD; Elizabeth P. Norheim, MD; Thomas G. Harris, MD
Torrance, CA

- Prospective study of 38 patients (36 SER stress positive, 2 PER stress positive)
- 3 required operative intervention (2 of which were PER patterns)
- Conclusion: SER stress positive ankles (statically congruent) can be treated nonoperatively, but require close follow-up

Are SER IV Stress Positive Ankles Still An Indication to Operate?

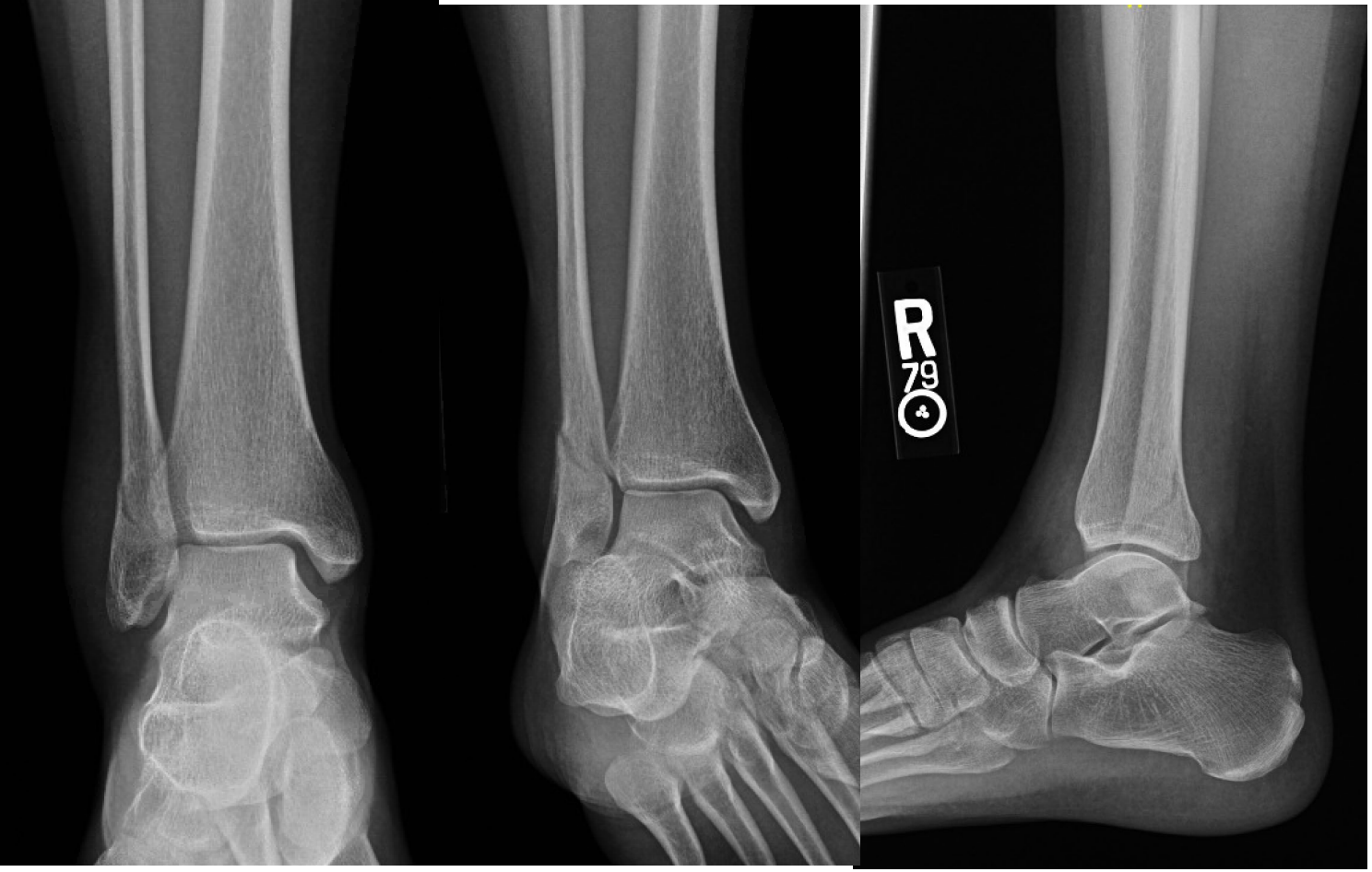
Operative Versus Nonoperative Treatment of Unstable Lateral Malleolar Fractures: A Randomized Multicenter Trial

David W. Sanders, MD, MSc, FRCSC, Christina Tieszer, MSc, CCRP,* and Bradley Corbett, PhD,† on behalf of the Canadian Orthopedic Trauma Society*

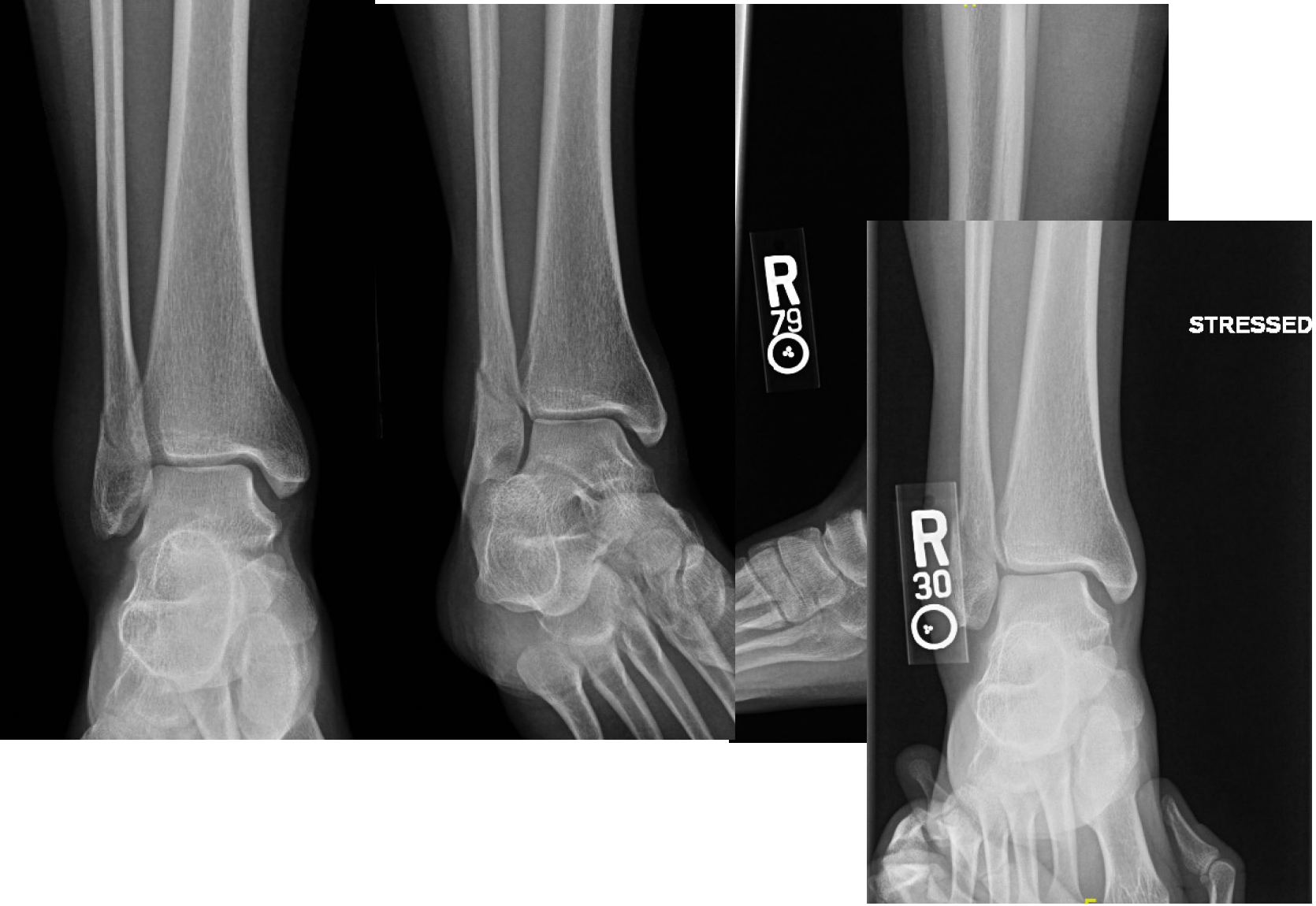
- Randomized, prospective study of 81 patients (All Weber B with medial clear space widening on stress)
- No significant difference in functional outcomes or pace of recovery at any time interval
- Conclusion: SER stress positive ankles treated conservatively had equivalent functional outcomes in comparison to surgical management, but higher risks of future displacement and nonunion

Are SER IV Stress Positive Ankles Still An Indication to Operate?

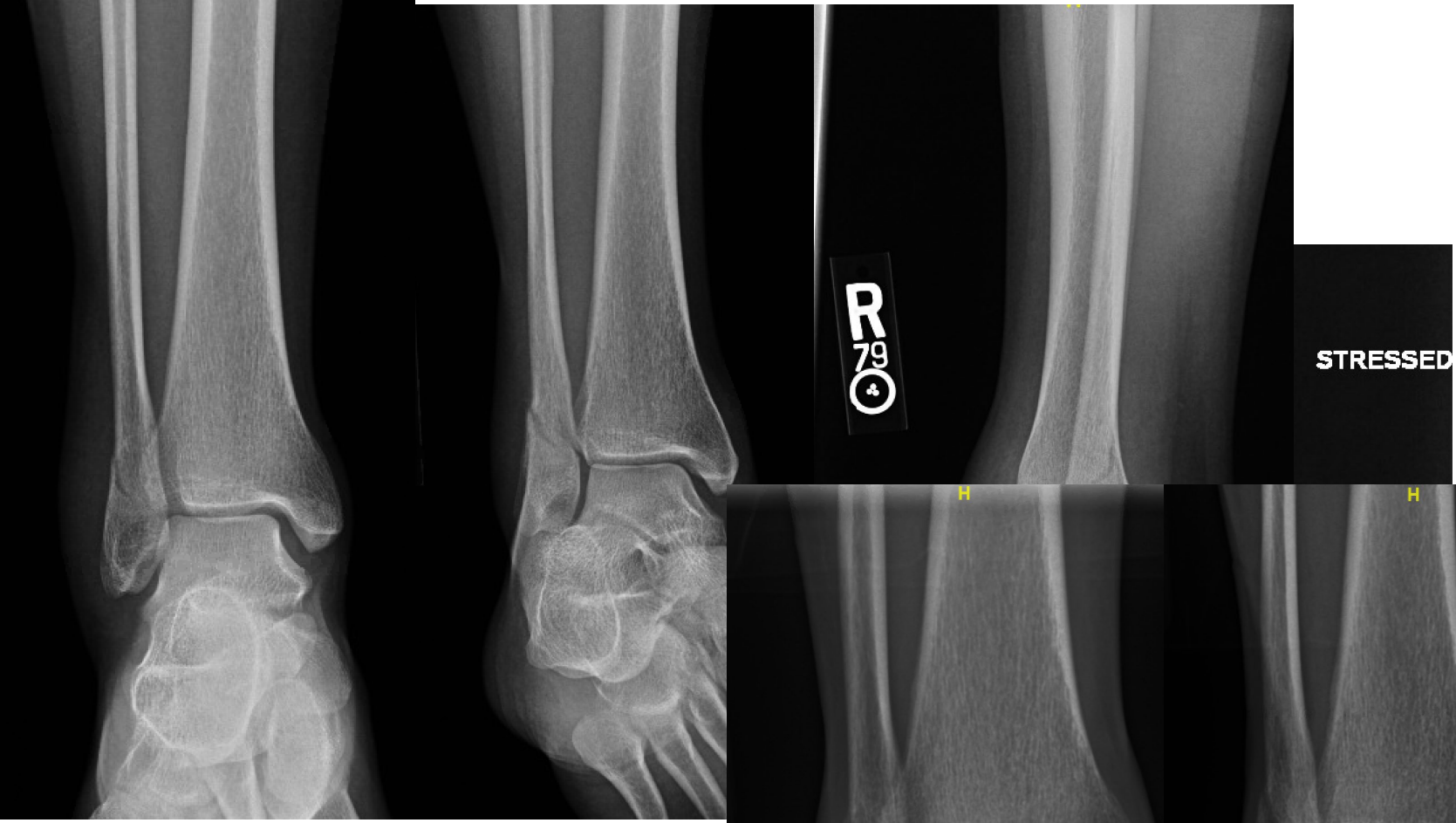
- Still evolving concepts
- Goal: Maintain congruent tibiotalar joint with plafond centered over talus
  - Close followup with nonoperative treatment which has the possibility of loss of reuction
  - ORIF may reduce clinic visits and more predictable healing but has risks of operative and hardware complications
- Requires patient informed consent either way



29 year-old female p/w a R oblique distal fibula fracture



On manual stress, medial clear space widening

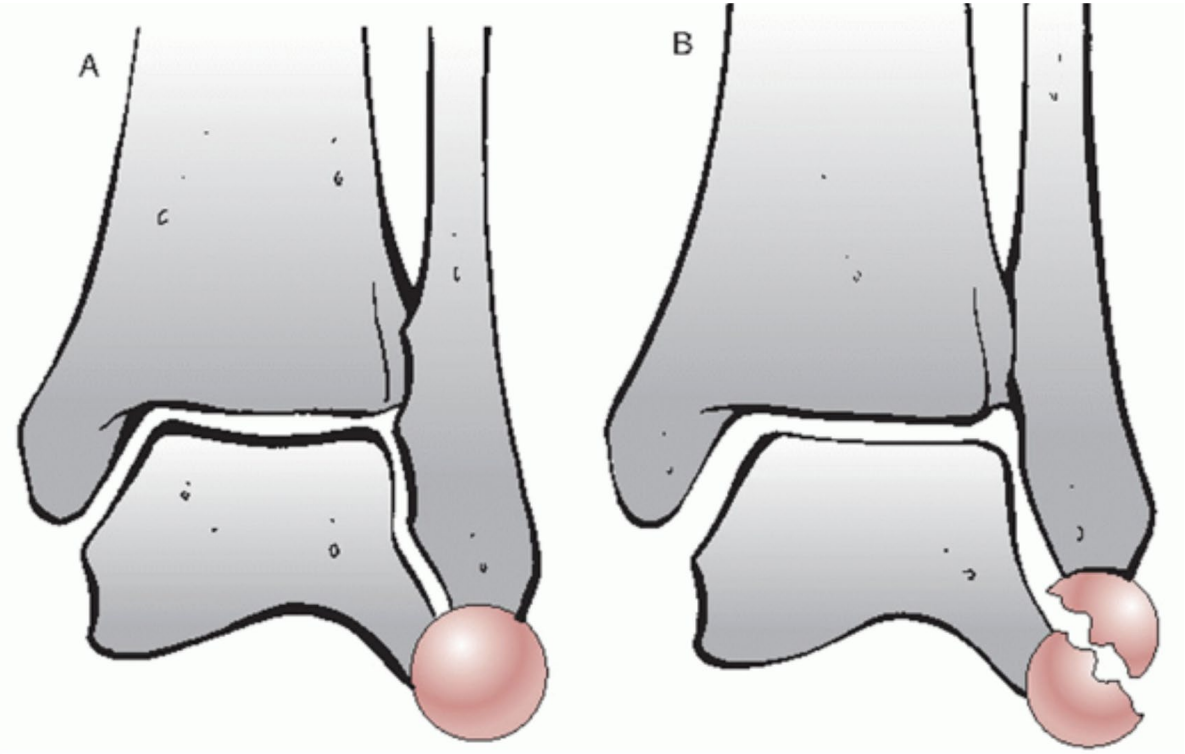


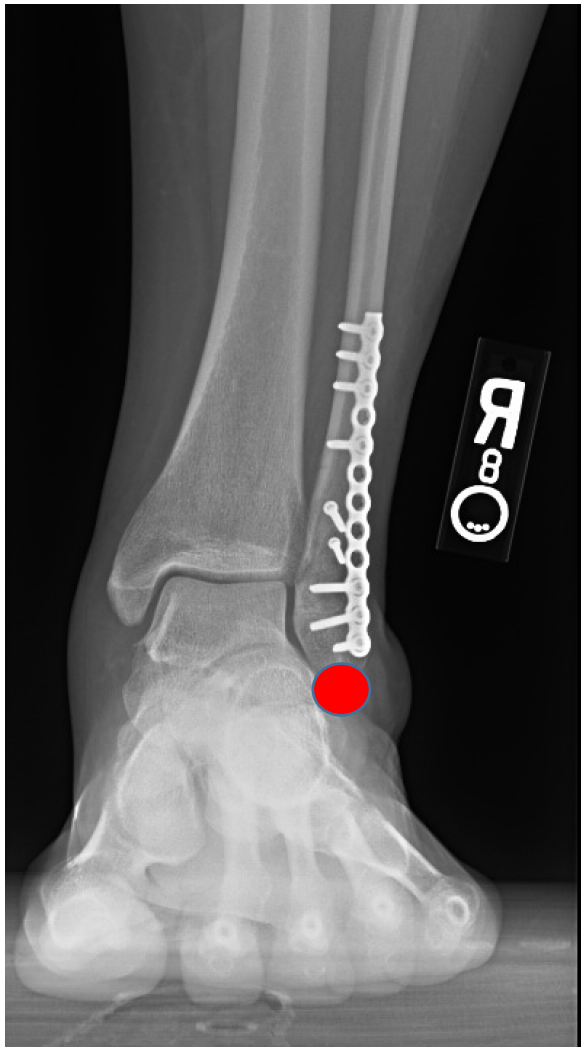
6 month follow-up, no pain, back to all normal activities

Surgical Treatment Checklist

- Address fibula
  - Ensure adequate length obtained (use contralateral side, dime sign)
  - Antiglide versus neutralization plate/lag screw
  - May require bridge plating if very comminuted
- Posterior malleolus
  - If present, consider fixation depending on size
- Medial malleolus
  - If present, likely fixation
    - Fully threaded bicortical screws versus partially threaded
- Stress ankle
  - Stress for syndesmotic stability

Dime (or “Ball”) Sign





- Round recess comprised of distal tip of fibula and lateral process of talus

Rockwood and Green’s. Chapter 57.

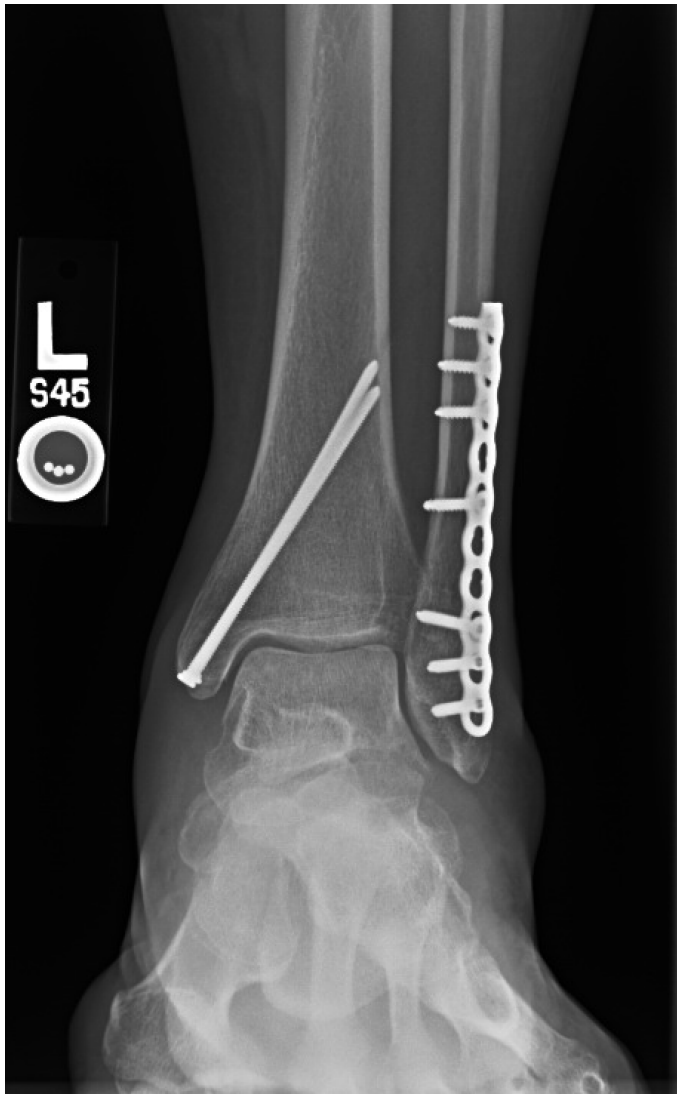
Weber SICOT 1981

SER IV – Surgical Treatment

- Re-establish fibular length, alignment, and rotation
  - Antiglide plate
    - Stronger, covered by greater soft tissue envelope
    - More likely to irritate peroneal tendons
  - Lag screw/neutralization plate
    - Weaker, directly under incision
    - Less likely to irritate peroneal tendons
- Reassess syndesmosis/medial stability with manual stress
  - +/- syndesmotic fixation

SER IV – Surgical Treatment

- Re-establish fibular length, alignment, rotation
- Medial malleolus fixation
  - Multiple fixation options
- Reassess syndesmosis
  - +/- syndesmotic fixation



Medial Malleolus Fixation

Lag Screw Fixation of Medial Malleolar Fractures: A Biomechanical, Radiographic, and Clinical Comparison of Unicortical Partially Threaded Lag Screws and Bicortical Fully Threaded Lag Screws

William M. Ricci, MD, Paul Tornetta, MD,† and Joseph Borrelli, Jr, MD‡*

- Bicortical fully threaded lag screws had superior biomechanical, radiographic, and clinical outcomes compared to partially threaded lag screws

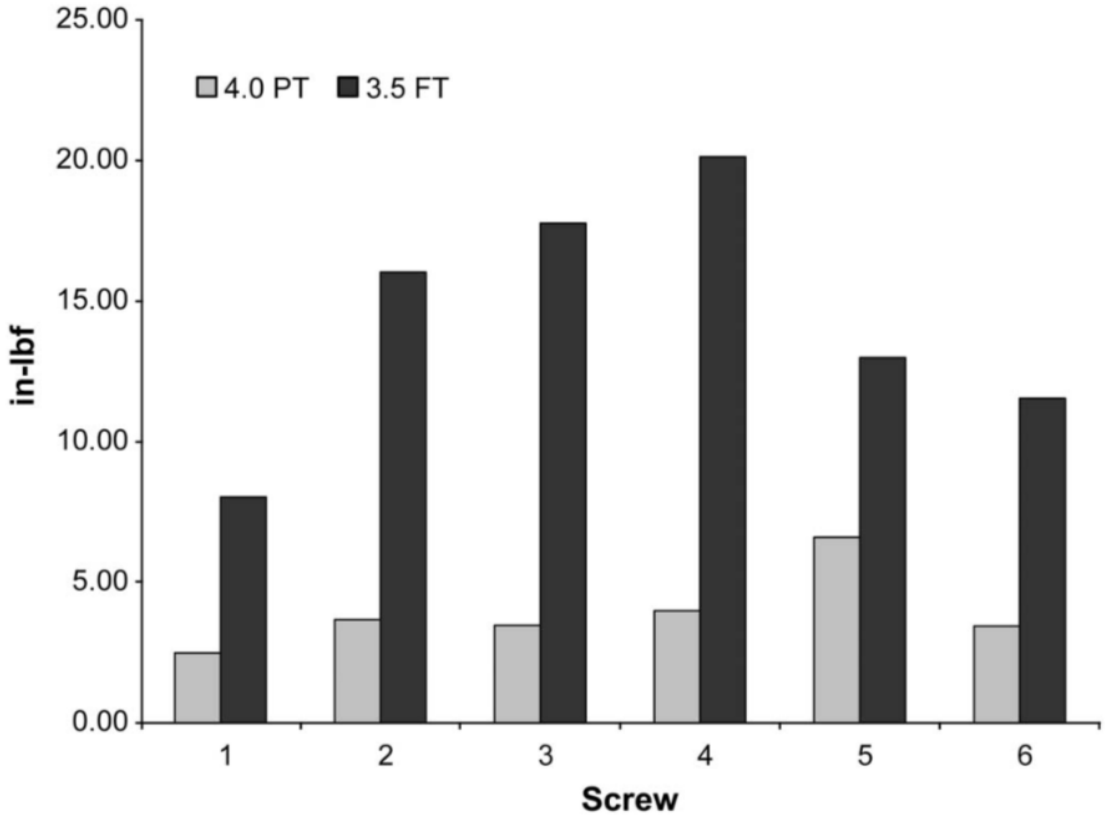


FIGURE 2. Graph showing results of maximal insertion torque generated for 4.0 mm PT unicortical cancellous lag screws and 3.5 mm FT bicortical lag screws.

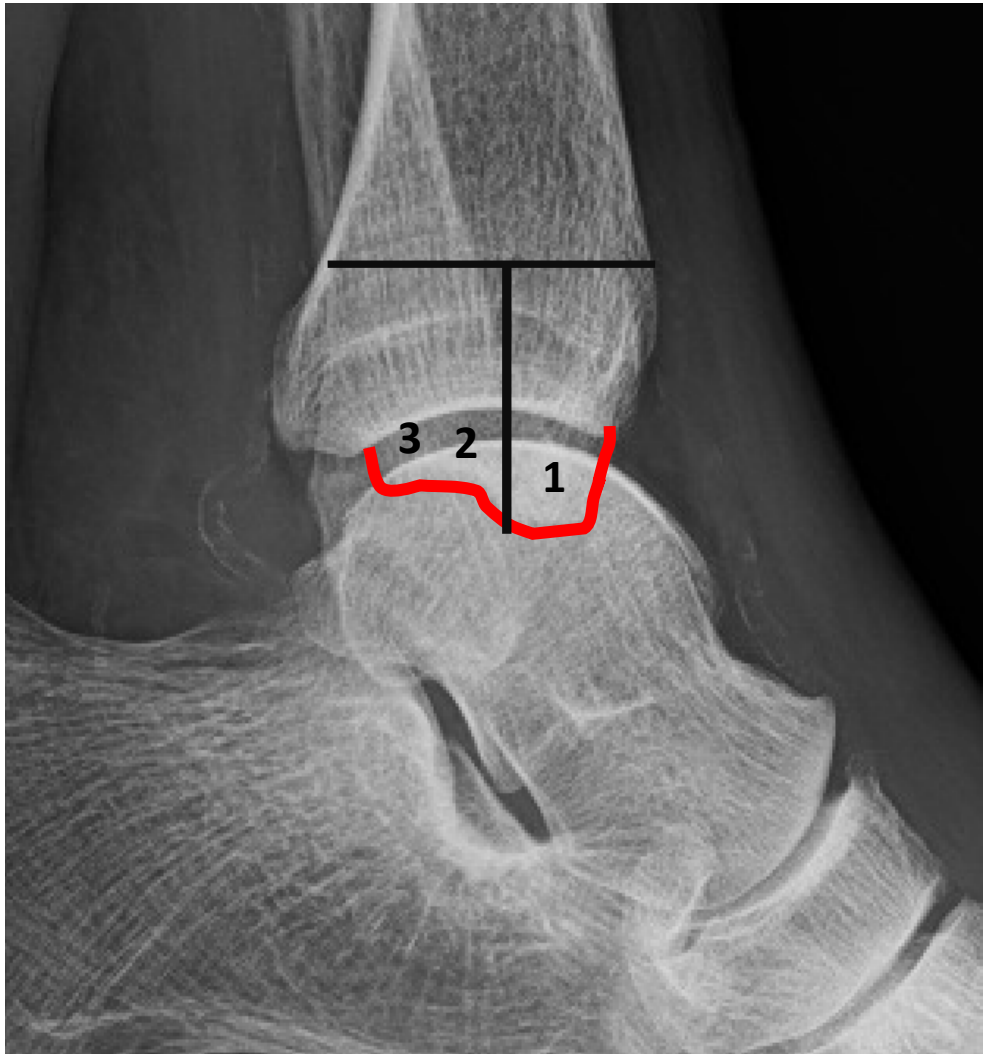
Ricci WM, Tornetta P, Borrelli J Jr. Lag screw fixation of medial malleolar fractures: A biomechanical, radiographic, and clinical comparison of unicortical partially threaded lag screws and bicortical fully threaded lag screws. J Orthop Trauma. 2012 Oct;26(10):602-6.

Position of Medial Malleolus Screws

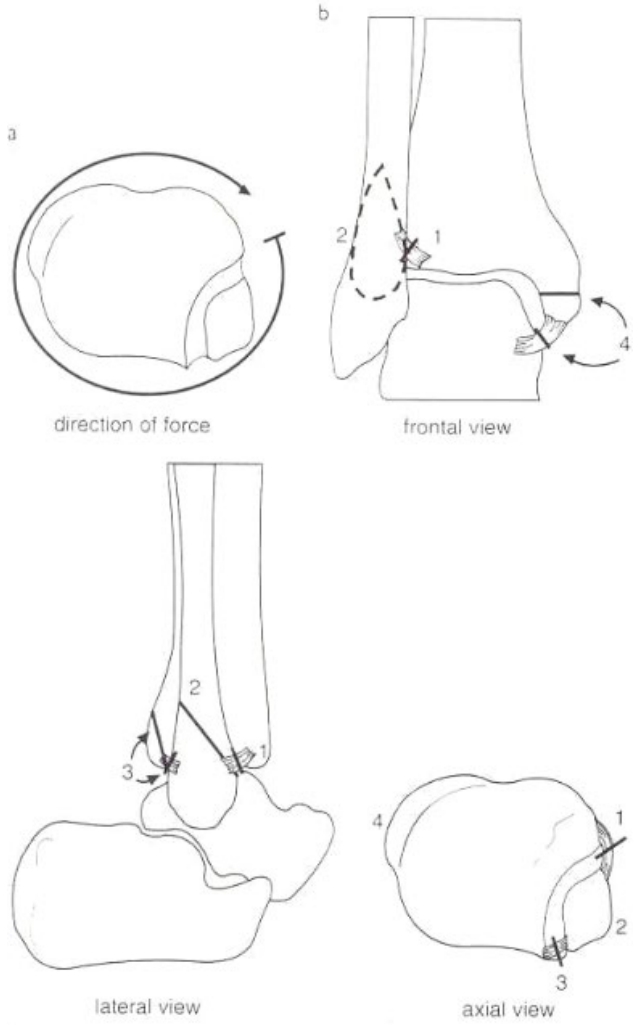
Safe Zone for the Placement of Medial Malleolar Screws

By John E. Femino, MD, Brian F. Gruber, MD, and Madhav A. Karunakar, MD

- Zone 1: Did not contact posterior tibial tendon (PTT)
- Zone 2: On average 2 mm from PTT
- Zone 3: Abutted/injured PTT in all specimens

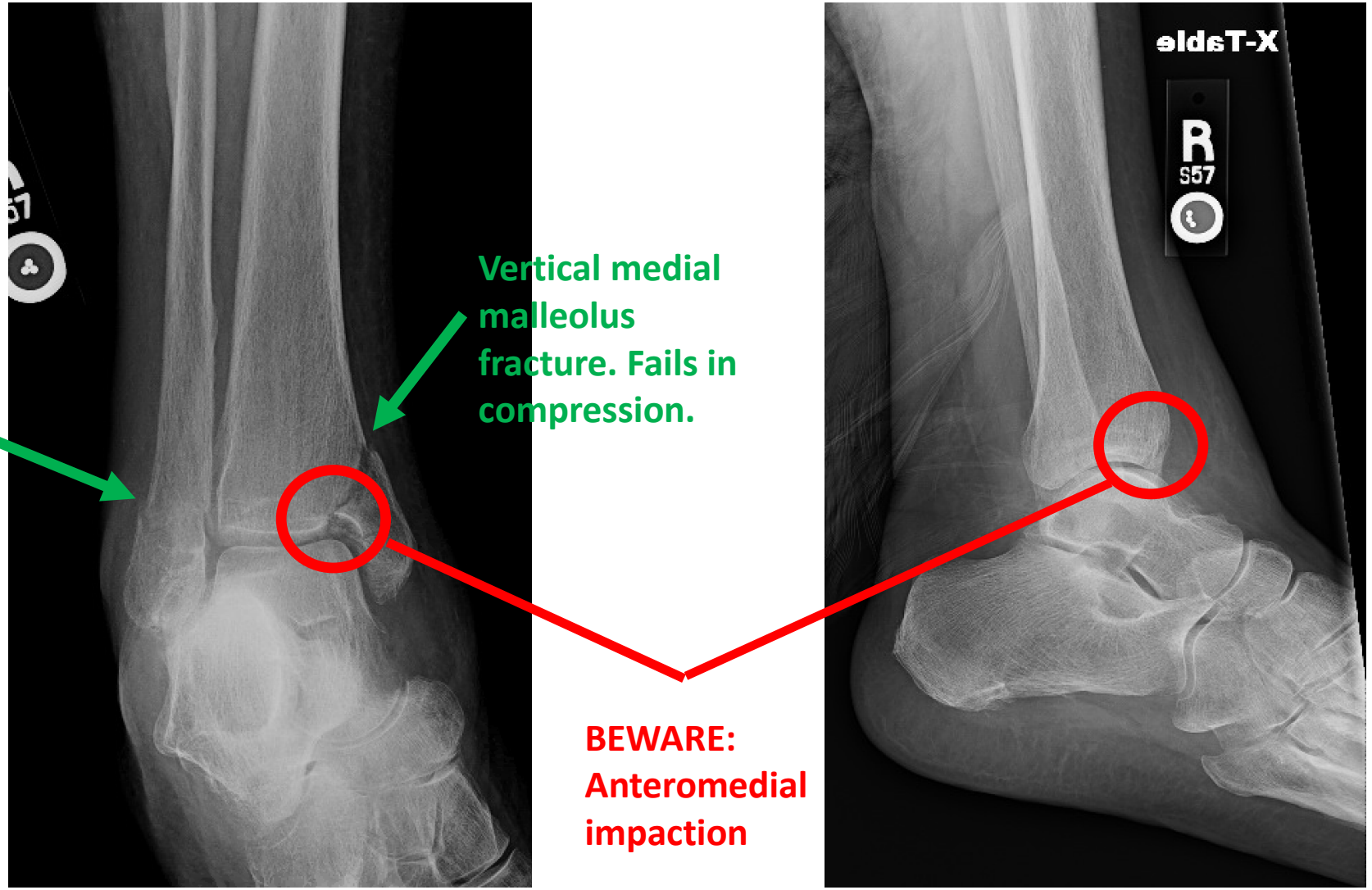


Supination - Adduction



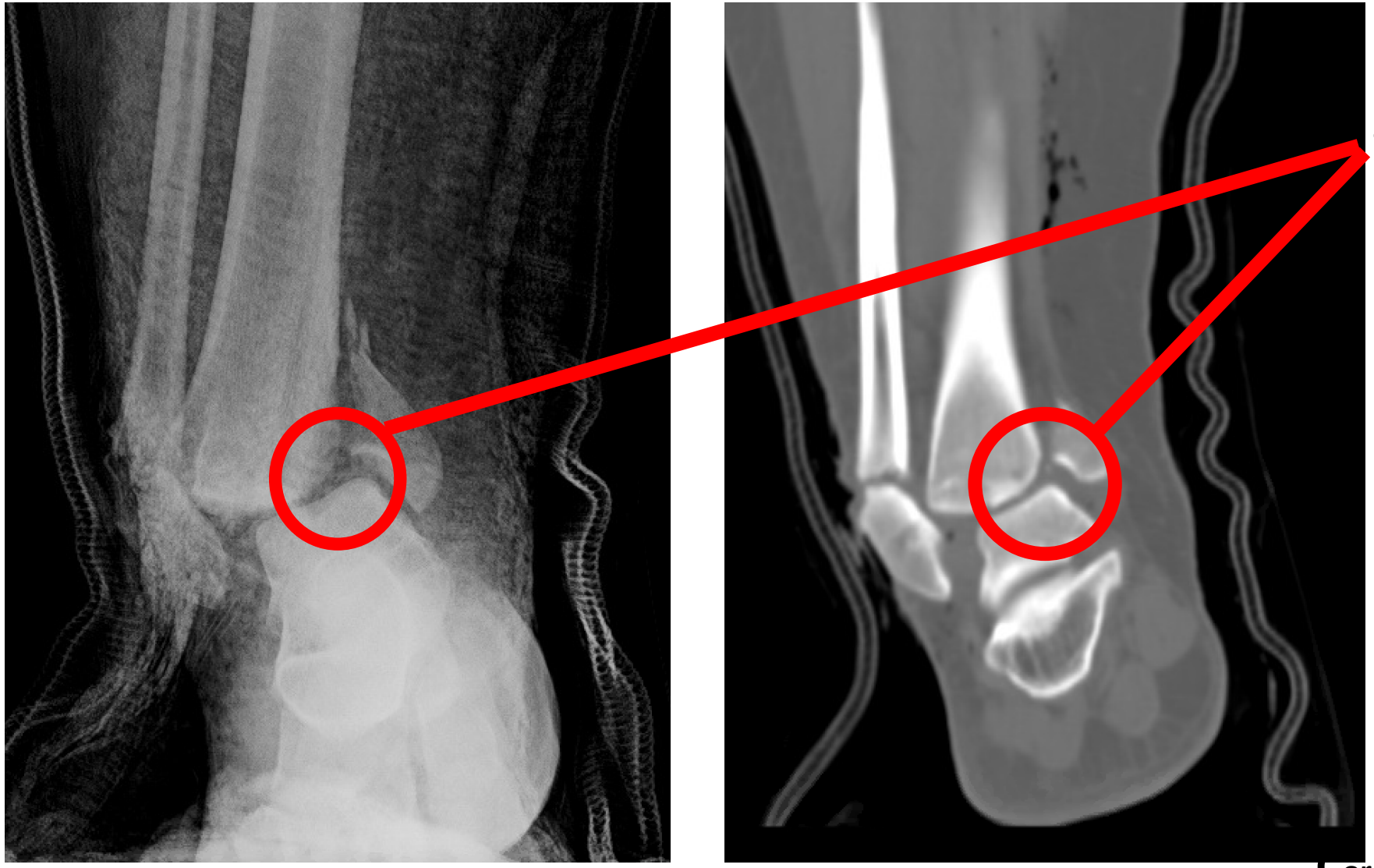
- Stage 1: Transverse Weber A/B distal fibula fracture
  - Tension sided failure
- Stage 2: Vertical medial malleolus fracture
  - Often times with MEDIAL impaction
  - Compression sided failure

Supination - Adduction



McConnell
JOT 2001

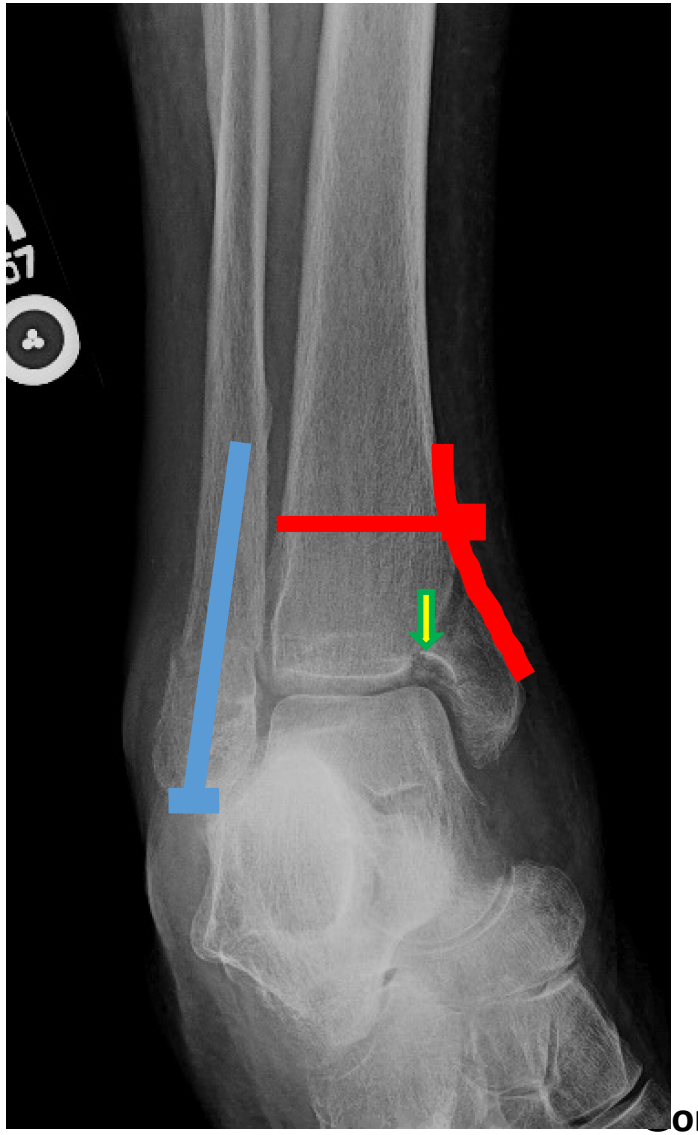
SAD - Impaction



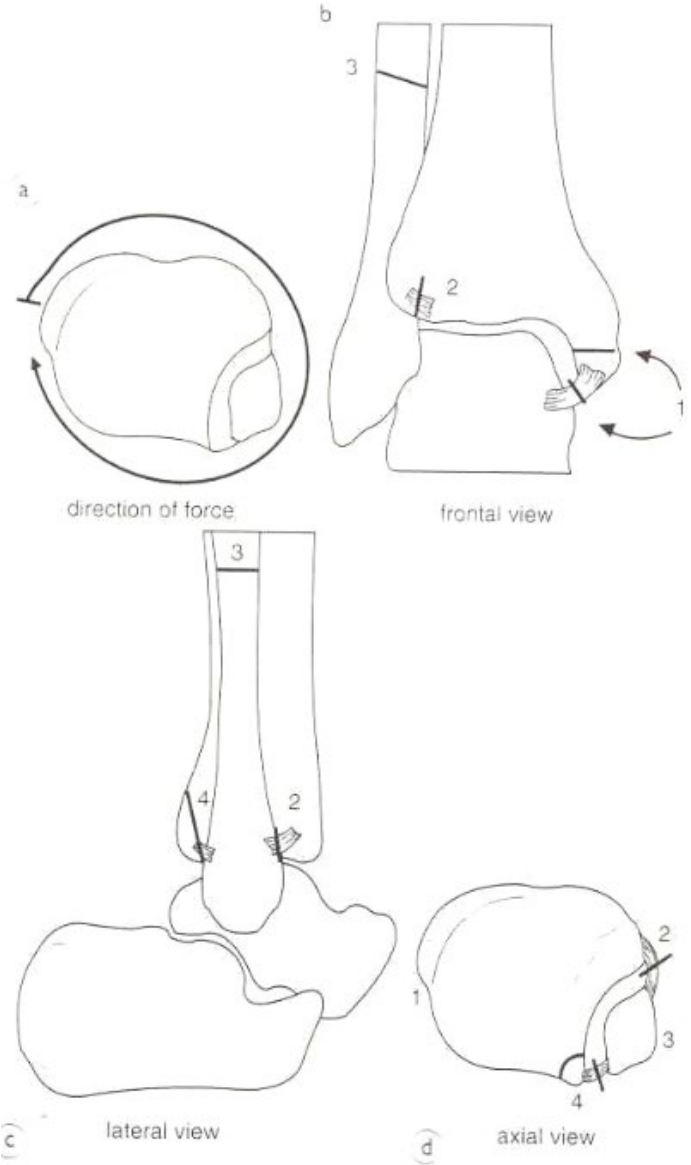
These impaction injuries can lead to poor outcomes

SAD Treatment

- Stage 1: Intramedullary screw versus plate to compress
- Stage 2: Address impaction, antiglide plate for medial malleolus

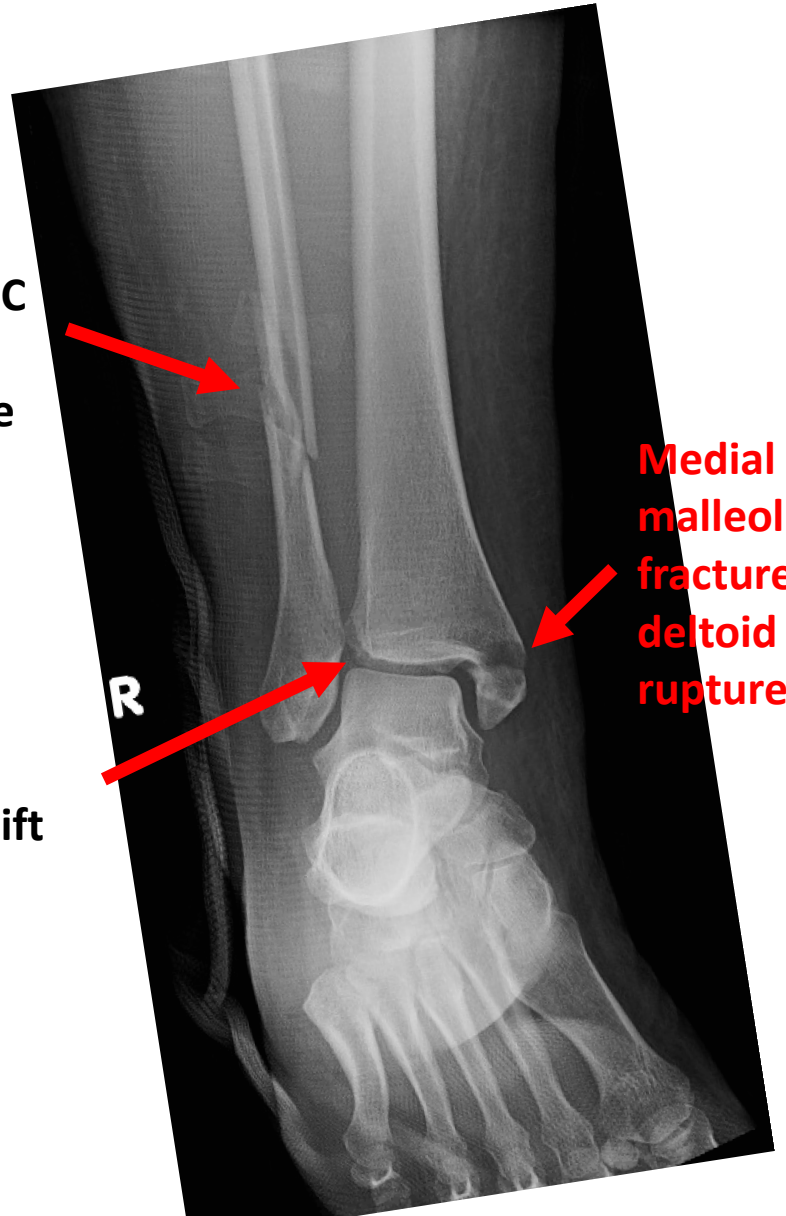


Pronation External Rotation



- Stage 1: Deltoid or medial malleolus fracture
- Stage 2: AITFL and IO membrane
- Stage 3: Spiral Weber C fibula fracture
- Stage 4: PITFL or posterior malleolus fracture

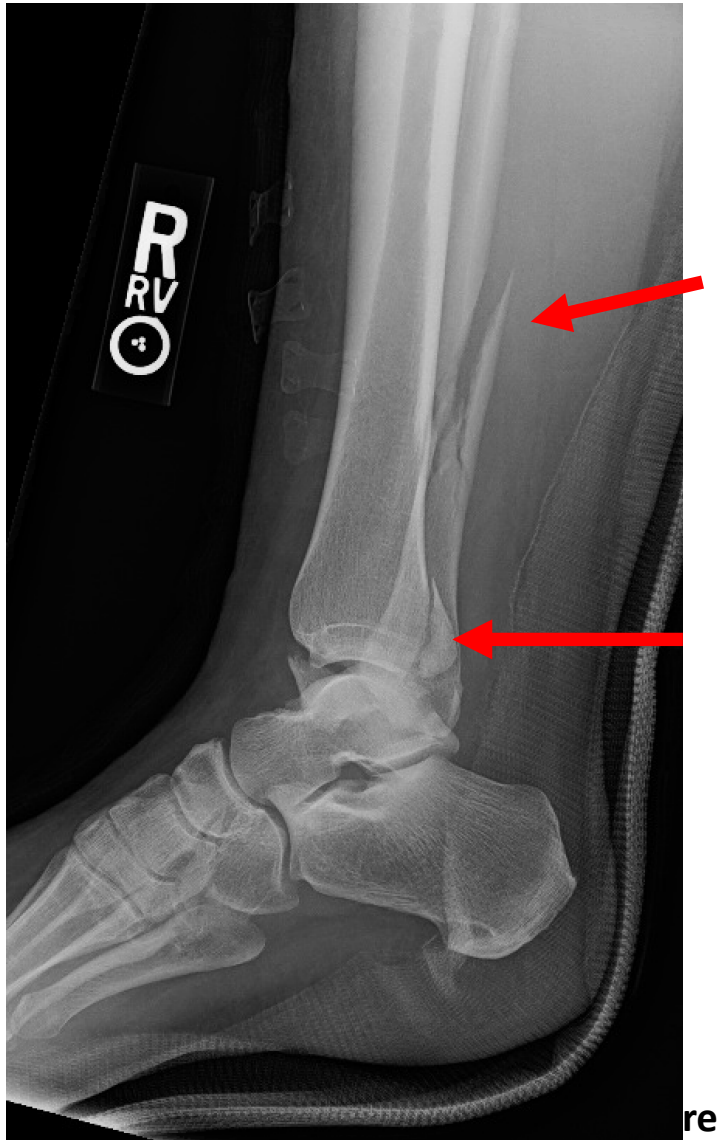
Pronation External Rotation



Weber C fibula fracture

Medial malleolus fracture (or deltoid rupture)

Lateral talar shift



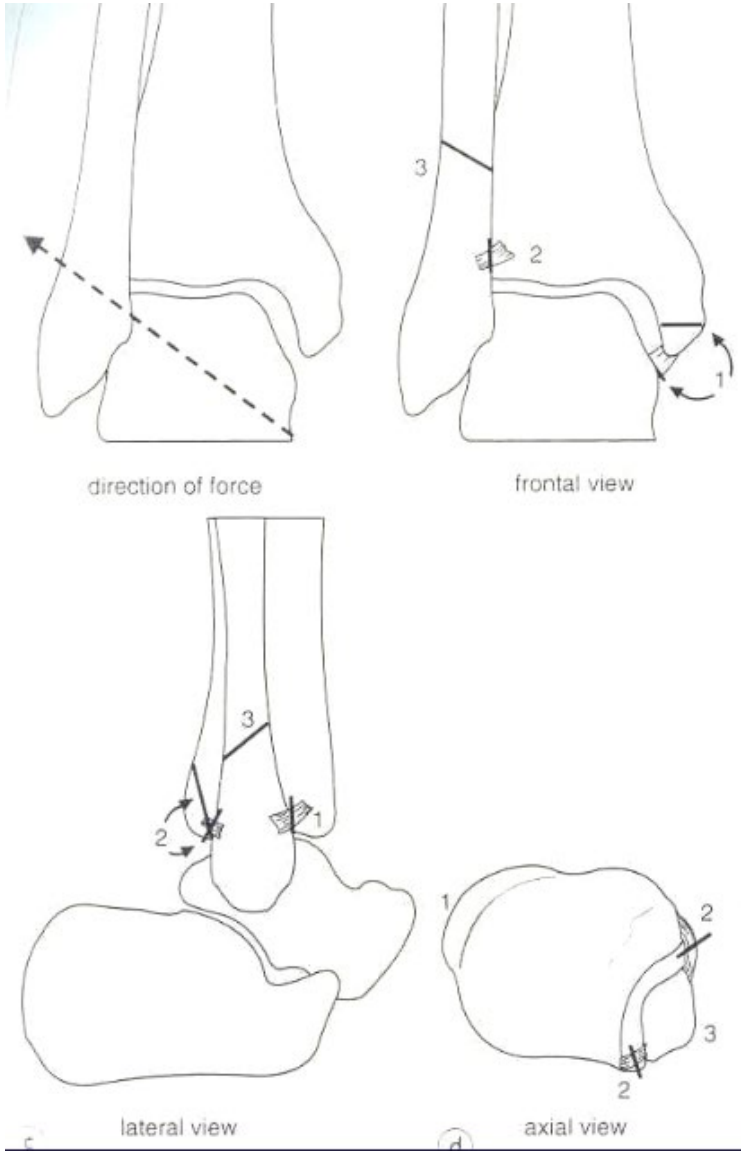
Oblique fibula fracture

Posterior malleolus fracture (can also be PITFL injury)

Pronation External Rotation

- Syndesmotic disruption expected
- Goals
  - Fibular length and rotation
  - Congruent ankle mortise
  - Syndesmotic stability with either posterior malleolus fixation or syndesmotic fixation

Pronation Abduction



- Stage 1: Transverse medial malleolus or deltoid injury
- Stage 2: PITFL or PM fracture
- Stage 3: Compression bending fibula fracture

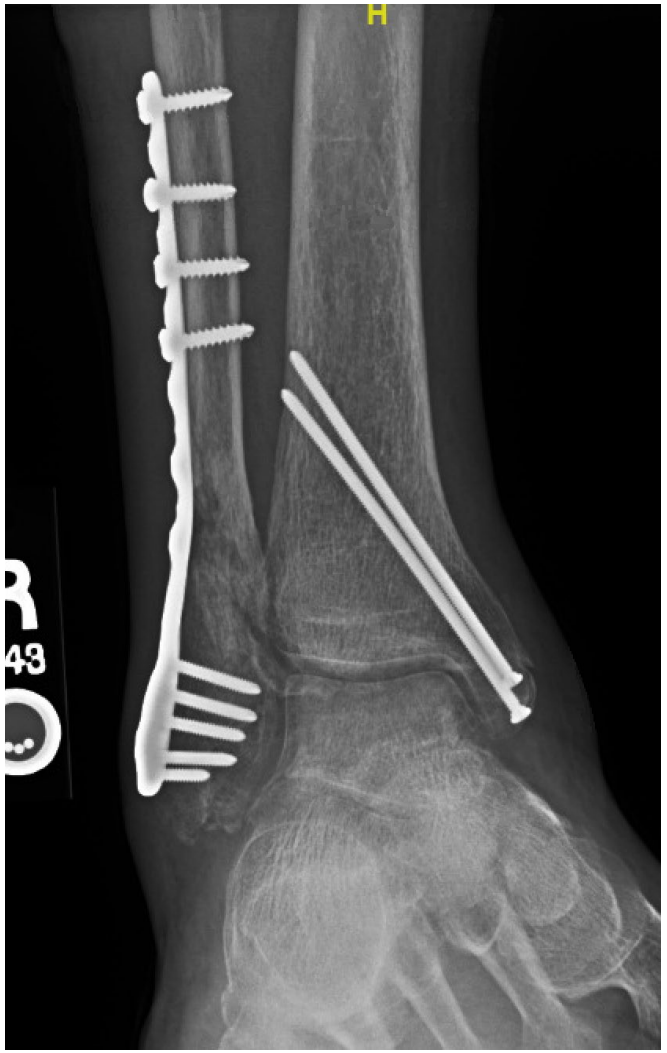
Pronation Abduction

Beware specific articular pathology

Core Curriculum V5

Pronation Abduction

- Medial malleolar fixation
  - This drives stability, fix FIRST
- Fibular comminution
  - Length stable construct
- Syndesmosis
  - Stress last



Outline

- Evaluation: Clinical and Radiographic
- Classification: Weber Lauge-Hansen
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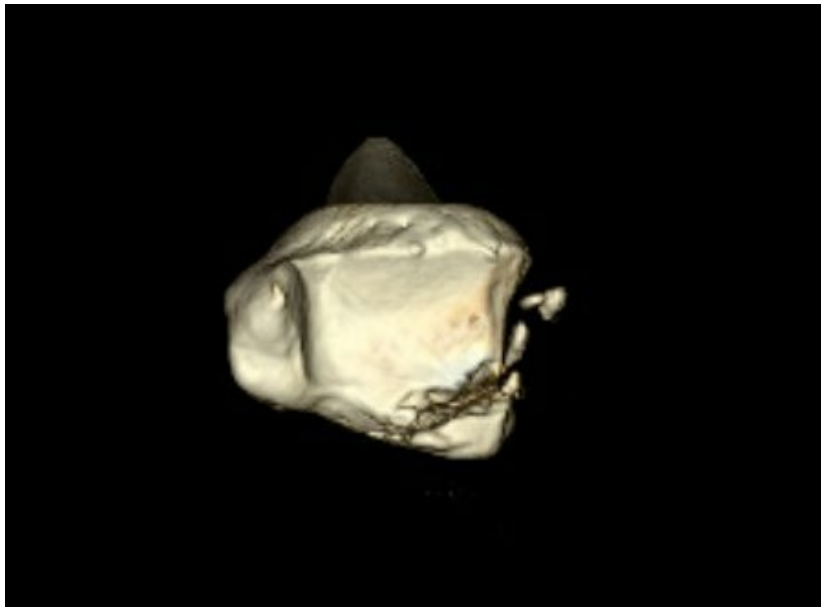
- Outcome
- Diabetic Ankle Fractures

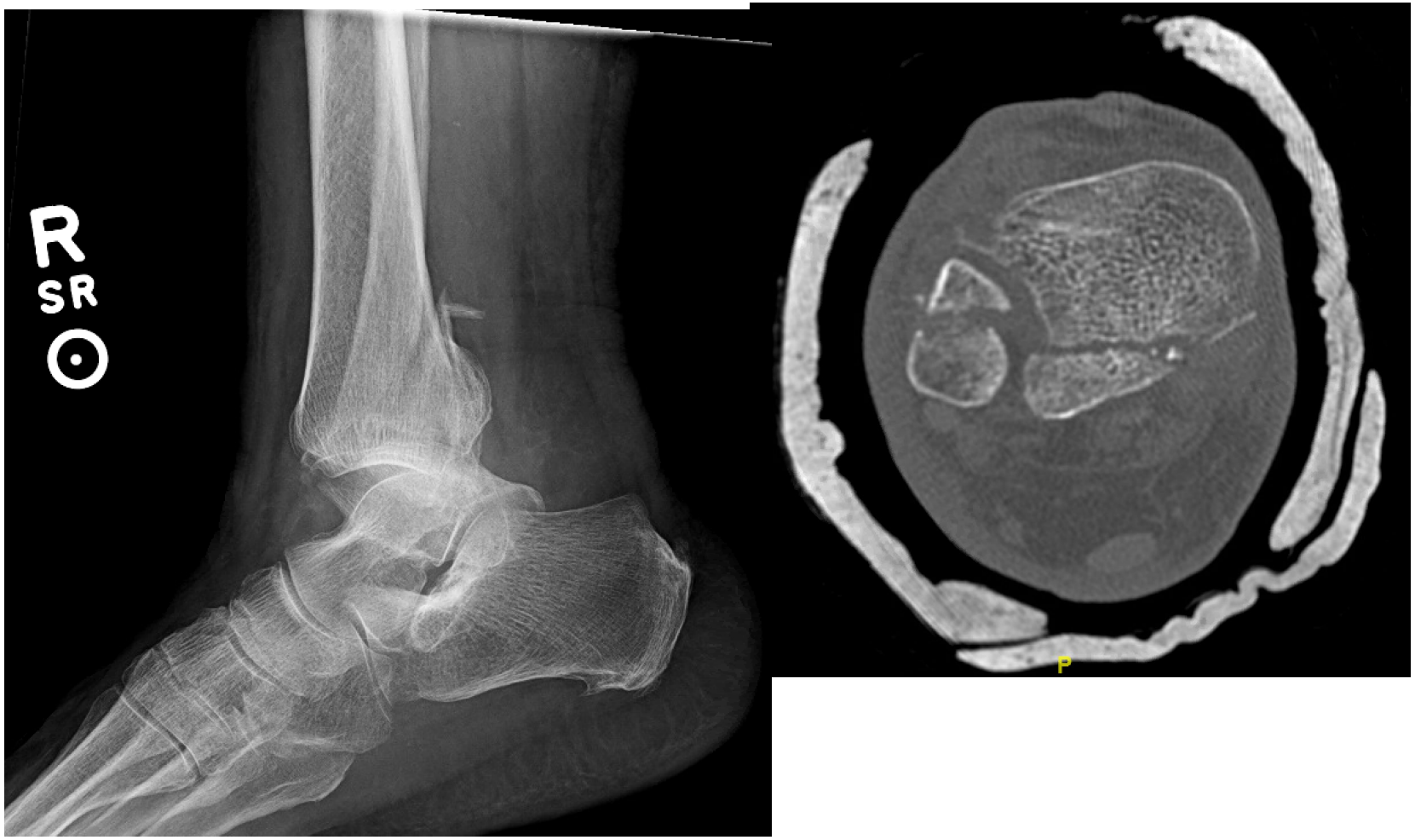
Posterior Malleolus



- Function
  - Stability: Prevents posterior translation of talus and enhances syndesmotic stability
    - Origin of PITFL
  - Weight bearing: Increases surface area of ankle joint

Posterior Malleolus

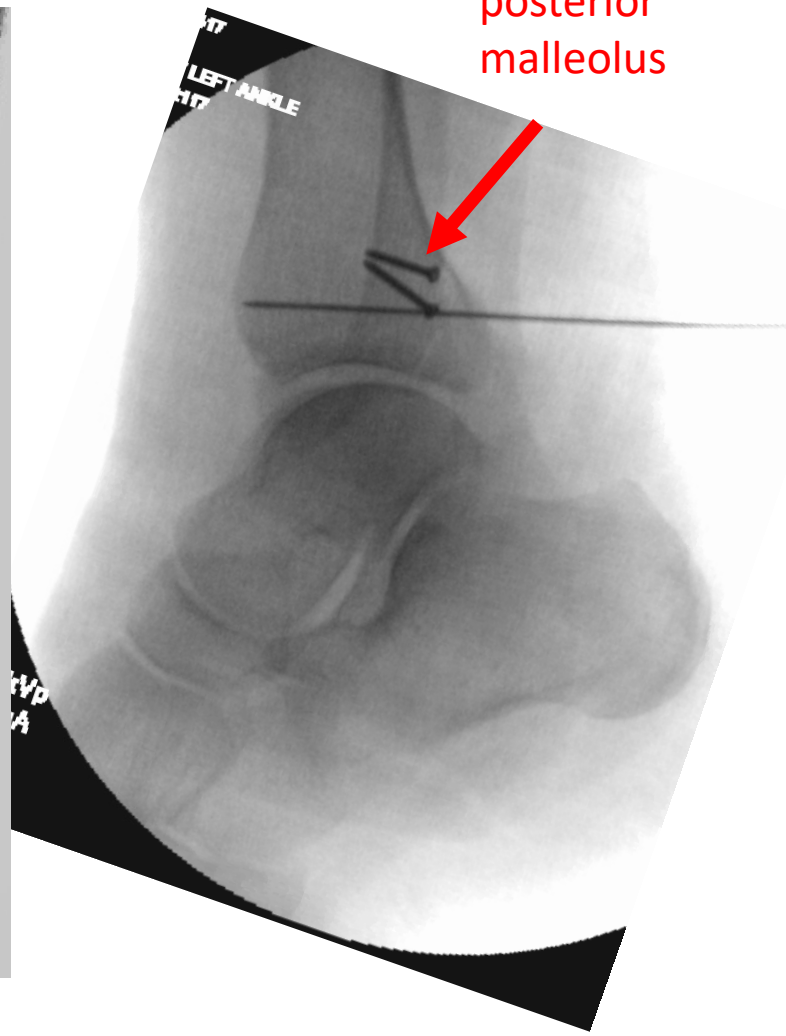
- Difficult to assess on lateral
- External rotation lateral view
- CT scan very helpful



Radiographic Evaluation

- Classic indication for fixation: >25% joint surface on lateral
- Problem: Lateral view can inadequately visualize posterior malleolus size and involvement
  - Associated with PITFL, and subsequently, lateral malleolus
  - Obliquely oriented
  - Involves incisura

Fibula fixation reduces posterior malleolus



Posterior Malleolus – Indications for Fixation

- Stability
  - Posterior translation of talus
  - ER of talus (syndesmotic widening)
    - May obviate need for syndesmotic fixation

Fixation of Posterior Malleolar Fractures Provides Greater Syndesmotic Stability

Michael J. Gardner, MD; Adam Brodsky, MD*; Stephen M. Briggs, PA-C*; Jason H. Nielson, MD†; and Dean G. Lorich, MD*,†*

Compared with intact specimens, stiffness restored to 70% after fixation of posterior malleolus and to 40% after syndesmosis fixation

Posterior Malleolus – Indications for Fixation

Stability of the Syndesmosis After Posterior Malleolar Fracture Fixation

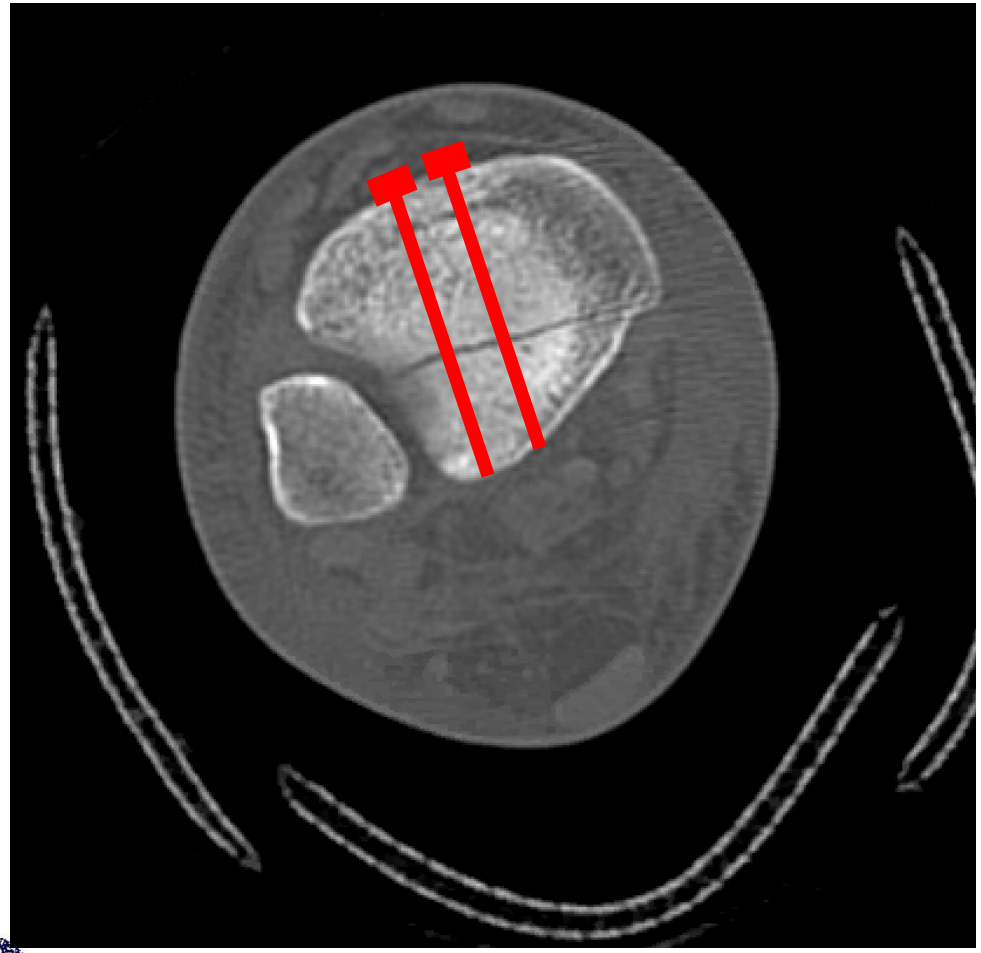
- 2.1% rate of instability after posterior malleolar fixation versus 13 fold higher syndesmotic instability rate in supine group

Miller et al, FAI 2017

Posterior Malleolus – Indications for Fixation

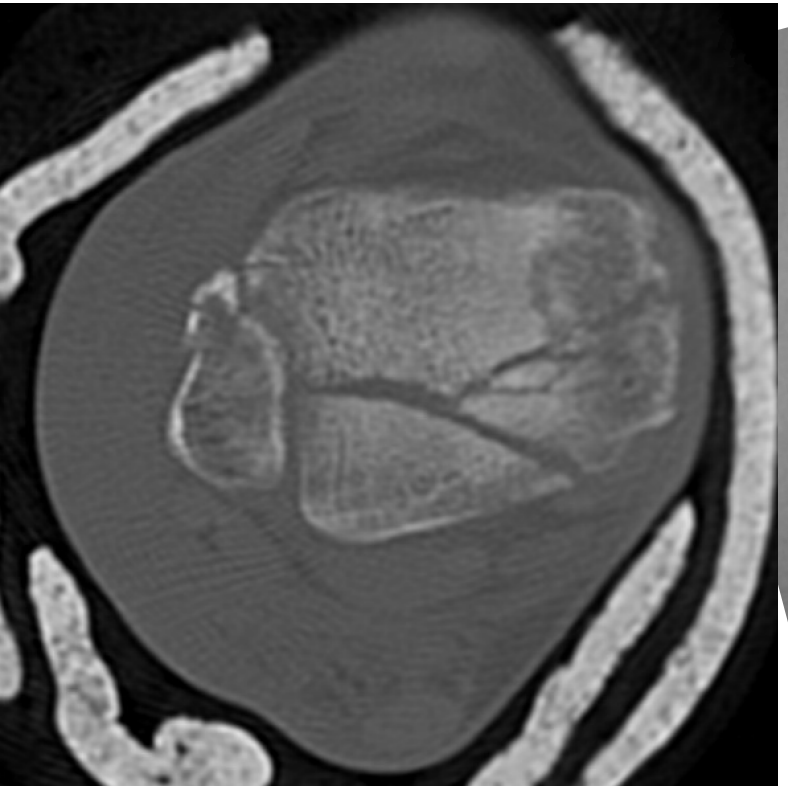
- Stability
  - Posterior translation of talus
  - ER of talus (syndesmotic widening)
    - May obviate need for syndesmotic fixation
- Articular congruence
  - Excessive stress → post traumatic arthritis
  - Contact stress changes significantly with PM size >33% (Hartford Corr 1995)

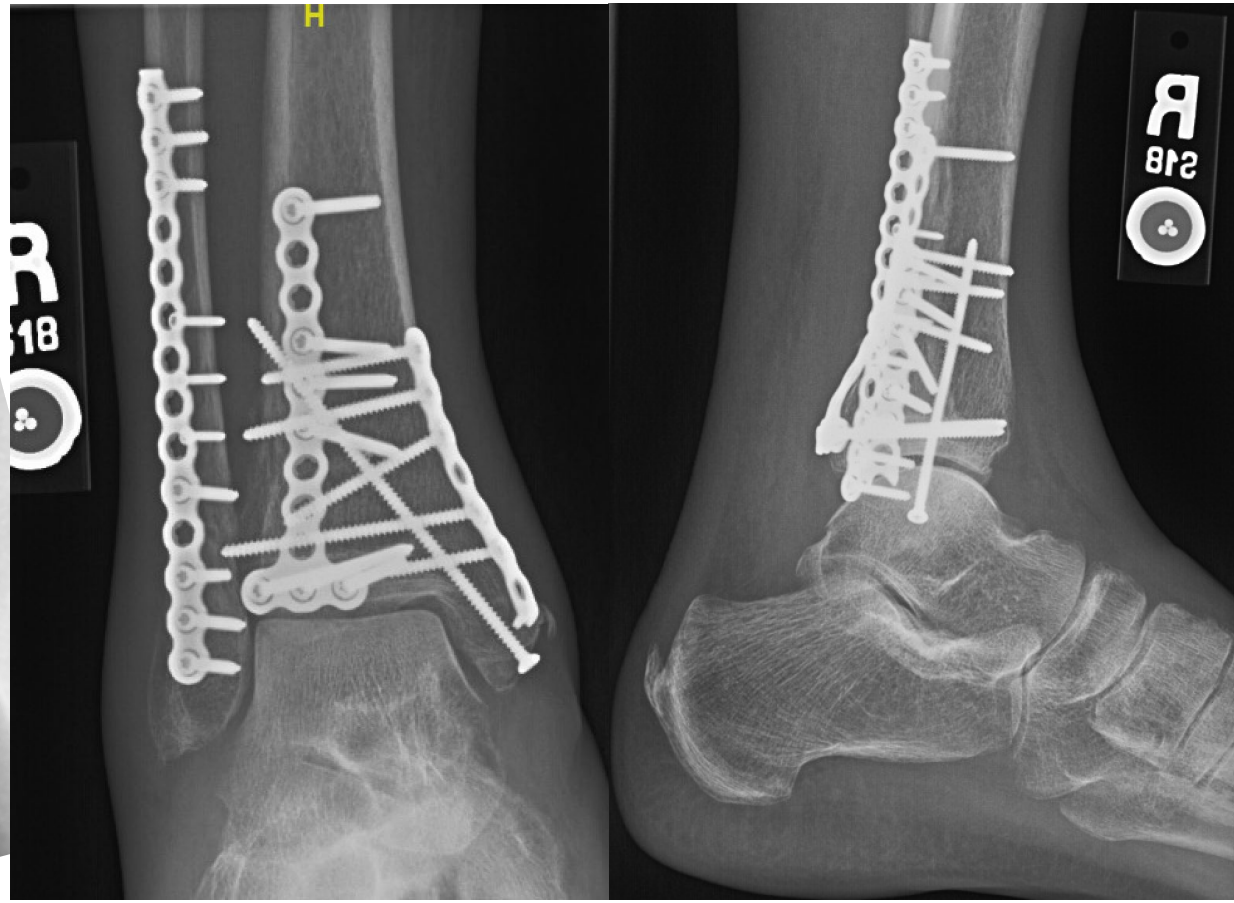
Fixation Options – Screw Fixation



Trajectory: Anteromedial to posterolateral

Fixation Options - Plates



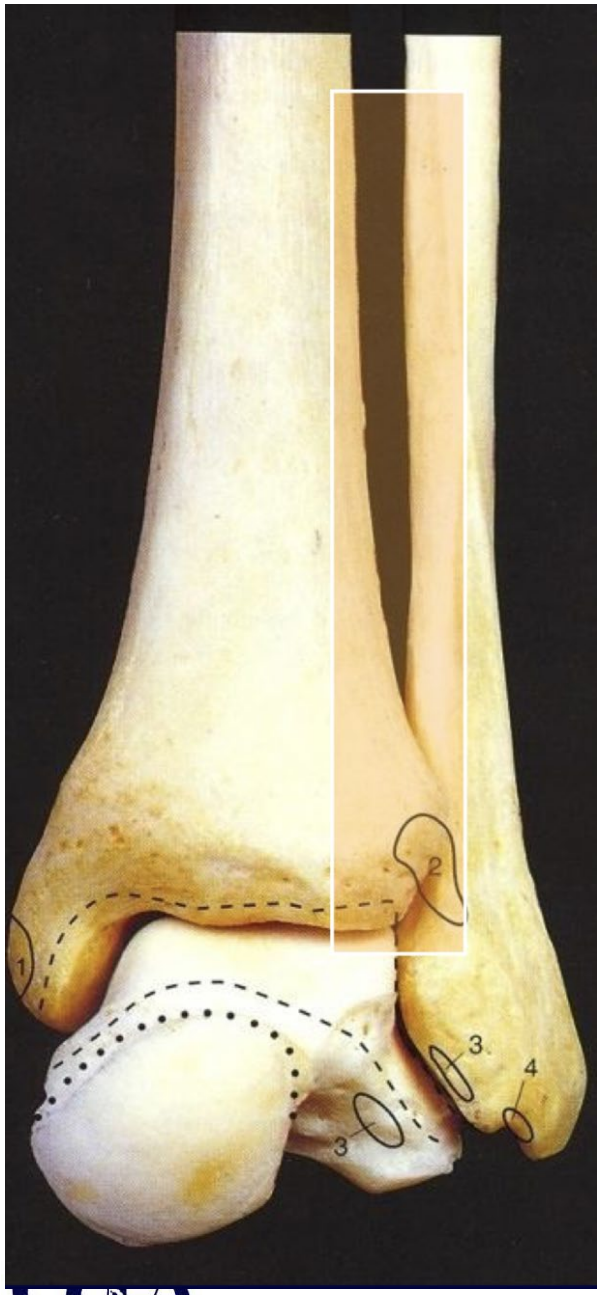


Which Option is Better?

"A to P" Screw Versus Posterolateral Plate for Posterior Malleolus Fixation in Trimalleolar Ankle Fractures

Timothy J. O'Connor, MD, Benjamin Mueller, MD, PhD,* Thuan V. Ly, MD,*
Aaron R. Jacobson, DC,* Eric R. Nelson, MD,† and Peter A. Cole, MD**

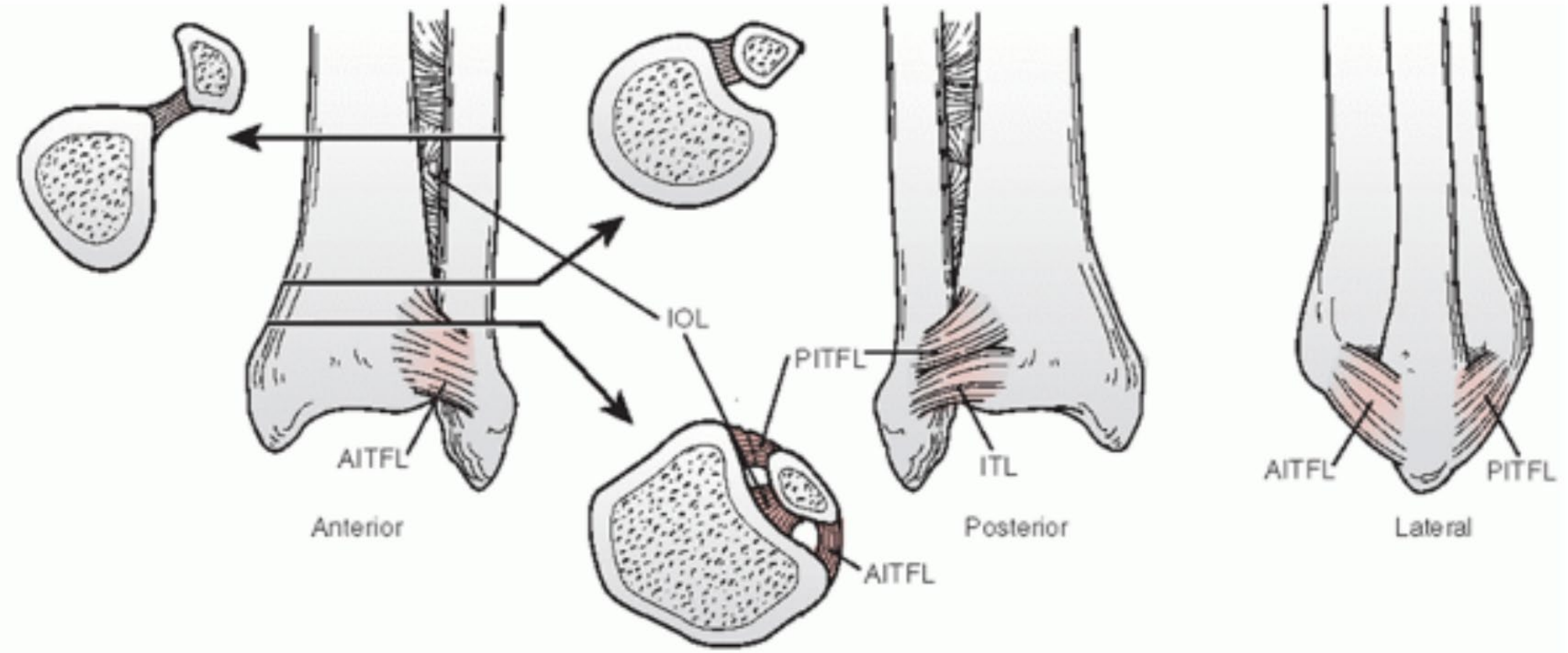
- Retrospective review of 27 patients
- Higher postop SMFA scores in PL plating group, trends towards better improvement in mobility and functional indices



Syndesmotic Injury

- FUNCTION
- Stability: resists external rotation, axial, and lateral displacement of talus
- Weight bearing: allows for standard loading

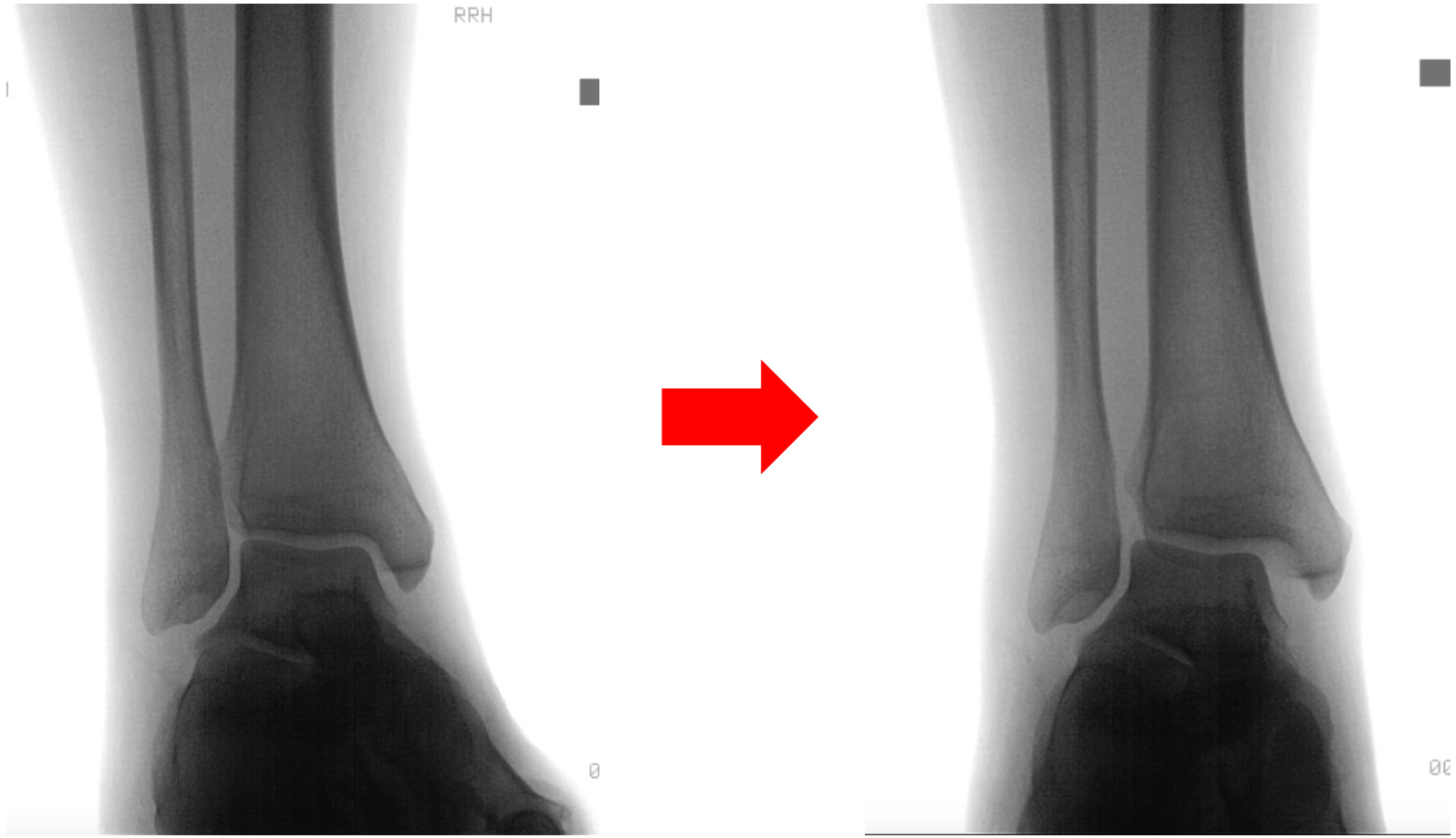
Anatomy



- Consists of: AITFL, IOL, interosseous membrane, PITFL, and ITL
- Wide variation in shape of incisura

How to Assess for Syndesmotic Instability

- How do you determine if instability is present?
  - Manual stress test
  - Cotton test intraoperatively with ankle fractures
- When should the manual stress test be performed?
  - Following fixation of other indicated components



How to Assess for Syndesmotic Instability

Instability of the tibio-fibular syndesmosis: have we been pulling in the wrong direction?

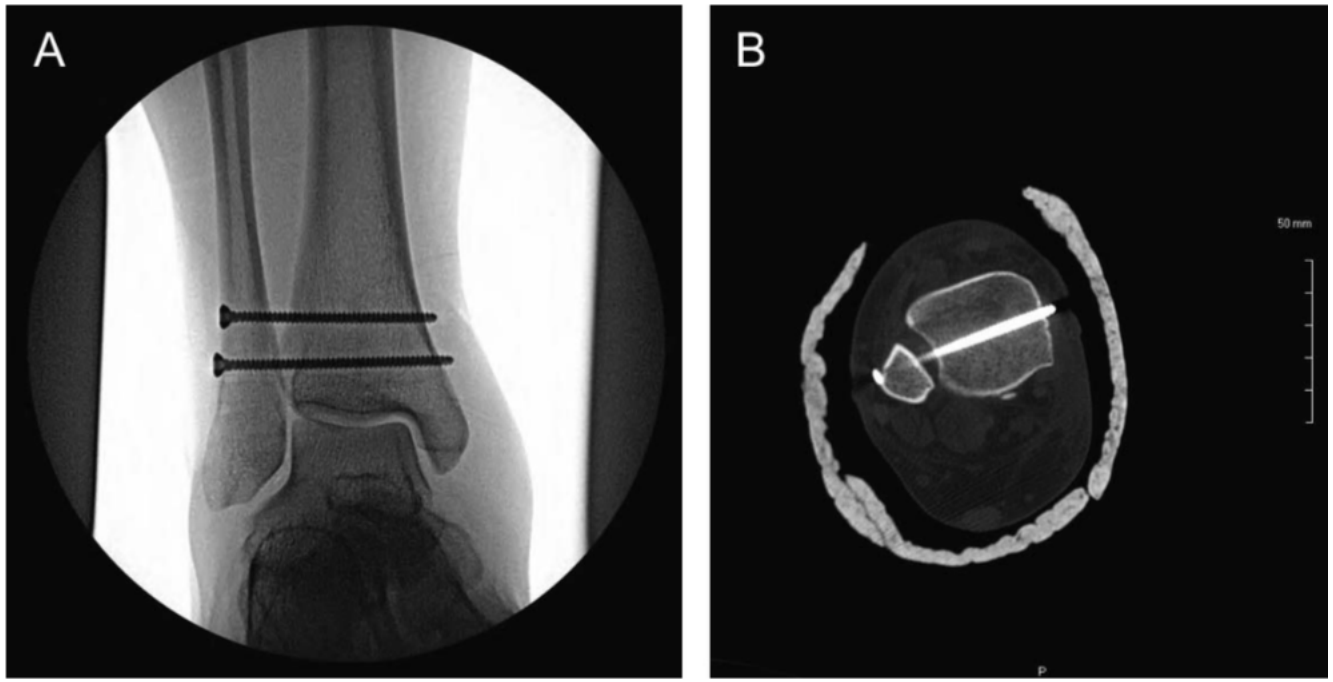
J.J. Candal-Couto[a,*], D. Burrow[b], S. Bromage[b], P.J. Briggs[a]

Greater instability in sagittal plane!

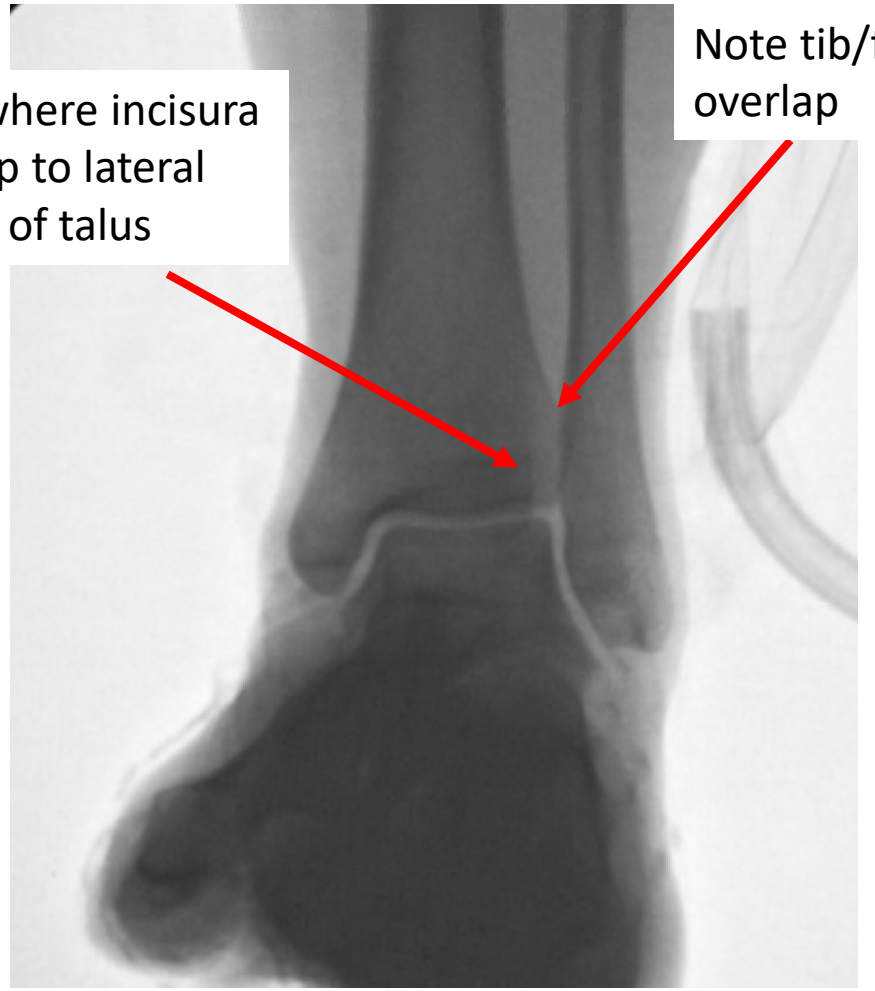
The Functional Consequence of Syndesmotic Joint Malreduction at a Minimum 2-Year Follow-Up

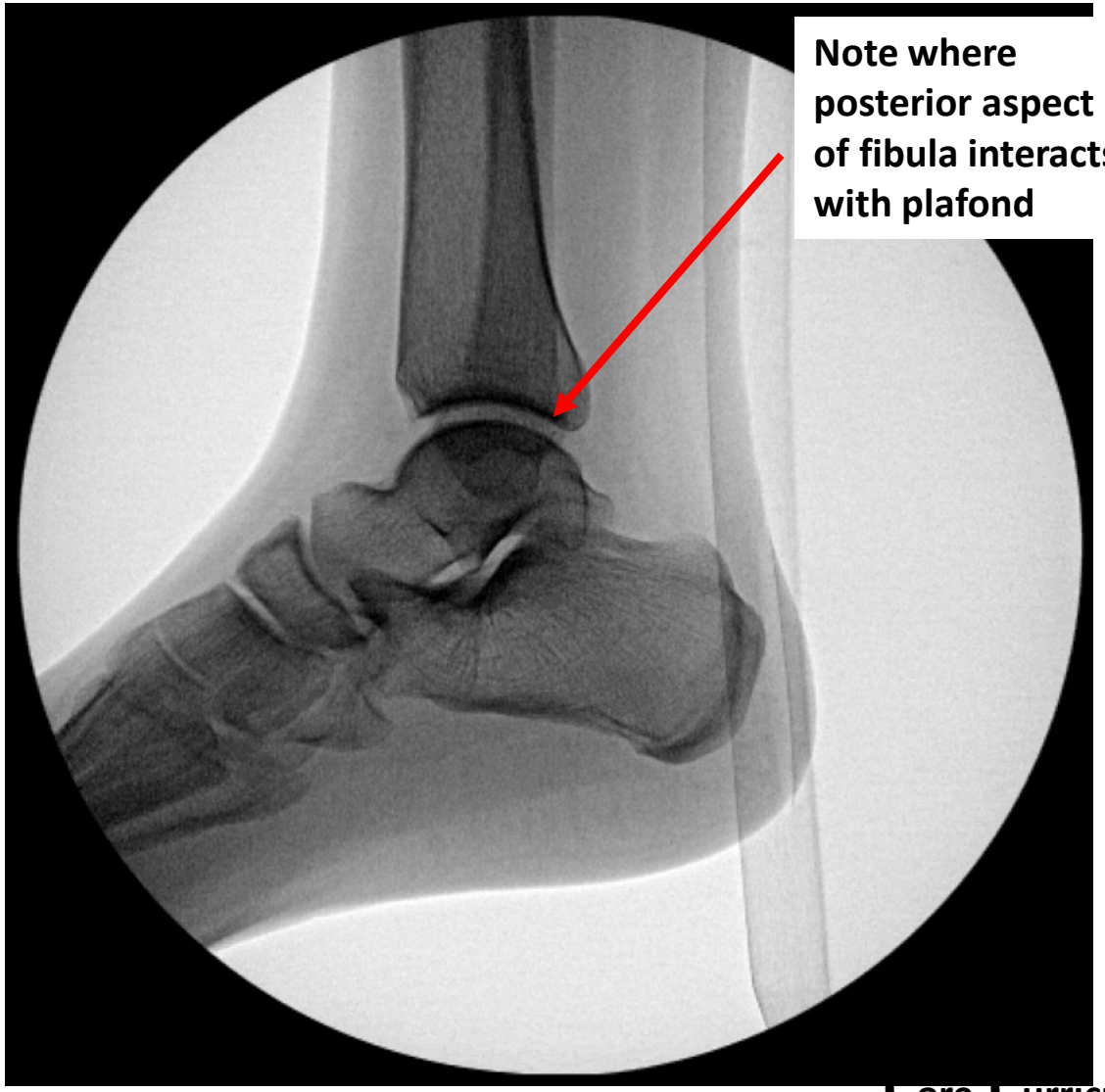
H. Claude Sagi, MD, Anjan R. Shah, MD, and Roy W. Sanders, MD

- Patients with malreduced syndesmoses had significantly worse SFMA and Olerud/Molander questionnaires



Reduction - Radiographic Assessment





Assessing the Reduction

Radiographic

- Intraop CT or 3D fluoro may reduce likelihood of malreduction
  - Cunningham et al, FAI 2020
  - Davidovitch et al, JBJS 2013
  - Hsu et al, FAI 2013

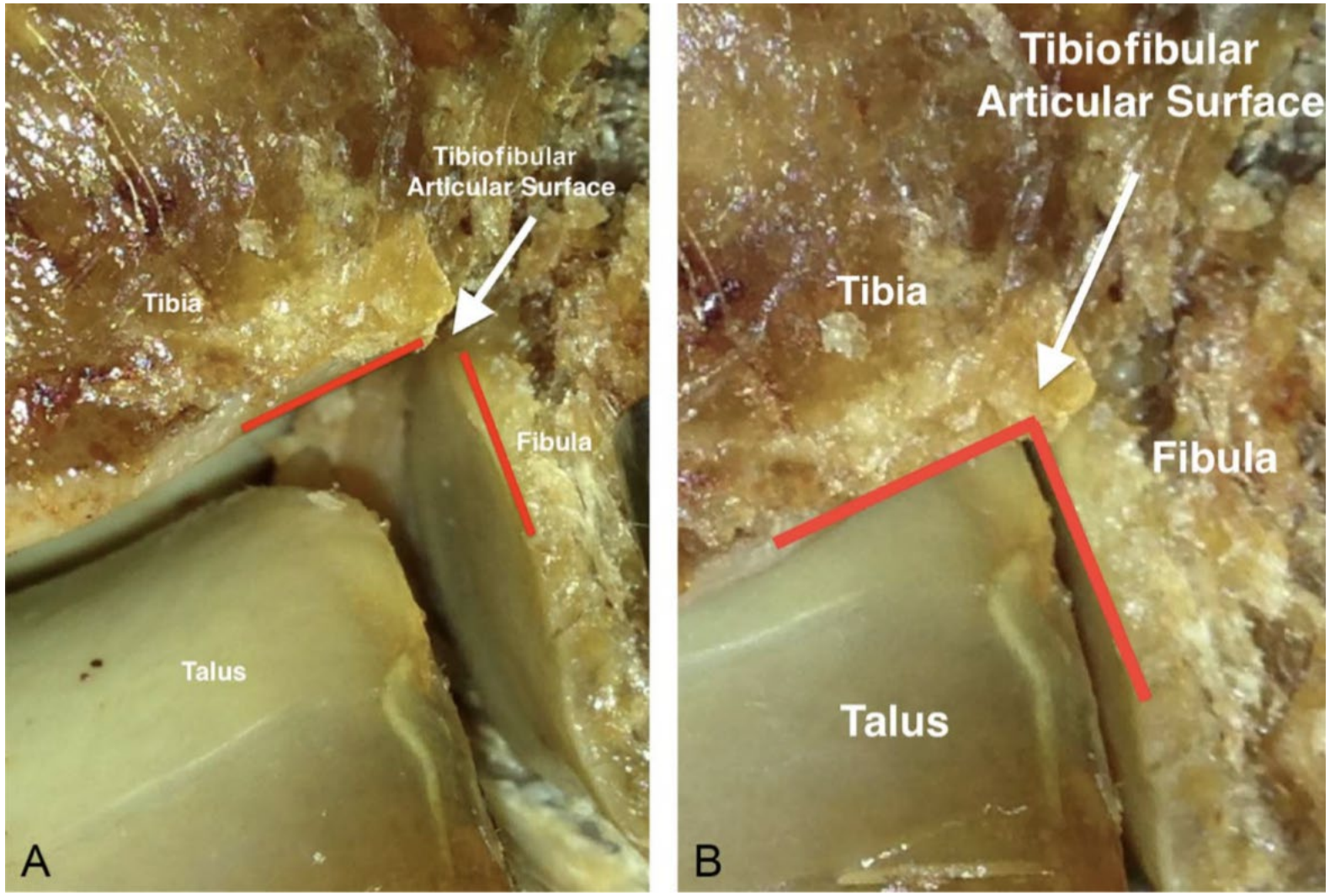
Direct Visualization

- Direct visualization over the distal tibio-fibular articulation/incisura anteriorly (Miller et al, FAI 2009)
  - 16% malreduction with direct visualization versus 52% for radiographic reduction

Reducing the Syndesmosis Under Direct Vision: Where Should I Look?

Paul Tornetta III, MD, Mark Yakavonis, MD,† David Veltre, MD,* and Anjan Shah, MD‡*

- Advocate using the anterolateral plafond and anteromedial fibular articular surface as a reference (arrow)
- Compared this to "incisura" method and found articular surface method more reliable



Tornetta P 3rd, et al. Reducing syndesmosis under direct vision: where should I look? J Orthop Trauma. 2019 Sep;33(9):450-454.

Clamp Reduction

- Medial tine placement along the tibia should be in the anterior 1/3 to decrease malreduction (Cosgrove et al, JOT 2017)
- Can lead to overcompression in up to 52% of patients (Haynes et al., FAI 2016)
  - Can lead to limited dorsiflexion
- Mean 130N clamp force allowed for adequate syndesmotic reduction, which correlates with a grip force of 65N (squeezing a full, sealed aluminum can)

Fixation Options

- Screws
  - 3.5 mm versus 4.5 mm
    - More prominent screw heads with 4. 5mm
  - 1 screw versus 2 screws
  - 3 v 4 x 6 x 8 cortices
    - 6 cortices → windshield wiper w/o removal
    - 8 cortices → screw breakage w/o removal
- Dealer's choice

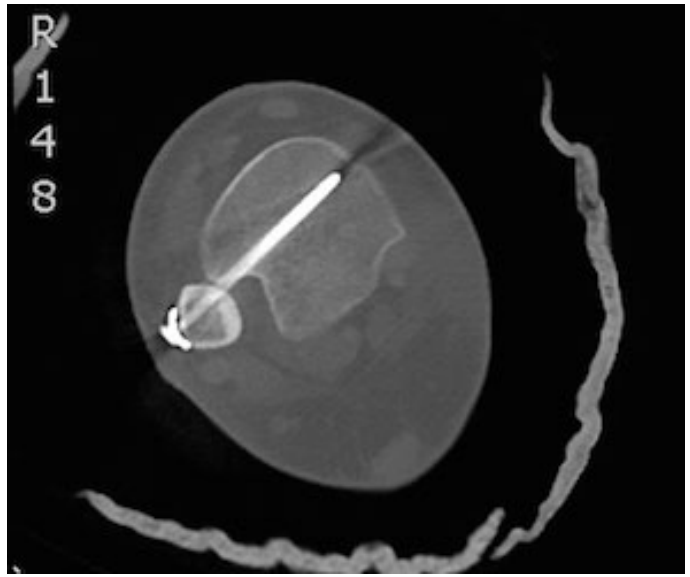
Thompson and Gesink, FAI 2000

Screws versus Suture Button

Improved Reduction of the Tibiofibular Syndesmosis With TightRope Compared With Screw Fixation: Results of a Randomized Controlled Study

*Canadian Orthopaedic Trauma Society; David Sanders, MD, FRCSC,**
*Prism Schneider, MD, PhD, FRCSC,† Michel Taylor, MD, MSc, FRCSC,**
Christina Tieszer, MSc, CCRP, and Abdel-Rahman Lawendy, MD, PhD, FRCSC**

- Malreduction
  - Screws → 39%
  - TightRope → 15%
- Reoperation rate
  - Screws → 30%
  - TightRope → 4%
- No functional outcome differences



Outline

- Evaluation: Clinical and Radiographic
- Classification: Weber Lauge-Hansen
- Specific Problem Areas: Posterior Malleolus and Syndesmosis
- Outcome
- Diabetic Ankle Fractures

Predictors of Short-Term Functional Outcome Following Ankle Fracture Surgery

By Kenneth A. Egol, MD, Nirmal C. Tejwani, MD,
Michael G. Walsh, PhD, Edward L. Capla, MD, and Kenneth J. Koval, MD

- At 1 year, most patients doing well
- Significant difference in functional recovery at 1 year compared to 6 months
- Younger age, male sex, absence of diabetes, and lower ASA class predictive of functional recovery at 1 year

Patient Risk Factors for Adverse Outcome

- Advanced age
- Osteoporosis
- Diabetes
- Peripheral vascular disease
- Female sex
- High ASA class
- Smoking
- Alcohol use
- Lower level of education

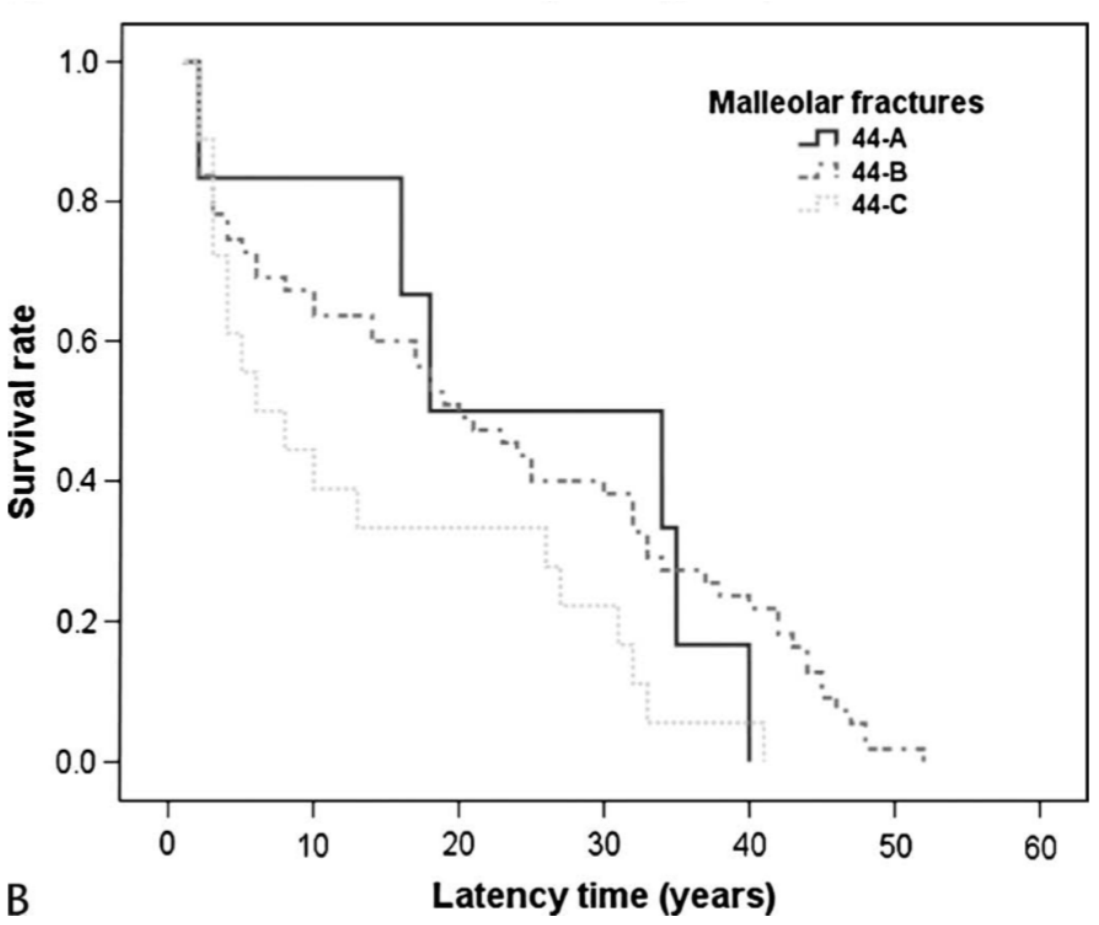
SooHoo et al, JBJS 2009
Egol et al, JBJS 2006
Ganesh et al, 2005
Bhandari et al, JOT 2004

Posttraumatic Ankle Osteoarthritis After Ankle-Related Fractures

Monika Horisberger, MD, Victor Valderrabano, MD, PhD,* and Beat Hintermann, MD†*

- Mean latency time between injury and end stage OA was 20.9 years

- OA correlated with
  - Fracture severity
  - Complications
  - Older age at time of injury



Horiseberger M, Valderrabano V, Hintermann B. Posttraumatic ankle osteoarthritis after ankle related fractures. J Orthop Trauma. 2009 Jan;23(1):60-7.

Complications

- Perioperative
  - Malreduction
  - Inadequate fixation
  - Intra-articular hardware penetration
- Early Postoperative
  - Wound edge dehiscence/necrosis
  - Infection
  - Compartment syndrome
- Late
  - Stiffness
  - Distal tibiofibular synostosis
  - Malunion
  - Nonunion
  - Post-traumatic arthritis
  - Hardware related complications
  - Complex regional pain syndrome type I

Outline

- Evaluation: Clinical and Radiographic
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- Specific Problem Areas: Posterior Malleolus and Syndesmosis
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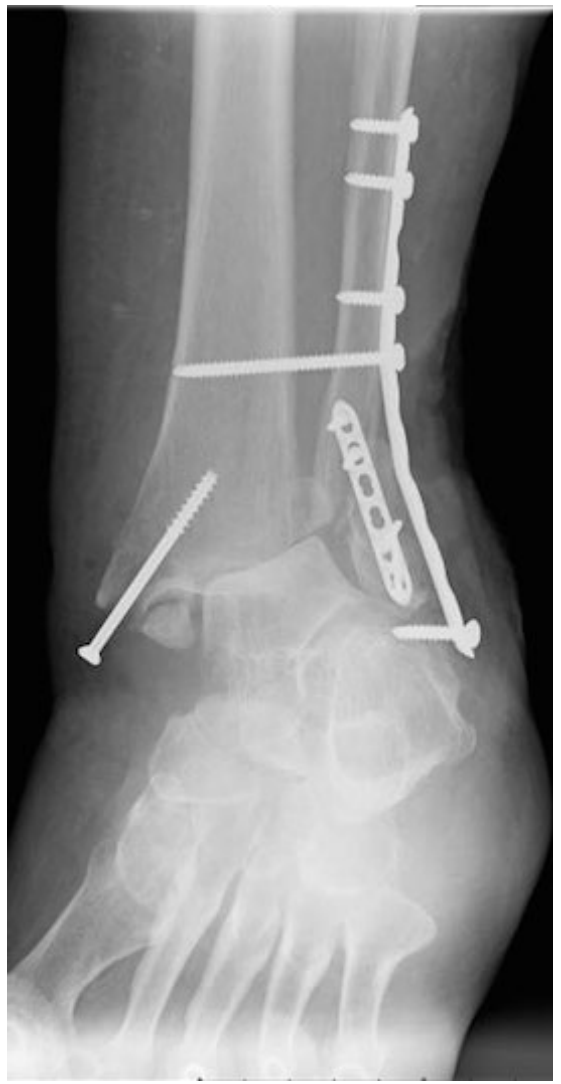
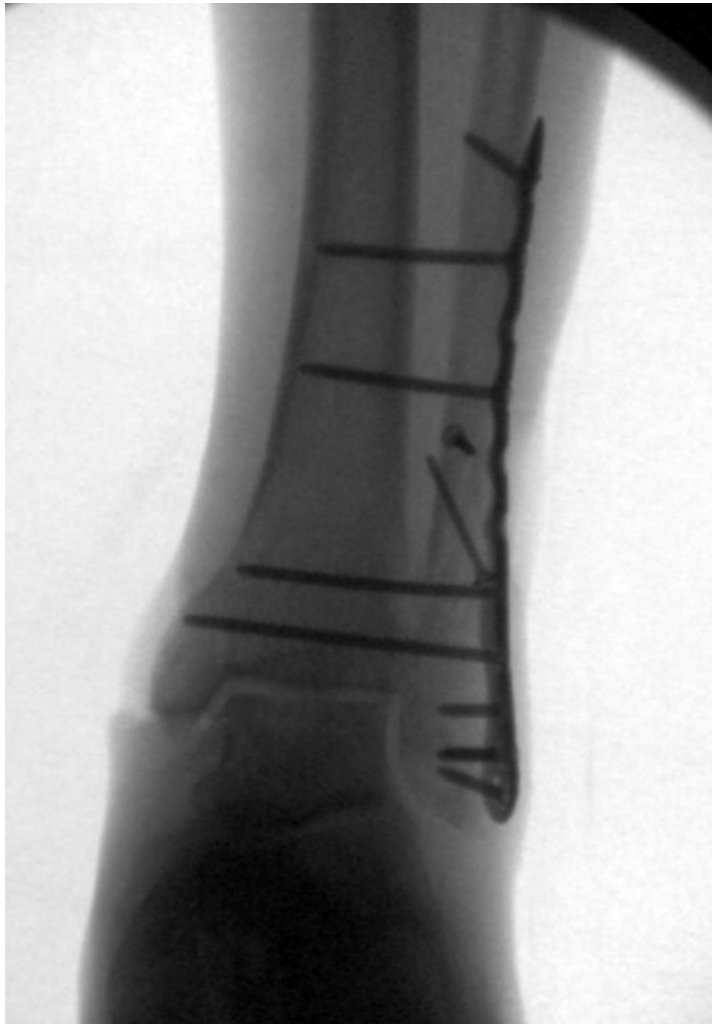
Diabetic Ankle Fractures – What's the Problem?



Diabetic Ankle Fractures

- Problem:
  - High complication rates with wounds and fixation stability
  - Patients often lack protective sensation
  - Poor bone quality

- Solution:
  - Unstable ankle fractures are still best treated with anatomic restoration of the ankle mortise and stable internal fixation
  - Continue to minimize soft tissue trauma
  - Double the fixation and non weight bearing in neuropathic patients
    - Costigan et al, FAI 2007
  - “Recruit” tibial bone to help with fibular fixation



Diabetic Ankle Fractures

- Postoperative care
  - SLC for 6-12 weeks, NWB for 12 weeks

- In debilitated, low demand, neuropathic patients, may require extreme measures to keep talus under tibia

Summary

At this point, you should be able to:

1. Recognize normal radiographic parameters
2. State the indications for fibular fixation
3. Define specific articular pathology associated with SA and PAB fractures
4. Identify the 3 common posterior malleolar fracture patterns
5. Understand significant of posterior malleolar fixation and indications
6. Identify various ways to reduce the syndesmosis

Helpful References

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