Banner Health

Anatomic vs. Reverse Total Shoulder Arthroplasty

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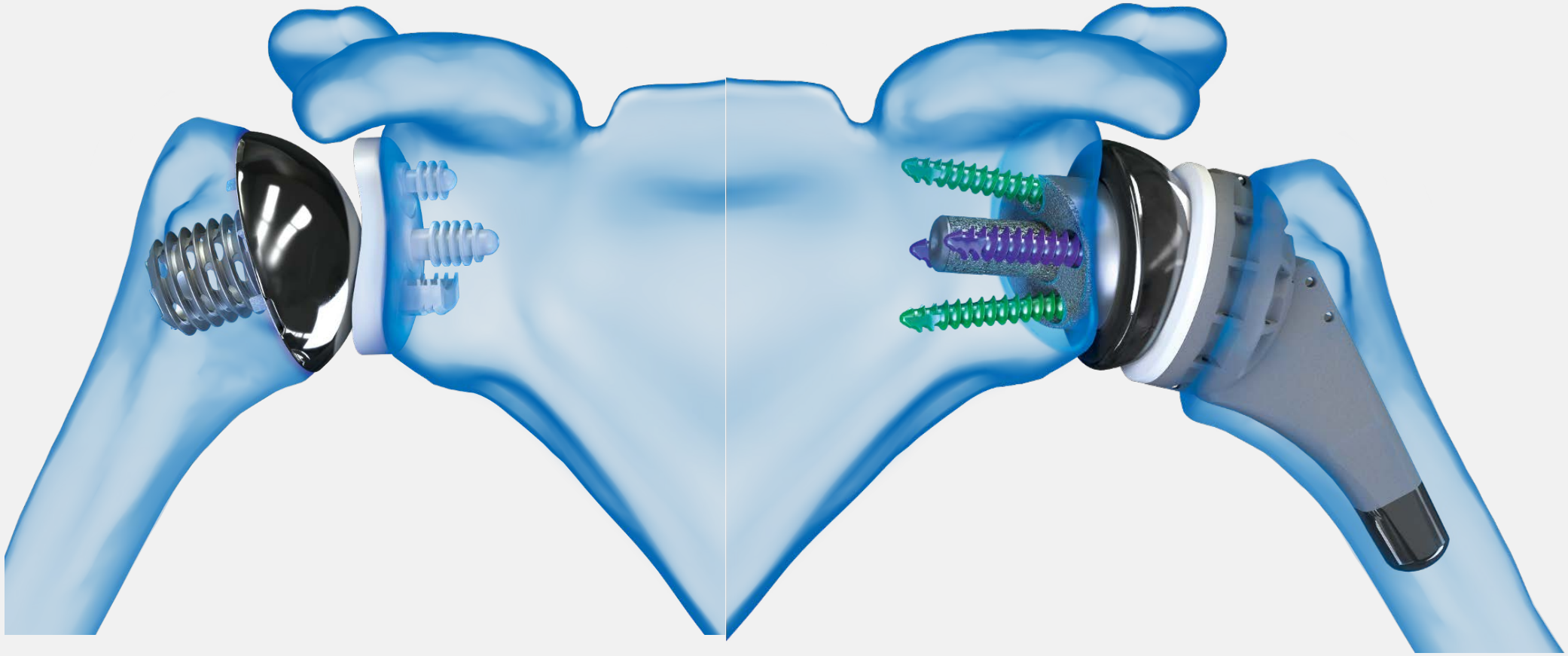
SHOULDER ARTHROPLASTY- WHY?

- Arthritis
- Rotator cuff arthropathy
- Fracture
- Avascular Necrosis
- Revision



aTSA vs. rTSA
WHY?

OSTEOARTHRITIS FINDINGS ON RADIOGRAPH

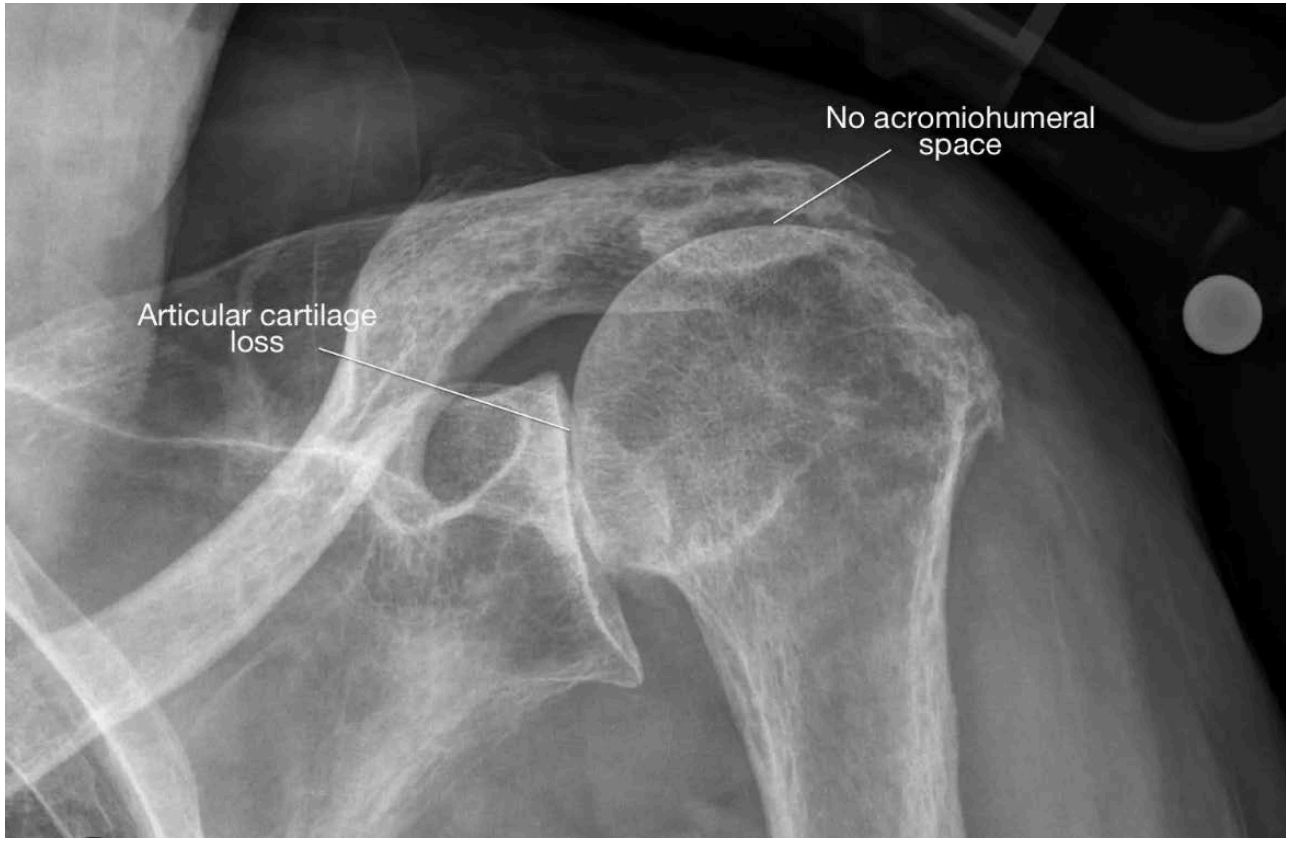
Subchondral sclerosis

Joint space narrowing

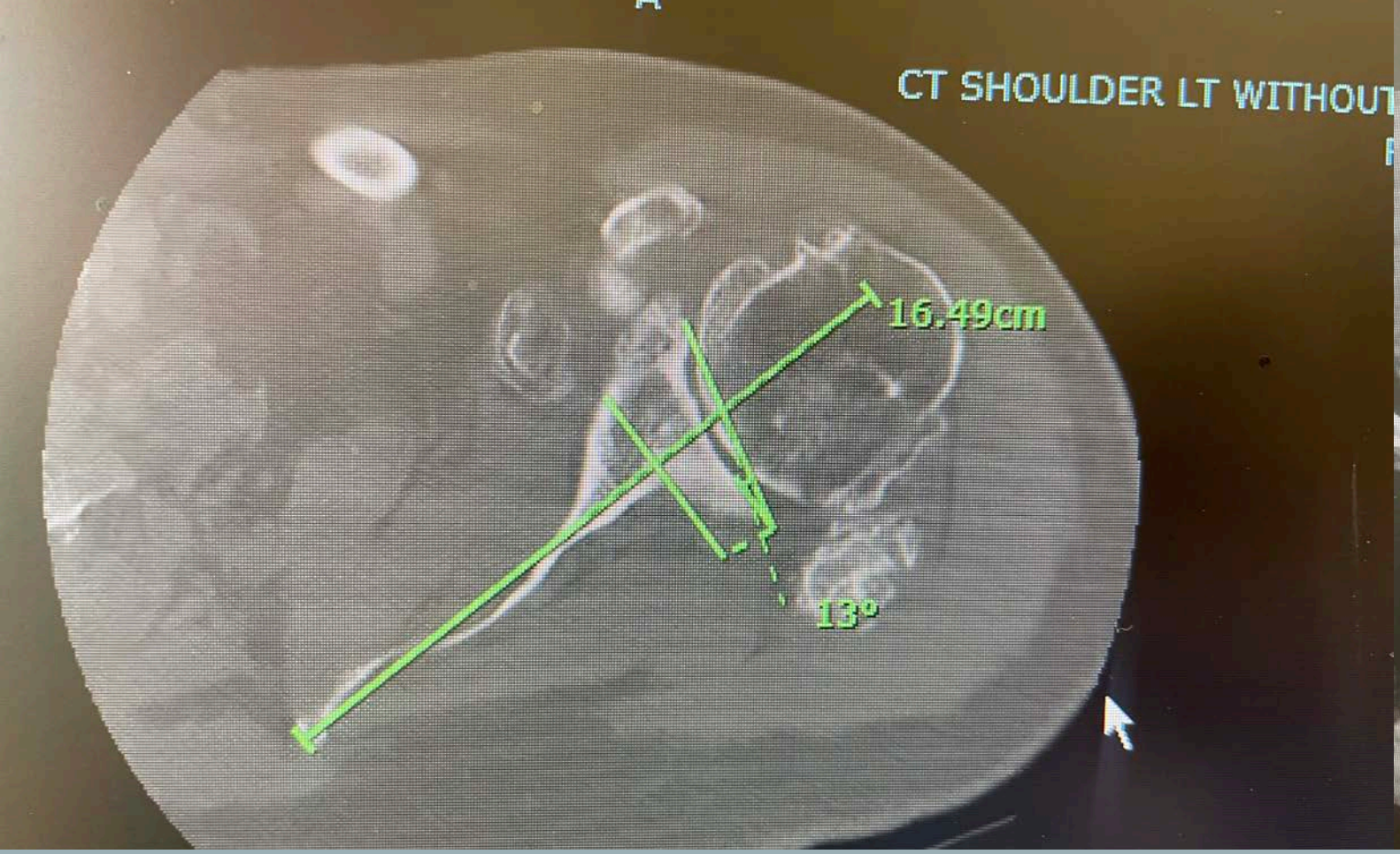
Osteophyte formation

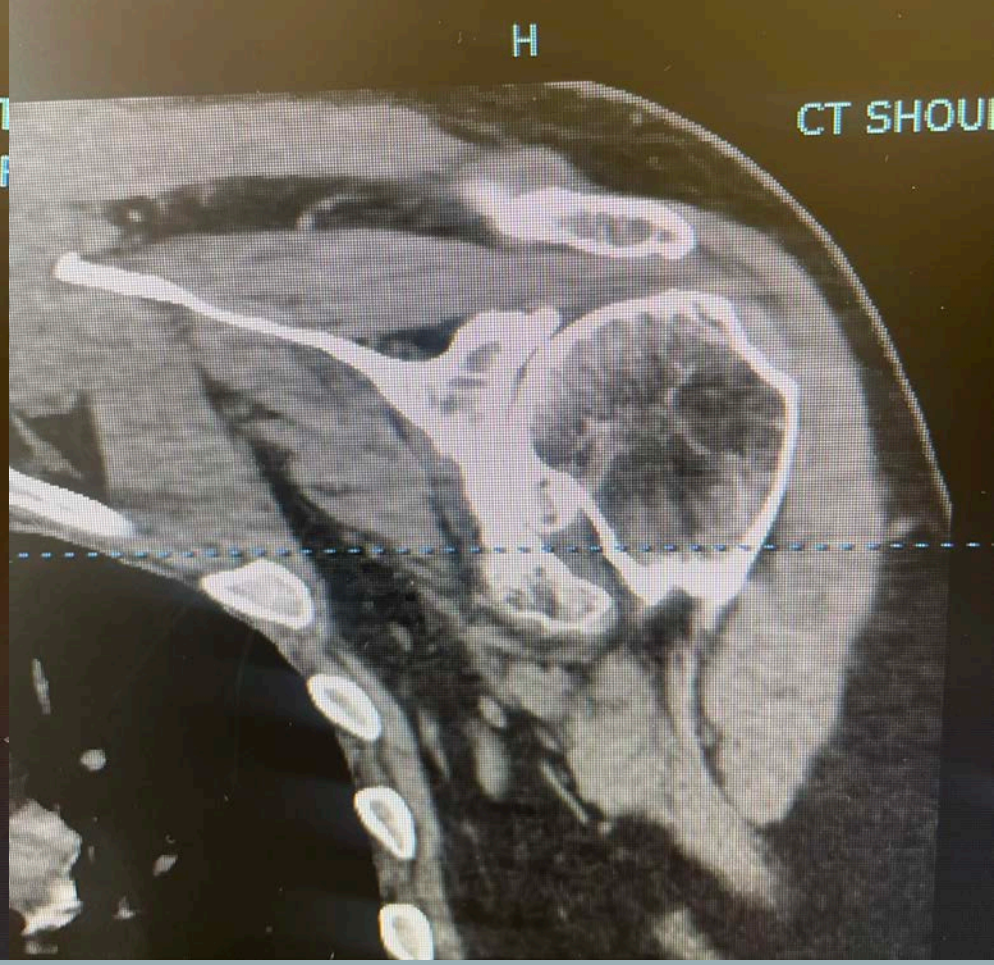
Cyst formation

ROTATOR CUFF ARTHROPATHY ON RADIOGRAPH



- Proximal migration of the humeral head- decreased acromiohumeral distance
- Acetabularization of the coracoacromial arch
- Joint space narrowing – often in the superior aspect of the glenohumeral joint
- Erosion and rounding of the greater tuberosity





ADVANCED IMAGING

CT
MRI

INDICATIONS FOR TSA

- Anatomic Total Shoulder Arthroplasty

- Young
- Intact Rotator Cuff
- No advanced glenoid erosion
- Primary Surgery

INDICATIONS FOR RTSA HAVE EXPANDED

Was approved for use in 2004 for pain and disability with:

- DJD with massive non-repairable rotator cuff tear and functional deltoid
- Revision prosthetic arthroplasty with massive non-repairable rotator cuff tear
- Age 70+

HAS EVOLVED INTO:

DJD with massive non-repairable rotator cuff tear

Revision prosthetic arthroplasty with massive non-repairable rotator cuff tear

Massive rotator cuff tears

Failed TSA/hemiarthroplasty

Acute proximal humerus fracture

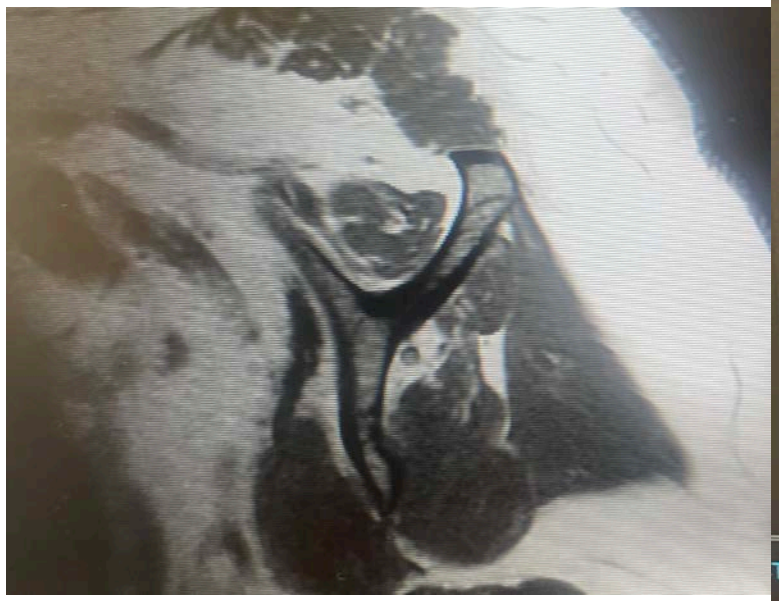
Sequelae of proximal humerus fracture (nonunion/malunion)

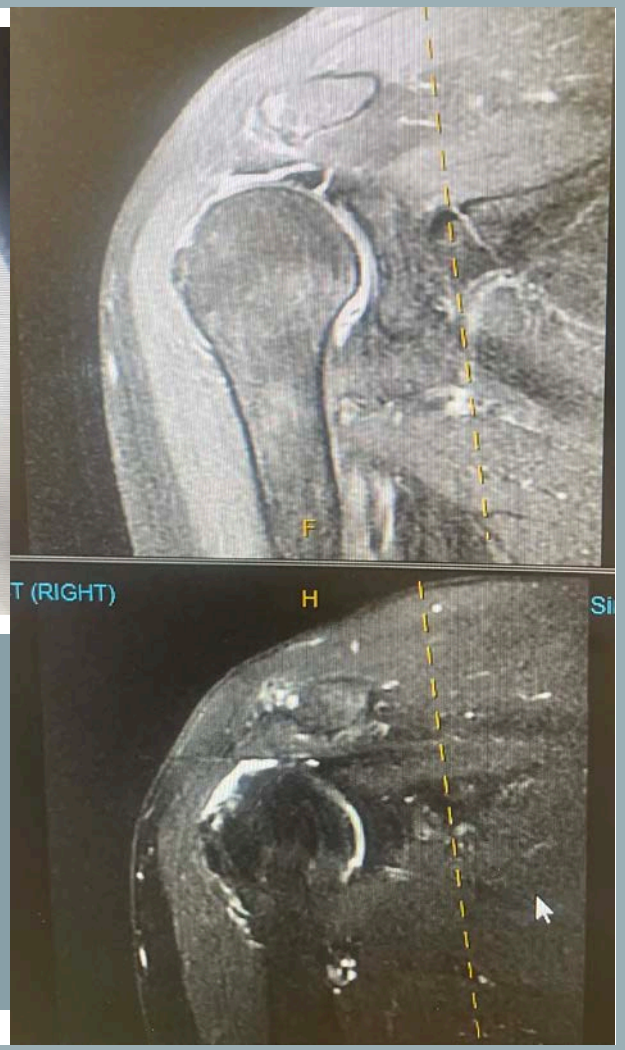
Risk of rotator cuff deficiency + arthritis

Fatty substitution of subscap/infraspinatus

B2 glenoid/eccentric wear

Chronic instability or failed instability procedure





FATTY INFILTRATION SCAPULAR Y VIEW

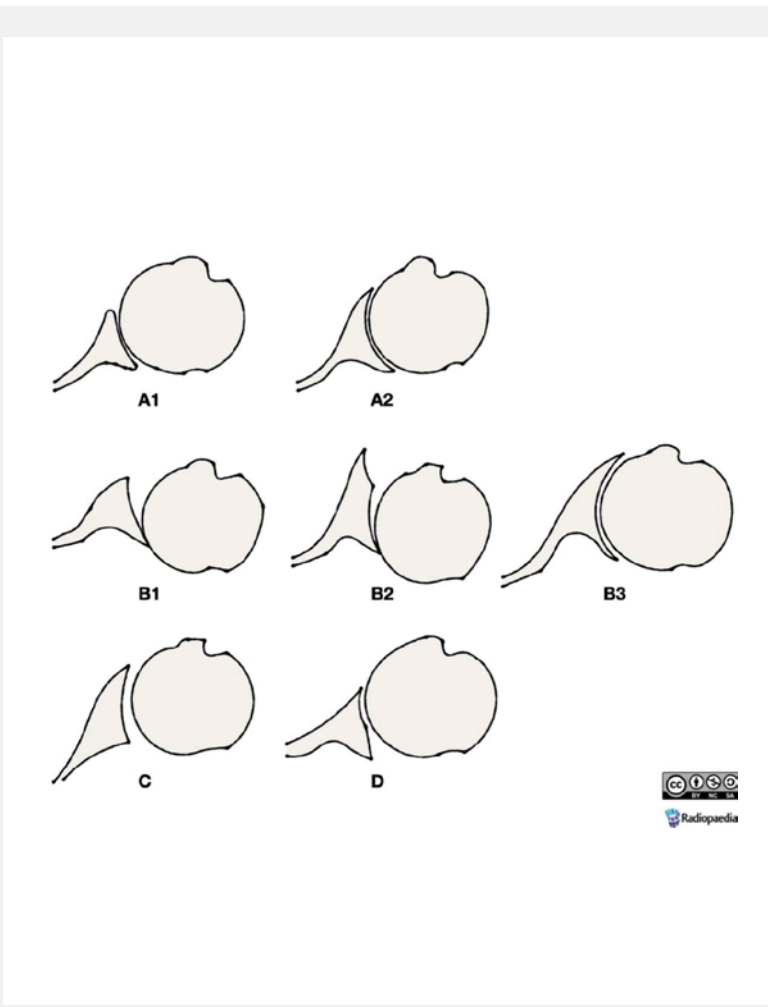
WALCH CLASSIFICATION

- Type A: Centered humeral head, concrentric wear, no subluxation
  - A1- minor central erosion
  - A2 – major central erosion

Type B: Humeral head subluxed posteriorly, asymmetric wear, biconcave
- B1 - narrowing posterior joint space
- B2 – retroverted glenoid, posterior rim erosion
- B3 - > 15 degrees retroversion, or > 70% posterior humeral head subluxation

Type C: > 25 degrees retroversion/posterior translation humeral head

Type D: Glenoid anteversion or anterior humeral head subluxation



NATIONAL UTILIZATION OF REVERSE TOTAL SHOULDER ARTHROPLASTY IN THE UNITED STATES. *J SHOULDER ELBOW SURG*. 2015;24(1):91-97. DOI:10.1016/J.JSE.2014.08.026

• 44% anatomic total shoulder arthroplasty (TSA) • 33% reverse total shoulder arthroplasty (rTSA) • 23% hemiarthroplasty

rTSA has gained acceptance within the orthopedic community since 2004. As this study indicated, rTSA accounts for roughly one third of all shoulder arthroplasty procedures in the US

ANATOMIC TOTAL SHOULDER ARTHROPLASTY

POTENTIAL BENEFITS OF SHORT STEM IMPLANTS

- Preserved bone stock
- Decreased stress shielding
- No diaphyseal stress riser
- Easier to remove for revision

CHALLENGES WITH STEMLESS IMPLANTS

"Surgeons performed better at anatomically reproducing the premorbid humeral head anatomy with stemmed shoulder arthroplasty compared with resurfacing arthroplasty." JSES 2014

SURGICAL TECHNIQUES/PEARLS

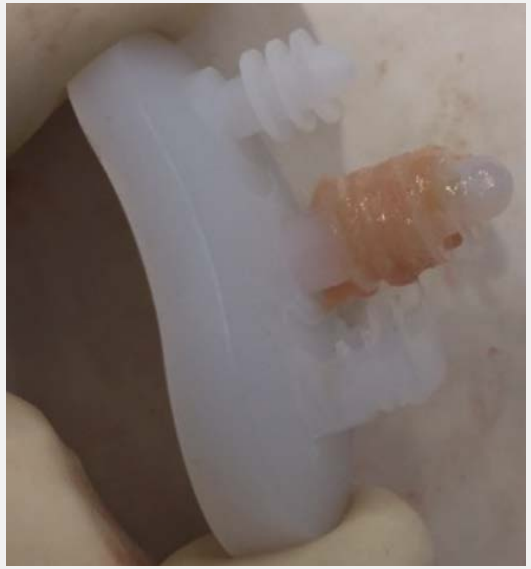
- AUTOGRAFT CENTRAL PEG GLENOID

- AUGMENTED GLENOID/BONE GRAFTING

- SUBSCAPULARIS TAKE DOWN OPTIONS/REPAIR

OSSEOUS INTEGRATION OF THE CENTRAL PEG OF AN ALL-POLYETHYLENE GLENOID WITH THREE DIFFERENT SURGICAL TECHNIQUES

PATRICK DENARD, REUBEN GOBEZIE, JUSTIN GRIFFIN, ANTHONY A. ROMEO, EVAN LEDERMAN

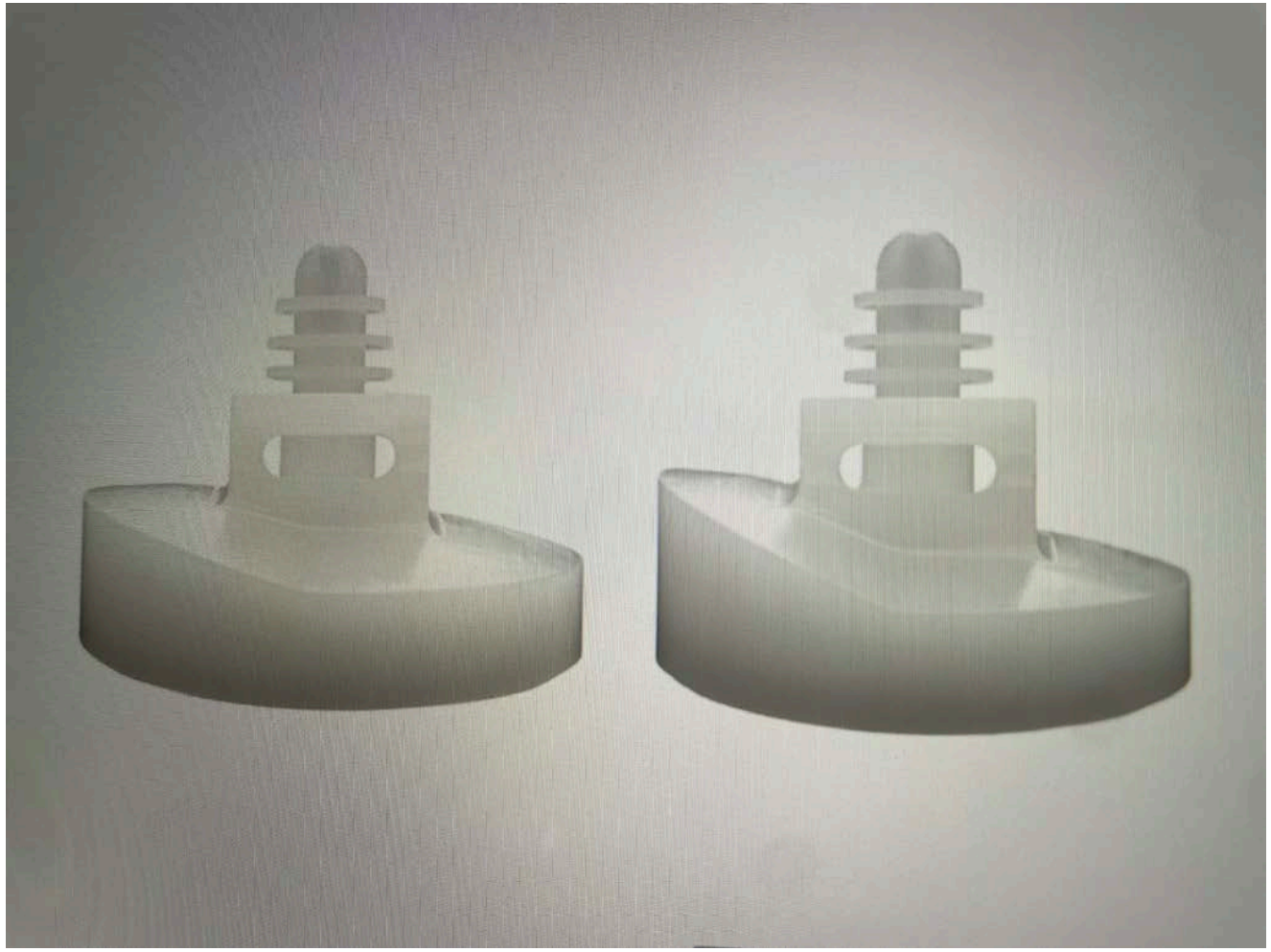


- 153 primary TSA patients
- Central peg: Autograft, DBM, No graft

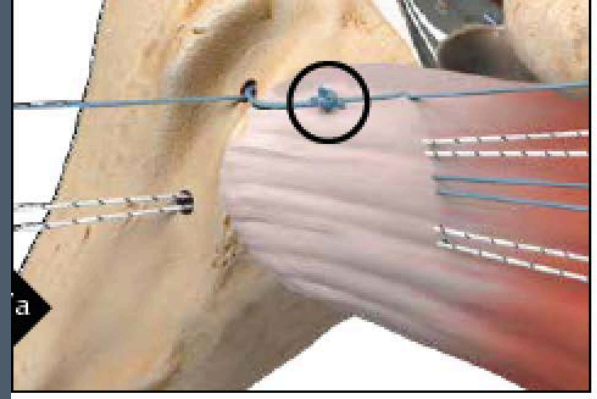
<u>Osseous Integration</u>

Autograft: 90%
DBM: 68%
No graft: 68%

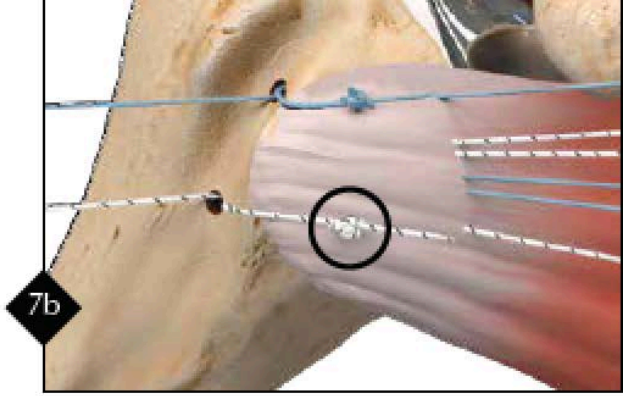
AUGMENTS



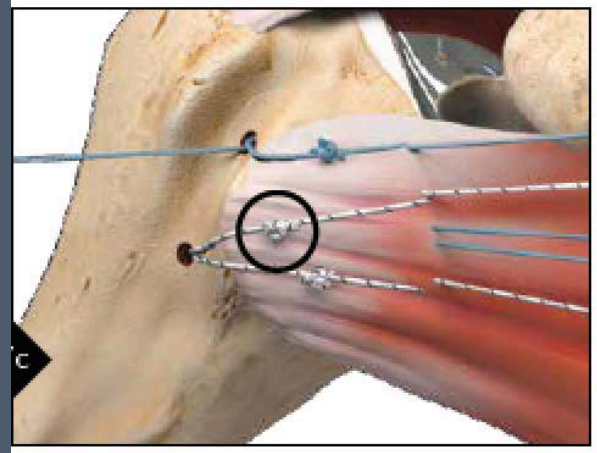
ARTHREX APEX SUBSCAP REPAIR METHOD



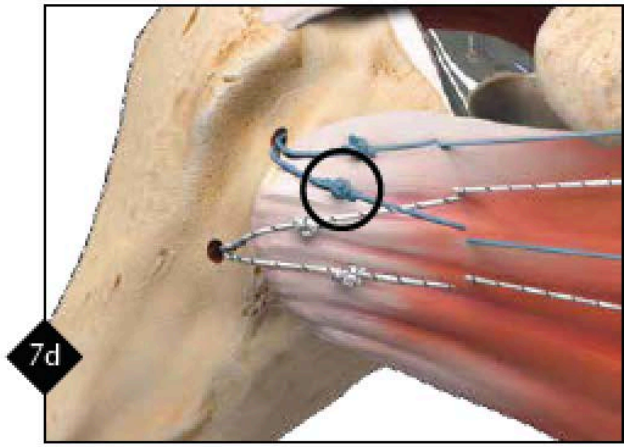
1 to A (FiberWire to FiberWire)



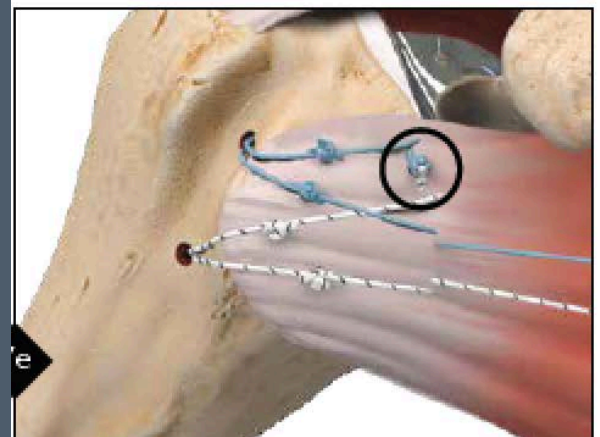
8 to D (TigerWire to TigerWire)

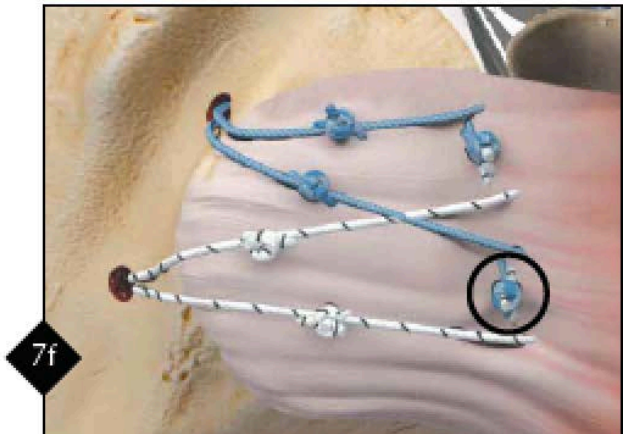


4 to C (TigerWire to TigerWire)

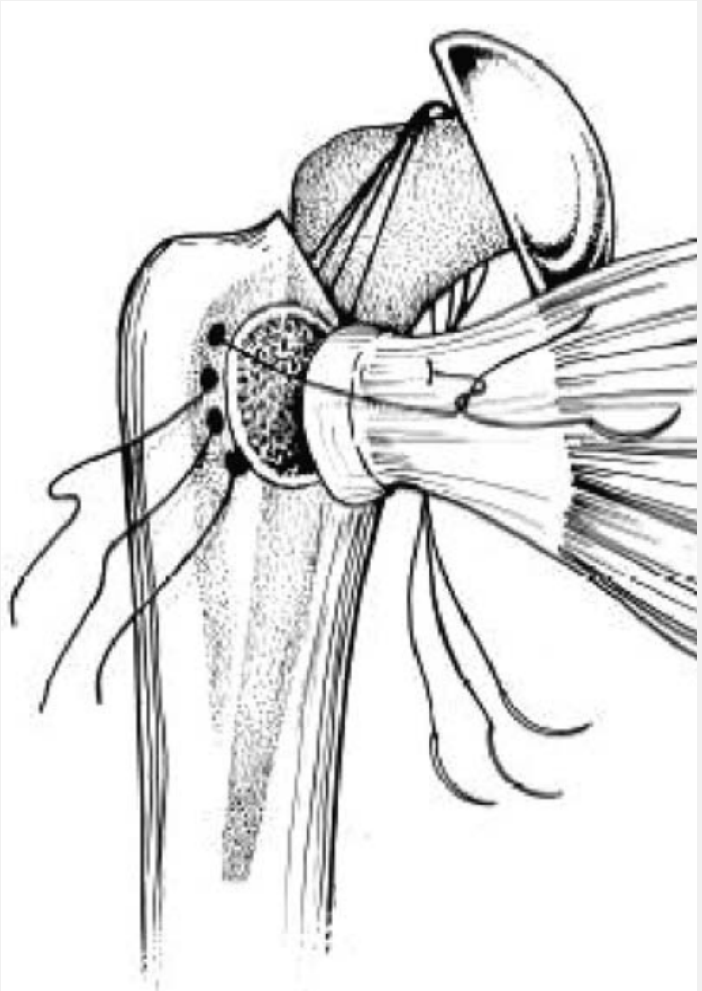


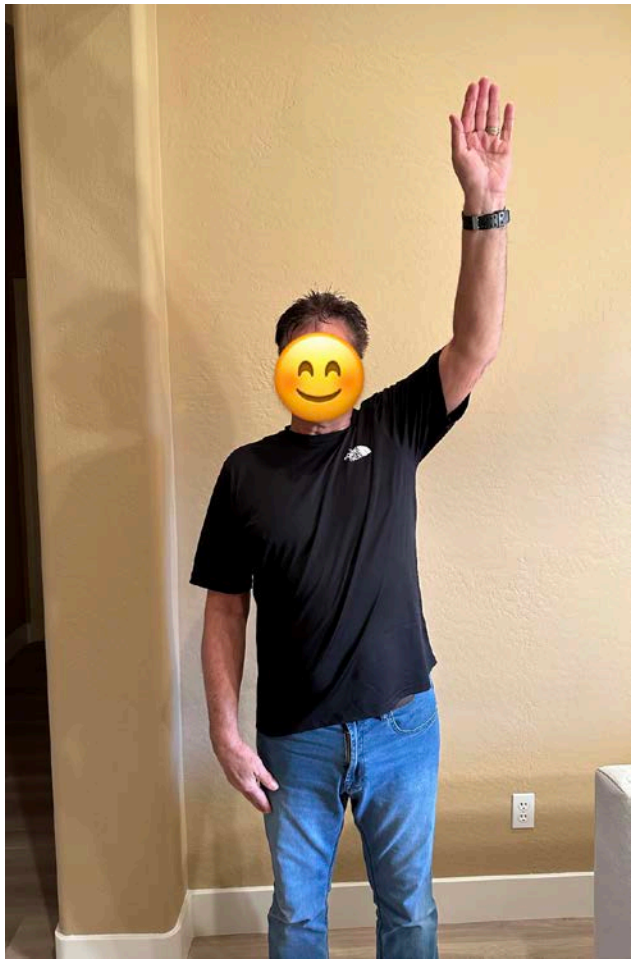
5 to B (FiberWire to FiberWire)

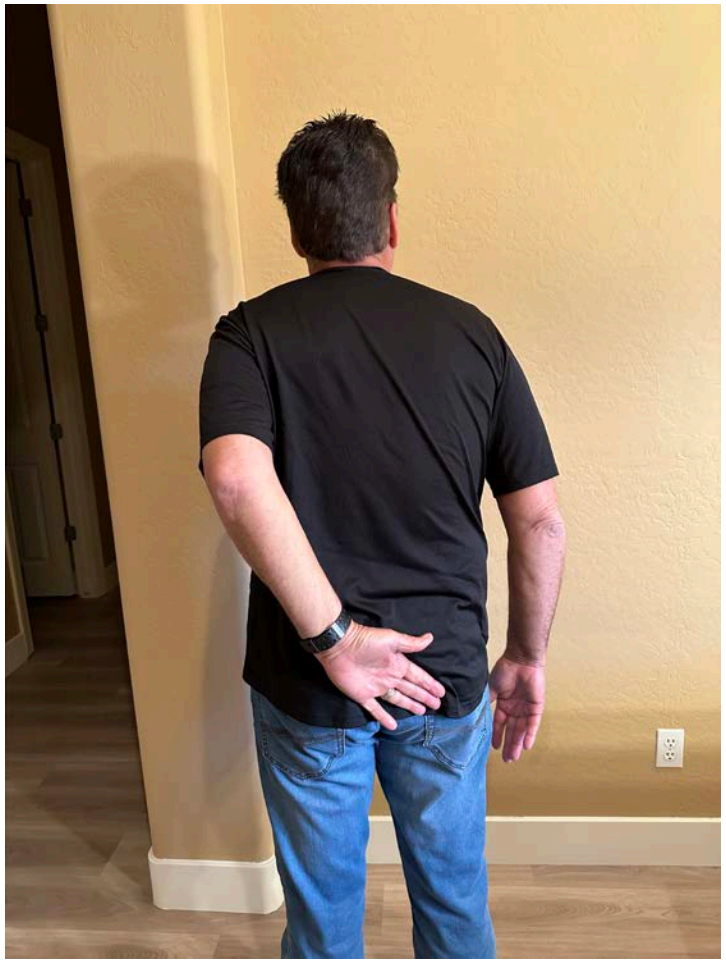




OSTEOTOMY LESSER TUBEROSITY







POST OP ROM TSA- 2 MONTHS POST OP

WHY DO TSA'S FAIL?

-ROTATOR CUFF TEAR/FAILURE (SUPRA OR SUBSCAP)

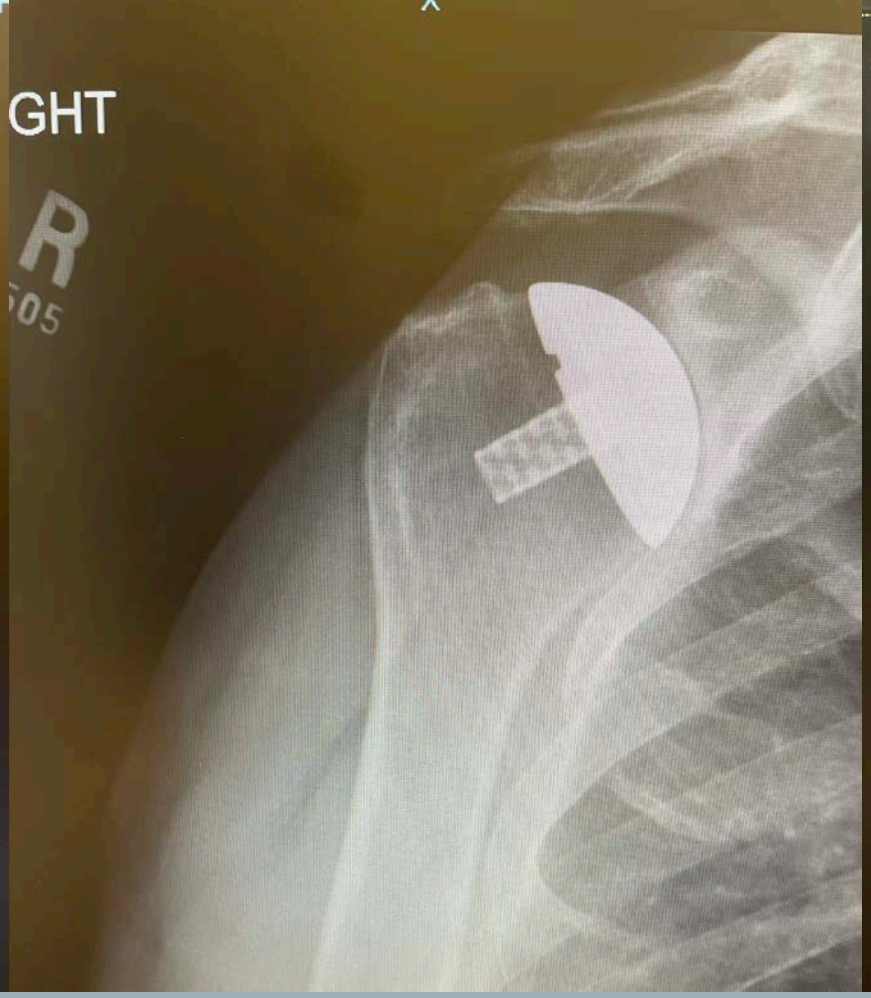
- INFECTION

- ASEPTIC LOOSENING

- EDGE LOADING GLENOID

- INCOMPLETE BACKSIDE SUPPORT GLENOID

Subscapularis failure



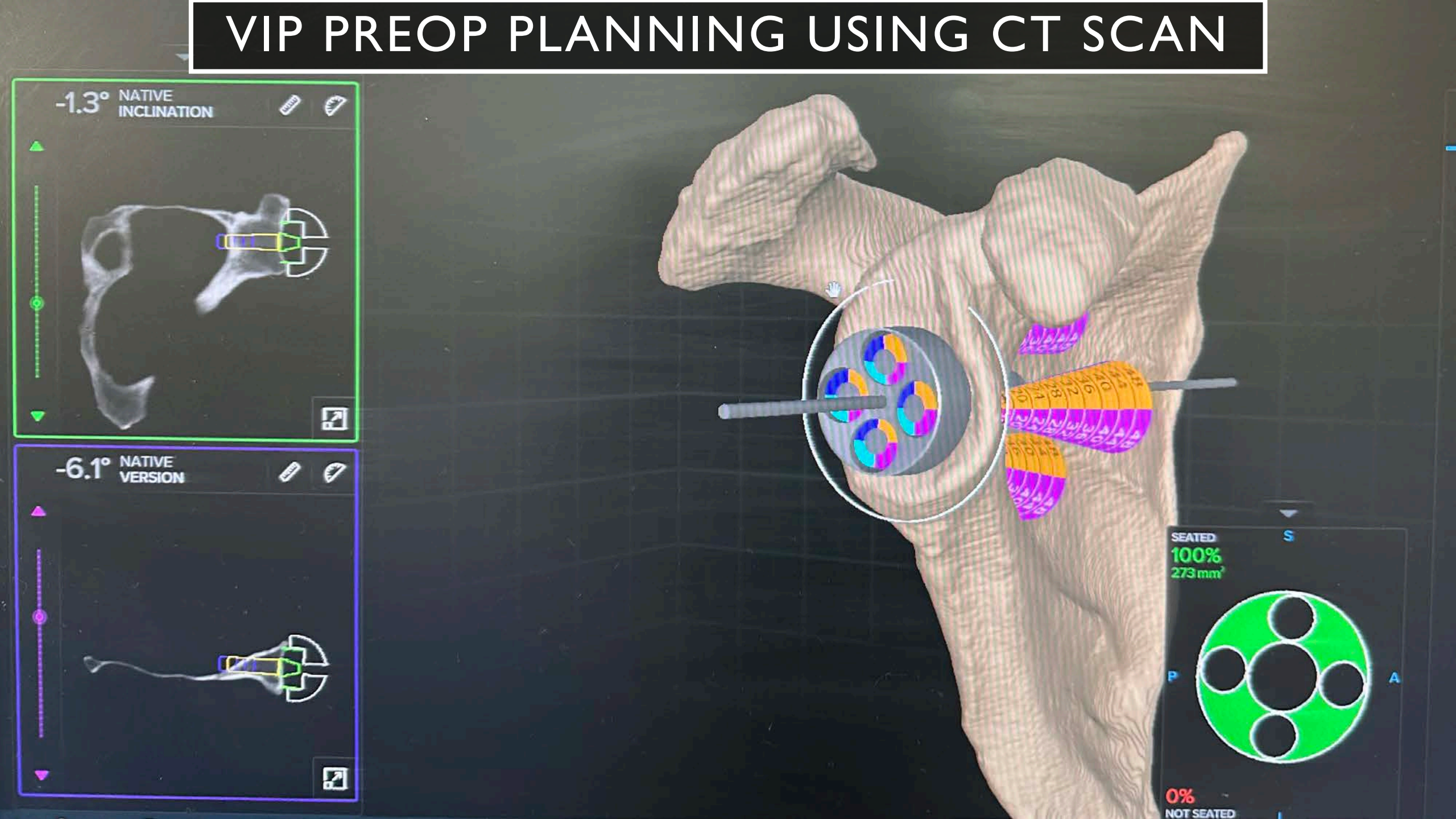
Overstuffed

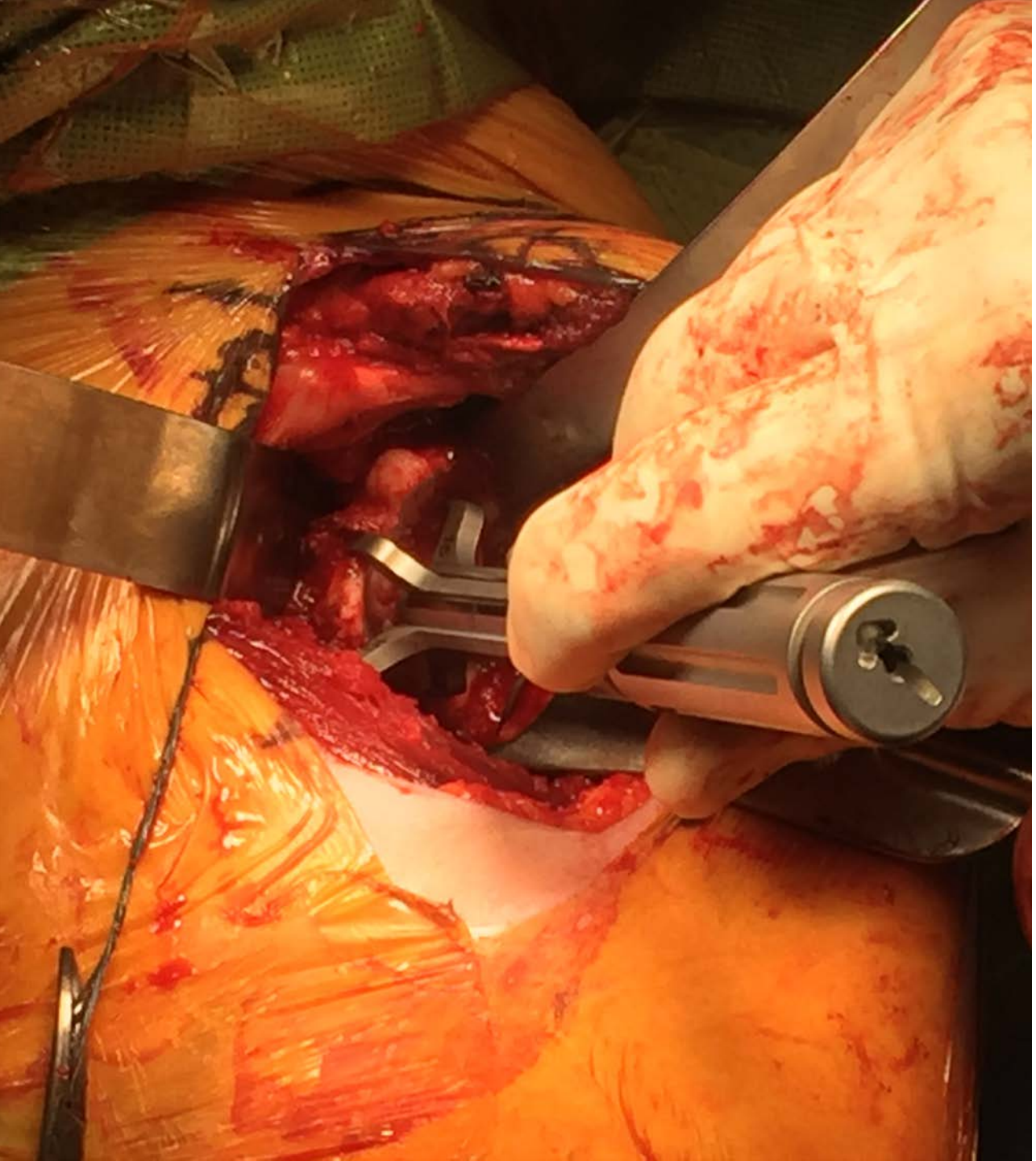
Aseptic loosening

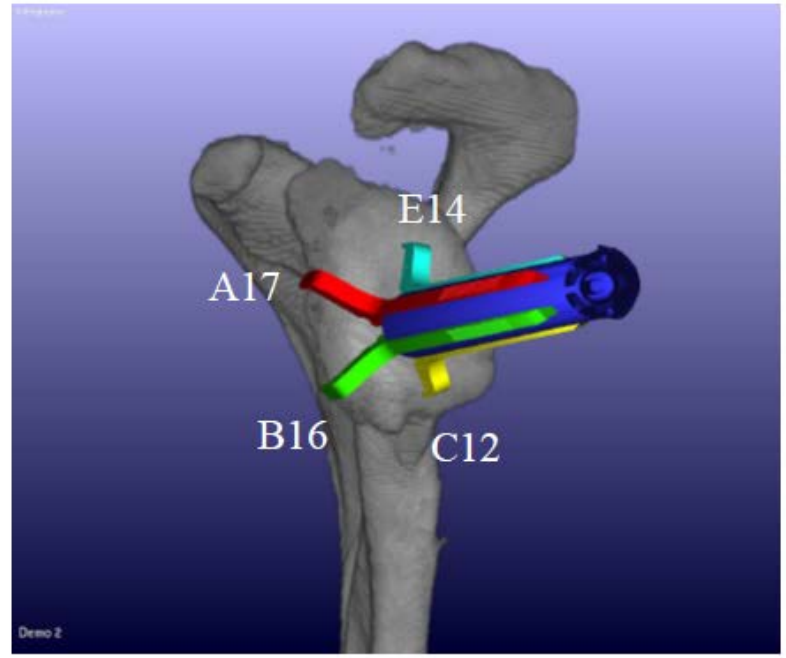
WHAT CAN WE DO TO AVOID FAILURE:

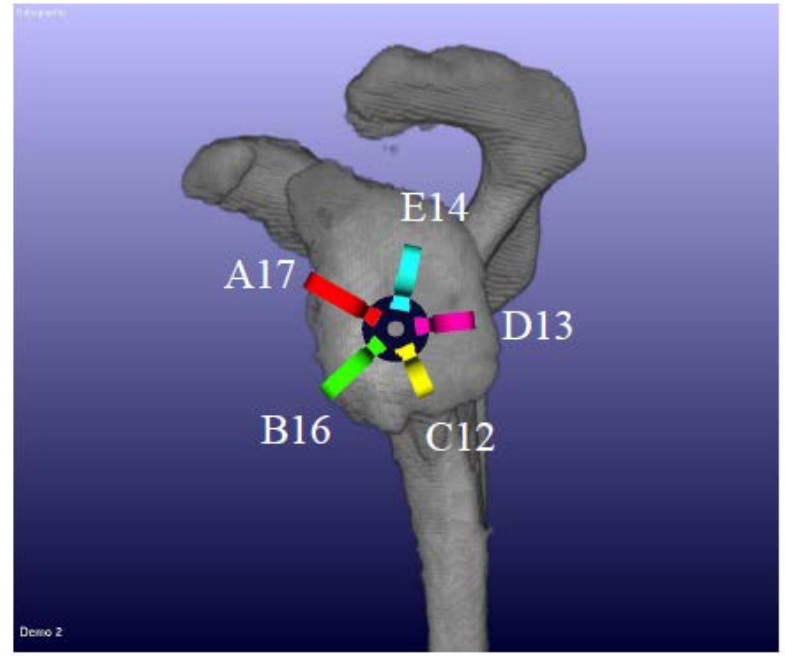
- Preop Planning
- Anatomic Humeral Reconstruction
- Bone Preserving
- Stable Glenoid Fixation
- Durable Subscapularis Repair

VIP PREOP PLANNING USING CT SCAN









CUSTOM ORTHOPAEDIC SOLUTIONS

Patient Name: Demo 2

Arthrex

REVERSE TOTAL SHOULDER ARTHROPLASTY

SURGICAL TECHNIQUES AND PEARLS

- INFERIOR/LATERALIZATION GLENOID COMPONENT

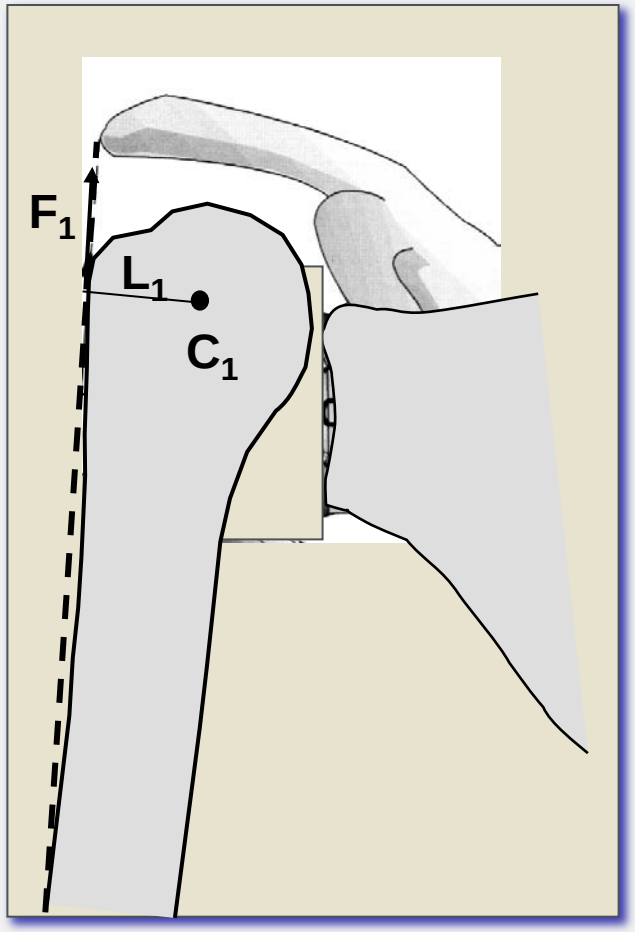
- 135 VS 155 PROSTHESIS

- INLAY VS ONLAY SYSTEMS

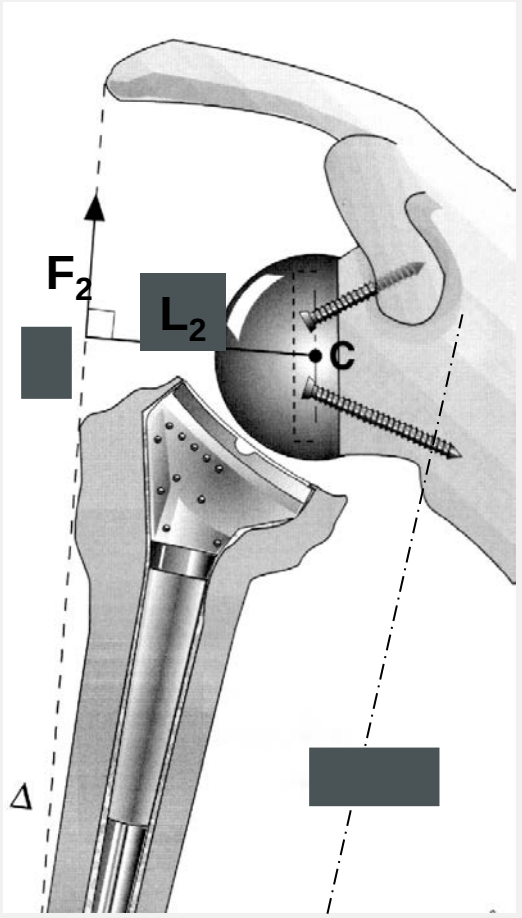
- DO WE REPAIR THE SUBSCAP?

Increased Deltoid Torque and Recruitment of Anterior and Posterior Deltoid

Increased Lever Arm: L2 > L1

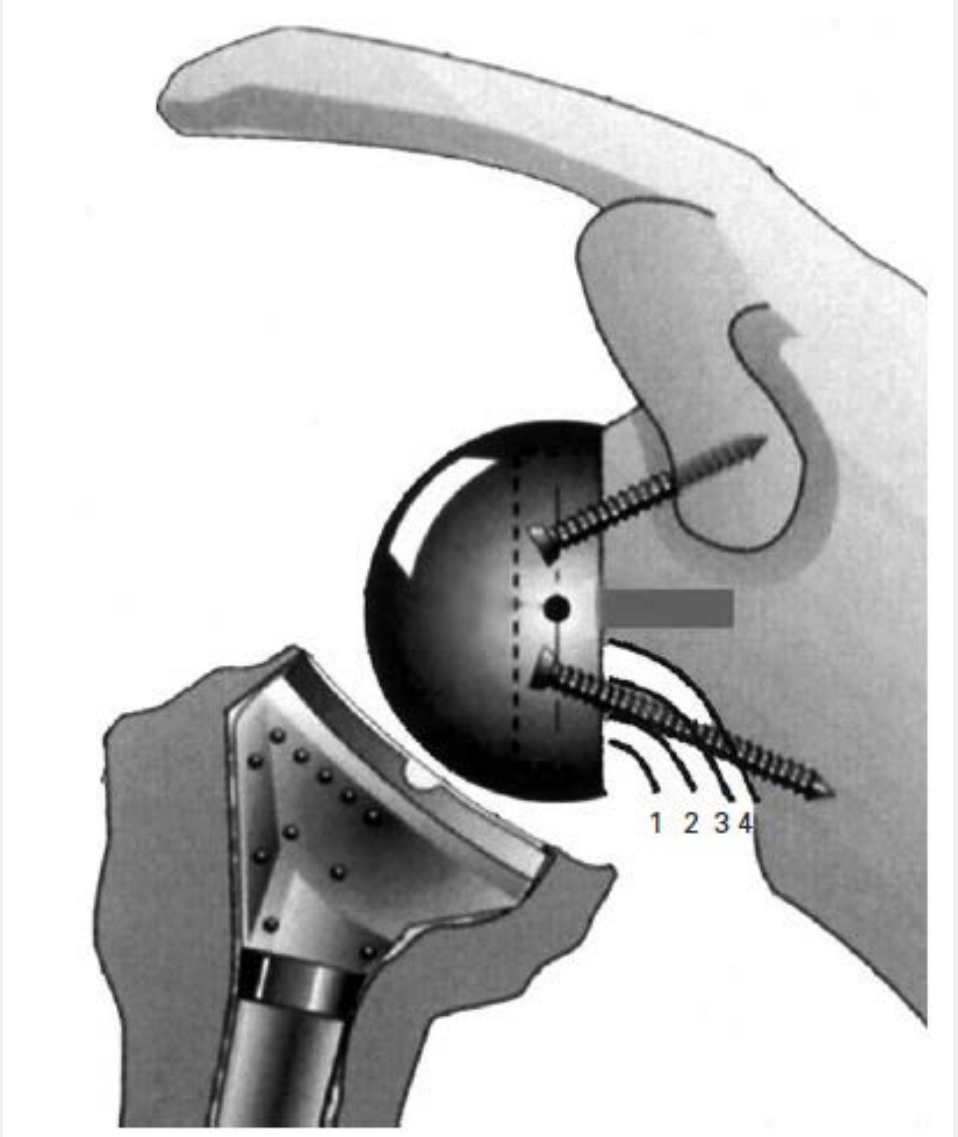


Increased Deltoid Force: F2 > F1



SCAPULAR NOTCHING

- Occurs during adduction and rotation of the arm
- Associated with poorer clinical outcome
- Bone erosion and polyethelene wear
- Can cause chronic inflammation
- Systematic review has shown 135 prosthesis less scapular notching and no increase in dislocation rate

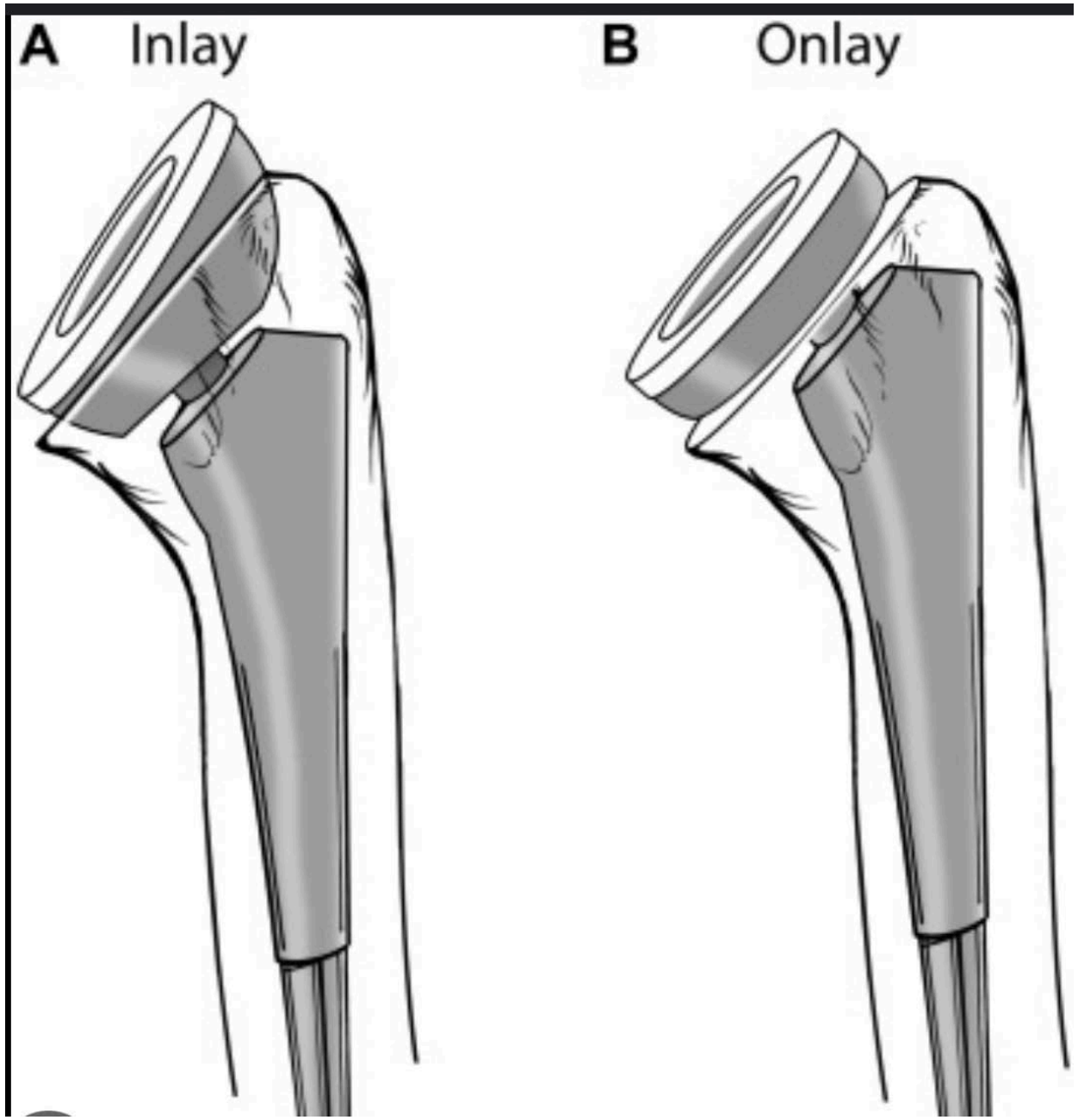


THE RISK OF POSTOPERATIVE SCAPULAR SPINE FRACTURE FOLLOWING REVERSE SHOULDER ARTHROPLASTY IS INCREASED WITH AN ONLAY HUMERAL STEM. *J SHOULDER ELBOW SURG*. 2020;29(12):2556-2563. DOI:10.1016/J.JSE.2020.03.036

Retrospective review of 426 RSA patients who received three different implant systems

The incidence of SSF was 2.5 times higher with an onlay stem compared to an inlay stem.

INLAY VS ONLAY



TO REPAIR THE SUBSCAP OR NOT TO REPAIR?

POSSIBLE BENEFITS OF REPAIR

- STABILITY?

- IR STRENGTH AND MOTION?

- DEAD SPACE CLOSURE?

- WHY NOT?????

THE IMPACT OF SUBSCAPULARIS INTEGRITY ON FUNCTIONAL OUTCOME IN REVERSE TOTAL SHOULDER ARTHROPLASTY UTILIZING A 135˚ STEM. *SEMIN ARTHROPLASTY.* 2021;31(4):721-729. DOI:10.1053/J.SART.2021.04.010

- registry of 75 patients who had undergone rTSA with 135° inclination assessed subscapularis integrity

- When the subscapularis was repaired, there was a healing rate of 57%, but there were no significant outcome changes regardless of the status of repaired/unrepaired, healed/unhealed.

80 yo male
Dx: rotator cuff arthropathy

55 yo male
Dx: Osteoarthritis
B2 glenoid
Poor subscapularis excursion intraop


ANCIENT RUINS
SCENIC RIM
DIAMONDBACK GULCH
BROKEN ARROW

POST OP COMPLICATIONS

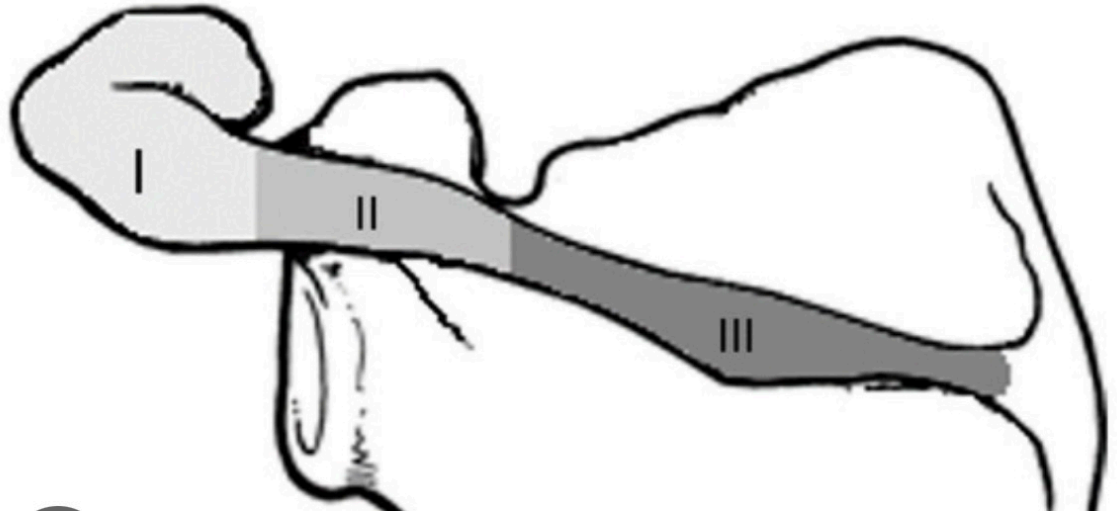
- SCAPULAR SPINE STRESS FRACTURE

- DISLOCATION

- INFECTION

- ASEPTIC LOOSENING

-PERIPROSTHETIC FRACTURE



SCAPULAR SPINE STRESS FRACTURE


505
R


XT-Rotate


77


R
SUPINE
MAC
PORTABLE

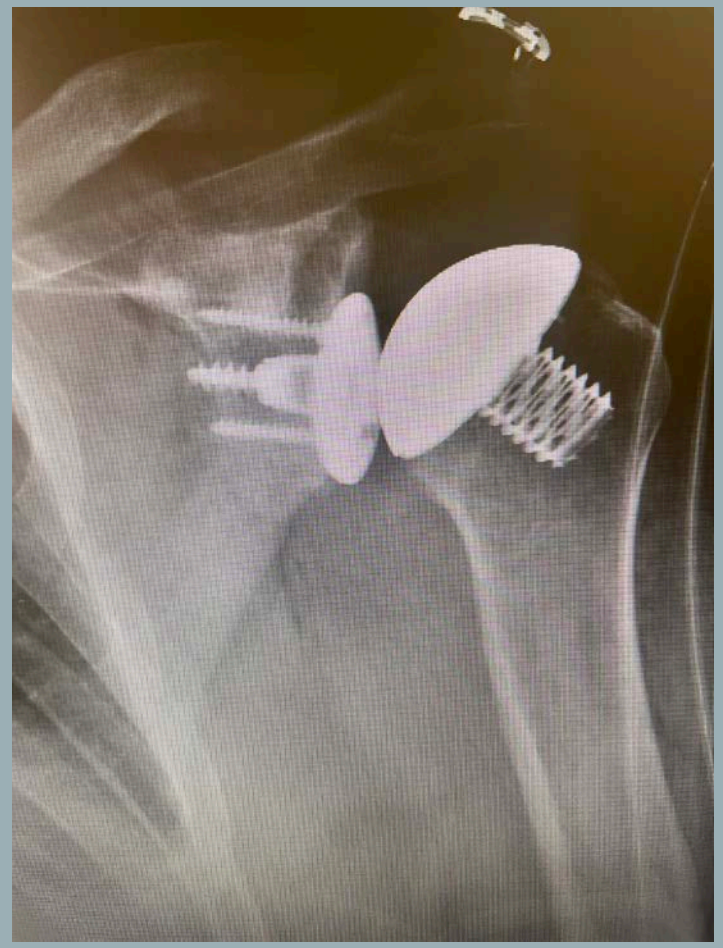
THREE PRIMARY CAUSES OF INSTABILITY

INADEQUATE SOFT TISSUE ENVELOPE TENSIONING

PROSTHETIC MALPOSITION

BONY OR SOFT TISSUE IMPINGEMENT

WHAT DO YOU DO WITH BORDERLINE PATIENTS?



POST OP RECOVERY AND TIMELINE

- 2 weeks in a sling (some docs hold for 6)
- Begin PROM, pulleys, pendulums and formal PT
- AROM at six weeks
- No heavy weight bearing, overhead weight bearing or recreational sports etc. for 4 months
- Return to activity in the 4-6 month range
- Full return no restrictions after 6 months

SUMMARY

rTSA indications have expanded significantly over the past several years

There are many things that should help us determine implant selection:

Age

Medical comorbidities

Prior surgery

Fracture

Activity level of the patient

Rotator cuff integrity

and bone loss