

The Lisfranc Midfoot Injury: Evaluation and Treatment in the Athlete and Active Population

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Session: The Lisfranc: Complexities of Dx and Tx

PAOS JW Marriott, Indianapolis, IN

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Orthopedic F/A Consultant

Indianapolis Colts
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Butler University
Wabash College
Guerin Catholic HS



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Disclosure

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Introduction-Lisfranc Athlete/Active Pop.

- Lisfranc - common cause of disability in athlete/active pop.
 - 2nd most common sports foot injury, but 0.2% of Orthopedic injuries
- Athletes/Active suffer “low energy” Lisfranc dislocation.
- A range of midfoot injuries exist from mild sprains to Fx/Disloc
- High risk - medical liability (missed dx)– accurate Dx, established Tx
- Avoid overtreatment also – accurate Dx, established Tx
- Unstable Lisfranc can involve both 1-2 TMT dislocation AND proximal intercunieforn dislocation, as well as 1st ray disloc.

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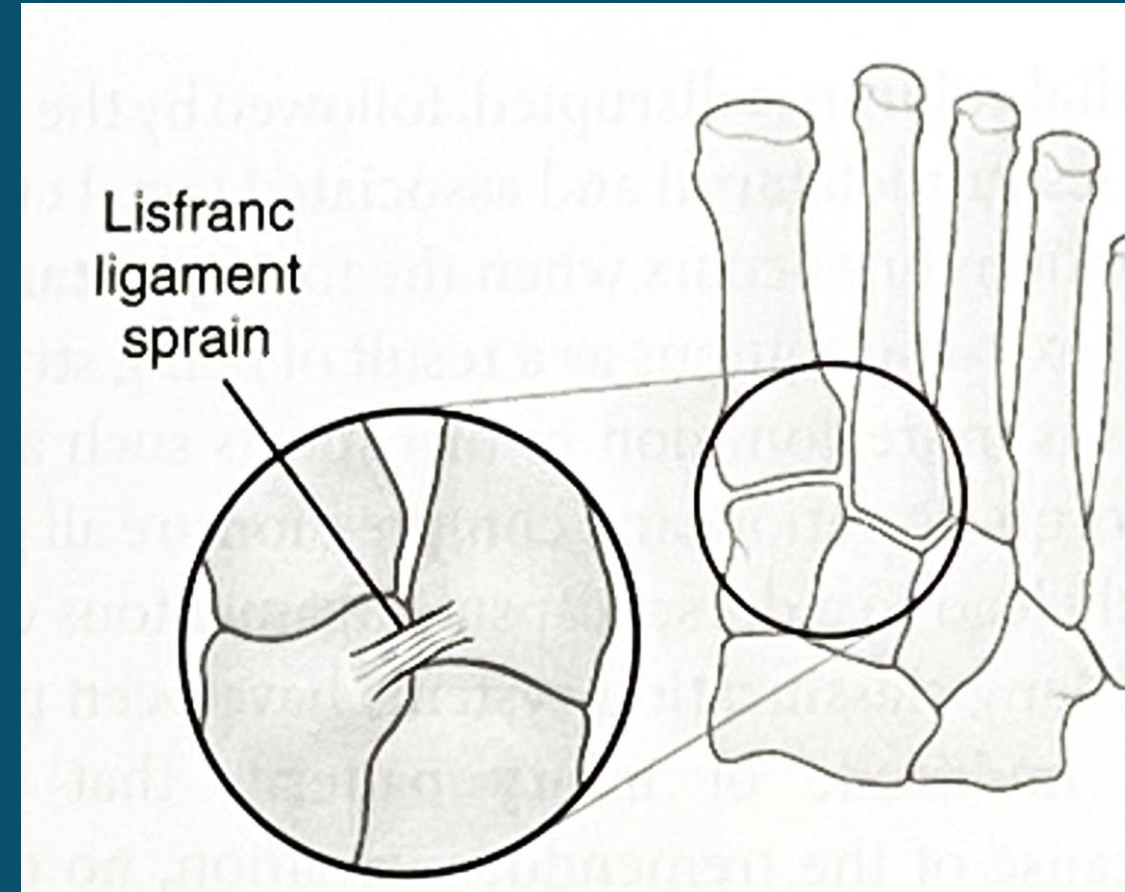
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What is a Lisfranc Injury?

- Let's Get the Words Correct!
 - **Lisfranc** was an OB-GYN surgeon
 - Did amputations thru midfoot
 - **Lisfranc "joints"** are the Tarso metatarsal joints
 - **"Lisfranc ligament"**
 - Medial Cuneiform- 2nd MT base
 - **"Lisfranc Dislocation"** rupture of Lisfranc ligament – w/ instability
 - And likely more, 1st TMT, IC joint, 3-5th TMT



Lis franc: Lets get the anatomy right!

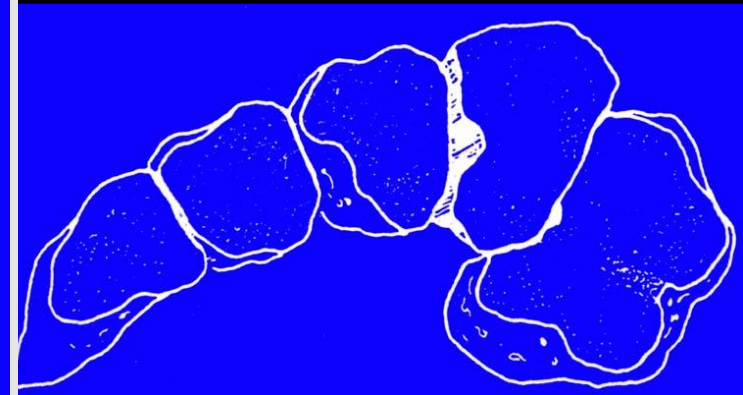
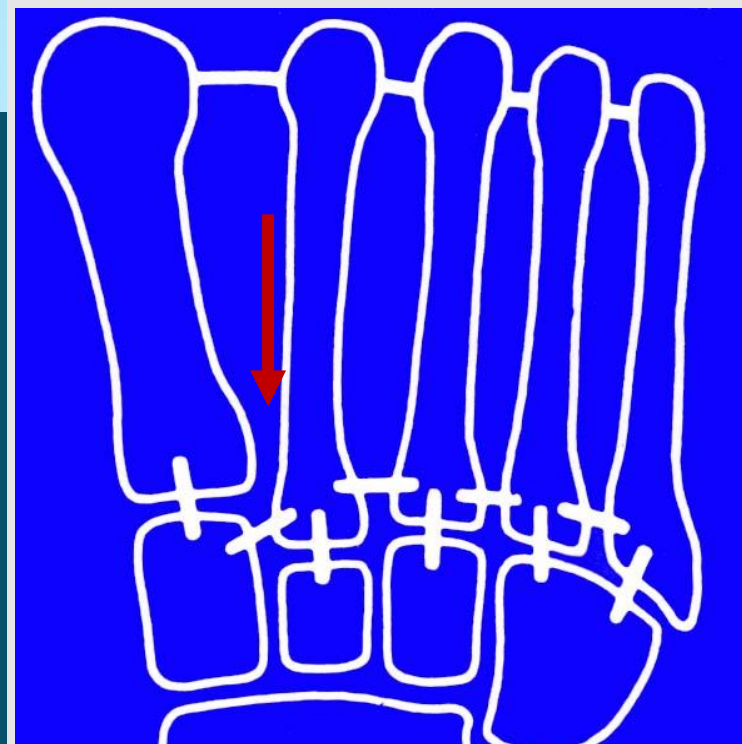
Metatarsal bases

dorsum wider than plantar

Structural stability for arch
transverse and longitudinal

Key to midfoot stability

2nd MT is the keystone
stability needed for push-off

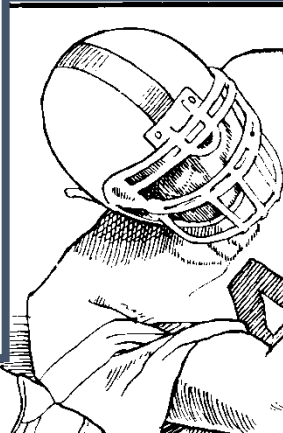
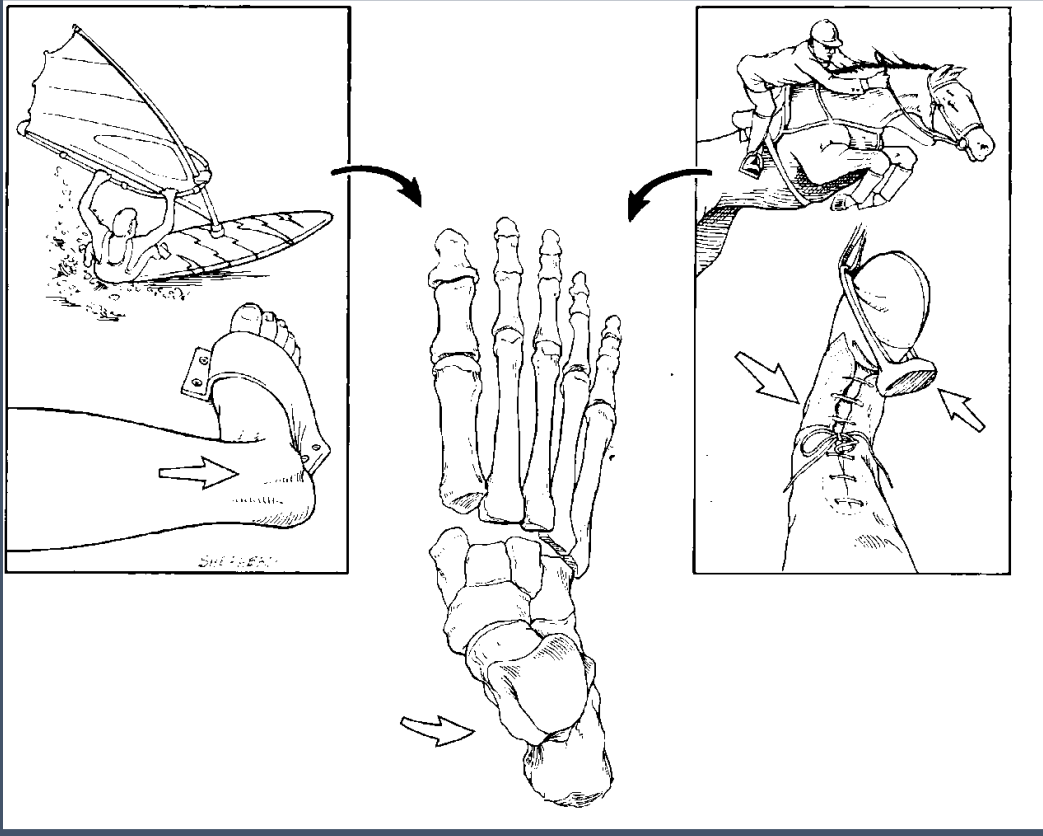


Lis franc midfoot MOI – Non Sports

- Stepping down from curb
 - Misstep
- Twisting injury
 - with change in direction
- MVA: abd stress head on collision



Lisfranc midfoot MOI - Sports



Lisfranc midfoot - presentation

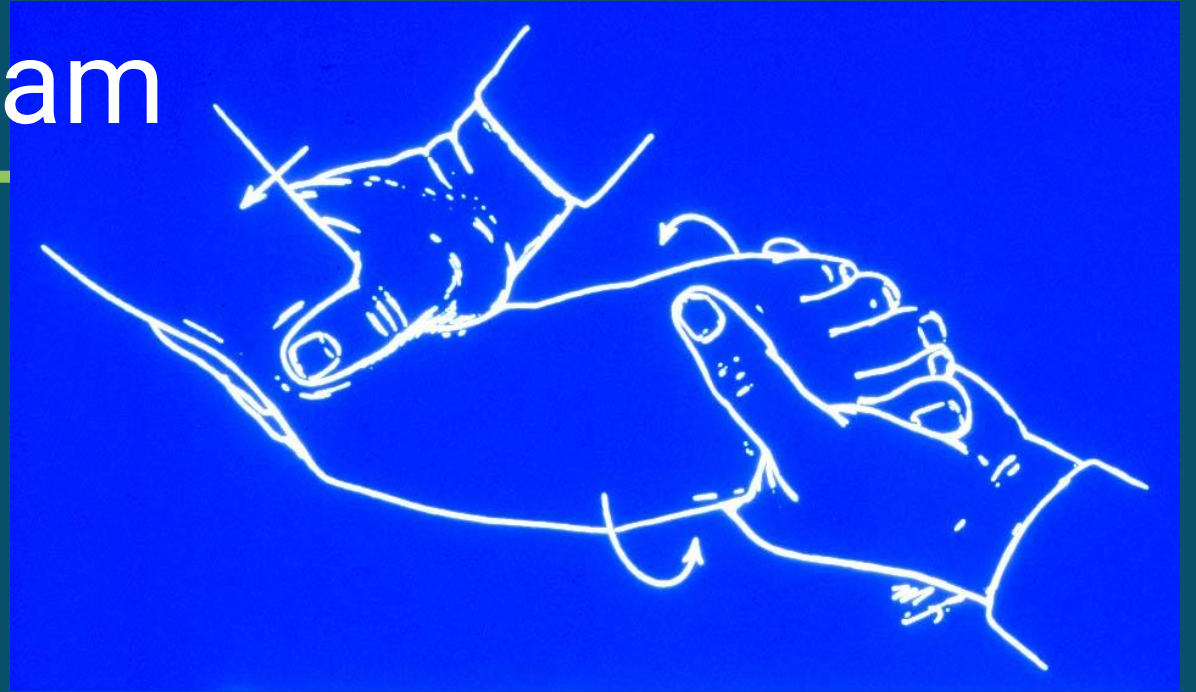
- Difficult to diagnose, often delays in treatment
- Early recognition key to preventing long-term disability
- C/o mid-foot pain and inability to bear weight
- Swelling and gross deformity if severe
Subtle edema and mild ecchymosis if low energy injury
- Spectrum of injury = sprain to fracture-dislocation - present differently



Lis franc Midfoot: Exam

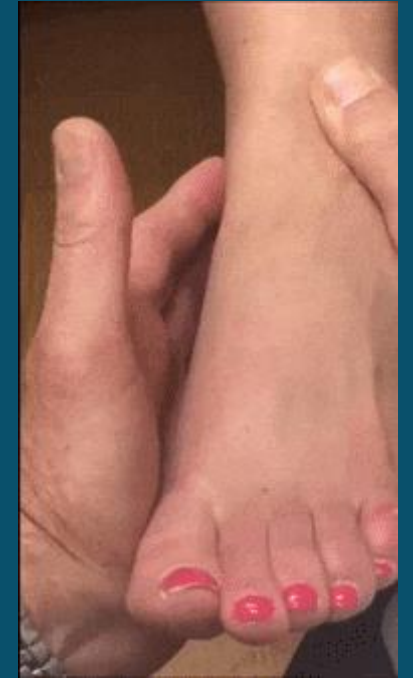
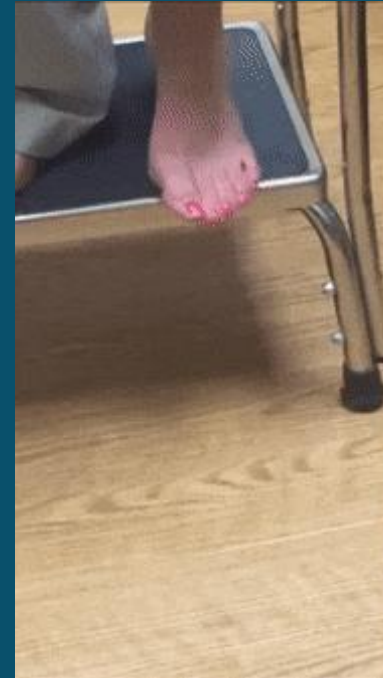
Treatment

- Operative- if ligament torn, its unstable, if wide on Xray; torn
- Stress Xray if doubt
- Dorsal ligaments are thin
- Crucial to arch alignment
- Must restore and maintain
- Typically open procedure
- ROH? At 3 months or later



Lis franc midfoot: **DDx extensor strain**

- Hyper-plantarflexion
- Often with fall, skiing, step off curb
- Stretching of extensor tendons
- ++ Pain Midfoot palpation
- + bruising midfoot
- NO pain with Abd stress
- +++ pain HyperPF midfoot/extensor tendon



Lisfranc midfoot - Radiographs

- XR- AP, oblique, lateral, **WB essential; comparison views** often helpful
- Normal alignment = **medial border of 2nd MT parallels the medial border of middle cuneiform on AP & oblique**
- Normal alignment = **medial border of 4th MT aligns w/ medial border of cuboid**



Lisfranc Injury - Radiographs

- MT should never lie more dorsal than its respective tarsal bone
- Any fracture of base of 2nd MT, even avulsion, suspect tarsometatarsal injury!
- Widening of MC-MT2 more than 2 mm compared to uninjured on WB XR indicates Lisfranc subluxation



Porter Classification-Lisfranc injury pattern

Classification

Traditional (1-2 TMT)----->

40/82



Medial column dislocation (Nav-MCun)----->

17/82



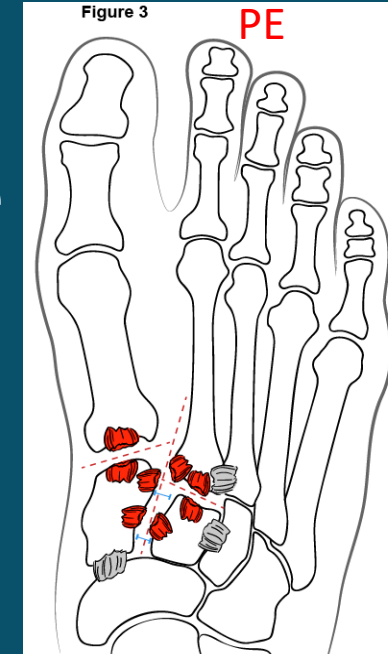
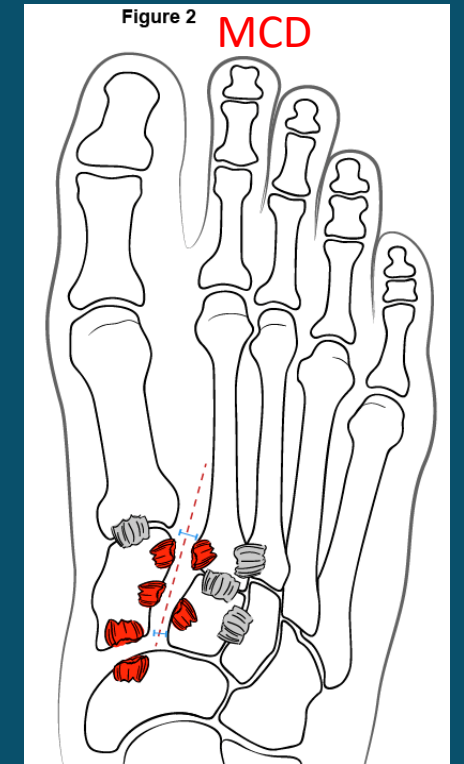
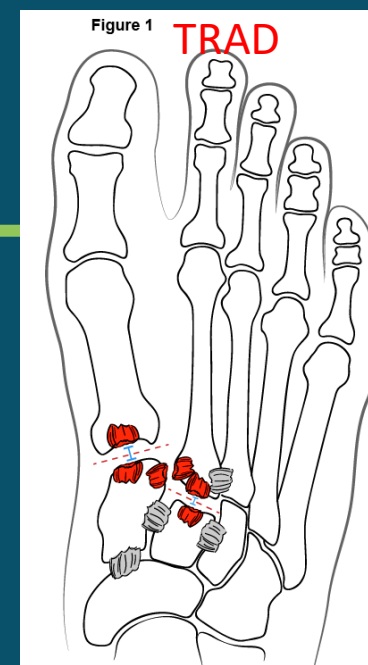
Proximal extension (IC dislocation)->

23/82

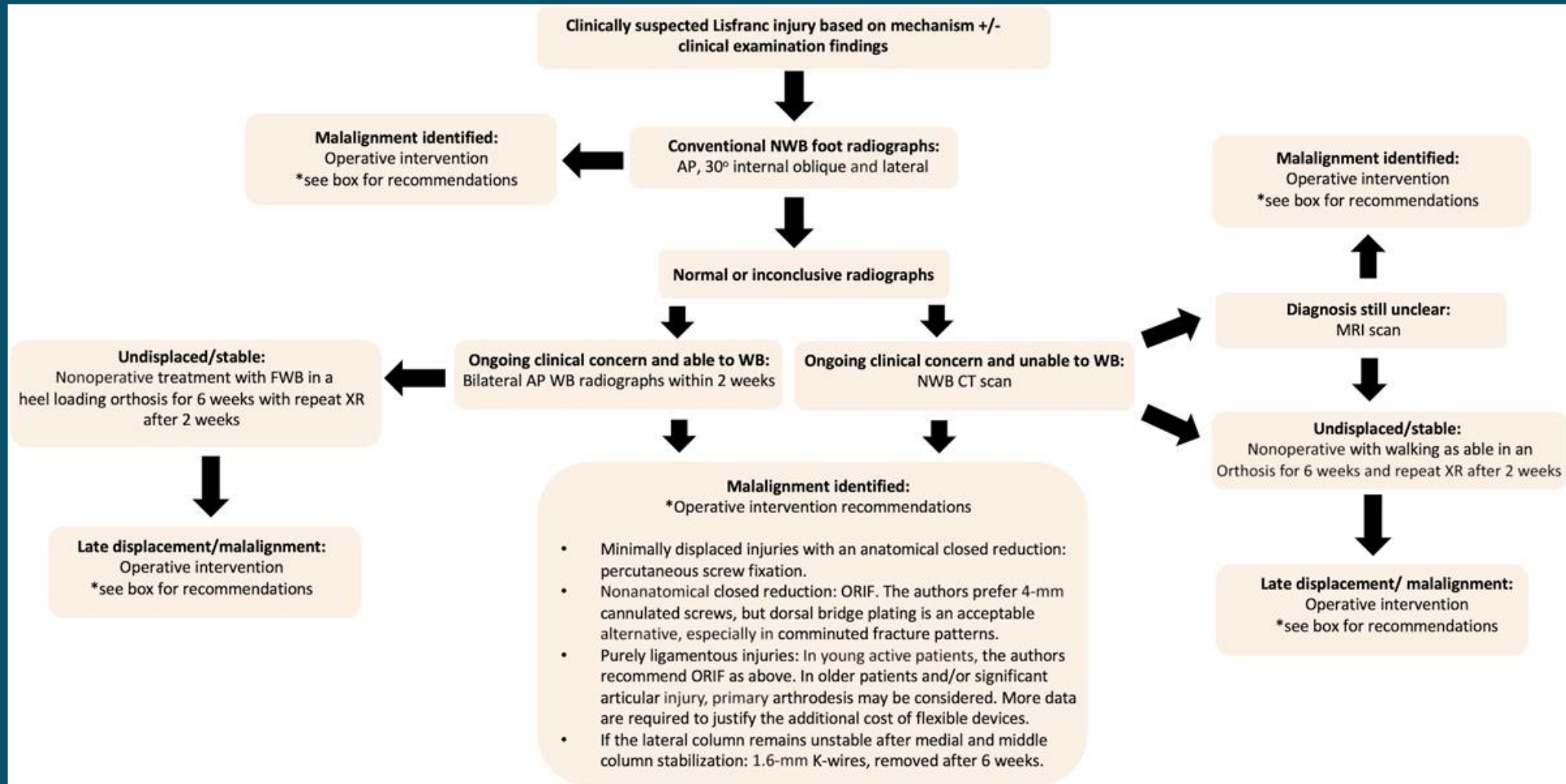


Porter-Classification

- Most classifications developed for high energy trauma
- Myerson, et al sports class
- Porter noted 3 primary disruption patterns
- Proximal extension ? worse
- Can be difficult to assess IC on Xrays alone
- Medial column dislocation not well studied
- TRADitional, Medial Column, Proximal Ext



Treatment Algorithm – TH Carter et al JBJS Review '23



Treatment Algorithm – Porter algorithm

- Suspected Lisfranc
 - injury based on clinical and MOI
- WB or simulated WB plain Xrays
 - If midfoot **unstable** *
 - ORIF to get anatomic alignment
- WB or simulated WB plain Xrays
 - If **indeterminant**
 - Anesthesia and stress imaging
 - Or, if low suspicion, repeat WB Xrays 1 week



Treatment Algorithm – TH Carter et al JBJS Review '23

- Suspected Lisfranc
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 - IF stress imaging = **instability**
 - **ORIF** involved joints



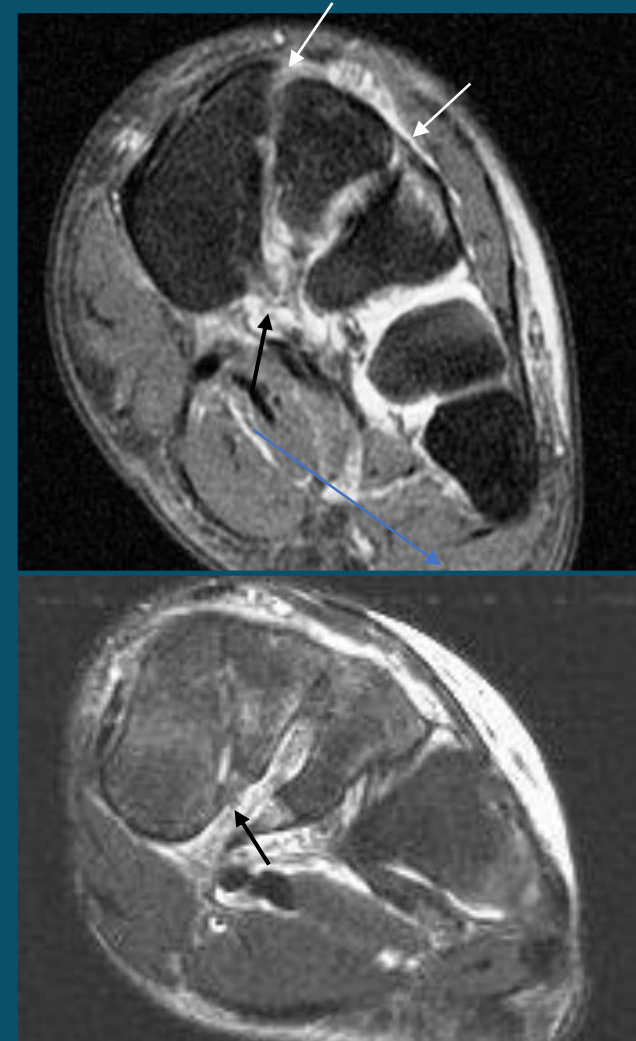
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 - Anesthesia and **stress imaging ***
 - Or, if low suspicion, repeat WB Xrays 1 week
 - IF stress imaging = **Stable ***
 - FWB in boot and re-Xray q 2-4 weeks
 - Re-evaluate/Image til back to activity



Treatment Algorithm – TH Carter et al JBJS Review '23

- Suspected Lisfranc
 - injury based on clinical and MOI
- WB plain Xrays = Stable
 - IF stress imaging = **Stable** *
 - OR unable to do WB and still suspicious
 - **MRI and/or CT**
 - MRI to look directly at midfoot ligaments
 - CT to look for peri-articular fx, “fleck” sign



Surgical Treatment Options – Unstable Lisfranc

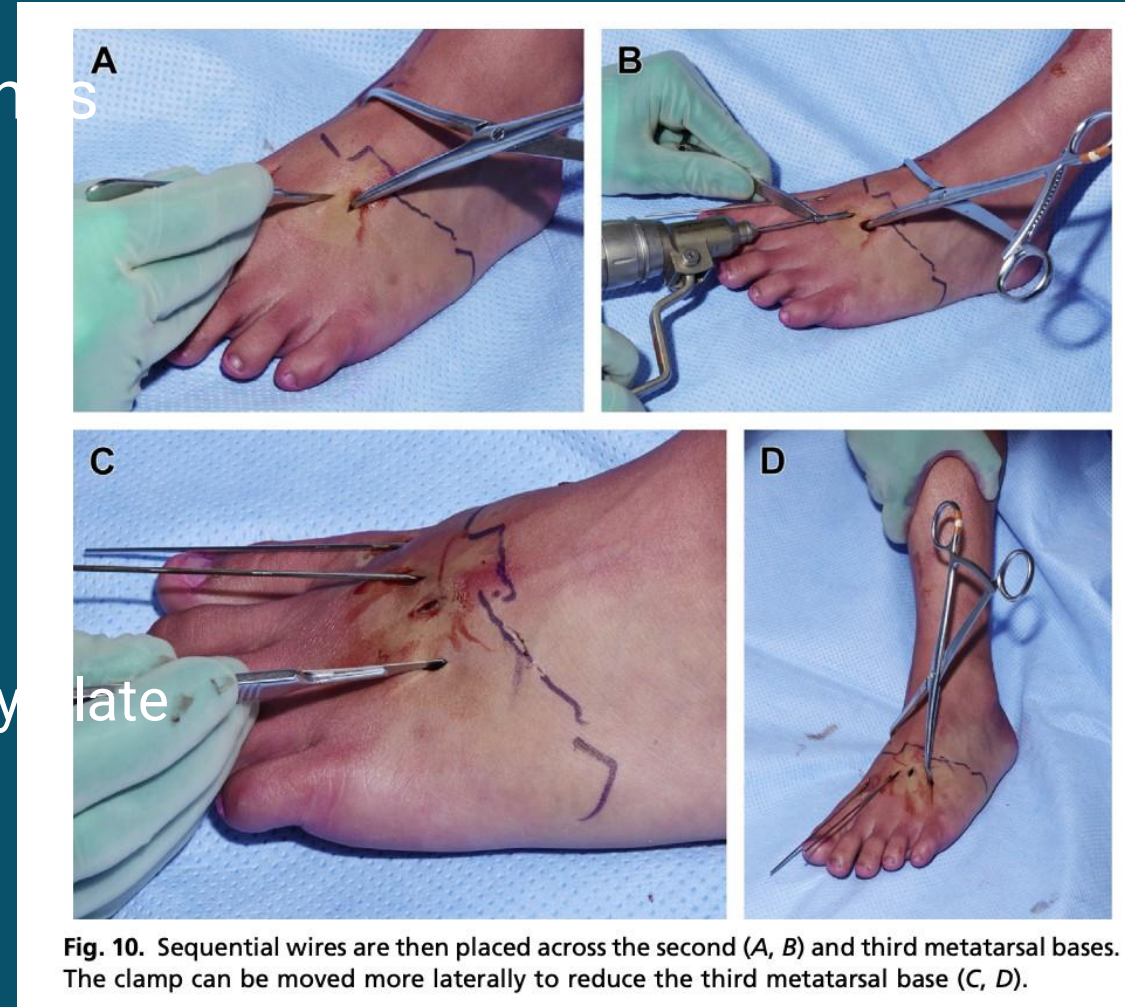
- Must have anatomic alignment – Determines Outcome
- Percutaneous Surgical stabilization
- Open surgical evaluation with open Stabilization
 - Screws only
 - Bridge Plate and screws
 - Flexible fixation
 - Surgical fusion all unstable segments
 - Hybrid fixation (fusion 2nd, 3rd?) and Temporary Plate 1st TMT



Surgical Treatment Options – Unstable Lisfranc

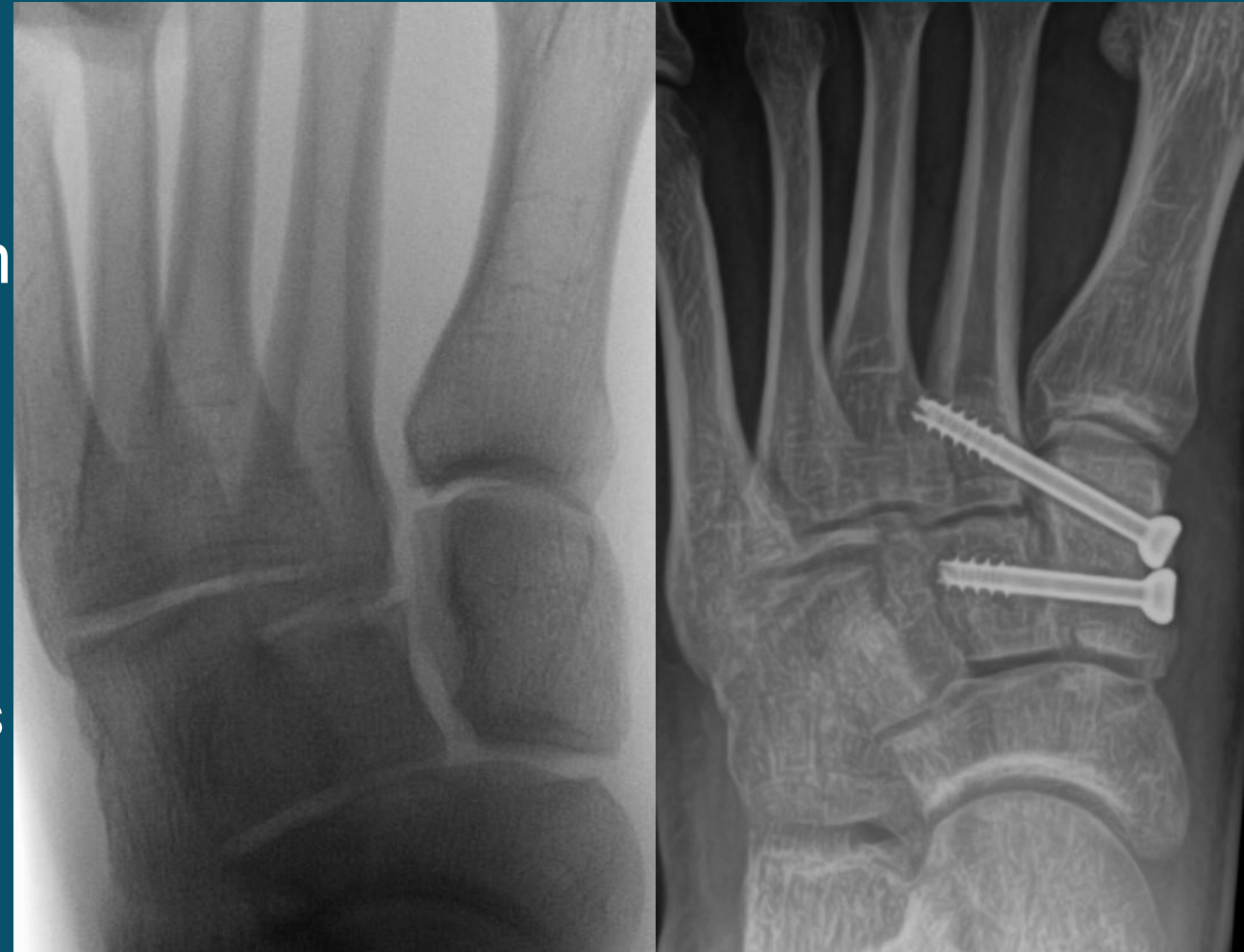
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Springer *Ligamentous Injuries of the F/A*, Hunt; chapter Porter 2022



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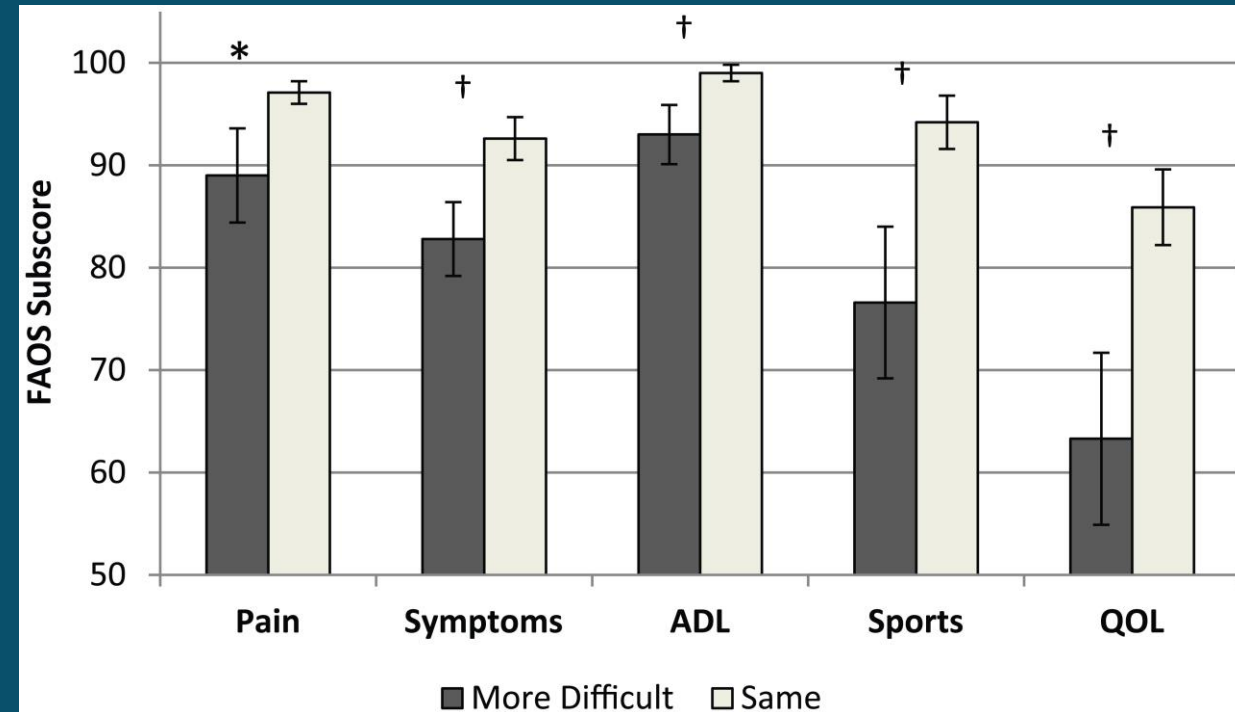
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 - Hybrid fixation (fusion 2nd, 3rd?) and Temporary Plate 1st TMT
- Courtesy Chris Coetzee, MD Minneapolis, MN



Surgical Treatment Options – Unstable Lisfranc

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MacMahon A, et al. Return to sports and physical activities after primary partial arthrodesis for Lisfranc injuries in young patients. Foot Ankle Int 2016

Lisfranc ORIF/repair video

When is it too Chronic to “Fix”?

- We have fixed up to 4-6 months in young athletes
 - Need MRI with min to no edema across joints
 - NO evidence of early OA
 - Reducible instability
- Use “hybrid” of flexible and rigid fixation
 - Remove rigid fixation 4 months
 - Add additional flexible fixation



Lis franc midfoot: **DDx DPN entrapment**

- Deep peroneal nerve entrapment
- Often with jumping sports
- Can also be after midfoot trauma or stress fracture
- Entrapment by EHB and extensor retinaculum
- NO pain with Abd stress
- +++ palpation DPN



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