Massive Rotator Cuff Tears without Arthritis in Patients Older than 65

Reverse Total Shoulder Arthroplasty or Rotator Cuff Repair?

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RCR or rTSA?

75 y/o F (Previous failed RCR)

RCR or rTSA?

66 y/o Male
3 Tendon, Retracted Tear

Assertions…

There are patient factors that lead a surgeon to perform a RCR or rTSA – these factors have not been identified.

The choice between rTSA and attempting a RCR for massive RCT can be a difficult one.

We Wanted to…

1. Quantify preoperative patient variables that may help surgeons in their decision making.
2. Assess and compare postoperative outcomes of RCR and rTSA.

Outline

1. Introduction/Background
2. Purpose
3. Methods
4. Results
5. Discussion

1. Introduction/Background

What is "Massive"?

- Tear size > 5cm
  - (DeOrio, JBJS 1984 & Burkhart, CORR 1991)
- Complete tear at least 2 tendons
  - (Warner JBJS 1992 & Zumstein JBJS 2008)
- Both (>5cm & 2 Tendons)
  - (Rockwood, JBJS 1995)

*Prevalence of Massive Rotator Cuff Tears Reported to be as high as 40% of all tears[1]

Introduction: Massive Cuff Tear

- Trending over the last five years
  - Over 300 studies
- Increased interest stimulated by
  - Improved arthroscopic techniques
  - **Controversy about treatment (rTSA?)**

Rotator Cuff Repair
(In an older Patient)

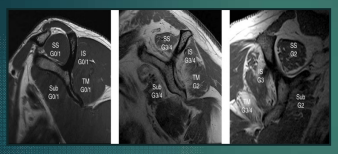
Advantages	Disadvantages
Bone Conserving	Less predictable healing
Allows Secondary Procedure as Salvage	Extensive downtime

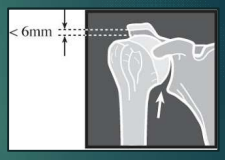
Reverse Total Shoulder
(In an older Patient)

Advantages	Disadvantages
More Reliable (Does not rely on RTC healing)	Does not conserve bone
Quicker recovery?	Historically has had higher complication rates[5,6]

Can the Literature Guide Us?

Maybe the "Irreparable" Cuff Tear should get a reverse



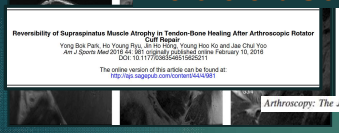


- Goutallier Classification CORR 2004 "Grade 3 or 4 = irreversible change"
- Pseudoparalysis
- Acromiohumeral Interval Keener, Yamaguchi JBJS 2009

Can the Literature Guide Us?

Maybe the "Irreparable" Cuff Tear should get a reverse

Literature is Contraversial…



Reversibility of Supraspinatus Muscle Atrophy in Tendon-Bone Healing After Arthroscopic Rotator Cuff Repair

Yong Bok Park, Ho Young Ryu, Jun Young Kim, Young Hoo Ko and Jae Chul Yoo

Am J Sports Med 2016 44: 981 originally published online February 10, 2016

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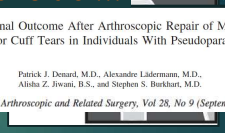
The online version of this article can be found at: http://ajs.sagepub.com/content/44/4/981



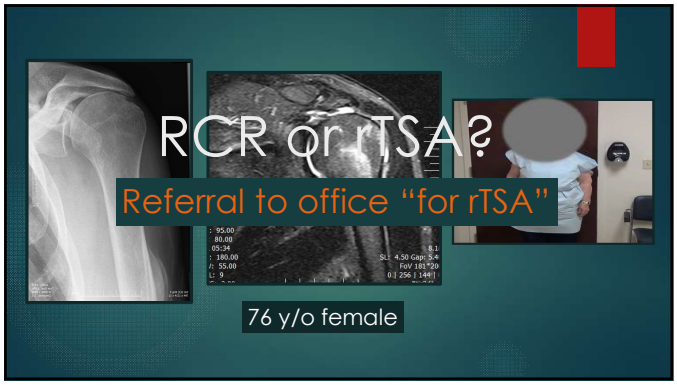
Functional Outcome After Arthroscopic Repair of Massive Rotator Cuff Tears in Individuals With Pseudoparalysis

Patrick J. Denard, M.D., Alexandre Lädermann, M.D., Alisha Z. Jiwani, B.S., and Stephen S. Burkhart, M.D.

Arthroscopy: The Journal of Arthroscopic and Related Surgery, Vol 28, No 9 (September), 2012

- Conclusion: 11.3-13.9% Increase in muscle volume
- Conclusion: "Preoperative pseudoparalysis reversed in 90% of patients without previous surgery"

Not Always a Clear Treatment Option in the Older Population



2. Purpose

Purpose #1

1. Identify preoperative patient variables that influence a surgeon's decision to go forward with RCR or rTSA.

Hypothesis

1. Patient factors that favor rTSA:
   - less function
   - less motion
   - more comorbidities
   - more radiographic subluxation
   - more previous rotator cuff repairs

Purpose #2

2. Assess and compare postoperative outcomes

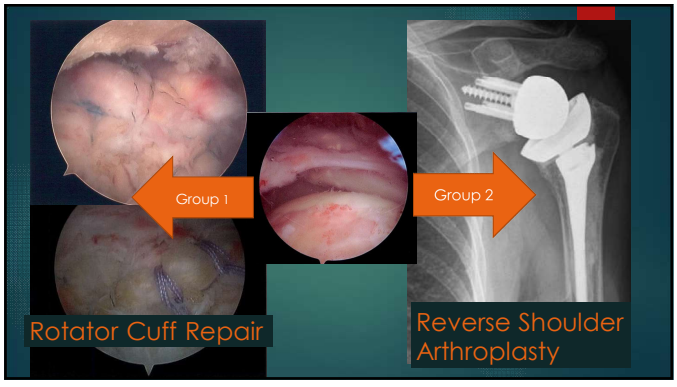
Hypothesis

2. Both groups would result in successful postoperative outcomes, including high patient satisfaction with either surgery.

3. Methods

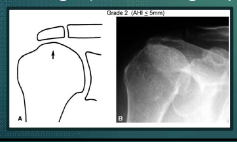
Methods

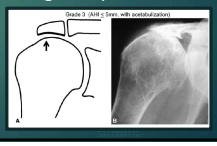
- Retrospective cohort study
- All patients failed course of nonoperative management
- All patients >65yo who underwent RCR or rTSA 2004 - 2015 for treatment of massive rotator cuff tear.
- All surgeries were performed at a single institution by a single surgeon (M.A.F.)



Inclusion Criteria

1. Minimum followup 3 months for RCR and 12 months for rTSA
2. Massive rotator cuff tear determined by majority of 3 fellowship trained shoulder and elbow surgeons
3. No preoperative glenohumeral arthritis, defined by radiographic changes (Hamada stage 1-3)





4. Results

Results

n = 220

RCR – 128	rTSA – 92
Avg Age 71.2 y/o	Avg Age 71.4 y/o
Avg F/U 11.9 months	Avg F/U 46.9 months

Preoperative ROM
rTSA less motion

Variable	RCR	rTSA	Significance
Flexion	112 (SD 50.60)	57 (SD 34.58) ↓↓	p < 0.0001
Abduction	96 (SD 44.07)	53 (SD 34.47) ↓↓	p < 0.0001
External Rotation	40 (SD 44.07)	32 (SD 27.59) ↓↓	p = 0.044

Preoperative Function
rTSA with lower SST

Variable	RCR	rTSA	Significance
VAS Pain	5.8 (SD 2.32)	5.6 (SD 2.46)	p = 0.55
Preop ASES*	42 (SD 17.50)	38 (SD 16.10)	p = 0.11
Preop SST	3.12 (SD 2.60)	1.93 (SD 1.73) ↓↓	p = 0.0003

*Similar Pain Score corresponds with similar ASES (Responsible for 50 points of 100)

Preop Imaging
rTSA with more subluxation

Variable	RCR	rTSA	Significance
AHI	8.7 mm (SD 2.71)	4.8 mm (SD 2.65) ↓↓	p < 0.0001
Subluxation	12.0%	50.6% ↑↑	p < 0.0001
Hamada Grade	1.35 (SD 0.67)	2.18 (SD 0.68) ↑↑	p <0.0001
% Grade 3/4 Atrophy	21.5%	28.1%	p = 0.20
>2 tendons	15.3%	44.4%	p = 0.10

Other Demographics
rTSA with more previous RCR

Variable	RCR	rTSA	Significance
Comorbidities	1.7 (SD 1.34)	2.1 (SD 2.69)	p = 0.12
BMI	28.3 (SD 4.24)	28.1 (SD 4.48)	p = 0.69
Previous Cuff Repair	7 (5.5%)	34 (37.4%) ↑↑↑	p < 0.0001

Postoperative ROM
rTSA Greater Improvement*

Variable	RCR	rTSA	Significance
Delta Flexion	41 (SD 63.75)	77 (SD 50.51) ↑↑	p < 0.0001
Delta Abduction	44 (SD 5.4)	75 (SD 49.71) ↑↑	p < 0.0001
Delta External Rotation	4 (SD 28.29)	23 (SD 42.90) ↑↑	p = 0.002

*Less Preop ROM = Greater Room for Improvement

Postoperative Function*
Similar Improvement

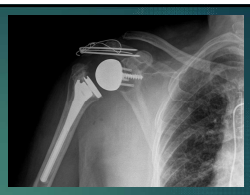
Variable	RCR	rTSA	Significance
Delta ASES	37.89 (SD 23.96)	38.34 (SD 25.97)	p = 0.89
Delta SST	5.42 (SD 3.84)	5.15 (SD 3.44)	p = 0.61

* Significant Improvement with either surgery

Postoperative Satisfaction
High Satisfaction with either surgery

Variable	RCR	rTSA	Significance
Satisfaction	7.68 (SD 2.88)	8.23 (SD 2.57)	p = 0.18
Repeat Surgery	5 (3.9%)	2 (2.2%)	p = 0.40

Reoperation



- RCR
  - 4 patients (3%) for pain/poor function (1 biceps tenotomy, 3 rTSA)
  - 1 patient underwent I&D for postoperative p. acnes infection
- rTSA
  - 1 patient (1%) for pain/poor function (ORIF Scapula Fracture)
  - 1 patient had I&D with poly exchange

Summary - Differences

- Preop (rTSA had…)
  1. Less motion
  2. Lower SST
  3. Smaller Acromiohumeral Interval
  4. Less radiographic subluxation
  5. Higher Hamada Grade
  6. More previous cuff repairs
- Postop (rTSA had…)
  1. Greater improvement in motion

Summary – No difference

- Preop
  1. Goutallier Grade
  2. Preop VAS Pain
  3. Comorbidities
  4. BMI
- Outcomes
  1. Both ↑↑ ASES/SST
  2. Both ↑↑ Satisfaction

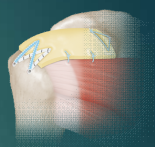
Discussion

Many Treatment Options for Massive Cuff Tear

1. Debridement w/acromioplasty
2. Biceps tenotomy
3. Tenotomy with tuberoplasty
4. Partial repair
5. Complete arthroscopic repair
6. Mini-open repair
7. Tissue augmentation
8. Tendon transfer
9. Deltoid flap
10. Hemiarthroplasty
11. Reverse Shoulder Arthoplasty
12. Superior Capsular Reconstruction

Younger Patients – Easy Decision

- Arthroscopic Procedure
  - Partial Repair
  - Tissue Augmentation
  - Superior Capsular Reconstruction
- Tendon Transfer



Why age >65?

PREVIOUS LITERATURE HAS USED AGE 65 BASED ON MEDICARE ELIGIBILITY

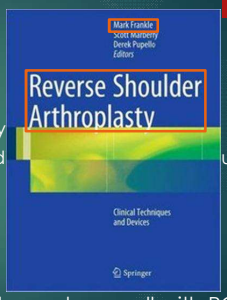
Literature - rTSA in patients under 65

rTSA and RCR in patients over 65

- Numerous studies[5,6,7,9,11,12,14]
- Both RCR and rTSA have been shown to improve functional outcomes, ROM, with high satisfaction

Comments on Study

- Strengths
  - Large comparative cohort study
  - No previous studies evaluating d ulations
- Weaknesses
  - Retrospective
  - Treatment Bias???*



*Patients selected for rTSA may have done well with RCR

We Wanted to...

2. Assess and compare postoperative outcomes of RCR and rTSA.

Both RCR AND rTSA are successful, highly satisfying surgeries for massive rotator cuff tear without arthritis in patients > 65 yo

We Wanted to…

1. Quantify preoperative patient variables that may help surgeons in their decision making.

rTSA

1. Less Motion (Avg Flexion 57 deg)
2. Lower Function (Avg SST 1.9)
3. More Previous RCR (37.4%)
4. Smaller Acromiohumeral Interval (Avg 4.8mm)
5. More Radiographic Subluxation (50.6%)
6. Higher Hamada Grade (Avg 2.2)

We Wanted to…

1. Quantify preoperative patient variables that may help surgeons in their decision making.

If mixed picture…
(ex. Subluxation, Massive Tear, but very good ROM)

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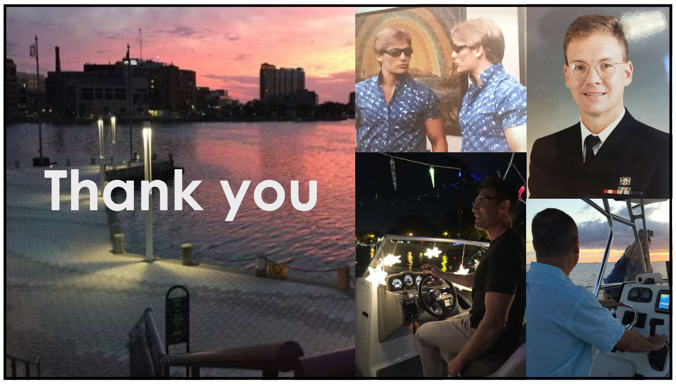

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Conclusion

- Factors that led to decision for rTSA
  1. Less Motion
  2. Lower SST
  3. Previous RCR
  4. Smaller Acromiohumeral Interval
  5. More Radiographic Subluxation
  6. Higher Hamada Grade

The Contraversy

- Does Healing Matter?
- Does RCR lead to more secondary surgeries?
- Are there good predictors of "irreparable repairs"?

- Finding the clarity amidst the cloudiness