

Intertrochanteric hip fractures: Decisions that affect outcomes!

Emil H. Schemitsch MD FRCS(C) FAAOS

Richard Ivey Professor of Surgery

Chair, Department of Surgery

University of Western Ontario

Chief of Surgery, London Health Sciences Centre, St. Joseph's Health

Care, London, Ontario

Editor-in-Chief, OTA International

I (and/or my co-authors) have something to disclose.

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<http://www.aaos.org/disclosure>

Intertrochanteric hip fractures

- Trochanteric fractures are a common injury in the older population
- Account for approximately half of all hip fractures
- Can lead to significant declines in patient function and health-related quality of life (HRQOL)
- Lack of conclusive evidence supporting any one treatment type

Things to consider

- Injury characteristics?
- What is an acceptable reduction?
- What is acceptable implant position?

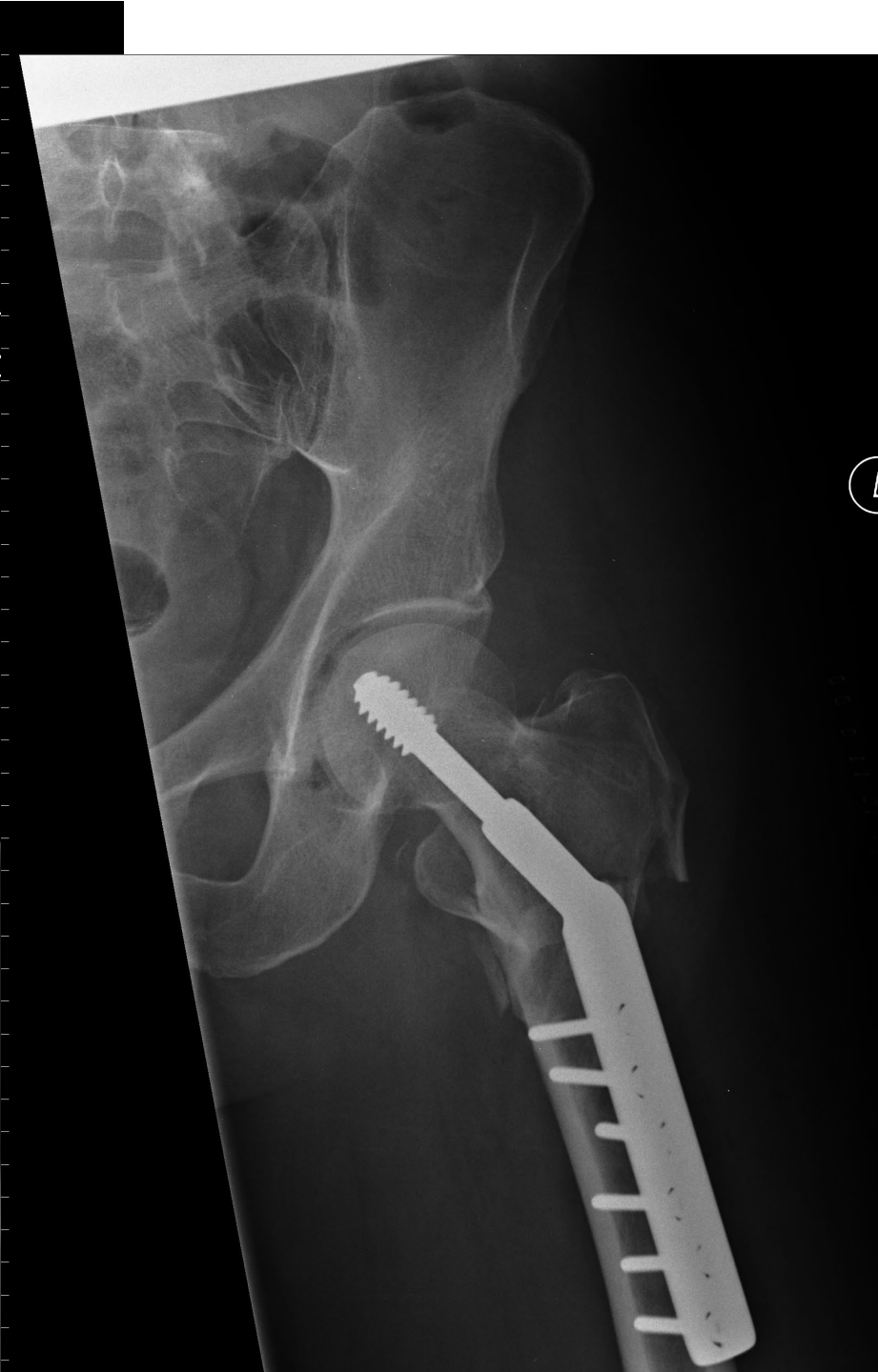
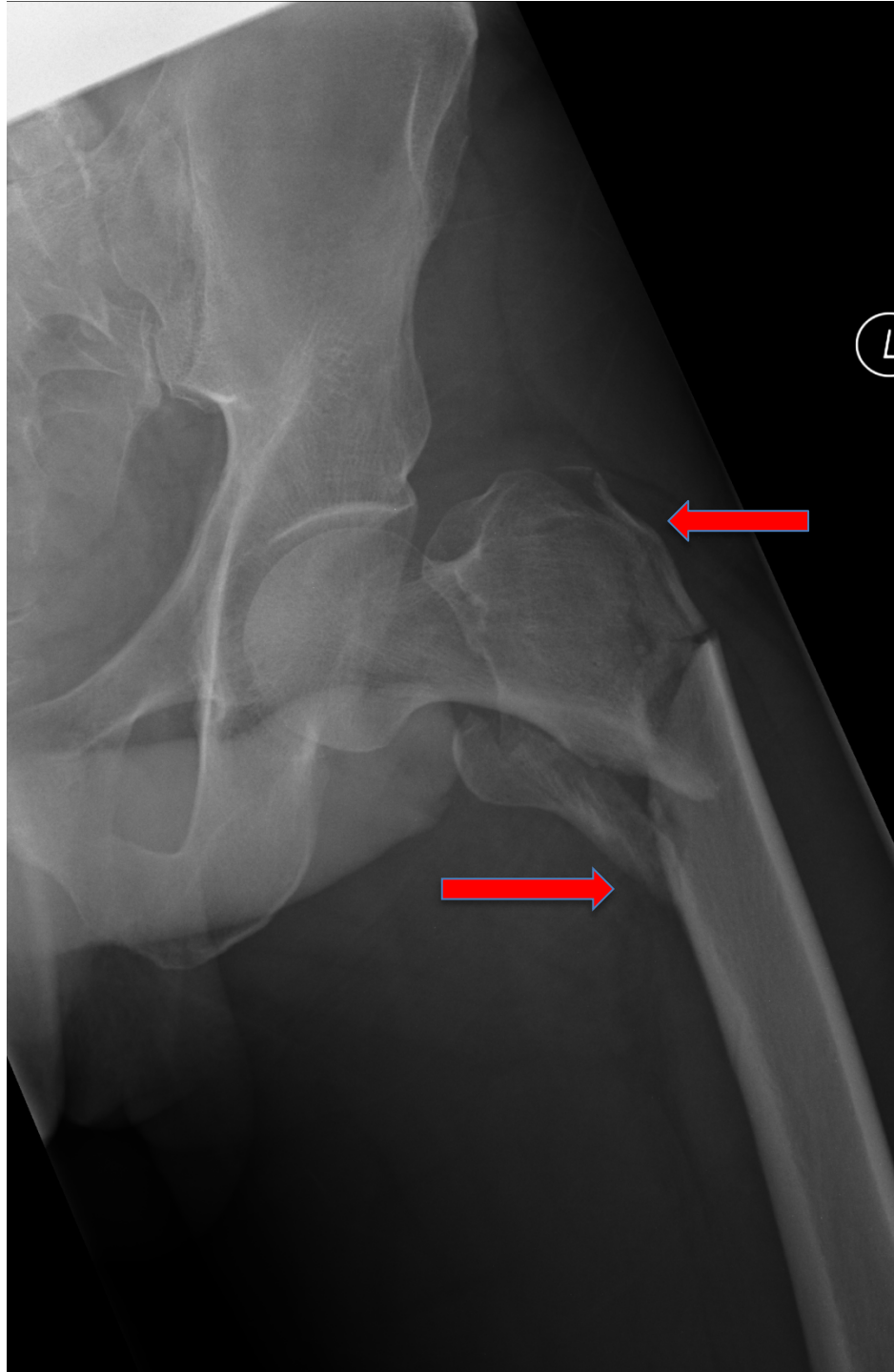
What to worry about pre-op

Injury characteristics

- Unstable patterns
- Reverse obliquity
- Subtroch extension
- Thin lateral wall
- Significant displacement
- Femoral bow



Dictate implant choice and approach



■ TRAUMA

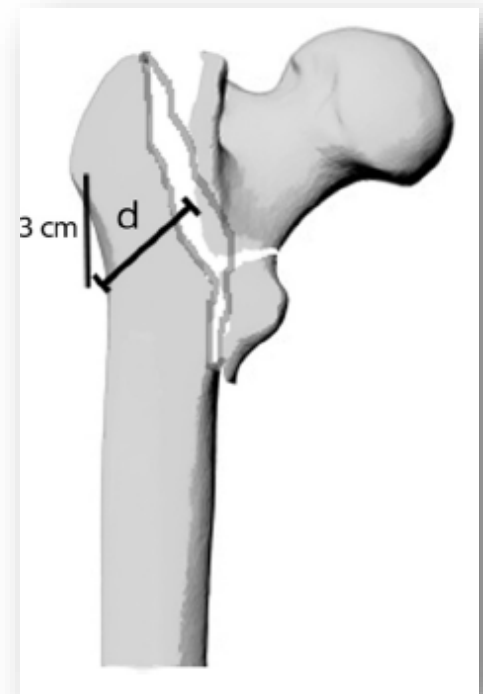
Lateral femoral wall thickness

A RELIABLE PREDICTOR OF POST-OPERATIVE LATERAL WALL FRACTURE IN INTERTROCHANTERIC FRACTURES

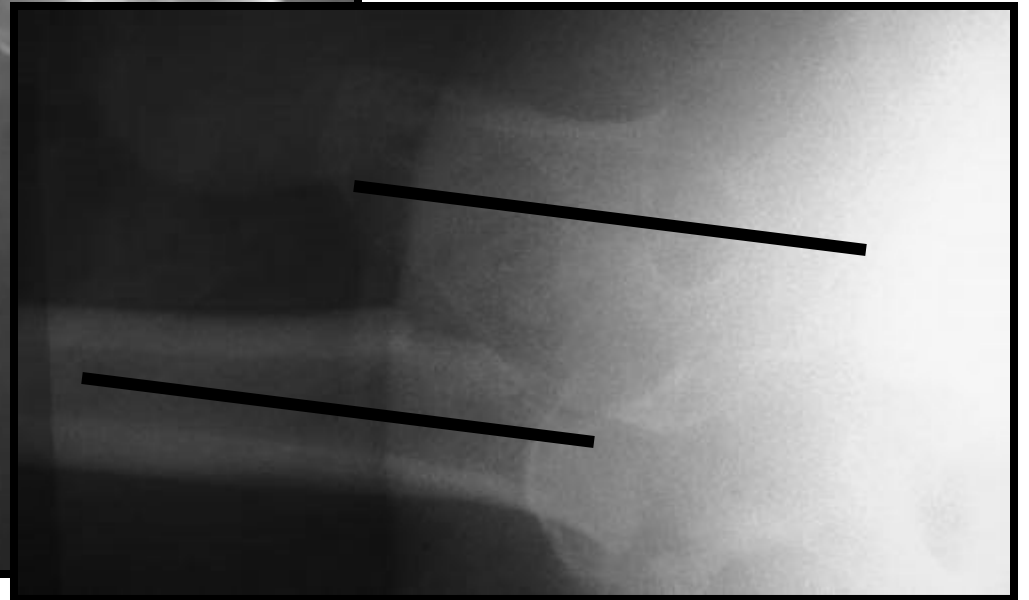
C-E. HSU, C-M. SHIH, C-C. WANG, K-C. HUANG

THE BONE & JOINT JOURNAL VOL. 95-B, No. 8, AUGUST 2013

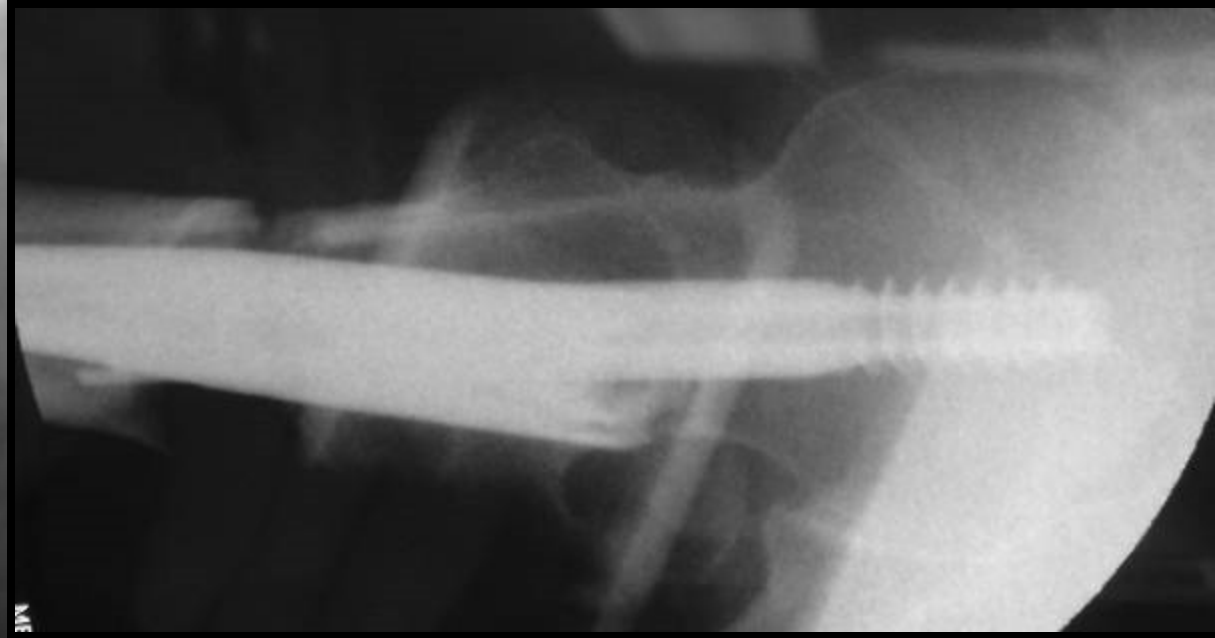
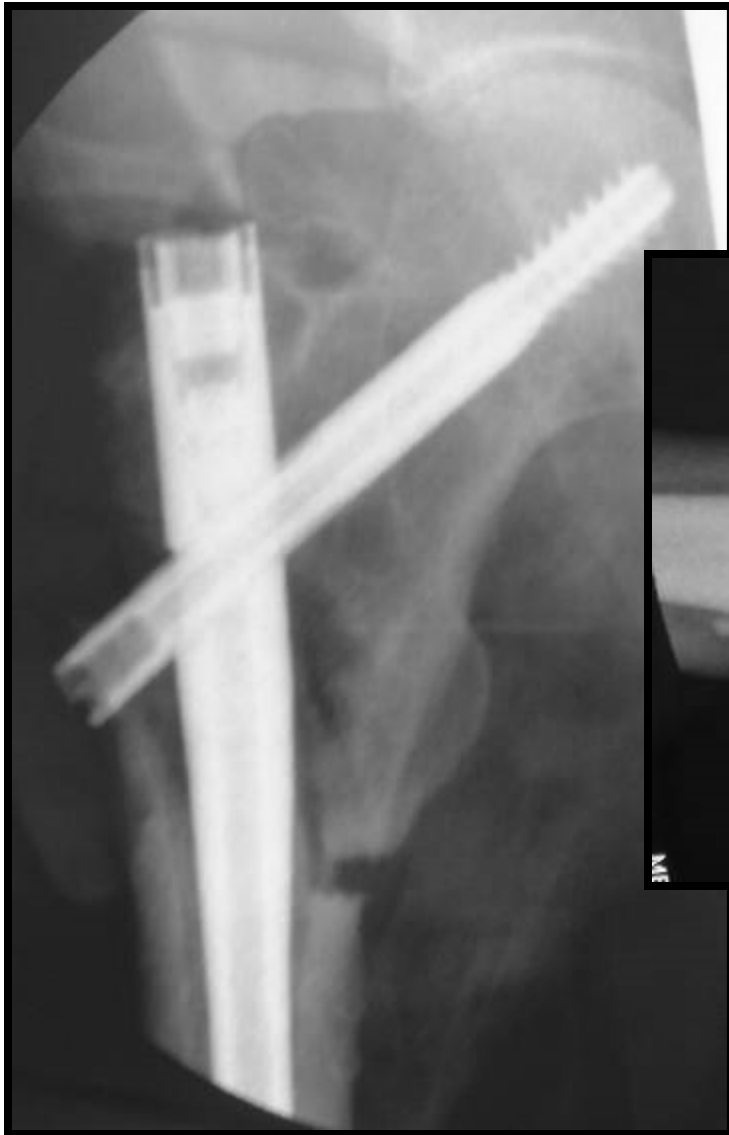
- 208 patients AO/OTA 31-A1 and -A2 intertrochanteric fractures
- Lateral wall thickness < 20.5 mm should not be treated with SHS alone



Significant displacement



Requires open reduction

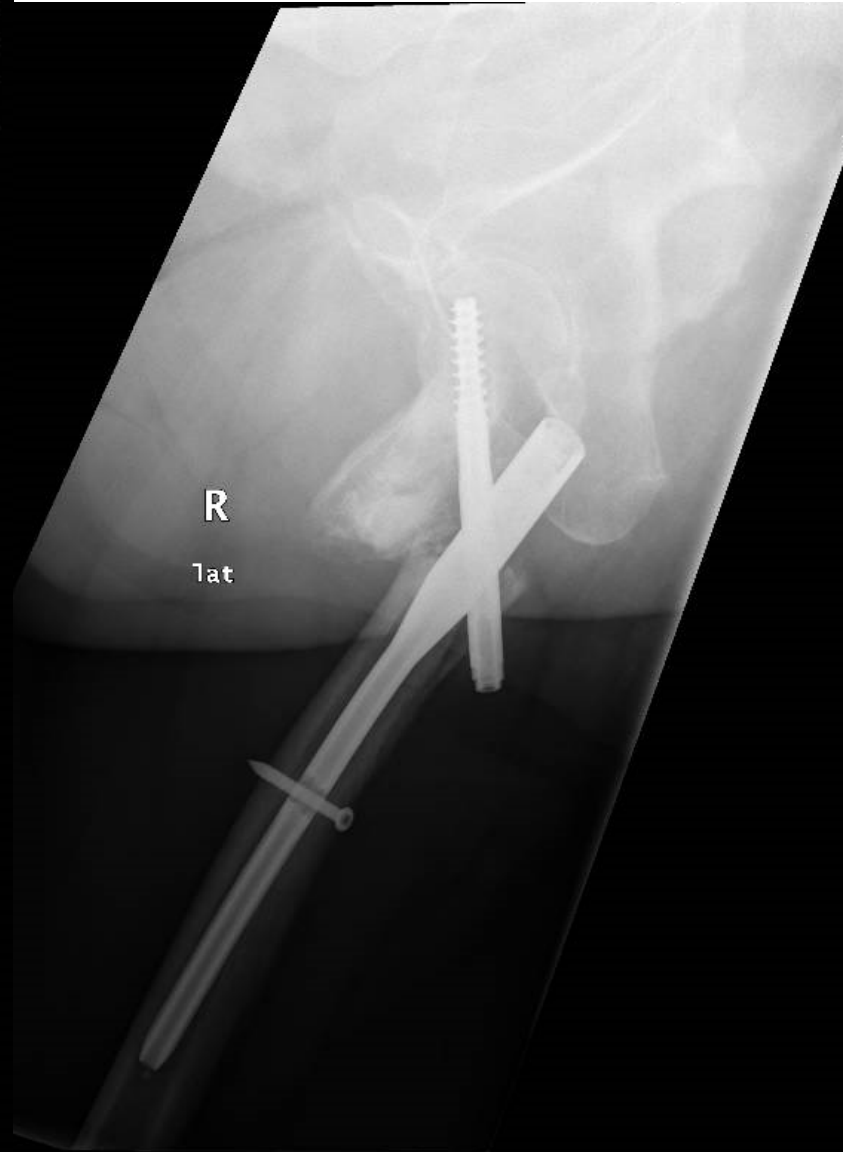


No open reduction

R
ap



R
lat



Femoral bow



Ensure nail ROC is appropriate for femur

Screw cut-out is still a problem! Reduction is key!



Research Article

Trend and Economic Implications of Implant Selection in the Treatment of Intertrochanteric Hip Fractures: A Review of the American Board of Orthopaedic Surgery Database From 2007 to 2017



Use of an IMHS is common for IT fractures

Smith et al, JAAOS 2021

- ABOS Part II (oral) used to identify IT fractures
- Cases were categorized by IMN or SHS fixation
- As of 2017, 92.4% of IT fractures were being fixed with an IMN (a 49.1% increase)

Risk Factors Associated With Cephalomedullary Nail Cutout in the Treatment of Trochanteric Hip Fractures

David J. Ciuflo, MD, Douglas A. Zaruta, MD, Jason S. Lipof, MD, Kyle T. Judd, MD, John T. Gorczyca, MD, and John P. Ketz, MD

- Important factors
 - Lateral wall fracture
 - Neck shaft mal-reduction
 - Residual basi-cervical gapping



Contents lists available at [ScienceDirect](#)

Injury

journal homepage: www.elsevier.com/locate/injury

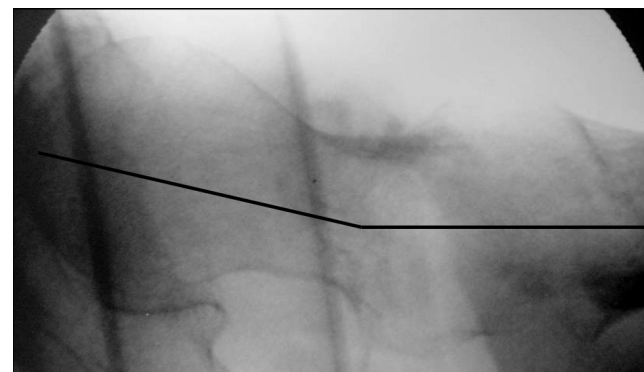


Reporting on quality of reduction and fixation of intertrochanteric fractures—A systematic review



Meir Marmor^{a,*}, Guy Guenther^b, Arash Rezaei^c, Morshed Saam^a, Amir Matityahu^a

- Reduction is critical
- Focus has been on implant and less on reduction
- 51% of papers found association between better immediate post-op reduction and improved outcomes



Acceptable reduction

- Anteromedial calcar reduced
 - Avoid translation
 - Avoid negative medial cortical support
 - Chang et al, AOTS 2015
 - Avoid anterior malreduction
 - Inui CORR 2024
- Restore neck shaft angle
 - Avoid varus
 - Fisher et al JAAOS 2024
- Avoid distraction

Calcar reduction

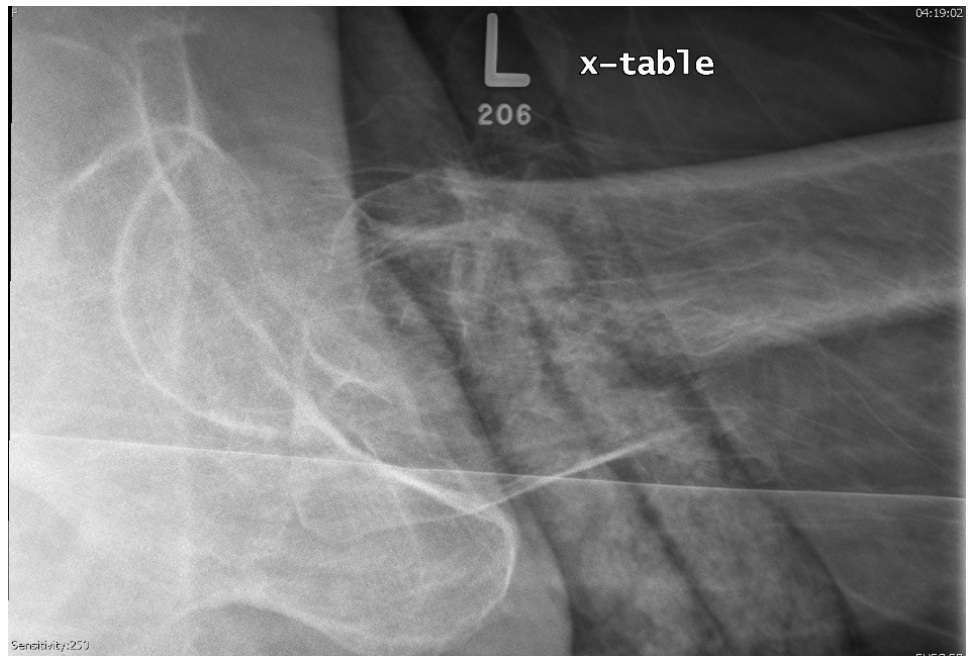
- Chang et al, AOTS 2015
 - Positive medial cortical support reduction had the least loss in neck–shaft angle and neck length

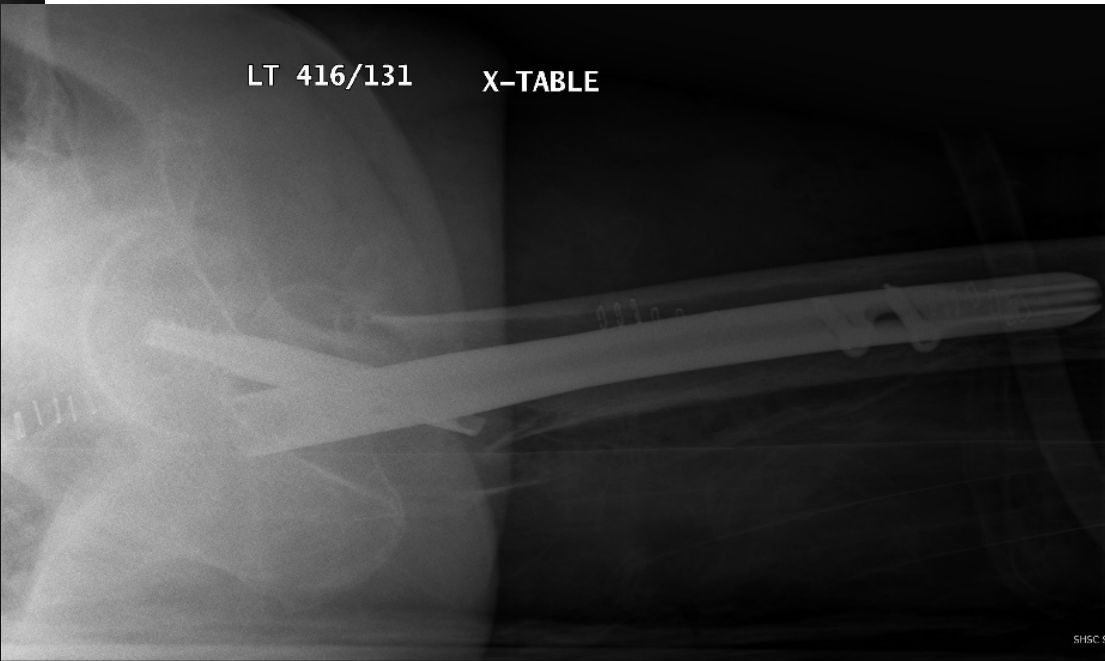
Positive

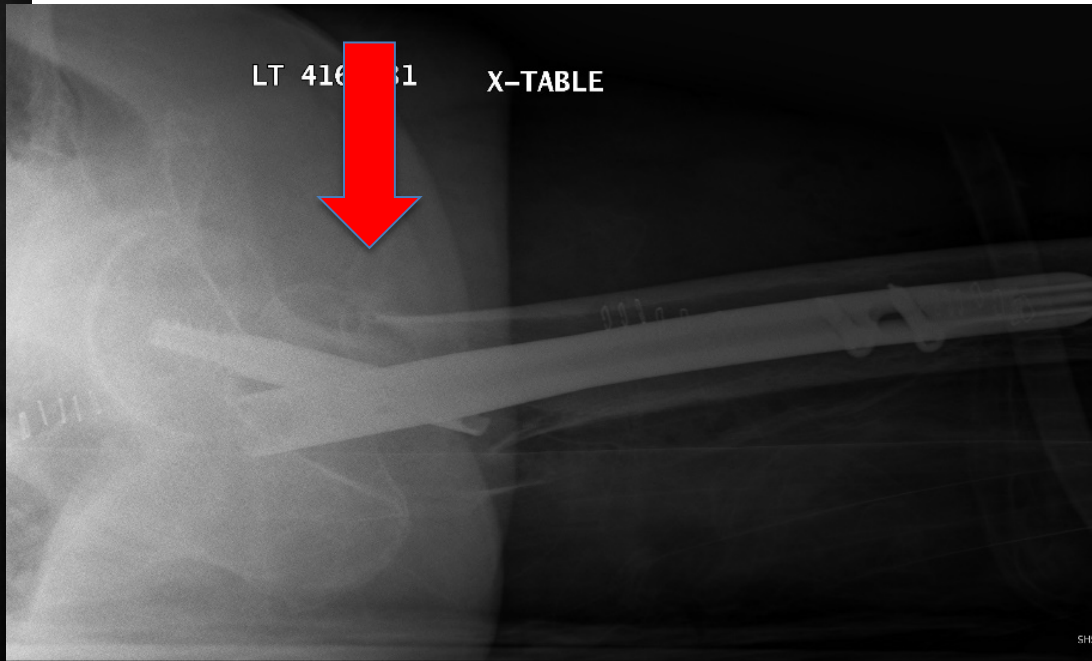
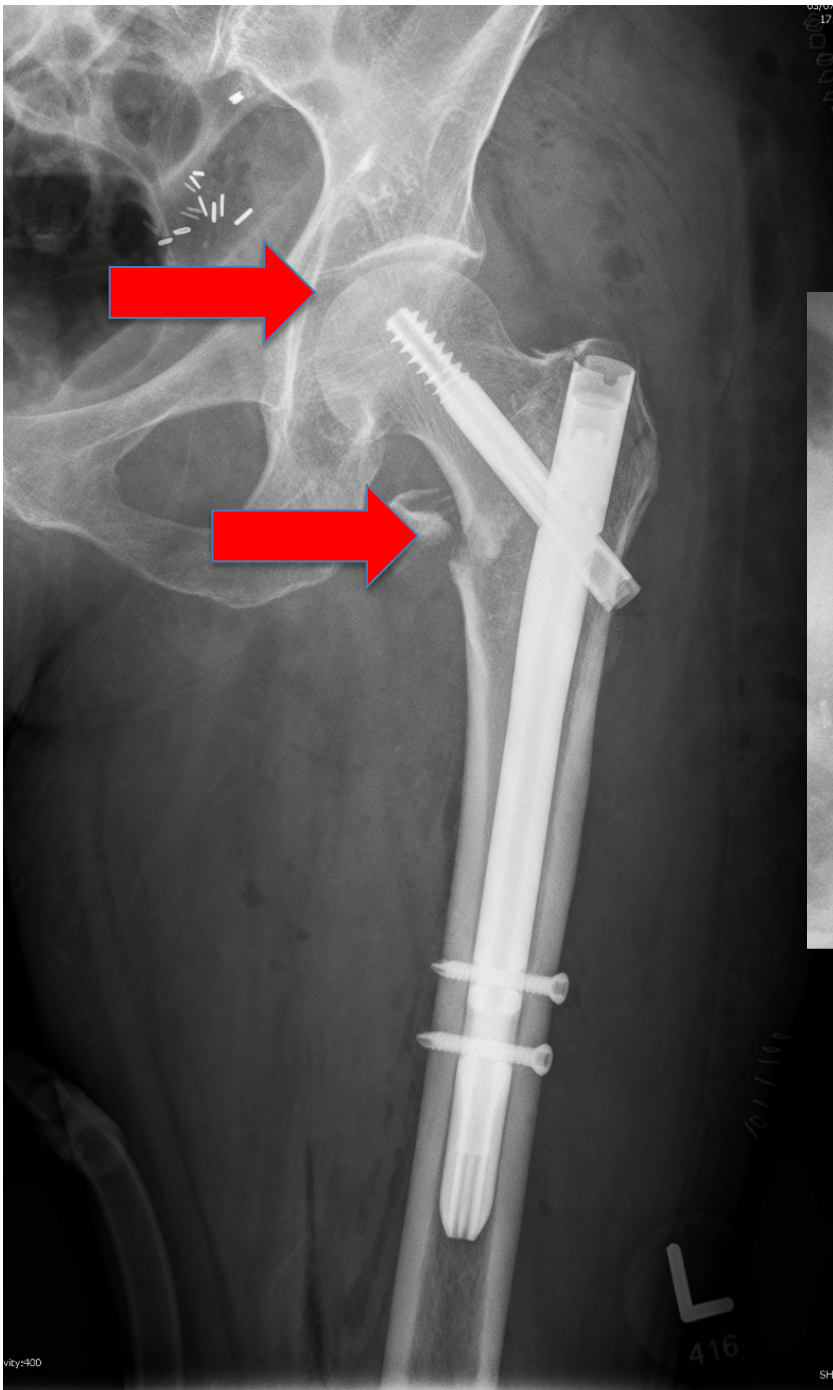


Negative











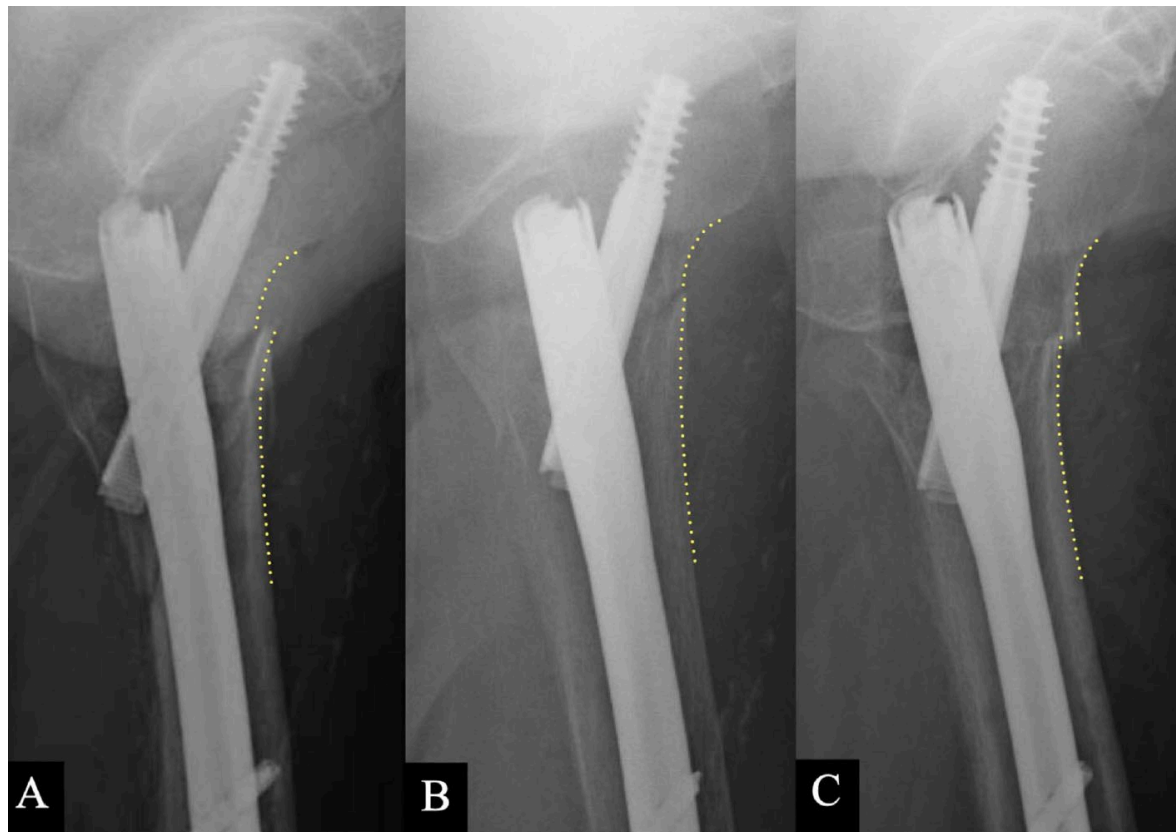
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Anterior reduction

- Inui et al, CORR 2024
 - Anterior mal-reduction associated with a 4.2x greater odds of cutout



Varus: Image opposite limb



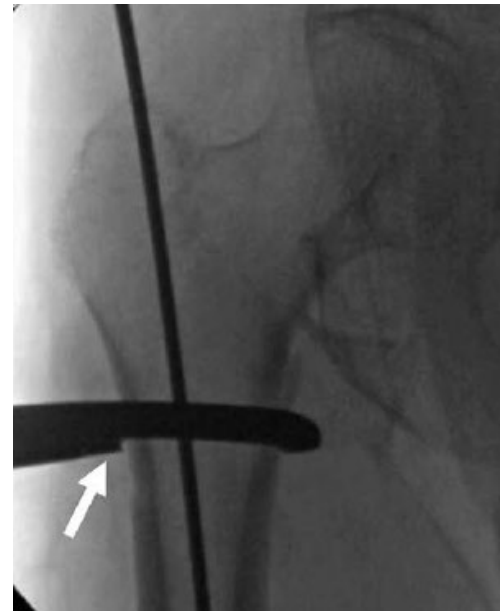


Distraction



Do what it takes to get reduction!

- If necessary open it
- Adjunctive techniques
 - Circlage wires
 - Colinear clamps
 - Mini-fragment plates

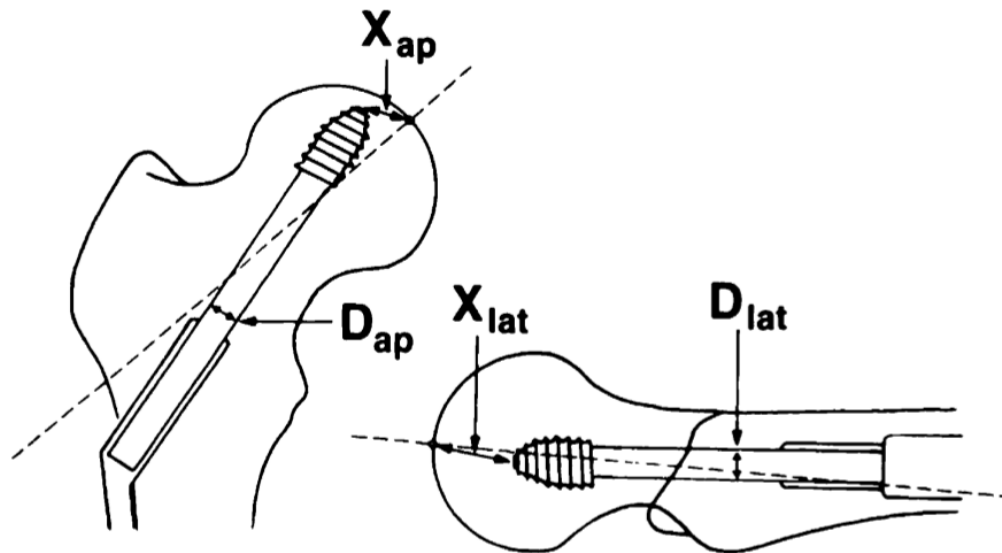


Implant position is key!

The Value of the Tip-Apex Distance in Predicting Failure of Fixation of Peritrochanteric Fractures of the Hip*

BY MICHAEL R. BAUMGAERTNER, M.D.†, STEPHEN L. CURTIN, M.D.†, DIETER M. LINDSKOG, B.A.†,
AND JOHN M. KEGGI, M.D.‡, NEW HAVEN, CONNECTICUT

Investigation performed at the Department of Orthopaedics and Rehabilitation, Yale University School of Medicine, New Haven



$$\text{TAD} = \left(X_{\text{ap}} \times \frac{D_{\text{true}}}{D_{\text{ap}}} \right) + \left(X_{\text{lat}} \times \frac{D_{\text{true}}}{D_{\text{lat}}} \right)$$

■ HIP

Predictors of failure for cephalomedullary nailing of proximal femoral fractures

Retrospective review of 170 fractures treated with cephalomedullary nailing

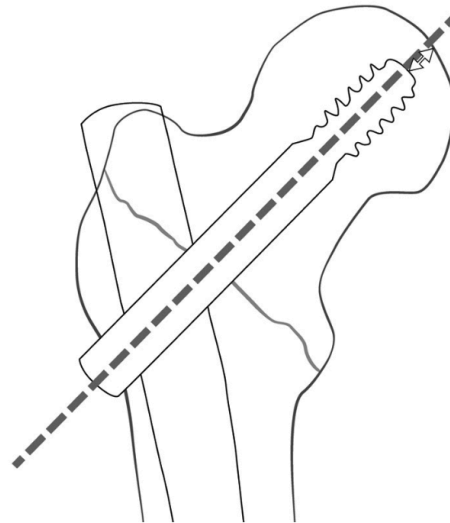


Fig. 1a

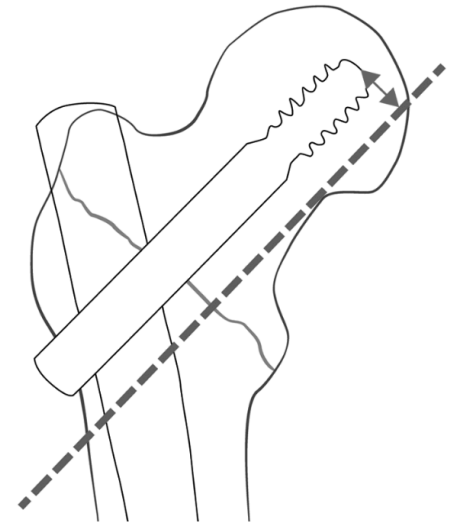


Fig. 1b

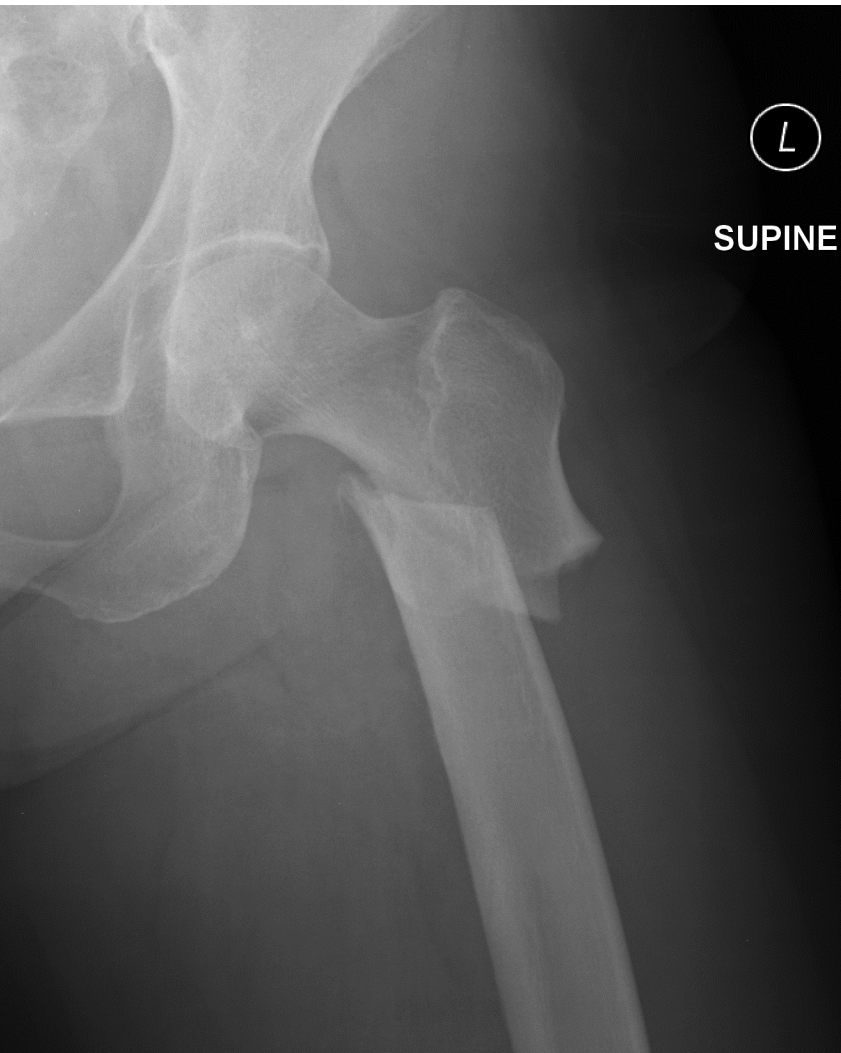
Our data provide the first reported clinical evidence that CalTAD is a predictor of cut-out. The finding of CalTAD as the only significant parameter in the multivariate analysis, along with the univariate significance of Parker's ratio index in the AP view, suggest that inferior placement of the lag screw is preferable to reduce the rate of cut-out.

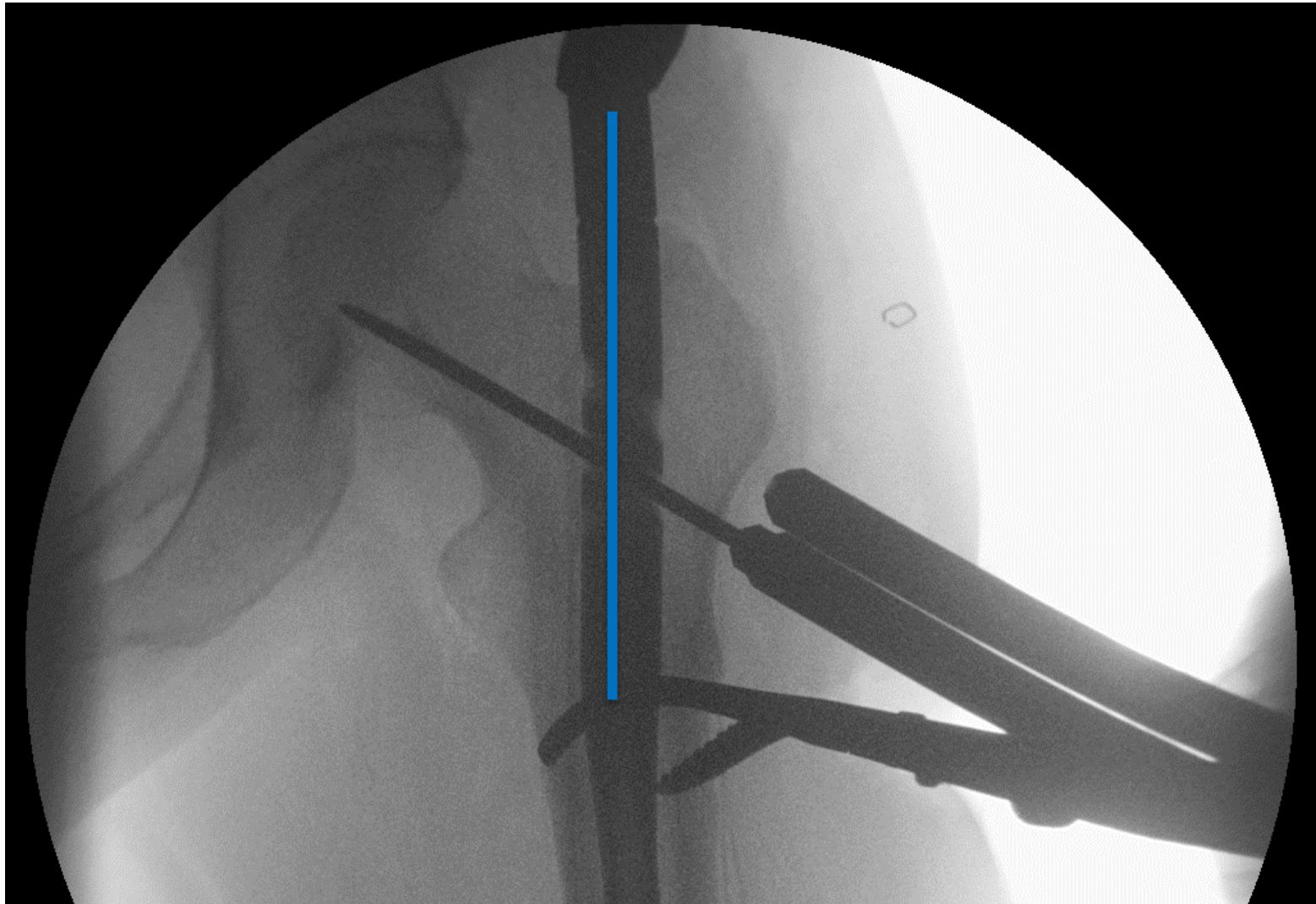
Cut-out

- Cut-out is related to improper surgical technique:
 - Quality of reduction,
 - Implant application

Tips for Success...

- Reduce before reaming
- Ensure correct entry point
- Reaming: must avoid further comminution and lateral drift
- Be aware of lag screw angle
- Beware distal nail perforation
- Check for Rotational deformity
- Atraumatic manual nail insertion







**Intertrochanteric hip fractures:
Is there really no difference
between nails and plates?**

IMHS vs SHS



Original Investigation | Orthopedics

Intramedullary Nailing vs Sliding Hip Screw in Trochanteric Fracture Management The INSITE Randomized Clinical Trial

Emil H. Schemitsch, MD; Lauren L. Nowak, PhD; Arndt P. Schulz, MD, PhD; Ole Brink, MD; Rudolf W. Poolman, MD, PhD; Samir Mehta, MD; Dirk Stengel, MD, PhD, MSc; Chang Qing Zhang, MD, PhD; Saul Martinez, MD; Bernd Kinner, MD, PhD; Timothy J.S. Chesser, FRCS; Mohit Bhandari, MD, PhD, FRCS; for the INSITE Investigators

TRIAL REGISTRATION ClinicalTrials.gov Identifier: [NCT01380444](https://clinicaltrials.gov/ct2/show/study/NCT01380444)

JAMA Network Open. 2023;6(6):e2317164. doi:10.1001/jamanetworkopen.2023.17164

METHODS

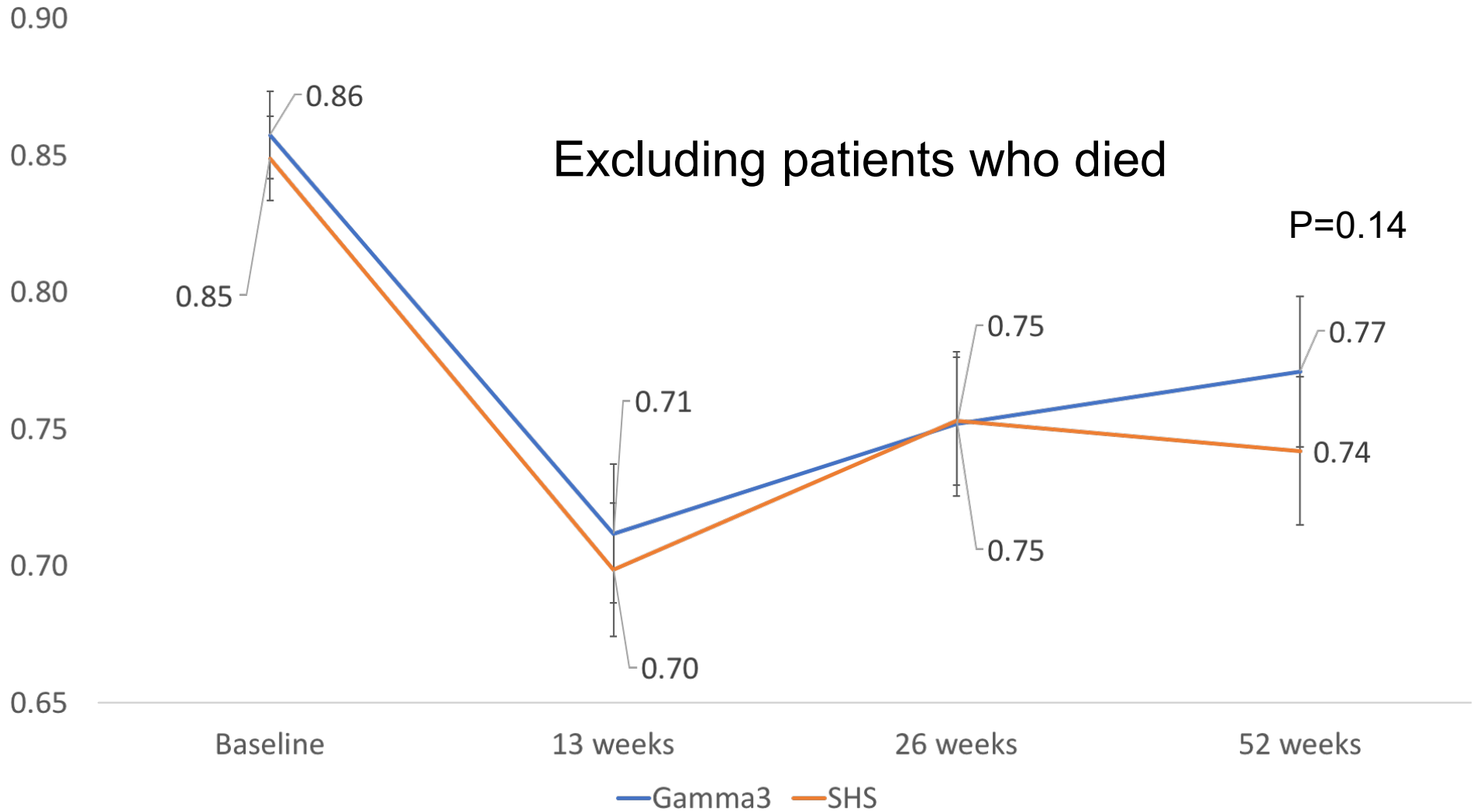
Design:

- Multicenter, international RCT
- Randomized 850 patients across 25 sites

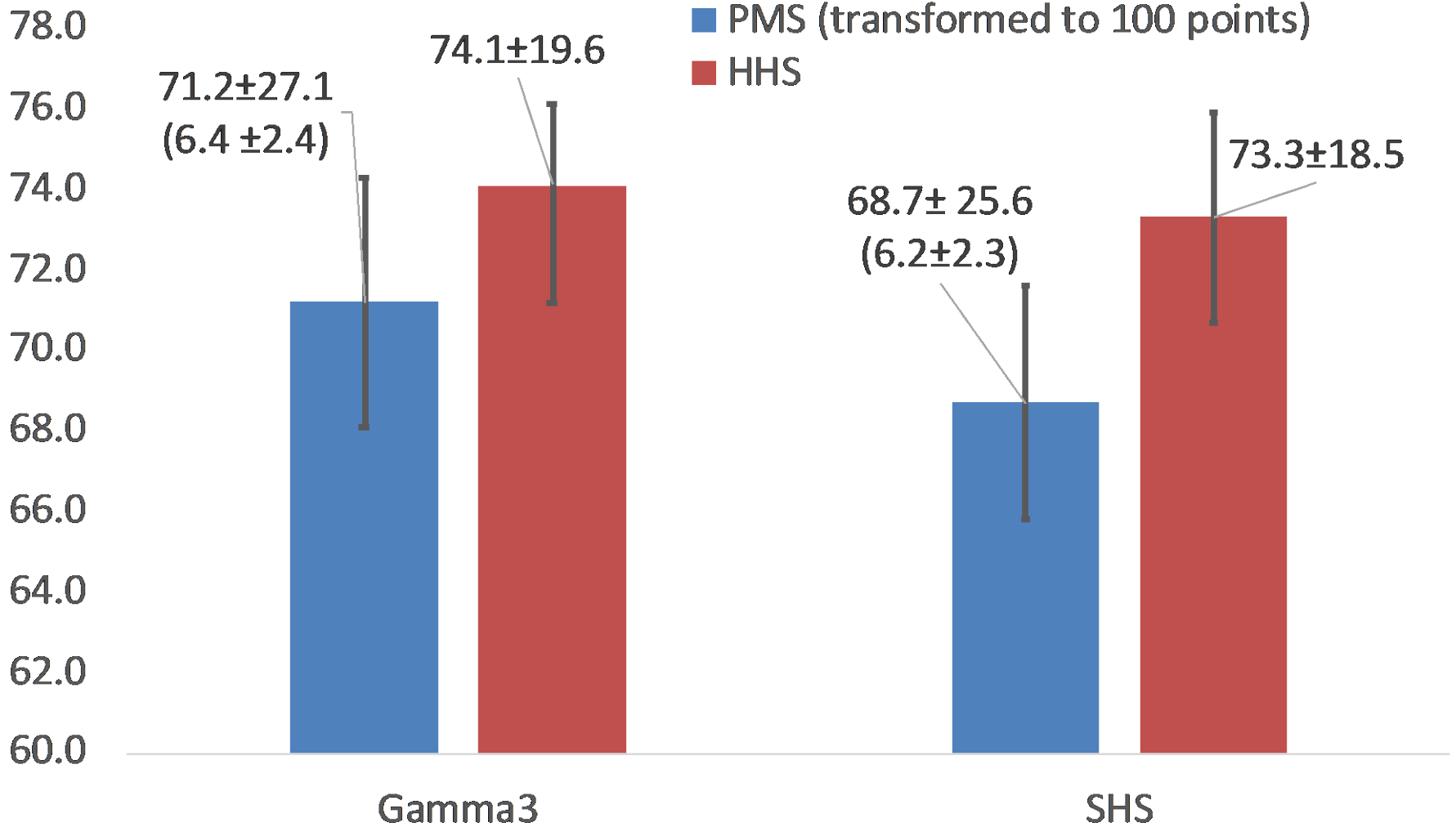
Eligibility Criteria:

- Inclusion: Ambulatory, ≥ 18 years, low-energy # (AO type 31-A1 or A2), surgery within 7 days
- Exclusion: Associated major injuries of lower extremity, retained hardware, pathologic #, obesity, dementia, severe Parkinsons

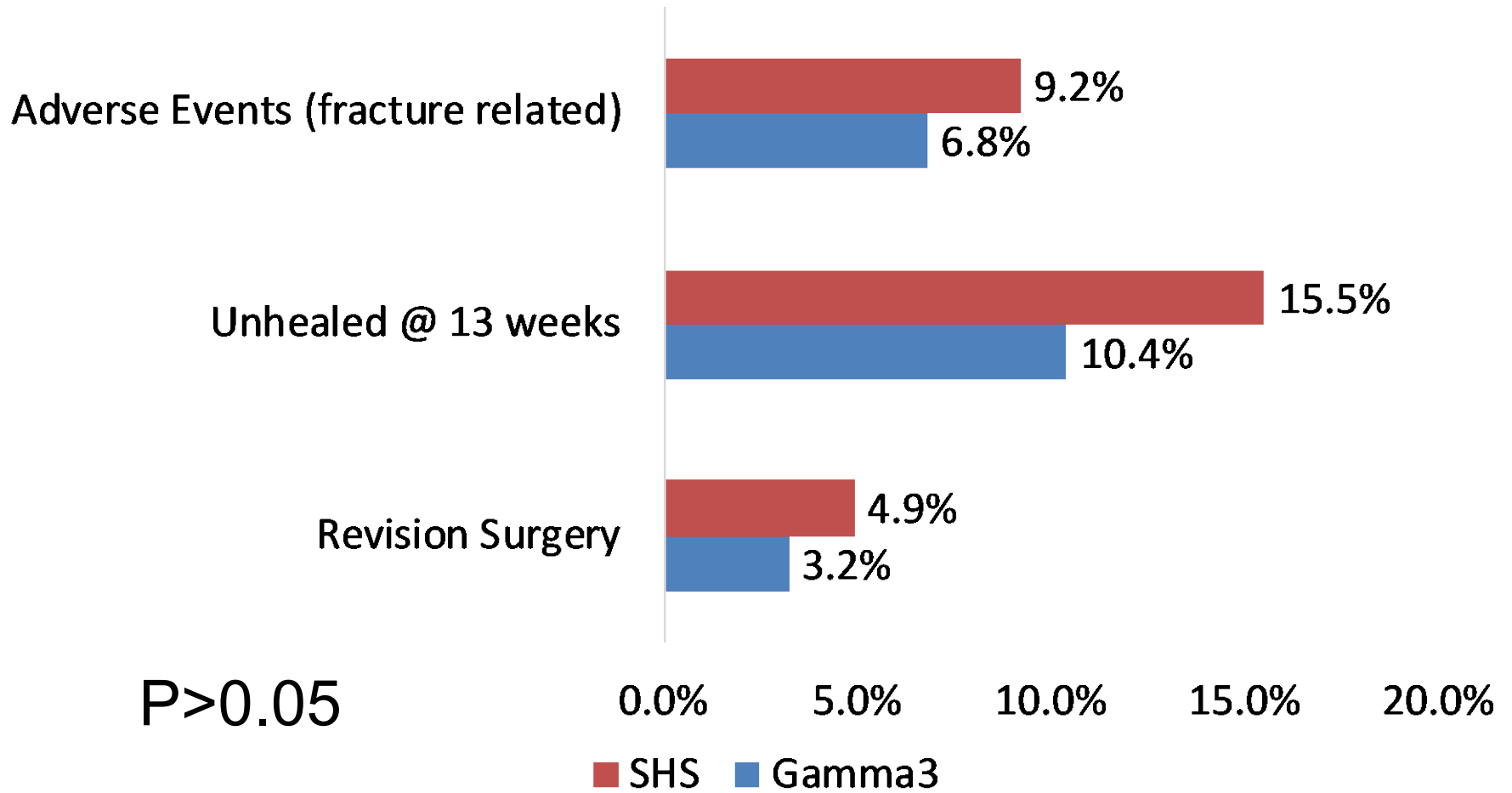
EQ5D



Mobility and Function



Other



SUMMARY

- No significant differences observed in HRQOL, revision surgery, and fracture healing between Gamma3 and SHS groups
- These findings do not support the increased use of IMN for managing trochanteric fractures

Evidence for the Device 2024

- Biomechanical results not supported by clinical results at long term follow-up
- No pivotal prospective RCTs have shown superior outcomes with any implant / fixation method
- Data in the high functioning patient lacking

What doesn't matter so much!

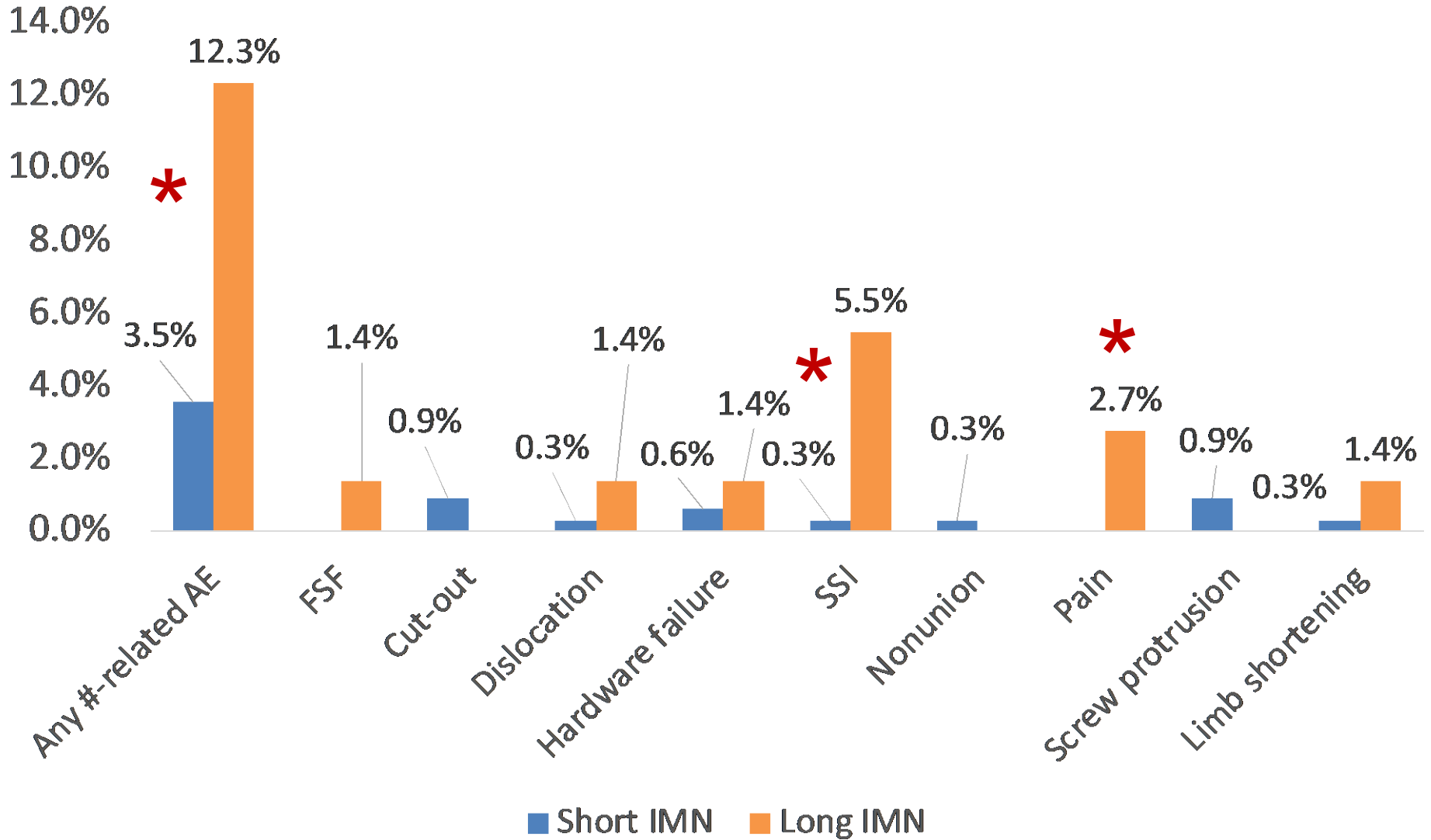
- Nail diameter
 - 10 mm works well: Rinehart JOT 2021
 - Not necessary to fill canal: Choi Int Ortho 2024
- Nail design
 - Integrated lag screw fixation controversial

Short vs Long nail?



- The ideal length of intramedullary implants for the fixation of trochanteric fractures remains under debate

RESULTS: Fracture-Related AE



Take Home Message

- Vast majority of intertrochanteric fractures managed with a nail can be safely treated with a short nail

Intertrochanteric: Bottom line

- Outcome is most related to proper surgical technique:
 - Quality of reduction, implant application
- No pivotal RCTs have shown superior fixation with any specific device or method
- Primary treatment is with well done internal fixation in the vast majority of cases

Thank you

