

Midfoot Injuries

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Disclosures

I have no relevant financial disclosures.

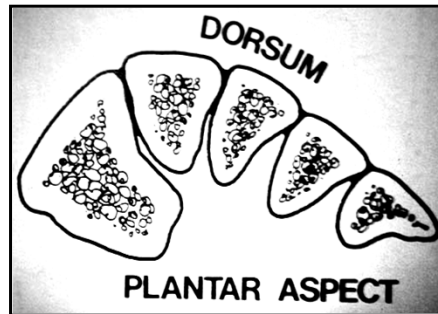


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Anatomy

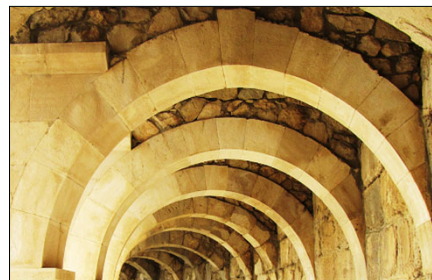
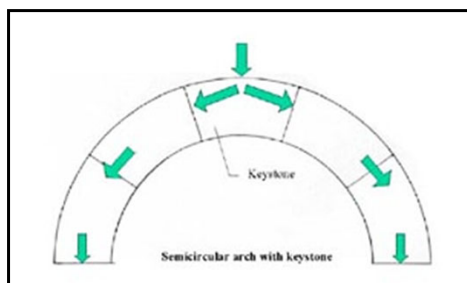
- Osseous anatomy
 - 2nd MT recessed between cuneiforms
 - Keystone configuration= KEY for coronal plane stability
 - Trapezoidal base of the metatarsals
- Lisfranc joint complex
 - Tarsometatarsal (TMT), intermetatarsal (IMT) and intertarsal (IT) joints



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Anatomy: Roman Arch Concept

- *Important for load sharing!*



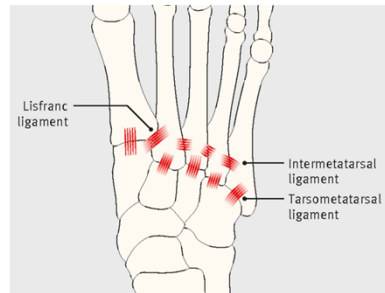
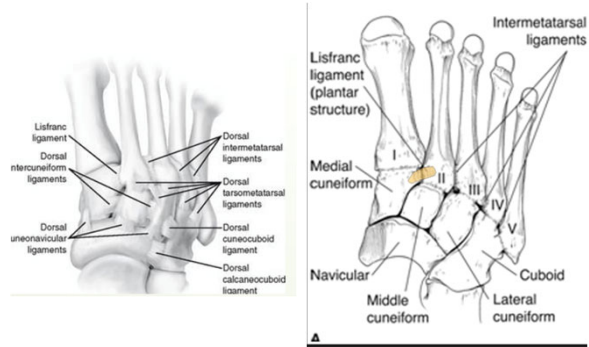
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Ligamentous Anatomy

NO direct ligamentous connection between the 1st and 2nd MT

- Lisfranc ligament originates from medial cuneiform, inserts on base of 2nd MT
 - Strongest interosseous ligament of TMT joint complex
 - The plantar portion is the strongest component of the ligament
- Midfoot joints are considered “non essential” i.e. rigid joints without mobility



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Mechanism of Injury

- DIRECT
 - Crush injury – causes the arch to splay and the plantar ligaments to tear
- INDIRECT
 - Axial load and abduction of the forefoot through a plantar flexed foot
 - Forefoot is laterally pulled. Testable buzzwords: horseback rider or snowboarder (strapped in feet can windsweep the forefoot out=abduction)



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Mechanism of injury



*Illustration credit: Dr. Pat Yoon, MN

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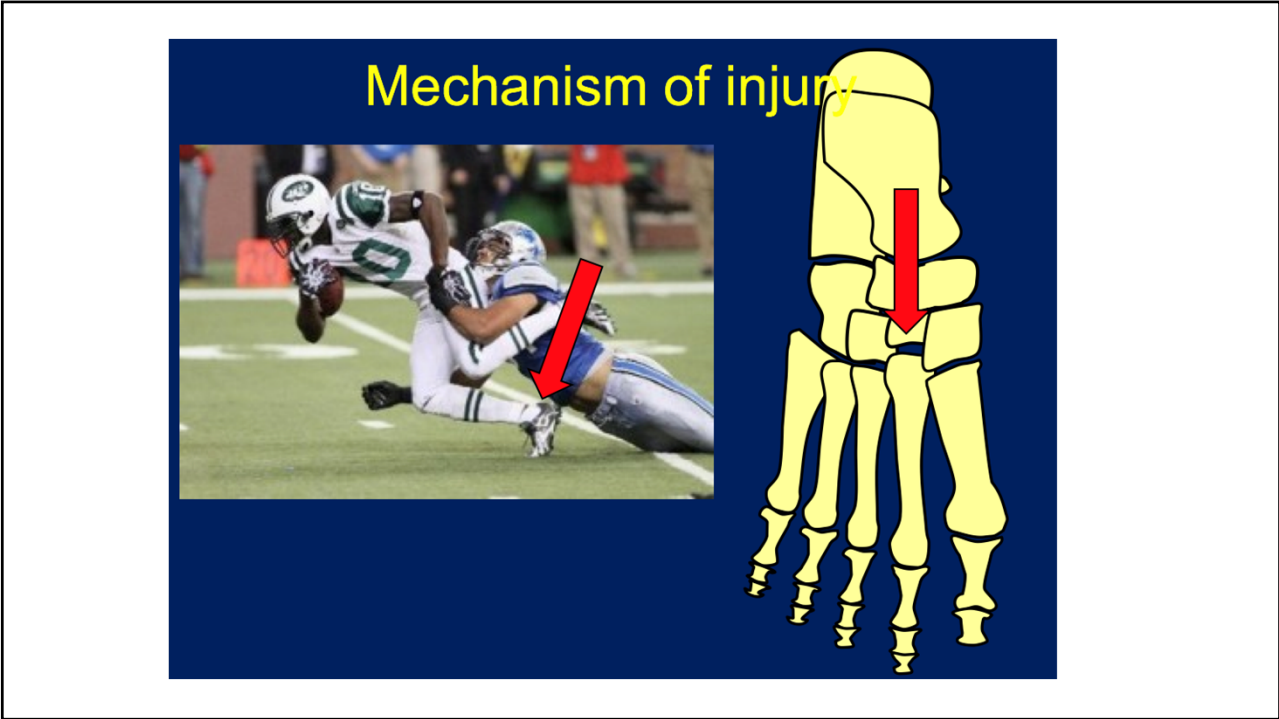
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Mechanism of injury

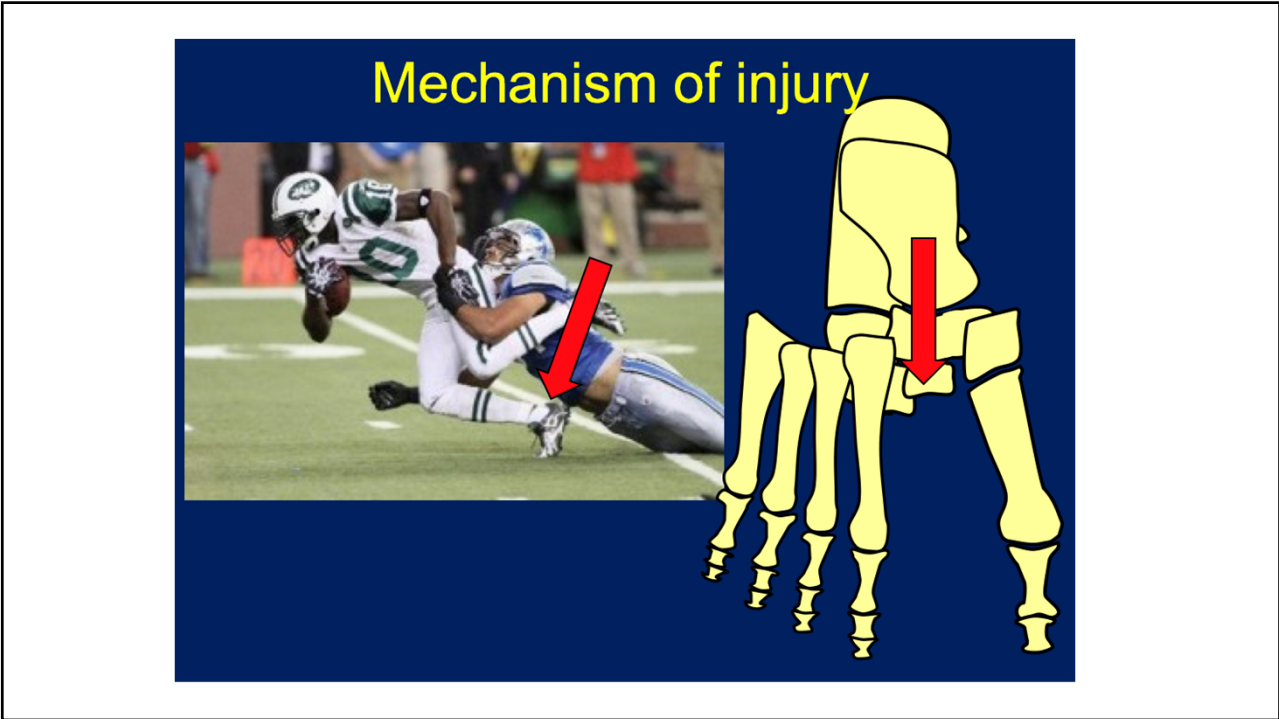


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History and Initial Evaluation

- Mechanism of injury
 - 2nd most common foot injury in collegiate football players
- Swelling, midfoot tenderness, blisters, open wounds
- Plantar ecchymosis- pathognomonic for lis franc injury
- WB xrays
 - If diagnosis is uncertain, can obtain contralateral WB xrays
 - If associated with any fractures, would obtain CT scan



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Radiographic evaluation- what is normal?

- AP
 - Medial border of 2nd MT lines up with medial border of middle cuneiform



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Radiographic evaluation- what is normal?

- Oblique
 - Evaluate lateral column
 - Medial Border of the 4th MT line up with medial border of cuboid



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Radiographic Evaluation- what is normal?

- Lateral
 - Dorsal border of navicular, cuneiforms, and MT line up



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Radiographic Evaluation- abnormal

- Loss of congruity between medial border of 2nd and medial border of middle cuneiform



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Radiographic Evaluation- abnormal

- Loss of congruity between medial border of 4th MT and medial border of cuboid

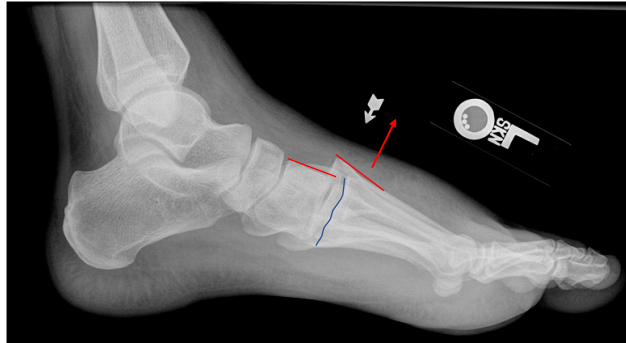


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Radiographic Evaluation- abnormal

- Lateral-
 - Dorsal subluxation of MT
 - When it is one MT that is up, it is always the 2nd!
 - Assess congruity of 1st TMT joint; signs of 1st TMT joint instability, need to stabilize



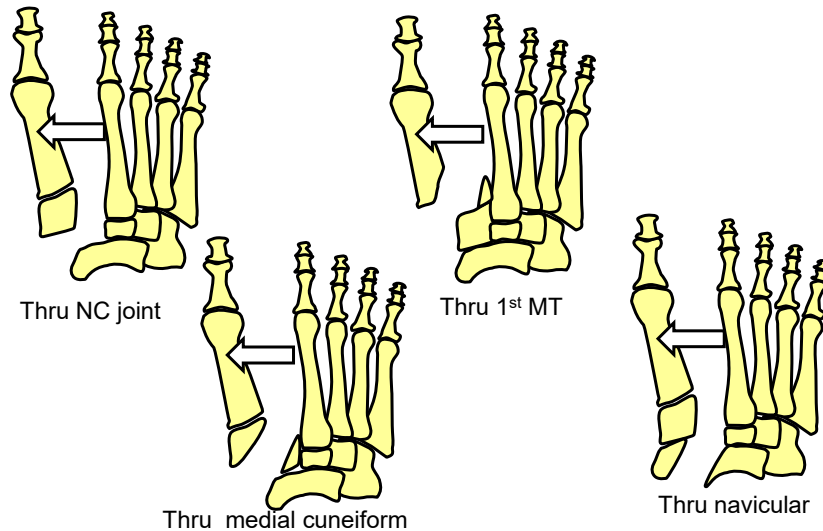
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Other subtle signs for lisfranc injury



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Fracture patterns highly variable



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Why is it important to identify?

- What happens to untreated Lis francs?
 - HIGH MORBIDTY → Planovalgus deformity, arthritis
- Remember....
 - What are ligamentous structures that maintain the medial arch of the foot?
 - PTT
 - Spring ligament
 - Lis franc ligament
 - Deltoid
 - Plantar fascia



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Categories of fixation

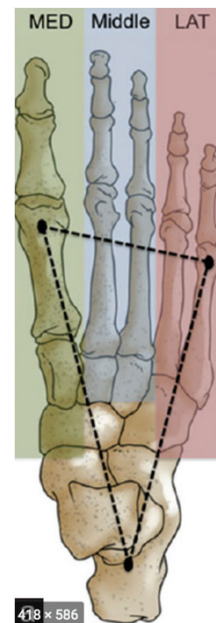
- 1) Non op – low grade or partial tears, no displacement
 - Other considerations- is the injury in the setting of a planovalgus or cavovarus foot posture?
 - Joint congruity
- 2) Temporization with closed reduction and pinning
- 3) Definitive fixation:
 - ORIF vs. arthrodesis



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Remember....

- Columns of foot
 - Medial and middle confer stability- rigid = 1st through third TMT joints. Think= rigid fixation
 - Lateral column- needs flexibility- 4-5th TMT joints. Think = temporary fixation, ie pinning. You should NOT fuse lateral column.



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Controversies

- ORIF vs. Primary arthrodesis
- Suture button fixation for early return to play?



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TREATMENT OF PRIMARILY LIGAMENTOUS LISFRANC JOINT INJURIES: PRIMARY ARTHRODESIS COMPARED WITH OPEN REDUCTION AND INTERNAL FIXATION

A PROSPECTIVE, RANDOMIZED STUDY
BY THUAN V. LY, MD, AND J. CHRIS COETZEE, MD, FRCS
BY THUAN V. LY, MD, AND J. CHRIS COETZEE, MD, FRCS

- JBJS 2006
- Level I, 41 pts (21 ORIF, 20 PA), 2y f/u
- All results in favor of PA
 - AOFAS Midfoot score in favor of PA
 - 15 of 21 ORIF with radiographic arthritis
 - 5 of 21 converted to arthrodesis
 - 16 of 21 with 2nd surgery for HWR



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Open reduction internal fixation versus primary arthrodesis for lisfranc injuries: a prospective randomized study

Jeffrey A Henning¹, Clifford B Jones, Debra L Sietsema, Donald R Bohay, John G Anderson

Affiliations + expand

PMID: 19796583 DOI: 10.3113/FAI.2009.0913

- 40 patients with fracture or fracture dislocations at the lis franc
- 78% ROH in ORIF versus 17% in PF
- No difference in physical function scores SF-36 or SMFA
- No difference in patient satisfaction



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Return to play? Outcomes

The American Journal of Sports Medicine



Impact Factor: 7.010 / 5-Year Impact Factor: 8.076

Restricted access | Research article | First published online May 10, 2016

Outcomes of Lisfranc Injuries in the National Football League

[Kevin J. McHale, MD](#), [Joshua C. Rozell, MD](#), et al., and [Brian J. Sennett, MD](#) [View all authors and affiliations](#)

[Volume 44, Issue 7](#) | <https://doi.org/10.1177/0363546516645082>

- Lis franc injuries in NFL players between 2000 and 2010
- 28 athletes – 11 offensive and 17 defensive
- 26 (93%) RTP at 11.1 months median time post injury and missed 8.5 games
- Pre and post injury athletic performance metrics compared including below showed no difference.
 - Yearly total yards
 - Yearly total tackles, sacks, and interceptions
 - Offensive and defensive power ratings

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Return to play? Outcomes

> Foot Ankle Int. 2018 Jul;39(7):801-807. doi: 10.1177/1071100718765176. Epub 2018 Apr 2.

Return to Sports and Physical Activities After Open Reduction and Internal Fixation of Lisfranc Injuries in Recreational Athletes

Allan David Mora¹, Mark Kao¹, Terrence Alfred¹, Gregory Shein¹, Jeff Ling¹, David Lutz¹

- Inclusion criteria – all patients less than 55 undergoing ORIF with Lisfranc screw + bridge plating
- 33 patients included
- 94% returned to pre activity sport but 35% said with increased difficulty or symptoms
- 1 out of 3 patients still experience some pain at site of ORIF

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Return to play? Outcomes

> Foot Ankle Int. 2016 Apr;37(4):355-62. doi: 10.1177/1071100715617743. Epub 2015 Nov 23.

Return to Sports and Physical Activities After Primary Partial Arthrodesis for Lisfranc Injuries in Young Patients

Aoife MacMahon¹, Paul Kim¹, David S Levine¹, Jayme Burket², Matthew M Roberts¹, Mark C Drakos¹, Jonathan T Deland¹, Andrew J Elliott¹, Scott J Ellis³

- 38 patients, mean follow up 5.2 years
- Difficulty of participation in pre op activity was the same in 66% and increased in 34%
- Participation levels same in 64% and impaired in 25%
- 97% satisfied with outcomes



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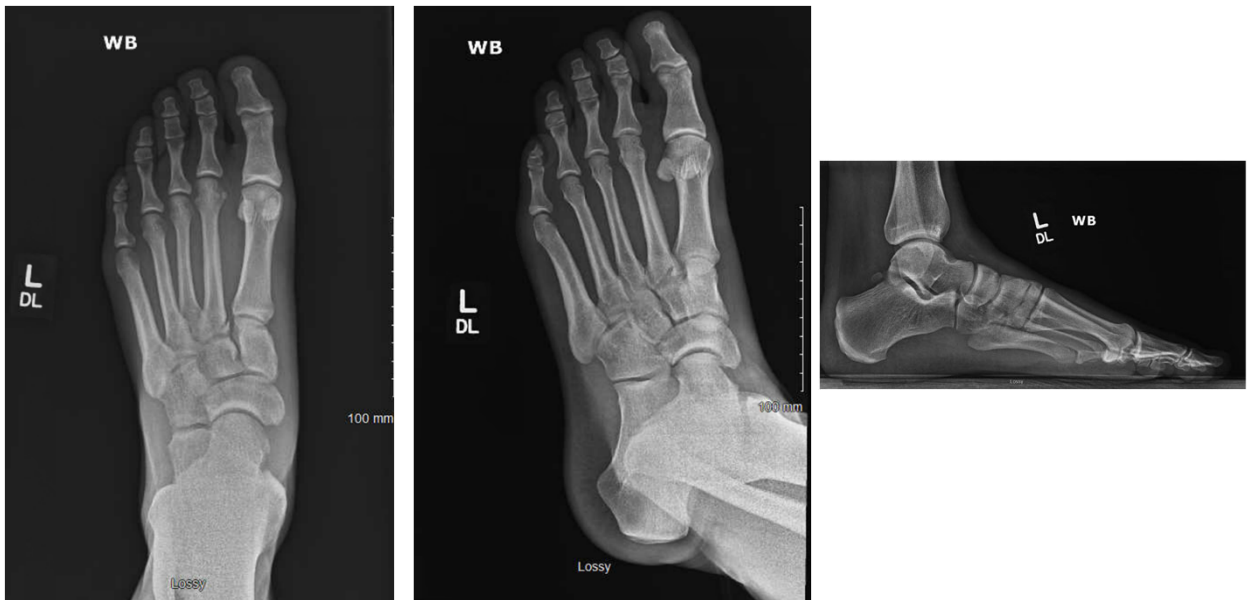
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Cases



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Case 1: 24M collegiate football player with NFL prospects



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Intraop



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2 weeks out



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Case 2: 23M collegiate football player

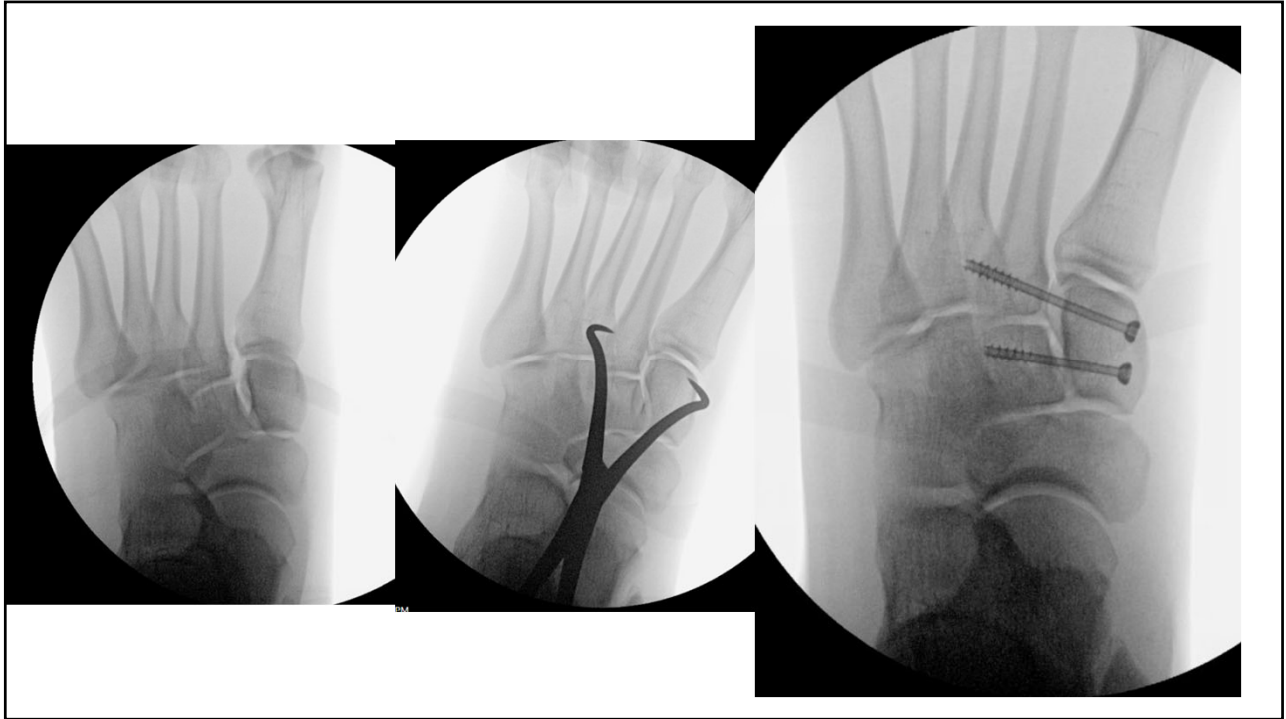


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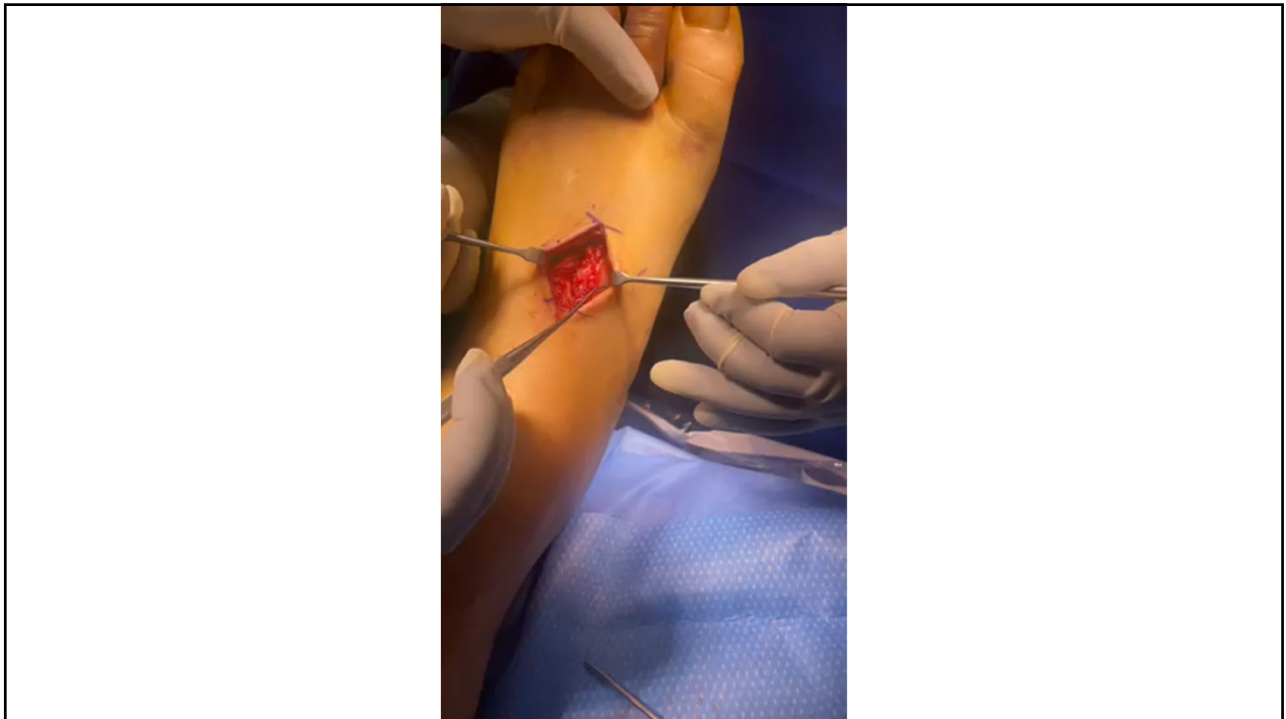


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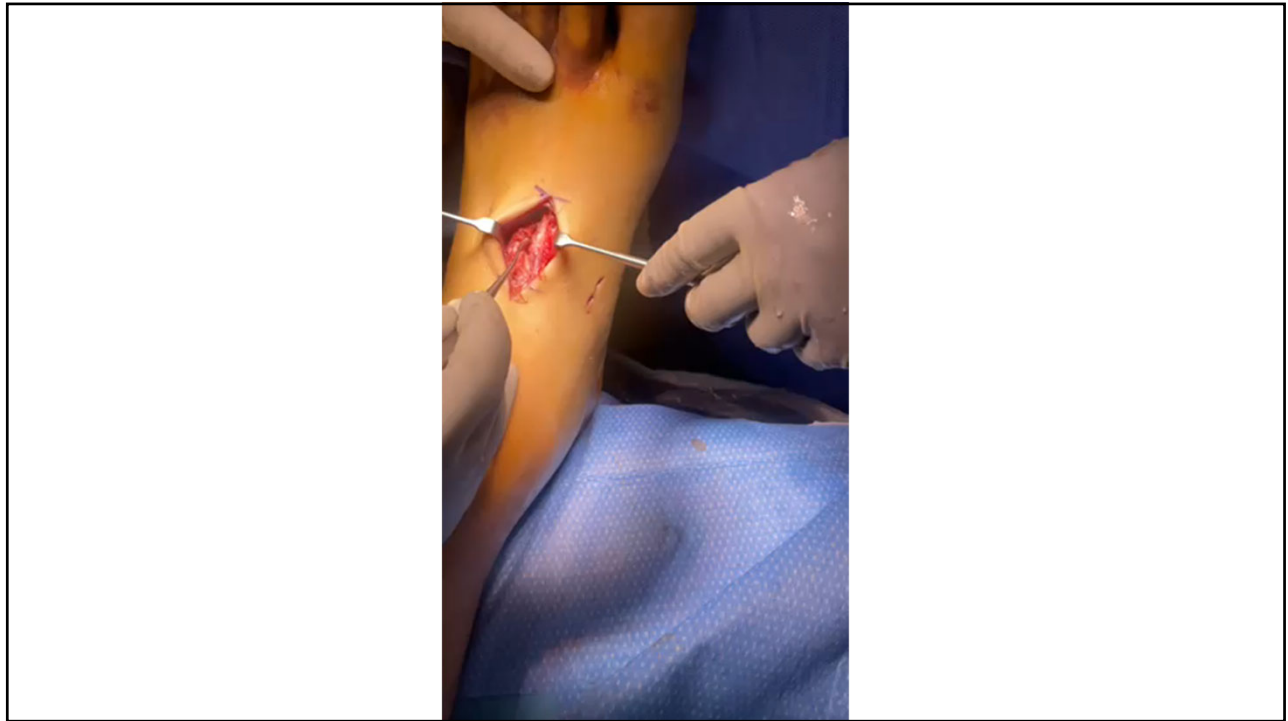


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4 months out...



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Case 3: 17M delayed presentation 4 months out



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Intra op



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6 months out



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Case 4: 45M crashed golf cart



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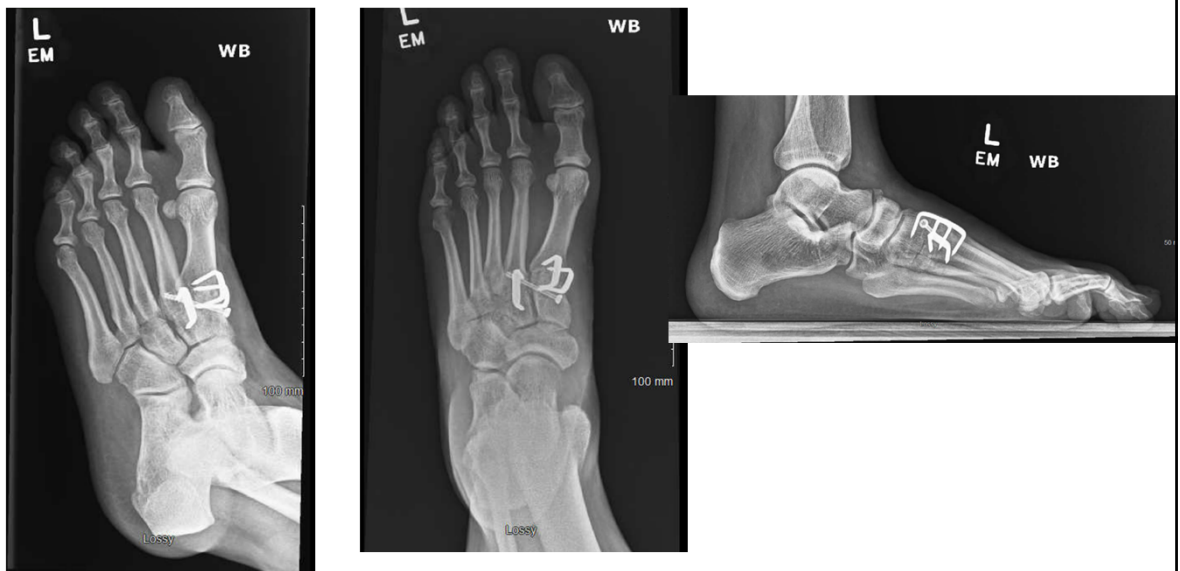
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Intraop



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6 months out



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