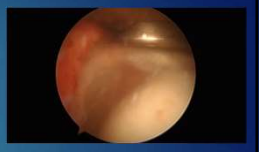
Massive Rotator Cuff Tear: We Can Fix These If You Know How

Chicago Sports Medicine Symposium
September 7 – 9, 2018



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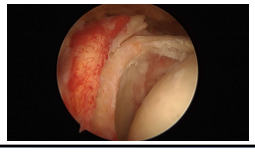
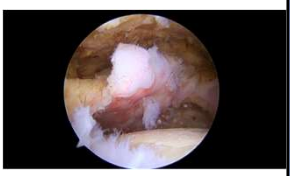
Technical Steps for Primary Repair

1. Definition of tear boundaries
2. Recognition of tear pattern
3. Mobilization
   1. Posteroinferior
   2. Anterosuperior
   3. "Other" Methods
4. Fixation
5. "Repair" Variations



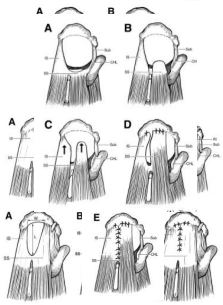
Definition of Tear Boundaries

- Debridement of "bursal leaders"
  - Most prominent posteriorly
  - Follow articular surface of posterior cuff to insertion
- Release of subdeltoid adhesions



Tear Anatomy (Burkhart Classification)

- Posterosuperior
  - Supraspinatus + infraspinatus
    - Crescent
    - L - / Reverse – L shaped
    - U – shaped

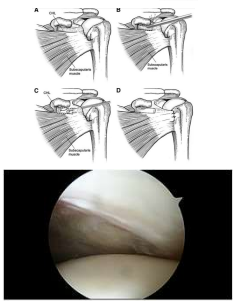


Mobilization: Posterosuperior

- Release of medial superior capsule
- Coracohumeral ligament (CHL) release
- Subdeltoid adhesion release
- Anterior interval slide in continuity
- Posterior interval slide

Mobilization: Anterosuperior

- Anterior capsular reflection release
- Subcoracoid adhesion release
- CHL Release
  - Anterior Interval Slide In – Continuity (Burkhart / Lo)

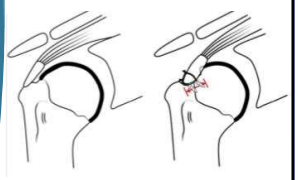


"Other" Mobilization Techniques

- Medialization of footprint
  - Choy et al, Arthroscopy, 2018
    - Medialization up to 1.05 cm improved results
      - 8.3% retear rate in medialization group
      - 31% retear rate in non-medialization group
- Incorporation of long head of the biceps tendon as autograft
  - Kim et al., JSES, 2018
    - No difference in retear rate between augment and non – augment group (p = 0.78)

Clinical and Radiologic Outcomes After Medializing and Not Medializing Rotator Cuff Tendon Attachment Site on Chronic Retracted Rotator Cuff Tears

Kwang Won Lee, M.D., Kyung Ho Moon, M.D., Chang Hyun Ma, M.D., Gyu Sang Lee, M.D., Dae Suk Yang, M.D., and Won Sik Choy, M.D.



Fixation: A Comment on Anchor Type

- Small diameter, all – su
  - Triple – loaded; conce
  - Set firmly!
  - Bracht et al., JSES, 2018
    - 20 patients status post arthrosc cuff repair with all – suture anch
    - MRI evaluation minimum 1 year follow-
    - 10% peri – anchor fluid interface
  - Mazzocca et al., Arthroscopy, 2012
    - ↑ Risk of micromotion / cadaveric glenoid study
  - Ruder et al., Arthroscopy, 2018

Rotator cuff repair with all-suture anchors: a midterm magnetic resonance imaging evaluation of repai

Hans Van d
Marc Pouill
Danny Stof

ELSEVIER

Arthroscopy: The Journal of Arthroscopic & Related Surgery

Volume 28, Issue 5, May 2012, Pages 642-648

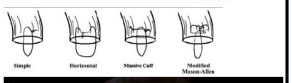
Original Arti
Biomec
Suture
Augustus D
Apostolakos

Greater Tuberosity Decortication Decreases Load to Failure of All-Suture Anchor Constructs in Rotator Cuff Repair

John A. Ruder, M.D., Ephraim Y. Dickinson, M.D., Richard D. Peindl, Ph.D., Nahir A. Habet, M.S., and James E. Fleischli, M.D.

Fixation: Suture / Anchor Patterns, Do They Matter?

- Massive cuff stitch, arthroscopic modified Mason – Allen, transosseous equivalent, arthroscopic transosseous…
- Single row vs. double row vs. transosseous equivalent vs. transosseous tunnels (open)
- Tape vs. tubular
- Biomechanical and vascular considerations

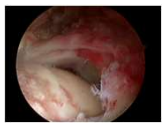


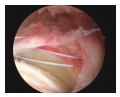
Difference in vascular patterns between transosseous-equivalent and transosseous rotator cuff repair

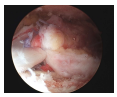
Atsushi Urita, MD, PhD[a], Tadanao Funakoshi, MD, PhD[a,*], Tatsunori Horie, RT[b], Mutsumi Nishida, PhD[b,c], Norimasa Iwasaki, MD, PhD[a]

"Repair" Variations: Arthroscopic Partial Repair / Margin Convergence

- Conversion of a "large" U-shaped tear to a "smaller" U-shaped tear
  - Margin convergence
  - Advancement of posterior cuff
- Reestablishment of anterior – posterior force couple
- General improvement in pain and function, though duration questionable
- Ma et al., Arthroscopy, 2017
  - High pre-op VAS, + night pain, low ASES may benefit more





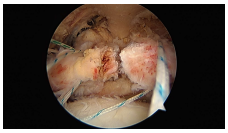


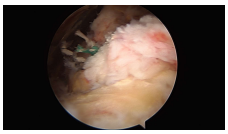
Arthroscopic Partial Repair of Irreparable Rotator Cuff Tears: Factors Related to Greater Degree of Clinical Improvement at 2 Years of Follow-Up

Kun-Hui Chen, M.D., En-Rung Chiang, M.D., Ph.D., Hsin-Yi Wang, M.D., and Hsiao-Li Ma, M.D.

Take – Away's

- Identify true tendon border
- Recognize tear pattern to determine reduction
- Mobilize
- Fixation…
- Rehab cautiously…
- Future directions - *orthobiologics*





THANK YOU

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Factors Affecting Repair Integrity

- Hwang et al., JSES, 2018
  - 180 patients with ≥ medium tear
  - Arthroscopic TOE (61) or SR (119) repair
  - 15% retear rate
  - Factors
    - Mechanical
      - Extent of retraction, delamination, distance from MTJ to glenoid, occupation ratio, fatty infiltration of Sp, AHI
    - Metabolic
      - DM, dyslipidemia, BMI

Factors affecting rotator cuff integrity after arthroscopic repair for medium-sized or larger cuff tears: a retrospective cohort study

Table III Significant factors for retear by multivariate logistic regression analysis*

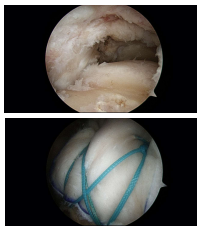
Variable	P value	Exp(B)†	95% CI
BMI	.018	1.466	1.067-2.015
DM	.046	2.703	1.021-24.332
Dyslipidemia	.004	52.814	3.449-808.643
Extent of retraction	.001	1.457	1.166-1.819
Delamination	.022	9.023	1.371-59.403
Distance from MTJ to face of glenoid	.049	1.253	1.008-1.575
Occupation ratio	.046	0.931	0.764-0.987
Fatty infiltration (IS)	.005	35.321	5.345-203.476
AHI	.006	0.523	0.330-0.827
Repair technique (SR or DR)	.034	0.147	0.025-0.862

CI, confidence interval; BMI, body mass index; DM, diabetes mellitus; MTJ, musculotendinous junction; IS, infraspinatus; AHI, acromiohumeral interval; SR, single-row technique; DR, double-row suture-bridge technique.
* Multivariate binary logistic regression analysis was performed using the backward elimination procedure. The condition of selection stay for variables was .05.
† Exp(B), exponentiation of the B coefficient, which means odds ratio.

Arthroscopic Repair +/- Augmentation

- Peck et al., AJSM, 2015
  - 35 patients
  - Blinded comparative study
  - Arthroscopic repair +/- ECM graft
  - Retear rates:
    - 10% (+) ECM
    - 26% (-) ECM
    - p = 0.048

Outcome of Large to Massive Rotator Cuff Tears Repaired With and Without Extracellular Matrix Augmentation: A Prospective Comparative Study



Repair vs. Augmentation vs. Debridement?

- Le Huec et al., JSES, 2018
  - Retrospective cohort study
  - 32 patients in 3 groups
    - Primary arthroscopic repair
    - Primary open repair with xenograft (porcine) augmentation
    - Debridement + LHBT tenotomy
  - C – M improvement (p < 0.01) all group
    - Arthroscopic and open repair > debridement (p < 0.002)
  - Significant complication rate in open augmentation group (1 deep infection, 4 post – op stiffness)

Surgical repair of large-to-massive rotator cuff tears seems to be a better option than patch augmentation or débridement and biceps tenotomy: a prospective comparative study