Anatomic Total Shoulder Arthroplasty

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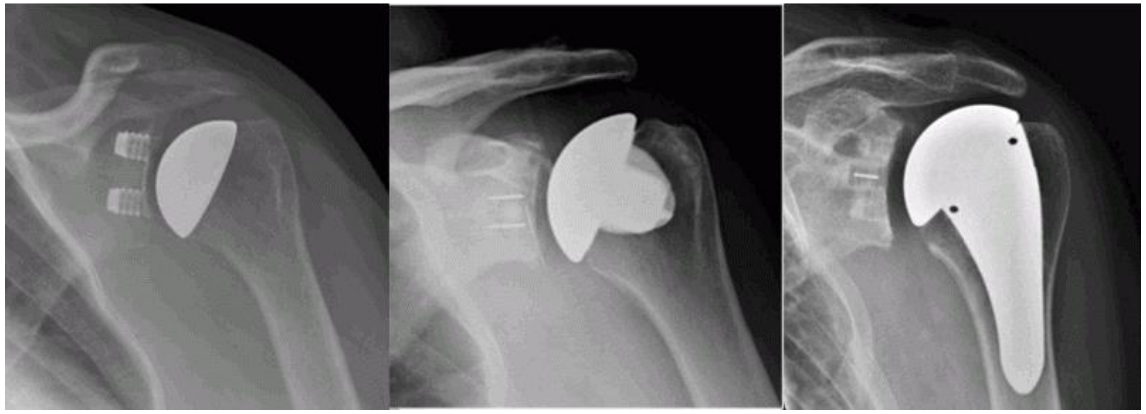
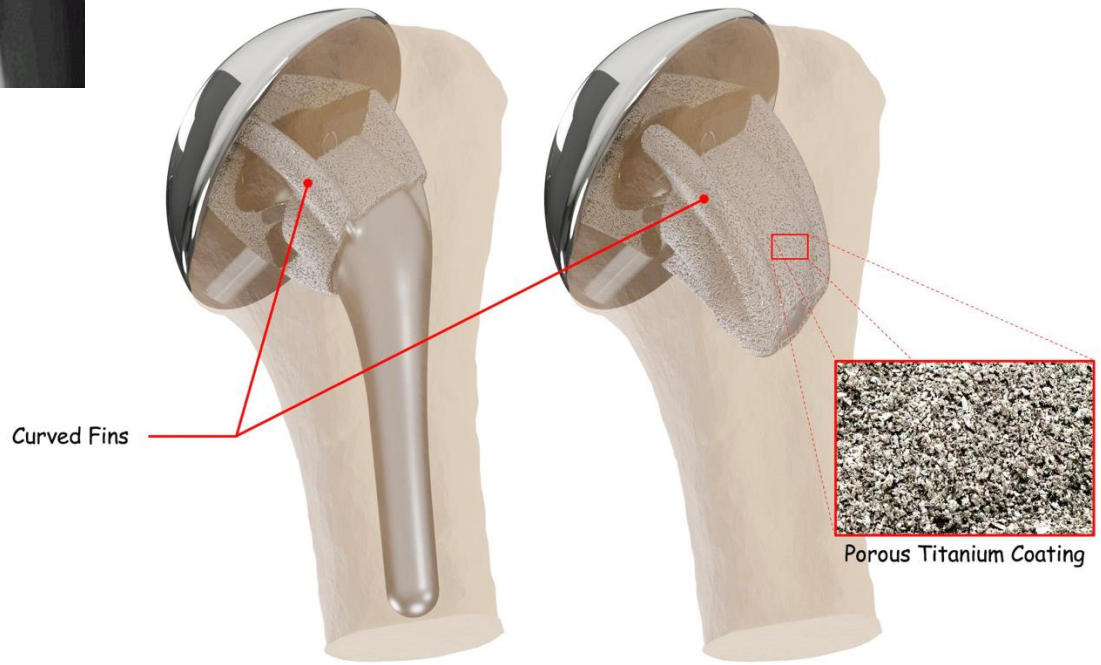
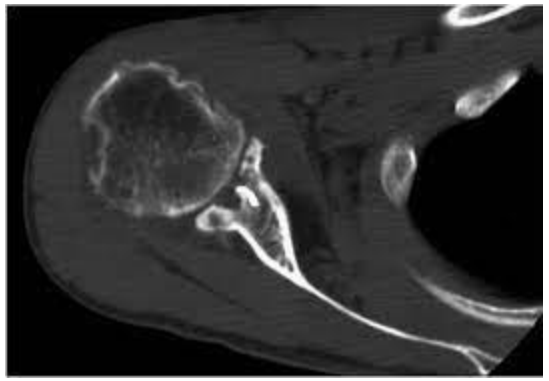
TSA: What we have on the market





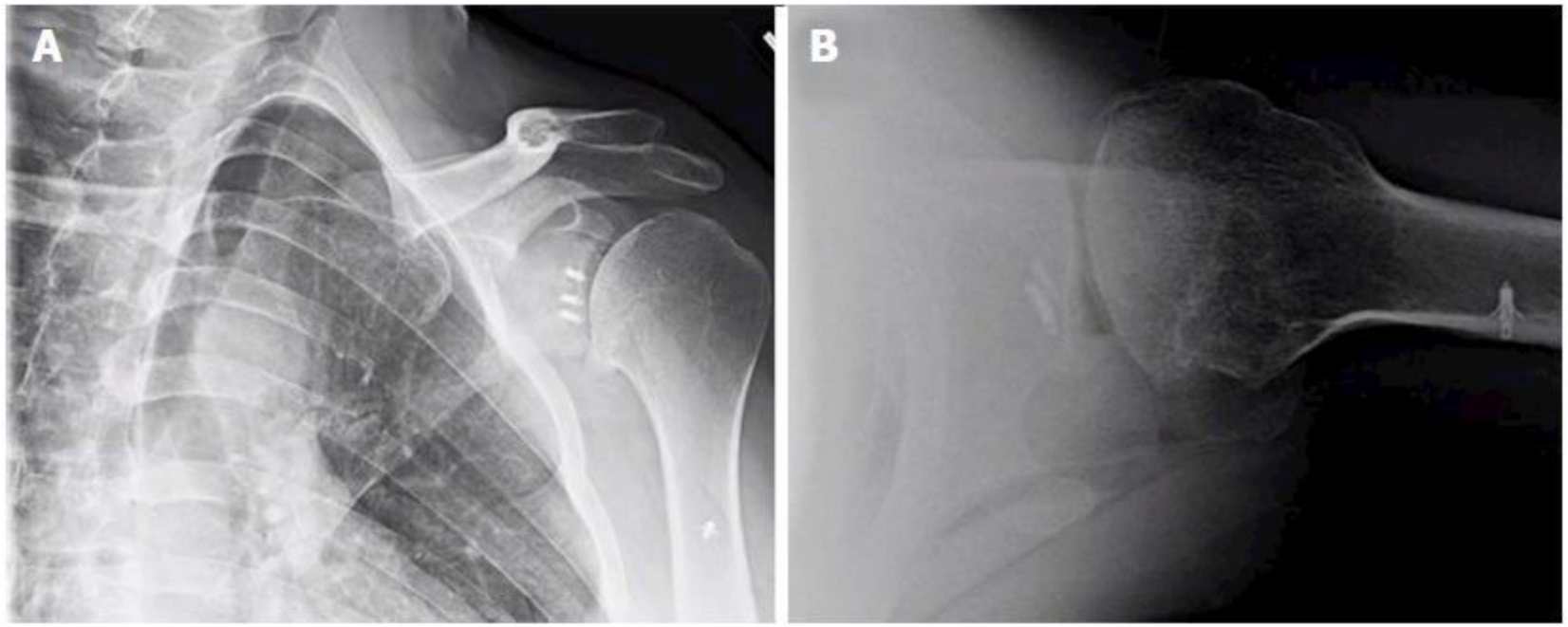
Where Anatomic TSA Shines

- Primary glenohumeral OA with intact, functional rotator cuff
- Younger, active patients where preserving native biomechanics is valuable



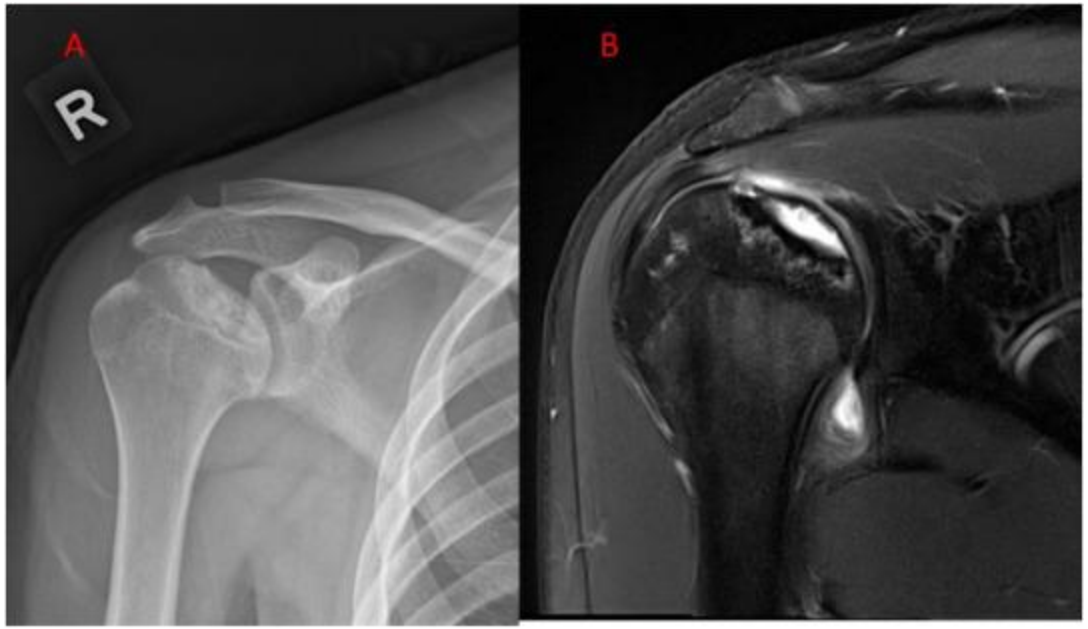
Where Anatomic TSA Still Shines

- Post-instability arthropathy with preserved cuff and manageable bone loss



Where Anatomic TSA Still Shines

- Avascular necrosis (centrally preserved glenoid), selected inflammatory cases
- Selected inflammatory cases



Where Anatomic TSA Still Shines

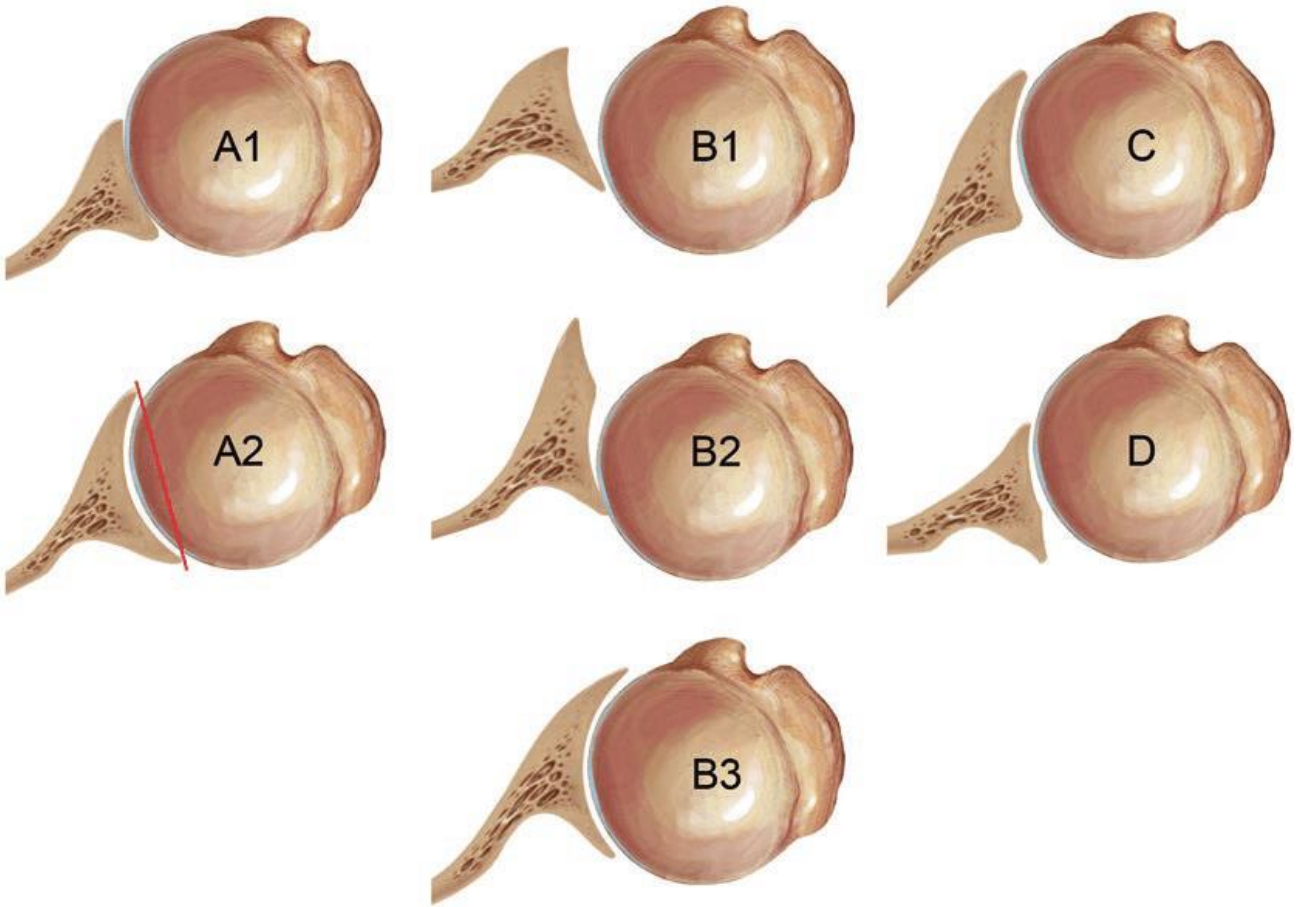
- Fracture?

Fig. 1

Pathoanatomy & Planning Priorities

- Cuff integrity (subscap quality is decisive for stability), eventually reparable cuff
- Posterior subluxation on AP/axillary (quantify % HH posterior translation)
- Glenoid morphology (e.g., Walch A1–A2–B1–B2–B3–C, D)
- Bone stock, scapular neck length, glenoid inclination/version

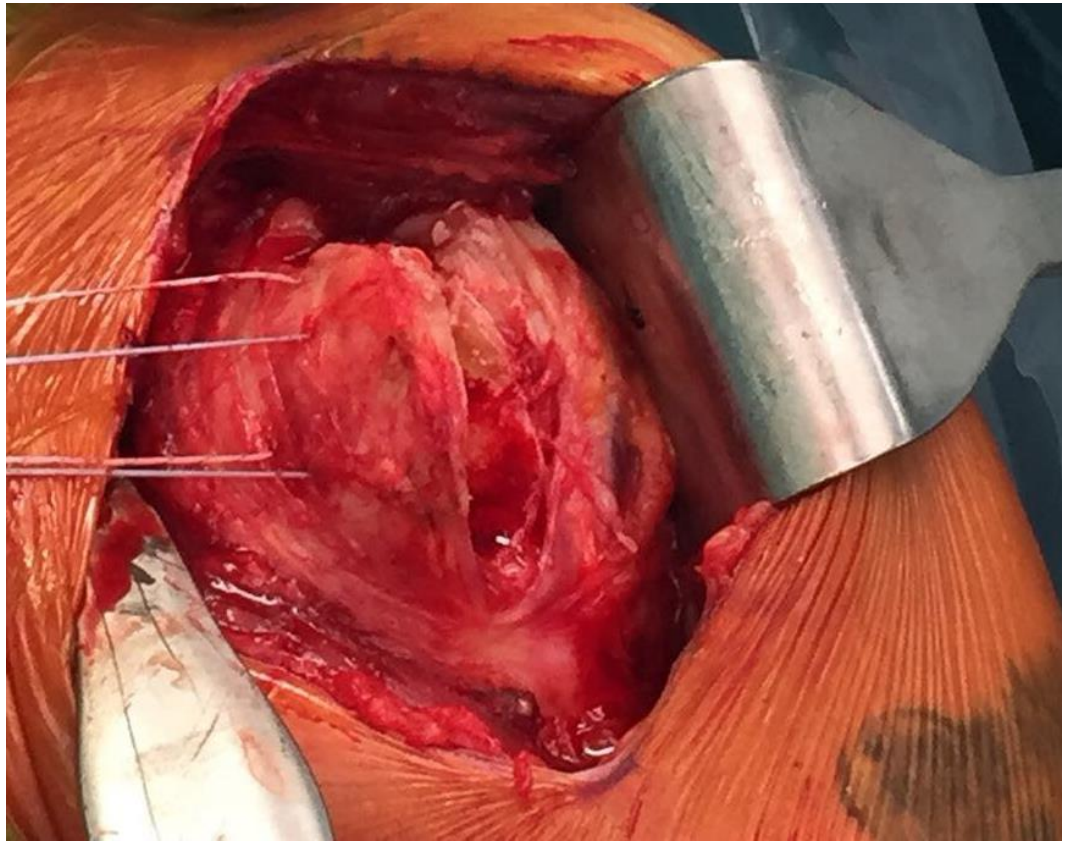
Pathoanatomy & Planning Priorities

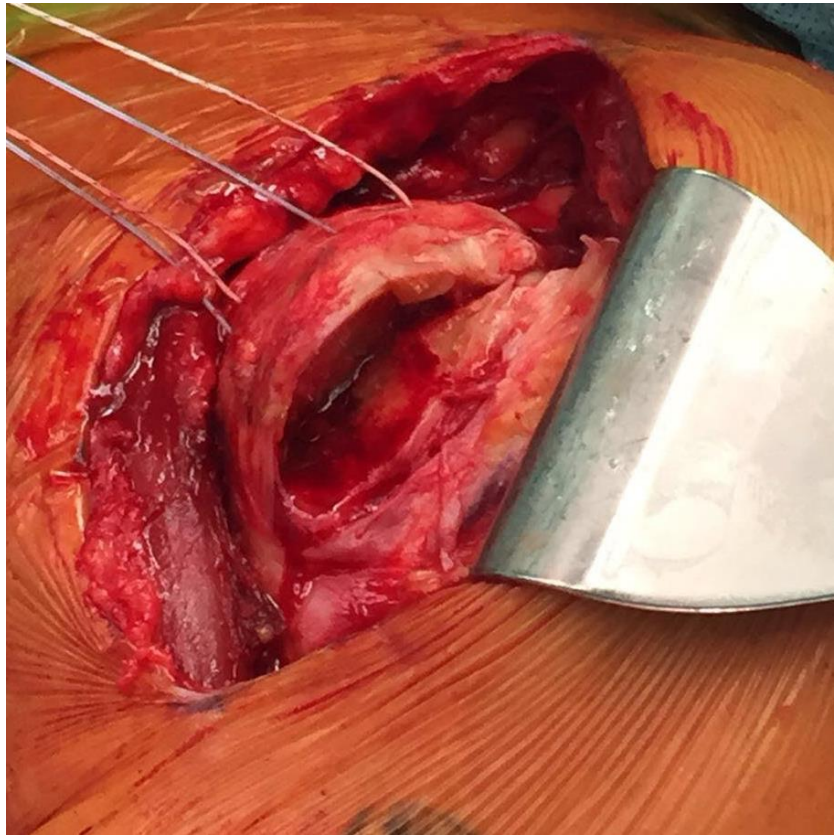


Approach & Subscapularis Management

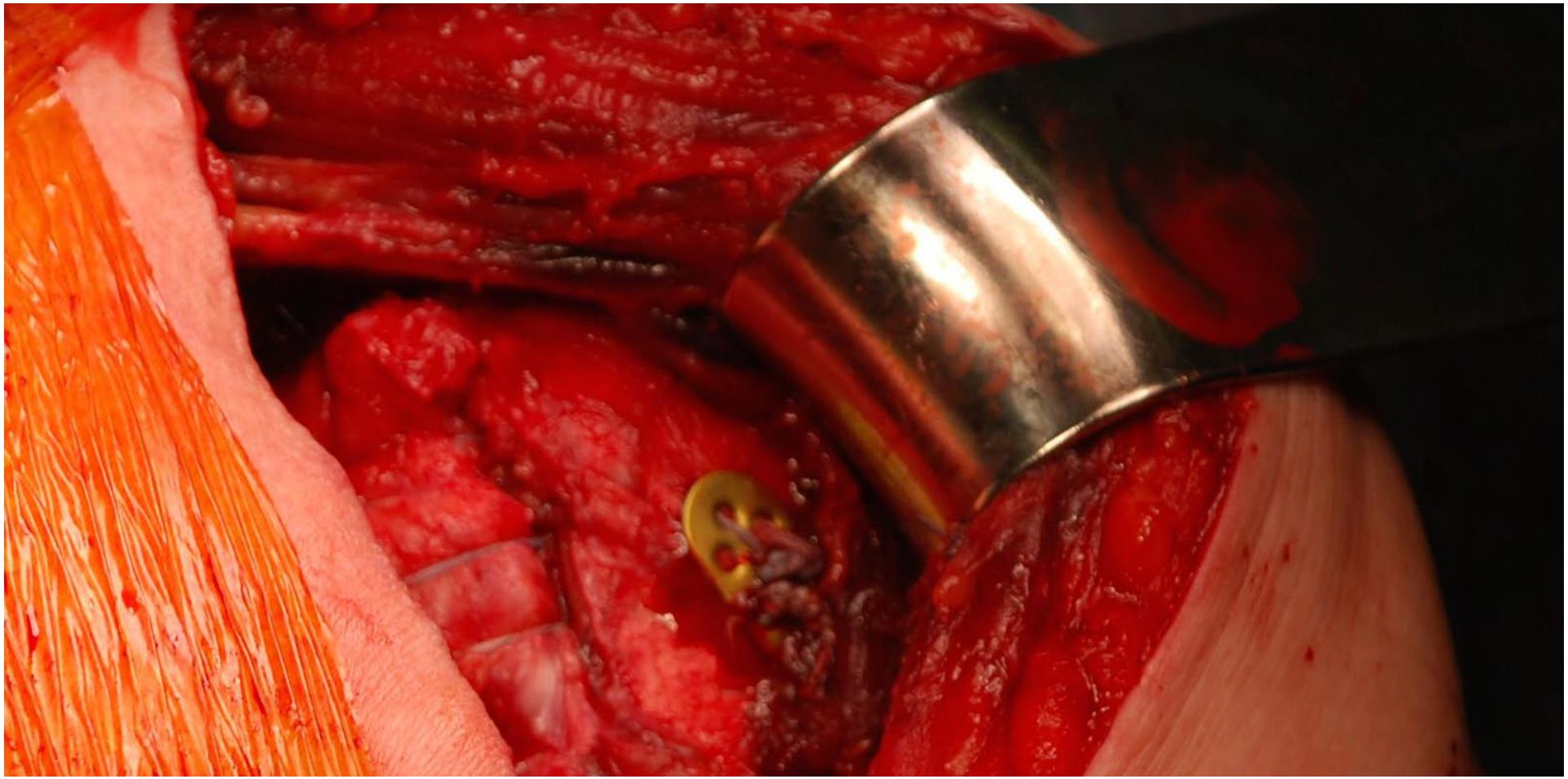
- Lesser Tuberosity Osteotomy (LTO) — bone-to-bone healing, robust repair; requires precise osteotomy size and anatomical reduction
- Peel — footprint repair with transosseous/suture anchors
- Tenotomy — simplest exposure; higher risk of length-tension mismatch if not meticulous refixation

Surgical Technique





Surgical Technique



Implant Strategy (Humerus)

- Stemless: metaphyseal fixation, bone preservation, easier revision; need good bone quality

Implant Strategy (Humerus)

- Short-stem: forgiving alignment, load sharing; watch for malversion

Implant Strategy (Humerus)

- Resurfacing: niche; beware overstuffing and limited correction

Implant Strategy (Humerus)

- Aim 25-45° humeral retroversion aligned to forearm/epicondylar axis
- Avoid overstuffing the humeral head
- Restore head height and medial offset; avoid overstuffing (instability, stiffness)

Implant Strategy (Glenoid - indications)

- **B2/B3 with ≤15-20° retroversion or minimal posterior wear:** favor augmented glenoid; PSI helpful; avoid >5–6 mm anterior reaming
- **High posterior humeral head subluxation:** augment + capsular balancing; avoid overstuffed head
- **Young patients (<60 years):** prefer stemless, conservative glenoid correction; set realistic expectations on implant longevity
- **Post-instability arthropathy:** evaluate bone loss, remplissage scars; subscapularis quality is critical

Glenoid retroversion does not impact clinical outcomes or implant survivorship after total shoulder arthroplasty with minimal, noncorrective reaming

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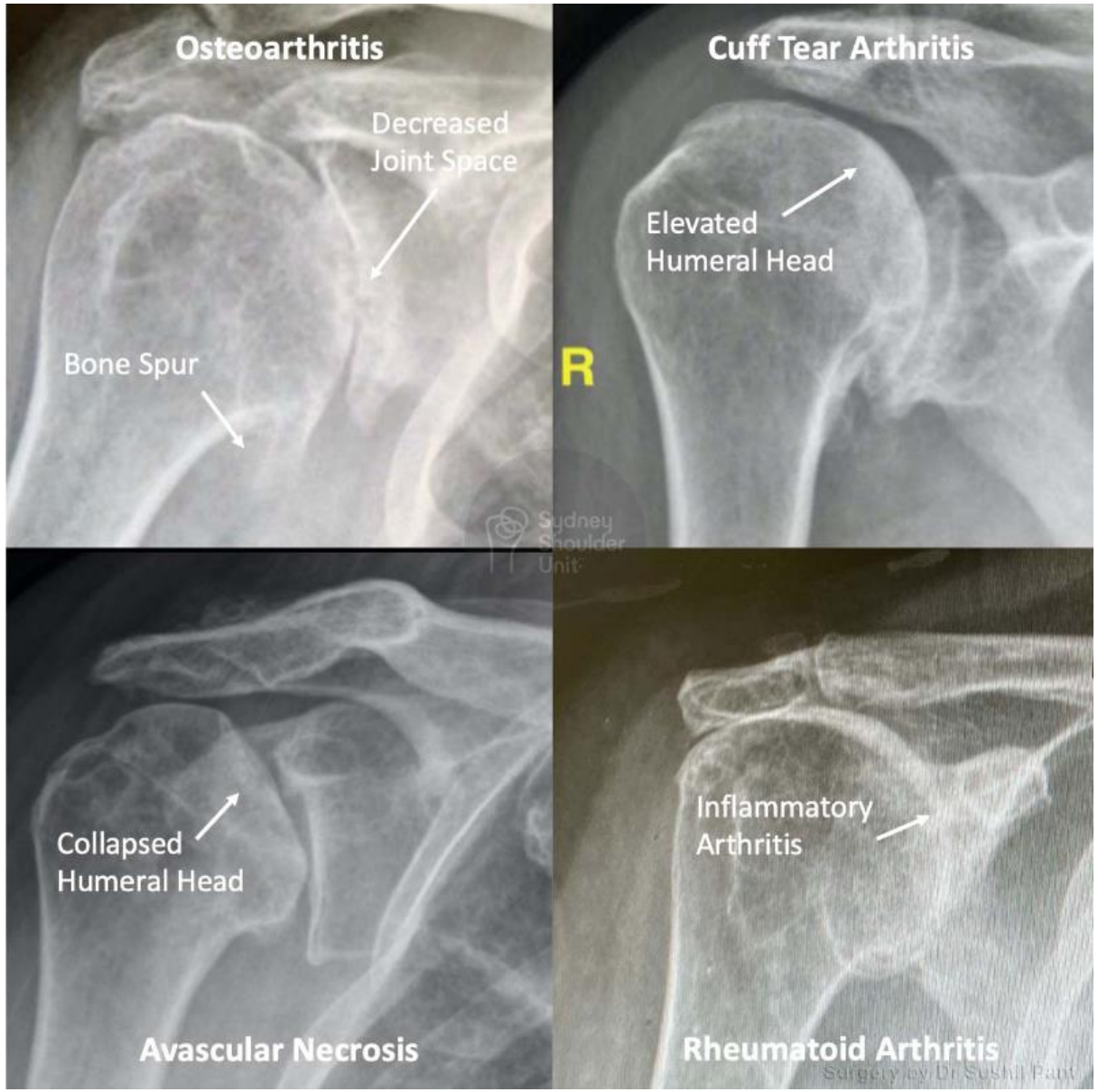
Anatomic total shoulder replacement with minimal and noncorrective glenoid reaming demonstrates reliable increases in patient satisfaction and clinical outcomes at a mean of 4.6-year follow-up in patients with up to 40° of native retroversion. Higher values of retroversion were not associated with early deterioration of clinical outcomes, revisions, or failures. Long-term studies are needed to see if survivorship and outcomes hold up over time.

Implant Strategy (Glenoid-strategy)

- Cemented pegged vs keeled poly; augmented poly for B2/B3; inlay designs selectively

Implant Strategy (Glenoid- targets)

- Version correction to near-neutral without sacrificing >6–8 mm of anterior bone
- Create slight inferior tilt to reduce superior edge loading


Osteoarthritis
Decreased
Joint Space
Bone Spur
Cuff Tear Arthritis
Elevated
Humeral Head
R
Collapsed
Humeral Head
Avascular Necrosis
Inflammatory
Arthritis
Rheumatoid Arthritis

Outcomes

- pain relief most predictive benefit (more predictable than hemiarthroplasty)
- reliable range of motion with preserved internal and external rotation
- good survival at 10 years (93%)
- worse results for post-capsulorrhaphy arthropathy

Complications & Failure Avoidance

- **Early**: Instability (subscap failure), fracture (humeral metaphysis, glenoid), nerve stretch, hematoma/infection
- **Late**: Glenoid loosening, progressive cuff degeneration, stiffness, polyethylene wear
- Revision rates: TSA ~7% vs Hemi ~13%
- Rotator cuff tears: 1.3–7.8%, often subscapularis

Rehabilitation

- Sling 3–4 weeks (protect subscap/LTO) with early pendulums and distal mobility
- Passive/assisted FE/ER within comfort; limit resisted IR for ~6 weeks if LTO/peel
- Progressive active ROM at 4–6 weeks; strength at 8–12 weeks; sport-specific later

Complications & Failure Avoidance

Avoidance pearls

- Don’t over-ream; use augments
- Restore head height/offset; don’t overstuff
- Strong subscap/LTO repair; protected rehab
- Neutral tilt

Take Home Messages

- TSA is gold standard in OA with intact/reparable cuff
- Glenoid management is critical: CT planning, avoid over-reaming
- Modularity improves anatomical reconstruction & revision options
- TSA shows superior outcomes vs hemiarthroplasty in OA
- Complications mainly involve glenoid & cuff; revision to RTSA is viable

Healing Potential of Lesser Tuberosity Osteotomy in the Surgical Approach for Stemless Shoulder Prosthesis

E. Albertazzi, F. Eckers, A. Hayoz, C. Gerber, M.A. Zumstein, U. Riede

Aim of the Study

- **Primary aim -> feasibility and intraoperative stability**
- **Primary outcome ->** radiographic healing of LTO
- **Secondary outcomes ->** implant stability, functional clinical scores

Methods

- Radiological evaluation of healing on axial radiographs
  - If possible new radiographs or most recent available (at least 12 months follow up)
- Clinical scores assessed:
  - Oxford Shoulder Score
  - Costant-Murley Score
  - Subjective Shoulder Value

Patients - Demographic

- Total Patients (n) 34
- Lost to follow up (n) 6
- Radiological follow up (n) 28
- Radiological and clinical follow up (n) 21
- Mean follow up n=28 (mts) 22 (12-43)
- Female/male (n) 12/16
- Implants (n)
  - Affinis short Mathys (n) 19
  - Medacta shoulder stemless (n) 9

Results – clinical scores (n=21)

	mean	(range)
• Constant-Murley Score (pts)	77	(36-94)
• Oxford Shoulder Score (pts)	43	(21-48)
• SSV	87	(35-100)

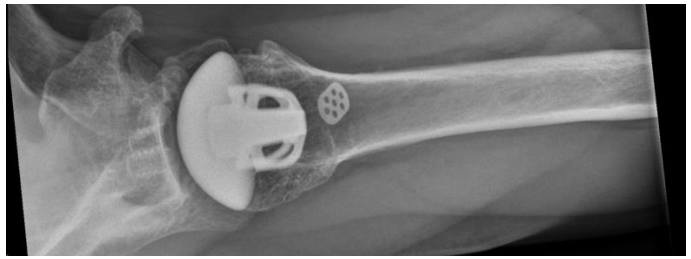
Results – clinical scores (n=21)

	Primary surgery (n=19) mean (range)	Previous surgeries (n=2) mean (range)
• Constant-Murley Score (pts)	80 (49-90)*	47 (36-58)
• Oxford Shoulder Score (pts)	45 (21-48)*	20 (28-31)
• SSV	92 (40-100)*	38 (35-40)

* = $p < 0.05$

Results – radiological healing (n=28)

- LTO osseous union (%) 100
- Implant loosening or mechanical failure (%) 0



Results - clinical scores (n=28)

- Feasibility (%) 100
  - No intraoperative cases of compliations related to osteotomy
- Intraoperative implant stability (%) 100
  - No implant loosening observed

Limitations

Limitations:

- Retrospective design
- Small sample size
- Loss to follow up

Conclusion

- ✓ LTO is feasible and does not compromise intraoperative stability.
- ✓ LTO provides **reliable bone healing** (100% union).
- ✓ LTO leads to good-to-excellent **functional outcomes** with high CMS, OSS, and SSV scores.
- ✓ Careful indication should be evaluated in revision cases.

Merci
Grazie
Danke
Thanks

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