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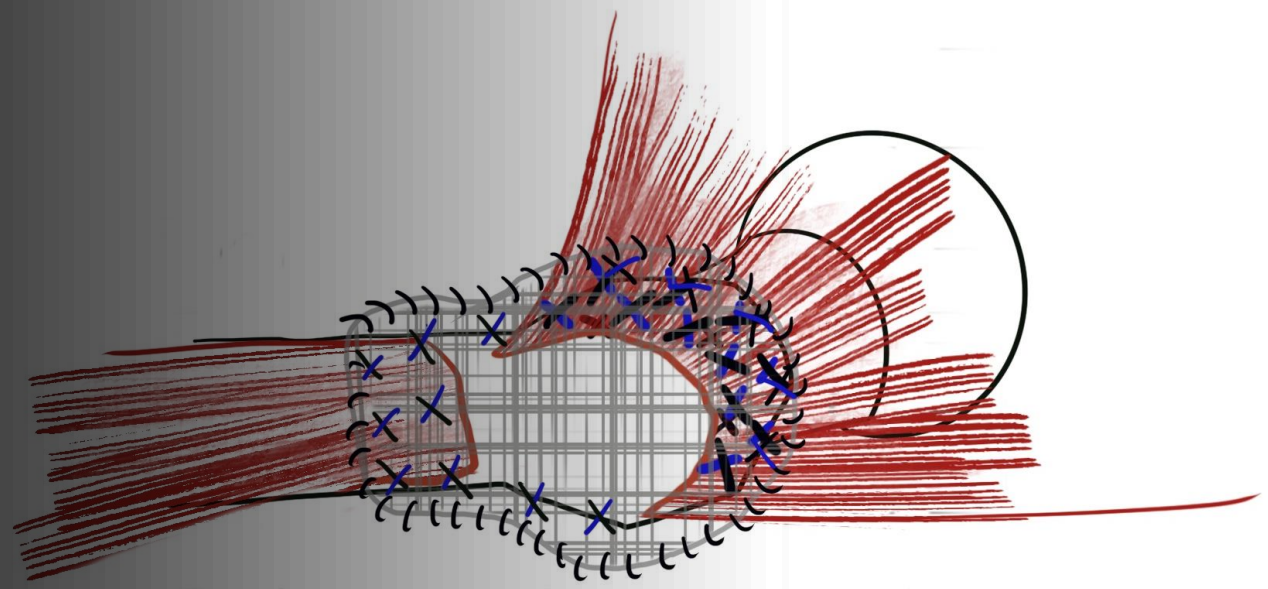
GLUTEAL TENDON REPAIR Update



Stefano A. Bini, MD

Professor of Orthopaedic Surgery

University of California San Francisco

Conflicts

- **Stefano Alec Bini, MD, FAAOS**
- JOURNALS
  - Arthroplasty Today, Associate Editor: Editorial or governing board
  - Journal of Arthroplasty: Editorial or governing board
  - Elsevier: Publishing royalties, financial or material support
- SOCIETIES
  - Personalize Arthroplasty Society: Board or committee member
- START UPS
  - CaptureProof.com: Stock or stock options
  - Cloudmedx.com: Stock or stock options
  - Gait Science: Stock or stock options
  - InSilicoTrials.com: Stock or stock options
  - Siramedical.com: Stock or stock options
  - Archetype.ai: stock or stock options
- INDUSTRY
  - Stryker: IP royalties

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DIAGNOSIS

- Symptoms of Abductor insufficiency
- Pain / Bursitis
  - Lateral hip pain
  - Sleep disturbance
  - Pain with stair climbing, walking
- Weakness/ Limp
  - Side to side waddle
  - Use of a cane, walker
- History
  - Multiple injections
  - Hip Surgery

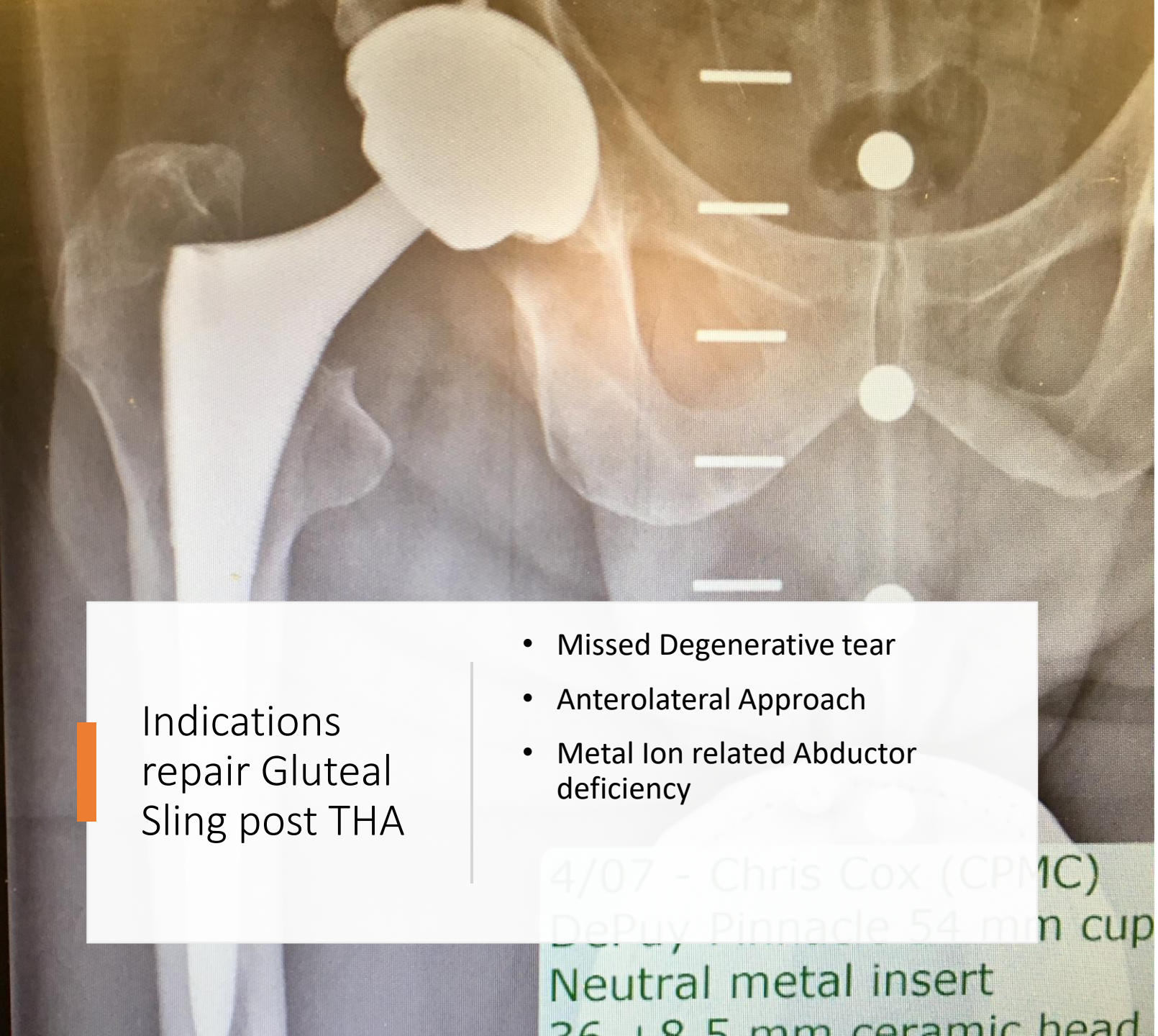
- Imaging
  - XR
    - Flattening of GT, Calcifications
  - U/S
    - Detachment
  - MRI
    - Detachment from insertion
    - Fluid Collections
    - Medius and/or Minimus
    - **fatty degeneration of muscle**

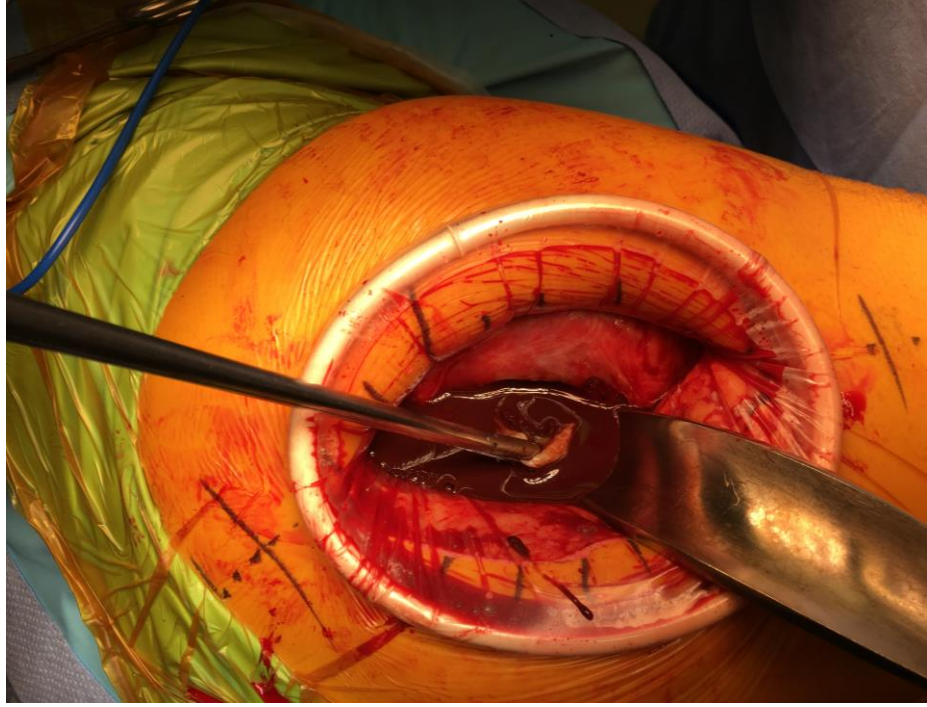
Greater Trochanteric Pain Syndrome

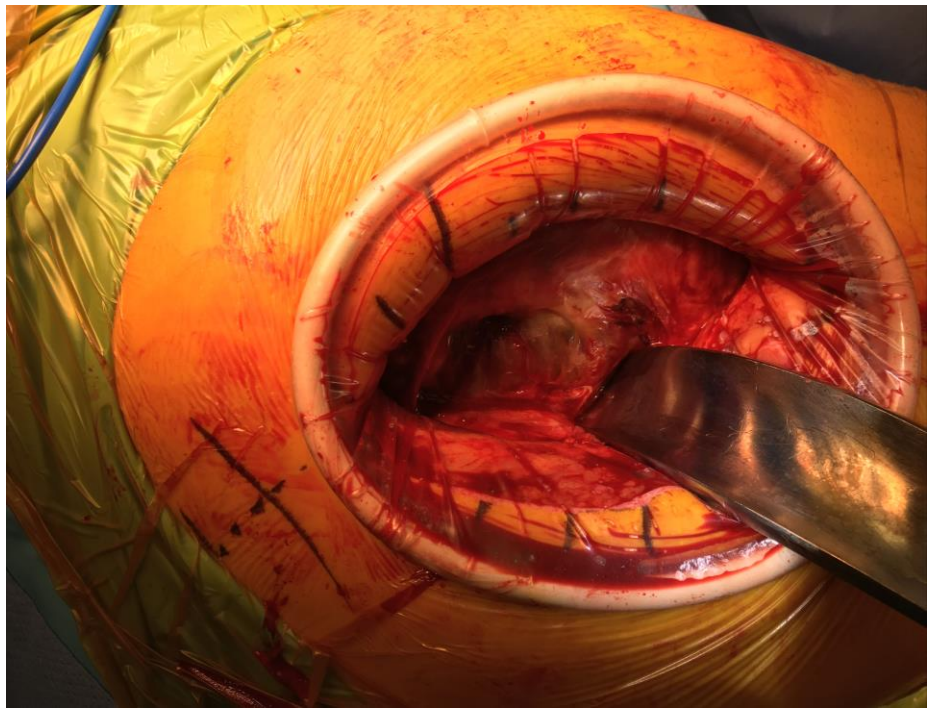
- Sunil Kumar et all, ESSKA 2021
- Middle aged women
- No history of trauma
- Female predominance
  - Wider pelvis
  - 30% increase abductor moment arm

Indications repair Gluteal Sling post THA

- Missed Degenerative tear
- Anterolateral Approach
- Metal Ion related Abductor deficiency

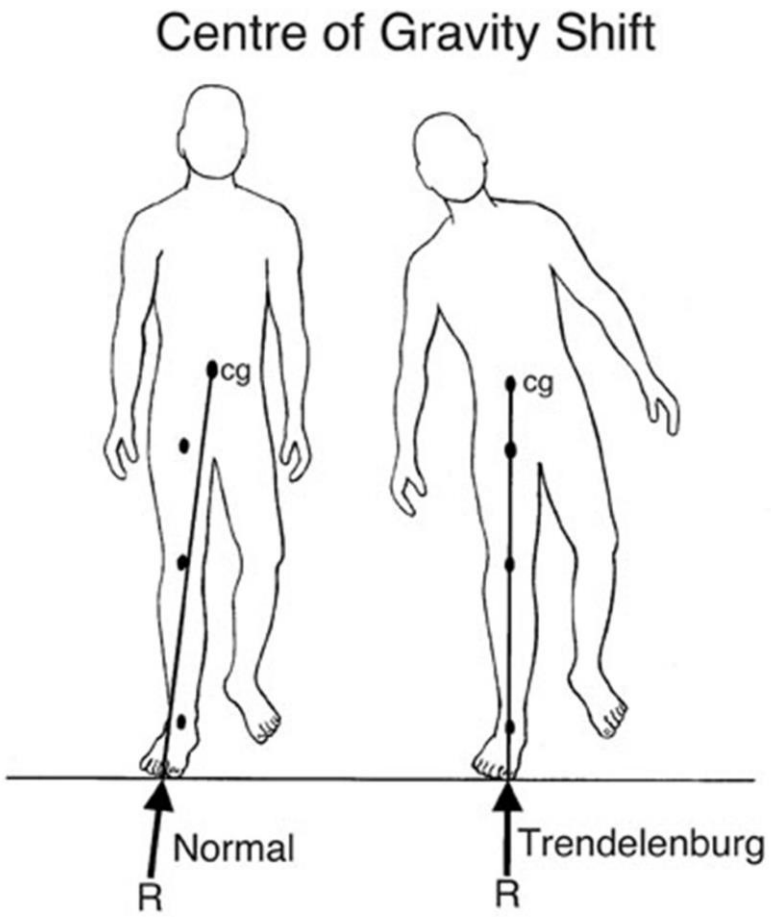


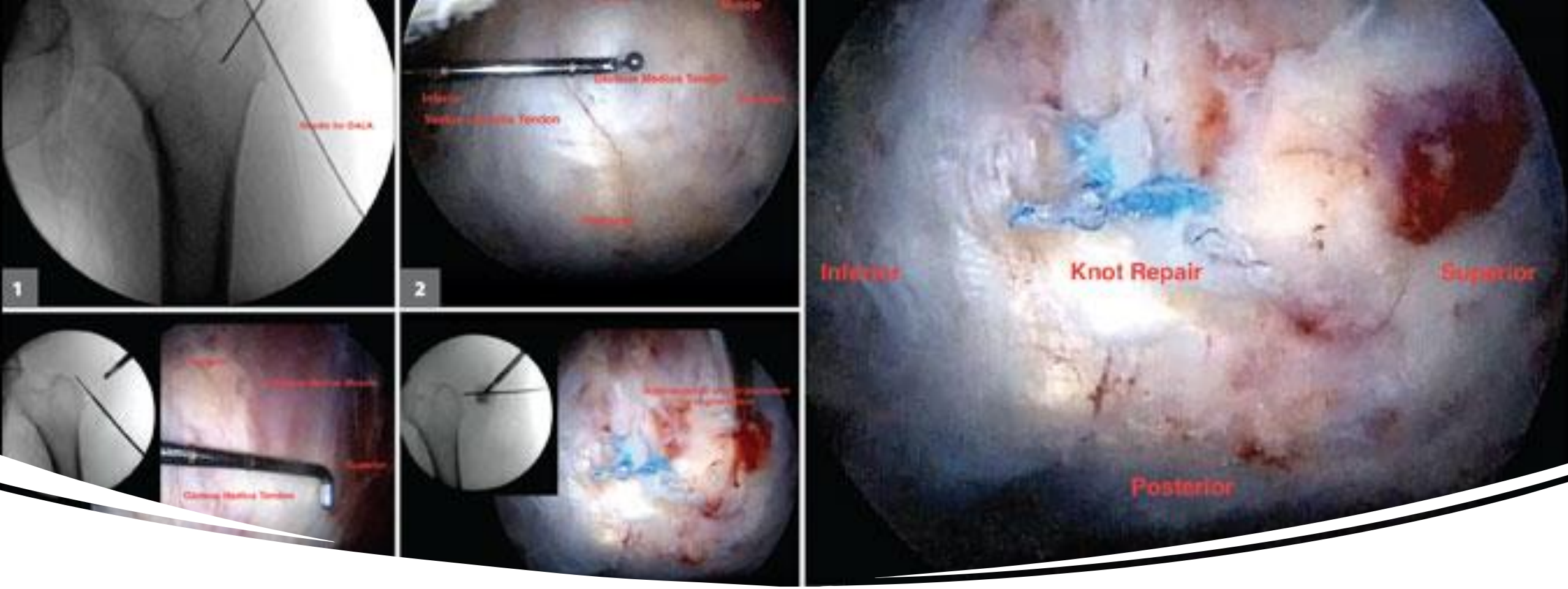




Loads

- 4-5 times body weight
- **8 times BW when stumbling**
- Much lower forces than the shoulder
  - Impacts recovery and surgical techniques





Solutions

- Open vs Closed
- Anchors vs. bone tunnels vs knotless anchors
- Patches vs Tendon Transfers

Consideration and Challenges

- Tendon
  - Retraction
  - Fatty degeneration
  - Metallosis
- G minimus joint sided tears
- **Ipsilateral HIP OA**
- Shoulder pathology and ability to use a walker

RESULTS

The Journal of Arthroplasty
Volume 35, Issue 6, Supplement, June 2020, Pages S352-S358

Complications - Other

Equivalent Mid-Term Results of Open vs Endoscopic Gluteal Tendon Tear Repair Using Suture Anchors in Forty-Five Patients

Alexander Maslaris MD [a, b], Thomas P. Vail MD [a], Alan L. Zhang MD [a], Rina Patel MD [c], Marcus Jäger MD [d], Stefano A. Bini MD [a]

- 37 Open Repairs
  - 23 Primary Repairs
  - 12 Secondary Repairs (following THA)
    - 9 Failed Anterolateral Repair
    - 6 Metal Ion related
- Mean F/up 20 months
- Decreased Opioid use
- Improved Clinical Function

- 70% excellent results
- 30% poor results
  - Fatty degeneration on MRI >50%
    - Delayed diagnosis
    - Larger Tears
      - No functional attachment
    - Metal ion
  - No functional improvement
  - Good Pain relief

Systematic Review

- Parilla, Sappey Marinier, Bini
- 2000 and 2022, 2284 studies published, 25 met inclusion criteria
- Improvement
  - 7/10 transosseous
  - 12/15 suture anchors
  - **30% sub-optimal outcomes**
- Of 25 studies complication rates ranged from 0-19%
- **Re-tear rates 0-25%**
- Infection 0-6 %

Fatty Degeneration and Gluteal Tendon Repairs

Archives of Orthopaedic and Trauma Surgery
https://doi.org/10.1007/s00402-021-03787-2

ORTHOPAEDIC SURGERY

Impact of fatty degeneration on the functional outcomes of 38 patients undergoing surgical repair of gluteal tendon tears

Alexander Maslaris[1,2,3] · Thomas P. Vail[1] · Alan L. Zhang[1] · Rina Patel[4] · Stefano A. Bini[1]

Received: 20 August 2020 / Accepted: 15 October 2020

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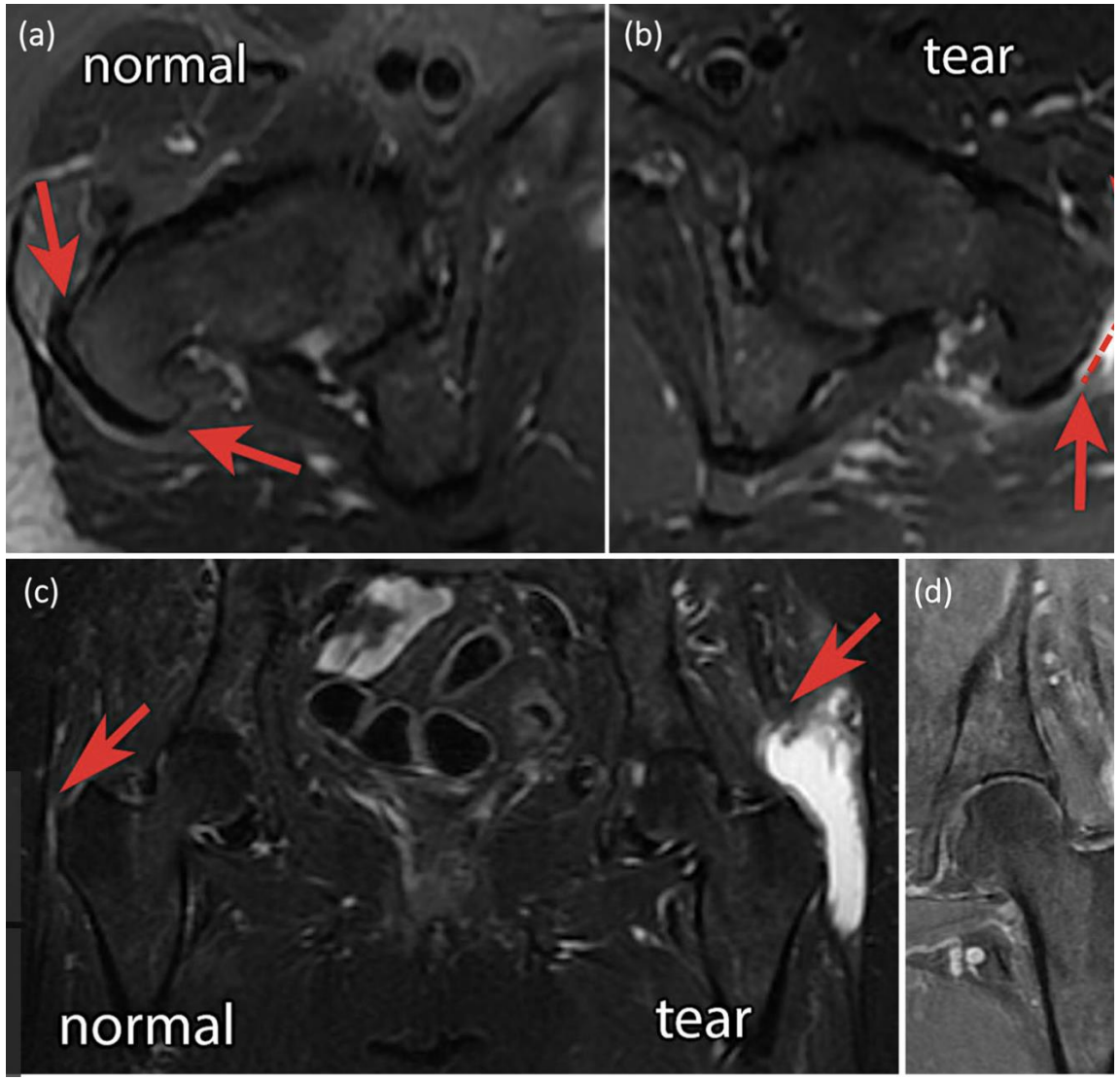
Tear Retraction

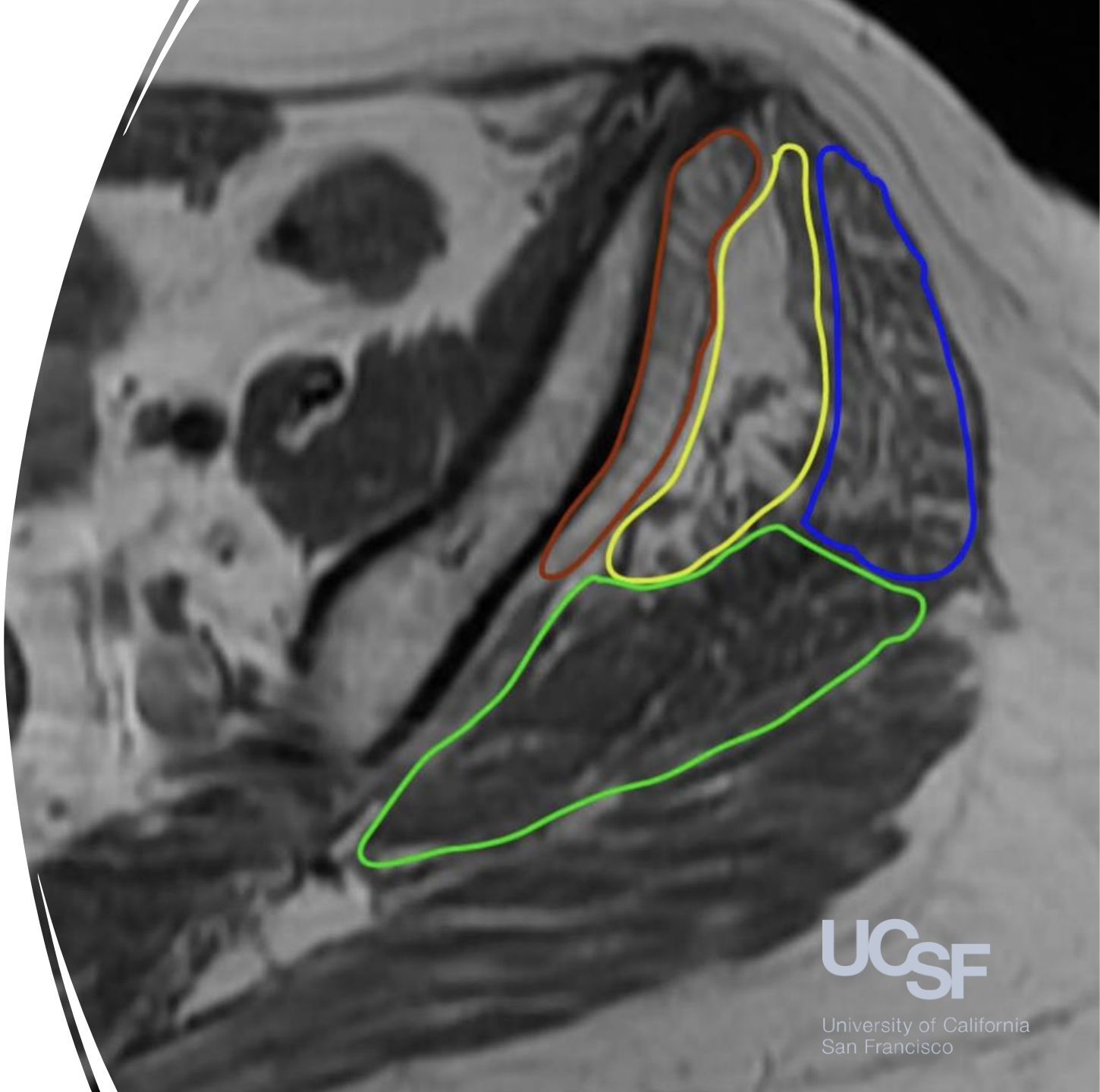
- X-Rays evaluated for offset and LL rest.
- Tears: **Glut med and Min separate eval**
  - Full thickness
  - Partial
    - Lateral Burrsal side
    - Medial joint side partial tears
- Length of **tendon retraction** from GT
- AP width of tear
- Bursitis (0-3) per Chi et al
- MSK radiologist



Fatty Degeneration and Atrophy

- An axial T1 Sequence of an MRI illustrating the Gmin and 3 parts of the Gmed included in the **assessment of Fatty Degeneration**
  - Thaunaut (Arthroscopy 2018)

- **Muscle atrophy** was present if >25% reduction in cross sectional are compared to contralateral side on Coronal mid trochanter view
  - Cvitanit et al AJR 2004



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Results

38 patients were identified, 29 (76.3%) were female.

The average **age was 67.**

Of the **11 (28.9%) patients with a prior hip arthroplasty** 87.5% of primary THAs had a direct lateral approach.

29 (76.3%) patients were treated open and 9 (23.7%) arthroscopically.

All used a form of **suture anchor** (76% anchor with #2 Fiberwire)

1 had an addition of mesh

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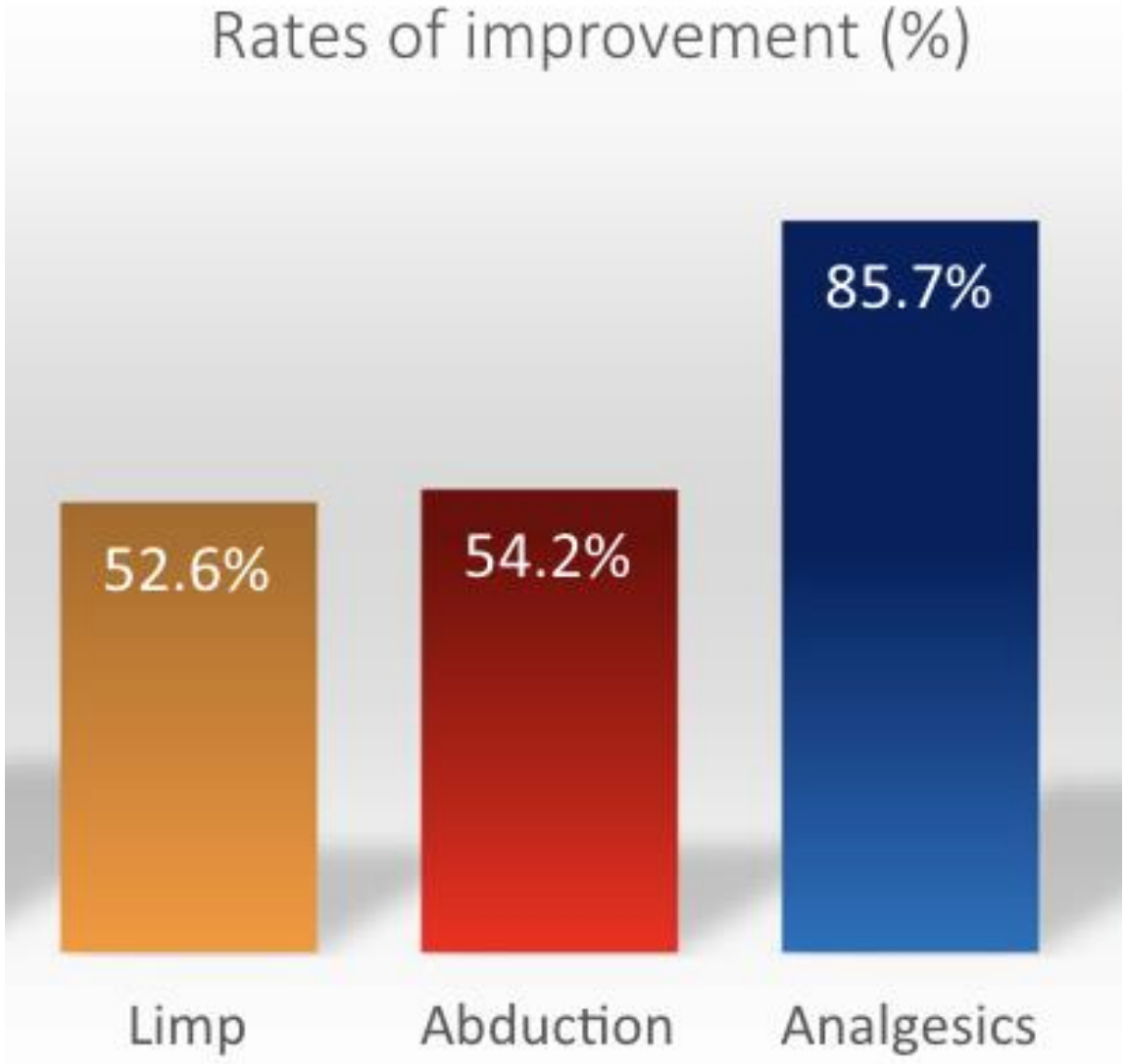
Results

- At an average follow-up of 20.9 months, patients reported
- a significant improvement in pain (97%),
- **No analgesic use (85.7%),**
- **Persistent limp (52.6%)**
- Abduction strength (54.2%) (all: $P \leq 0.01$).



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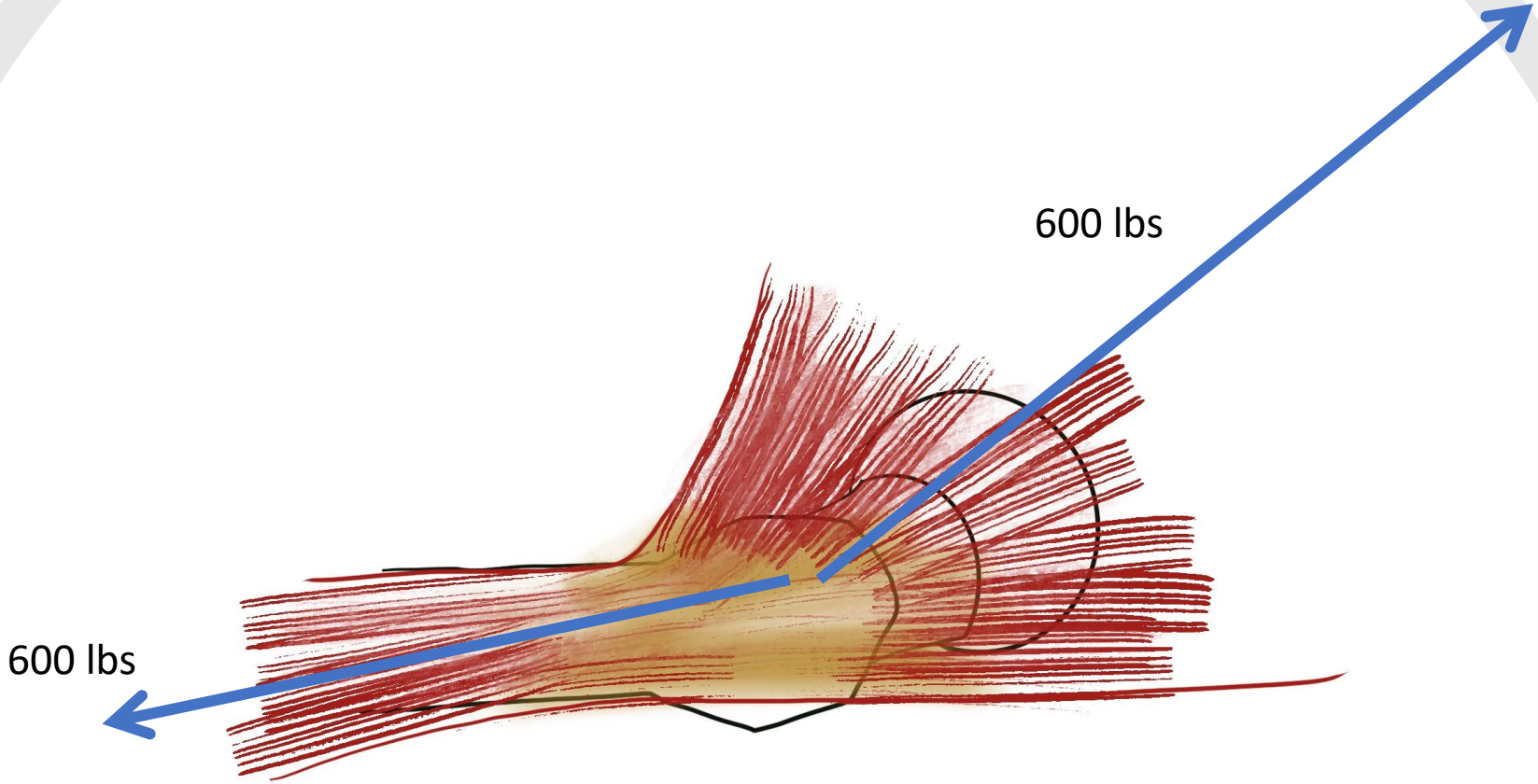
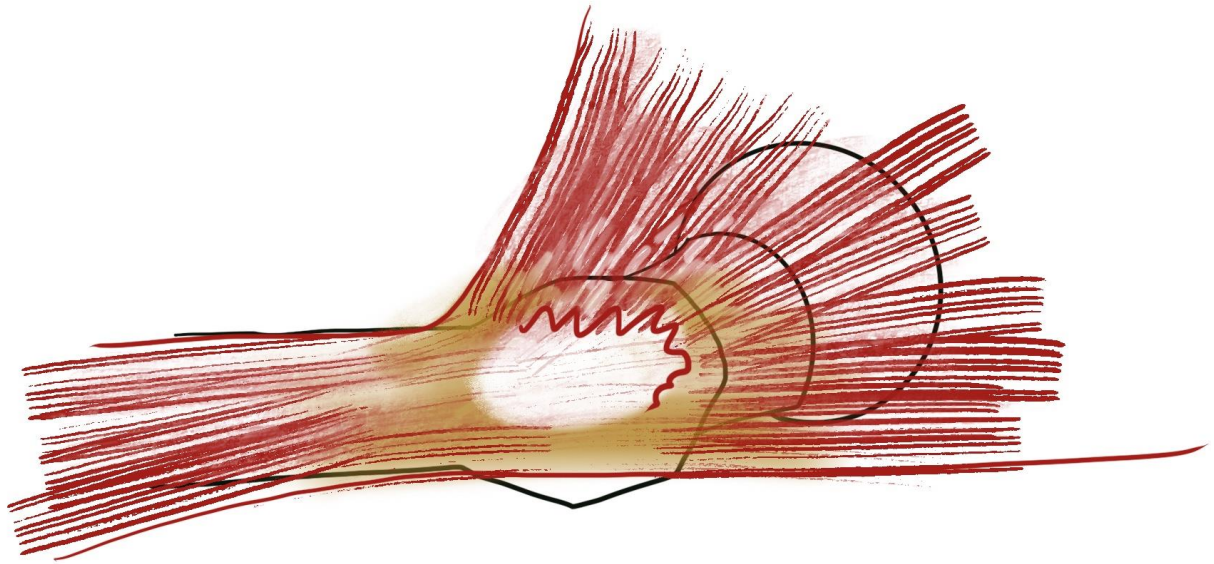
Impact of GFC class.

- **GFC ≥ 2° were associated with significantly worse outcomes in terms of**
- limp (0.19/3 vs. 1.2/3, P = 0.05),
- HHS-S1 (58.19 vs. 71.68, P = 0.04) and complication rates (37.5% vs. 0%, P = 0.02)
- There was a strong correlation between tear retraction (P = 0.005), tear size (P = 0.009) and muscle atrophy (P = 0.001) with GFC ≥ 2° but **not with clinical outcomes**.
- **GFC ≥ 2° was strongly related to lateral THA exposures (P < 0.001).**
- **Open vs closed Surgical approach had no impact on clinical outcome**



0-20%



Central Tears, Degenerative

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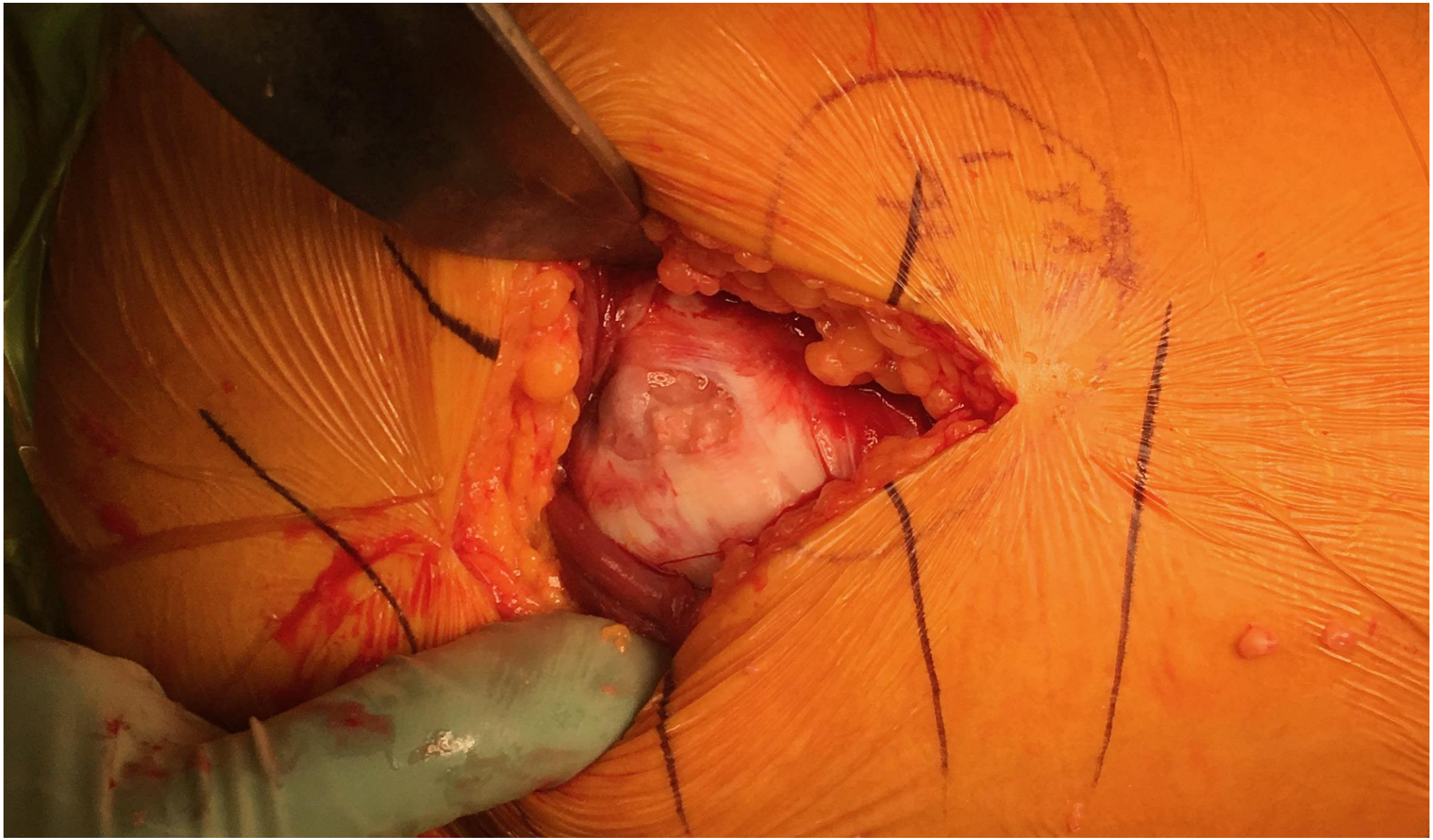
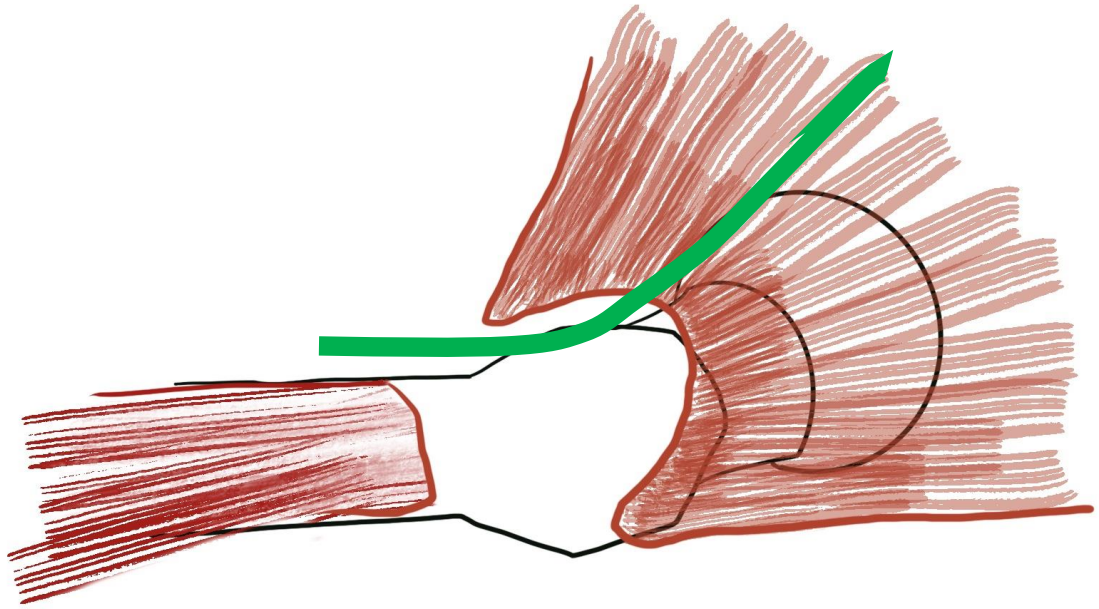
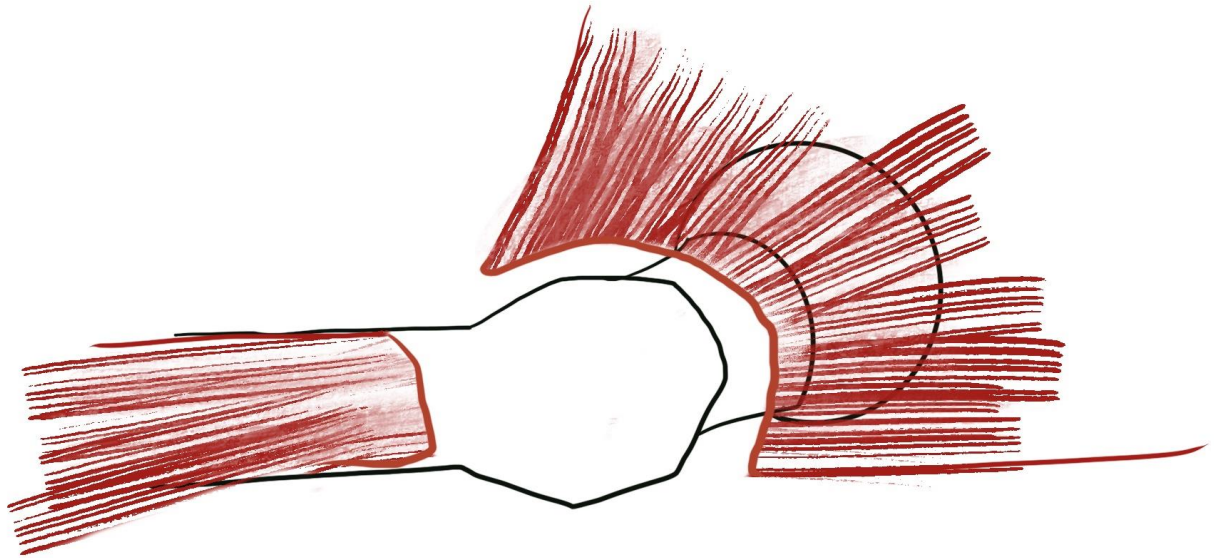


30-50%

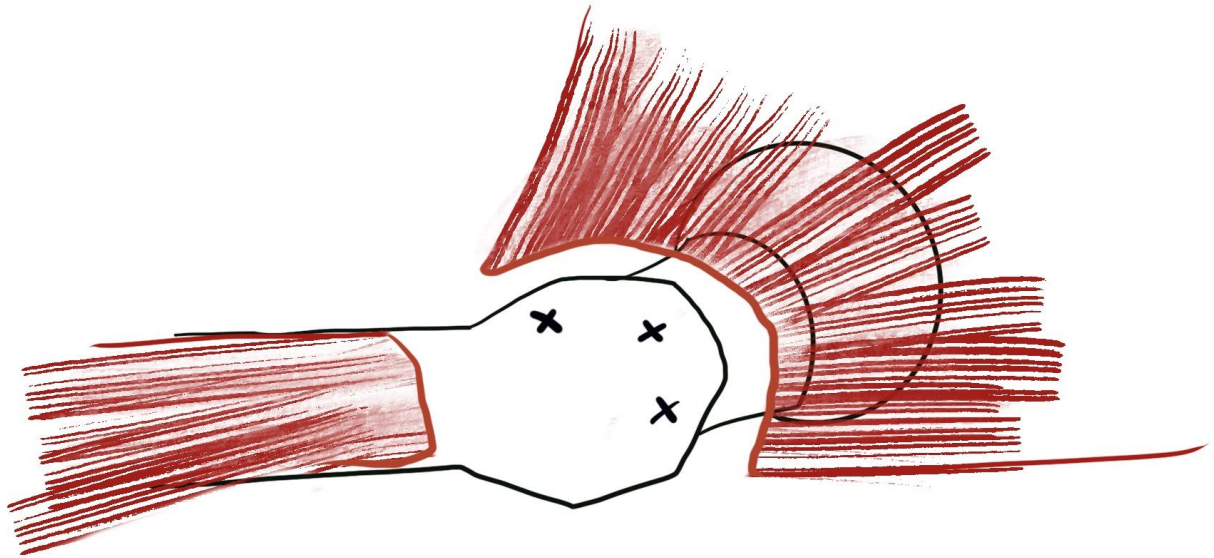


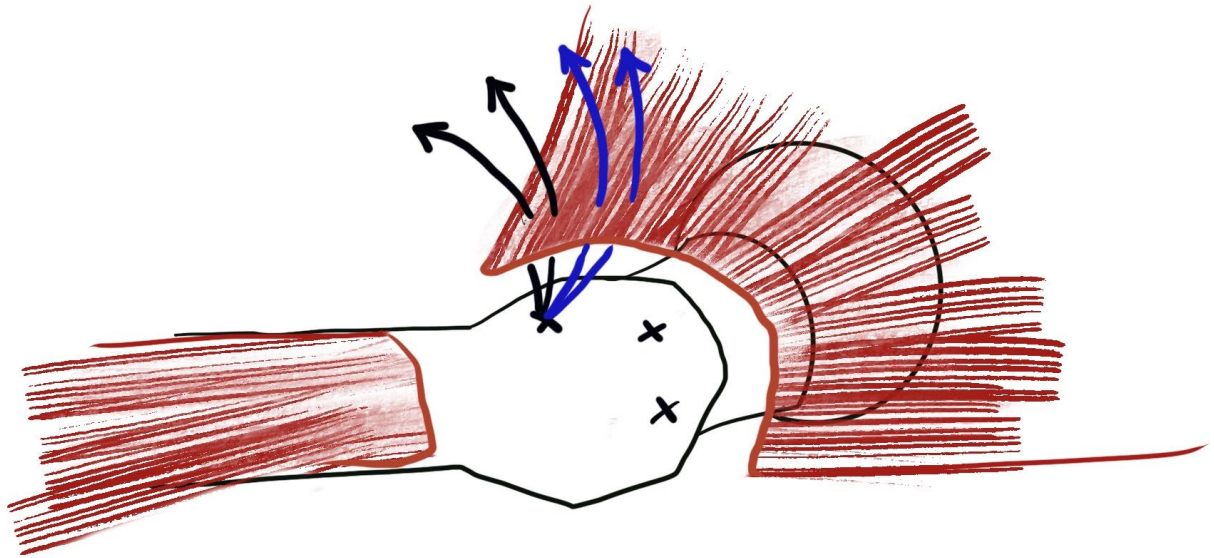
Iatrogenic from Anterolateral Approach

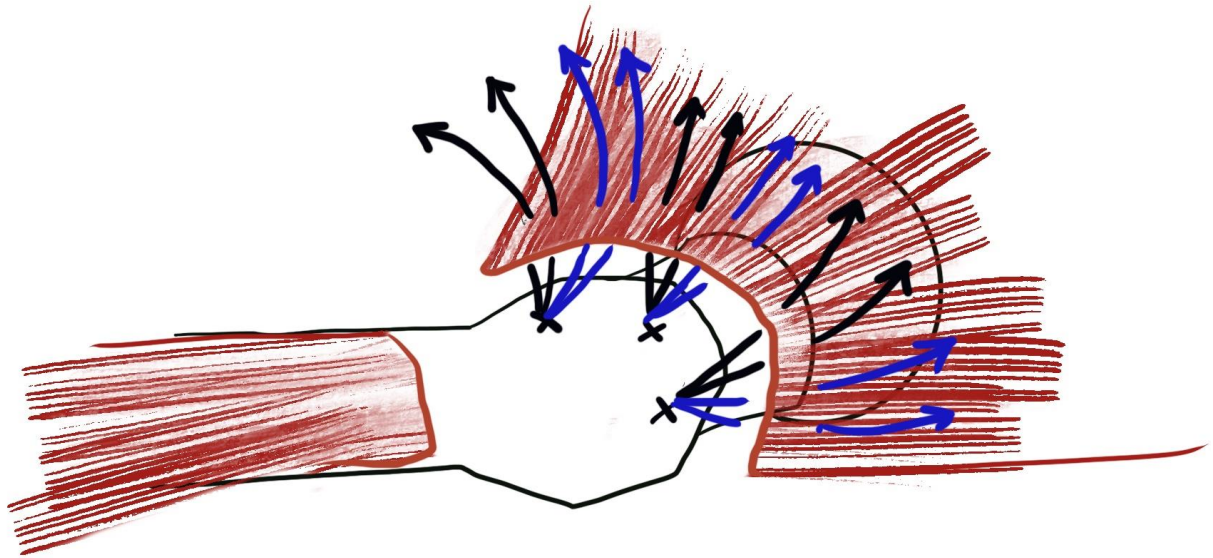
60-100%

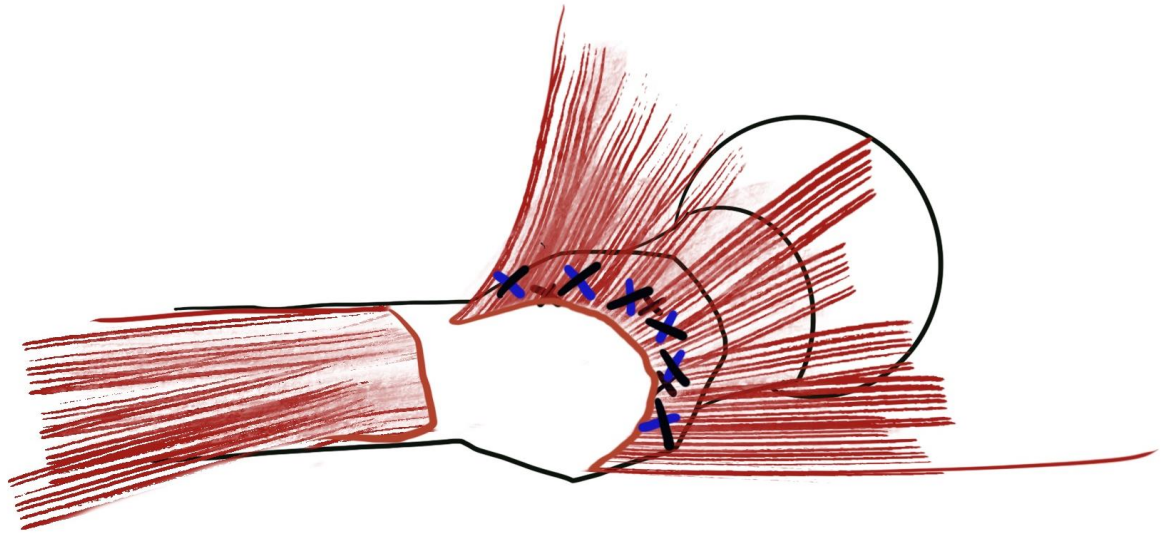


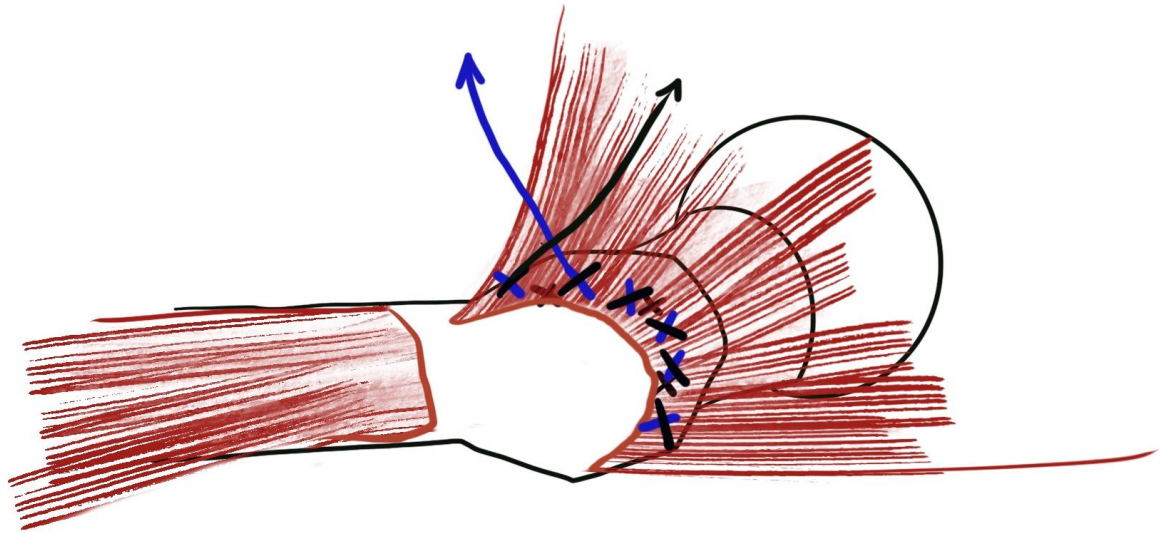
Chronic, degenerative

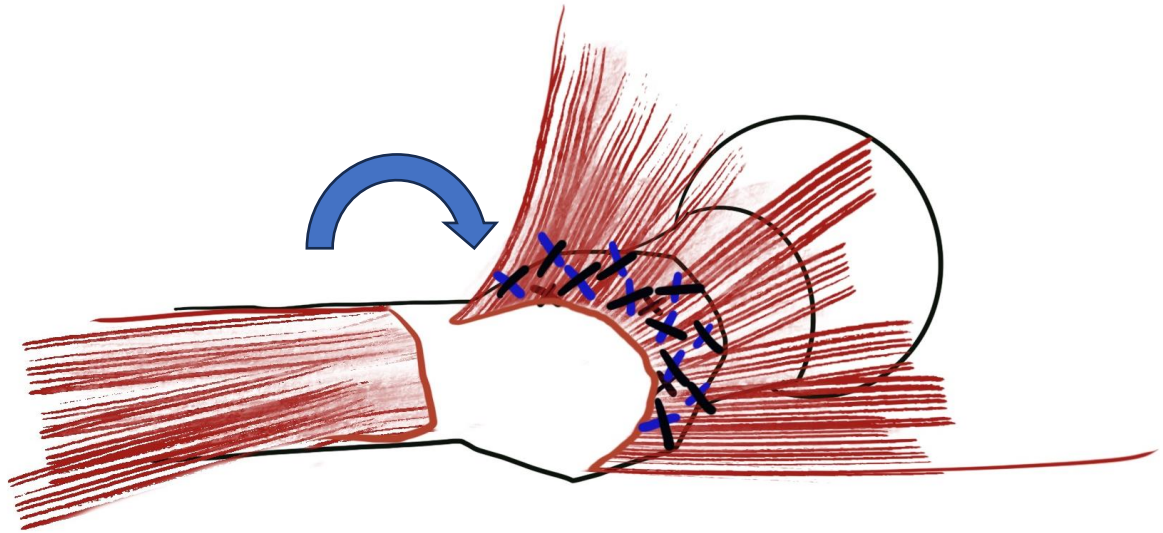












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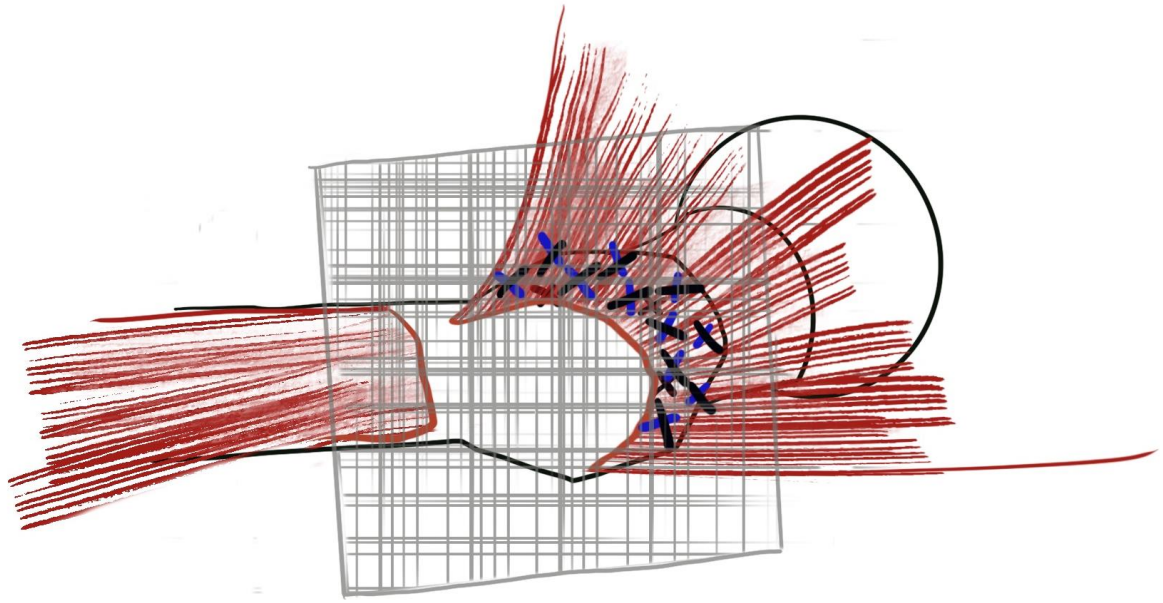

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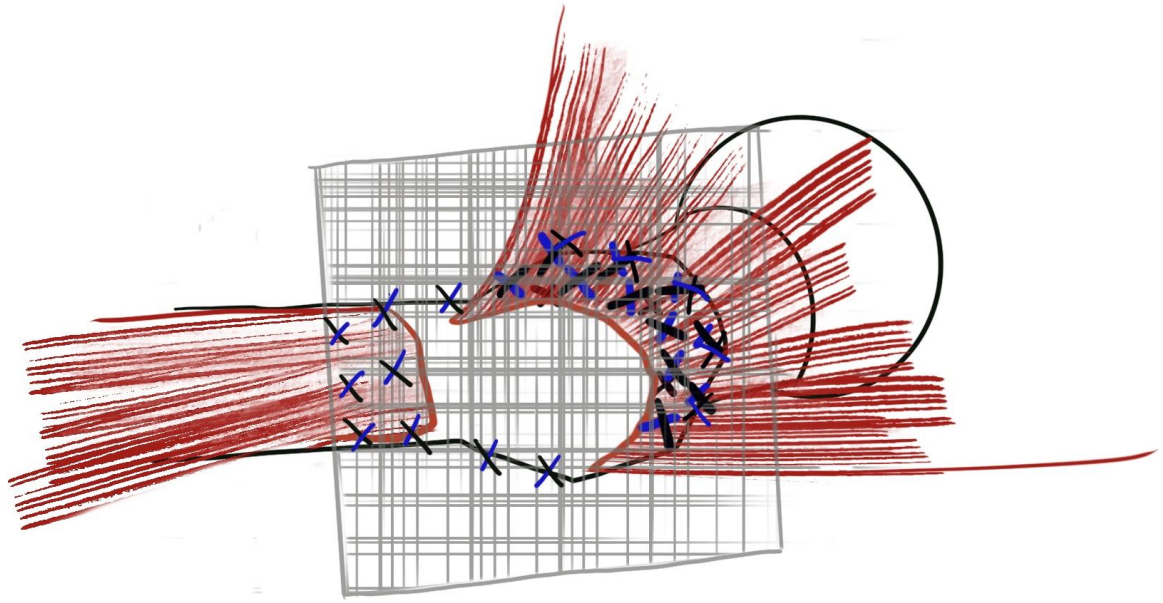

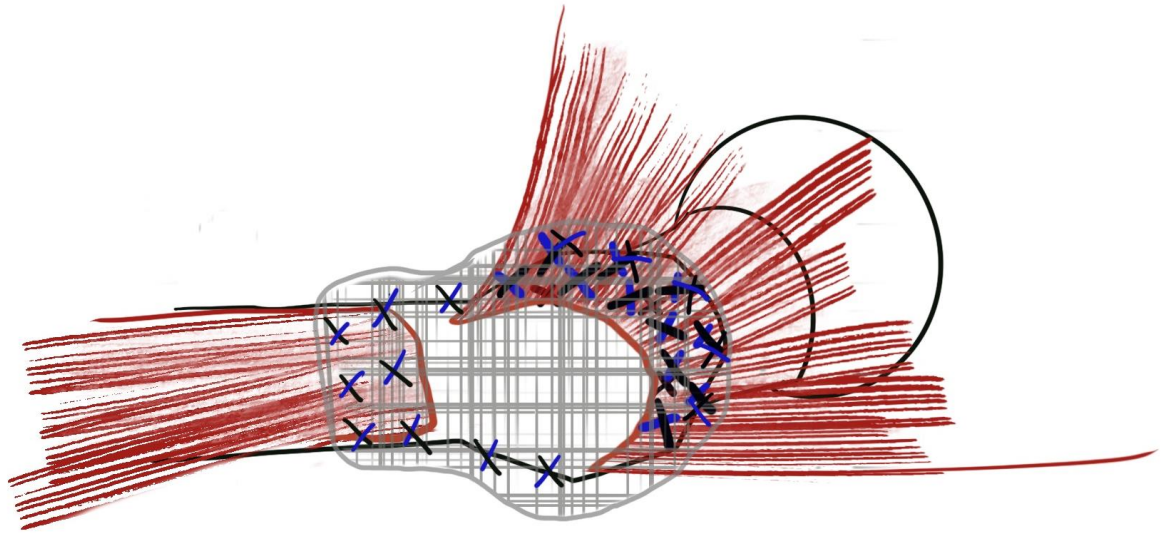

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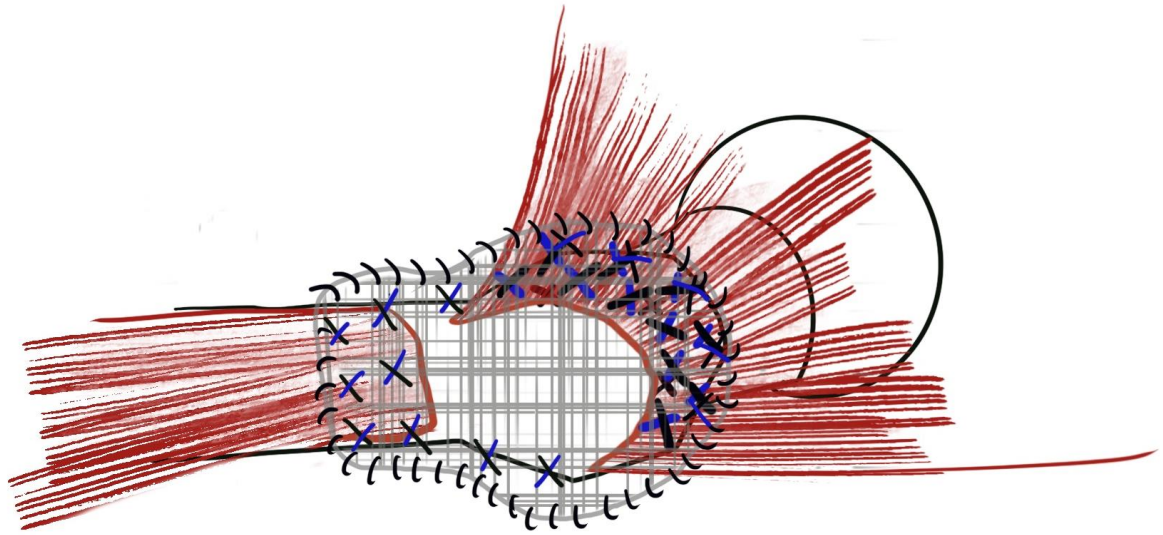

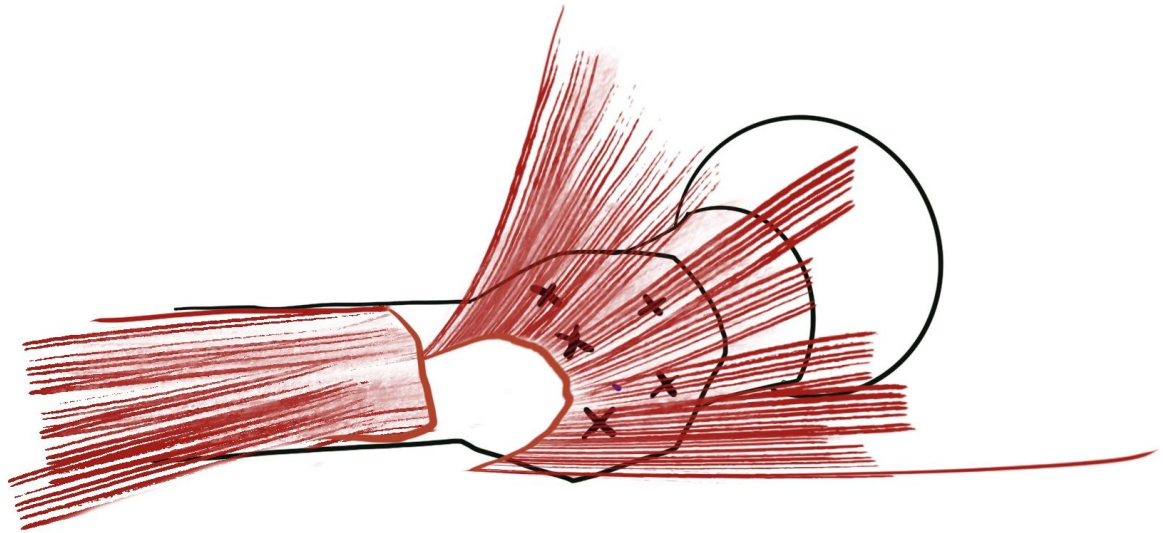

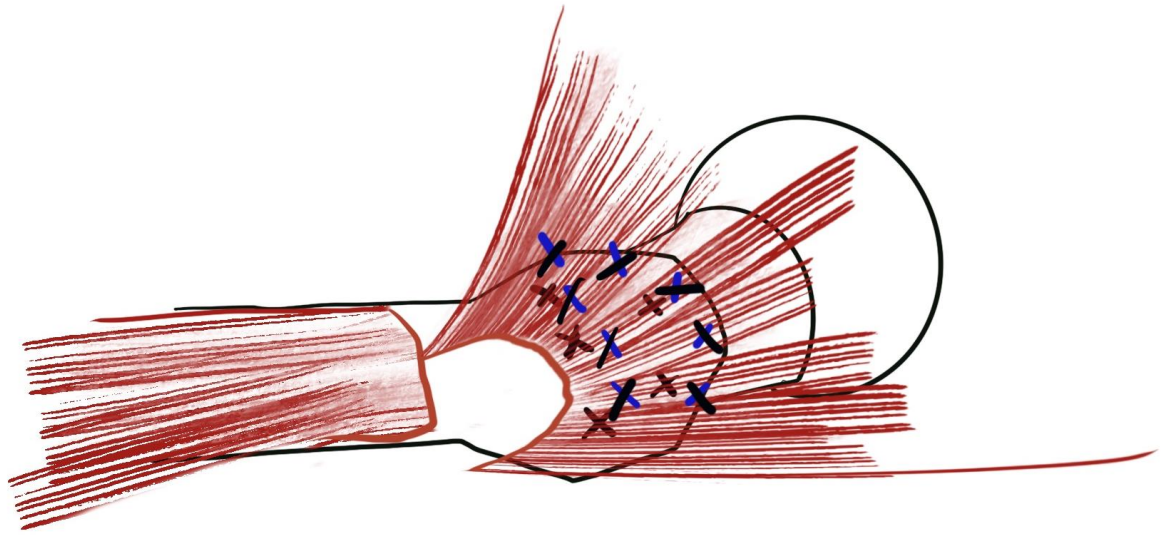

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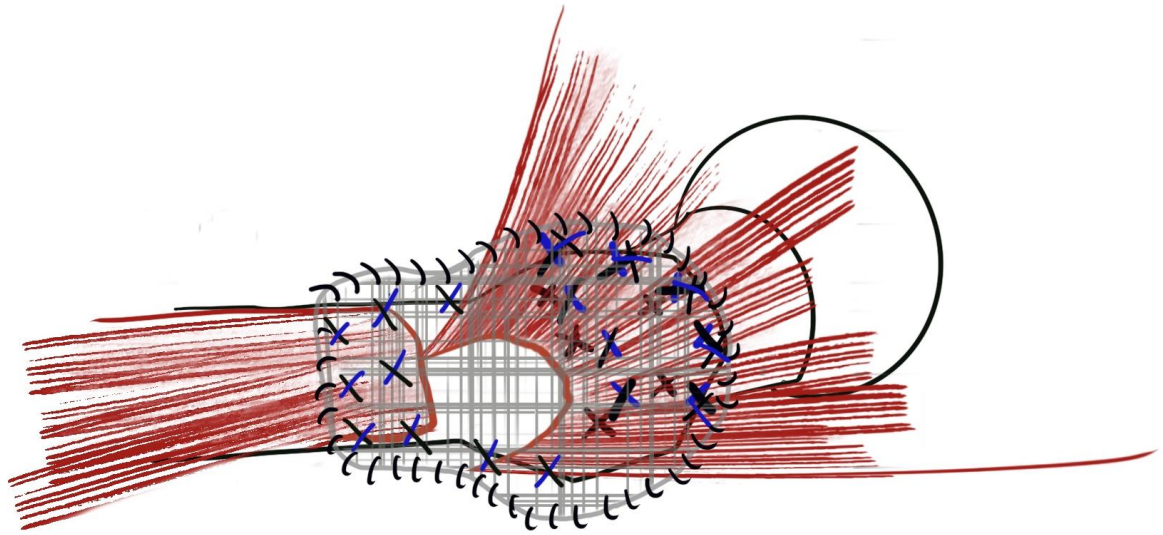


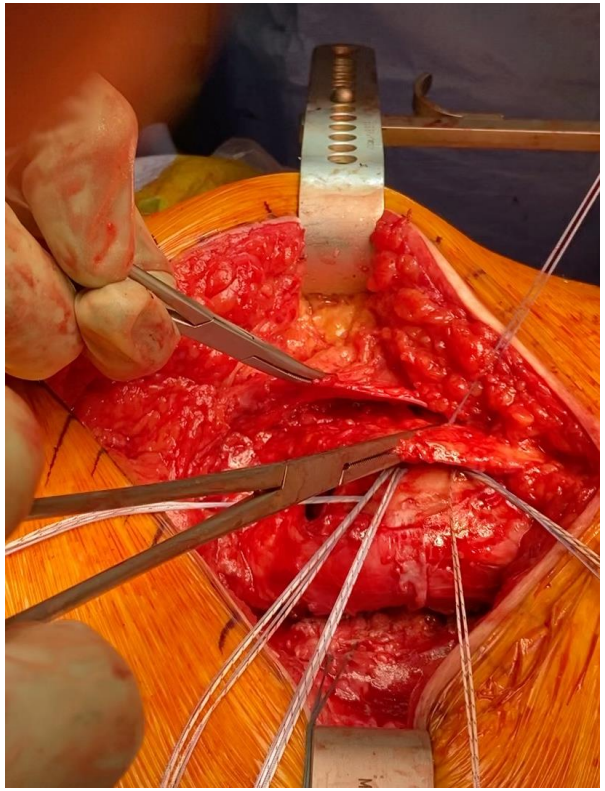
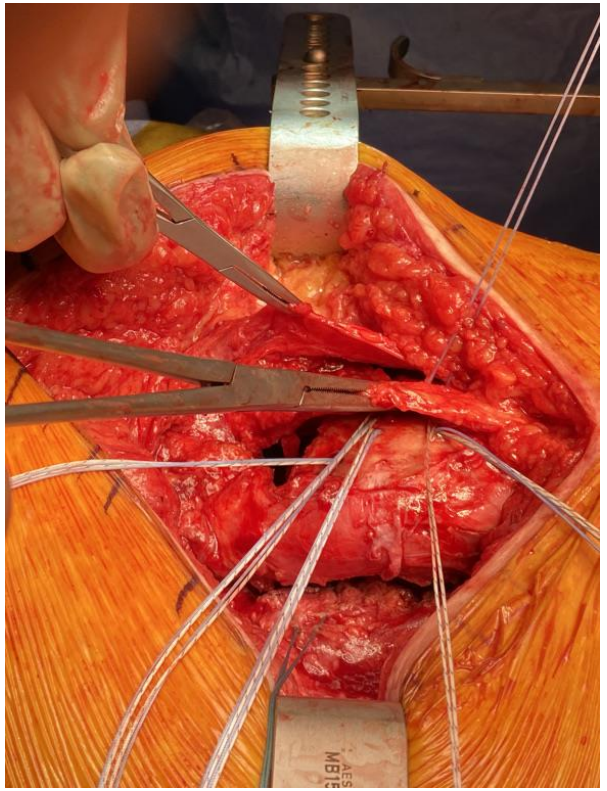
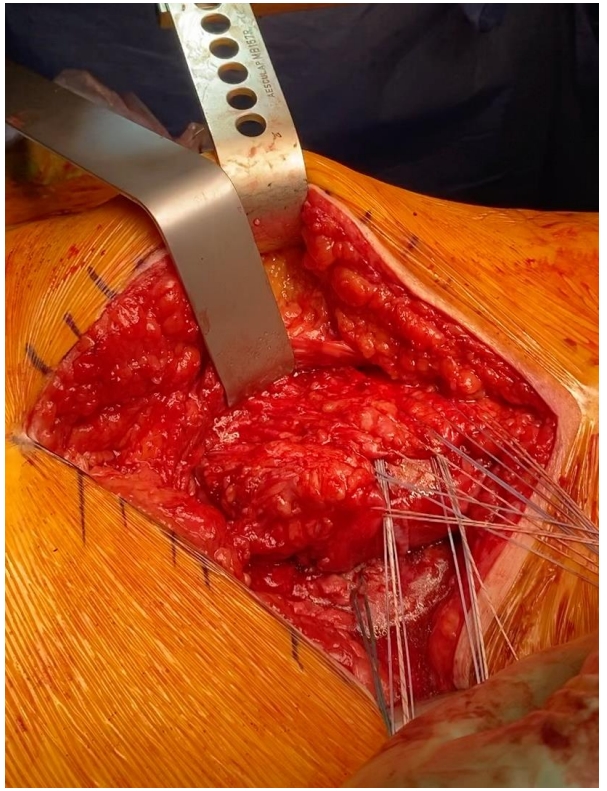

Identifying and freeing the Gmed Sleeve

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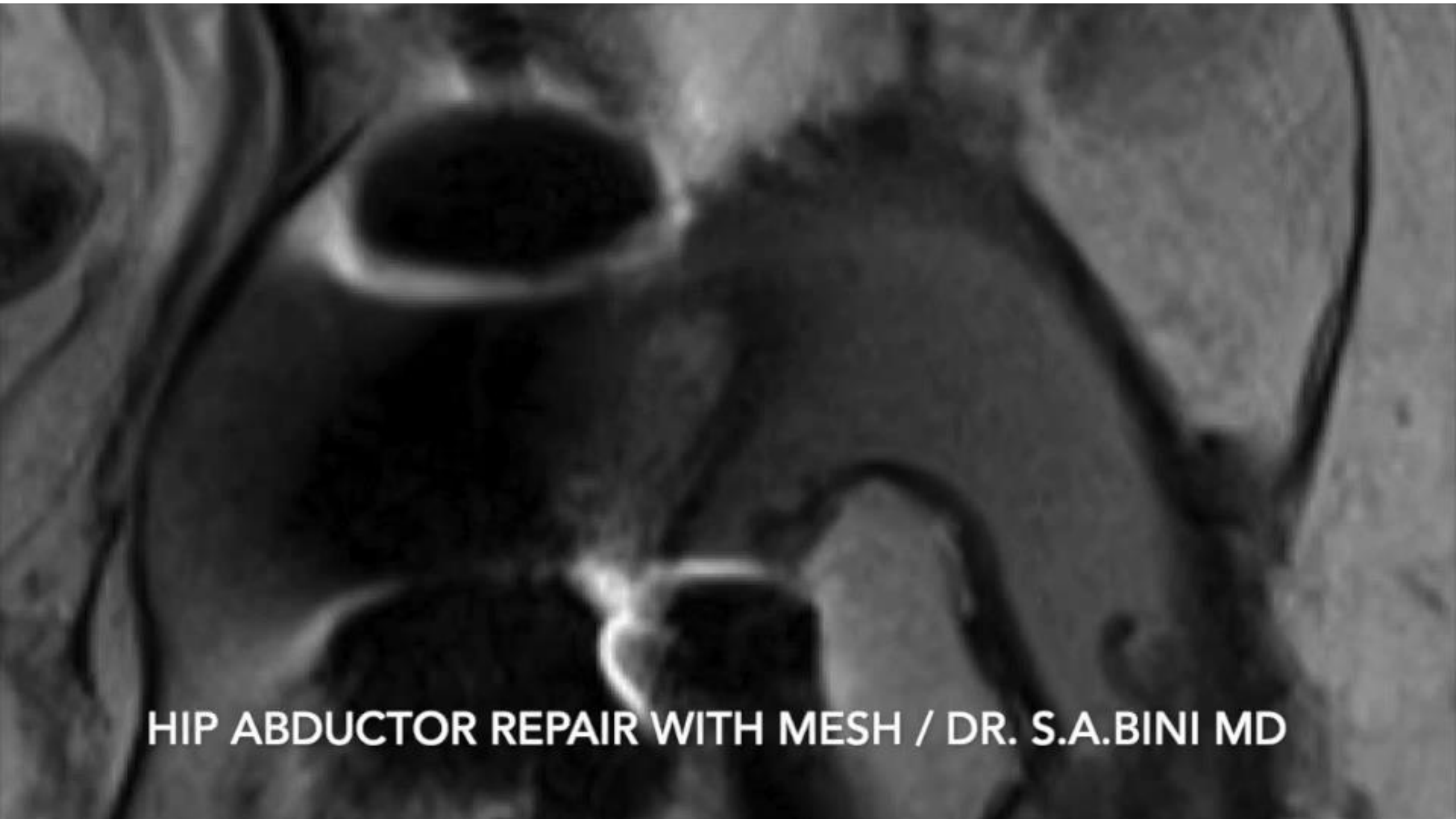
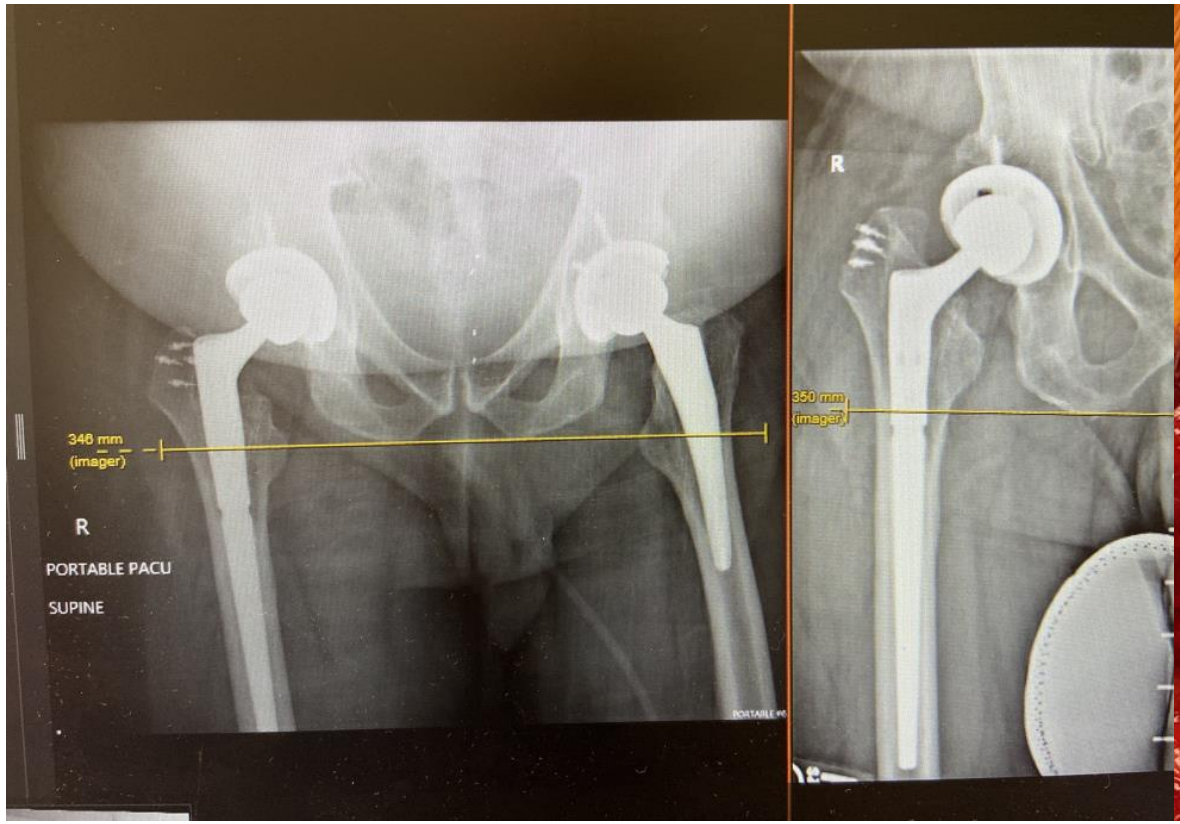
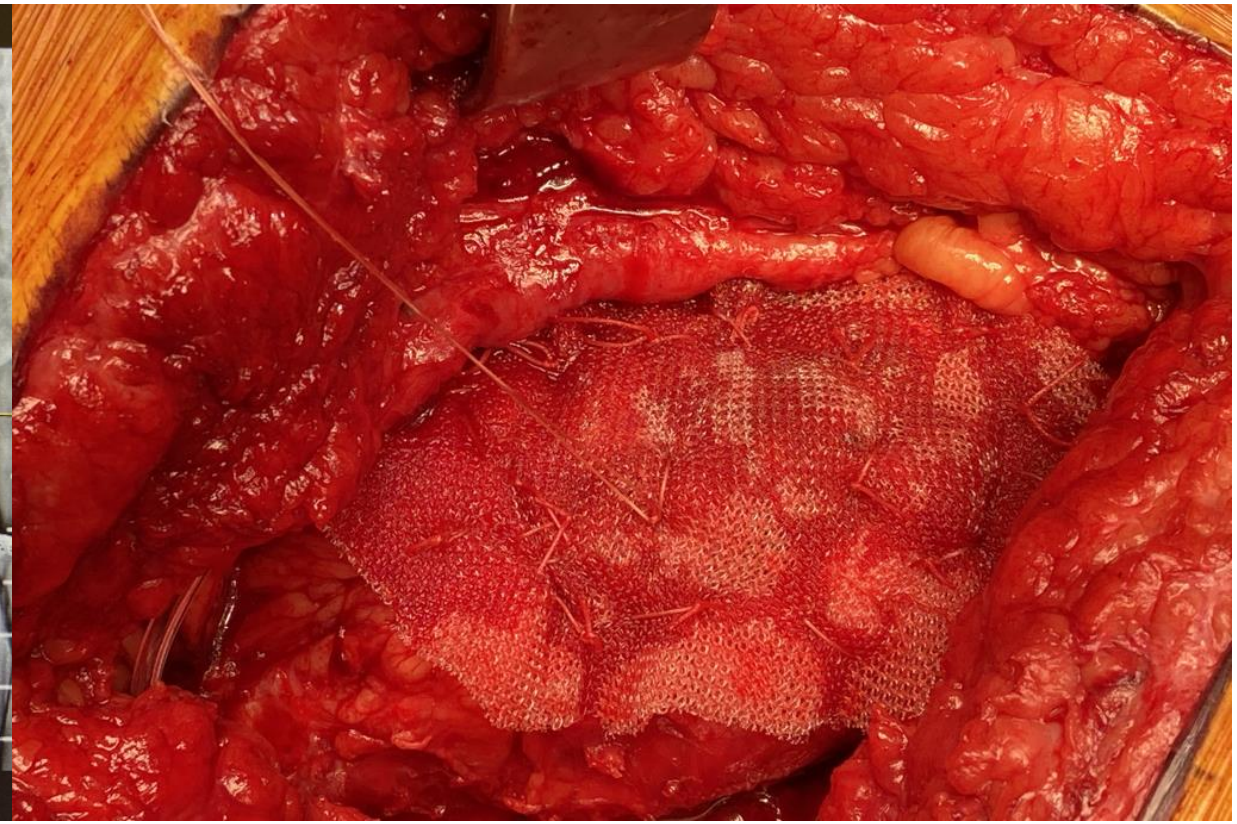

HIP ABDUCTOR REPAIR WITH MESH / DR. S.A.BINI MD

Post operative recovery

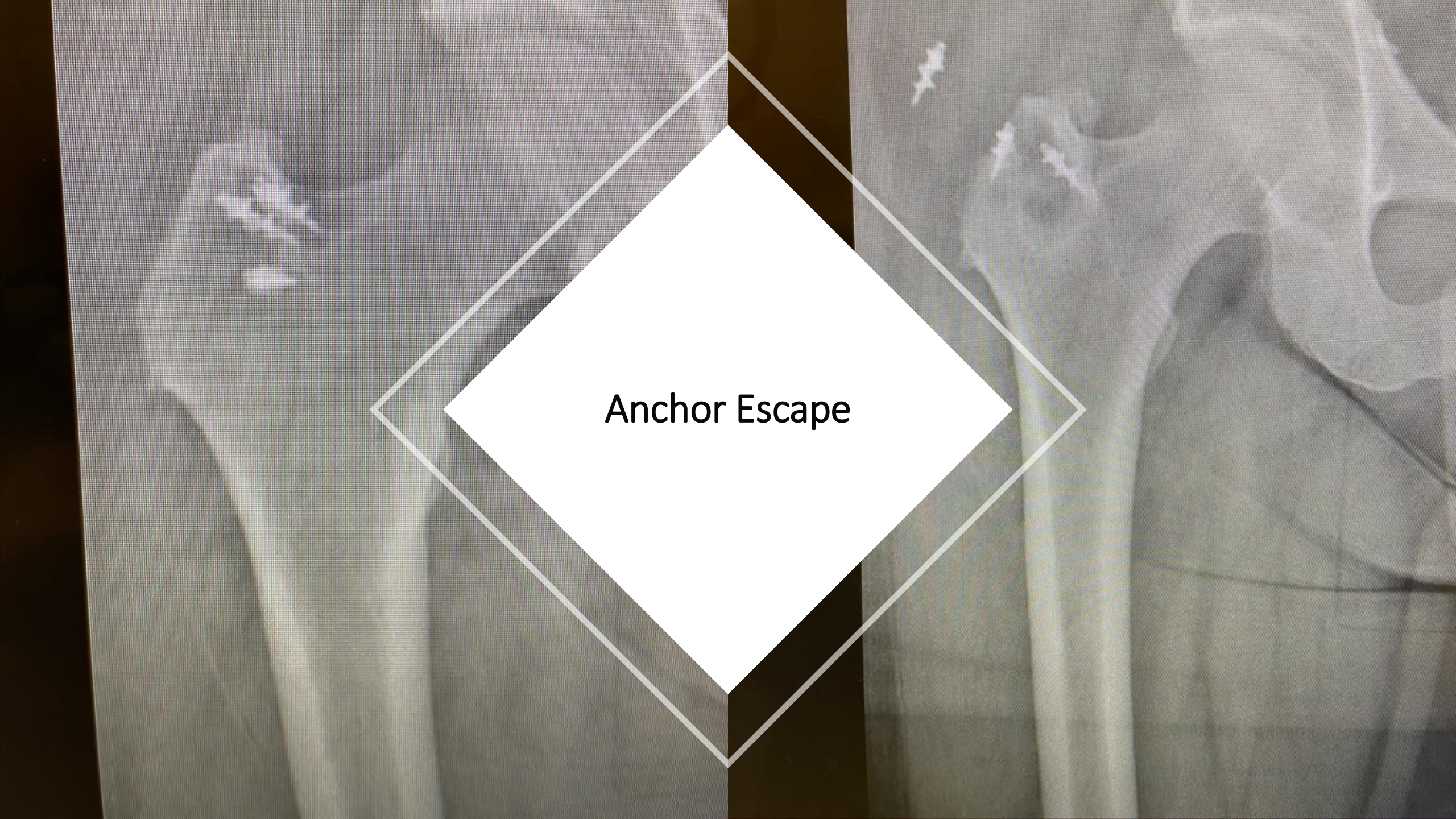
- Prolonged protected weight bearing
  - 12 weeks, 24/7
  - Walker
- PT
  - 0-12 weeks walk
  - >12 weeks OK to do Abductor strengthening
- Wounds SQ closure with Glue and Tegaderm
  - Can bathe immediately

At time of Revision Surgery





Gluteus Medius Repair (revision hip)


Anchor Escape

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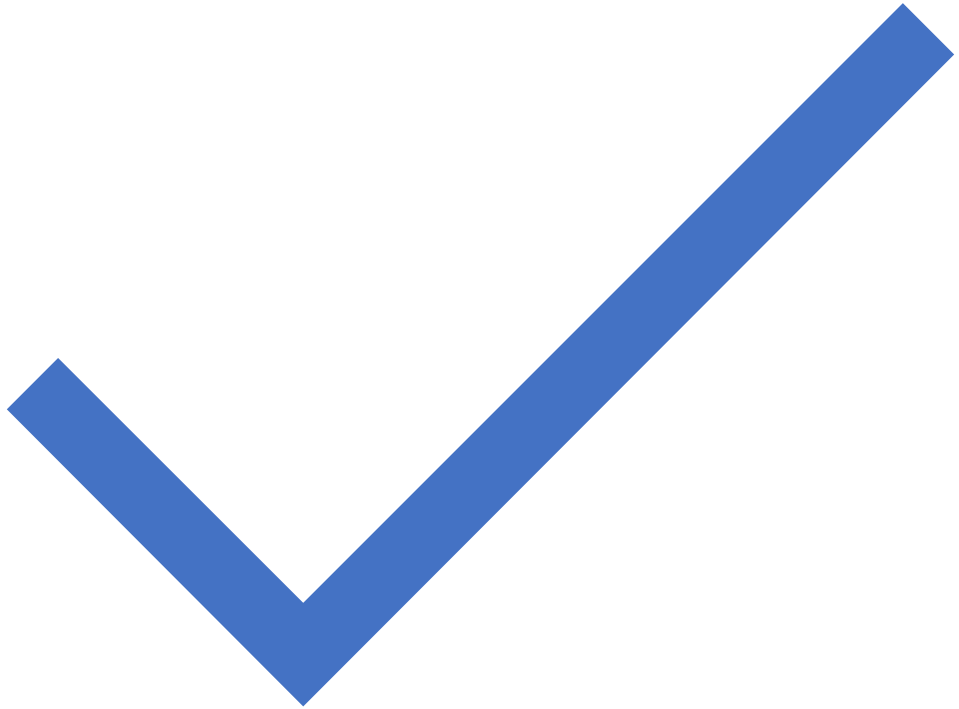
Thank you. Fix it if you see it!



And one more thing…

Clinical Decision Support Systems

- Knowledge Based (rules driven) and Knowledge Free (machine learning) to analyze clinical data
- Currently mostly leverage EHRs
- Philips, Allscripts, AthenaHealth, GE Healthcare, McKesson etc
  - Medication Errors
  - Image Analysis
- Currently over $2B

from Single X-ray image with AI

Tissue Separation on X-ray

Tissue extraction from X-ray image

Mid Flexion Instability

take a perfectly good knee balance it in flexion and extension about the wrong axis ...then “drive”.

Mid-flexion instability is an artifact of mechanical alignment.

What happens when you change the axis of rotation of a knee?

Take a perfectly good car