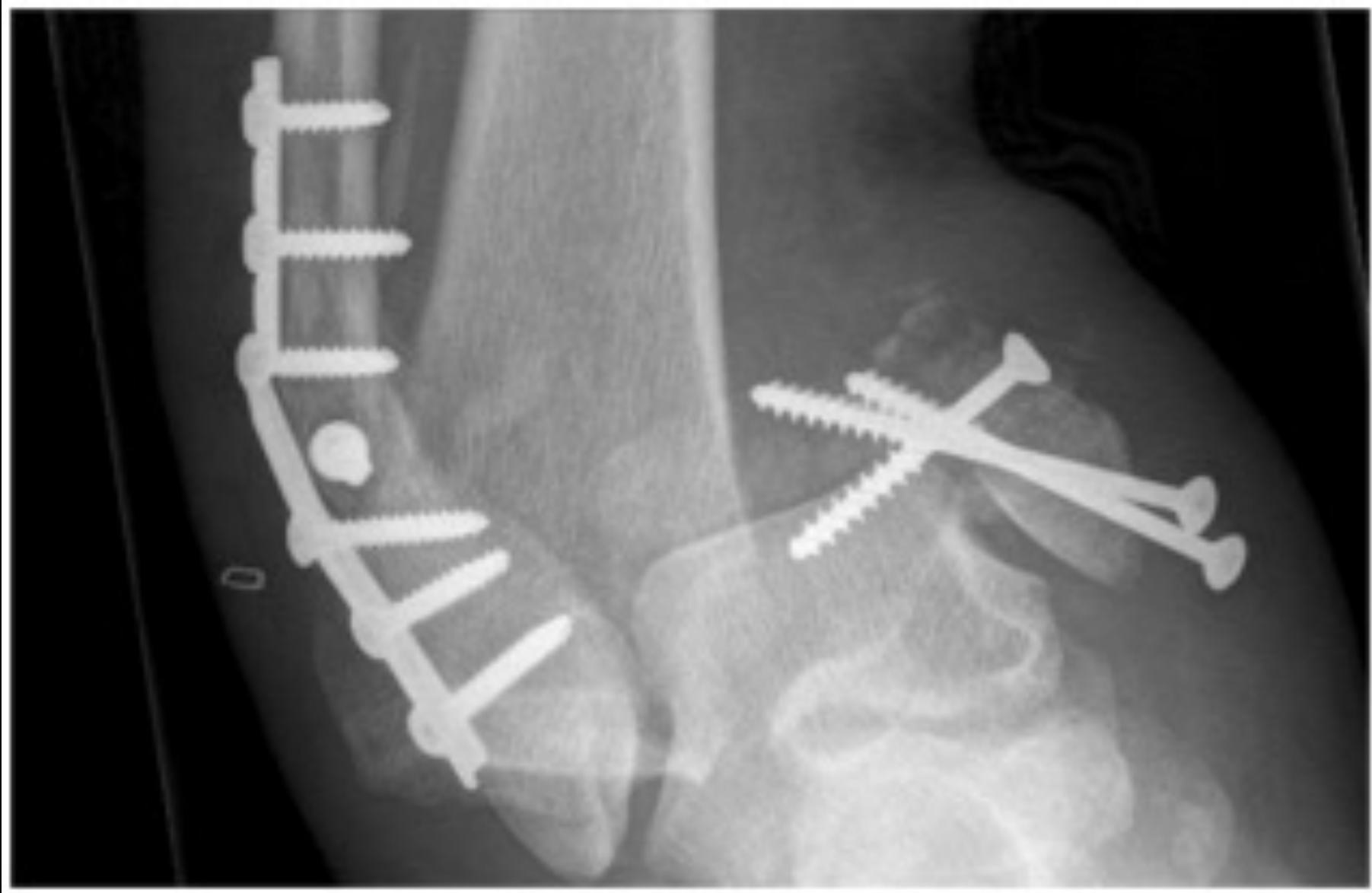


Complex malleolar fractures



Complex malleolar fractures

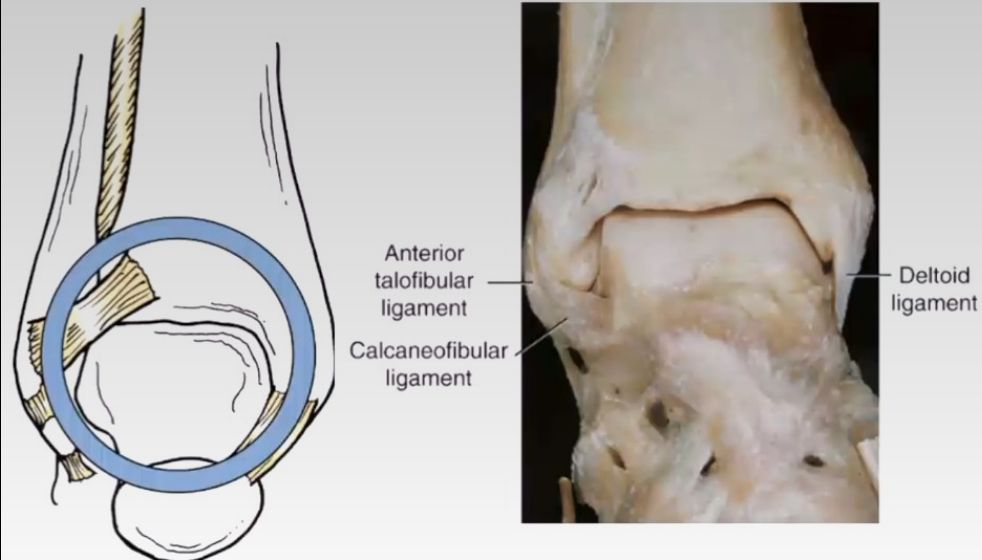


Dr. Mohamed Mokhtar Abd-Ella

AO Trauma Advanced Principles Course

“Volumes have been written regarding ankle fractures”

Anatomy



Complex malleolar fractures

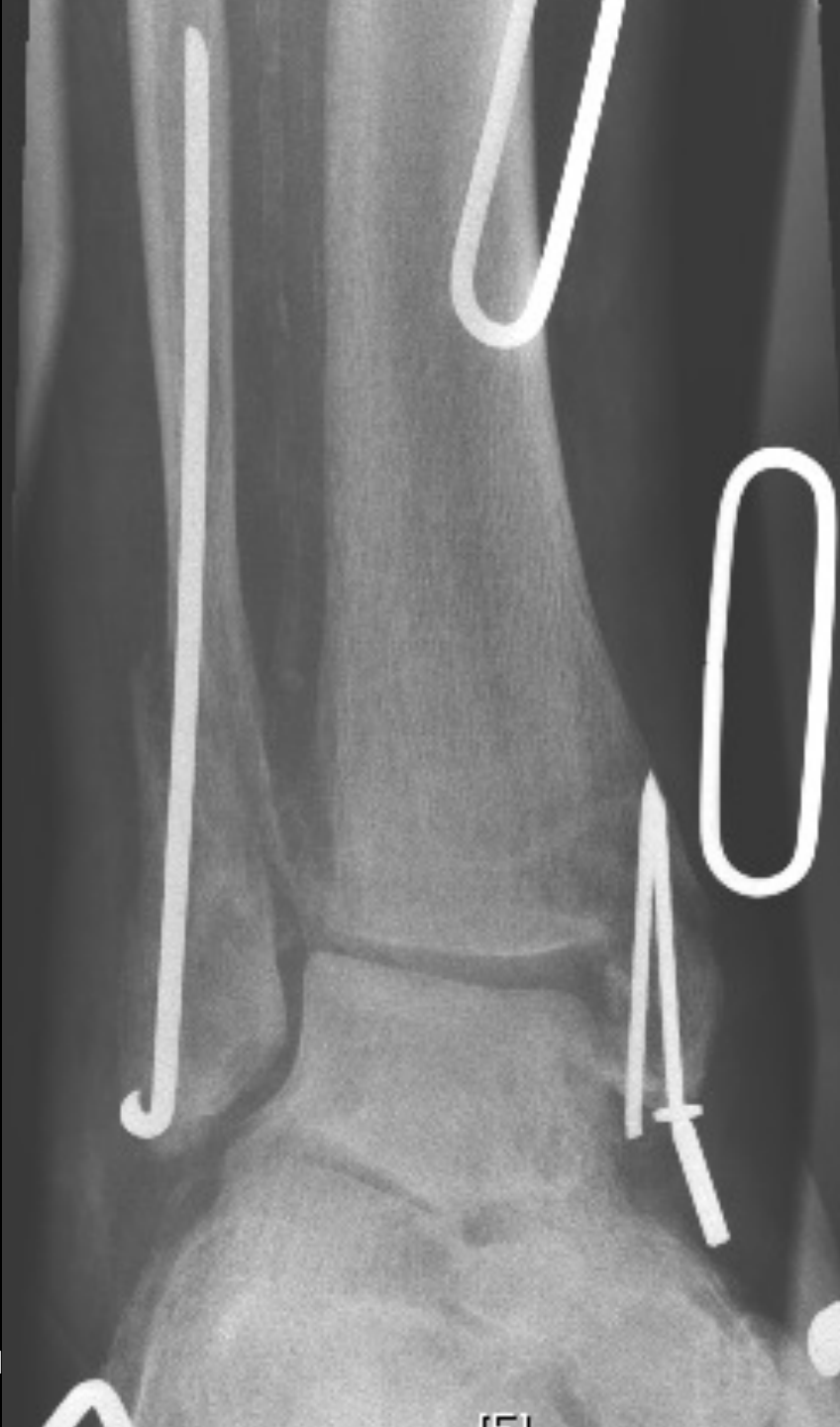






Male
Age 79
Non-smoker
NIDDM
Angiopathy
Neuropathy
Nefropathy, hemodialysis
Cardiomyopathy
Obese (97 kg)
Mobilised with rollator





Se:3
Im:2

OLSEN, ERIC, K
Study Date:12-04-
Study Time:18:2
MRN:071032

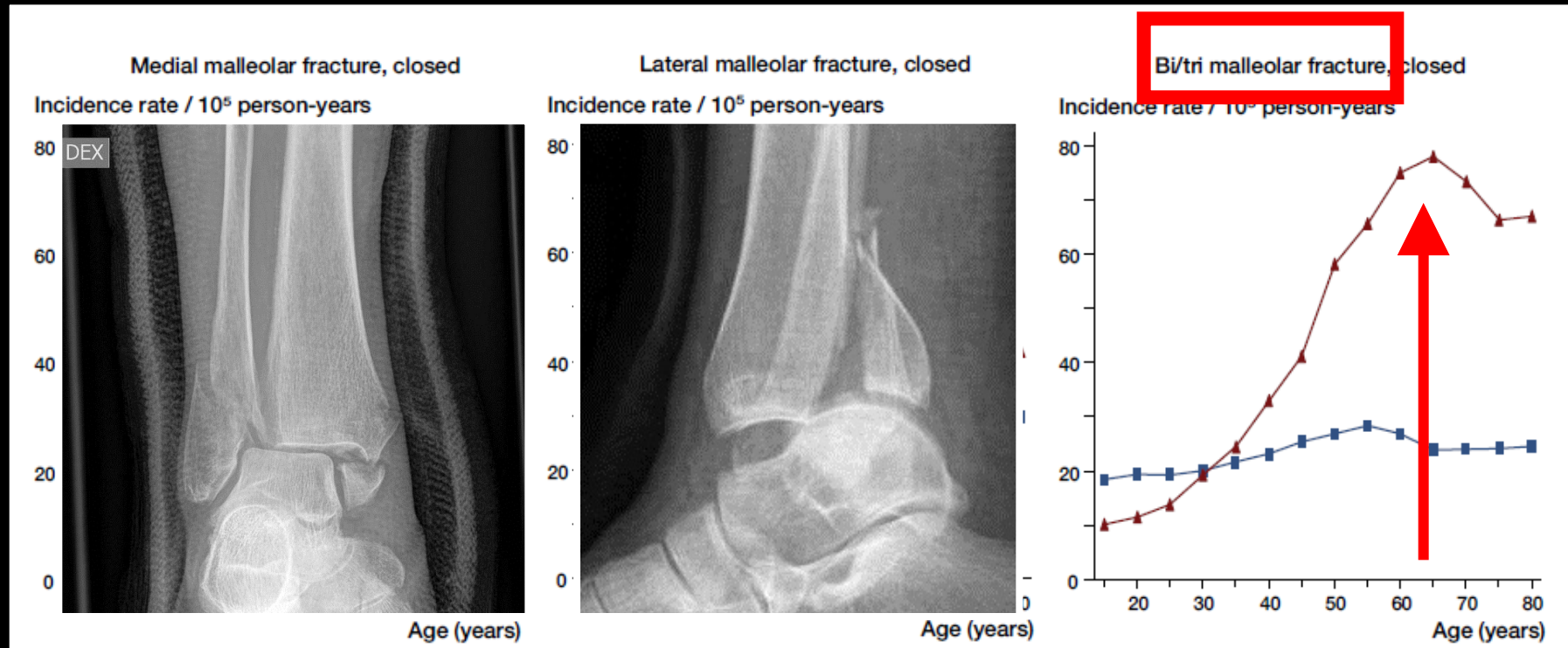
7 weeks later



HØJRE AP

Lasse Bayer Hillerød Hospital 2012

C
W



Thur et al. Acta Orthop 2012



Red flags

- Geriatric patient (poor bone quality)
- Diabetes
- Smoking
- Alcohol abuse
- Obesity
- Compromised soft tissue

COMPLICATIONS IN
ANKLE FRACTURE
SURGERY



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*

Based on our results, demonstrating equivalent functional outcomes with operative and nonoperative care, older and less active individuals are likely to be safely treated with immobilization. In younger patients, the observed risk of misalignment supports a consideration of operative intervention.



Primum non nocere

The Bovill Award Paper
Best Paper 2010 OTA Annual Meeting

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*

Based on our results, demonstrating equivalent functional outcomes with operative treatment in active individuals, early mobilization. In younger patients, this supports a consideration of operative treatment.



AO SURGERY REFERENCE Search... (approaches, preparations, etc) Login

1 Home 2 Skeleton 3 Diagnosis 4 Indications 5 Treatment

2/8 - Reduction

[All approaches](#) [All preparations](#) [All further reading](#)

Authors of section
Authors
Paulo Barbosa, Felix Bonnaire, Koki Kojima
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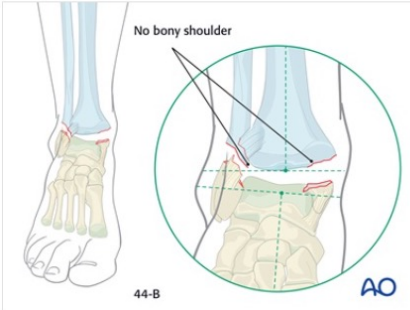
No bony shoulder

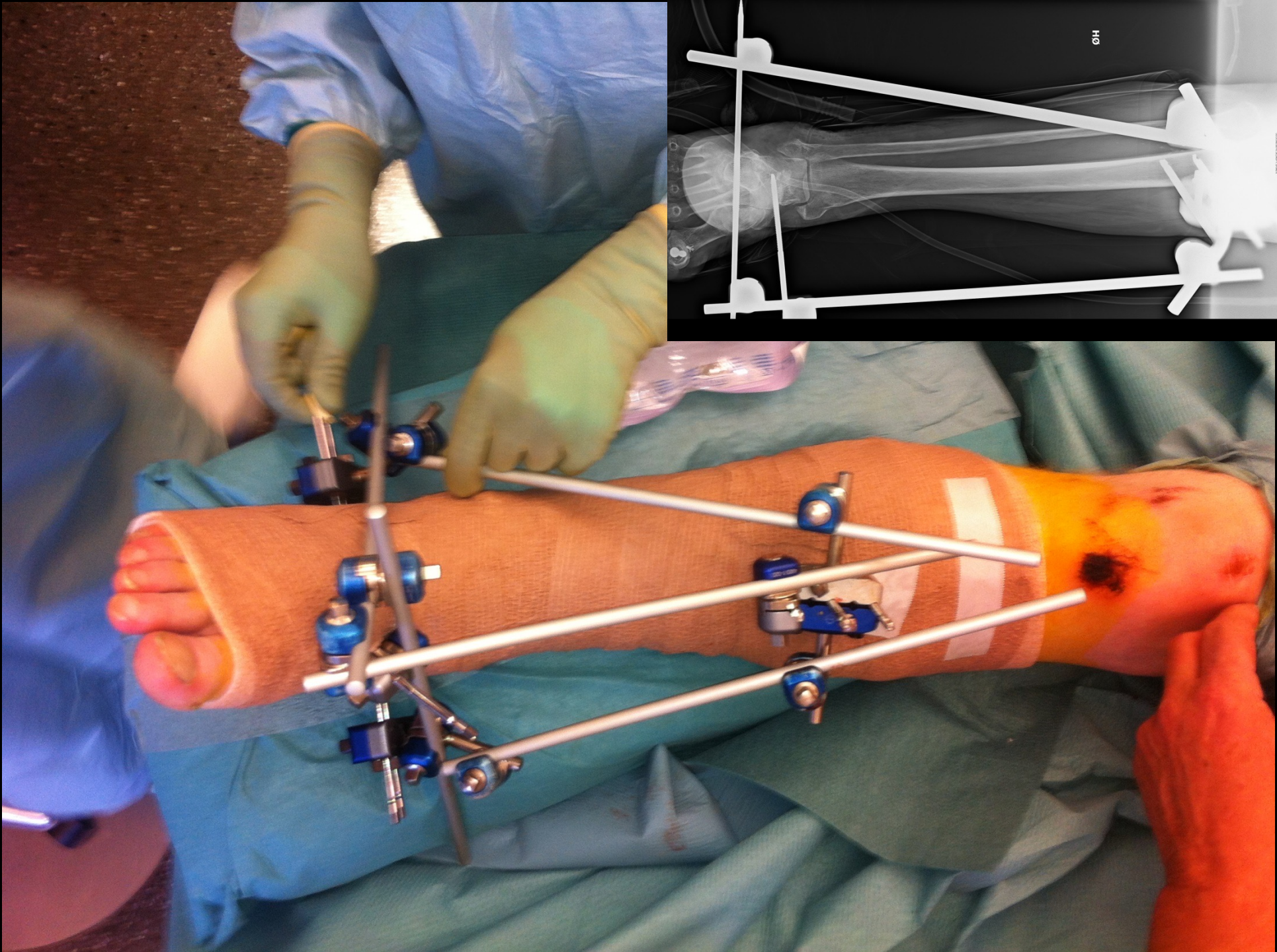
In some patterns of transyndesmotom fractures the medial malleolar fracture is flush with, or above, the joint level, and no medial shoulder remains against which to reduce the talus. In these injuries, there is rarely a lateral (fibular) shoulder.

Reduction of fracture with a medial shoulder present

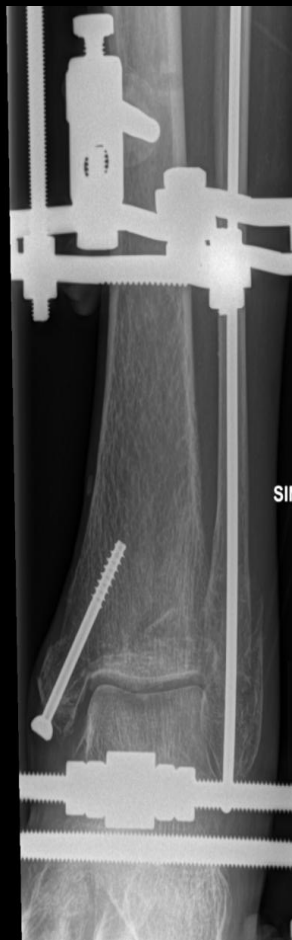
Firstly, the posterior displacement is corrected.

A plantigrade position of the foot is important, but needs to be achieved by manipulation of the hindfoot downwards, forwards and correcting any external rotation, rather than pushing upwards on the forefoot.







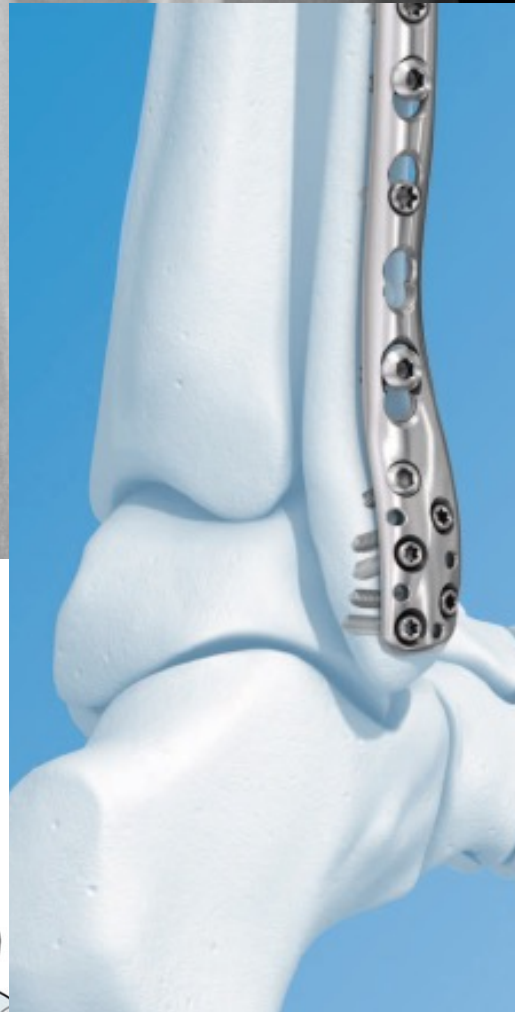
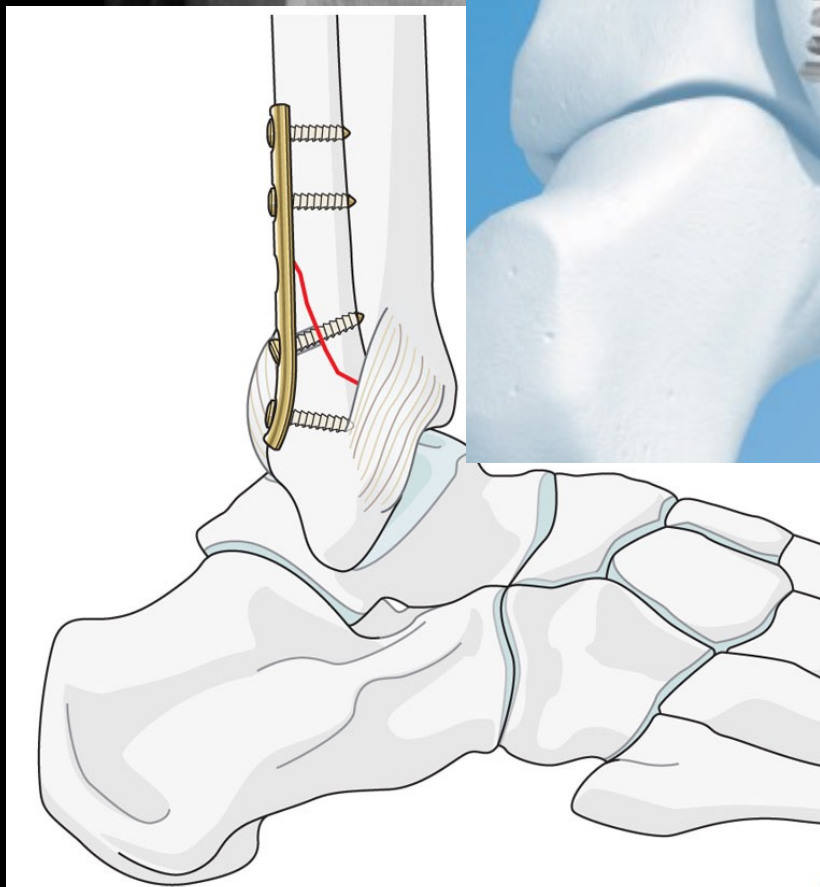




NOT in osteoporotic bone









1. Kort klinisk retningslinje vedr.

Behandling af dislocerede, ustabile ankelfrakture hos patienter > 70 år – åben reposition og fiksatoren med skinne og skruer eller marvsøm?

✓ God praksis:

Der foreligger **ikke tilstrækkelig evidens** for at ældre over 70 år med ustabil ankelfraktur har bedre effekt af lukket eller åben reposition osteosynteret med marvsøm sammenlignet med åben reposition og intern fiksatoren med skinner og skruer.

Der er ingen studier, der kan påvise signifikant forskel i funktionelt outcome, mens der er modstridende resultater for reoperationer pga infektioner eller materialesvigt/fjernelse.

Evidensen på området er meget lav og arbejdsgruppen **anbefaler derfor at overveje minimalt invasive metoder individuelt**, hvis bløddels forhold og komorbiditet tilsiger dette.

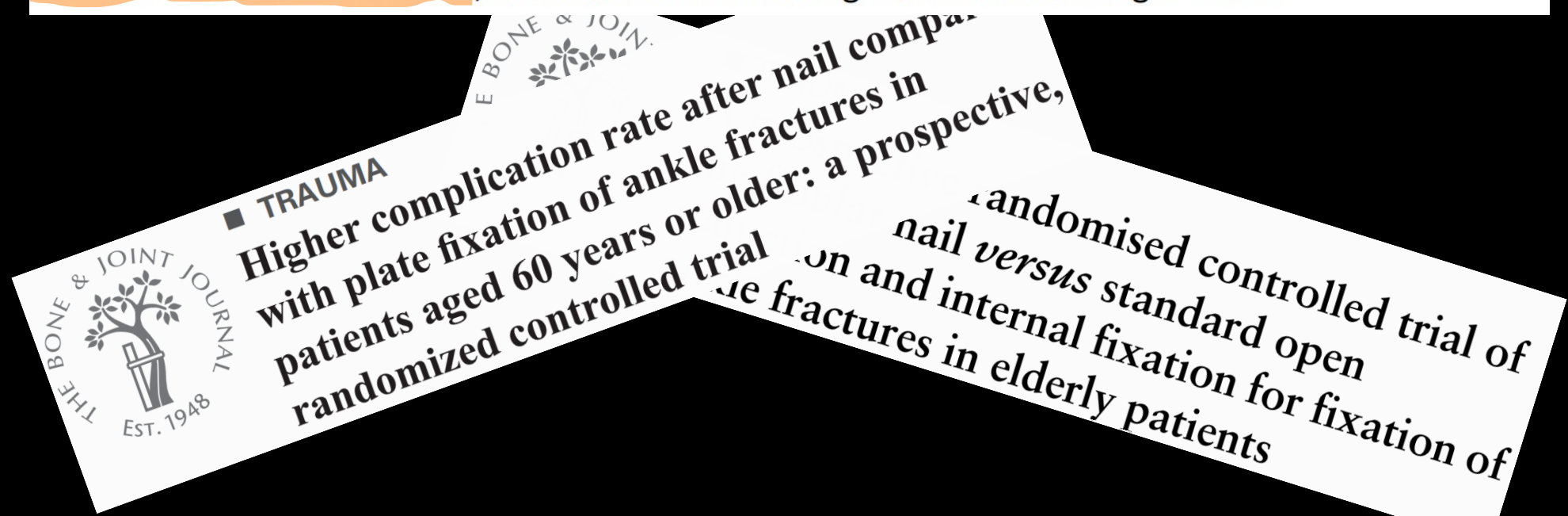
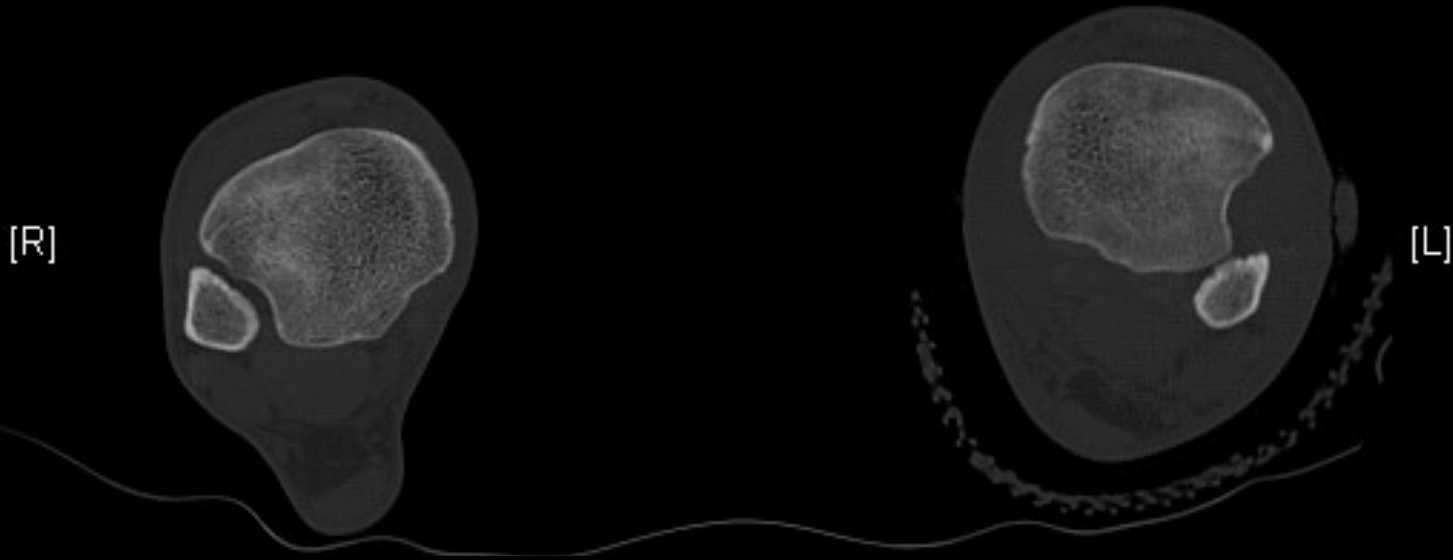




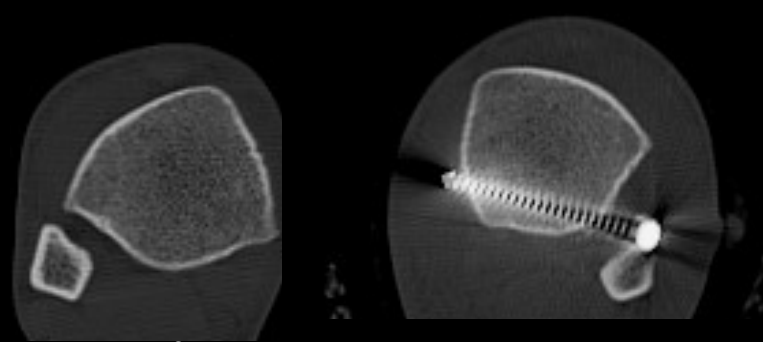
Figure 1: Lateral X-ray of the knee joint showing a large, well-defined, rounded, radiopaque mass in the suprapatellar region, consistent with a Baker's cyst.

Syndesmotic injury

Tips and tricks



The syndesmosis Malreduction



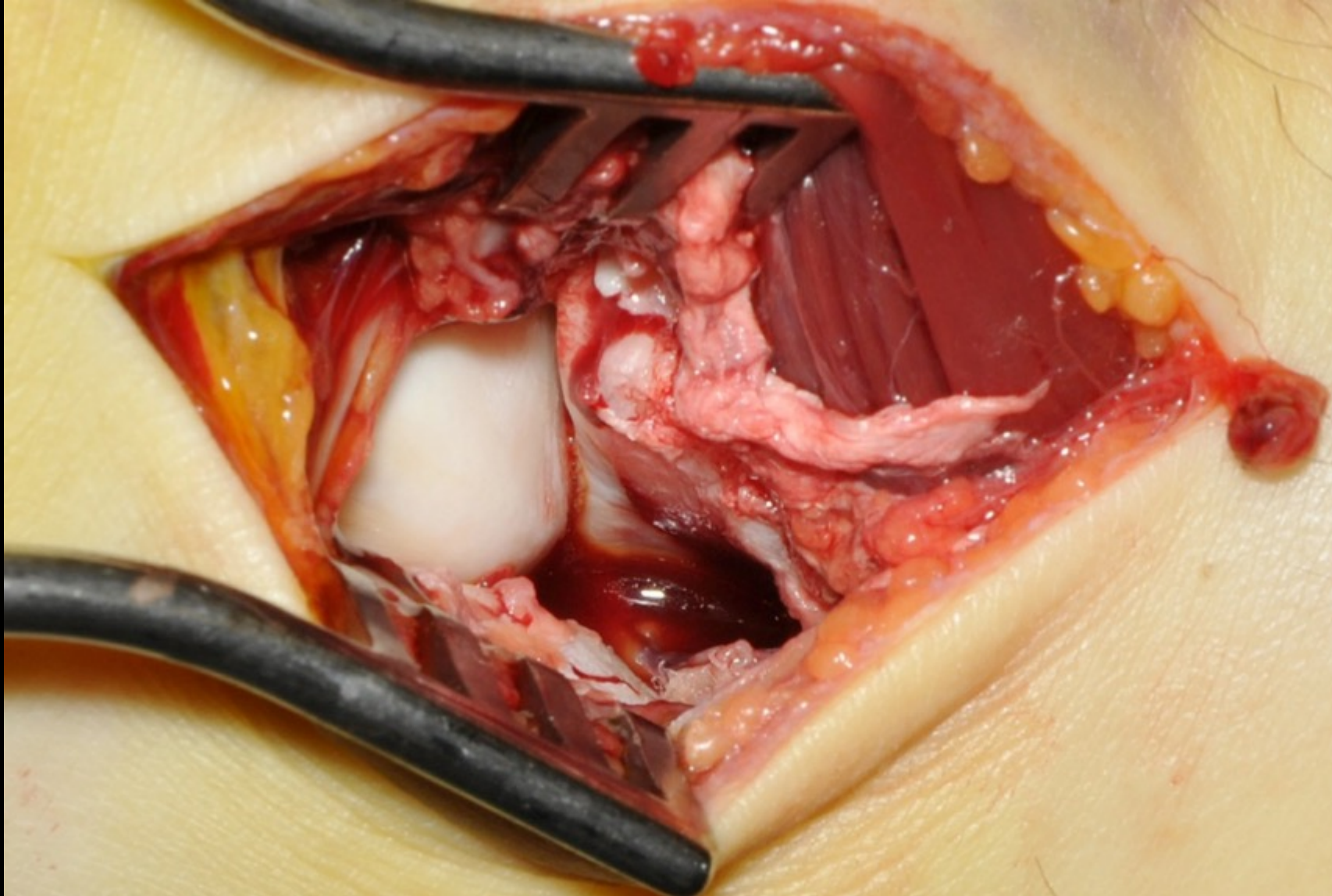
- Weening B, Bhandari M: Predictors of functional outcome following transsyndesmotoc screw fixation of ankle fractures. J Orthop Trauma 2005;19(2): 102-108.
16%
- Sagi HC, Shah AR, Sanders RW: The functional consequence of syndesmotoc joint malreduction at a minimum 2-year follow-up. J Orthop Trauma 2012;26(7): 439-443.
39%
- Gardner MJ, Demetrakopoulos D, Briggs SM, Helfet DL, Lorch DG: Malreduction of the tibiofibular syndesmosis in ankle fractures. Foot Ankle Int 2006;27(10):788-792
52%
- Franke J, von Recum J, Suda A J, Grützner P A, Wendl K: Intraoperative three-dimensional imaging in the treatment of acute unstable syndesmotoc injuries. J Bone Joint Surg Am 2012;94(15):1386-1390.
25,5%

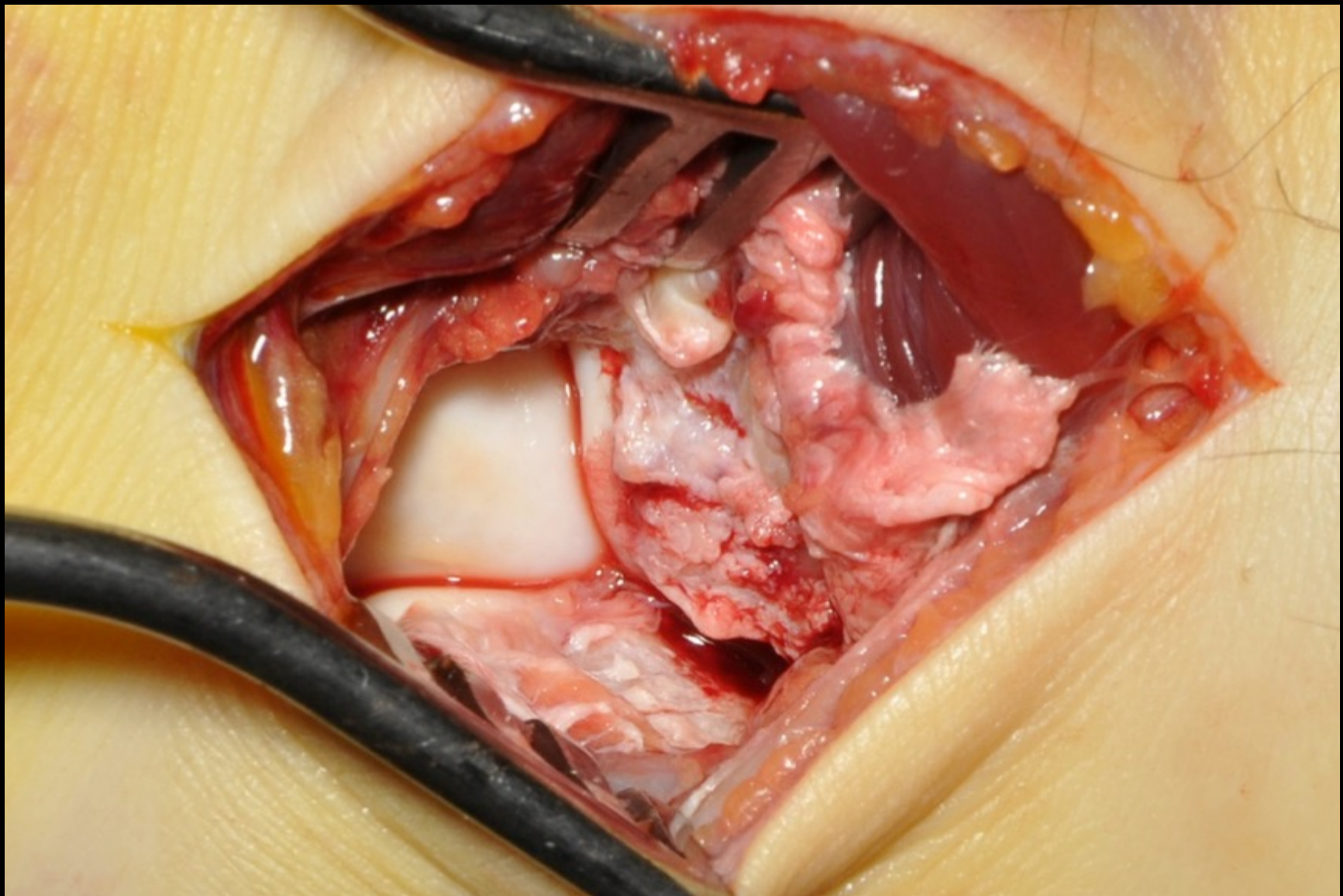
Accurate reduction of the syndesmosis is a major factor in the resulting outcome

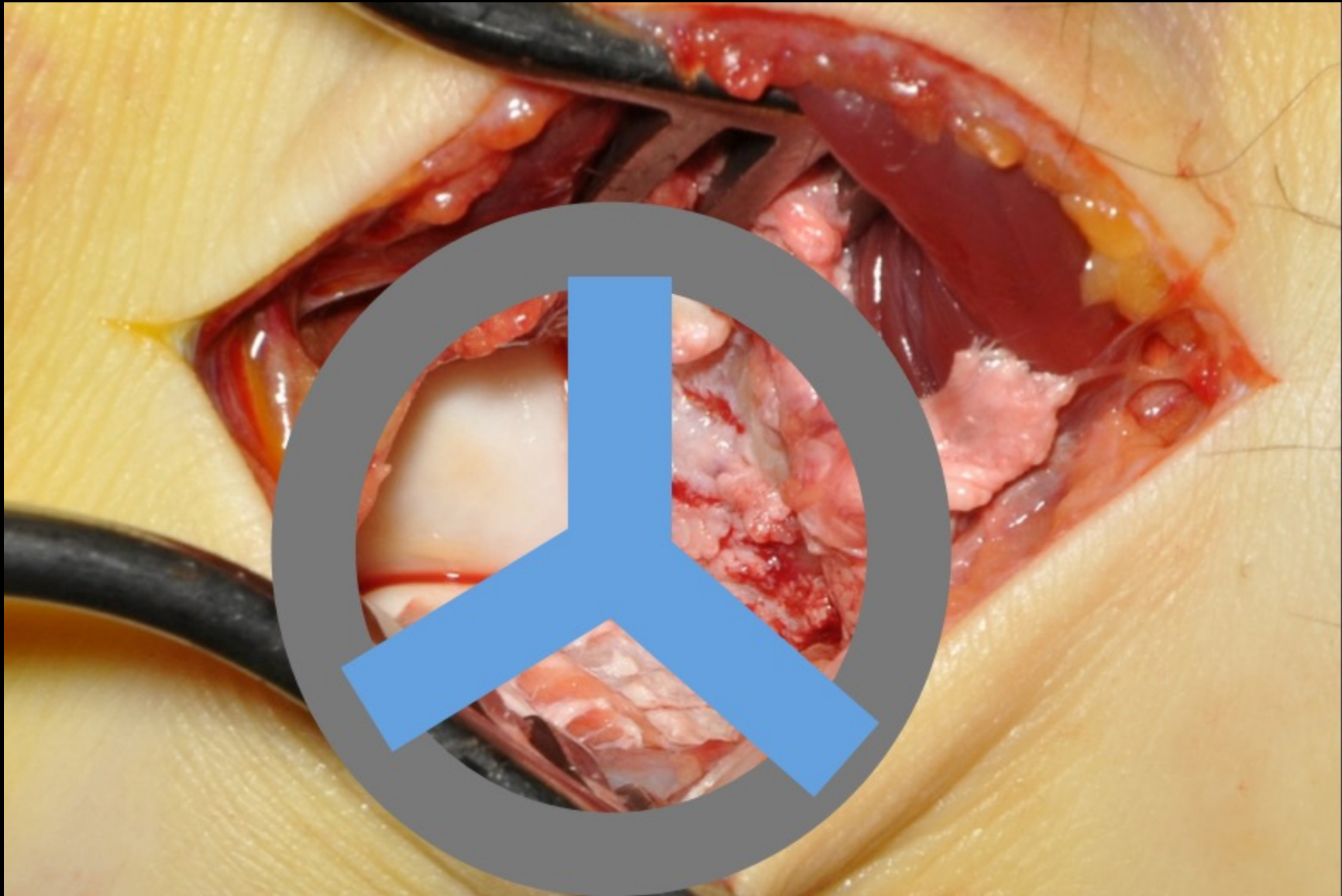
What to do???

- Consider strongly anatomic fibular reduction whenever possible
- Direct visualization
 - Anterior
 - Posterior (reduction and fixation of posterior malleolar fracture)
- X-ray evaluation
 - Mortise + TRUE LATERAL
- Arthroscopic evaluation

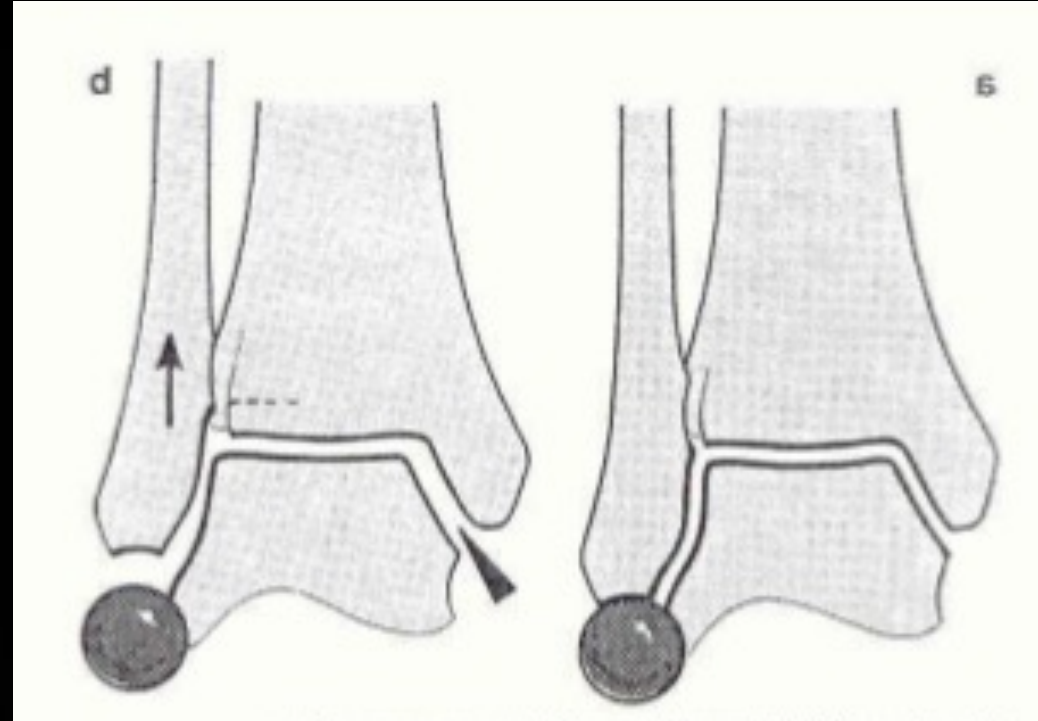
Direct visualization Anterior







Mortise view

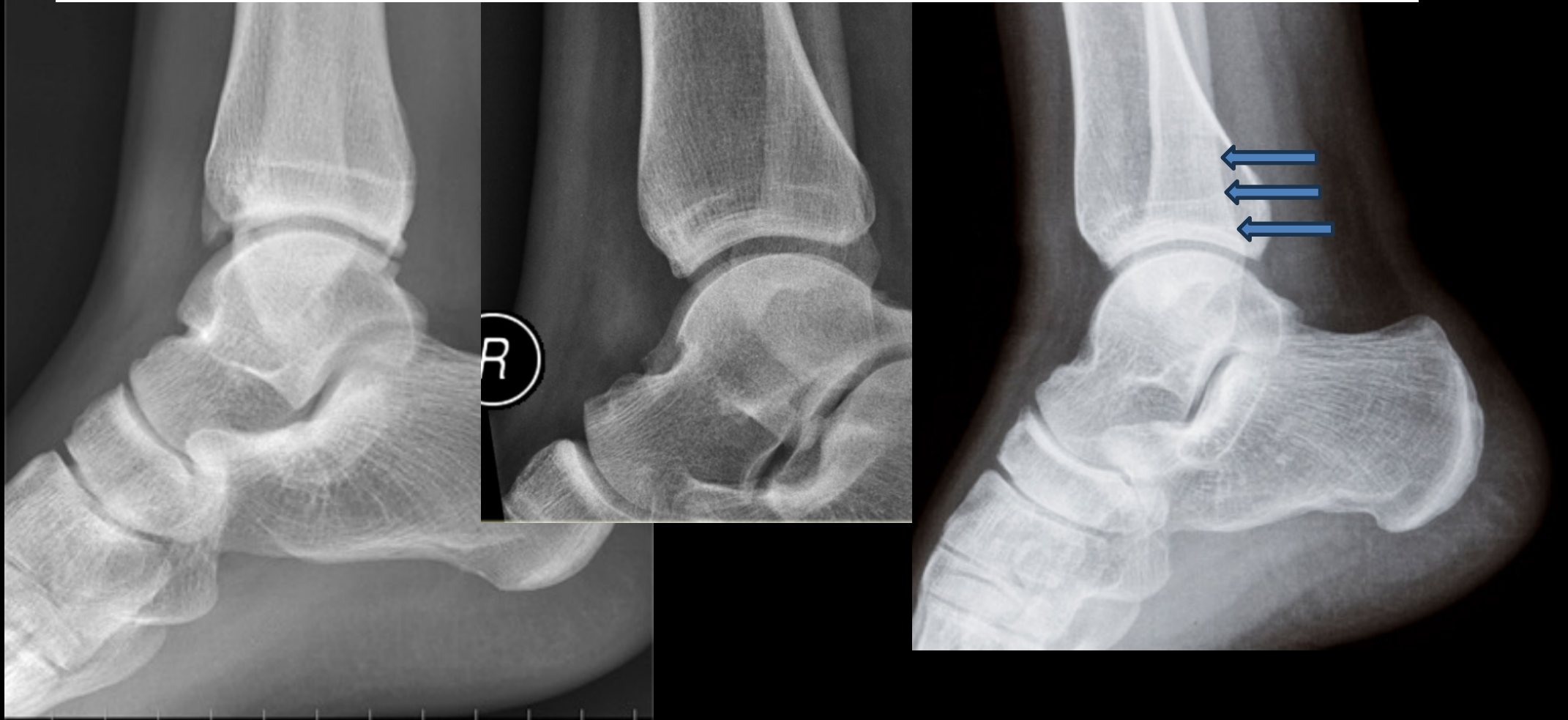


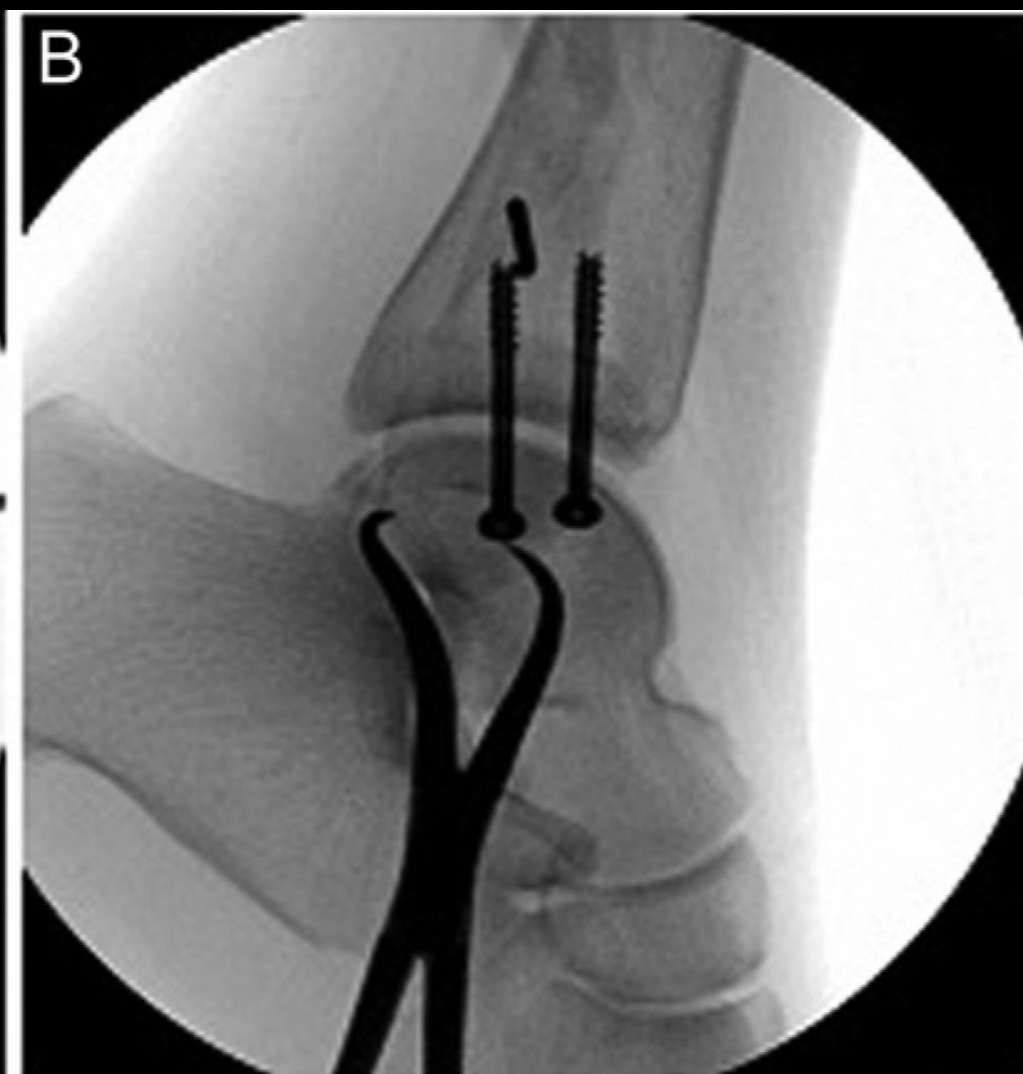
True Lateral view

J Am Acad Orthop Surg. 2015 Aug;23(8):510-8. doi: 10.5435/JAAOS-D-14-00233.

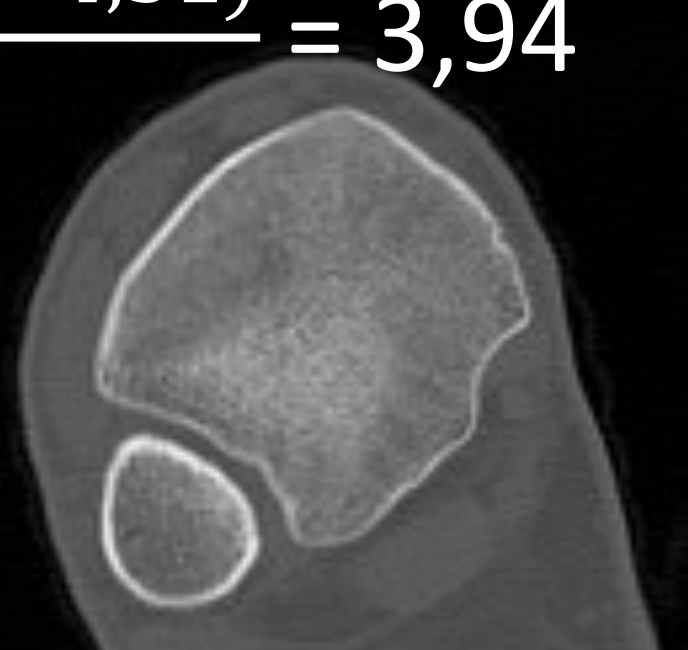
Technical Considerations in the Treatment of Syndesmotic Injuries Associated With Ankle Fractures.

Gardner MJ, Graves ML, Higgins TF, Nork SE.

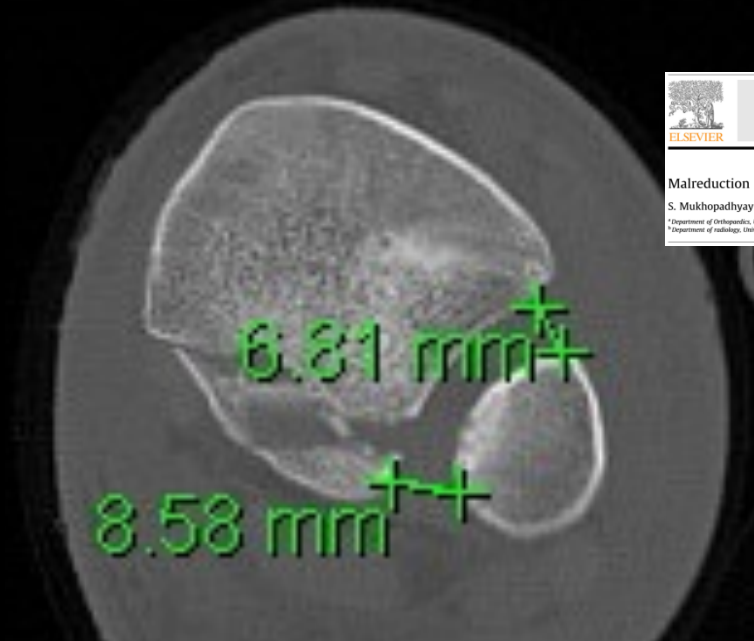




$$\frac{(6,81-3,19)+(8,58-4,31)}{2} = 3,94$$



Mean difference in anterior displacement and posterior displacement
MAX 2 mm



not conclusive
unclear
debatable
No long term results
No evidence
Not reliable
Limited value
Little is known
Controversial
questionable

Review Article

Technical Considerations in the Treatment of Syndesmotic Injuries Associated With Ankle Fractures

Michael J. Gardner, MD
Matthew L. Graves, MD
Thomas F. Higgins, MD
Sean E. Nork, MD

Abstract

Malleolar ankle fractures associated with syndesmotic injuries are common. Diagnosis of the syndesmosis injury can be difficult and often requires intraoperative fluoroscopic stress testing. Accurate reduction and stable fixation of the syndesmosis are critical for optimal patient outcomes. Recent literature has demonstrated that the unstable syndesmosis is particularly prone to iatrogenic malreduction. Multiple types of malreduction can occur, including translational, rotational, and overcompression. Knowledge of the technical details regarding intraoperative reduction methods and reduction assessment can minimize the risk of syndesmosis malreduction and improve patient outcomes.

The syndesmosis is a complex of ligaments that joins the distal fibula to the distal tibia at the level of the ankle joint. Four main ligaments contribute to the syndesmotic complex: the anterior tibiofibular ligament (ATFL), the posterior tibiofibular ligament (PTFL), the transverse ligament, and the interosseous ligament. The ATFL is situated obliquely between the anterolateral tibial (Chaput) tubercle and the anteromedial distal fibula. The PTFL connects the posterolateral tibial (Volkman) tubercle to the posteromedial distal fibula. The transverse ligament represents a wrap, the dense zone of the distal-most portion of the PTFL, and functions like a lateral deepening and stabilizing the tibiotalar joint. The PTFL and associated transverse ligament provide nearly half of the overall syndesmotic strength.¹ The interosseous ligament is the distal aspect of the tibiofibular interosseous membrane and joins the tibia to the fibula several centimeters above the articular surface.

A concavity of variable depth and shape known as the incisura fibularis is located at the posterolateral aspect of the distal tibia.² The distal fibula provides a small amount of bony support to the ankle joint. However, without the ligamentous stability provided by the syndesmosis, the articulation is rendered unstable to physiologic stresses.

In the normal ankle, the stabilizing ligaments of the syndesmosis provide a small amount of elasticity, allowing physiologic motion at the distal tibiofibular joint. With ankle dorsiflexion, the wide anterior talar body glides into the mortise, requiring lateral rotation of the distal tibia. The posterolateral distal tibia rotation of the fibula, as well as external rotation.⁴ Overall, ligament diameter is normally approximately 2 mm through the entire ankle range of motion.

The position of the fibula within the incisura and its relative stability are critical for maintenance of ankle mortise congruity and normal distribution

From the Department of Orthopaedic Surgery, Washington University School of Medicine, St. Louis, MO (Dr. Gardner), the Department of Orthopaedic Surgery, University of Mississippi Medical Center, Jackson, MS (Dr. Graves), the Department of Orthopaedic Surgery, University of Utah, Salt Lake City, UT (Dr. Higgins), and the Department of Orthopaedic Surgery, University of Washington, Seattle, WA (Dr. Nork).

J Am Acad Orthop Surg 2015;23: 510-518

<http://dx.doi.org/10.54002/JAAOS.14-0025>

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Review

Acute syndesmotic instability in ankle fractures: A review

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Ankle fractures are among the most common fracture types, and 10% of all ankle fractures lead to accessory syndesmotic injury. Injuries that are unstable in every respect is syndesmotic instability. Since the range of diagnostic techniques and therapeutic options is extensive, it still is a controversial subject, despite the abundance of literature. This review aims to summarize the current knowledge on syndesmotic instability in ankle fractures and to formulate recommendations for clinical practice. Chronic instability and the operative osseous treatment of ankle fractures are not part of this review. © 2016 European Foot and Ankle Society. Published by Elsevier Ltd. All rights reserved.

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E-mail address: vanzuijlen@hotmail.com (W.J. van Zuijlen).

Suture button versus syndesmoseskrue

Randomized Controlled Trial > Bone Joint J. 2020 Feb;102-B(2):212-219.

doi: 10.1302/0301-620X.102B2.BJJ-2019-0692.R2.

Better outcome for suture button compared with single syndesmotomic screw for syndesmosis injury: five-year results of a randomized controlled trial

Benedikte W Ræder¹, Wender Figved¹, Jan E Madsen^{2 3}, Frede Frihagen², Silje B Jacobsen⁴,
Mette Renate Andersen^{3 1}

Affiliations + expand

PMID: 32009435 DOI: 10.1302/0301-620X.102B2.BJJ-2019-0692.R2

770

Acta Orthopaedica 2020; 91 (6): 770–775

Randomized trial comparing suture button with single 3.5 mm syndesmotomic screw for ankle syndesmosis injury: similar results at 2 years

Benedikte Wendt RÆDER¹, Ingrid Kvellø STAKE², Jan Erik MADSEN^{3,4}, Frede FRIHAGEN³,
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Ankle fractures with associated syndesmotomic injuries

Treatment of syndesmosis injuries and the impact of posterior malleolar fractures

by

Lise Benedikte Wendt Ræder

for the degree of Philosophiae Doctor (PhD)

Faculty of Medicine, University of Oslo

&

Orthopaedic Department, Bærum Hospital, Vestre Viken Hospital Trust

2021



Pas på confirmation bias

Ligamentum deltoideum

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journal homepage: www.journals.elsevier.com/foot-and-ankle-surgery



A clinical guide to the medial ligaments of the ankle: Anatomy, function, diagnosis of injuries and treatment of instability—a narrative review[☆]



Kenneth Obionu, Henrik Palm, Yvette Astrup, Naja Bjørslev Lange,
Michael Rindom Krogsgaard *

Department of Orthopedic Surgery, Copenhagen University Hospital Bispebjerg, Copenhagen, Denmark

“currently there is no evidence to support repair in malleolar fracture patients with concomitant injury to the deltoid ligament”

The complicated ankle fracture

