SUPERIOR CAPSULAR RECONSTRUCTION (SCR)

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Disclosures

- Consultant:
  - Arthrex, Zimmer, Depuy-Synthes, Depuy-Mitek, Shoulder Options, Inc.
  - United Healthcare (UHC)
- Royalties:
  - Arthrex, Shoulder Options, Inc.
- BOD:
  - Leroy C. Abbott Orthopedic Society
  - Northern California Orthopaedic Society

Outline

- History of SCR
- Biomechanics and rationale
- Clinical indications
- Surgical technique
- My personal experience
**Treatment Algorithm for Rotator Cuff Tears**

- **Patient**
  - Reparable Tear
  - Unreparable Tear
  - Repair Options
  - Salvage Options

**Most Rotator Cuff Tears are Repairable**

- Improved anchor design
- Improved anchor placement site
- Improved suturing techniques
  - SU
  - KN
  - MO
  - DO
- Biologics?

1 Tingart et al., JBJS Br 85:611, 2003.

**Stage**

- Stage 0: no fat
- Stage 1: some fatty streaks
- Stage 2: fat < muscle
- Stage 3: fat = muscle
- Stage 4: fat > muscle

Likely NOT Repairable

Fatty Infiltration: The Key Element

- Likely not repairable
- Pain relief more predictable than functional improvement
- Can we do better arthroscopically and not burn any bridges for reconstruction later?

Massive ‘Irreparable’ Rotator Cuff Tears

- Debridement
- Biceps tenotomy
- Partial repair
- Tendon transfer
- Reverse TSA
- ECM bridge*
  - Graft/Tendon Failure
- Superior capsular reconstruction (SCR)

* NOT FDA-Approved

Arthroscopic Superior Capsular Reconstruction

- Pioneered by Dr. Teruhisa Mihata
- Fascia lata autograft from superior glenoid to greater tuberosity
- Goals:
  - Improved pain and function
  - Provide superior stability of GHJ and enhance AP force couple of residual rotator cuff
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Biomechanical Role of Superior Capsule

Ishihara, Mihata, Lee et al., JSES 23:642, 2014.

- 24 shoulders (mean f/u 34 mos)
- Irreparable tears (11 large, 13 massive)
- Fascia lata autograft with side-side repair to residual cuff

Clinical Results of Arthroscopic Superior Capsule Reconstruction for Irreparable Rotator Cuff Tears

Mihata et al, Arthroscopy, 29(3), 459-70, 2013
Graft Choice: Still under debate

<table>
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<th>Graft</th>
<th>Source</th>
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<td>Pericardium (Cross-linked)</td>
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<td>Pegsus Biologics</td>
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</table>

Arthroflex human dermal allograft

- Most robust biomechanically
- Lowest antigenicity based on residual DNA content

![Graph showing mechanical properties of different grafts]
Clinical Indications

- Irreparable SS or SS/IS tear
- Minimal arthritis
- Intact subscapularis*
- Intact teres minor*
- Good bone stock for anchor fixation
- Minimal proximal migration of humerus


Surgical Technique

- Beach-chair position
- Attempt repair (releases)
- Biceps tenotomy/tenodesis
- Ant/Post/Lateral/Nevais
- Anchor placement
- Calculation of graft size
- Graft implantation
- End-to-end repair to residual posterior cuff to graft

Rehabilitation: Go Slow!

- Phase 1: Protection (week 0-6)
  - Sling 6 weeks. No Shoulder Motion
  - Elbow/Wrist/Hand ROM only
- Phase 2: Intermediate (week 6-10)
  - Unrestricted Passive ROM, AAROM
  - Periscapular strengthening
- Phase 3: Dynamic (week 10-16)
  - AROM
  - RTC strengthening
- Phase 4: Return to Sport (>week 20)
Early Clinical Observations

- 12 patients (5 male, 7 female)
- Mean age 46
- Active patients, not interested in rTSA or latissimus transfer
- 4 SS, 8 SS/IS
- Intact SSC/TM in all cases, min arthritis
- Maximum follow up 6 months
- Graft choice
  - ArthroFlex (9), Connexa (1), Fascia Lata (2)
- Predictable early pain relief
- Better early functional improvement with SS tears

SCR versus Latissimus Transfer

Conclusions

- SCR is a promising new treatment for patients with irreparable SS/IS rotator cuff tears
- Proper patient selection is critical: SSC/TM integrity, minimal arthritis or static instability
- Choice of graft remains unclear (auto vs allo)
- Although early results are encouraging, longterm studies are needed to properly assess clinical effectiveness.
THANK YOU!!

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