

Current Controversies in Shoulder Surgery:

Shoulder Instability

Rotator Cuff Injury and Repair

Reverse Shoulder Arthroplasty

Brian Feeley, MD

UC San Francisco

Sports Medicine and Shoulder Surgery



Disclosures

- Funding for research from
 - OREF
 - NIH (R03)

Controversies in Shoulder Surgery

- Shoulder Instability
 - Natural history—has anything changed?
 - Evaluation—what is the best way to evaluate bone loss?
 - Management
 - Anchor type? Management of bone loss?
- Rotator Cuff Tears
 - Natural history—can we predict progression?
 - Evaluation—can we reliably use MRI to eval subscap tears?
 - Management—
 - When does non operative management work?
 - When/how to repair subscap tear?
 - When is it time to say no!
- Reverse Shoulder Arthroplasty
 - When is too young for RTSA?
 - How do we make it work better?

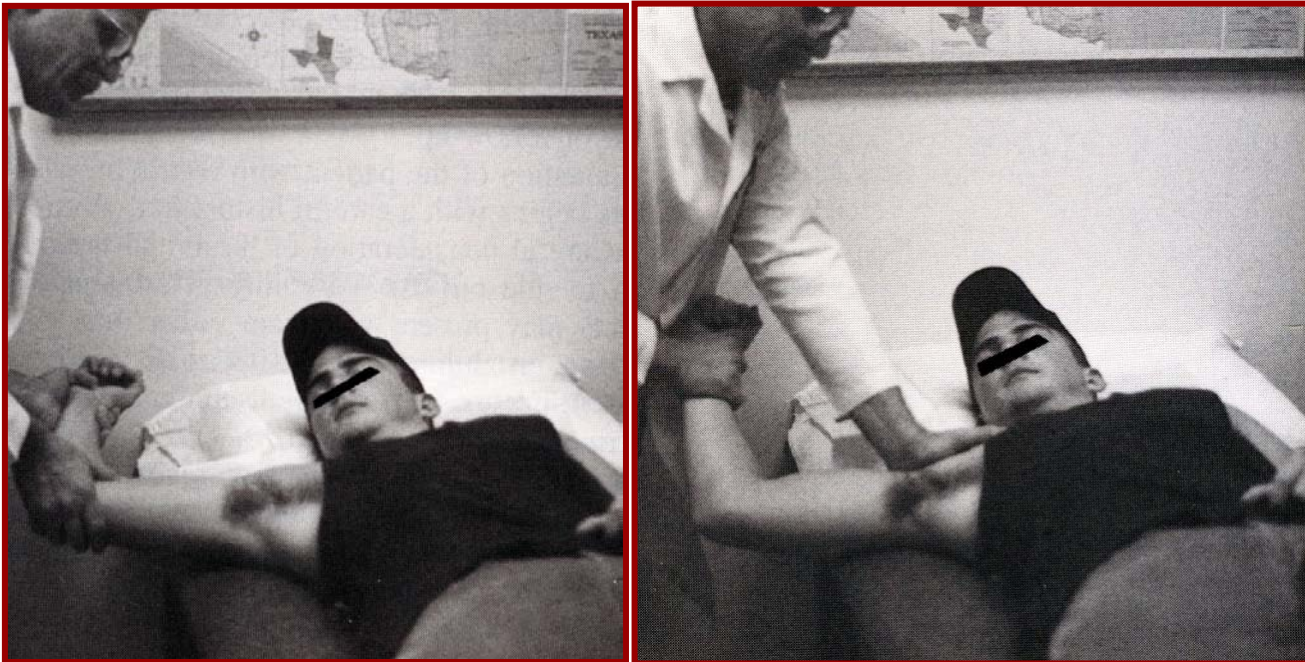
Shoulder Instability

- History
 - First time vs. multiple
 - Mechanism
 - Direction/voluntary



Shoulder Instability

- Physical Exam
 - ROM
 - Apprehension/Relocation
 - O'Brien's

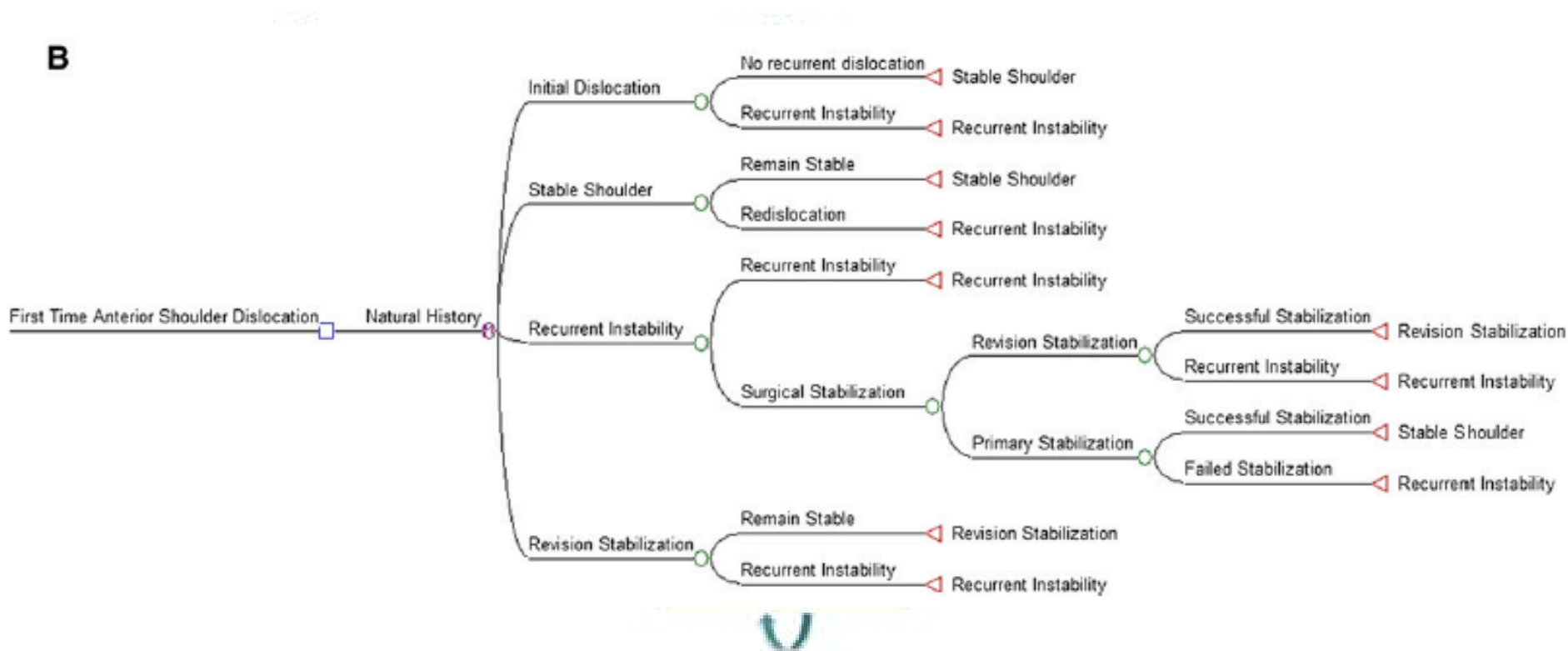


A predictive model of shoulder instability after a first-time anterior shoulder dislocation.

Mather RC 3rd, Orlando LA, Henderson RA, Lawrence JT, Taylor DC.

Department of Orthopaedic Surgery, Duke University Medical Center, Durham, NC 27710, USA. mathe016@mc.duke.edu

B



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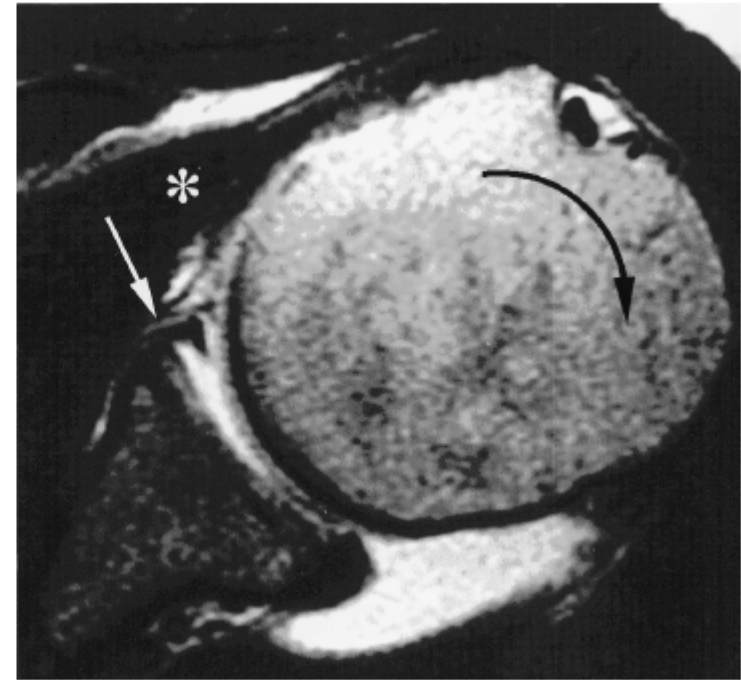
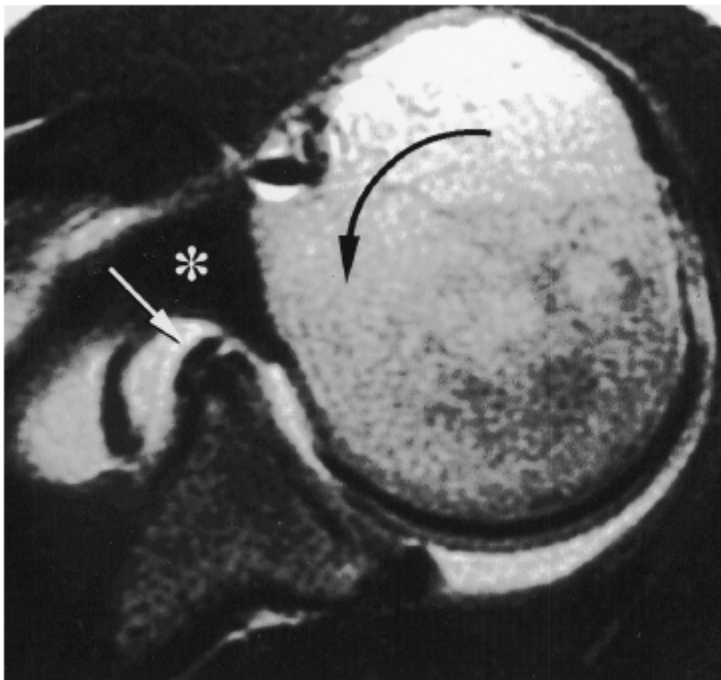
Table III Results of a microsimulation of example model applications

Scenario	WOSI	Recurrent instability		Surgical stabilizations		Stable at 10 yrs
		Year one	Total	Primary	Revision	
18-year-old male (A)	64	77%	82%	17%	0.1%	32%
30-year-old female painter (B)	68	34%	58%	23%	0.3%	62%
US military (C)	67	46%	70%	29%	0.5%	54%

Summary:
Predictive model can be used based on historical data to provide information in first time dislocation

Shoulder Instability

- Imaging
 - Xrays (make sure not locked posterior)
 - MRI (+/- intraarticular injection)



Best method to assess bone loss?



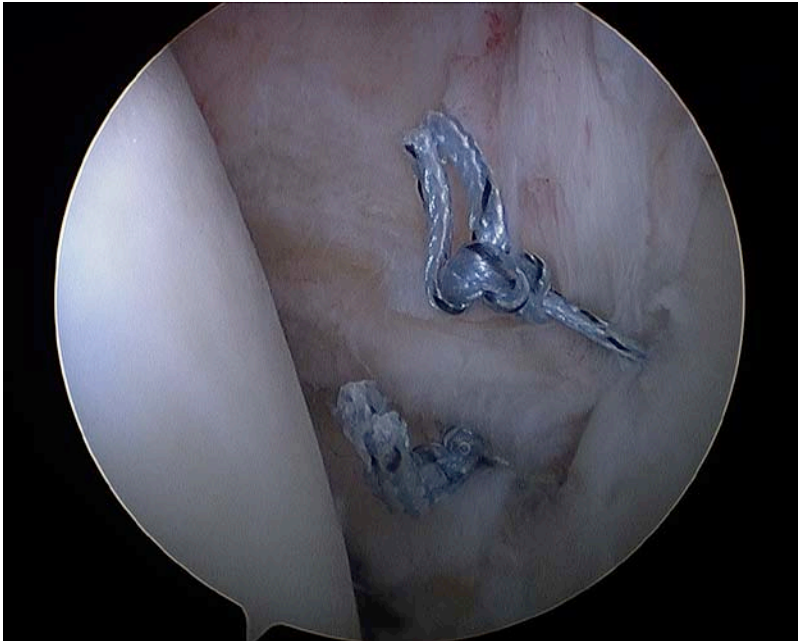
3-D CT is the Most Reliable Imaging Modality When Quantifying Glenoid Bone Loss

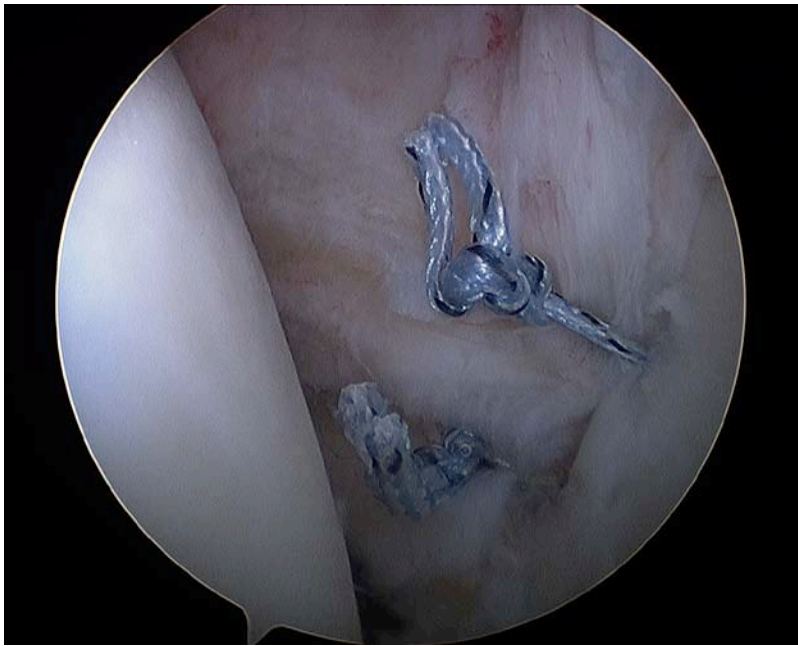
**Julie Y. Bishop MD, Grant L. Jones MD,
Michael A. Rerko MD, Chris Donaldson MD,
MOON Shoulder Group**

- Cadaveric specimens compared between XR, MRI, CT, 3DCT
- Kappa value: True vs. predicted bone loss
 - 3DCT (0.50)
 - CT (0.47)
 - MRI (0.27)
 - Xray (0.15)

Shoulder Instability

- What is the best technique for arthroscopic stabilization?

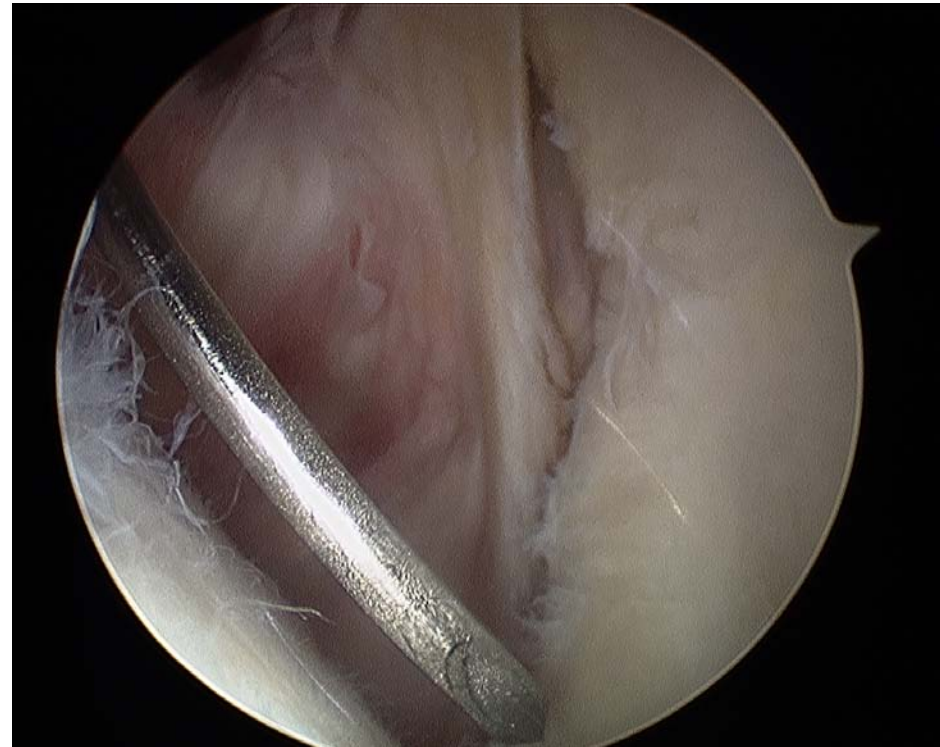
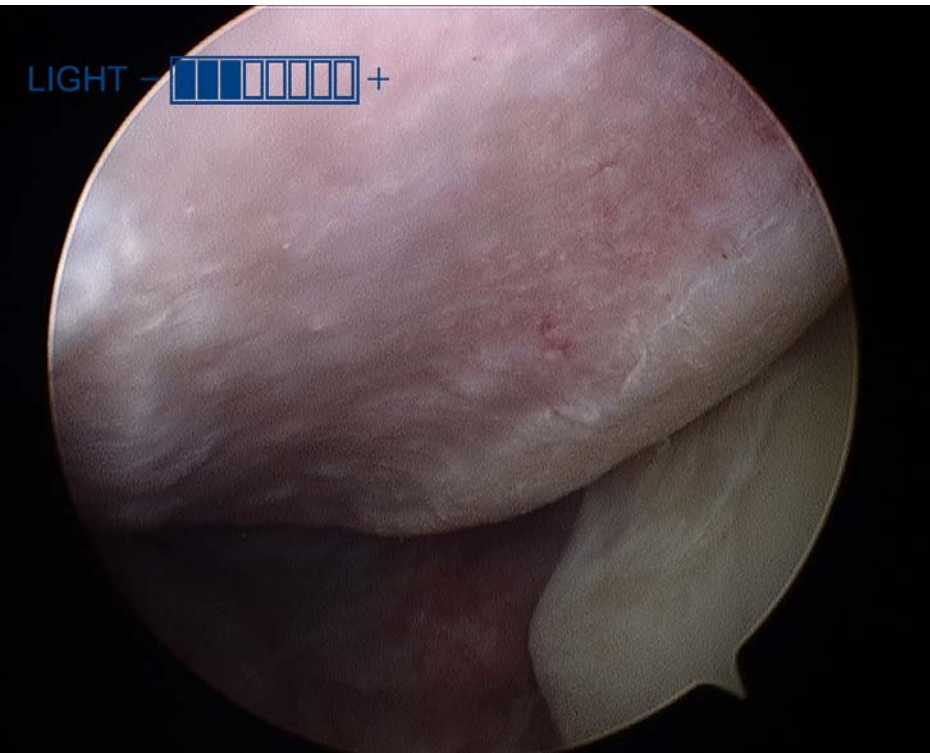




Kocalgo et al KSSTA 2010

- Thirty-eight athletes underwent arthroscopic Bankart repairs.
- Suture anchors in 18, knotless in 20
- No difference in outcomes:
- Same post op scores (Rowe)
Same recurrence rates

What would you do?

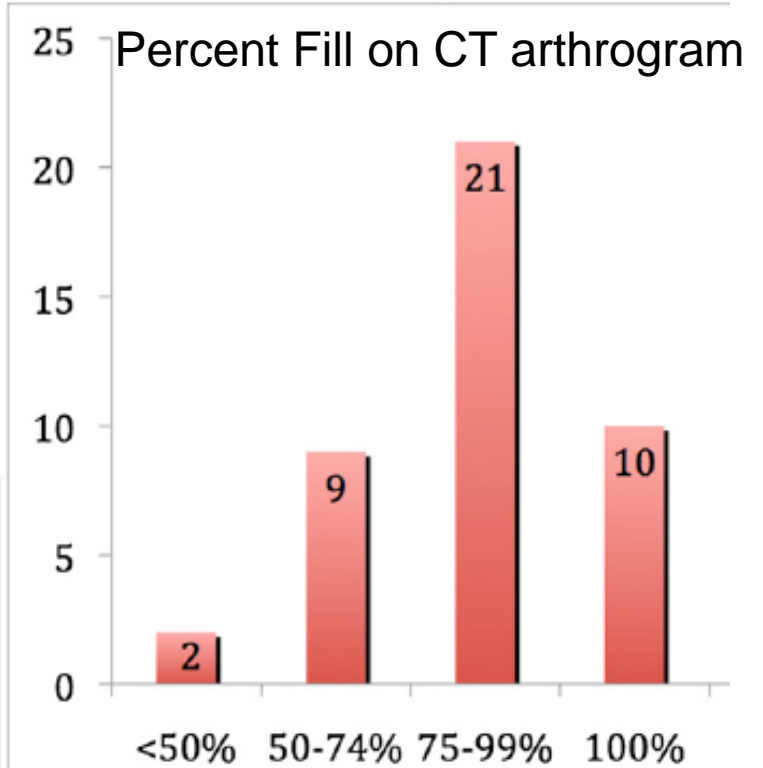
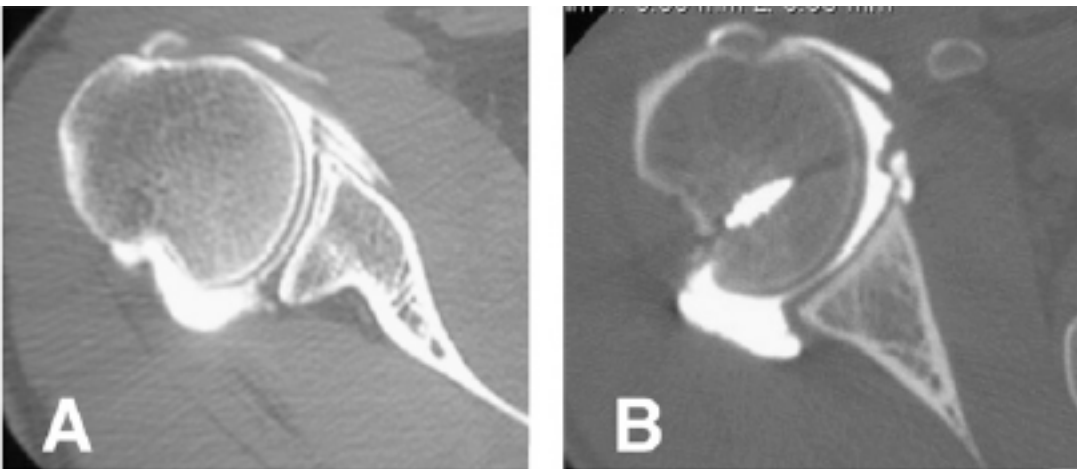


Anatomical and Functional Results After Arthroscopic Hill-Sachs Remplissage

Pascal Boileau, MD, Kieran O'Shea, MD, Pablo Vargas, MD, Miguel Pinedo, MD, Jason Old, FRCSC, and Matthias Zumstein, MD

Investigation performed at the Department of Orthopaedic Surgery and Sports Traumatology, L'Archet Hospital II, University of Nice-Sophia-Antipolis, Nice, France

JBJS 2012



47 patients, avg age 29 years
8 degree loss of ER
98% stable at 2 years
90% return to sports

Remplissage Repair—New Frontiers in the Prevention of Recurrent Shoulder Instability

A 2-Year Follow-up Comparative Study

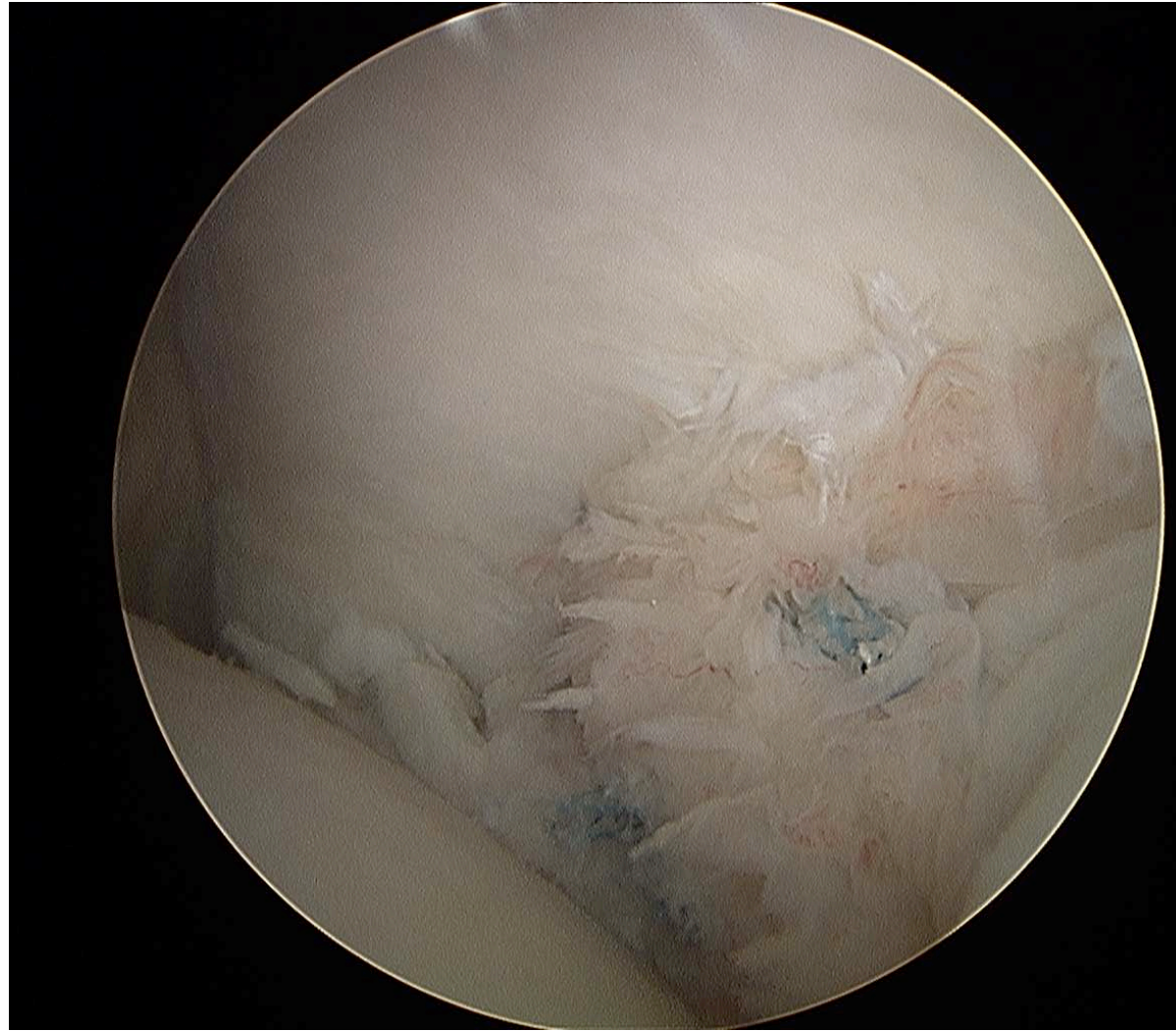
AJSM 2012

Francesco Franceschi,* MD, Rocco Papalia,* MD, PhD, Giacomo Rizzello,* MD, Edoardo Franceschetti,* MD, Angelo Del Buono,* MD, Manlio Panasci,* MD, Nicola Maffulli,^{†‡} MD, PhD, MS, FRCS(Orth), and Vincenzo Denaro,* MD

TABLE 5
Matched Intergroup Differences^a

	Remplissage and Bankart Group	Bankart-Only Group
UCLA score	31.16 ± 2.1	27.8 ± 7.3
Constant score	11.94 ± 0.97	20.3 ± 15.3
Rowe score	82.8 ± 5.6	73.1 ± 16.8
Forward elevation	168.9 ± 15.1	165.9 ± 17.1
External rotation beside body	56.0 ± 17.6	58.0 ± 15.8
Internal rotation	T6	T7
Redislocation rate, %	0	20

Glenoid Bone Loss



Normalization of Glenohumeral Articular Contact Pressures After Latarjet or Iliac Crest Bone-Grafting

By Neil Ghodadra, MD, Aman Gupta, BS, Anthony A. Romeo, MD, Bernard R. Bach Jr., MD, Nikhil Verma, MD, Elizabeth Shewman, PhD, Jordan Goldstein, MD, and Matthew T. Provencher, MD, CDR, MC, USN

Investigation performed at Rush University Medical Center, Chicago, Illinois

JBJS 2012

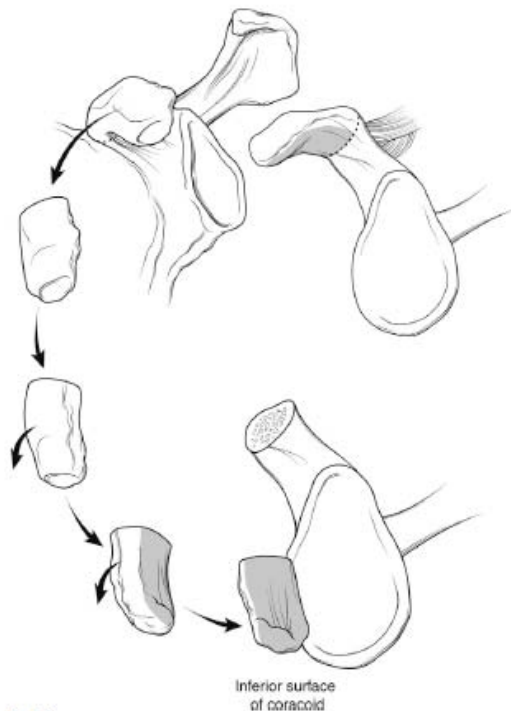
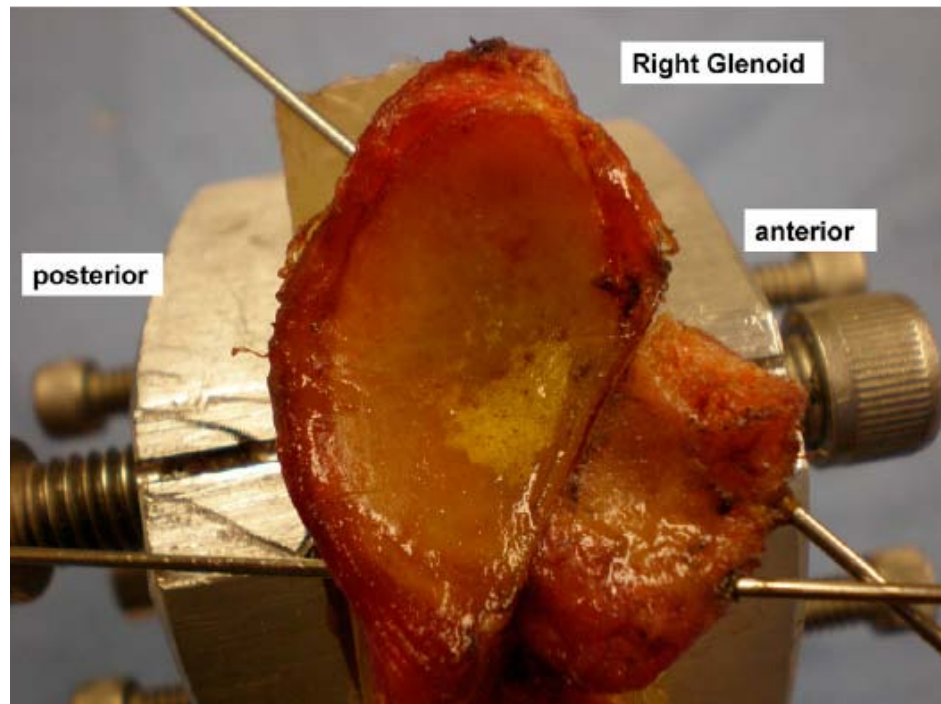


Fig. 4-B



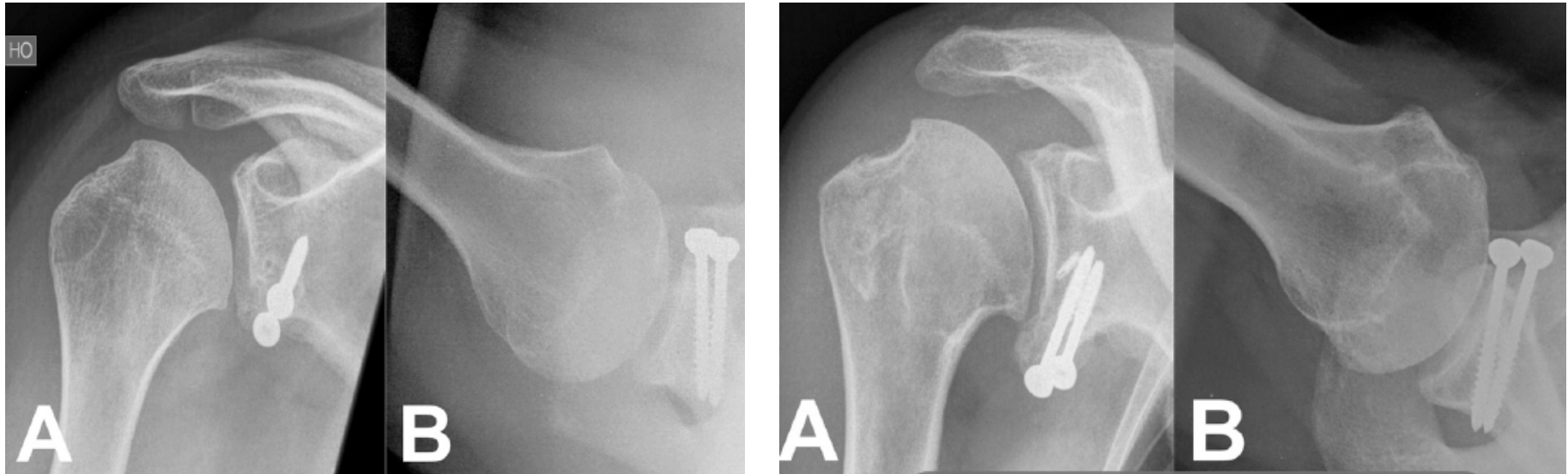
The Latarjet Procedure for the Treatment of Recurrence of Anterior Instability of the Shoulder After Operative Repair

JBJS 2012

A Retrospective Case Series of Forty-nine Consecutive Patients

Samuel L. Schmid, MSc, Mazda Farshad, MD, Sabrina Catanzaro, RRN, and Christian Gerber, MD, FRCSEd(Hon)

Investigation performed at the Department of Orthopaedics, University Hospital Balgrist, University of Zürich, Zürich, Switzerland



Instability

- Remains a common problem with similar rates of recurrence
 - Management should be shared decision making with patients
- Consider (3D)CT scan when there is a concern for bone loss
- Arthroscopic Stabilization gold standard for most cases
 - Good outcomes expected
 - Remplissage for larger Hill-Sachs defects
 - Latarjet for anterior glenoid bone loss

Rotator Cuff Controversies

Rotator Cuff Tears

Natural history—can we predict progression?

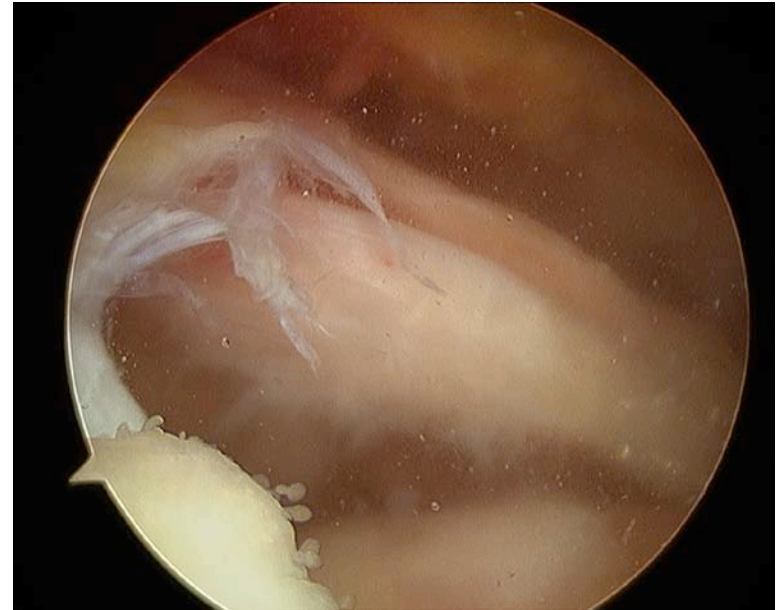
Evaluation—can we reliably use MRI to eval subscap tears?

Management—

When does non operative management work?

When/how to repair subscap tear?

When is it time to say no!



Diagnosis of rotator cuff tears

Supraspinatus

- History
 - Pain at night/overhead activity
- Physical Exam
 - Loss active ROM
 - Provocative tests (80-85%)
- Imaging (MRI)
 - 90 % for FT tears

Subscapularis

- History
 - Anterior pain
- Physical Exam
 - Lift off (75%)
 - Belly press (70%)
 - Bear Hug (60-70%)
- Imaging
 - MRI

The Accuracy of Magnetic Resonance Imaging and Magnetic Resonance Arthrogram Versus Arthroscopy in the Diagnosis of Subscapularis Tendon Injury

Arthroscopy 2012

Abdullah Foad, M.D., and Coen A. Wijdicks, Ph.D.

40 patients scanned in 1.5 T scanner

Compared pre-op MRI to arthroscopic findings

MRI Sensitivity: 40%

MRA Sensitivity: 36%



Conclusion: MRI may not be accurate for the diagnosis of subscapularis tears

A Systematic Approach for Diagnosing Subscapularis Tendon Tears With Preoperative Magnetic Resonance Imaging Scans

Arthroscopy 2012

Christopher R. Adams, M.D., Paul C. Brady, M.D., Samuel S. Koo, M.D., M.Ph.,
Pablo Narbona, M.D., Paolo Arrigoni, M.D., G. Joshua Karnes, and Stephen S. Burkhart, M.D.

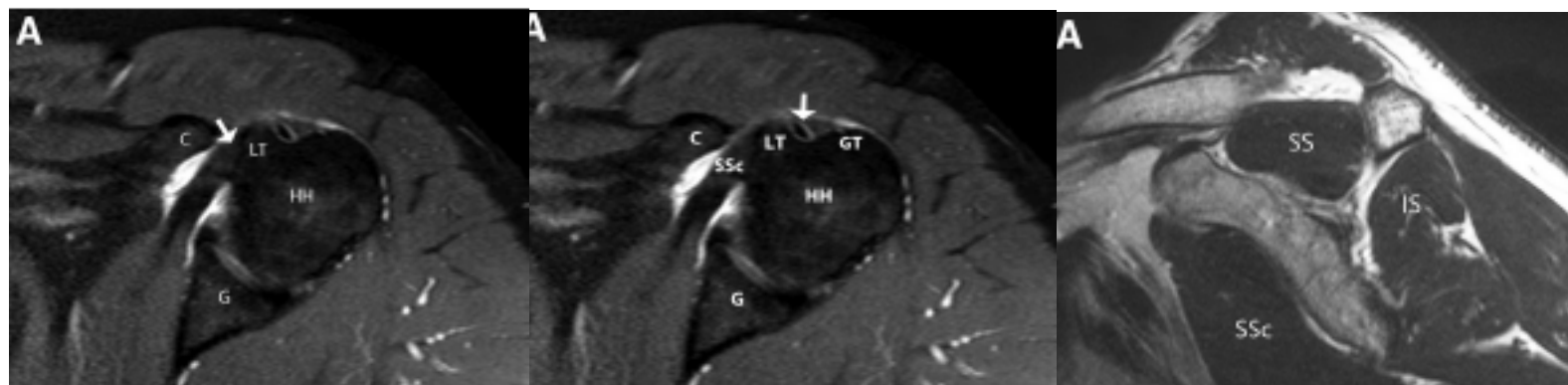


TABLE 2. *Results of MRI Interpretations by Orthopaedic Surgeons Compared With Radiologists*

Groups	Surgeons	Radiologists	Statistical Difference Between Surgeons and Radiologists
Sensitivity	73% (60/82)	61% (50/82)	No, $P > .05$
Specificity	94% (113/120)	96% (115/120)	No, $P > .05$
Positive predictive value	90% (60/67)	91% (50/55)	No, $P > .05$
Negative predictive value	84% (113/135)	78% (115/147)	No, $P > .05$
Accuracy	86% (173/202)	82% (165/202)	No, $P > .05$

Rotator cuff-non operative management

- MOON study group (in press)
 - 400 patients followed and treated with PT, NSAIDS
 - 70% small tears (50% minimal tears)
 - 15% required surgery

Assessment Tool	Baseline Scores	6 weeks	P value	12 weeks	P value
SF-12 MCS	40.26	40.57	0.36	40.84	0.895
SF-12 PCS	35.34	35.64	<0.0001	36.05	<0.0001
ASES Score	54.47	77.98	<0.0001	83.67	<0.0001

Outcome of Nonoperative Treatment of Symptomatic Rotator Cuff Tears Monitored by Magnetic Resonance Imaging

JBJS 2009

By Eran Maman, MD, Craig Harris, MD, Lawrence White, MD, FRCSC, George Tomlinson, PhD, Misra Shashank, MD, and Erin Boynton, MD, FRCSC

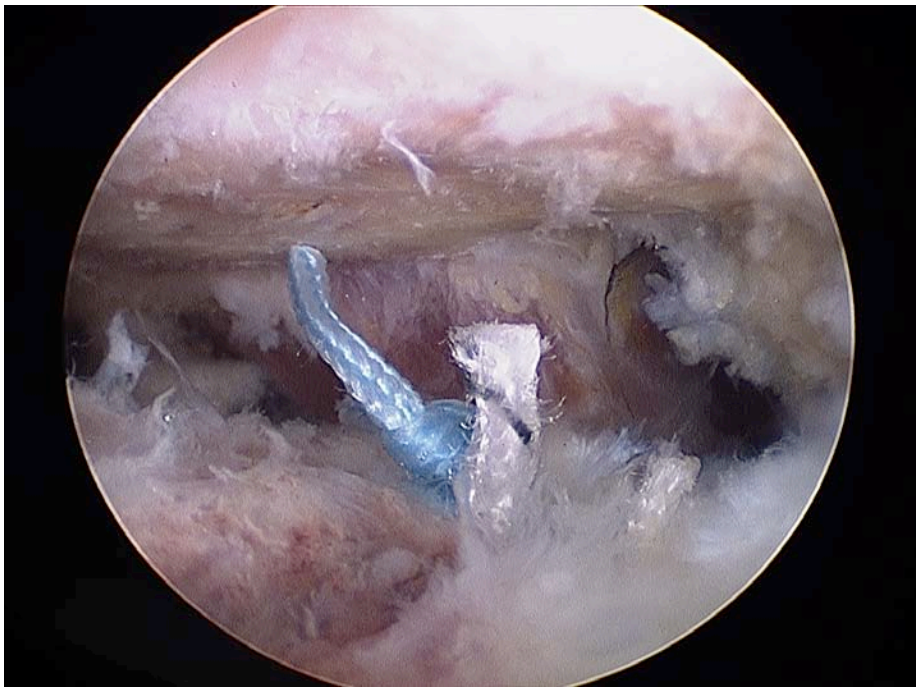
- 59 patients, 59 years old with full thickness tears
 - 24% increased >5 mm, 27% increased 2-5 mm, 36% had not changed
 - Older than 60, larger tears, fatty infiltration increased risk of progression

Natural History

- Melis et al. CORR 2010
 - 1688 patients followed non operatively
 - Fatty infiltration was related to
 - Older patients, larger tears
 - Occurred on average of 4 years after onset of symptoms
- Cheung et al. JSES 2011
 - Fatty infiltration increases with increasing tear size
 - FI can occur in the infraspinatus even in the setting of an intact tendon
 - Suggests a role of denervation in the pathogenesis of fatty infiltration

Rotator Cuff Repair

- What is the best repair strategy for rotator cuff tears?



A watertight construct in arthroscopic rotator cuff repair

Jonathan T. Nassos, MD^{a,*}, Neal S. ElAttrache, MD^a, Michael J. Angel, MD^b,
James E. Tibone, MD^a, Orr Limpisvasti, MD^a, Thay Q. Lee, PhD^c

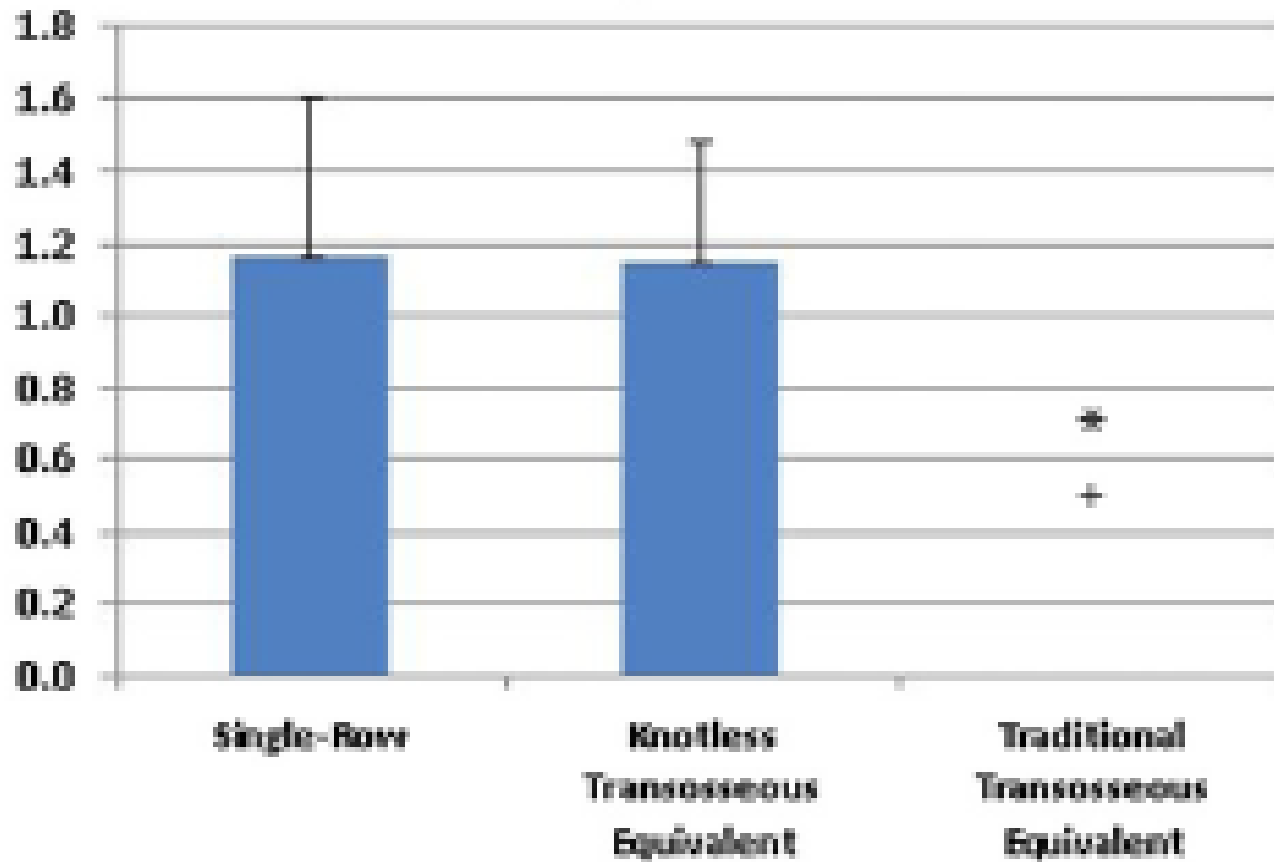
JSES 2012



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Leakage Area



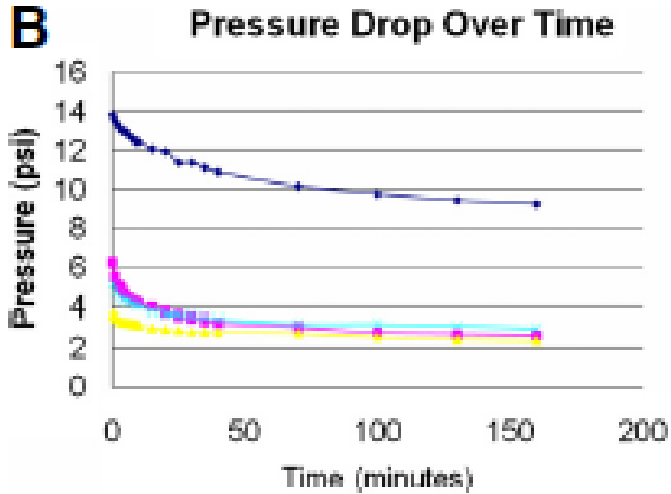
* $p < 0.05$ vs. Single Row

+ $p < 0.05$ vs. Knotless Transosseous Equivalent

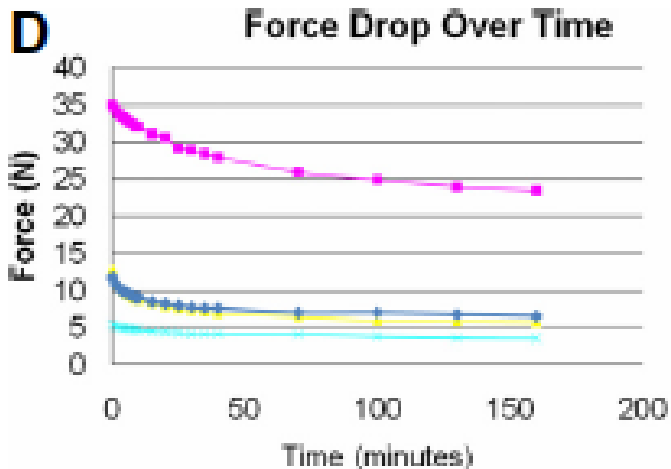
Biomechanical Evaluation of Arthroscopic Rotator Cuff Repairs Over Time

Augustus D. Mazzocca, M.D., M.S., Matthew J. Bollier, M.D., Elifho Obopilwe, M.S., Joseph P. DeAngelis, M.D., Stephen S. Burkhart, M.D., Russell F. Warren, M.D., and Robert A. Arciero, M.D.

Arthrosc 2010



Comparison of SR, DR, TOE
160 minutes after repair
Pressure highest/force highest
with TOE
Loss the least with TOE



Clinical Outcomes

- Clinically—more anchors is (May be) better for larger (>1 cm) tears

Clinical Sports Medicine Update

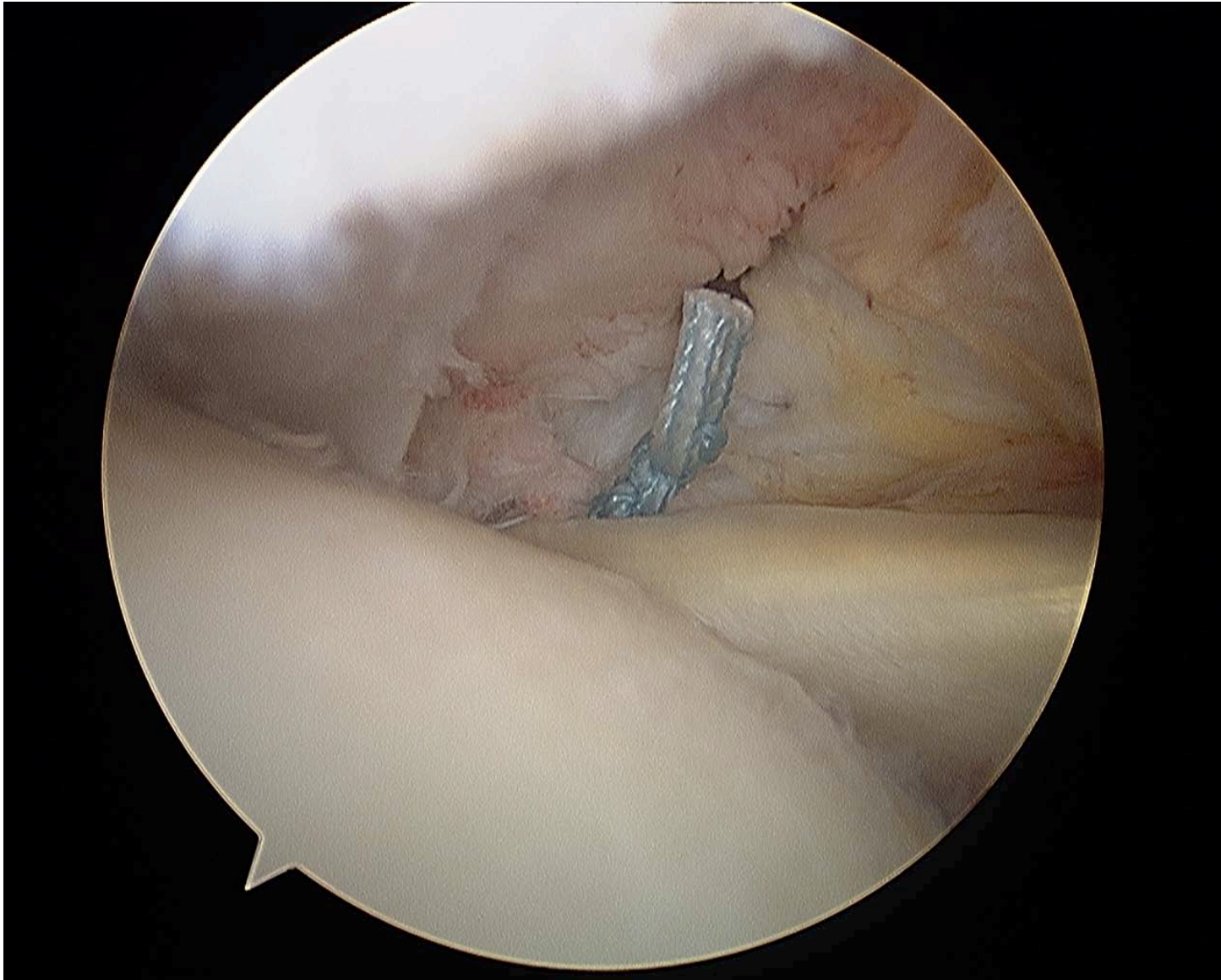
Does Double-Row Rotator Cuff Repair Improve Functional Outcome of Patients Compared With Single-Row Technique?



A Systematic Review

Alexander M. DeHaan,* MD, Thomas W. Axelrad,* MD, PhD, Elizabeth Kaye,* MPH, PhD, Lorenzo Silvestri,* MD, Brian Puskas,* MD, and Timothy E. Foster,*[†] MD
Investigation performed at the Department of Orthopaedic Surgery and Sports Medicine, Boston University School of Medicine, Boston, Massachusetts

What would you do with this?

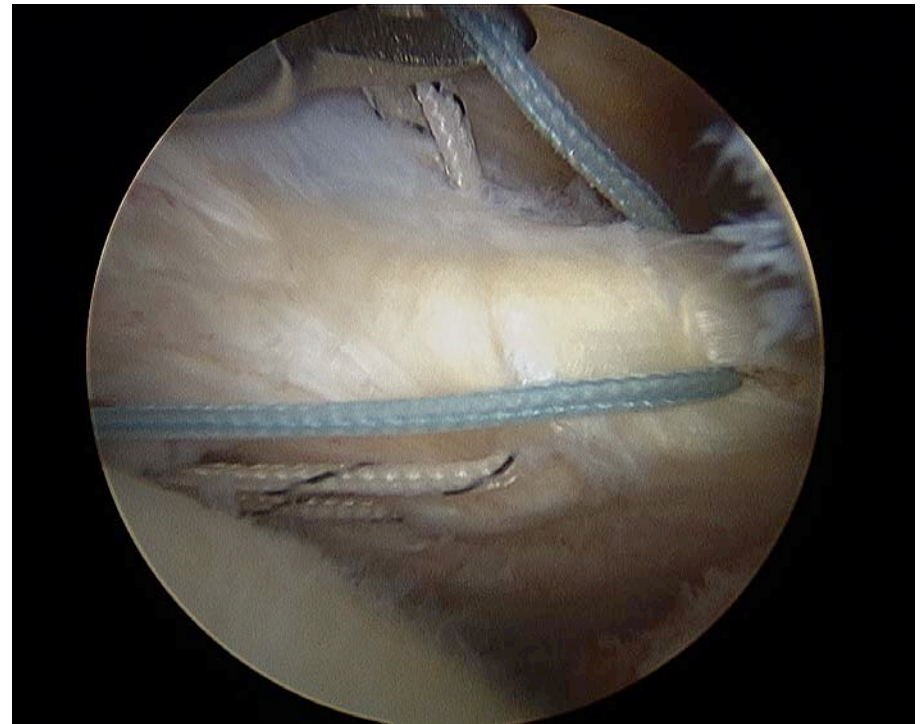


Arthroscopic Reconstruction of Isolated Subscapularis Tears: Clinical Results and Structural Integrity After 24 Months

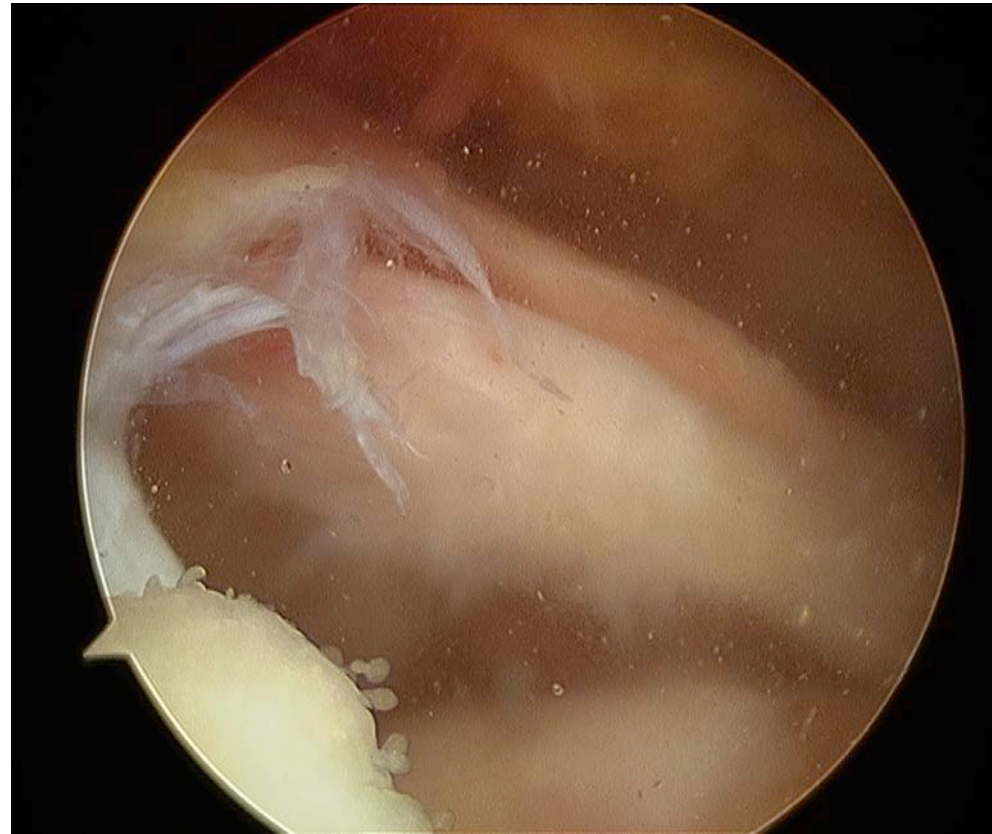
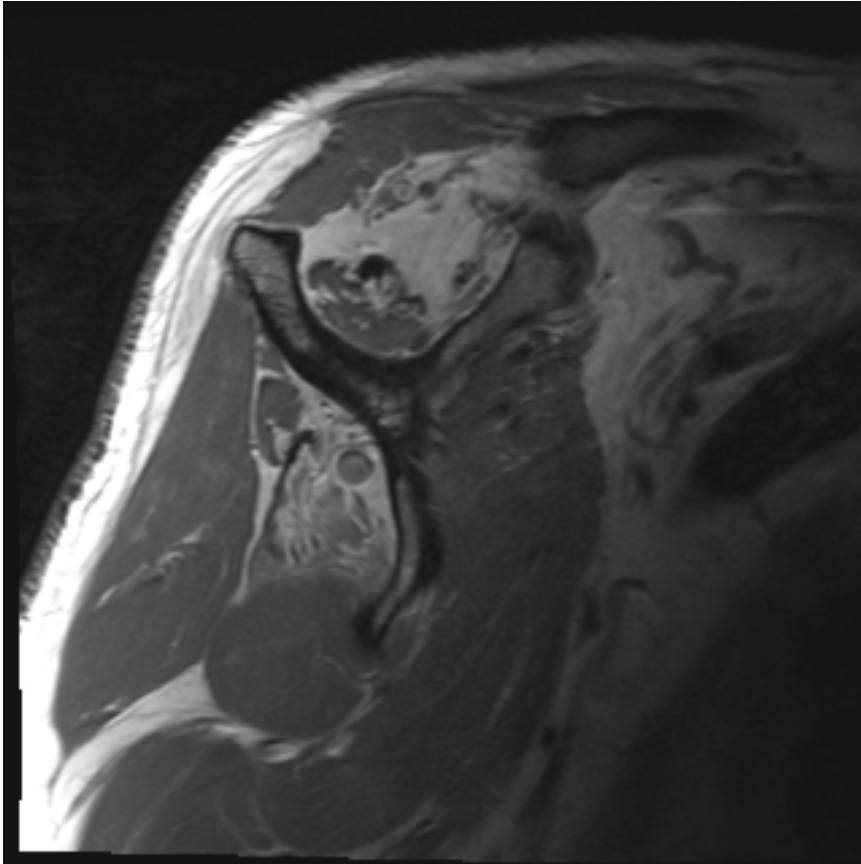
Arthrosc 2012

Roderich Heikenfeld, M.D., Ioannis Gigis, M.D., Anastasios Chytas, M.D.,
Rico Listringhaus, M.D., and Georgios Godolias, M.D.

- Arthroscopic repair in 19 shoulders
 - Constant score 81
 - 17/19 happy
 - 2 return



When to say no?

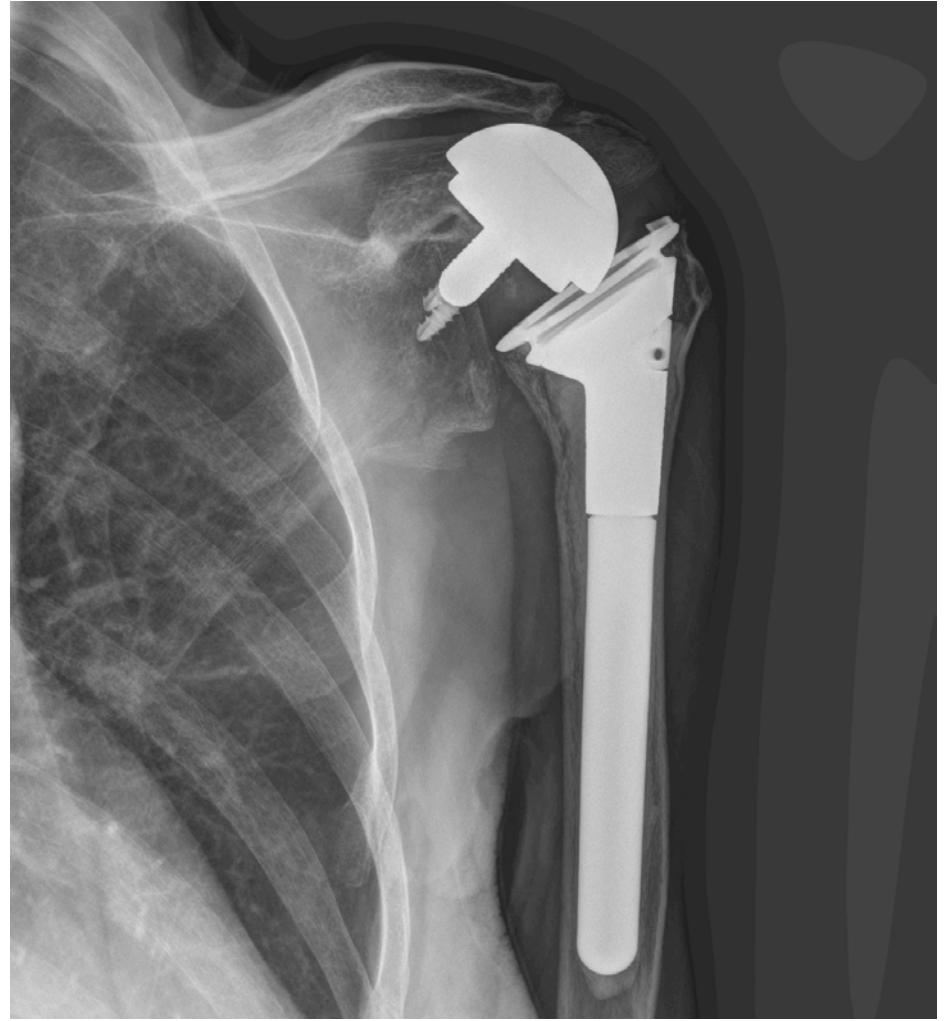


Rotator cuff repair

- Summary
 - Natural history—look at fat/atrophy as a predictor of worse outcomes
- Arthroscopic cuff repair
 - Single row for small tears
 - TOE for larger (>3 cm tears)
 - Fix subscap tears
- Expect decent, but not amazing outcomes
 - Still have not conquered biology

Reverse Shoulder Arthroplasty

The future, or too much of a good thing?



Outcomes after RTSA

Diagnosis	Outcome	Reference
Cuff Tear Arthropathy	Best overall ASES/Constant score vs. other etiologies	Mulieri JBJS 2011
Failed TSA	Constant 65% FF 106 deg 50% complication rate	Kelly JSES 2012
Fracture (hemi vs RTSA)	Better 5 year outcome with RTSA vs. hemi	Boyle JSES 2013

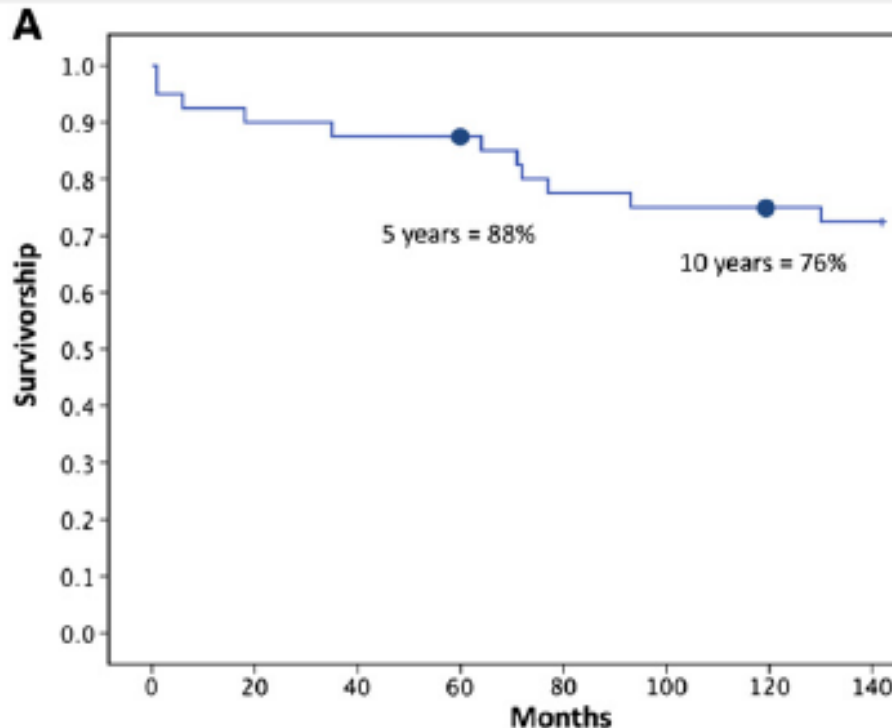
Reverse Shoulder Arthroplasty

- What is too young for RTSA?

Reverse total shoulder arthroplasty for massive irreparable rotator cuff tears in patients younger than 65 years old: results after five to fifteen years

Eugene T.H. Ek, MBBS, PhD, FRACS^{a,b}, Lisa Neukom, MD^a, Sabrina Catanzaro, RN^a, Christian Gerber, MD, FRCSEd (Hon)^{a,*}

JSES 2013



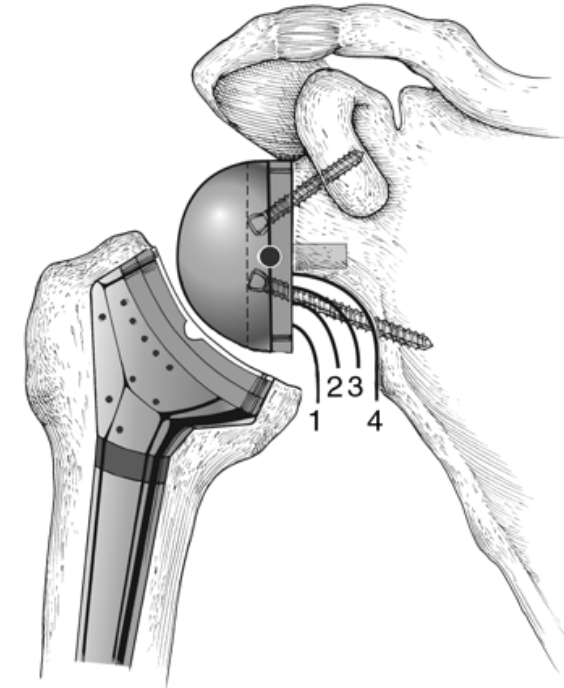
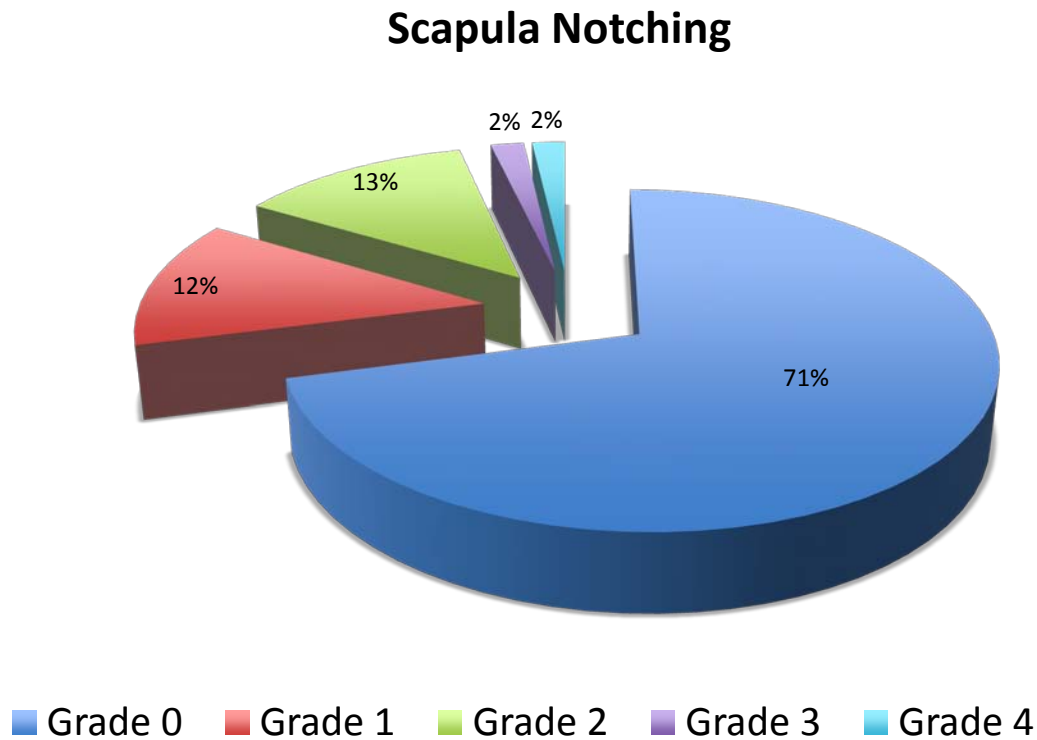
Constant Score 74%
Forward flexion 120

Complications in 37%
6 (15%) failures (3 infxn, 3
glenoid loosening)
10 (25%) had revision, hemi,
exchange

Surgical techniques

- Alternations implant design leads to less notching (JSES, in press 2013)
 - 54 patients with >2 year follow-up (avg. 2.6 years)
 - Majority CTA
 - Fx
 - Failed TSA
 - Infection
 - Zimmer RTSA (increased offset and lateralized glenosphere)

Scapular notching



Majority (81%) of patients have no notching or very minor notching only

Scapular Notching

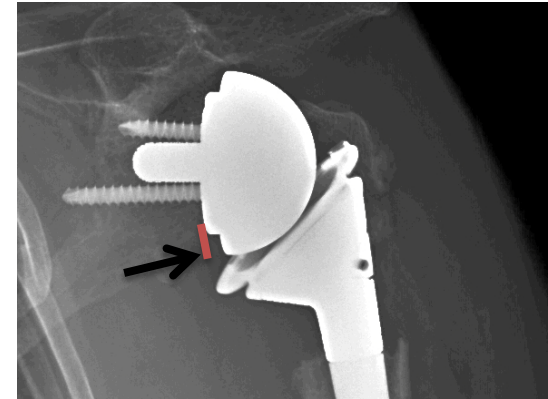
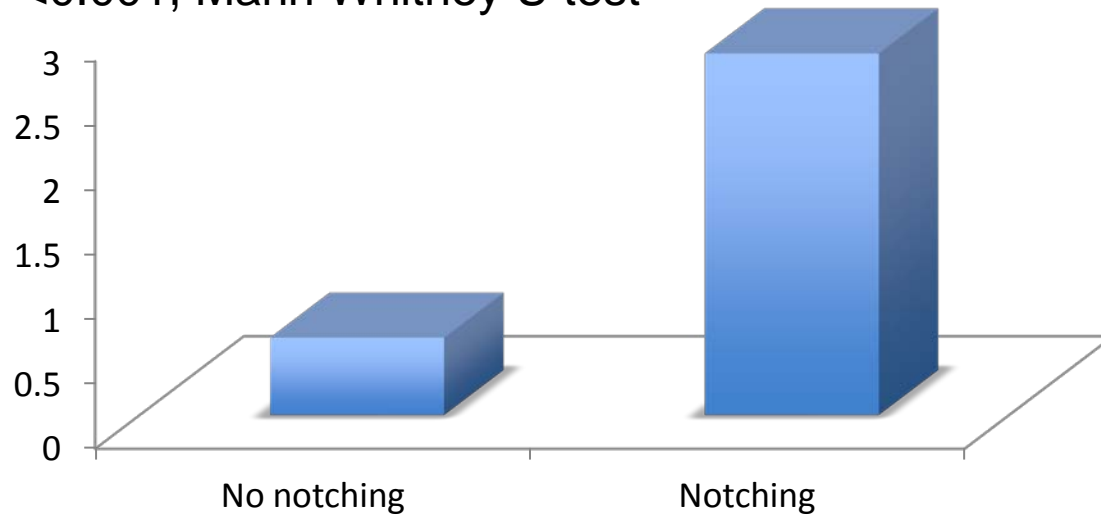
- Of the 9 patients with grade 2 and above, 7 of 9 have demonstrated progression since 1 year.



BPD

BPD

P<0.001, Mann Whitney U test



Radiographs vs. Notch Grade

Table III. Radiographic Measurements Related to Notch Grade

Grade	
Grade	Summary:
Grade	<ul style="list-style-type: none">• Notching is less common with lateral offset/low neck shaft
PG	<ul style="list-style-type: none">• Get the baseplate as low as possible
scala	<ul style="list-style-type: none">• If there is notching at 1 year, need to follow closely

Summary

- Reverse TSA
 - Good option for CTA
 - Can be a good option for younger patients without another option
 - Good surgical technique important
 - Long term outcomes lacking so far

Thank you

