Open Calcaneus Fractures:

How to Optimize Results

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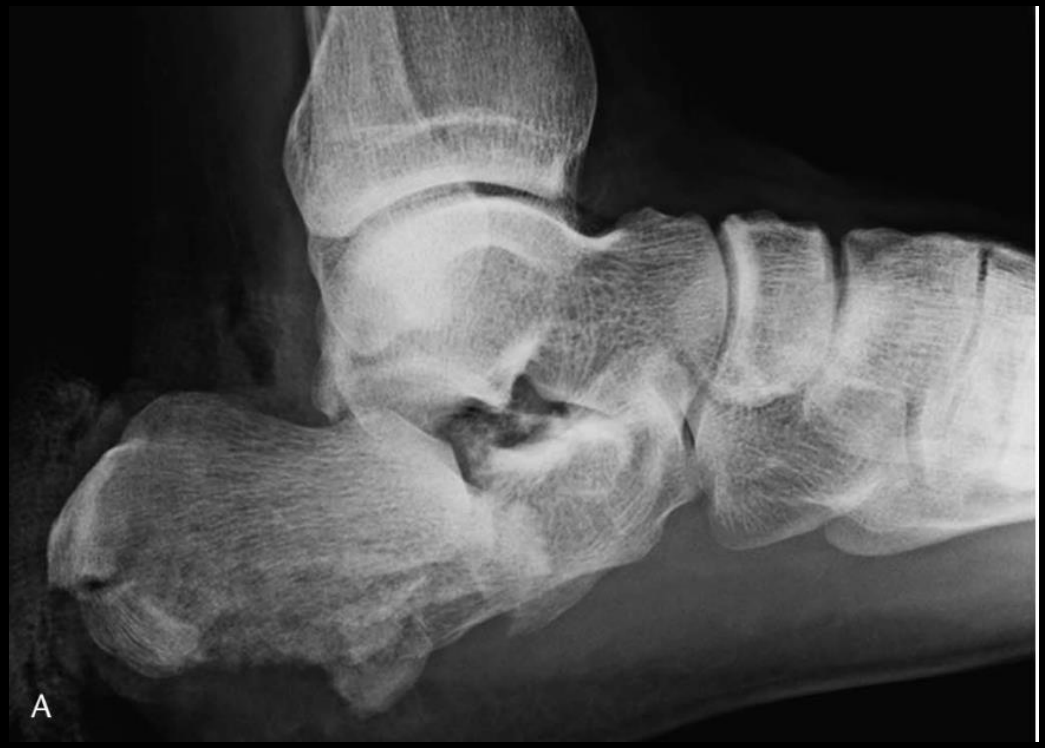
Disclosures

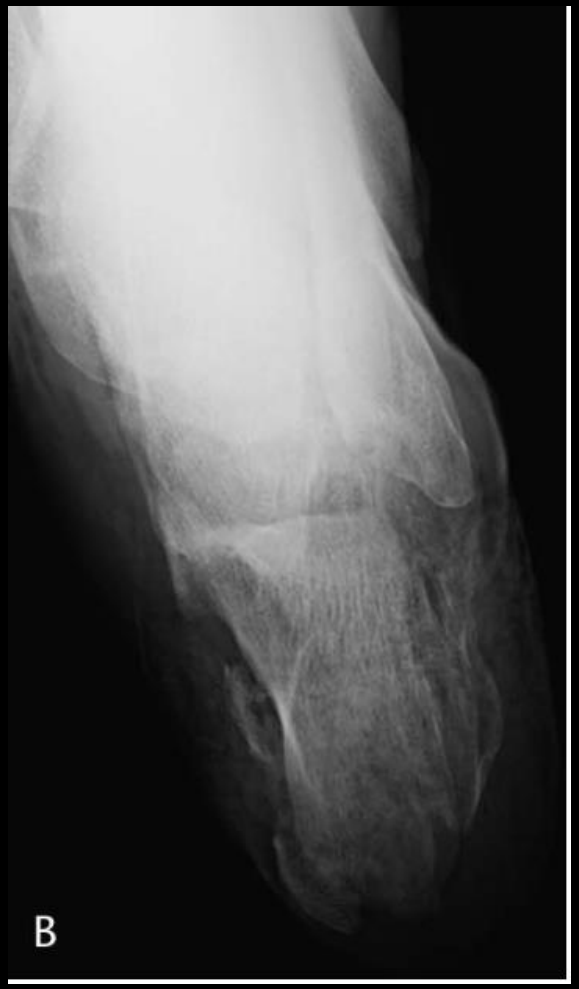
A Staged Treatment Plan for the Management of Type II and Type IIIA Open Calcaneus Fractures

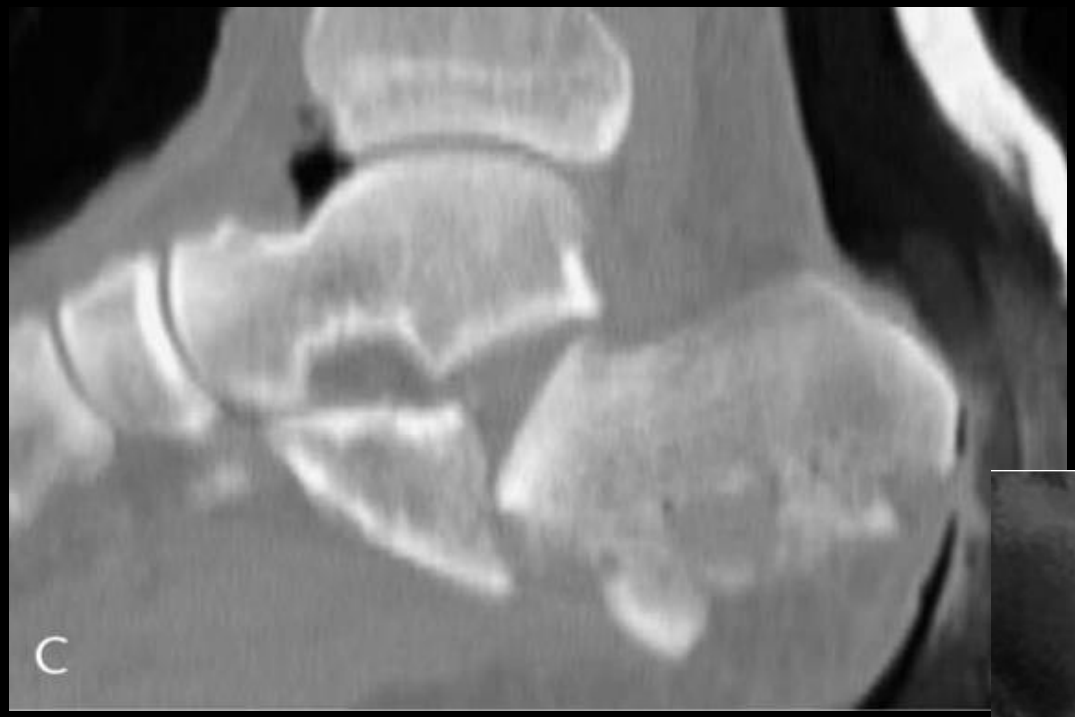
Samir Mehta, MD, Amer J. Mirza, MD,† Robert P. Dunbar, MD,‡ David P. Barei, MD,‡ and Stephen K. Benirschke, MD‡*

Case

- 58yo M fall from a ladder



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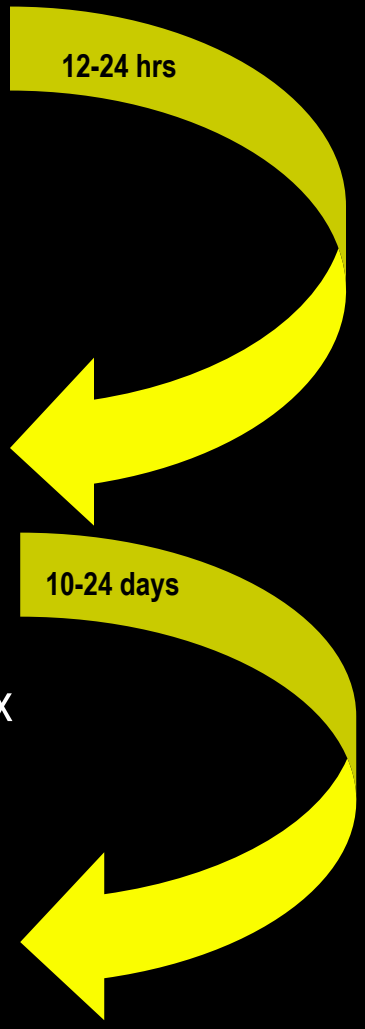
Objectives

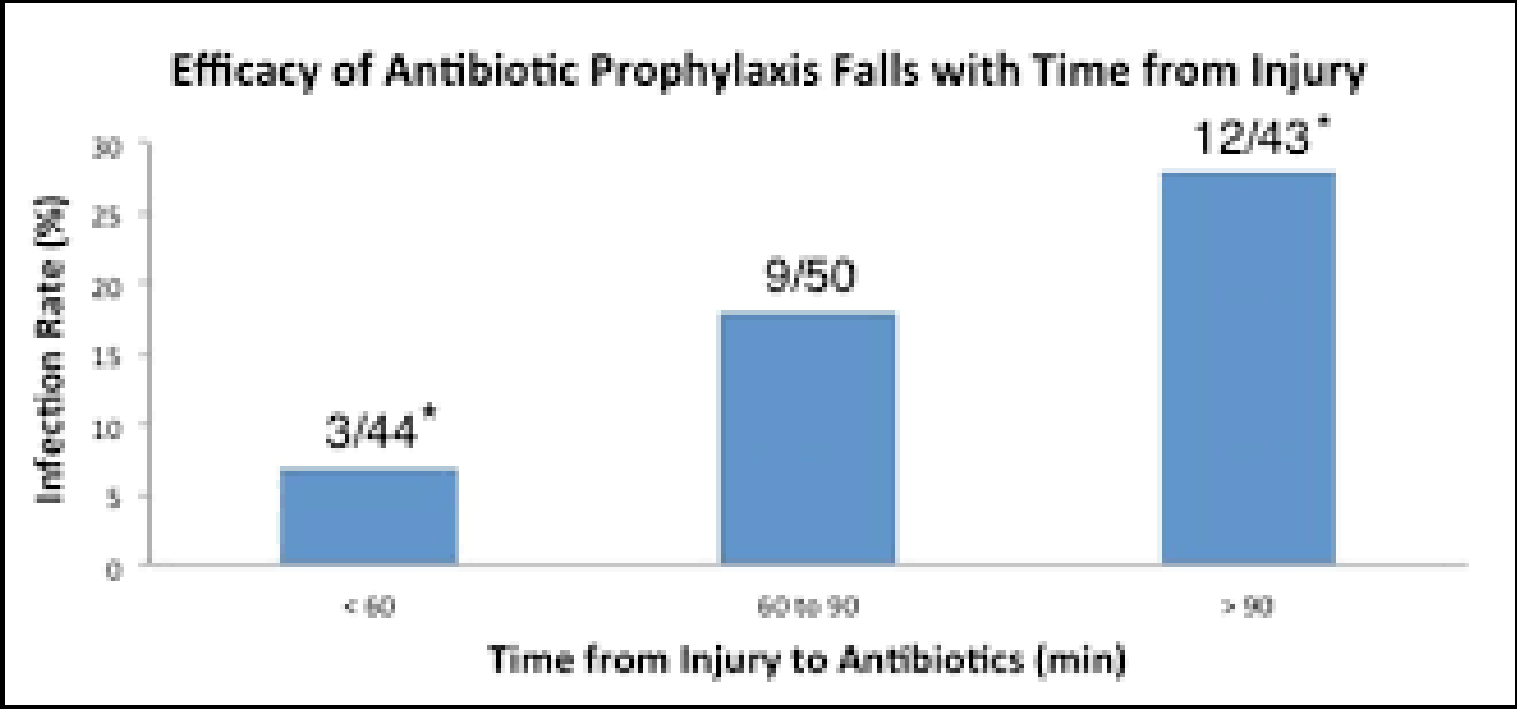
- Review Staged Protocol
- Emphasize the similarities to other open LE injuries
- Review Outcomes

Staged Protocol

- ER
  - Bedside I&D
  - Tetanus
  - Abx
- OR # 1
  - I&D
  - Temporary fixation
    - Tongue: CRPP
    - Joint depression: Ex fix
- OR # 2
  - Definitive ORIF



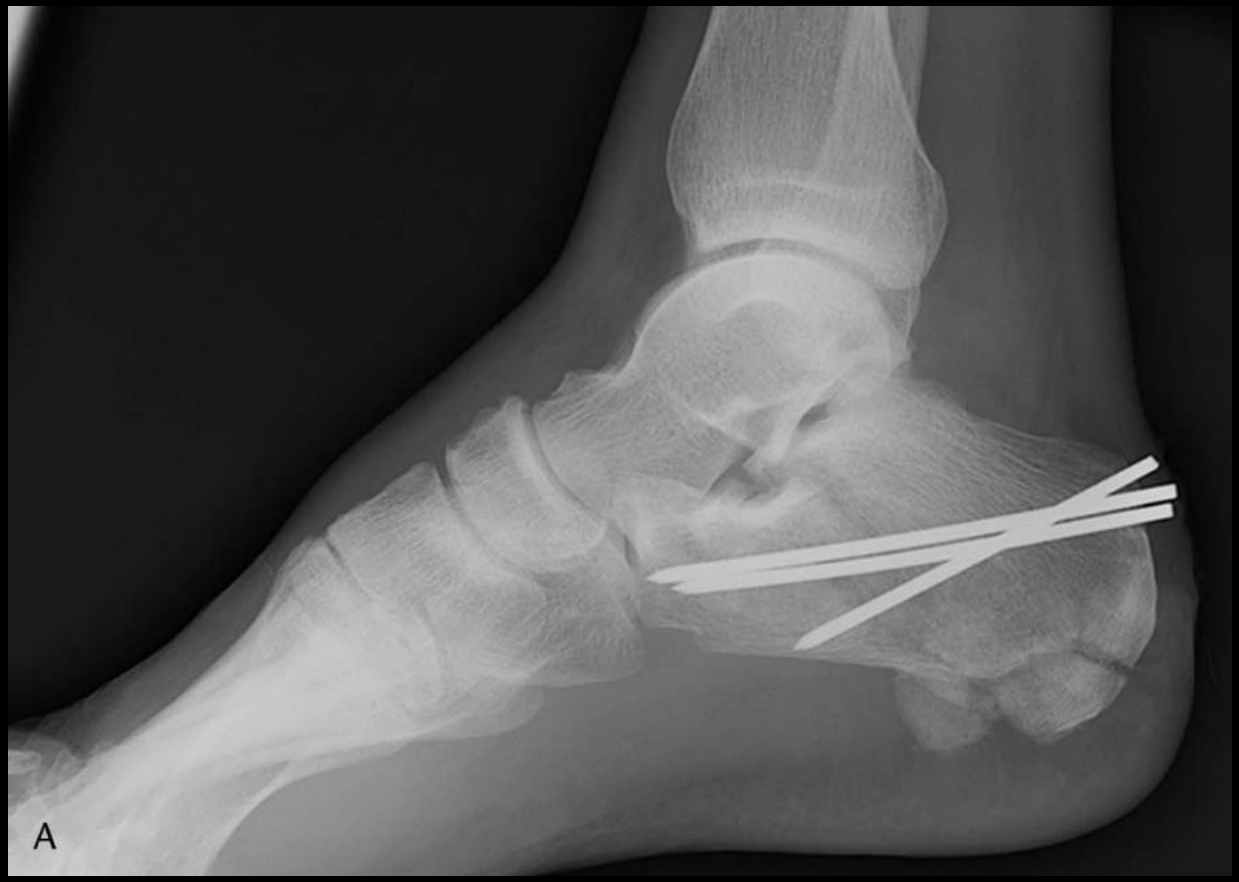
ER



Lack WD, Karunakar MA, Angerame MR, et al. Type III open tibia fractures: immediate antibiotic prophylaxis minimizes infection. J Orthop Trauma 2015;29:1–6.

OR # 1

- Irrigation and debridement through open wound
- Temporary stabilization:
  - CRPP (tongue)
  - Ex-fix (joint depression)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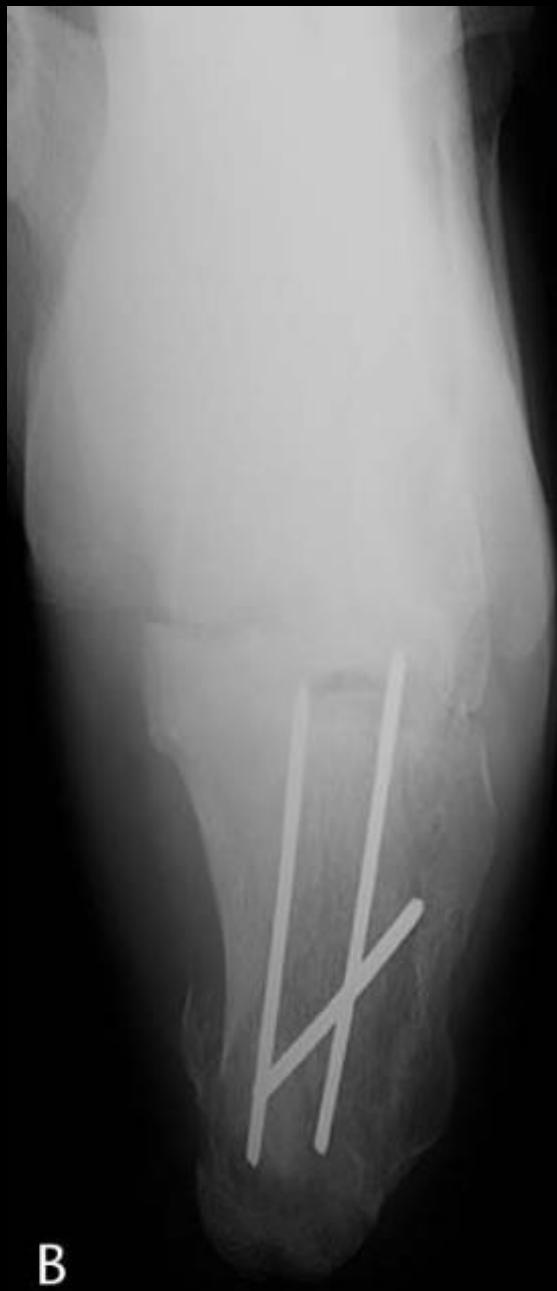
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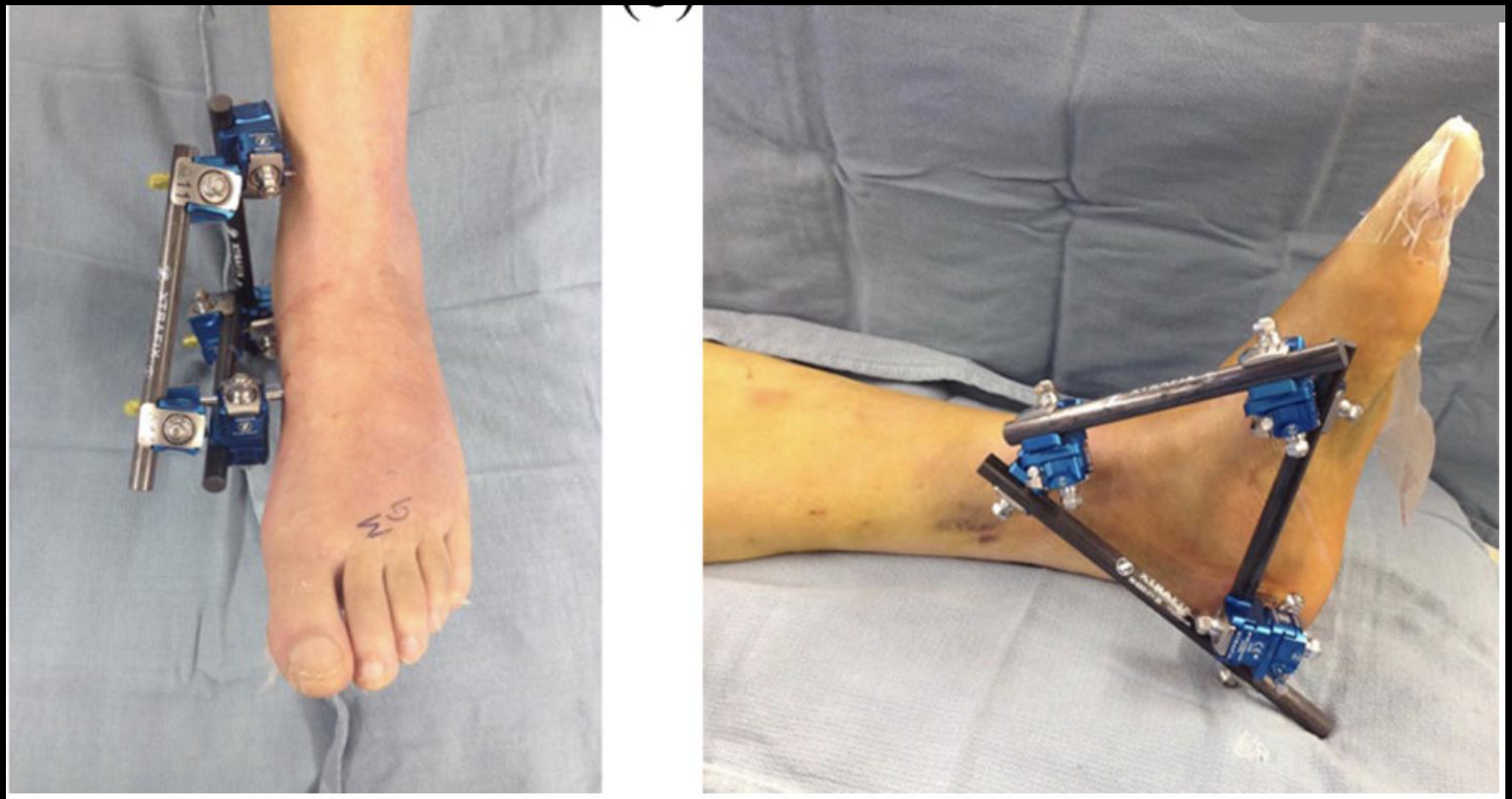
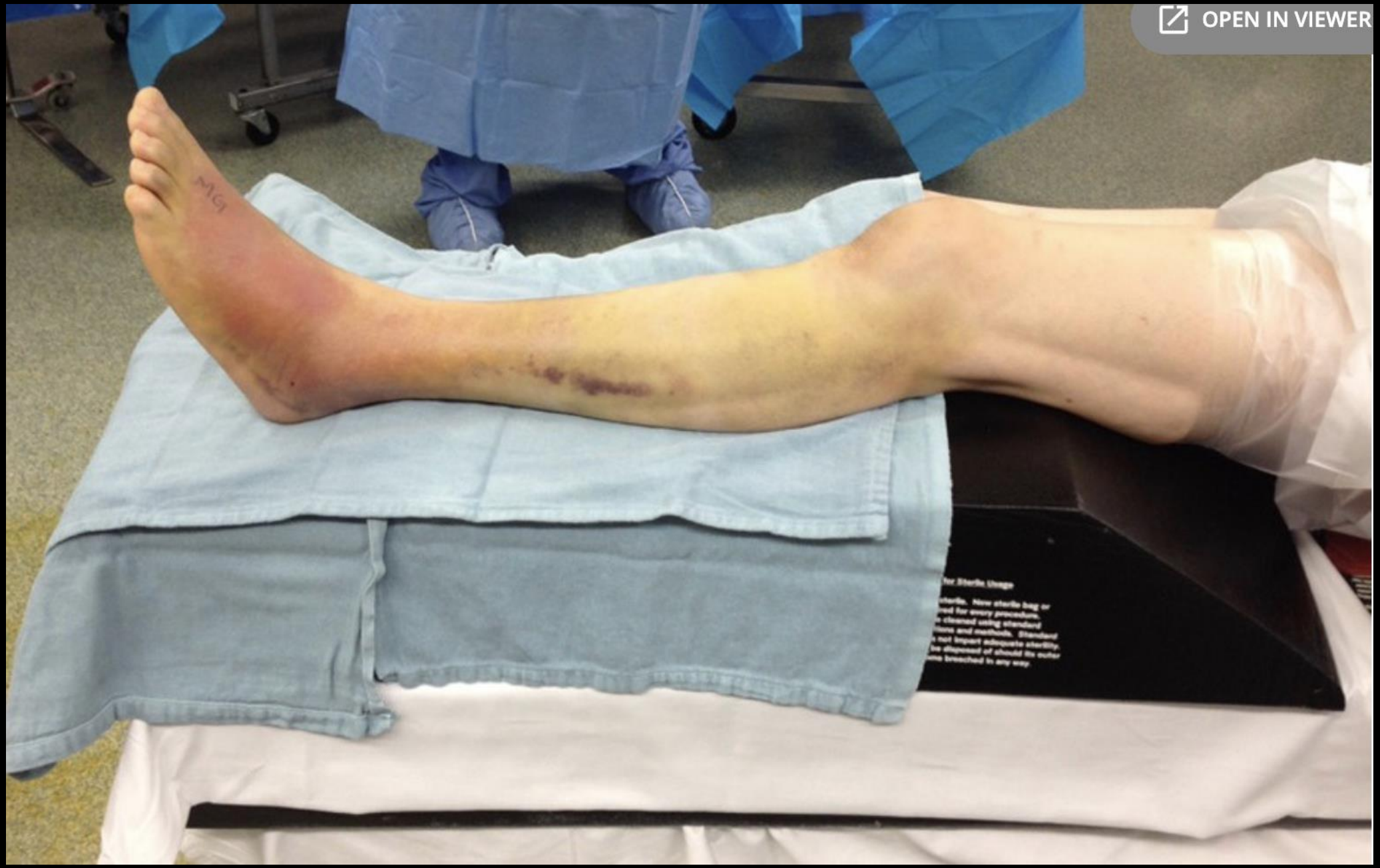
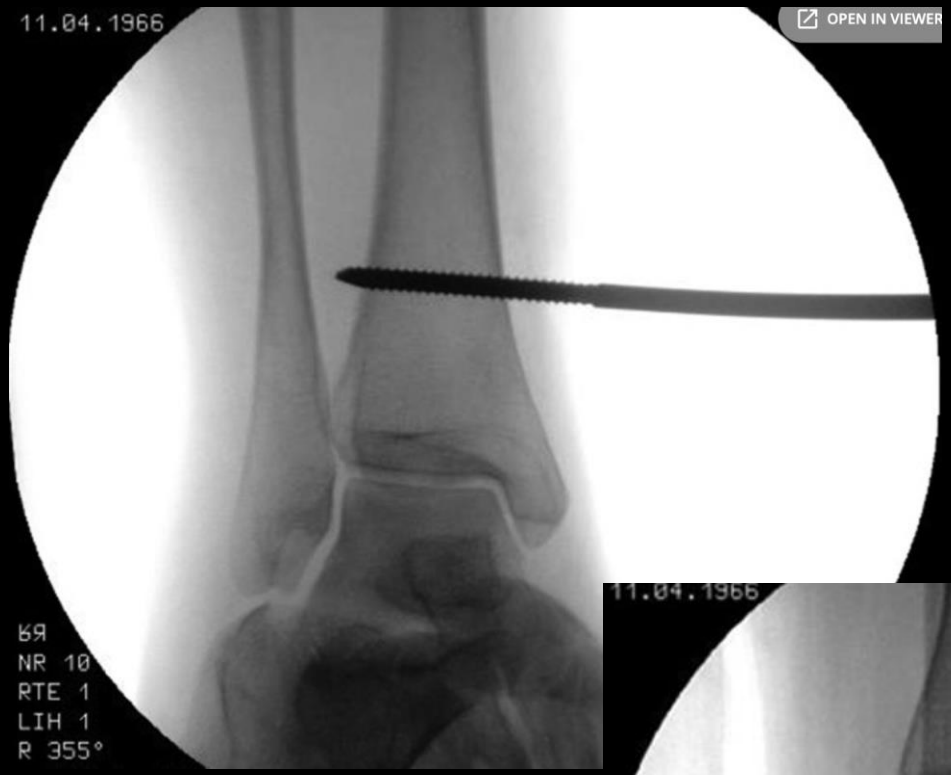
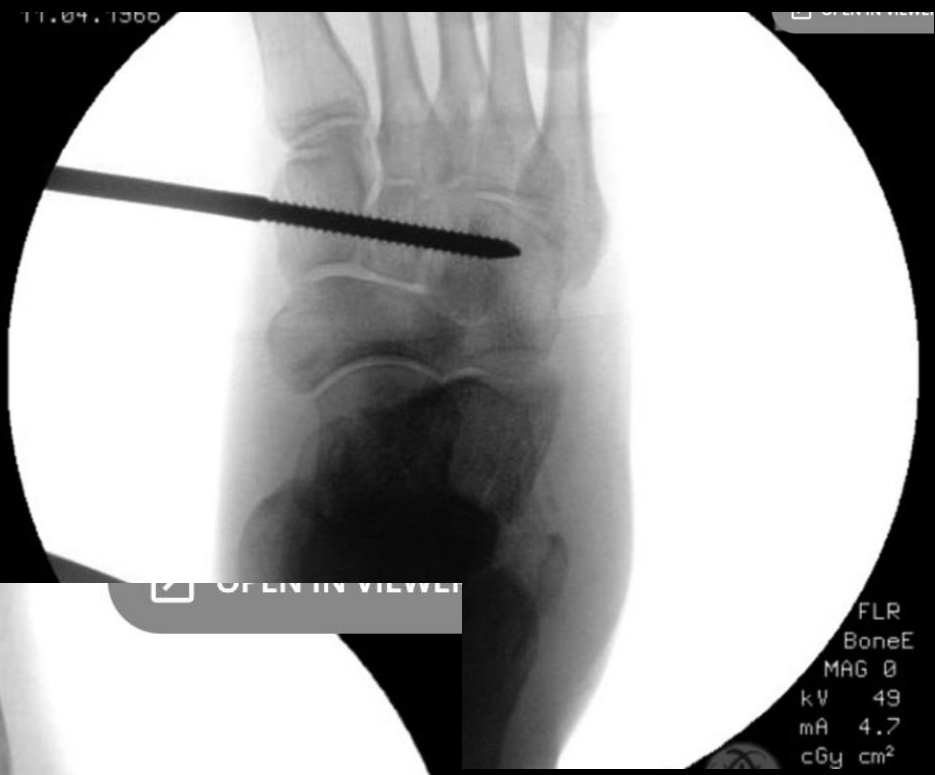
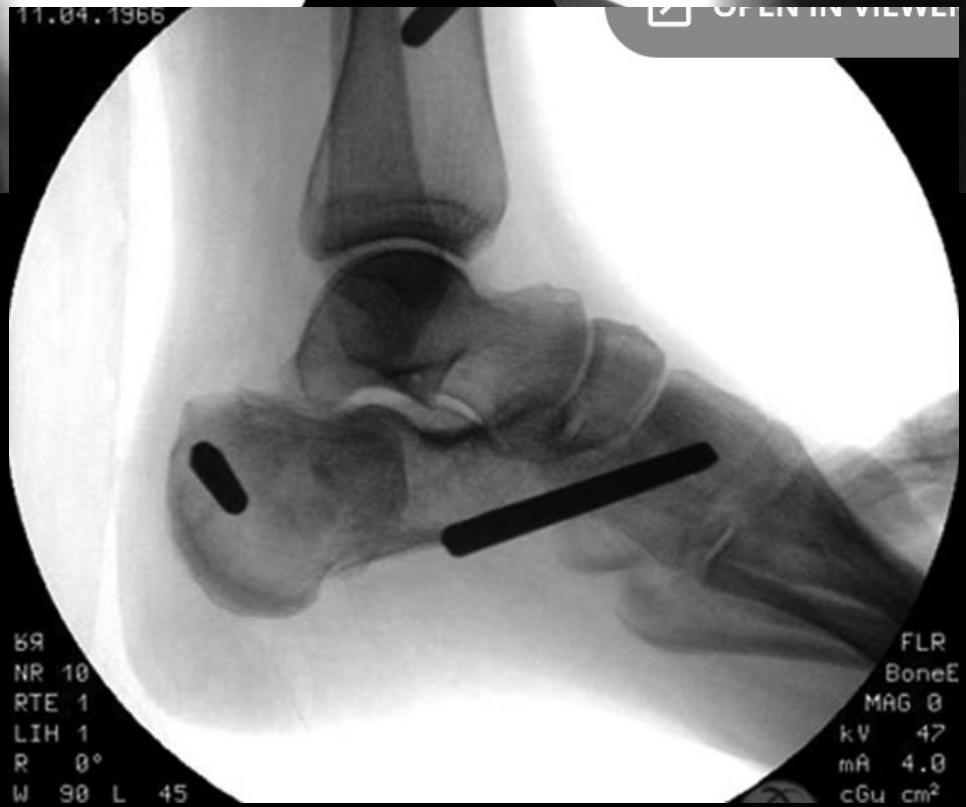


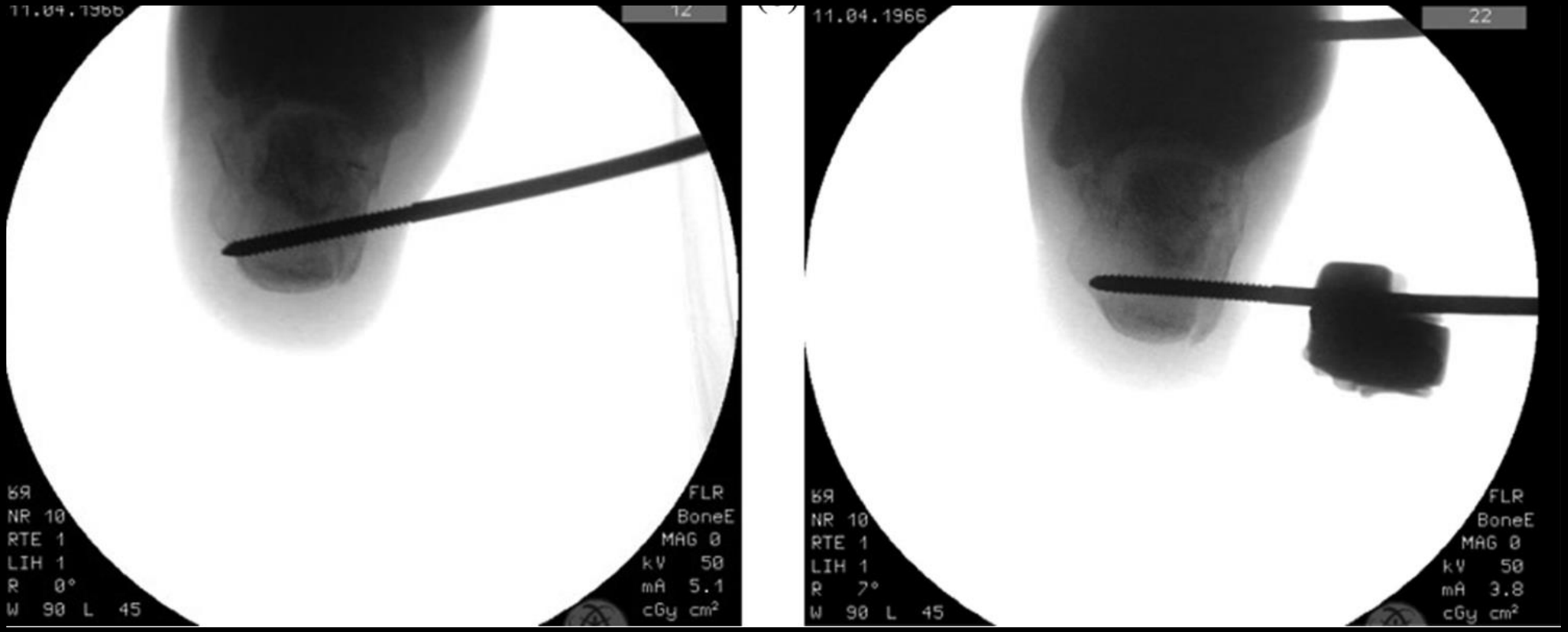

OPEN IN VIEWER


11.04.1966
OPEN IN VIEWER
NR 10
RTE 1
LIH 1
R 355°

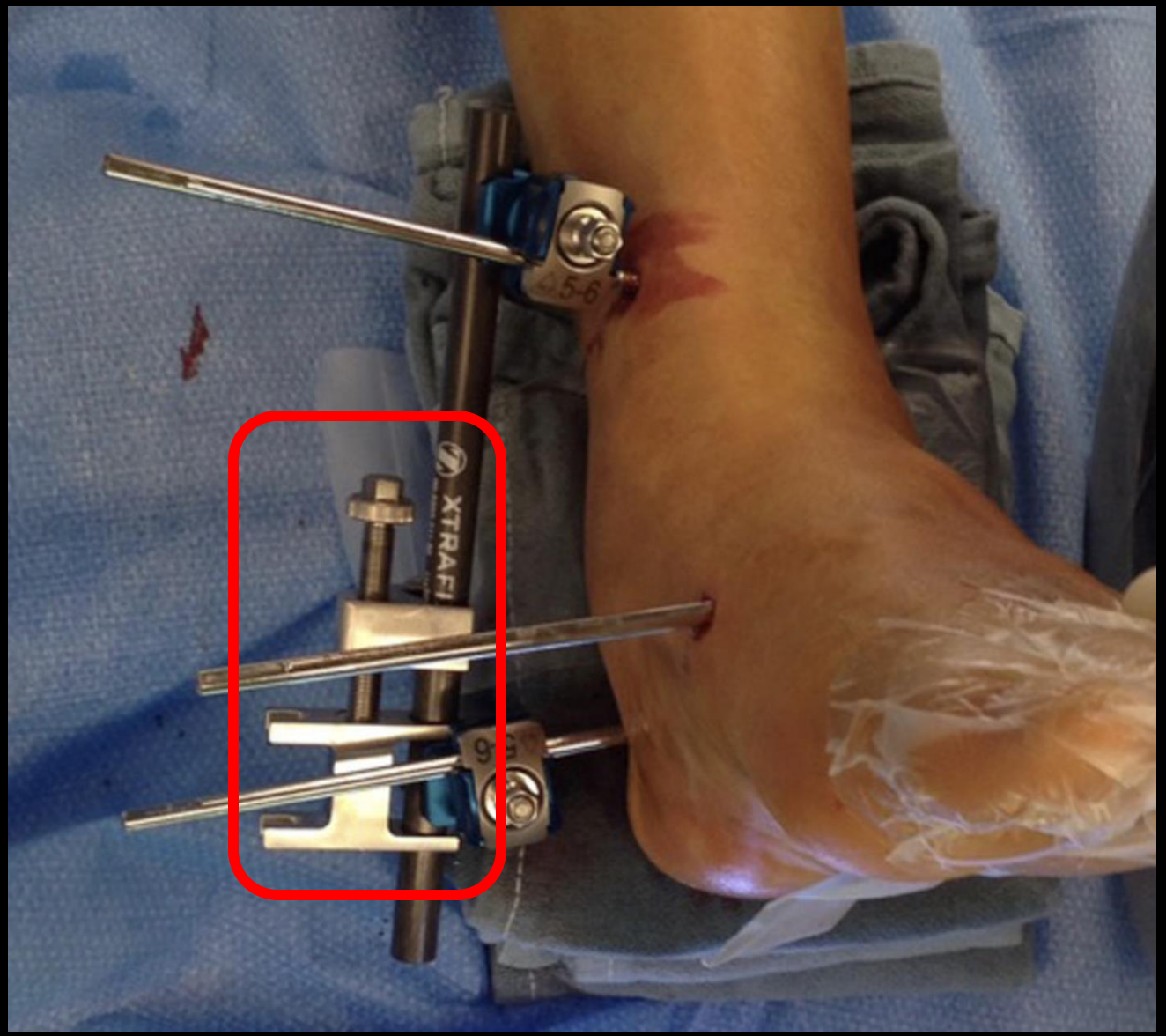

FLR
BoneE
MAG 0
kV 49
mA 4.7
cGy cm²


11.04.1966
NR 10
RTE 1
LIH 1
R 0°
W 90 L 45
FLR
BoneE
MAG 0
kV 47
mA 4.0
cGy cm²

Reduce Varus

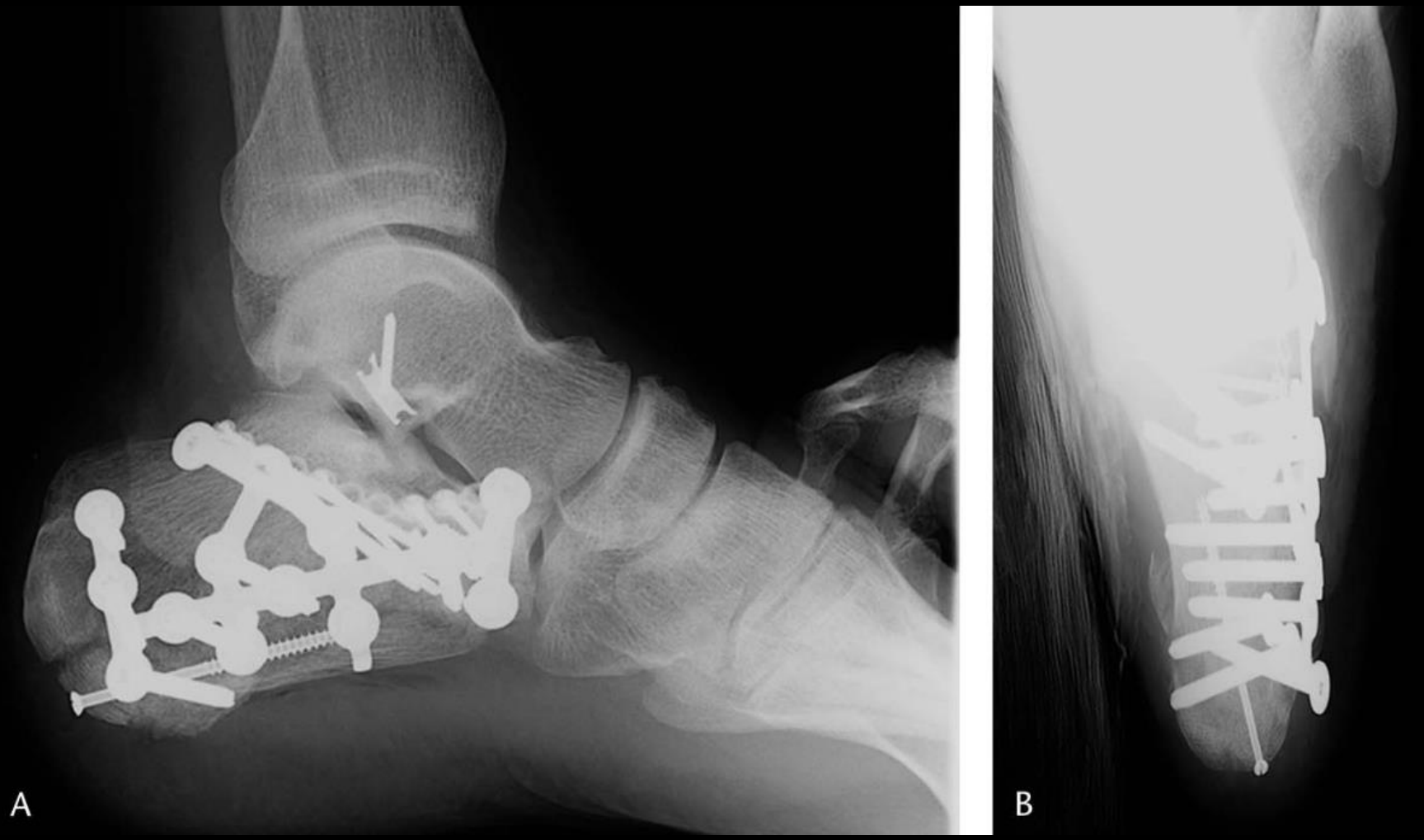


Gain Length/Height




11.04.1966
28
BR
NR 10
RTE 1
LIH 1
R 2°
W 30 L 45
FLR
BoneE
MAG 0
kV 47
mA 4.1
cGy cm²

OR # 2



Similarities to other injuries

Does this sound familiar?

Does this sound familiar?

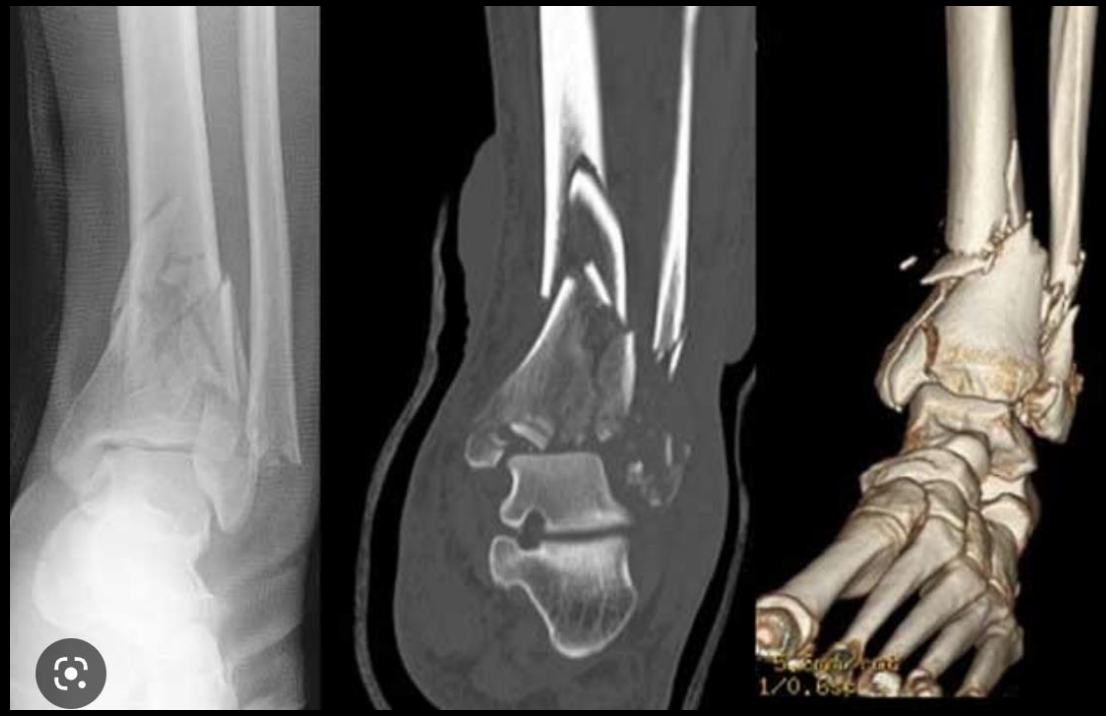
A Staged Protocol for Soft Tissue Management in the Treatment of Complex Pilon Fractures

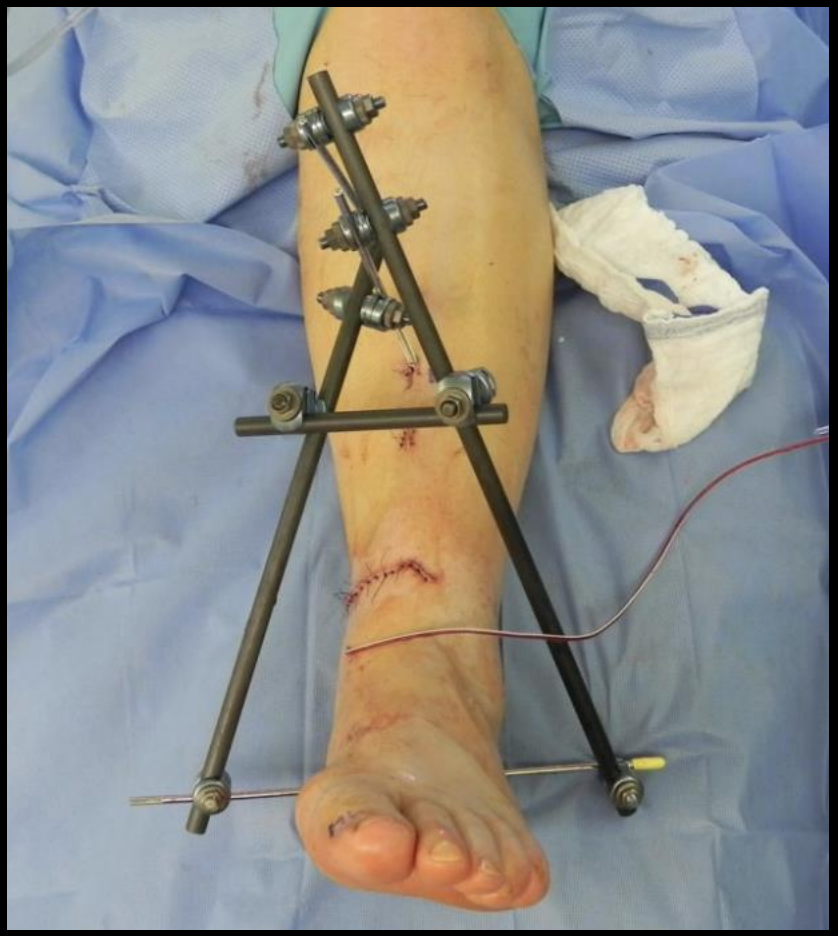
Sirkin, Michael; Sanders, Roy*; DiPasquale, Thomas*; Herscovici, Dolfi Jr.*

Author Information

Journal of Orthopaedic Trauma 13(2):p 78-84, February 1999.

Does this sound familiar?



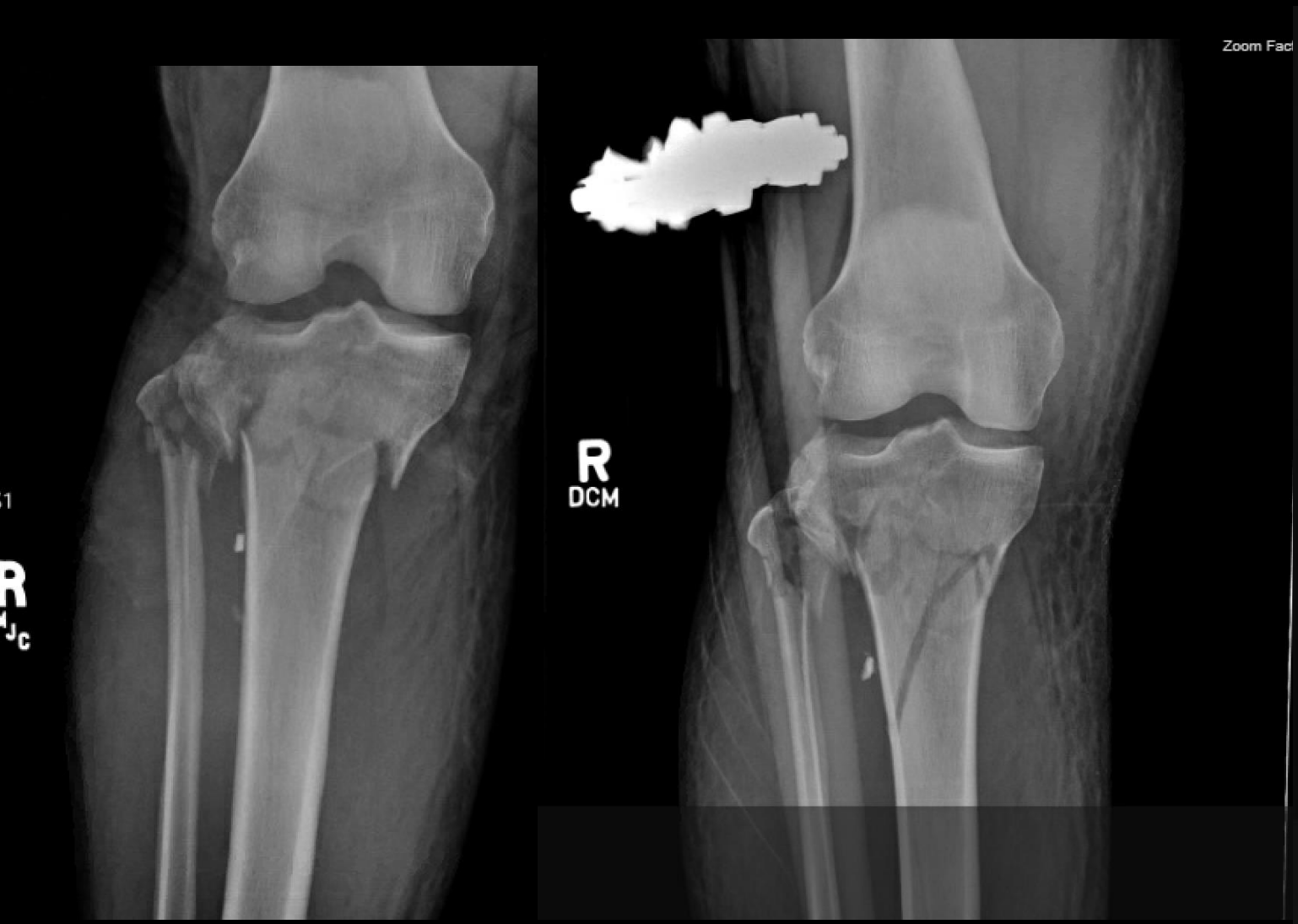


Does this sound familiar?

Staged Management of High-Energy Proximal Tibia Fractures (OTA Types 41)

The Results of a Prospective, Standardized Protocol

Egol, Kenneth A MD*; Tejwani, Nirmal C MD*; Capla, Edward L MD*; Wolinsky, Philip L MD†; Koval, Kenneth J MD‡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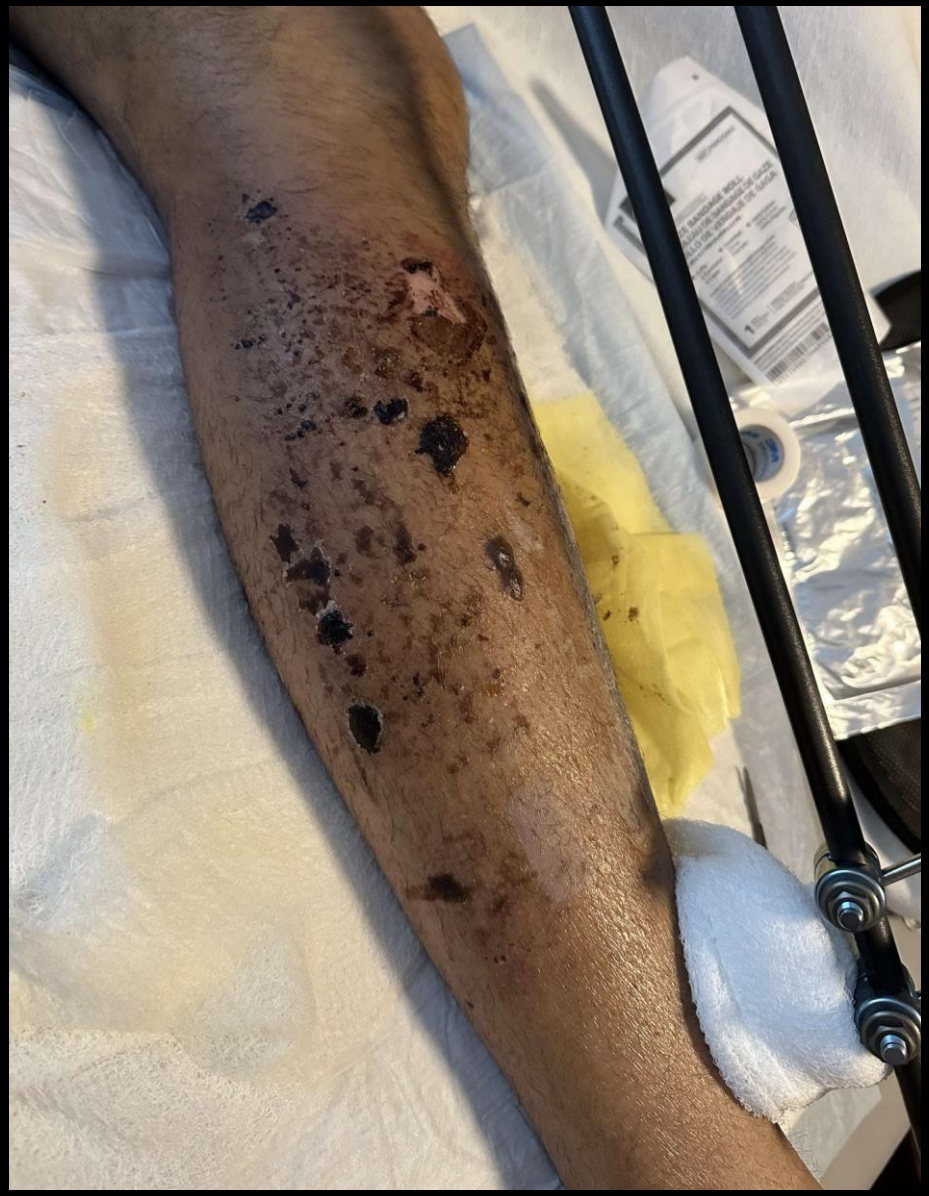
DCM

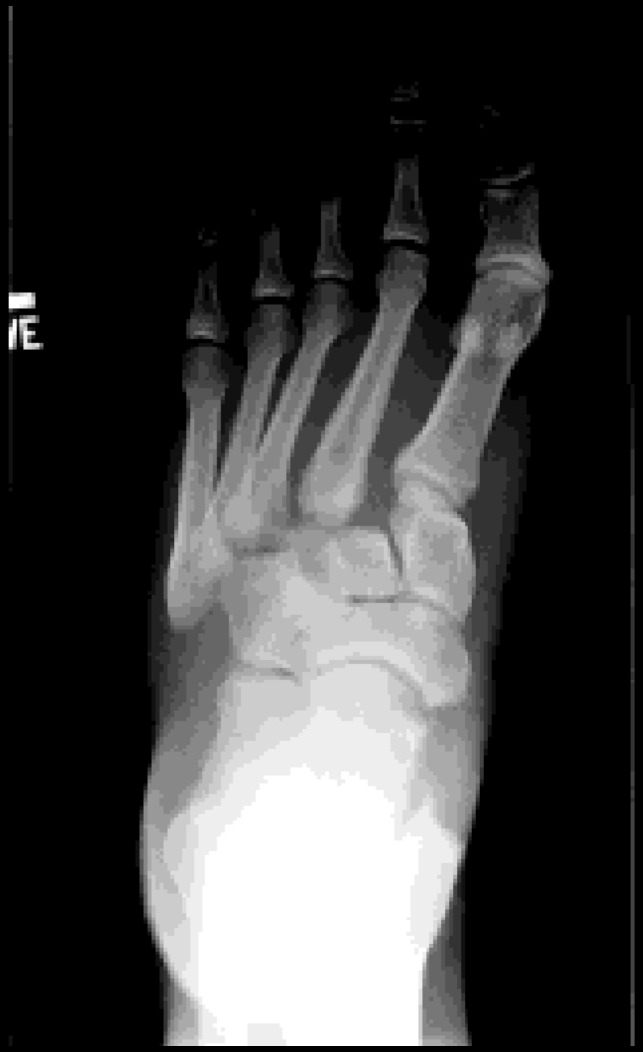


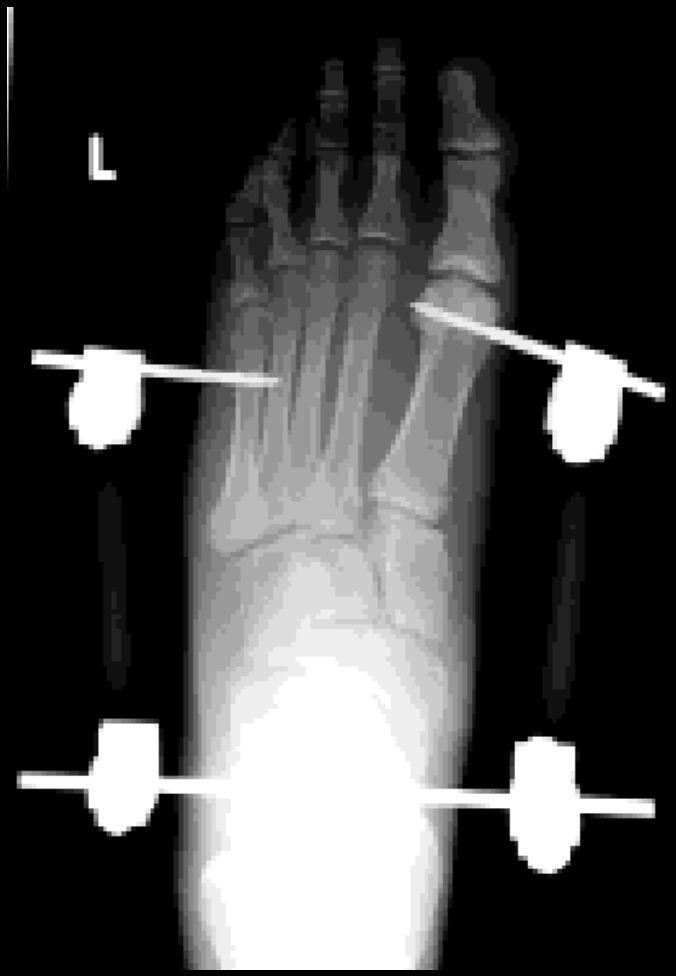
Does this sound familiar?

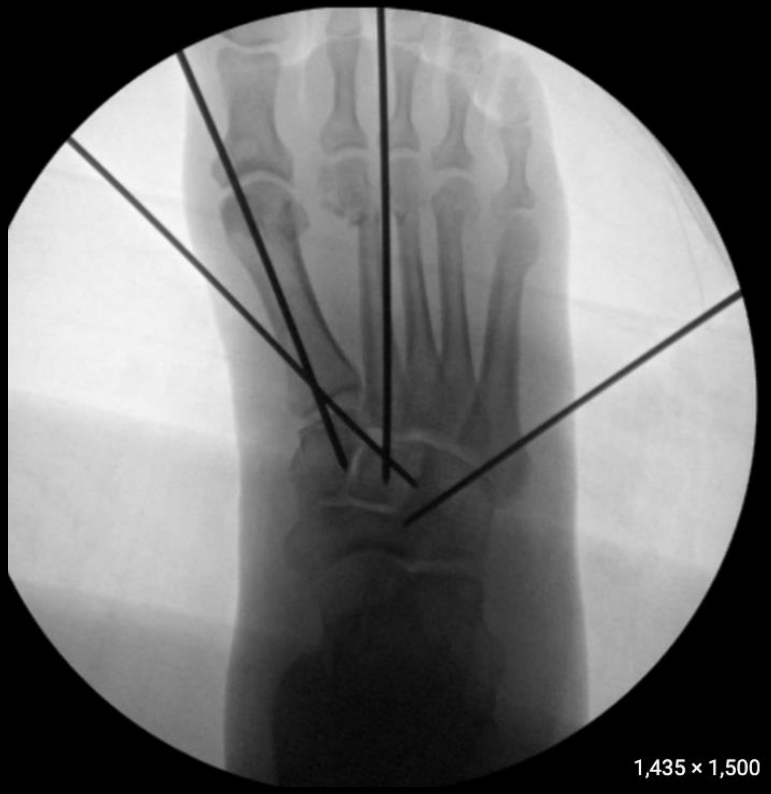
Management of Complex Open Fracture Injuries of the Midfoot With External Fixation

Prakash Chandran MS, AFRCS [1], Ravindra Puttaswamaiah MS [2], Mandeep Singh Dhillon MS [3], Shivender Singh Gill MS [4]

Does this sound familiar?







Outcomes

Outcomes

TABLE 1. Demographics of Patients Treated With a Staged Treatment Plan for Open Calcaneal Fractures

Patients (calcaneus fractures)	14 (14)
Age (range)	41 (29–61)
Mean follow up (months; range)	19 (12–96)
Gender	
Male	12
Female	2
Mechanism of injury	
Motor vehicle collision	9
Fall from height	4
Crush	1
Side	
Right	10
Left	4
Orthopaedic Trauma Association classification	
73B2	2
73B3	2
73C1	2
73C2	1
73C3	7
Gustilo type	
II	4
IIIA	10
Infection	
Superficial	1
Deep	1

Open Calcaneal Fractures

Results of Operative Treatment

Julian M. Aldridge, III, MD, Mark Easley, MD, and James A. Nunley, MD

(*J Orthop Trauma* 2004;18:7–11)

TABLE 1. Results

Case No.	Sex, Age (yrs)	Gustilo Grade (Location of Wound)	Sanders Class	Mechanism of Injury	Comorbid Condition	Soft Tissue Complication or Infection
1	F, 22	I (Medial)	III	MVC	None	No
2	M, 17	IIIB (medial)	IV	MVC	None	No
3	F, 36	IIIB (posterolateral)	III	Lawn mower	None	No
4	M, 18	II (medial)	II	MVC	None	No
5	F, 72	IIIA (medial)	IV	MVC	None	No
6	F, 23	II (medial)	IV	MVC	None	No
7	M, 21	II (medial)	III	MVC	None	No
8	F, 18	II (medial)	II	MVC	None	No
9	F, 68	II (medial)	III	Trip/fall	RA, HTN, tobacco	No
10	M, 20	II (medial)	III	MVC	None	No
11	M, 30	I (medial)	IV	20-ft fall	None	No
12	F, 15	I (medial)	II	20-ft fall	None	No
13	M, 44	II (medial)	III	MVC	None	No
14	M, 26	I (medial)	III	Parachute	None	No
15	M, 32	II (medial)	III	GSW	Psychosis, alcohol	Yes; I&D with abx beads 1/13, 1/22/99
16	M, 33	IIIC (postero medial)	IV	Motorcycle	IV drug use, tobacco	Yes; elective L BKA 7/16/91
17	M, 49	I (medial)	III	Fall	None	No
18	M, 50	IIIB (medial)	III	Industry accident	None	No
19	M, 27	IIIC (medial)	IV	MVC	None	No

Open Fractures of the Calcaneus

A Review of Treatment and Outcome

G. K. Berry, MD, FRCS(C), D. G. Stevens, MD, FRCS(C),† H. J. Kreder, MD, MPH, FRCS(C),†‡§ M. McKee, MD, FRCS(C),†‖ E. Schemitsch, MD, FRCS(C),†‖ and D. J. G. Stephen, MD, FRCS(C)†§*

(*J Orthop Trauma* 2004;18:202–206)

TABLE 1. Demographics for Patients With Functional Evaluation

	Study Group
Infection	
Deep	0
Superficial	2 (9.5)

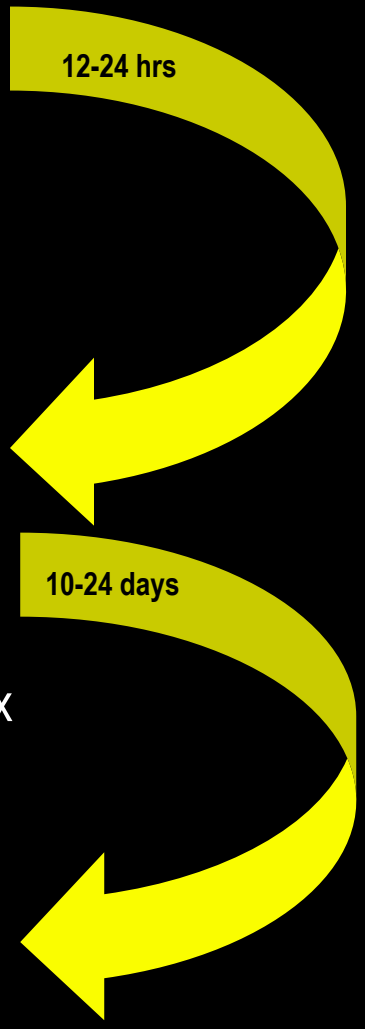
ber of patients ($P > 0.05$). The mean functional scores for patients with plantar wounds tended to be much worse than scores for patients with medial wounds [MFA_F(68.78 versus

TABLE 2. Functional Outcome Score Results

	Study Group (21 Patients/22 Calcanei)
SF-36 Population comparisons	
Physical Component Score	**35.84 (10.11)**
Mental Component Score	50.71 (11.73)
Bodily Pain	**−0.80 (0.64)**
Physical Function	**−1.57 (1.37)**
Role Physical	**−1.46 (1.04)**
Social Function	**−0.57 (1.13)**
General Health	−0.59 (1.27)
Vitality	−0.18 (0.82)
Role Emotional	−0.61 (1.35)
Mental Health	−0.19 (1.09)
Maryland Foot and Ankle Score	
Total	63.48 (17.90)
Pain	62.97 (25.41)
Function	65.43 (17.18)
Mobility	53.33 (29.89)
American Foot and Ankle Society Score	
Total	59.38 (15.40)
Pain	60.71 (18.66)
Function	59.24 (18.89)
Alignment	54.76 (35.02)

Summary

- ER
  - Bedside I&D
  - Tetanus
  - Abx
- OR # 1
  - I&D
  - Temporary fixation
    - Tongue: CRPP
    - Joint depression: Ex fix
- OR # 2
  - Definitive ORIF

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Thank You