Treatment of Ankle Fractures in the Elderly

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Disclosures

- I have no relevant financial relationships to disclose

Objectives

- Prevalence of Geriatric Ankle Fractures
- Challenges and Complications in This Population
- Treatment Strategies
  - Nonoperative management, ORIF, Fibular nail, TTC nail
- Salvage options

Prevalence

- 1 in 3 elderly patients experience at least one fall annually[1]
- Ankle fractures are 3rd most common fracture in geriatric patients[3]
- 0.83% incidence per year in medicare patient population[2]
- Currently, Americans >65 years old account for 15% of the population, expected to grow to 20%+ by 2050[4]
- Result of predisposition to falls and worsening obesity epidemic, not directly a result of poor bone quality.[5]

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Challenges

- Poor bone quality
- Skin
- Comorbidities
  - Peripheral vascular disease
  - Diabetes
- Poor health reserves, difficulty with rehabilitation
- Compliance
  - Dementia?
- Lack social support to return home
  - SNF

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Treatment: Nonoperative

- Diligent skin care
- Frequent radiographs
- Frequent splint/cast changes
- Avoid equinus contracture

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93 year old female

Avoid Equinus Contracture

If there is progressive deformity/loss of reduction → time to think about surgery

Treatment: ORIF

If patient is reasonably healthy, good skin quality, nonsmoker, nondiabetic→ 1st choice

Early weightbearing?

- absence of large displaced posterior malleolus fracture, complete syndesmotic disruption, severe osteoporosis

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Syndesmotic fixation

- Attempt to get four cortices of fixation if using screws
  - Also aids in removal if needed in the future (e.g. ankle replacement)

Schepers et al. Syndesmotic Screw: Where does It Break? COMPLEX INJURIES AROUND THE ANKLE. Dec. 2021

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Treatment: Fibular Nail

- Smaller incision than a plate
- If wound breaks down, do not have a plate directly exposed!
- However, reduction may not be as anatomic


Gravity Stress
L BG
L NR
STANDING
L NR
STANDING

Complications

Dressings/Splinting

- Place Gauze on either side of the incision to minimize pressure
- Splint every patient for 2-3 weeks for wound healing

Lots of padding to prevent pressure ulcers

Beware of neuropathy!

If they walk on it before surgery, they will walk on it after surgery

It's ok to use internal and external fixation at the same time!

Circular/ilizarov frame can be combined with internal fixation if concerns about weightbearing, compliance etc.

Beware of iatrogenic fractures with half pins

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Primary Hindfoot Arthrodesis

- Lower wound complication rate
- Early/Immediate weightbearing
- Lower patient reported outcomes postoperatively[6, 7]
- Should you prepare the subtalar and tibiotalar joints?
  - Lightweight, low demand, elderly patients may do fine without prepping the joint
- Who should you *consider* this option in?
  - Minimally ambulatory (<200m), age >65, ASA > 3, A1c>7.5
  - Mental or physical impairment, ankle arthropathy, alcohol/tobacco abuse, PVD, open fracture > GA1

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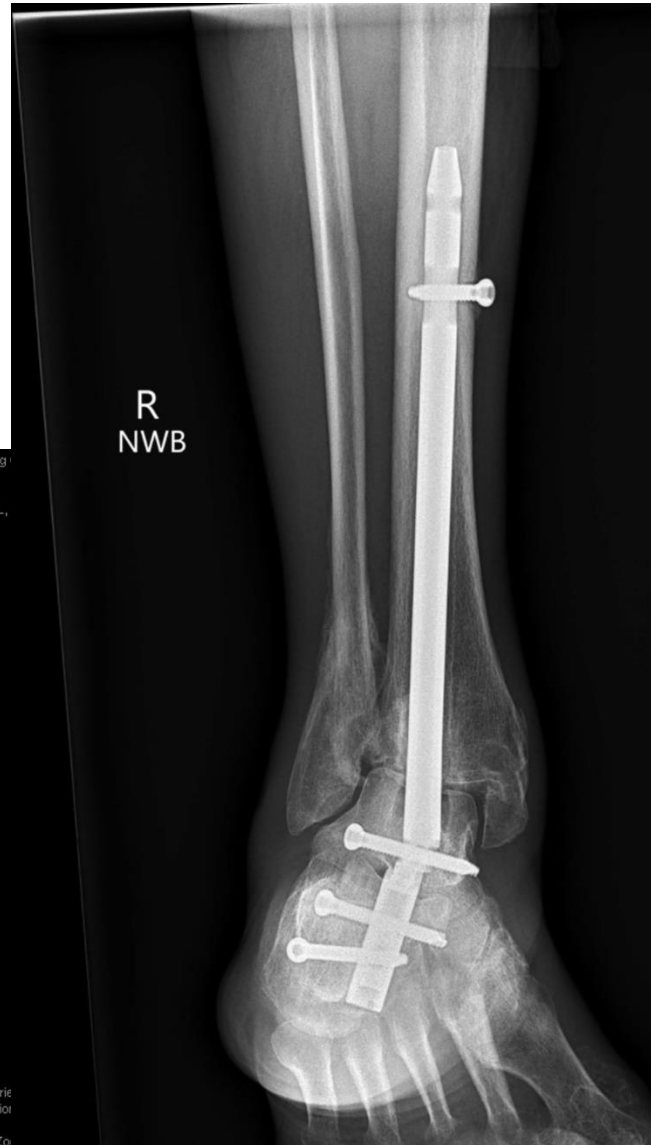
Primary Hindfoot Arthrodesis

- Risks for implant failure[8]
  - Smaller diameter nail (9mm risk for failure, try to get 11mm)
  - Use of only one proximal cross lock screw
  - Diabetes (a1c > 7.5)
  - Increased patient activity level

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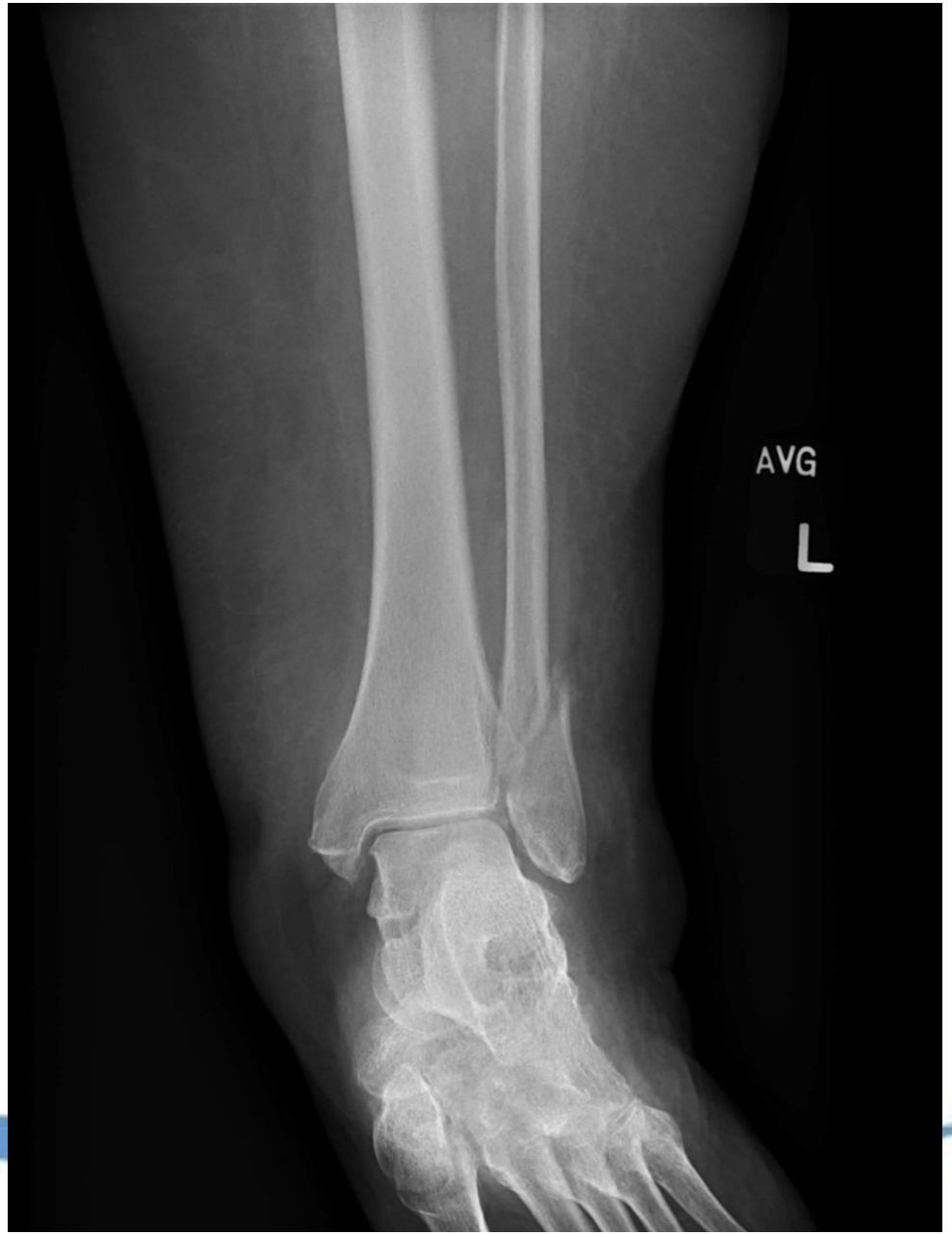
AVG
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72 yo F, presents 9 months out from injury


12:52:32 PM
21954241
CYCHOSZ
10/26/1946
28
30
66 kVp
1.90 mA
2
OEC


1:09:12 PM
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NWB
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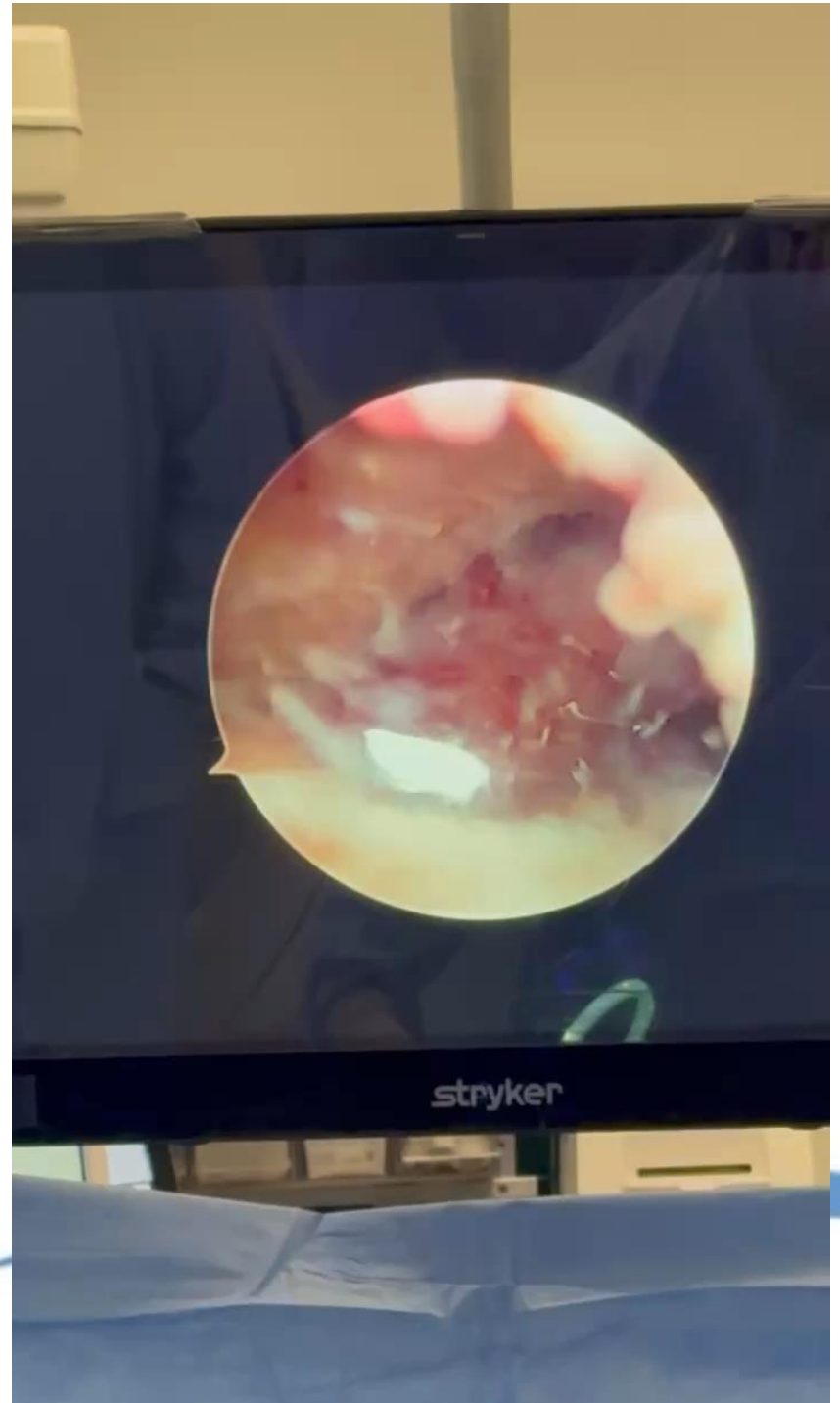
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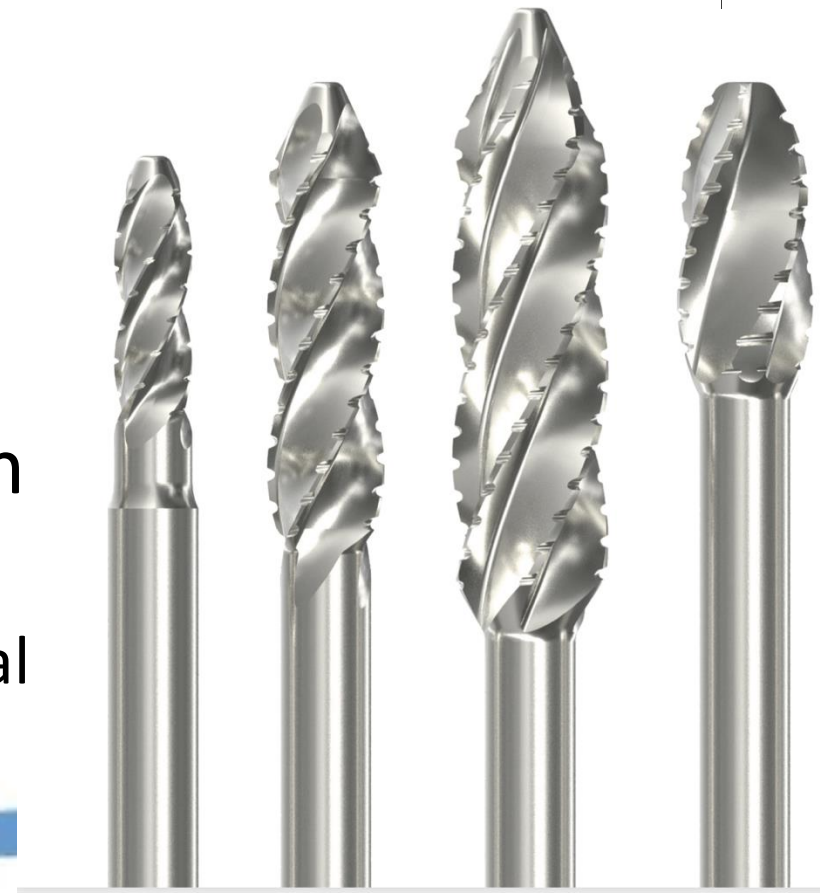
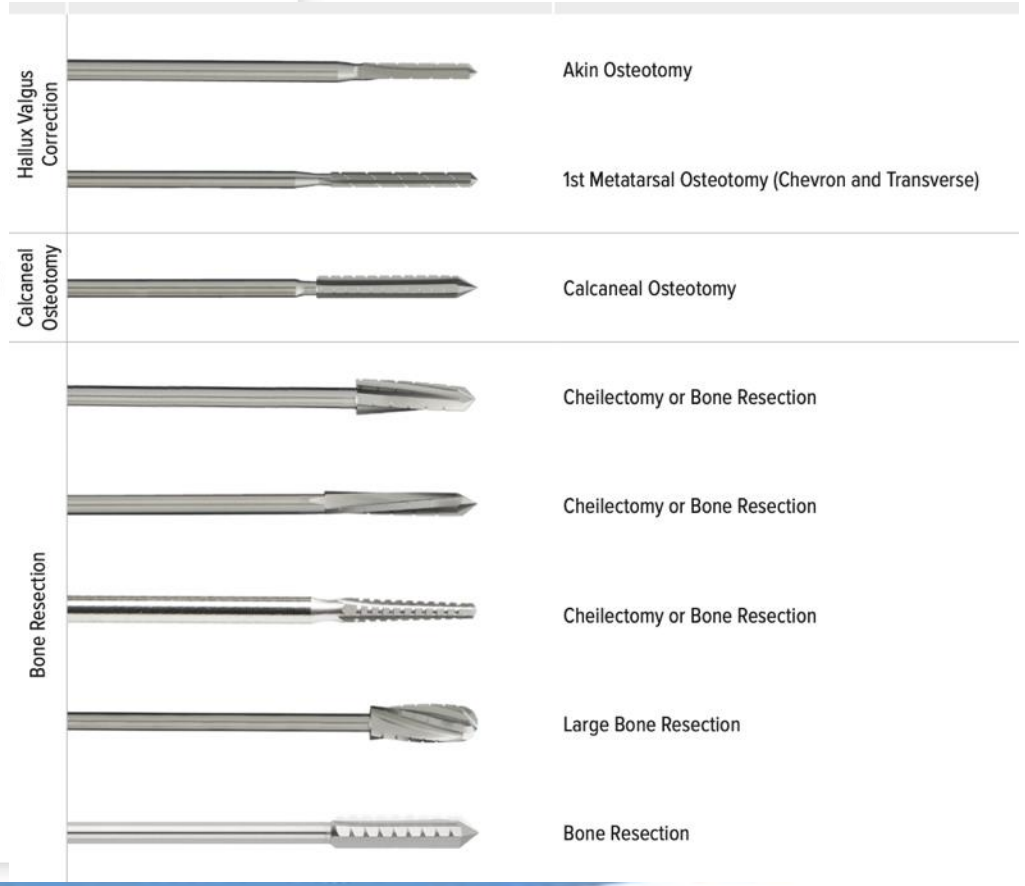
MIS Burr is Useful!

- Osteotomies
- Joint prep
- Low speed, high torque
  - minimal thermal injury to bone





MIS Joint Prep

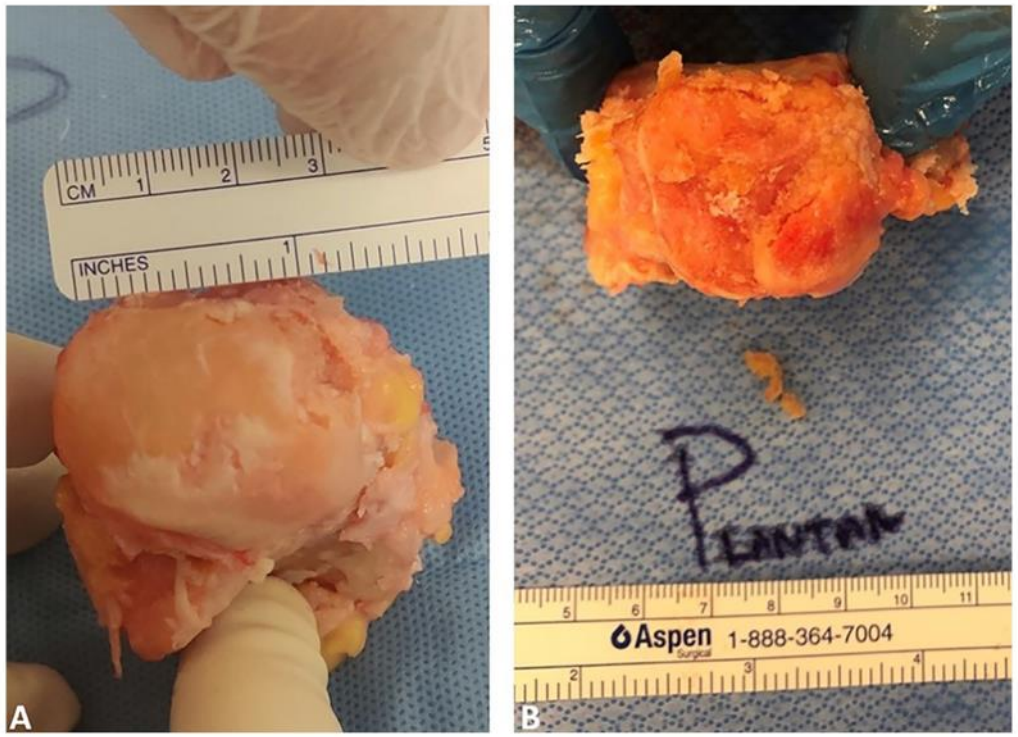


Figure 4. Representative images of the talar head joint preparation. (A) Open technique. (B) MI
MIS, minimally invasive surgery.

Five cadaveric samples of the foot and ankle were prepared using the open technique, and 10 cadaveric samples were prepared using the MIS technique. The median and interquartile range (IQR) percentage of joint surface prepared for each facet can be found in Table 1.

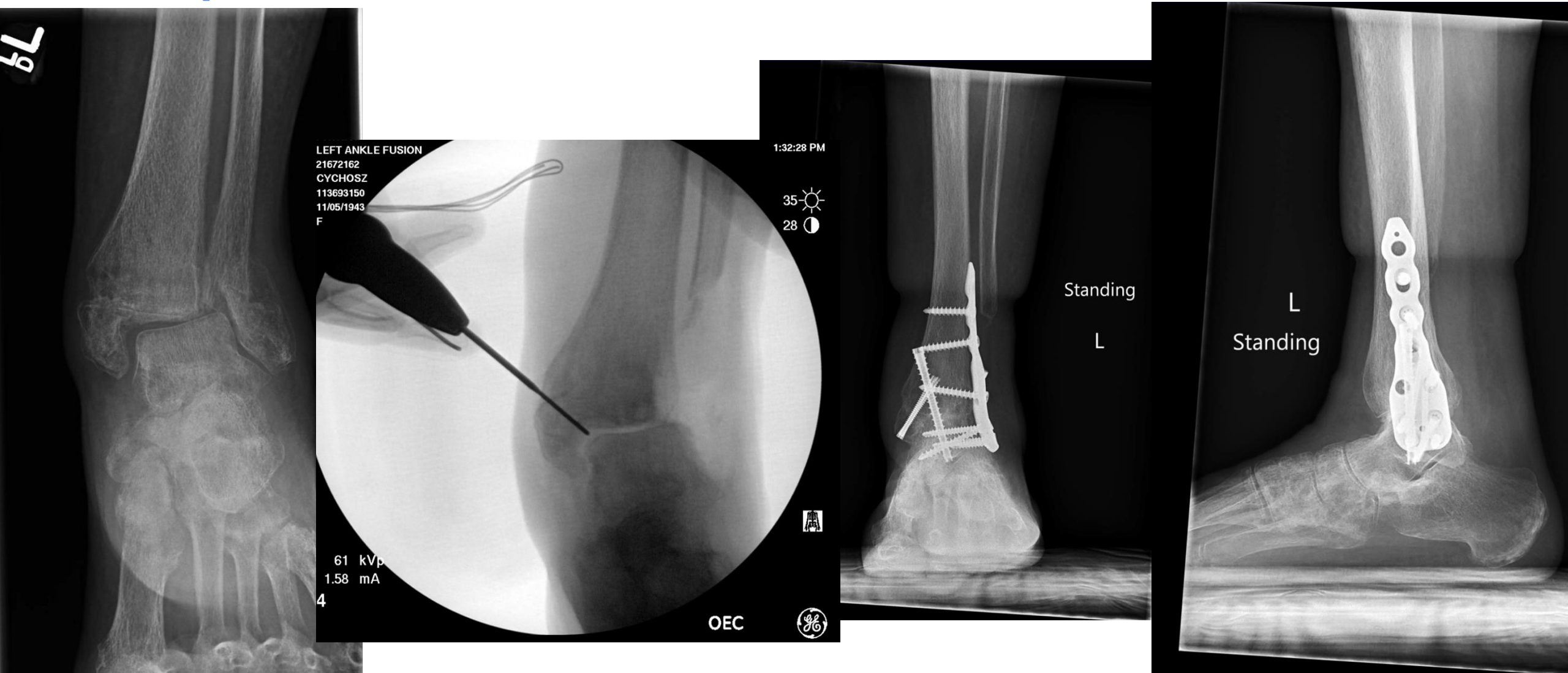
Table 1. Median Percentages of Joint Surface Prepped for Open and MIS Techniques.

Joint	Bone	Open Technique, %	IQR, %	MIS Technique, %	IQR, %	*P* Value[a]
Ankle	Tibia	69.4	67.5-75.3	87.8	82.3-95.4	.090
	Talus	82.5	80.0-83.8	81.6	74.7-85.3	>.999
Subtalar	Talus	73.8	68.7-77.3	75.8	71.8-84.1	.322
	Calcaneus	62.5	51.9-76.1	76.6	68.5-80.8	.322
CC joint	Calcaneus	75.6	69.2-79.1	82.5	77.3-89.1	.157
	Cuboid	79.0	68.0-81.4	92.6	84.5-99.3	**.048*****
TN joint	Talus	76.2	69.9-79.8	83.5	81.2-91.2	**.048*****
	Navicular	81.8	80.3-87.4	75.7	69.7-84.7	.258
NC joint	Navicular	72.3	58.2-81.3	81.7	71.3-92.3	.157
	Cuneiforms	73.2	70.6-75.3	77.9	65.2-88.2	.572
TMT joint	Cuneiforms	66.2	63.6-66.7	71.8	65.3-85.4	.280
	First MT	77.7	70.3-85.4	85.0	69.0-92.7	.671
	Second-third MT	62.4	55.1-70.6	83.8	65.9-92.7	.090
Hallux MTP joint	MT	76.4	64.4-86.6	77.8	67.7-87.8	.777
	Proximal phalanx	83.6	80.6-87.7	99.3	74.7-100.0	.877
Hallux IP joint	Proximal phalanx	82.8	72.7-88.1	75.4	69.1-93.5	.888
	Distal phalanx	89.7	77.9-97.4	82.5	67.0-97.9	.724

Abbreviations: CC, calcaneocuboid; IP, interphalangeal; IQR, interquartile range; MIS, minimally invasive surgery; MT, metatarsal; MTP, metatarsophalangeal; NC, naviculocuneiform; TMT, tarsometatarsal; TN, talonavicular.
[a]*P* values are for the Wilcoxon rank-sum test.
***Statistically significant values denoted.

Quality of MIS vs Open Joint Preparations of the Foot and Ankle
John Z. Zhao, MD, Philip B. Kaiser, MD, Christina DeGruccio, BS, Evan M. Farina, MD, Christopher P. Miller, MD, MHS

83 yo F with malunion, medial skin compromised



Summary

- **<u>Watch out for neuropathy!!</u>**
- Use **minimally invasive** techniques when possible
- Add a **circular frame** if needed to protect your construct
- If treating with cast immobilization, **avoid equinus** contracture
- Social support/rehab potential is important
- These patients are deconditioned
  - Blood flow restriction therapy (BFR)
- If **choosing primary hindfoot arthrodesis, the first shot is the best shot at fusion**
- Follow closely for complications

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