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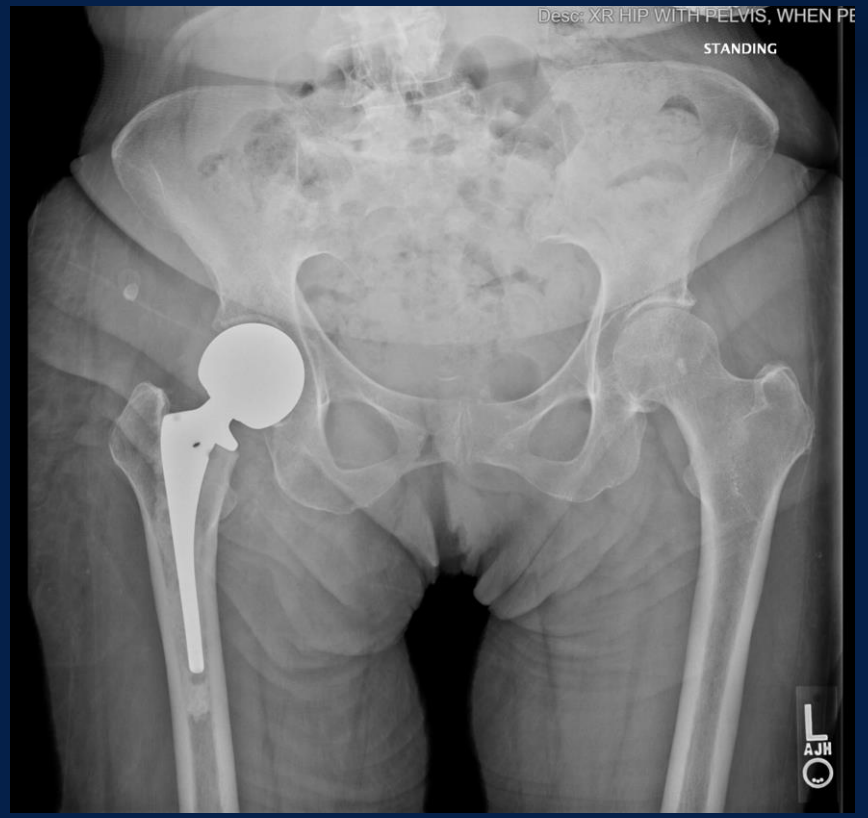
San Francisco

Anterior Approach Cemented Hemiarthroplasty (really any cemented stem)

Jeff Barry, MD
Associate Clinical Professor of Orthopaedics
Arthroplasty Fellowship Director
UCSF Department of Orthopaedic Surgery
9/21/24

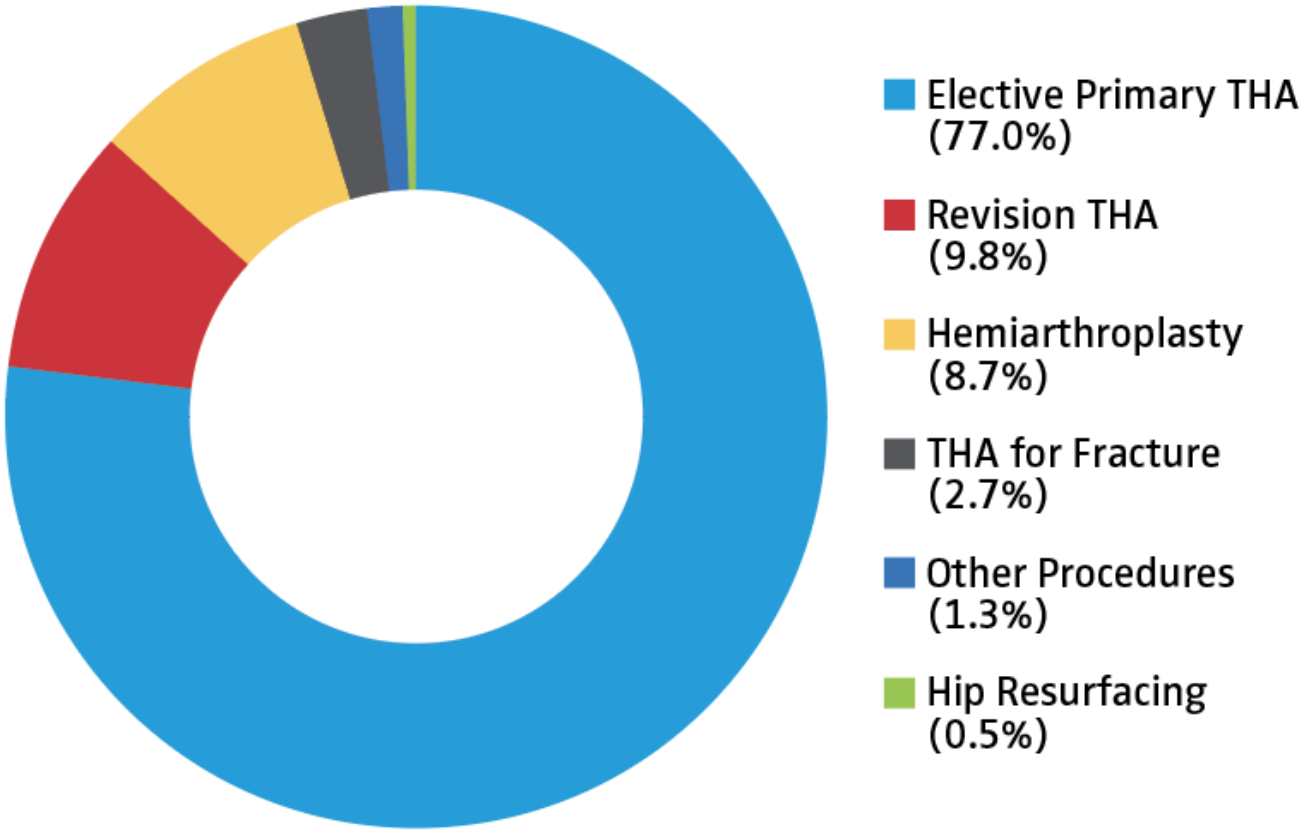


Disclosures

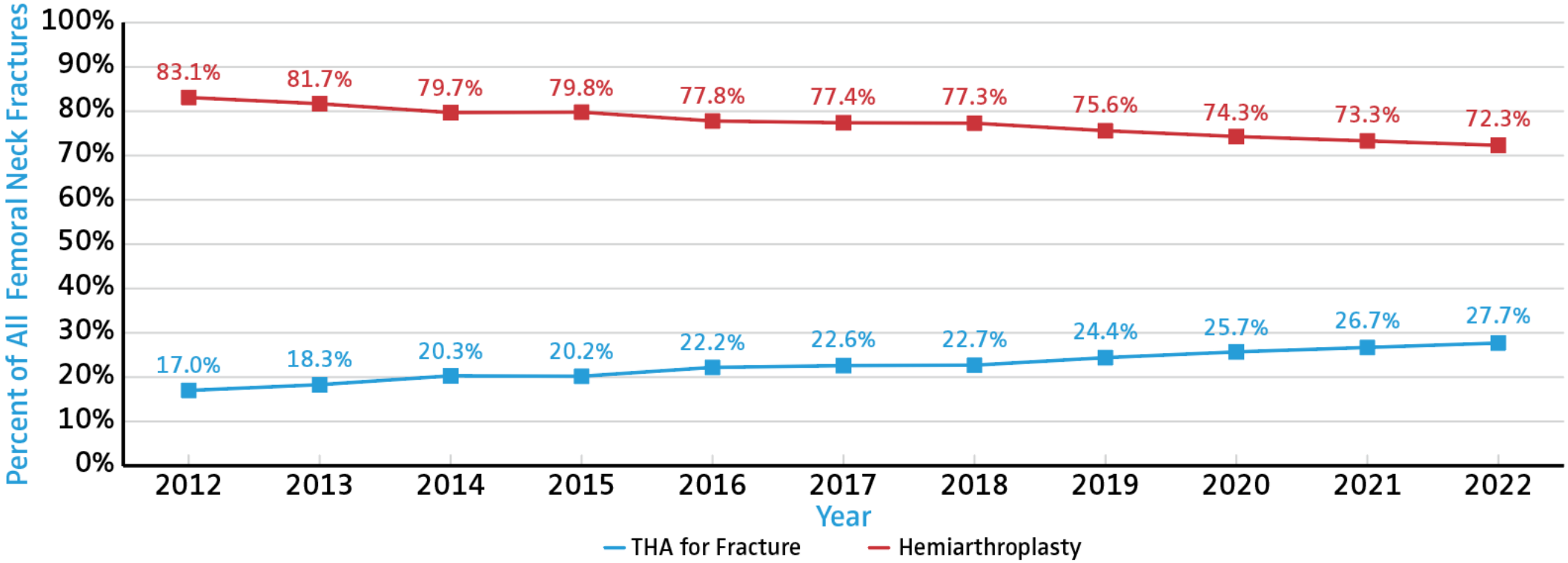
- Smith & Nephew
- Onkos
- Depuy
- Lineage Medical
- Fellowship grants: S&N, OMeGA, AAHKS

- All products shown are available from multiple vendors and I receive no royalties or consulting in regard to any of the products shown in this talk

Distribution of Procedure Codes for All Hip Arthroplasty Procedures, 2012-2022 (N=1,317,887)



Total Hip Arthroplasty and Hemiarthroplasty Procedures Performed for Femoral Neck Fracture, 2012-2022



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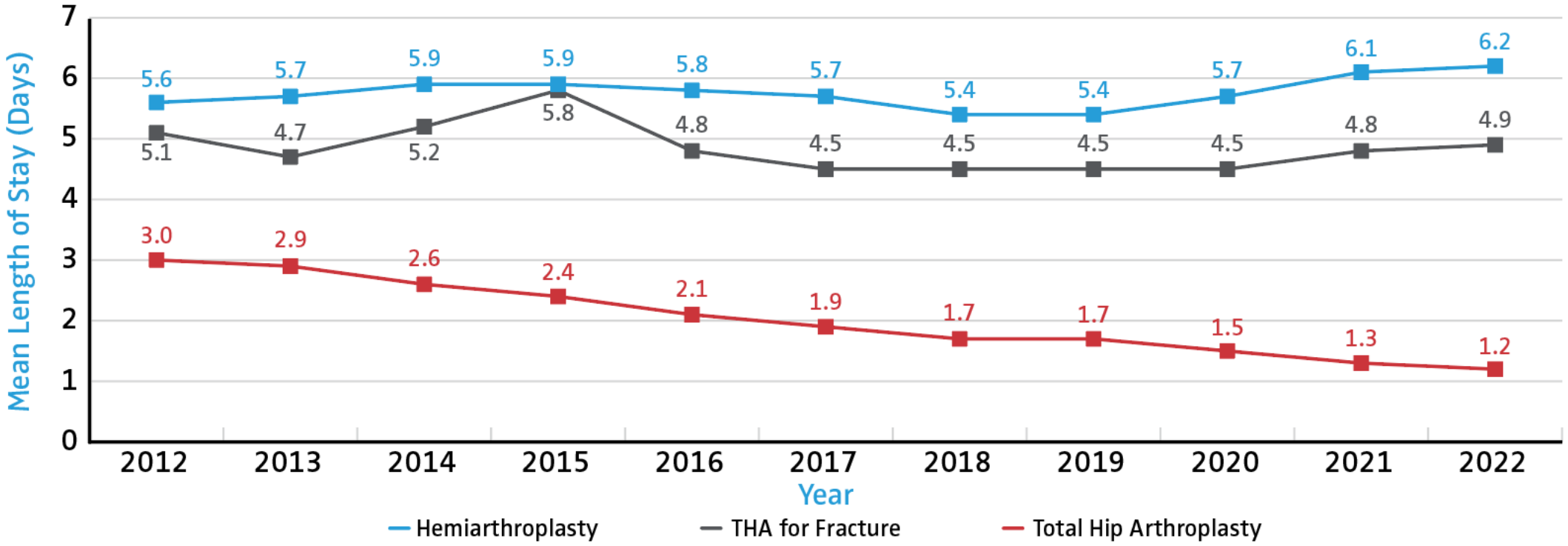
Mean Length of Stay for Hip Arthroplasty Procedures, 2012-2022 (N=752,866)



Posterior (an[illegible] vs Anterior

The Arthroplasty Civil War

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J Orthop Trauma • Volume 37, Number 9, September 2023

Surgical Approach and Dislocation Risk After Hemiarthroplasty in Geriatric Patients With Femoral Neck Fracture With and Without Cognitive Impairments—Does Cognitive Impairment Influence Dislocation Risk?

Brian Joseph Page, MD,[a] Miles Stanley Parsons, MD,[b] Josh Ho-sung Lee, MD,[c] Joel Graham Dennison, MD,[c] Kendall Pye Hammonds, MPH,[d] Kindyle Losey Brennan, PhD, PT,[e] Michael Lee Brennan, MD,[f] and Dan Lee Stahl, MD[f]

Conclusions: In this patient population, the PA has a higher dislocation rate than other approaches and has an especially high rate of dislocation when the patients were cognitively impaired. The authors of this study suggest careful consideration of surgical approach when treating these injuries.

Contents lists available at ScienceDirect

The Journal of Arthroplasty

journal homepage: www.arthroplastyjournal.org

Review

Surgical Approaches and Hemiarthroplasty Outcomes for Femoral Neck Fractures: A Meta-Analysis

Max P.L. van der Sijp, MD [a, *], Danny van Delft, MD [b], Pieta Krijnen, PhD [a], Arthur H.P. Niggebrugge, MD, PhD [c], Inger B. Schipper, MD, PhD [a]

[a] *Department of Surgery, Leiden University Medical Centre, Leiden, the Netherlands*
[b] *Department of Orthopaedics, Alrijne Hospital, Leiderdorp, the Netherlands*
[c] *Department of Surgery, Haaglanden Medical Centre, Den Haag, the Netherlands*

Conclusion: The PA for hemiarthroplasty in proximal femoral fractures poses an increased risk of dislocation and reoperation compared to the LA and AA. There are no evident advantages of the PA and its routine use for fracture-related hemiarthroplasty should be questioned.

JAMA Netw Open. 2024 Jan; 7(1): e2350765.
Published online 2024 Jan 11. doi: 10.1001/jamanetworkopen.2023.50765: 10.1001/jamanetworkopen.2023.50765

PMCID: PMC10784859
PMID: 38206628

Posterolateral or Direct Lateral Surgical Approach for Hemiarthroplasty After a Hip Fracture

A Randomized Clinical Trial Alongside a Natural Experiment

Maria C. J. M. Tol, MD,[✉ 1] Nienke W. Willigenburg, PhD, [1] Ariena J. Rasker, MSc, [1] Hanna C. Willems, MD, PhD, [2] Taco Gosens, MD, PhD, [3, 4] Martin J. Heetveld, MD, PhD, [5] Martijn G. M. Schotanus, Ing, PhD, [6, 7] Bart Eggen, MSc, [8] Mate Kormos, MSc, [8] Stéphanie L. van der Pas, PhD, [9, 10] Aad W. van der Vaart, PhD, [8]

Conclusions and Relevance

This combined RCT and NE found that among patients treated with a cemented hemiarthroplasty after an acute femoral neck fracture, PLA was not associated with a better quality of life than DLA. Rates of dislocation and reoperation were higher after PLA. Randomized and pseudorandomized data yielded similar outcomes, which suggests a strengthening of these findings.

- Limited data but most link posterior approach with higher complications after hemi compared to other approaches
- Lateral historically lower complications compared to posterior but do we really hate our patients that much….

2023 Napa Review

- Merits of cement
- Merits of collared stems

Americans Hate Cementing

- Takes longer
- Not trained in it well
- BCIS (Bone Cement Implantation Syndrome)
- We hate taking out cement
- We are all super active and fit and need the more durable physiologic bond of pressfit…

Clin Orthop Relat Res (2014) 472:1291–1299
DOI 10.1007/s11999-013-3308-9

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

CLINICAL RESEARCH

Cemented versus Uncemented Hemiarthroplasty for Displaced Femoral Neck Fractures: 5-year Followup of a Randomized Trial

Ellen Langslet MD, Frede Frihagen MD, PhD, Vidar Opland MD, Jan Erik Madsen MD, PhD, Lars Nordsletten MD, PhD, Wender Figved MD, PhD

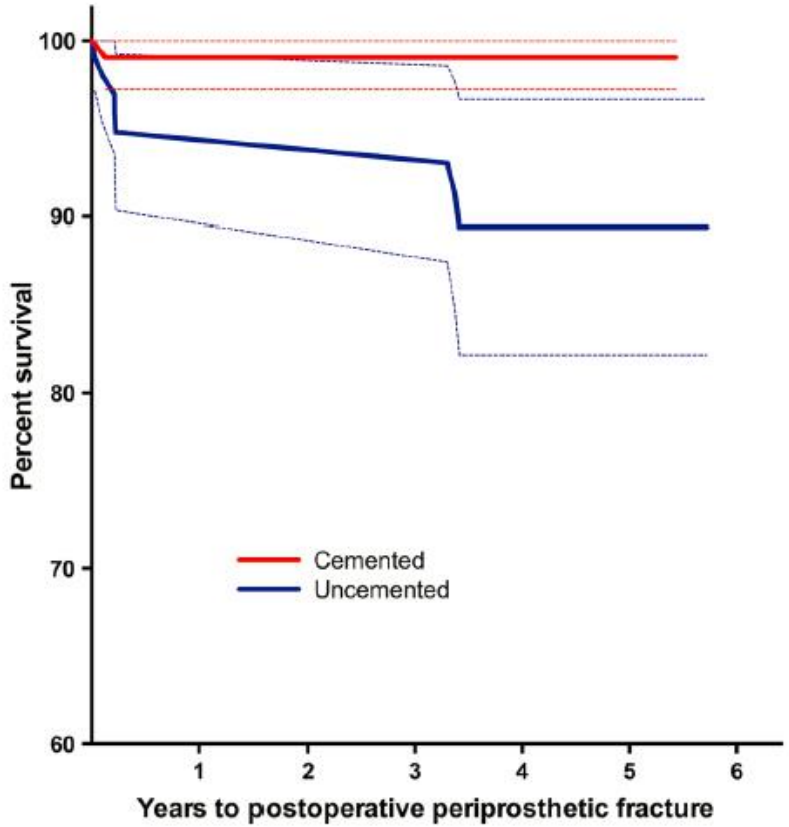

Fig. 5 The survival curve with 95% CIs shows the cemented and uncemented hemiarthroplasties with postoperative periprosthetic femoral fracture as the endpoint, censored for death.

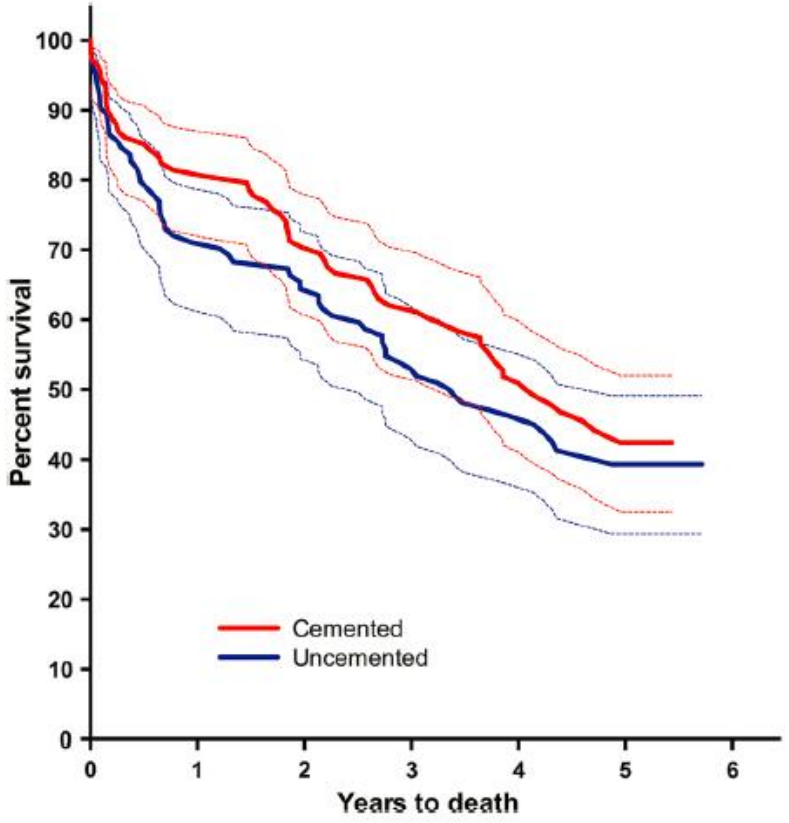

Fig. 6 The survival curve with 95% CIs shows the patients with cemented and uncemented hemiarthroplasties with death as the end point. Seven patients were included with both hips and are only included with their first hip in the mortality analysis.

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European Journal of Orthopaedic Surgery & Traumatology (2019) 29:731–746
https://doi.org/10.1007/s00590-019-02364-z

GENERAL REVIEW • HIP - FRACTURES

Hemiarthroplasty for neck of femur fractures: to cement or not? A systematic review of literature and meta-analysis

Prasoon Kumar[1] · Rajesh Kumar Rajnish[1] · Deepak Neradi[1] · Vishal Kumar[1] · Saurabh Agarwal[1] · Sameer Aggarwal[1]

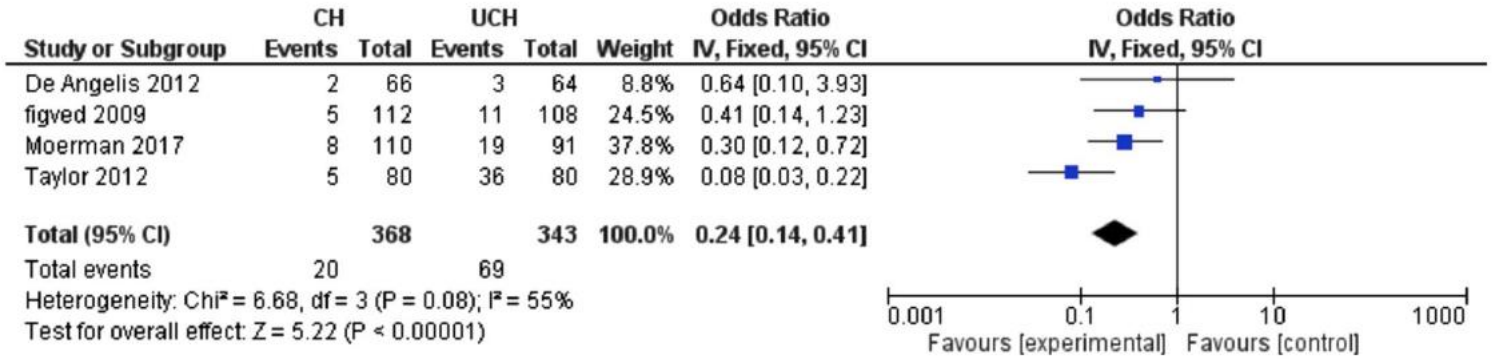


Fig. 6 Comparison of prosthetic-related complications (Experimental = CH; Control = UH)

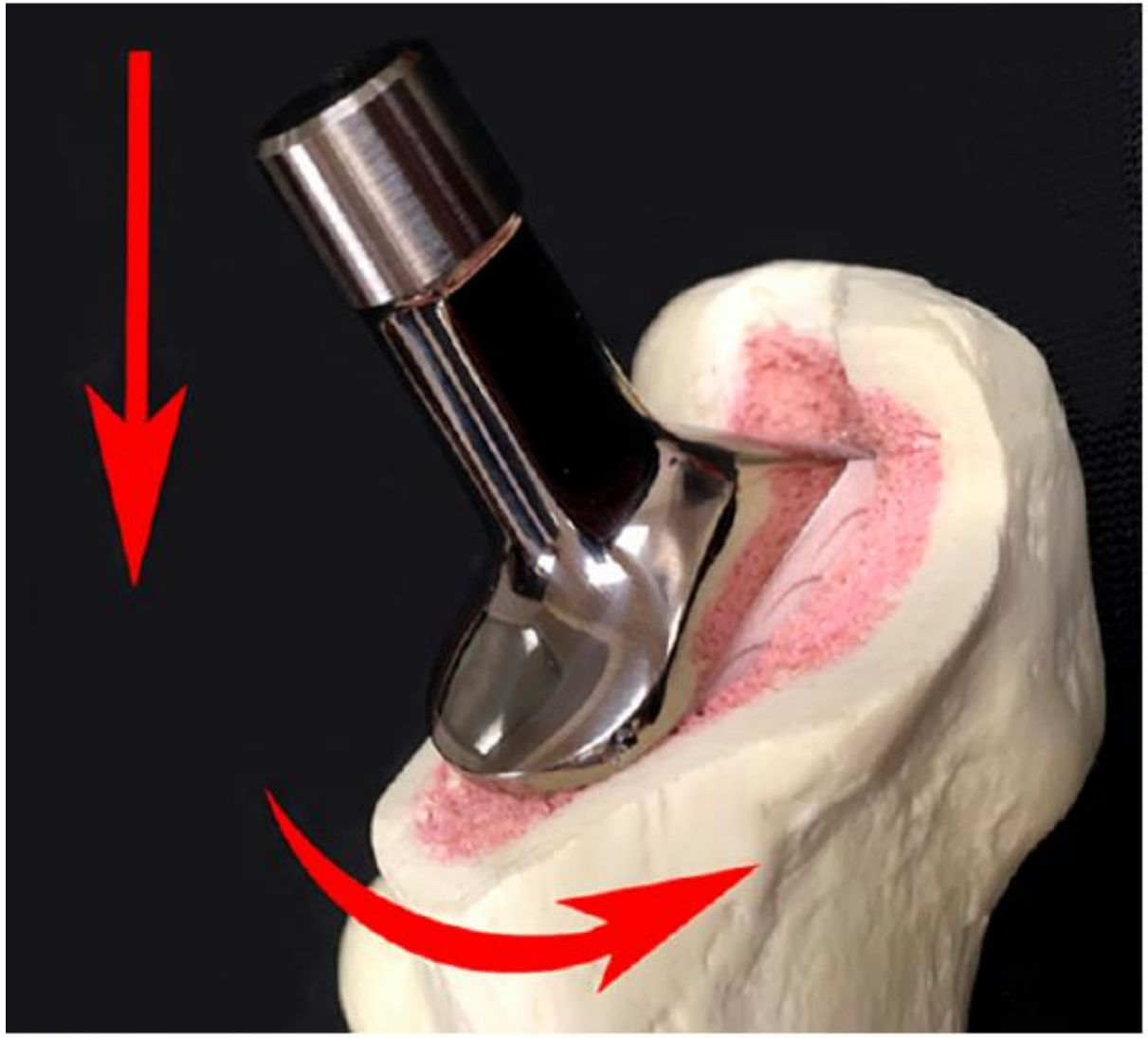
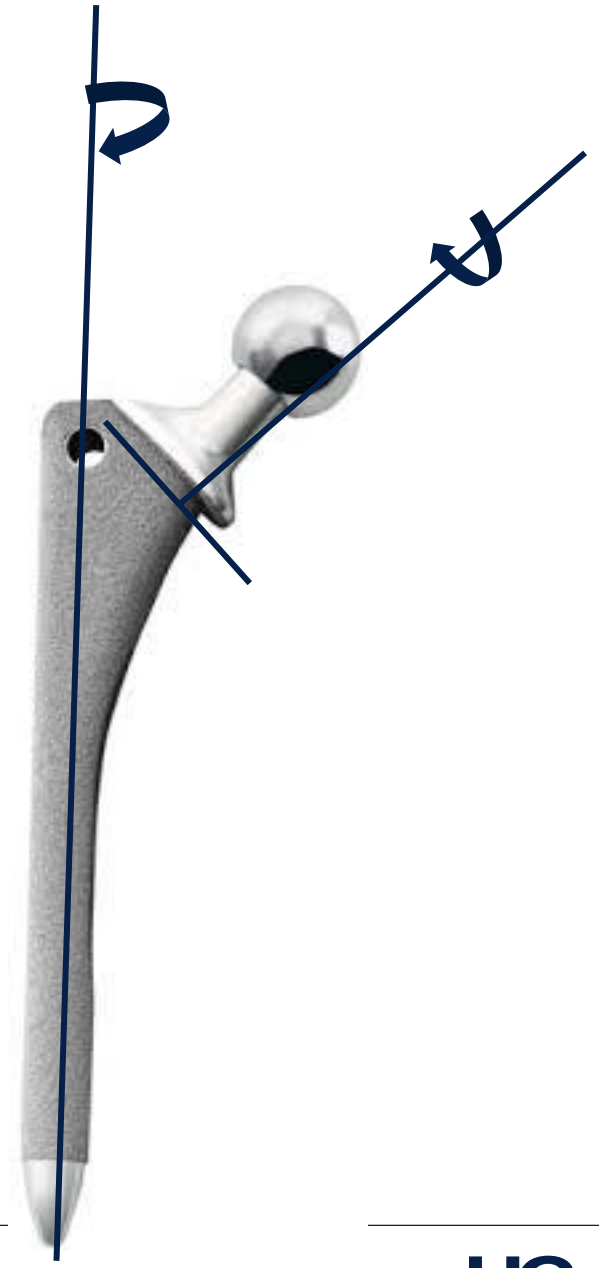


Fig. 1

With an axial load applied to the hip stem trunnion, the collar presses against the calcar, resisting the ability of the stem to rotate with respect to the femoral endosteal geometry. We surmise that limitation of rotation of



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A Calcar Collar Is Protective Against Early Torsional/ Spiral Periprosthetic Femoral Fracture

A Paired Cadaveric Biomechanical Analysis

How Does Implant Survivorship Vary with Different Corail Femoral Stem Variants? Results of 51,212 Cases with Up to 30 Years Of Follow-up from the Norwegian Arthroplasty Register

Silje Marie Melbye[1], Sofie Cecilia Dietrich Haug[1], Anne Marie Fenstad MSc[2], Ove Furnes MD, PhD[2,3], Jan-Erik Gjertsen MD, PhD[2,3], Geir Hallan MD, PhD[2,3]

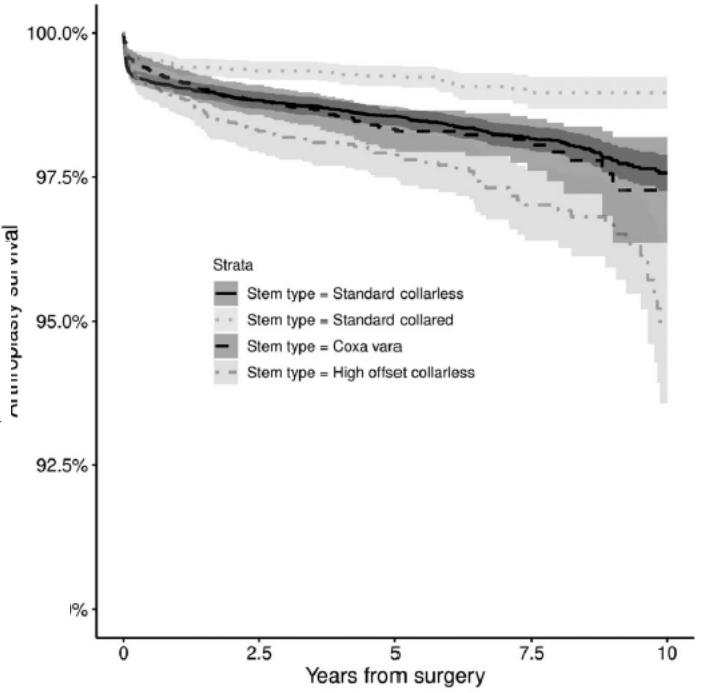

Fig. 5. This Kaplan-Meier curve shows the four Corail stem variants with the endpoint of stem revision for any reason.

Calcar-collar contact during simulated periprosthetic femoral fractures increases resistance to fracture and depends on the initial separation on implantation: A composite femur in vitro study

Jonathan N. Lamb[a,*], Oliver Coltart[b], Isaiah Adekanmbi[c], Hemant G. Pandit[a], Todd Stewart[b]

The Journal of Arthroplasty Vol. 26 No. 8 2011

Does a Collar Improve the Immediate Stability of Uncemented Femoral Hip Stems in Total Hip Arthroplasty? A Bilateral Comparative Cadaver Study

J. N. Lamb, J. Baetz,

■ HIP

A calcar collar is protective against early periprosthetic femoral fracture around cementless femoral components in primary total hip arthroplasty

A REGISTRY STUDY WITH BIOMECHANICAL VALIDATION

Design variables		HR	p-value
Design variables			
Collar	Collared	1.0	
	Collarless	4.7	< 0.001*

J Arthroplasty. 2023 Jun 19;S0883-5403(23)00653-8. doi: 10.1016/j.arth.2023.06.014. Online ahead of print.

Systematic Review and Meta-Analysis of Studies Comparing the Rate of Post-operative Periprosthetic Fracture Following Hip Arthroplasty With a Polished Taper Slip versus Composite Beam Stem

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Don’t Forget your Cemented Collar Too!

J Arthroplasty. 2023 Jun 19;S0883-5403(23)00653-8. doi: 10.1016/j.arth.2023.06.014.
Online ahead of print.

Systematic Review and Meta-Analysis of Studies Comparing the Rate of Post-operative Periprosthetic Fracture Following Hip Arthroplasty With a Polished Taper Slip versus Composite Beam Stem

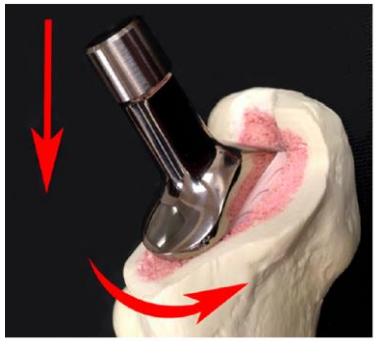

Fig. 1
With an axial load applied to the hip stem trunnion, the collar presses against the calcar, resisting the ability of the stem to rotate with respect to the femoral endosteal geometry. We surmise that limitation of rotation of the stem with respect to the femur limits early postoperative spiral periprosthetic fracture.

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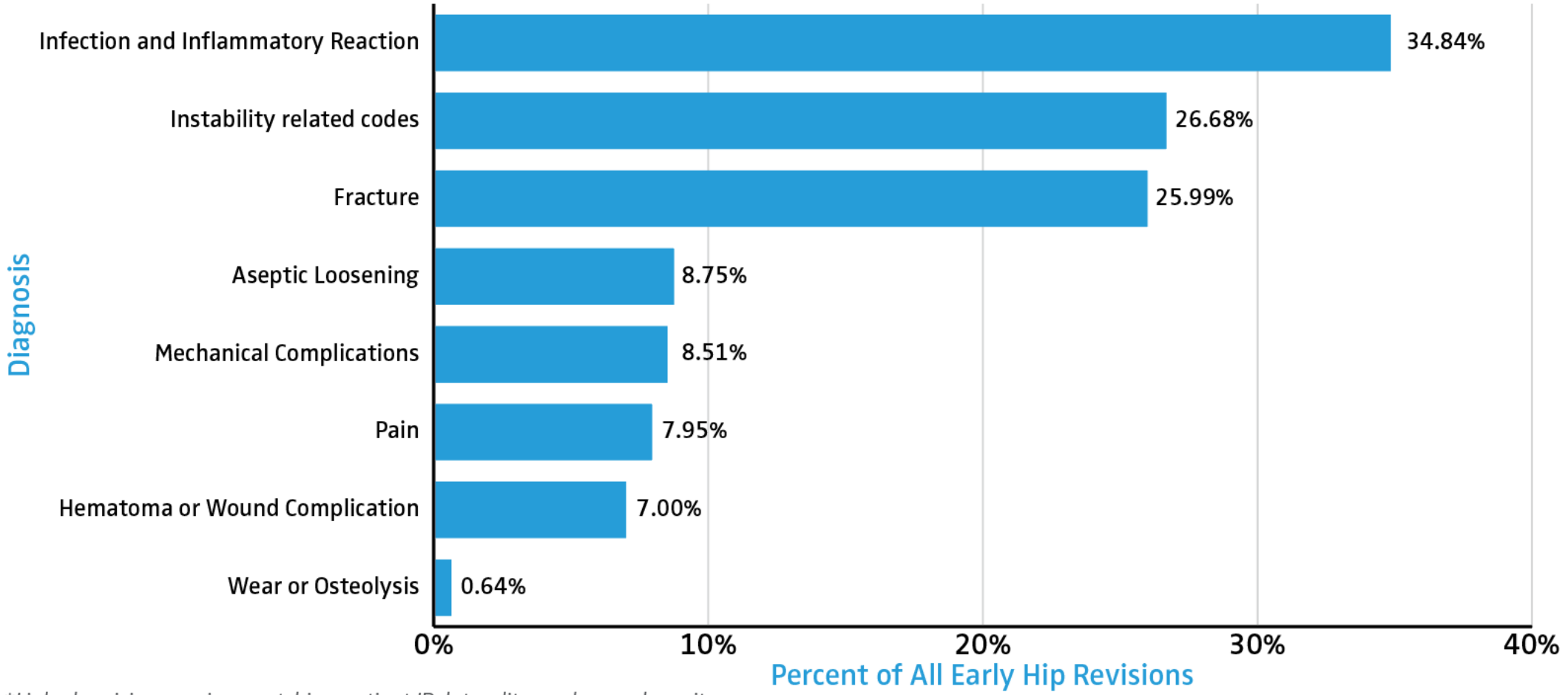
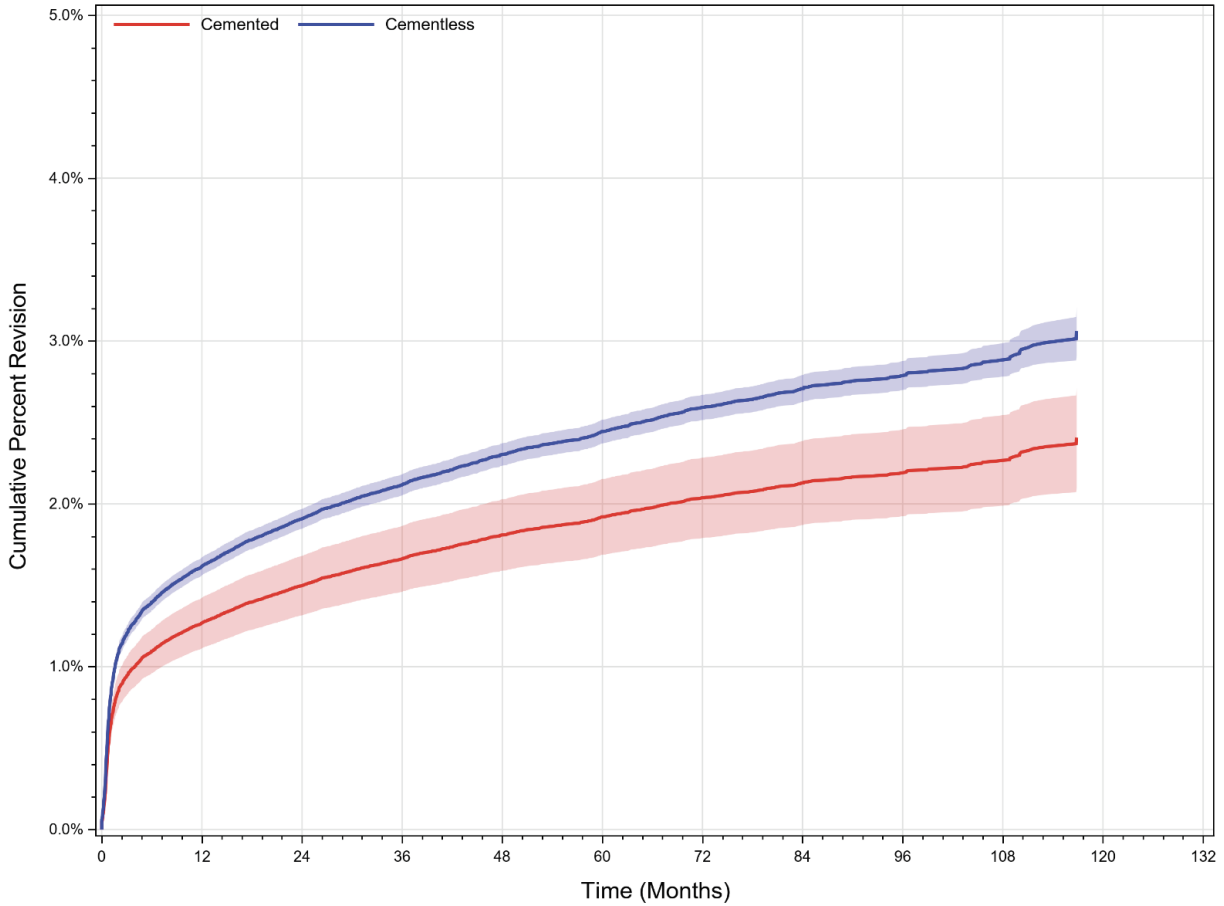
Distribution of Diagnosis Associated With all Early "Linked" Hip Revisions, 2012-2022 (N=9,696)*



*Linked revision requires matching patient ID, laterality, and procedure site

Cumulative Percent Revision for Femoral Stem Fixation Used for Elective Primary Total Hip Arthroplasty for Female Medicare Patients 65 Years of Age and Older with Primary Osteoarthritis, 2012-2022



Number at Risk (Months)	0	12	24	36	48	60	72	84	96	108	120	132
Cemented	14,539	12,730	10,717	9,049	7,147	5,341	3,640	2,163	1,097	429	159	1
Cementless	201,804	180,696	159,896	139,183	112,921	86,091	58,974	35,709	19,845	8,683	2,536	10
Total	216,343	193,426	170,613	148,232	120,068	91,432	62,614	37,872	20,942	9,112	2,695	11

Age adjusted HR (95%CI), p-value
Cemented vs. Cementless: 0.783(0.684,0.896) p=0.0004

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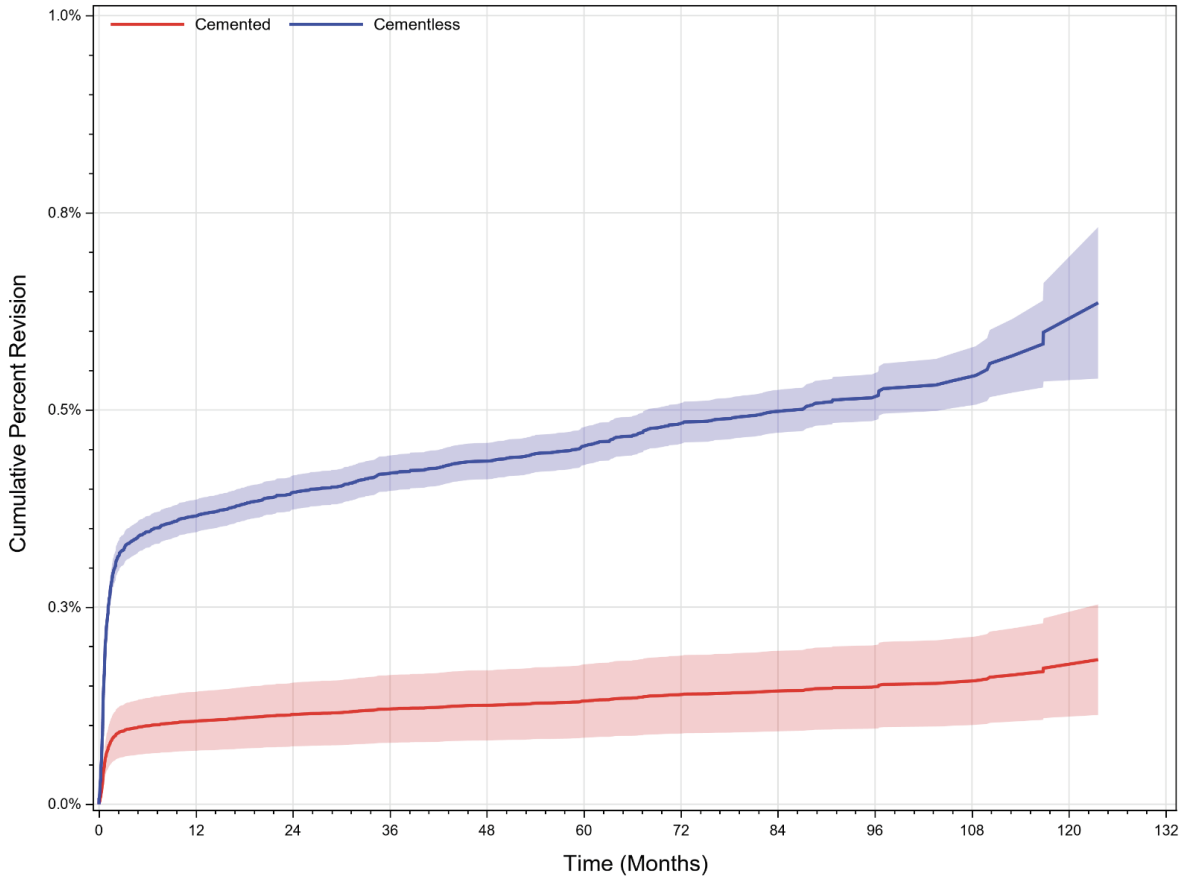
Cumulative Percent Revision due to Periprosthetic Fracture for Elective Primary Total Hip Arthroplasty Patients 65 Years of Age and Older, 2012-2022

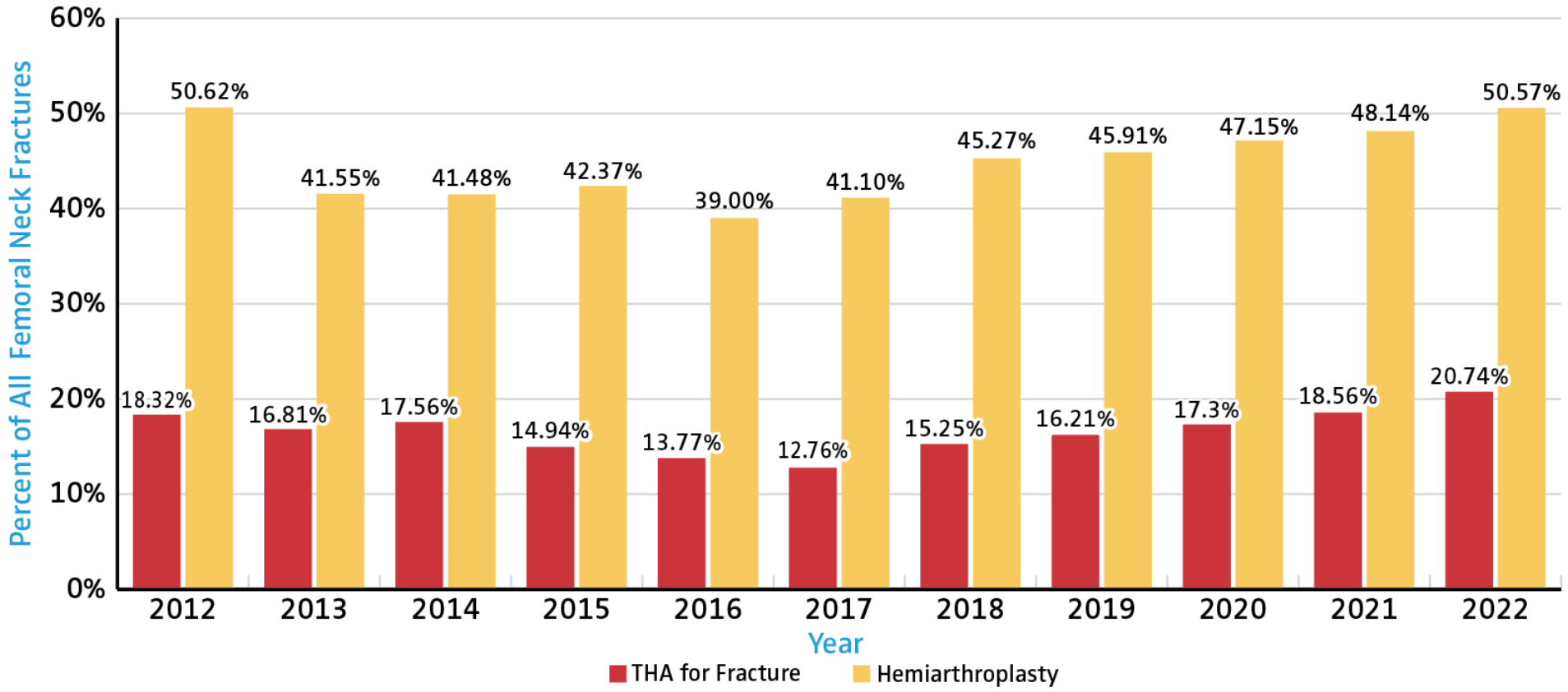


Number at Risk (Months)	0	12	24	36	48	60	72	84	96	108	120	132
Cemented	17,899	15,682	13,201	11,142	8,824	6,633	4,553	2,686	1,349	525	189	1
Cementless	338,998	303,809	268,526	233,303	189,380	144,520	98,593	59,730	33,066	14,391	4,240	13
Total	356,897	319,491	281,727	244,445	198,204	151,153	103,146	62,416	34,415	14,916	4,429	14

Age/Sex adjusted cause-specific HR (95%CI), p-value
Cemented vs. Cementless: 0.287(0.192,0.43), p=<0.0001

HAPPY TO SEE CONTINUED RESURGENCE!!!

Cemented Fixation for Femoral Stems in Total Hip Arthroplasty and Hemiarthroplasty for Femoral Neck Fracture, 2012-2022 (N=44,187)



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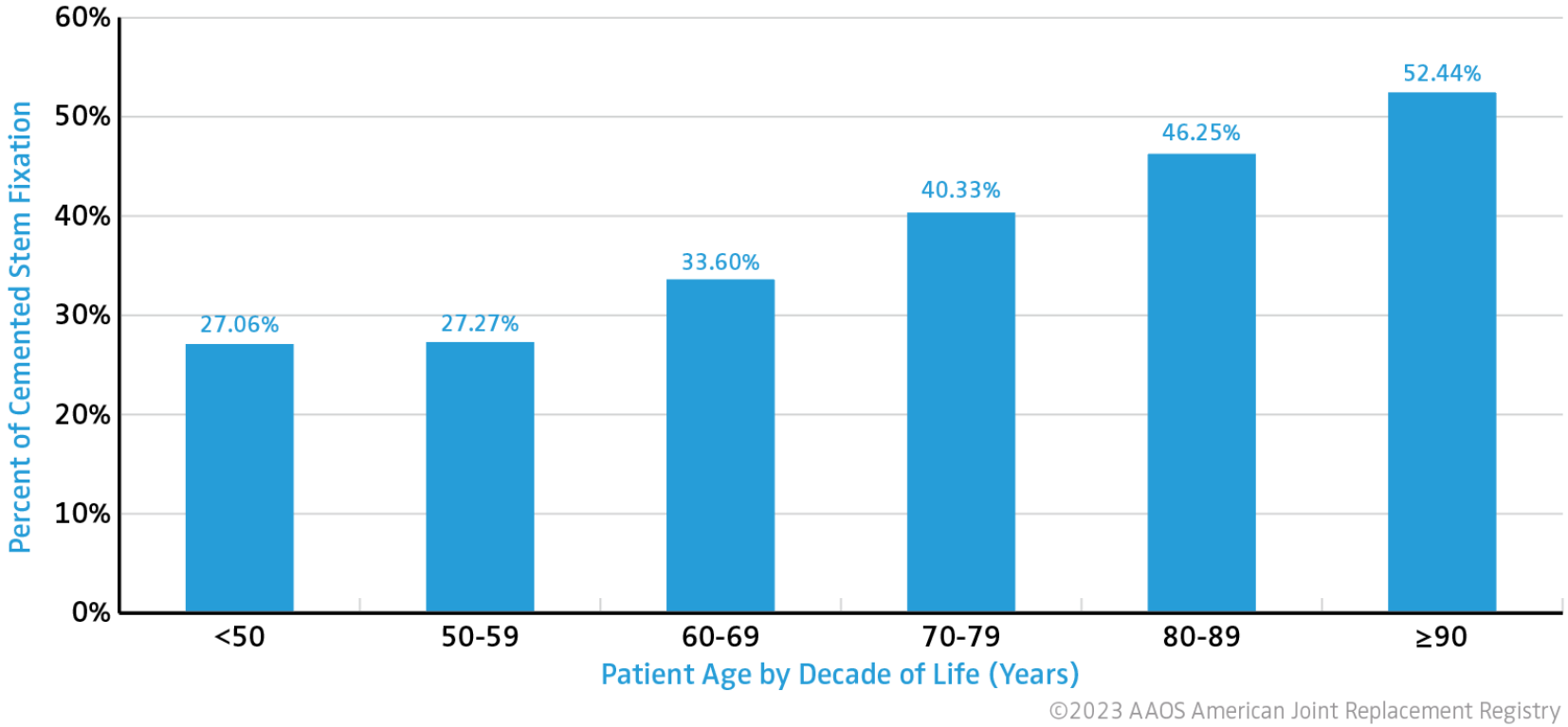
Percent of Cemented Stem Fixation Used in Hemiarthroplasty for Femoral Neck Fracture by Age Group, 2012-2022 (N=39,898)

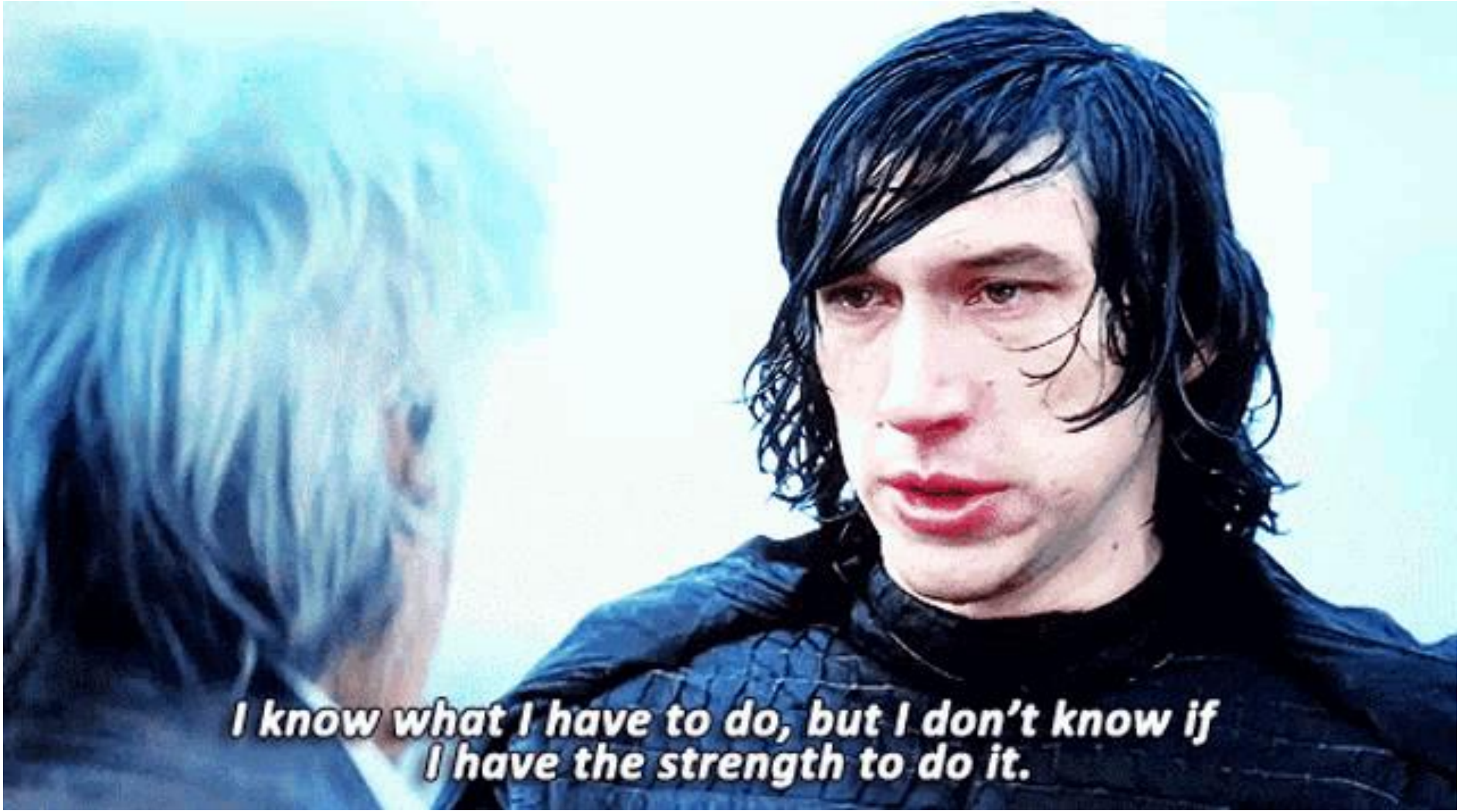


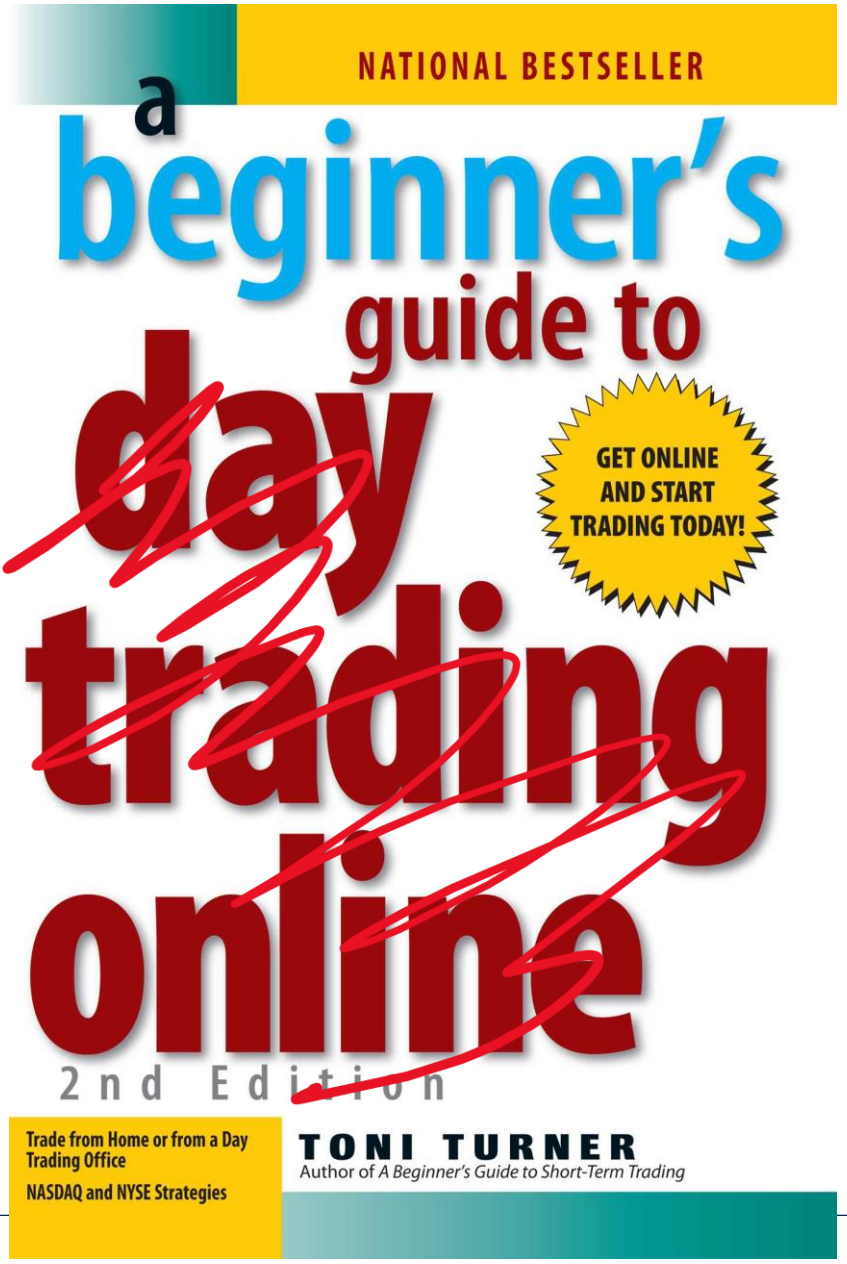
"LESS THAN HALF OF YOU WOULD CEMENT ME!?!"

Why are cemented DA rates low?

- Lack of appropriate instrumentation
- Lack of surgeon comfort/training
- Concern about getting necessary exposure
- What is something bad happens in the case?
- Cementless is faster

- Hemi DA even more rare
  - Maybe just doing a total (just as fast, easier reductions, not worried about instability…)
  - For me pretty much only dementia or non-ambulator (costs and MRB/MFB)


I know what I have to do, but I don't know if
I have the strength to do it.



Cementing (a Hemiarthroplasty) through Direct Anterior Approach

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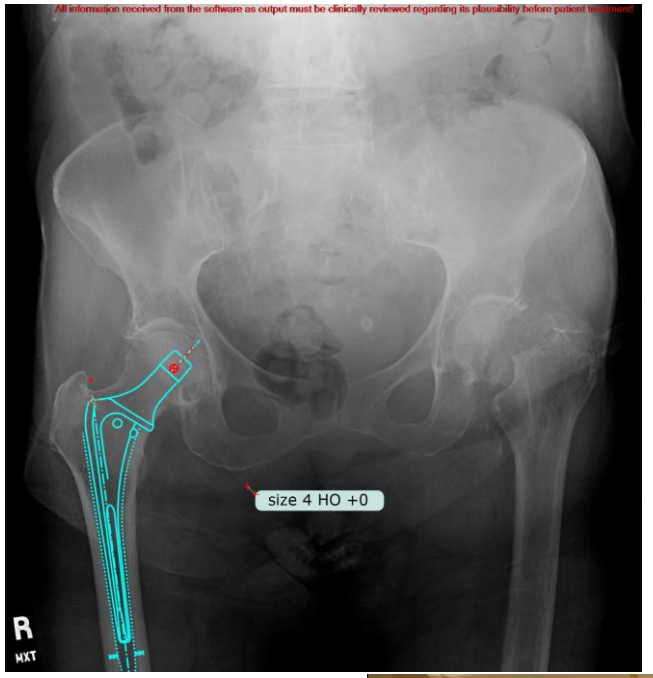
Setup

- Template off the contralateral side

- Hana table
  - “Don’t leave your most powerful instrument sitting in the hallway”

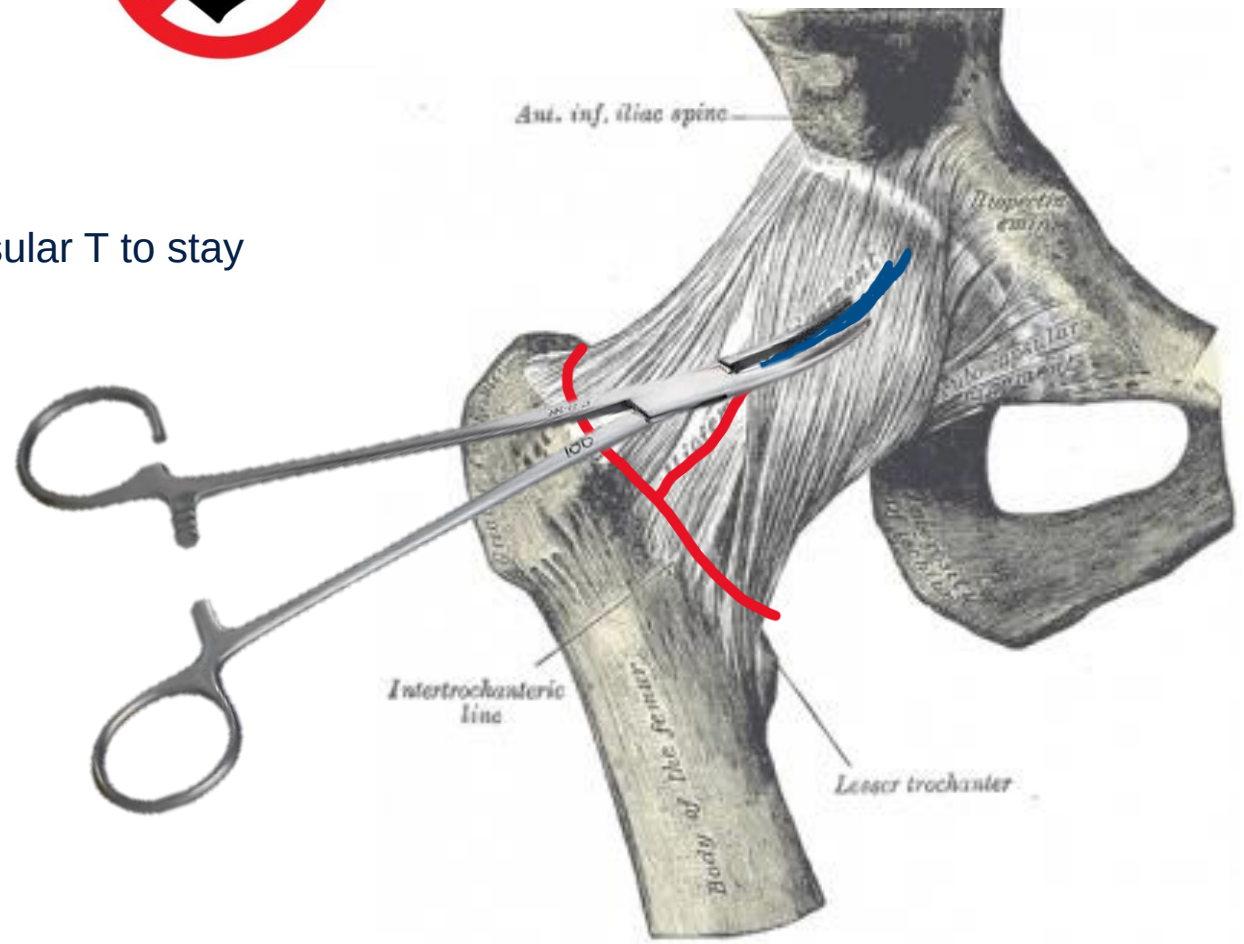
- PRO-TIP: Gentle traction on the operative extremity
    – Normalizes anatomy on approach

- If have access to self-retaining retractors use them
  - Don’t want movement during cementation curing



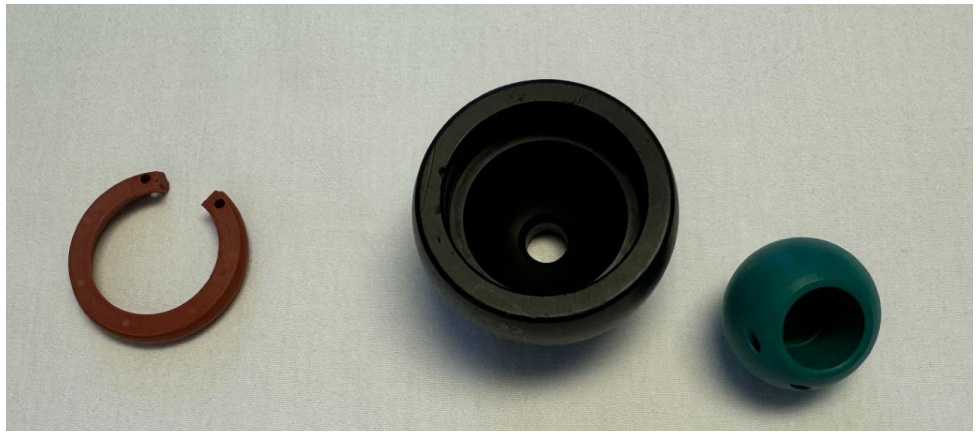
Approach

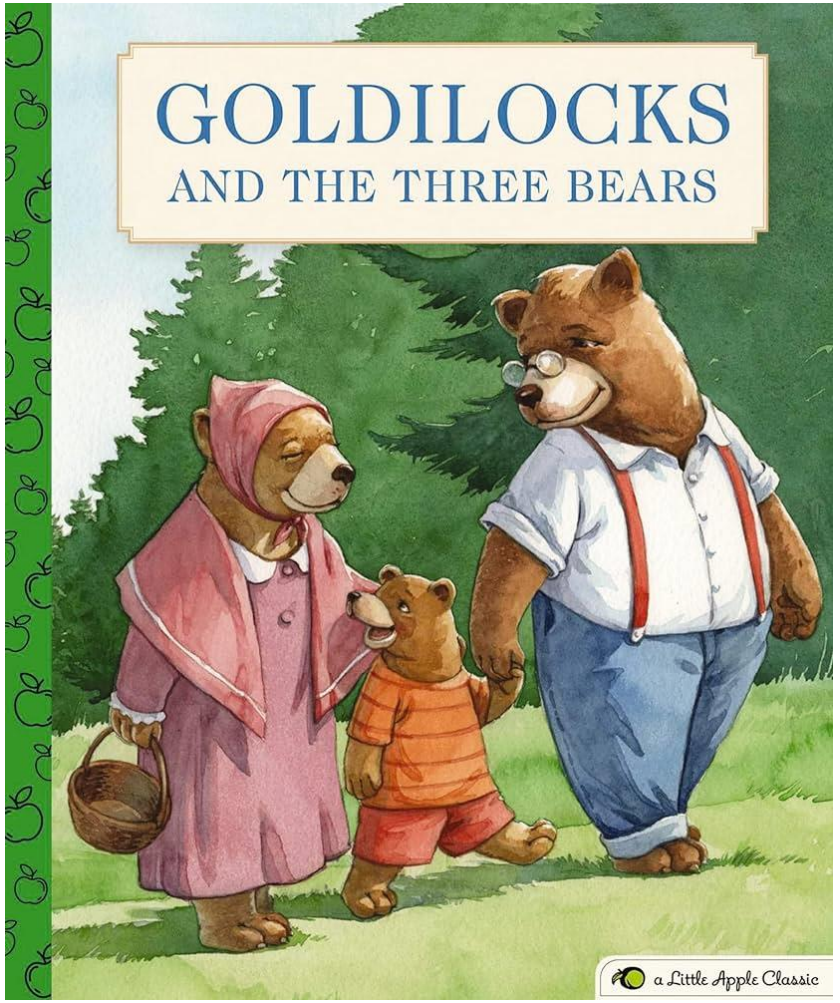
- Standard approach
- Preserve labrum – use a schnidt after starting capsular T to stay above the labrum proximally
  - (I keep capsule)
- Freshen neck cut
- Traction and ER
- Corkscrew into head and remove remnants



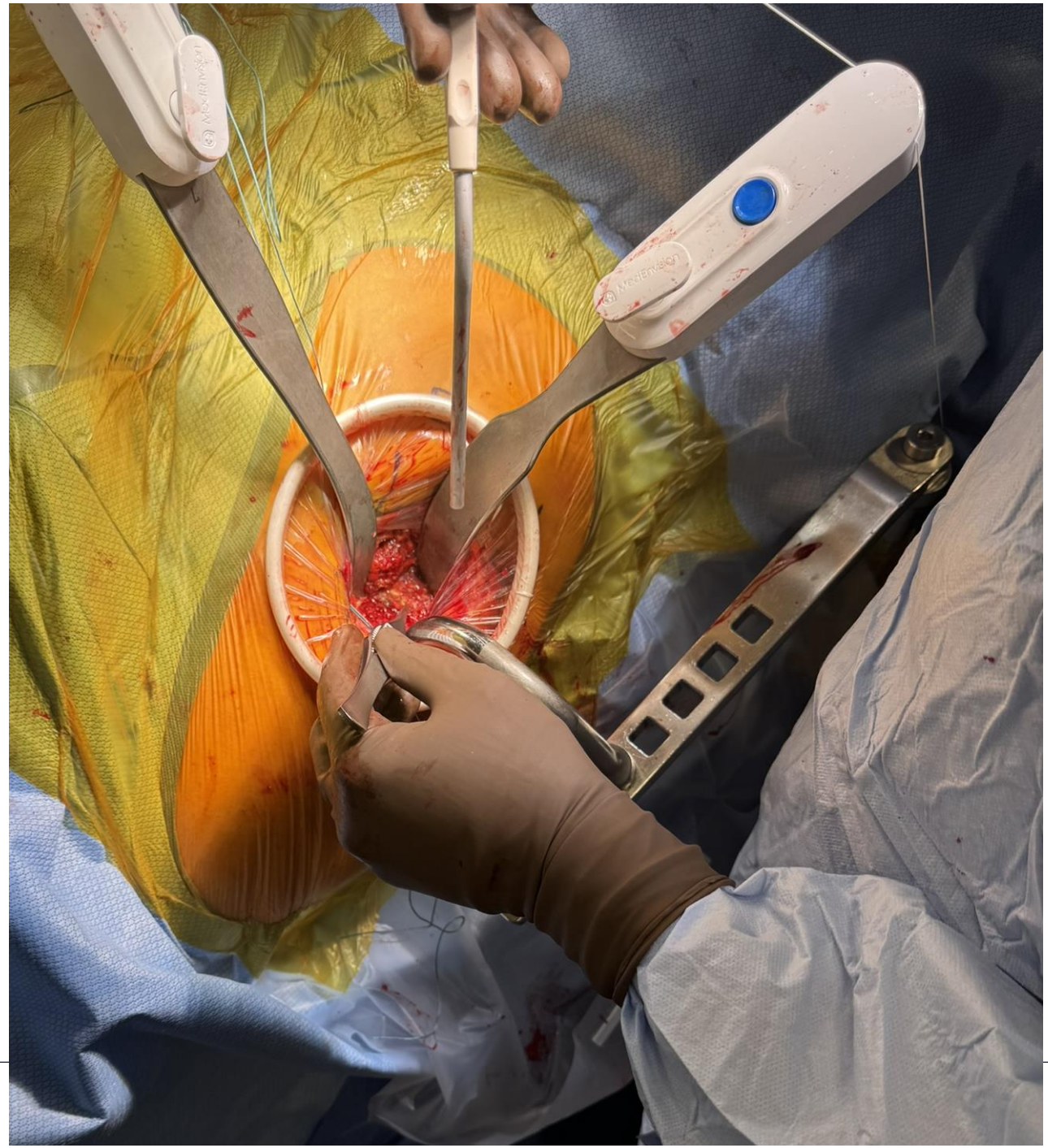
Trial Heads

- Outer bipolar ball only
- Three little bears with fingers
- LEAVE THE TRIAL IN THE SOCKET



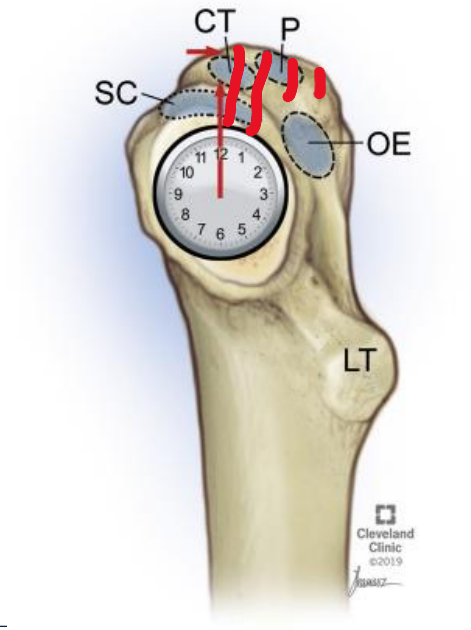


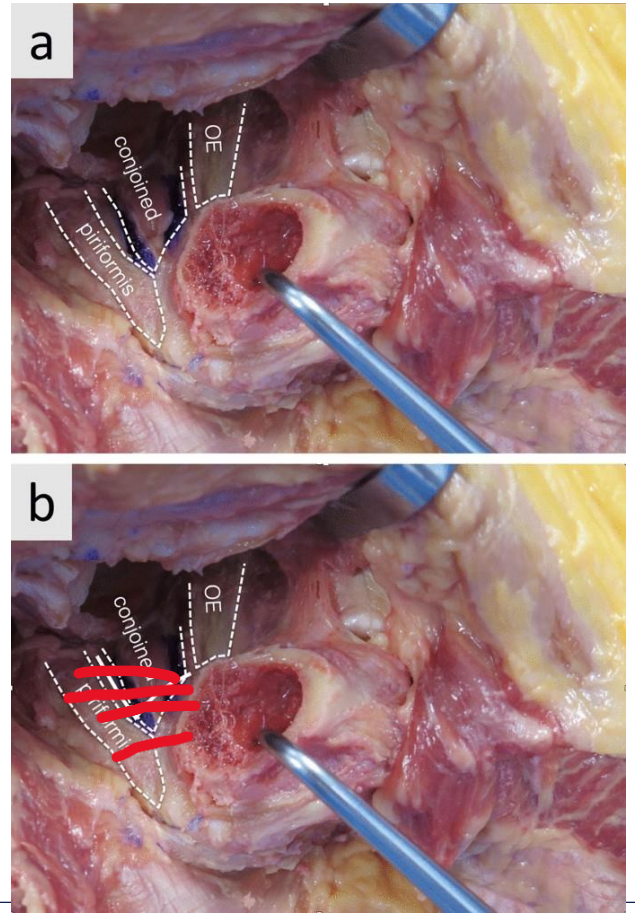
Femoral Exposure

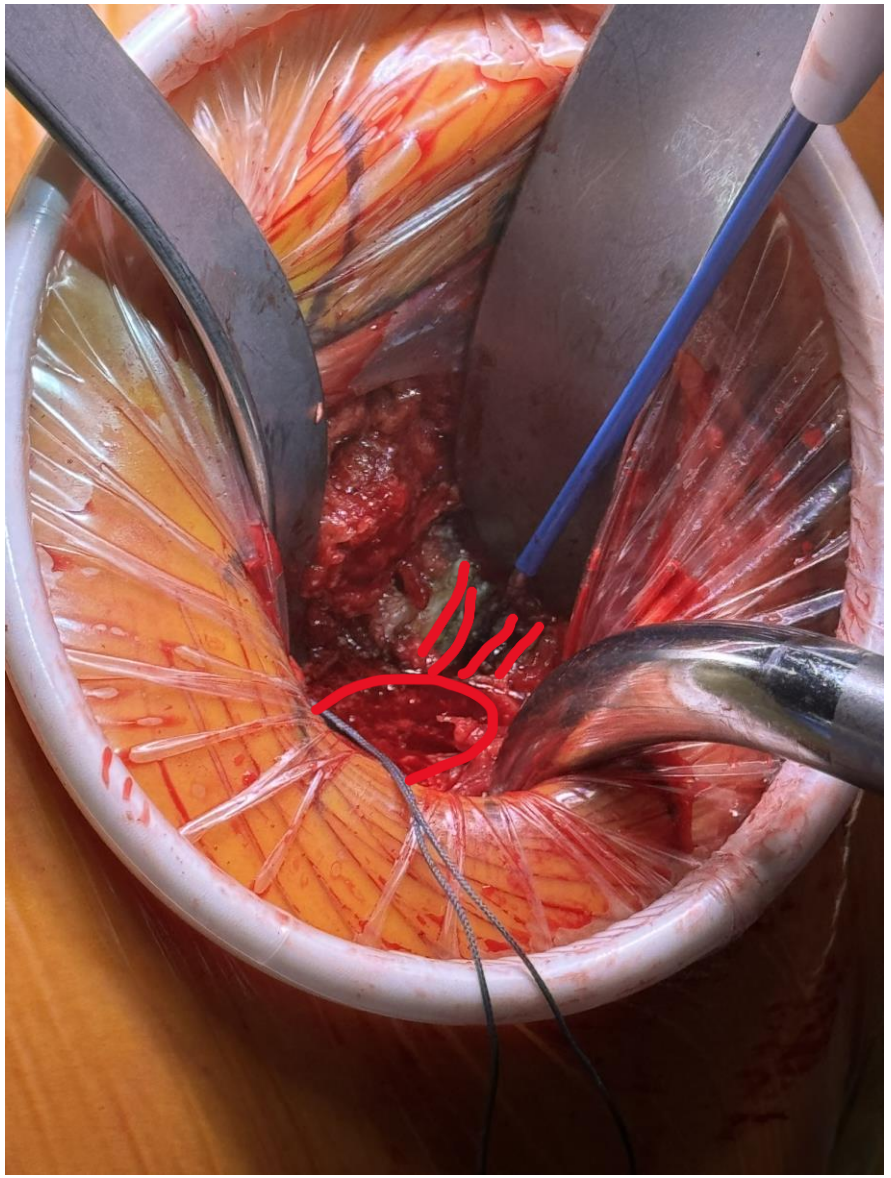


Full Inner Troch Release

- No undue pressure from conjoint/piriformis onto greater trochanter
- Leave obturator externus
- Decrease risk of troch fracture
- Max exposure for straightest shot



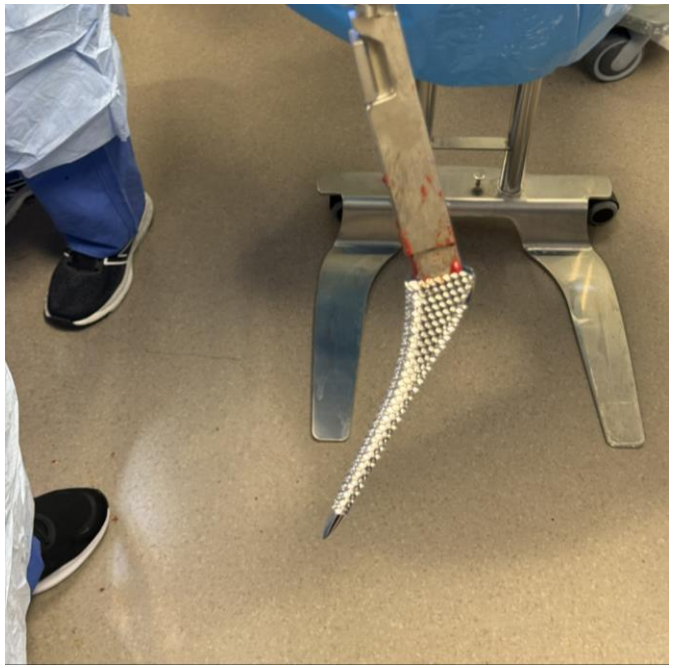




Broaching

- Clear lateral neck remnant aggressively
- Need straighter shot than most DA stems
  - No cemented stems with shoulder relief available
  - Longer broaches

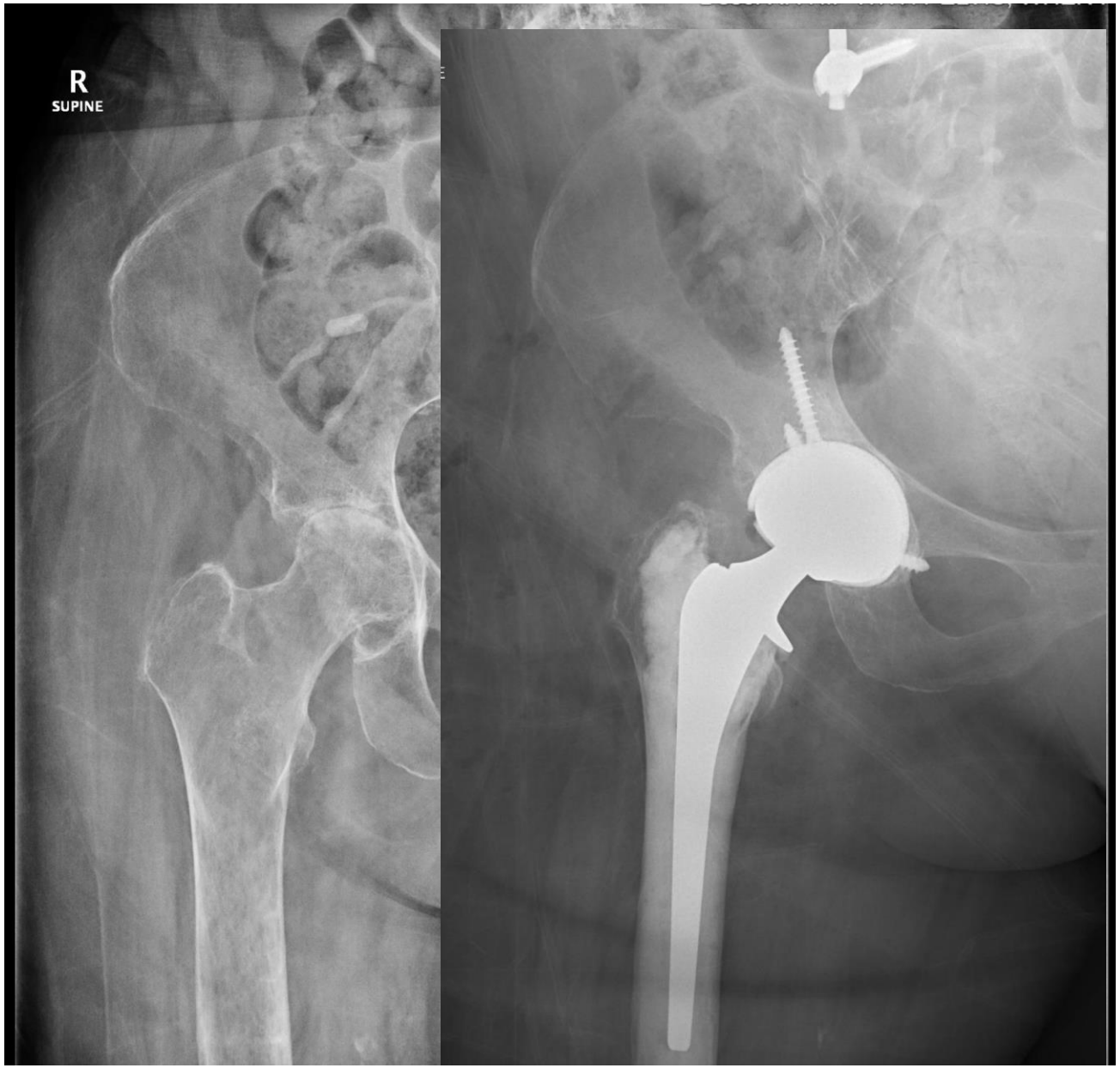
- Offset Broaches
  - Manual or automatic impaction doesn't matter
  - If really really bad I use manual and almost just push broaches in/out



If horrible bone….

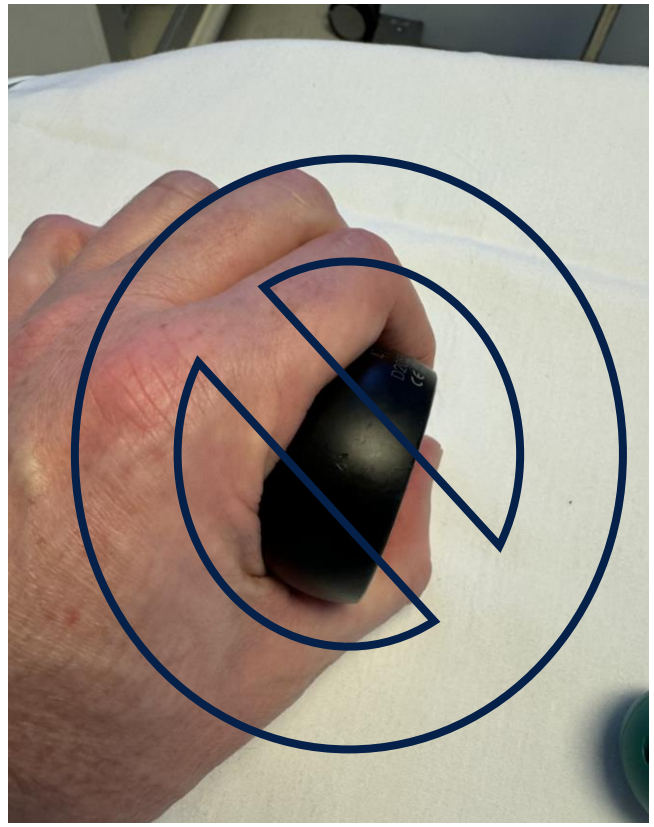
- Don’t be afraid to skip trialing until after cemented
- Trailing is most dangerous part of the procedure!!
- Cement in a reasonable position (templating helps!!). Trial afterwards

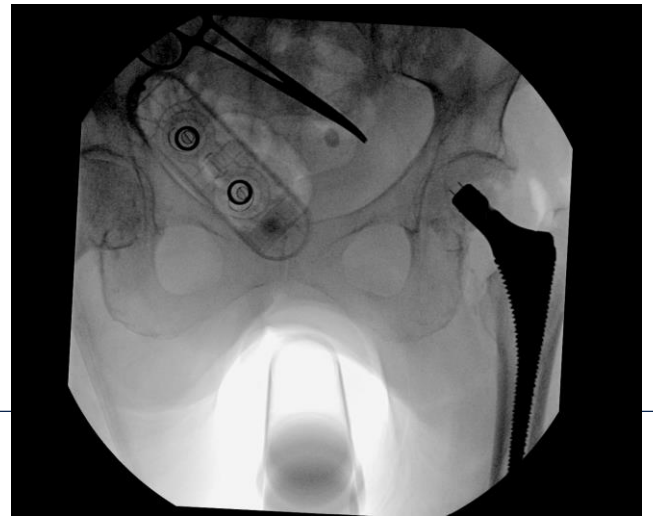
- Most hemi not worried about a few mm extra length or offset

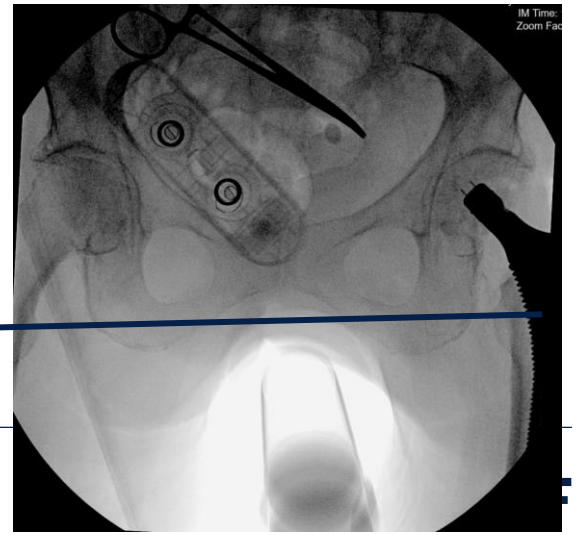


Normal Hemi Trialing

- Orient the outer bipolar trial to “accept” the reduction
- Reduce small ball of bipolar into the big ball (pseudo-acetabular trial)
  - Technically without centering sleeve its slightly off length/offset (<1mm)
  - Dislocate same way

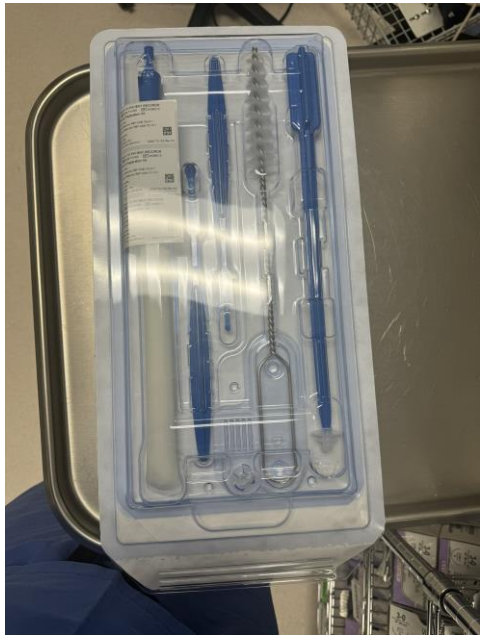


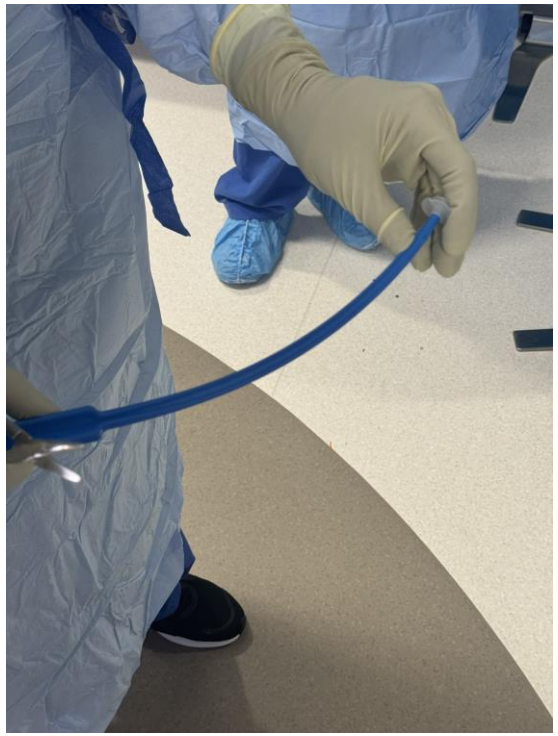


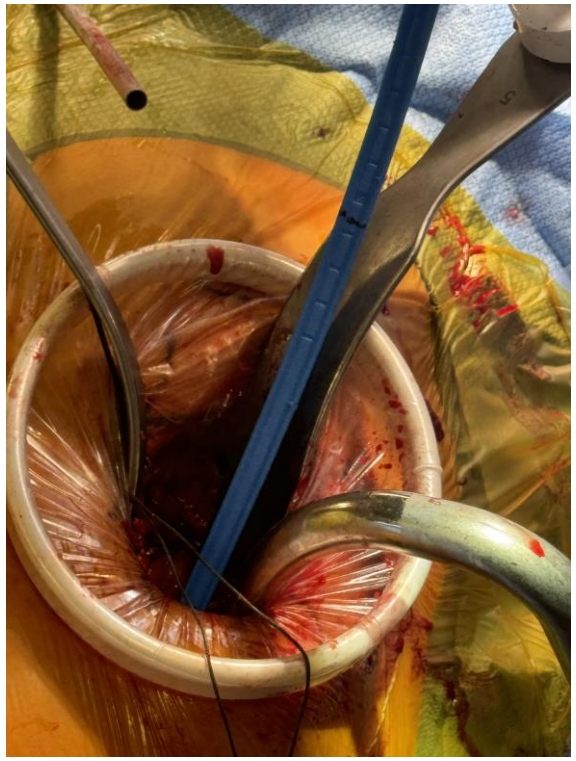


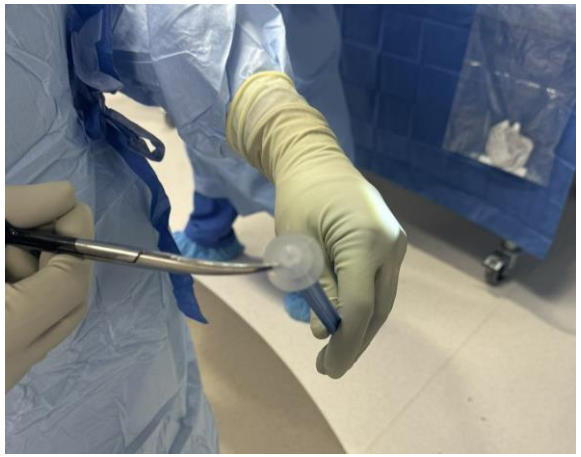
Prepare Bone for Cement

- Flexible restrictor inserter a MUST
- Never more than a baby tap of the mallet to insert (usually just palm slap)

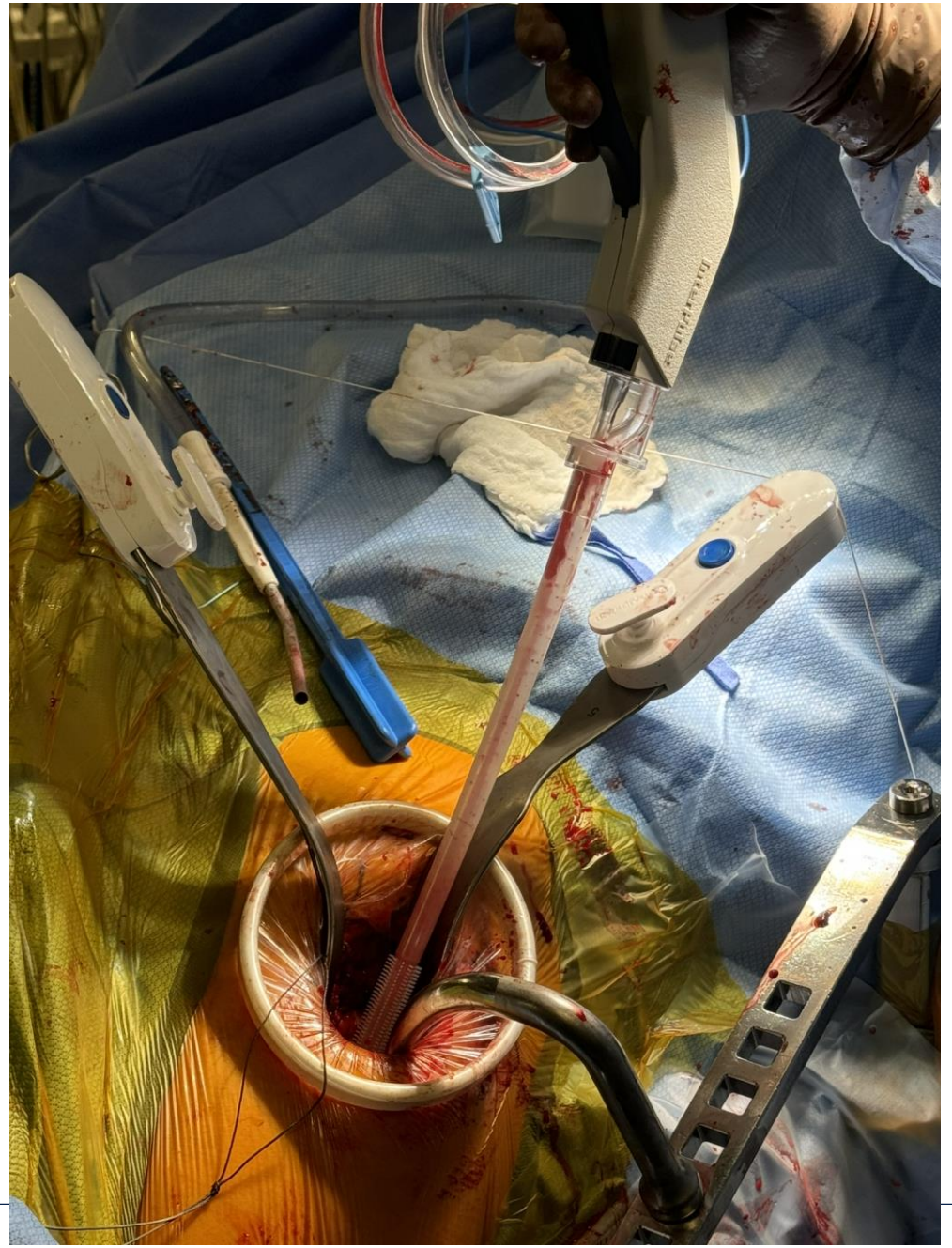






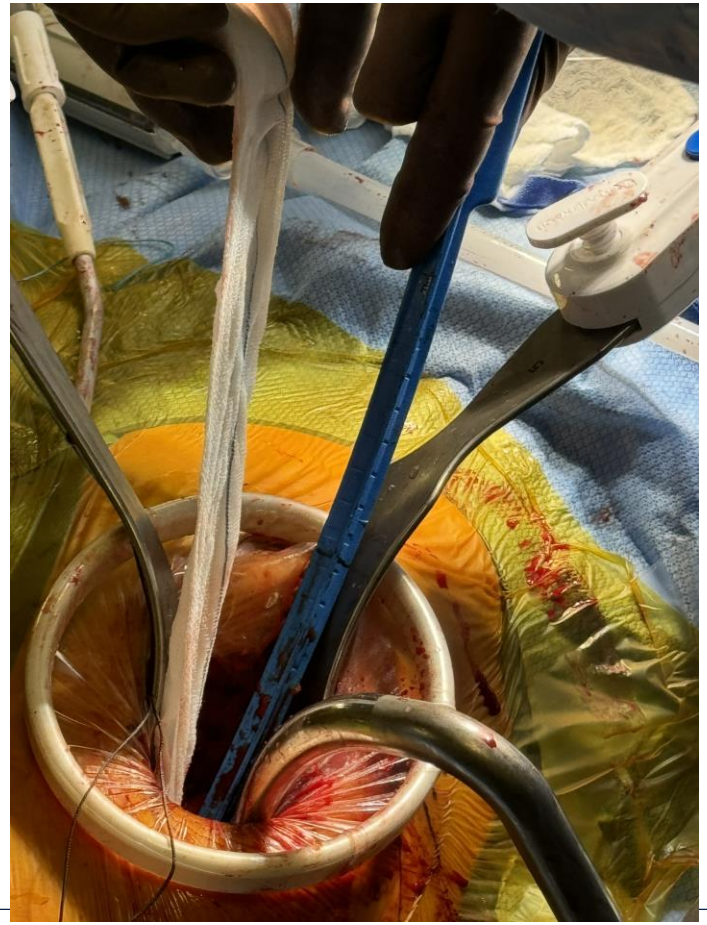


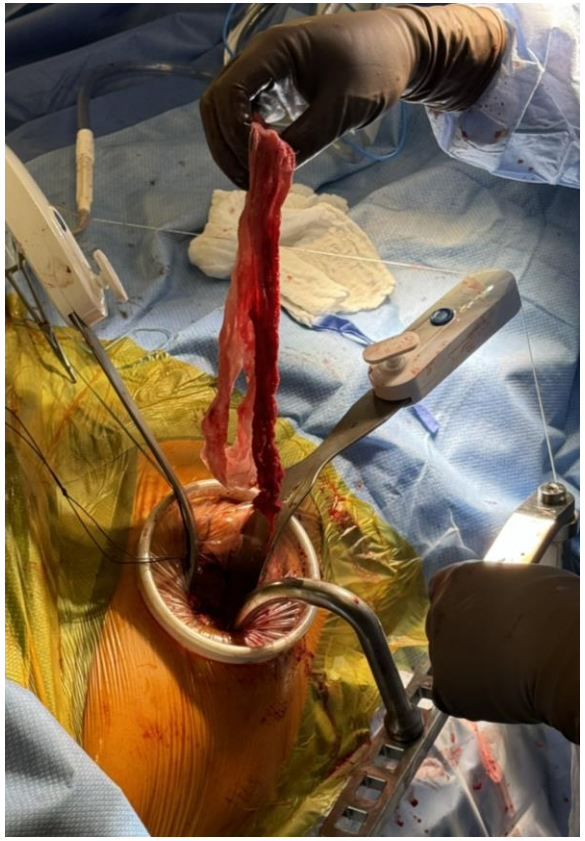
Pulse lavage (deep and peritroch)

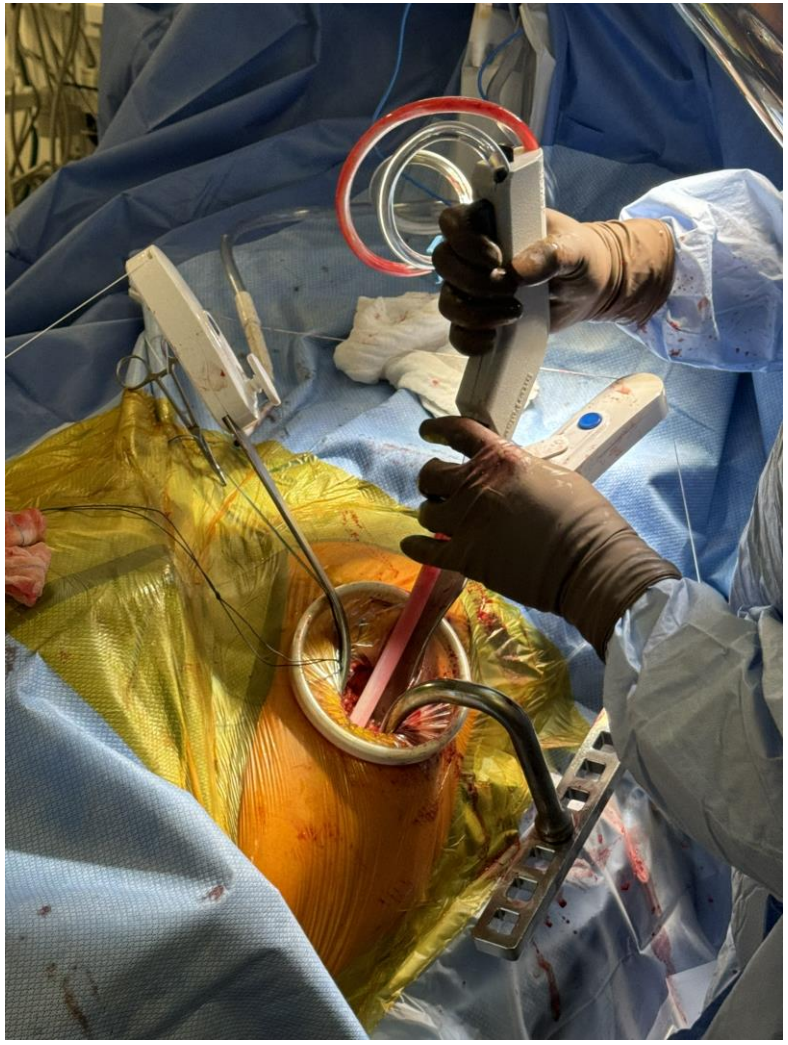


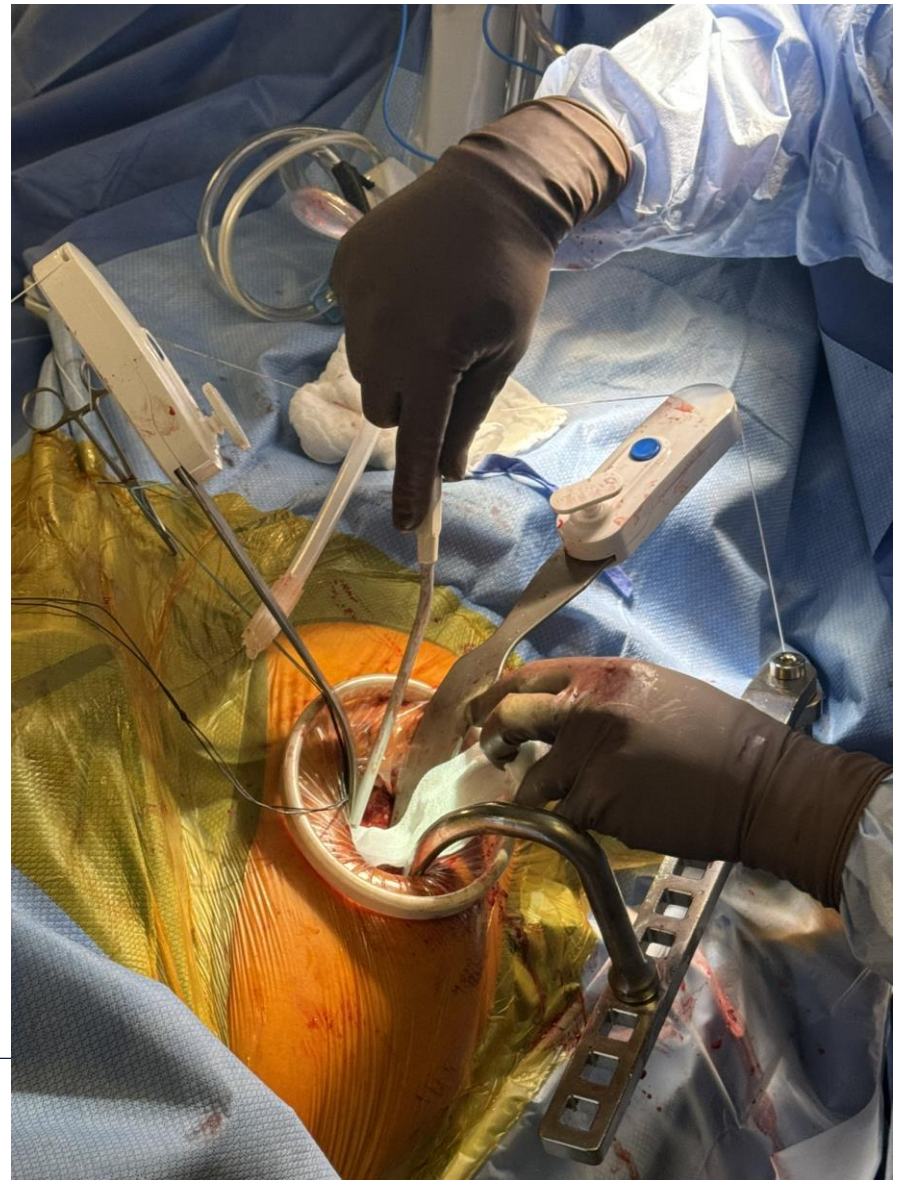
Drying

- Vaginal packing
  - Cut in half
  - First half in epinephrine + saline (1mg + 50cc saline)
  - Second half stays dry
- Epi soaked in first
  - Use cement restrictor inserter or the tip of Fraizer tip sucker to push all the way to bottom and pack from bottom up
- Leave epi soaked sponge in



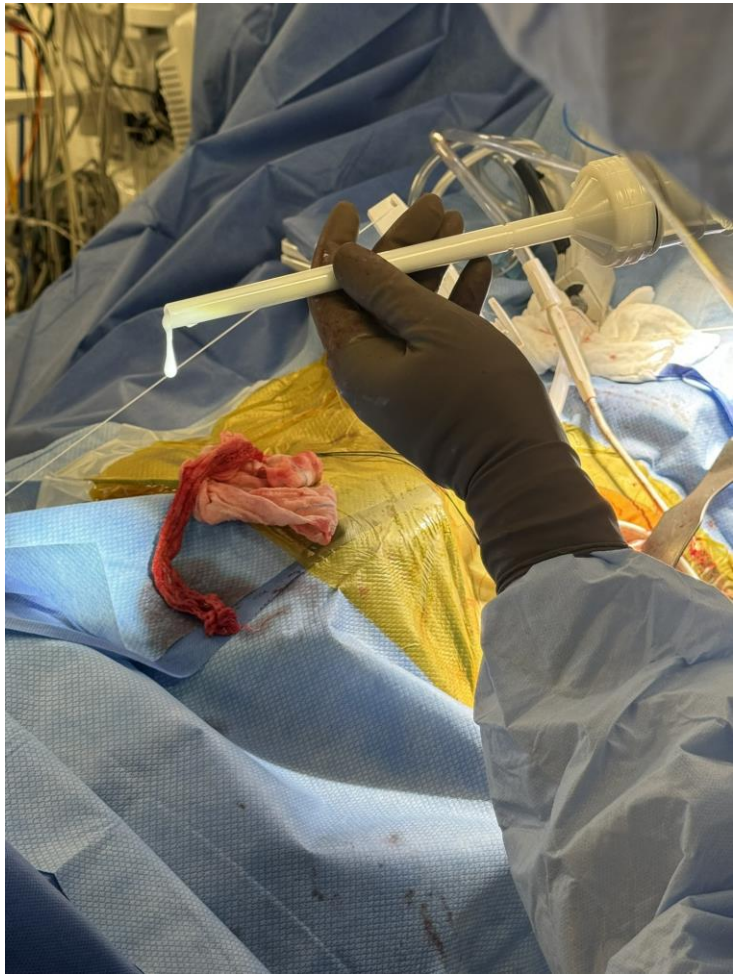






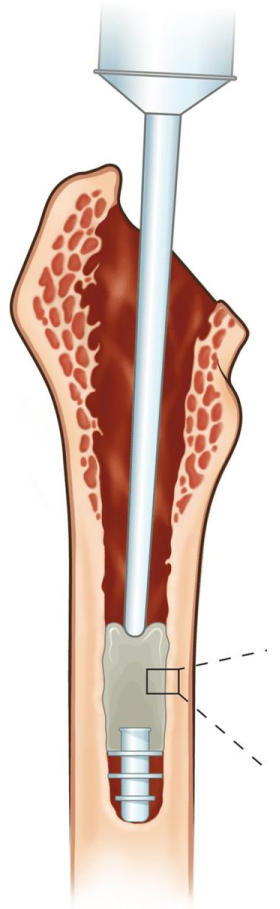
- When cement almost ready
- Wet sponge out
- Pulse again
- Suction dry
- Dry sponge down ALL THE WAY

Spiderweb Drip test – need some viscosity to pressurize



Cement time

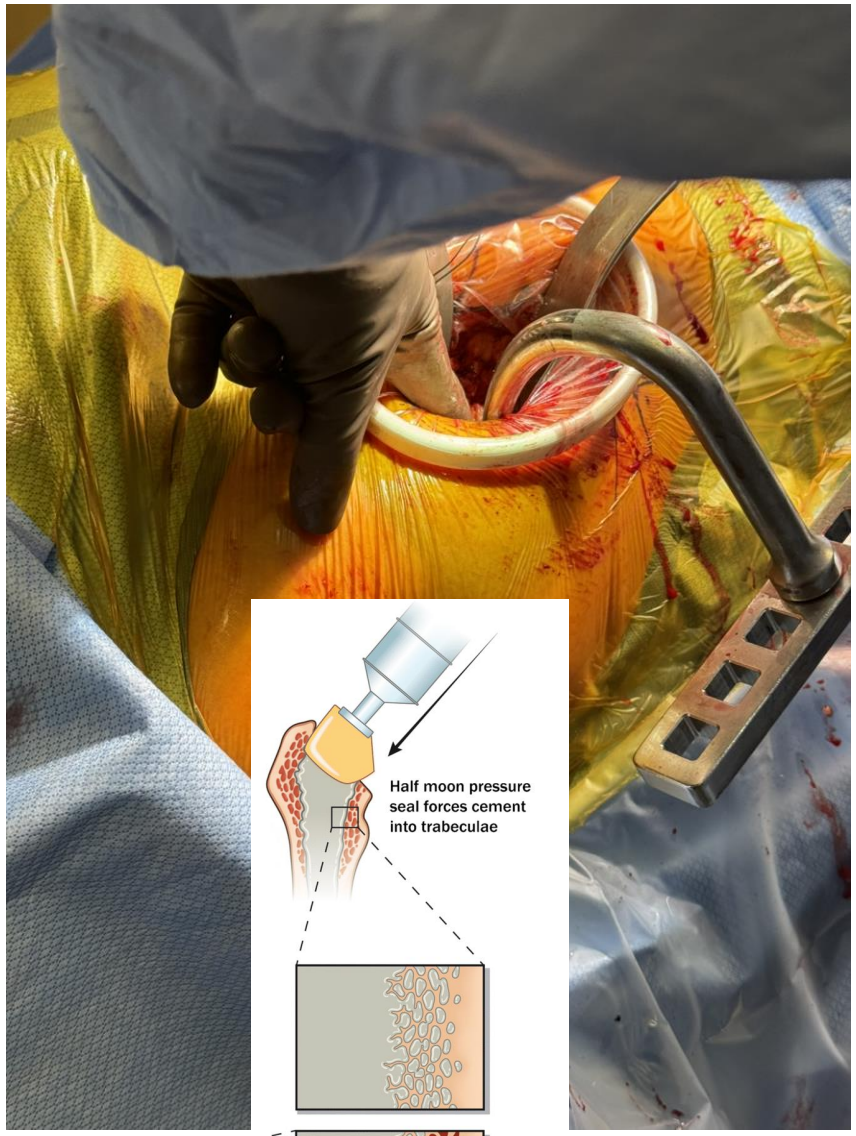
- STAY IN FRONT OF THE CEMENT!!!
  - Don’t pull the whole column out with the tip
  - Squeeze trigger as pulling back ALWAYS in case is stuck on you
  - Some use a pediatric feeding tube to prevent this… (pain the ass…)

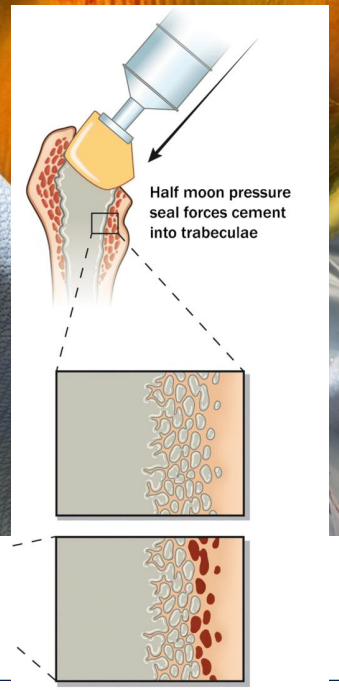


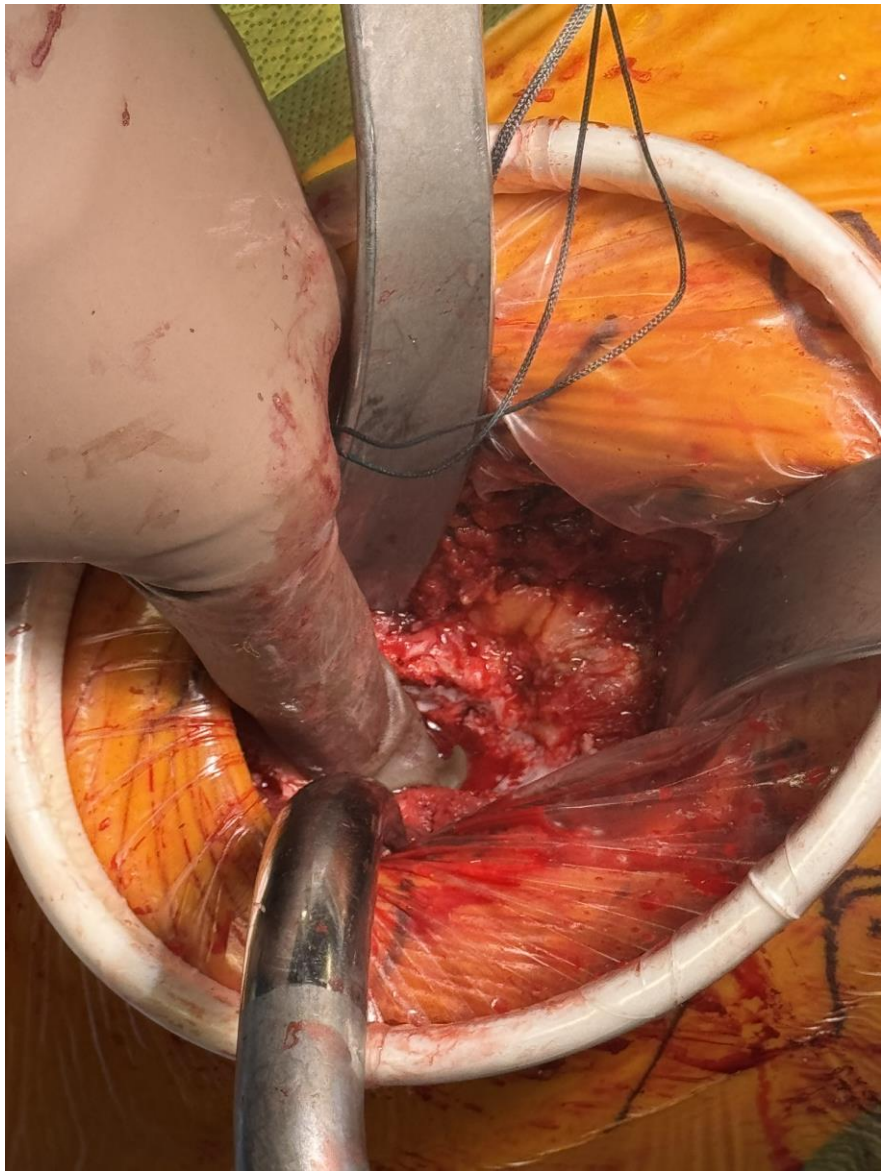
- Finger pressurization
  - DA WORKS AMAZING
  - Need some viscosity – be patient

- Slow steady pressure
- Add more cement prn
- Seal the opening with glove and drive finger down
- Pack calcar and peritroch region as well

- Can finish with normal pressurization tip (slow steady squeezes) – need backpressure to drive into the bone





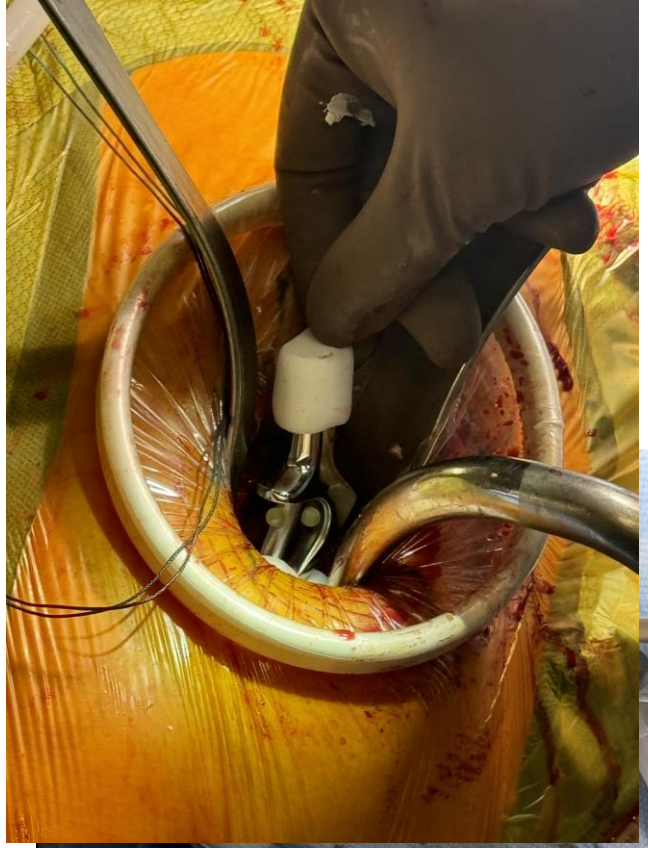


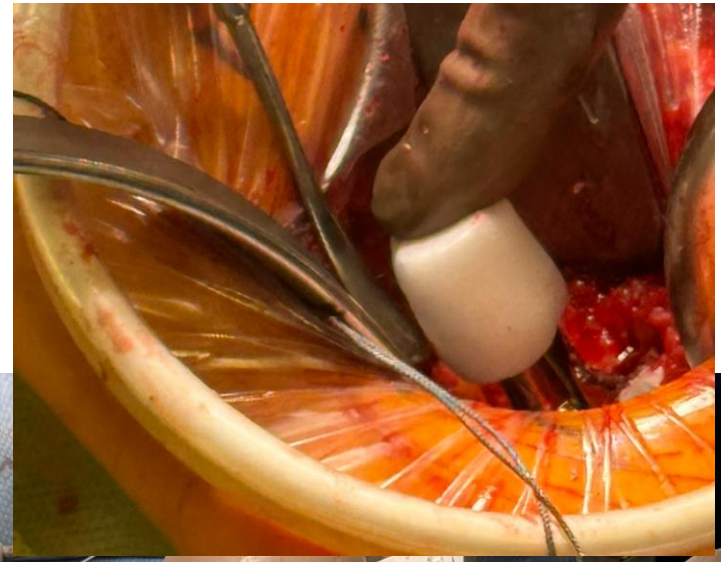
Stem Insertion

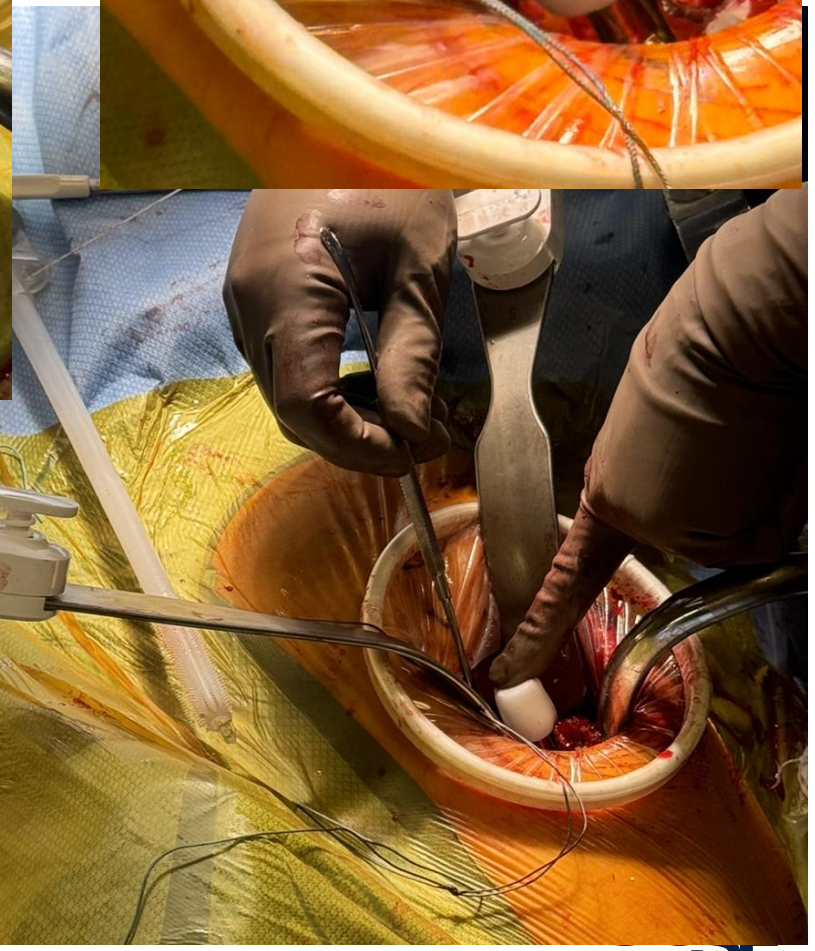
- Nothing touches cemented surfaces except cement
- Slow insertion by hand
  - Inserters all too straight for DA
  - Can cover medial calcar to add to backpressure
  - WATCH VERSION GOING DOWN
    - Medial retractor will want to push you anteverted
  - No Moving – one finger hold while curing
    - Assistant falling asleep or medial retractor slipping here = poor form

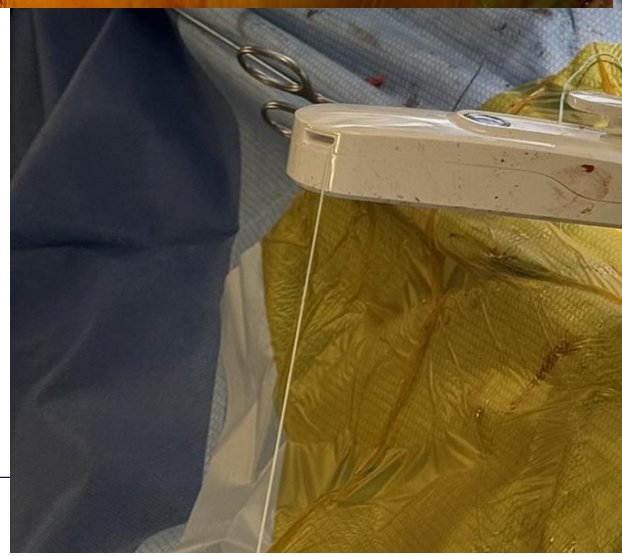
      \+ for self-retainers
    - Leg rotation needs to be steady

      \+ for Hana





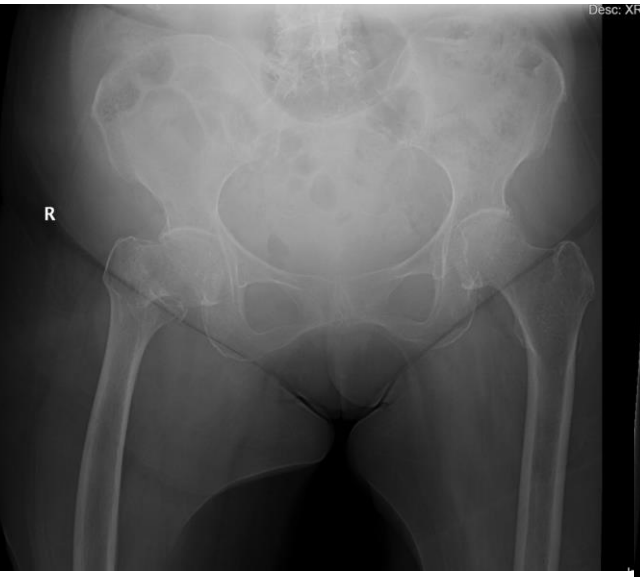


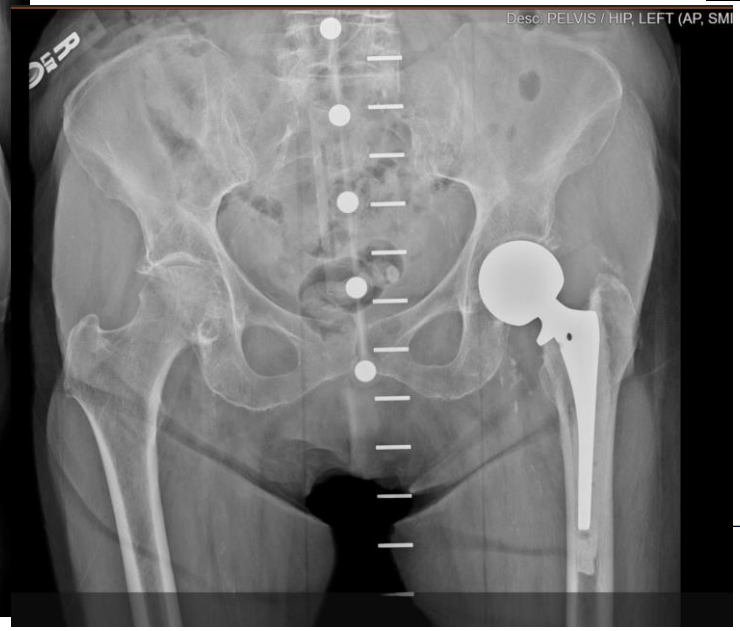


Final Reduction

- Remove any wound protectors
- Impact final head
- Controlled reduction
  - Tip: Lock traction without pulling for contralateral leg
  - Never rotate leg to neutral before its over the brim (60ER and traction is my position)
  - Sometimes need extra fine traction
  - Head pusher on the large ball directed toward midline and distal

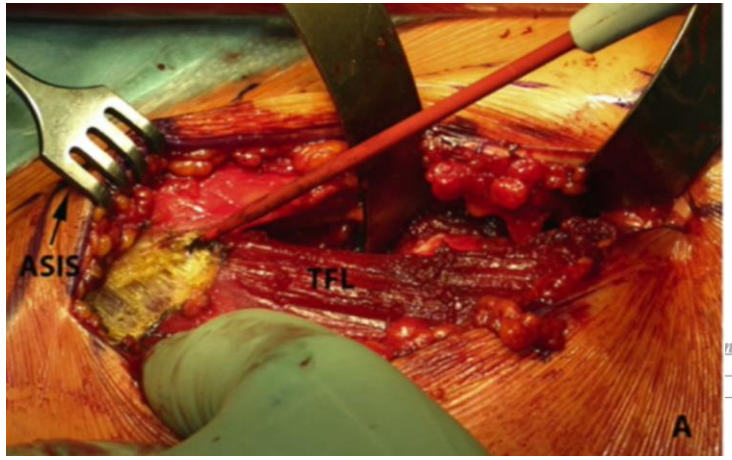
Examples from our fellows case logs last year

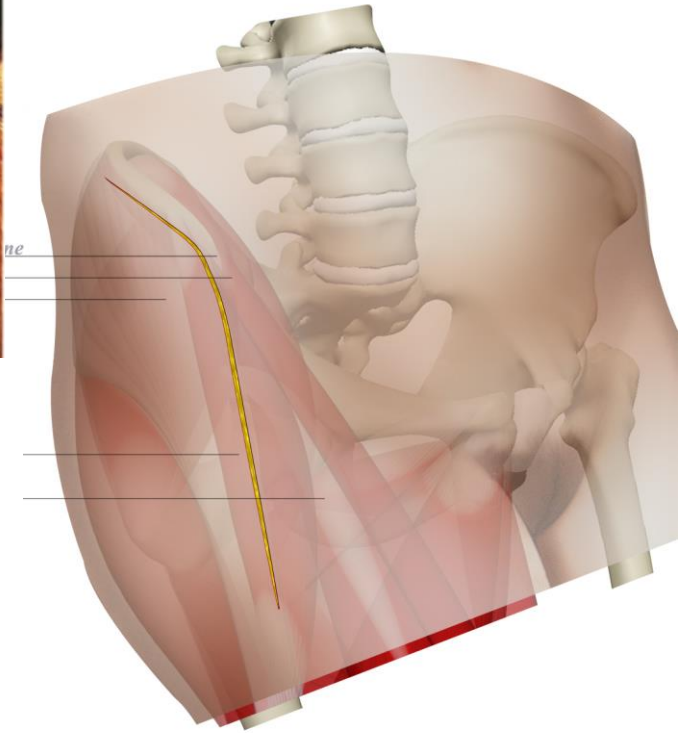


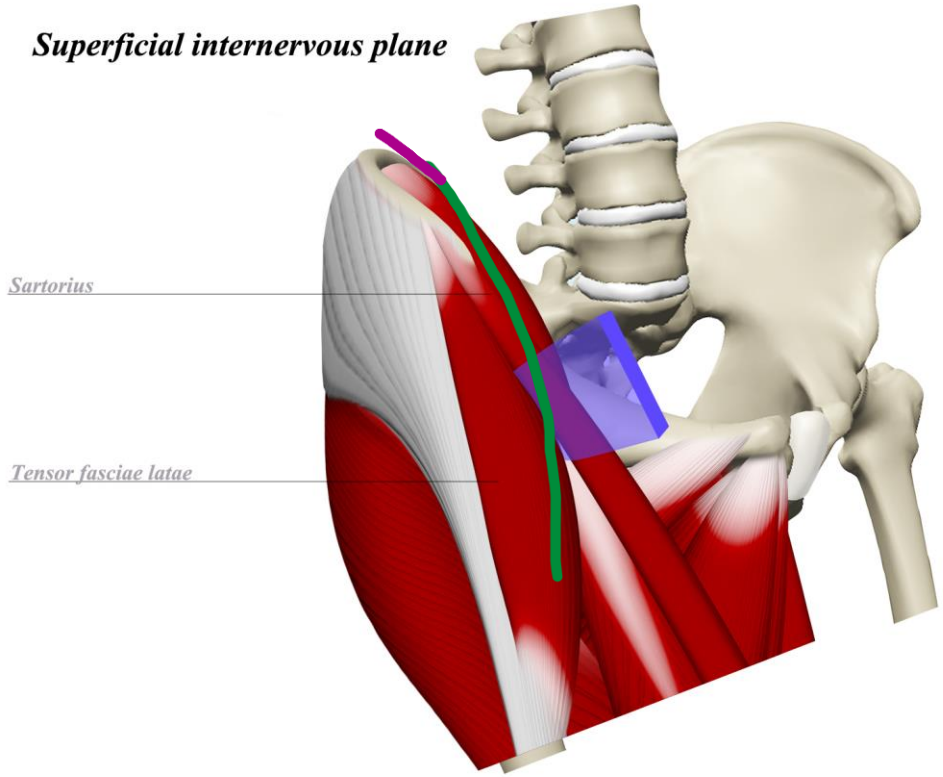


Extensions if needed

- Difficult femur exposure despite full release:
  - TFL anterior origin release
  - Leave small cuff on iliac crest
  - Just repair with normal fascial closure
  - 1-2cm usually enough
  - Minimal to no functional consequence
  - Massive improvement in visualization of femur
  - Not usually needed for hemi patients....

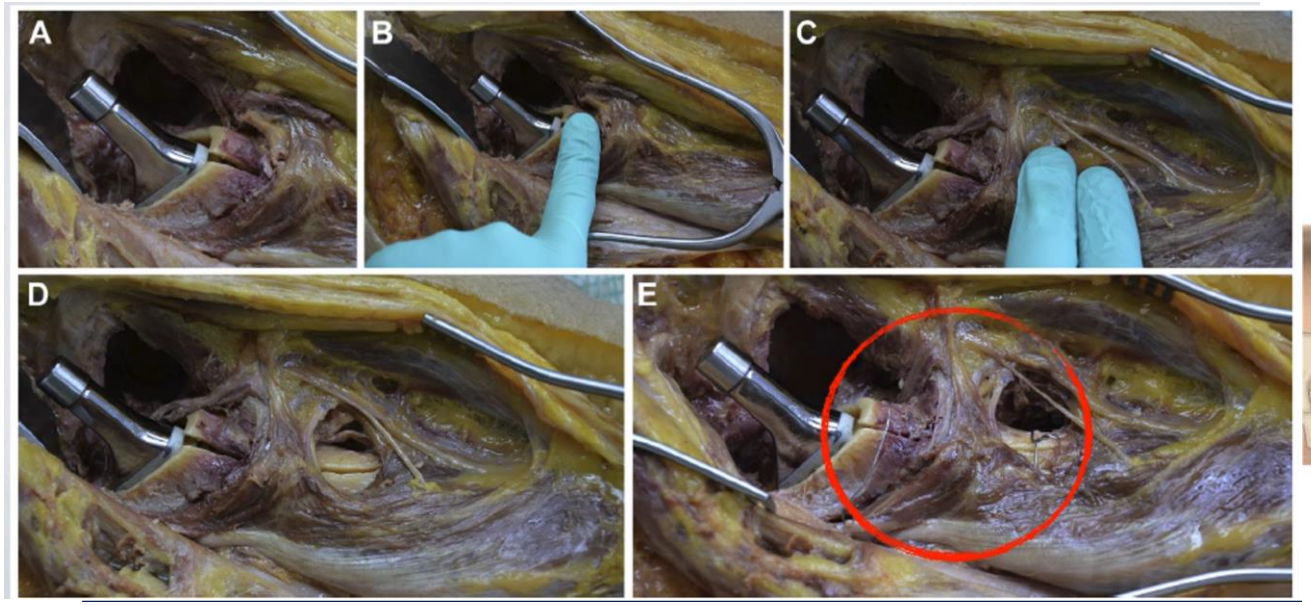


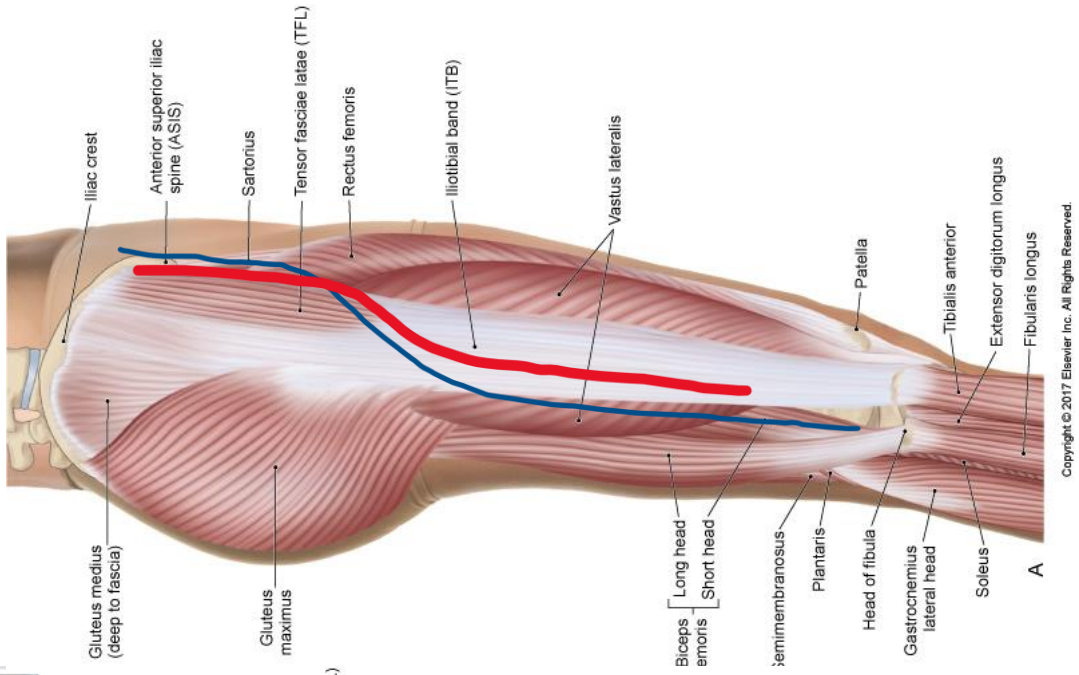


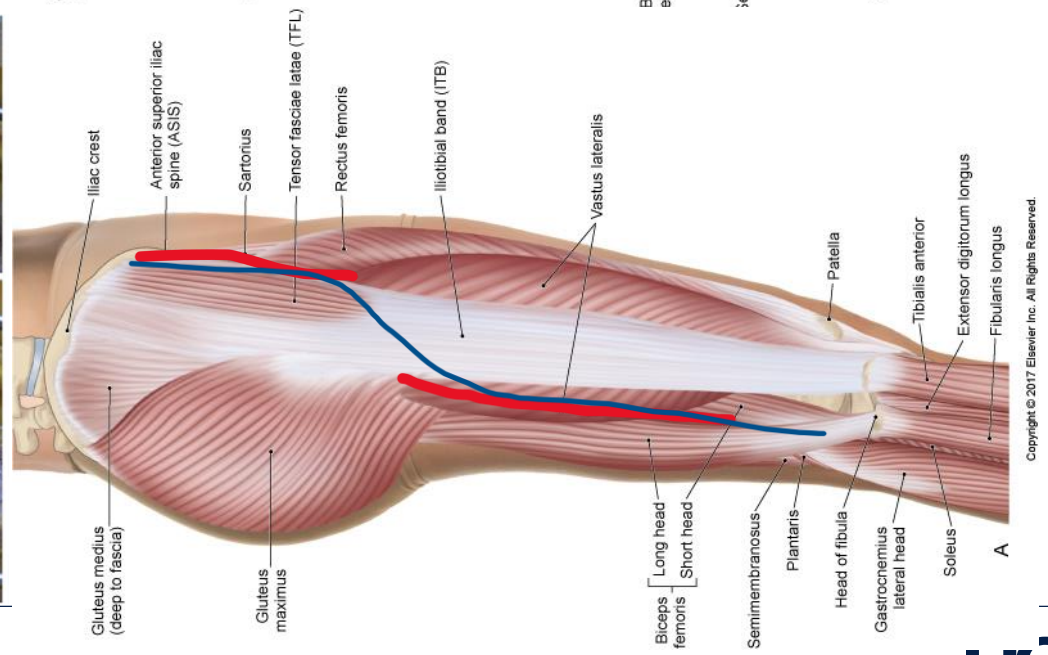


Extensions if needed

- Femoral exposure for far distal fracture extension or cabling
  - Sweep into a lateral femur approach
    - – Can do one or two windows in IT band
    - – I prefer two – switch between normal window proximal and standard subvastus distally – avoid NV dissection







Summary

- DA cemented hip shouldn’t be scary
  - Use offset friendly instrumentation
  - Be aware of the dangerous spots (trialing, broaching, restrictors, holding steady while cementing)
- Know how to cement from any approach
  - Try on a cadaver
  - Go to a course
  - Play with extensile approaches
- All low-energy FNF should be cemented
  - Proven poor bone
  - Consider a collar

UCSF

University of California
San Francisco