

Long Term Outcomes of Anatomic Shoulder Arthroplasty

Lawrence V. Gulotta, MD
Director of Research, Sports Medicine and Shoulder Service
Co-Medical Director, Leon Root Motion Analysis Laboratory
Attending Surgeon, Sports Medicine and Shoulder Service
Hospital for Special Surgery
New York, NY

Disclosures

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Survival

- Challenges in interpreting "long-term" data:
 - By definition, index surgery performed years ago
 - Indications have changed over time
 - RA -> OA
 - Anatomic arthroplasties in setting of deficient rotator cuff
 - Implants have evolved (For better?)
 - Mix of Hemi's and TSA's
 - Revision options have expanded with Arthroscopy and RSA



Radiographic Survival

Radiographic survival in total shoulder arthroplasty

Tyler J. Fox, MD, Antonio M. Foruria, MD, PhD, Brian J. Klika, MD,
John W. Sperling, MD, MBA, Cathy D. Schleck, BS, Robert H. Cofield, MD*

JSES, 2013

- 151 TSA's
- Humerus seldom loose (3%)
- Radiographic glenoid loosening common
- Clinical glenoid failure rare

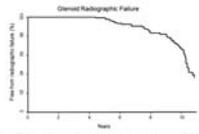


Figure 1 Survival of the glenoid component free of radiographic failure defined as the component becoming "at risk." Survival percentage with 95% confidence interval: 5-year 99% (98-100%), 10-year 87% (84-79%).

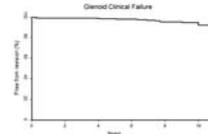


Figure 2 Survival of the glenoid component free of revision or removal. Survival percentage with 95% confidence interval: 5-year 99% (97-100%), 10-year 93% (90-97%).

Radiographic Survival

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- 151 TSA's
- Humerus seldom loose (3%)
- Radiographic glenoid loosening common
- Clinical glenoid failure rare
- Factors associated with glenoid loosening
 - Radiolucent lines at time zero (OR 4.6)
 - Poor glenoid seating at time of surgery
- Importance of meticulous glenoid preparation

Glenoid Survival

Survival of the glenoid component in shoulder arthroplasty

Tyler J. Fox, MD*, Akin Cil, MD*, John W. Sperling, MD, MBA*,
Joaquin Sanchez-Sotelo, MD*, Cathy D. Schleck, BS*, Robert H. Cofield, MD**

JSES, 2009

- 125 TSA's
- End-point revision
- All Glenoids
- All-poly glenoids outperform metal-backed

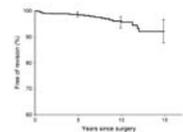


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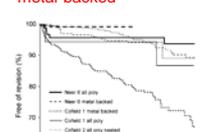


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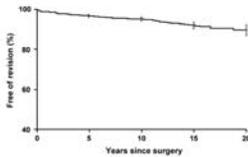
Humeral Survival

Survivorship of the humeral component in shoulder arthroplasty

Akin Cil, MD*, Christian J.H. Velletta, MD*, Joaquin Sanchez-Sotelo, MD*, John W. Sperling, MD, MBA*, Cathy D. Schleck, BS*, Robert H. Coffield, MD**

JSES, 2010

- 1584, TSA's and Hemi's
- Humeral survival 83% at 20 years
- Over half of humeral revisions were to access the glenoid
- In 49 remaining cases
 - 32 for instability
 - 10 were for infection
 - 4 were for isolated aseptic loosening



Think infection in setting of isolated humeral loosening



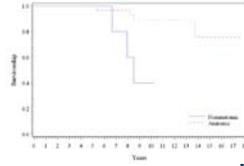
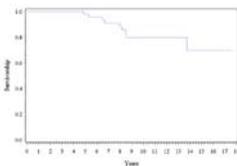
Glenoid Survival – Related to Humeral Position

Mid- to long-term follow-up of total shoulder arthroplasty using a keeled glenoid in young adults with primary glenohumeral arthritis

Patrick J. Denard, MD^{1,2,3,*}, Patric Raiss, MD¹, Boris Sowa, MD¹, Gilles Walch, MD¹

JSES, 2013

- 52 TSA's
- All under 55 years old
- Poorly implanted humeral component led to glenoid loosening



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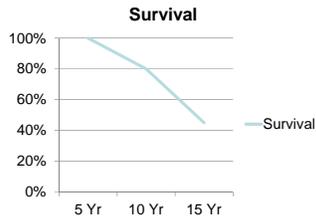


Rotator Cuff

Secondary Rotator Cuff Dysfunction Following Total Shoulder Arthroplasty for Primary Glenohumeral Osteoarthritis: Results of a Multicenter Study with More Than Five Years of Follow-up

Allen A. Young, MD, Giles Walsh, MD, Guido Pezzo, MD, Frank Gohlke, MD, Luc Favard, MD
J Bone Joint Surg Am. 2012 Apr 18; 94 (8): 685-693. <https://doi.org/10.2196/BJISJ.00727>

- 517 Shoulders
- Average of 8.5 years follow-up
- 16.8% had “secondary cuff dysfunction”
- Of those at 15 years, only 45% had functional cuff



What Does All This Data Tell Us?

- Glenoid is the weak link
- It requires meticulous preparation and implantation
- Humeral position is important too because malposition starts a chain reaction that leads to glenoid loosening.
 - Cuff failure
 - Rocking horse
 - Glenoid failure



Surgical Technique Directly Relates to Long Term Outcomes



If Glenoid is so Tenuous, Why Not Just Do A Hemi?



Hemiarthroplasty vs TSA

- Hemi attractive due to:
 - Don't have to expose the glenoid
 - Shorter OR time
 - Lower surgical cost
 - Encouraging short term data
 - No fear of eventual glenoid loosening



Hemiarthroplasty vs TSA

J Shoulder Elbow Surg. 2007 Jul-Aug;16(4):396-402. Epub 2007 Jun 20.

Total shoulder replacement compared with humeral head replacement for the treatment of primary glenohumeral osteoarthritis: a systematic review.

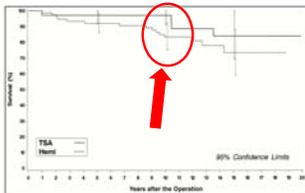
Radtkey CS¹, Steiner KJ, Chambers L, Levine WN, Bgoliani LU, Ahmad CS.

- 23 Studies, mean f/u 43 months
- Better outcomes in TSR compared to HHR
 - Pain relief
 - ROM
 - Pt Satisfaction
- Revisions:
 - HHR 10.2%
 - TSR 6.5%
 - All poly glenoid = 1.7%



Hemiarthroplasty vs TSA

- Sperling et al, JBJS 1998
 - Patients under 50y/o
 - Neer hemi and Neer TSA
 - TSA starts to separate at 10 Years



Over time - more likely to have revision to put in a glenoid for failed hemi, than to revise a glenoid for failed TSA



Hemiarthroplasty vs TSA

- TSA is more cost-effective for young patients with osteoarthritis

J Shoulder Elbow Surg. 2010 Apr;19(3):325-34. doi: 10.1016/j.jse.2009.11.057.

Cost effectiveness analysis of hemiarthroplasty and total shoulder arthroplasty.

Mather RC 3rd¹, Watters TS, Orlando LA, Bolognesi MP, Mooman CT 3rd.

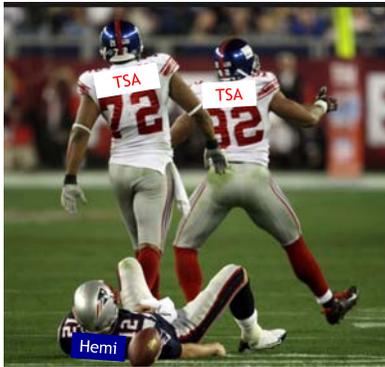
Clin Orthop Relat Res. 2016 Nov;474(11):2493-2492. Epub 2016 Jul 25.

Economic Decision Model Suggests Total Shoulder Arthroplasty is Superior to Hemiarthroplasty in Young Patients with End-stage Shoulder Arthritis.

Rhat SB¹, Lazarus M¹, Getz C¹, Williams GR Jr¹, Nandori S².



Hemiarthroplasty vs TSA



Conclusions

- Your surgical technique matters and it affects long term outcomes
- Know how to see and prepare the glenoid
 - Appreciate glenoid morphology and know how to correct deformity
 - Meticulous bone preparation and cement technique
 - Cemented, all-polyethylene pegged or keeled glenoid is standard of care.
- Anatomic humeral restoration is critical
 - Provides concentric articulation
 - Limits cuff failure, which can lead to glenoid loosening
- Suspect infection if you see isolated humeral loosening
- While technically challenging, TSA is better for patients than Hemi and is worth the effort



Conclusions

- What do I tell my patients about long term outcomes?
 - Needs to be revised at a rate of approximately 1%/year
 - So, at 10 years – roughly 10% chance of revision
 - Glenoid may loosen, can address if symptoms are enough to warrant
 - Rotator cuff may fail with time as it can with non-arthroplasty shoulders – deal with this on case-by-case basis



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Thank You
