THE UNSTABLE RTSA: WHAT NOW?

RICHARD J. FRIEDMAN, MD, FRCSC
CHIEF, SHOULDER AND ELBOW SURGERY
PROFESSOR OF ORTHOPAEDICS
MEDICAL UNIVERSITY OF SOUTH CAROLINA

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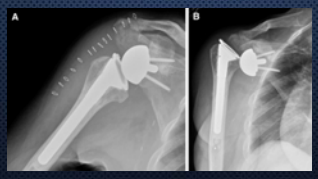
INCIDENCE OF INSTABILITY IN RTSA

- 2004-2006: 15.8%
- CHALMERS ET AL. 2014: 2.9%
- FRIEDMAN ET AL 2016: 0.98%



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Review Article

Complications in Reverse Total Shoulder Arthroplasty

JAOOS, 2011

Emilie Cheung, MD
Matthew Willis, MD
Matthew Walker, MD
Rachel Clark
Mark A. Frankle, MD

- RATES RANGE FROM 2.4%-31%
- TYPICALLY ANTERIOR, FOLLOWING EXTENSION, ADDUCTION, AND INTERNAL ROTATION
- CONTRIBUTING FACTORS TO INSTABILITY: SOFT-TISSUE TENSION, GLENOSPHERE DIAMETER, CONSTRAINT ON HUMERAL SOCKET, MECHANICAL IMPINGEMENT, BONY DEFICIENCY, ERRONEOUS VERSION OF PROSTHESIS, AXILLARY NERVE/ DELTOID DYSFUNCTION
- PROSTHETIC DESIGN/ SURGICAL TECHNIQUE FACTORS: GLENOSPHERE OFFSET AND SIZE, HUMERAL NECK-SHAFT ANGLE, HUMERAL INSERT THICKNESS

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Problems, complications, reoperations, and revisions in reverse total shoulder arthroplasty: A systematic review

Matthias A. Zumstein, MD[a,b], Miguel Pinedo, MD[a,d], Jason Old, MD, FRCSC[a,c], Pascal Boileau, MD[a,*]

Journal of Shoulder and Elbow Surgery
2011

- 782 RTSAs
- Postoperative problem/ complication rate of 44% and 20.7%
- Most common problem: scapular notching (35%)
- Most common complication: instability (4.7%)
- DP approach used in 97.3% of those with instability
- More frequent in revisions
- Reoperation in 88%: open reduction with thicker polyethylene liner to improve tension of deltoid

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CAUSES OF INSTABILITY

- Inadequate tensioning of the deltoid and conjoint tendon
- Impingement of components
- Irreparable subscapularis/ abnormal subscap function
- Bony deficiency/impingement
- Erroneous version
- Implant design: glenosphere diameter, medial vs. lateral COR
- Infection

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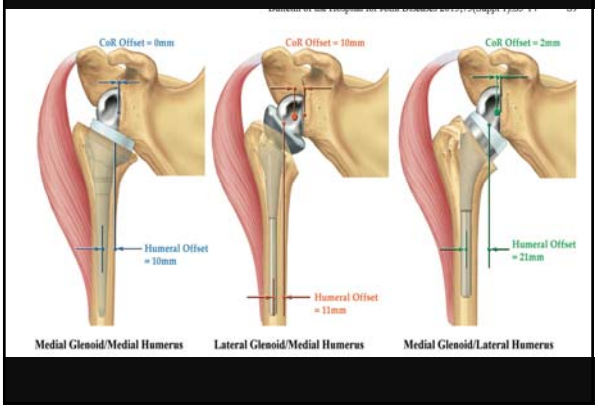


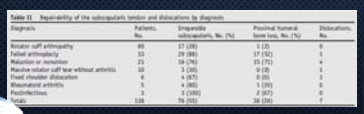
Subscapularis insufficiency and the risk of shoulder dislocation after reverse shoulder arthroplasty

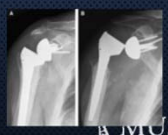
T. Bradley Edwards, MD*, Matthew D. Williams, MD, Joanne E. Labriola, MD, Hussein A. Elkousy, MD, Gary M. Gartsman, MD, Daniel P. O'Connor, PhD

Journal of Shoulder and Elbow Surgery

2009

- Prospective evaluation of 138 RTSA
- 62 reparable subscaps, 76 irreparable
- 7 postoperative dislocations, all in irreparable subscaps
- Proximal humeral nonunion, fixed GH dislocation, failed prior arthroplasty and insufficient subscapularis significantly increased risk of dislocation





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Early dislocation after reverse total shoulder arthroplasty

Peter N. Chalmers, MD*, Zain Rahman, MA, Anthony A. Romeo, MD, Gregory P. Nicholson, MD

Journal of Shoulder and Elbow Surgery

2014

- Retrospective record review of 385 RTSA patients
- 11 had documented dislocation within 3 months postoperative (2.9%)
- Mean age 68, 64% previous surgery, mean BMI 32
- Dislocations: all anterior, closed reduction in all but 1 (chronic: placement of thicker PE spacer)
- Risk factors: men, prior surgery, obesity, poor subscapularis

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Instability after reverse total shoulder replacement

Robert A. Gallo, MD*,+, Seth C. Gamradt, MD[b], Christopher J. Mattern, MD[c], Frank A. Cordasco, MD[c], Edward V. Craig, MD[c], David M. Dines, MD[c], Russell F. Warren, MD[c], on behalf of the Sports Medicine and Shoulder Service at the Hospital for Special Surgery, New York, NY

Journal of Shoulder and Elbow Surgery

2011

- Retrospective case series of 57 RTSA, 9 dislocations
- Mean age: 66, 7 had prior surgeries
- All 9 had abnormal subscap tendon at time of RTSA
- 3 had absent subscap
- Only 5 had intact, well-reduced greater tuberosities
- Instability within first 6 months

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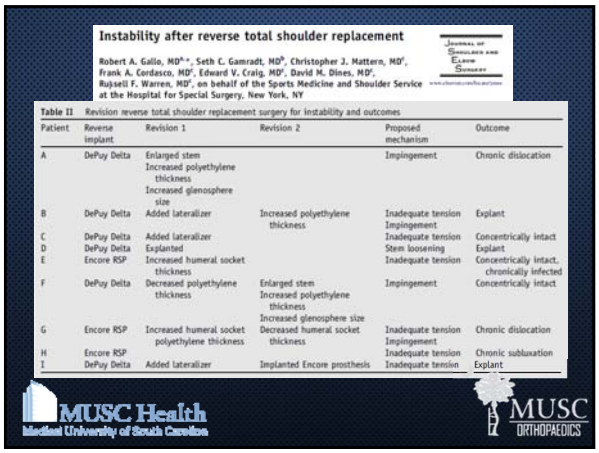

Instability after reverse total shoulder replacement

Robert A. Gallo, MD[a,*], Seth C. Gamradt, MD[b], Christopher J. Mattern, MD[c], Frank A. Cordasco, MD[c], Edward V. Craig, MD[c], David M. Dines, MD[c], Russell F. Warren, MD[c], on behalf of the Sports Medicine and Shoulder Service at the Hospital for Special Surgery, New York, NY

Table II Revision reverse total shoulder replacement surgery for instability and outcomes

Patient	Reverse implant	Revision 1	Revision 2	Proposed mechanism	Outcome
A	DePuy Delta	Enlarged stem Increased polyethylene thickness Increased glenosphere size		Impingement	Chronic dislocation
B	DePuy Delta	Added lateralizer	Increased polyethylene thickness	Inadequate tension Impingement	Explant
C	DePuy Delta	Added lateralizer		Inadequate tension	Concentrically intact
D	DePuy Delta	Explanted		Stem loosening	Explant
E	Encore RSP	Increased humeral socket thickness		Inadequate tension	Concentrically intact, chronically infected
F	DePuy Delta	Decreased polyethylene thickness	Enlarged stem Increased polyethylene thickness Increased glenosphere size	Impingement	Concentrically intact
G	Encore RSP	Increased humeral socket polyethylene thickness	Decreased humeral socket thickness	Inadequate tension Impingement	Chronic dislocation
H	Encore RSP			Inadequate tension	Chronic subluxation
I	DePuy Delta	Added lateralizer	Implanted Encore prosthesis	Inadequate tension	Explant

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PREVENTING INSTABILITY

- PROPER IMPLANT
- REMOVE OSTEOPHYTES
- PROPER COMPONENT VERSION
- PROPER TISSUE TENSION

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PREVENTING INSTABILITY

- REMOVE OSTEOPHYTES THAT MAY CAUSE IMPINGEMENT AND LEVERING
  - HUMERAL
  - GLENOID
- PROPER COMPONENT VERSION
  - HUMERAL – 20° RETROVERSION
  - GLENOID – AVOID RETROVERSION >10°

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PREVENTING INSTABILITY

- Proper soft tissue tension in deltoid, conjoint tendon
- Assess in adduction and extension
- No pistoning or shuck
- Hard to reduce and re-dislocate
- No anaesthetic paralysis

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PREVENTING INSTABILITY

- Larger glenosphere (42mm)
- Semiconstrained liner
- Repair the subscapularis and protect x 6 weeks
- Dislocation rate 0.3% with repair, 1.7% without repair

Friedman RJ et al. AAOS 2016

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TREATING INSTABILITY

- evaluate implant position, version and soft tissue tension
- Closed reduction +/- GA with sling immobilization x 6 weeks
- Avoid ext, add and IR

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TREATMENT OF INSTABILITY

- DETERMINE THE CAUSE AND CORRECT
  - GLENOID REVISION
  - HUMERAL REVISION
  - EXCISE OSTEOPHYTES
  - LARGER HEAD
  - THICKER INSERT
  - SEMI-CONSTRAINED LINER

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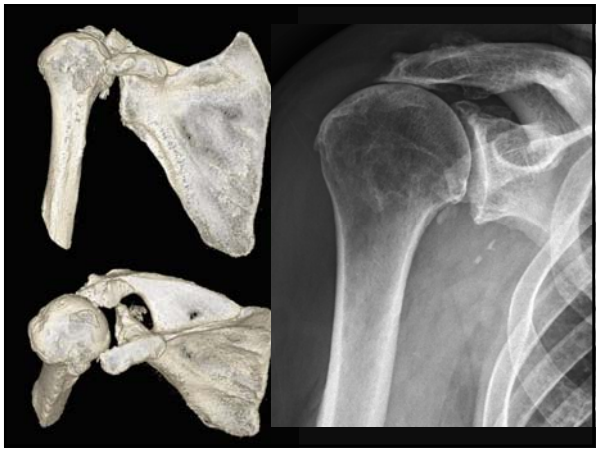

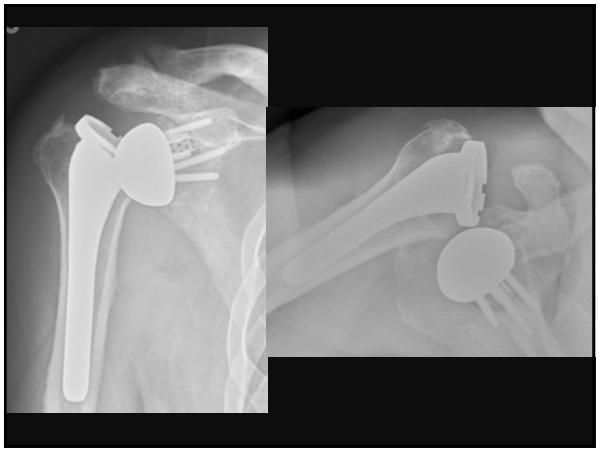

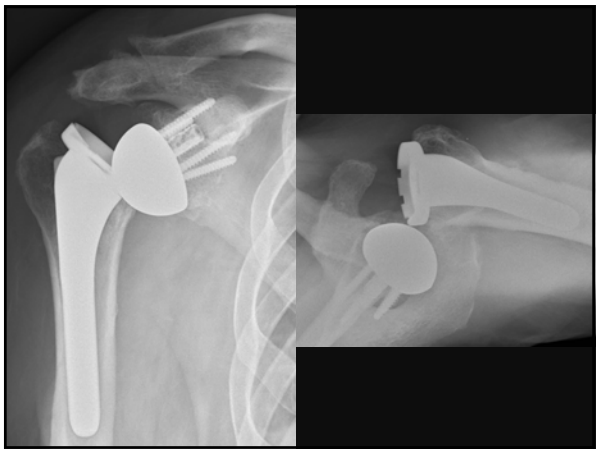

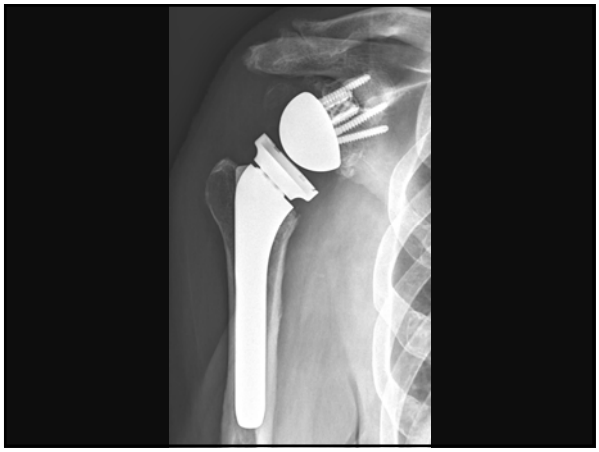

PREVENTING INSTABILITY IN RTSA

- PREVENTION IS KEY
- ATTENTION TO DETAIL
- CLOSED REDUCTION TREATS MOST
- IDENTIFY CAUSE AND CORRECT AT SURGERY

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