The Rotator Interval Closure: Why, When and How

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Agenda

- **Why:** Does an interval closure promote shoulder stability in the unstable setting?
- **When:** Which patients would benefit? (e.g. MDI, isolated anterior instability)
- **How:** “bow-tie”, side to side, ? CHL reefing
Definition: Rotator Interval

- Triangular area
- Inferior border: superior aspect of the subscapularis
- Superior border: leading edge of the supraspinatus
- Consists of:
  - SGHL, CHL, Biceps and joint capsule
Role of the CHL: Historical Confusion → Now Clarified

- Jost, Harryman
  - Critical structure for controlling inferior translation
- Boardman, Warner
  - CHL >>> SGHL in cross-sectional area, ultimate load to failure and stiffness
- Kuhn

- Restraints to external rotation in late-cocking phase of throwing:
  - Entire inferior glenohumeral ligament resected: increase in ER = 10 degrees
  - Resection of coracohumeral ligament alone: increase in ER = 8.6 degrees
  - Resection of SGHL: Increase of less than 1 degree
The Role of the Rotator Interval Capsule in Passive Motion and Stability of the Shoulder

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1. Limits ROM in flexion, extension, adduction, and ER
2. Limits inferior translation in adduction
3. Limits posterior translation in flexion / abduction-external rotation
Harryman et al JBJS 1992

Graph showing the relationship between Applied Force (N) and Inferior Translation (mm) for Short RIC, Intact RIC, and Cut RIC conditions.
CHL Dissection: Right Shoulder

Video: Pau Golano, M.D. Barcelona.
Coracohumeral Ligament (CHL): Arthroscopic View from Anterolateral portal

Courtesy: G. Arce
The “Why” is Answered

- The CHL, much more so than the SGHL, can be a significant stabilizing force across the shoulder.
When?

- Does a rotator interval closure provide for better results in treating instability patients?
Open, isolated rotator interval closure for isolated “defects” of the rotator interval

No other stabilization performed; no other pathology noted

Majority women

1+ sulcus minimum

15/15 good or excellent with ave 3.3 year follow up
Indications for Isolated Rotator Interval Closure

History
Persistent, symptomatic anterior instability
No history of traumatic dislocation

Physical examination and imaging
Mild inferior laxity with 1+ to 2+ sulcus sign
Anterior laxity insufficient to subluxate humeral head over glenoid rim
No radiographic evidence of Hill-Sachs or bony Bankart lesions
No magnetic resonance imaging evidence of labral or capsular tears
1. Medial stitch at glenoid margin with SSc
2. Ext rotation 30 degrees
3. Second stitch 1 cm lateral
4. Significant decrease in ABD/ER translation
5. No change in posterior translation
6. Minimal sulcus sign change
Rotator Interval Closure: “North-South” (Cadaveric)

- Sutured with 30° of ER
- No change in inferior translation
- Decreased anterior translation in abduction in the scapular plane
- 12° decrease ER at 0°
- 17° decrease ER at 60°
Provencher et al 2007: (Cadaveric) Arthro vs Open RIC

- Arthroscopic RIC:
  - In abduction/ER, stability improved; ext rotation loss 12 degrees
  - No effect on inferior or posterior translation
- Open RIC:
  - Neutral anterior stability improved
  - Inferior sulcus improved
  - Loss of ext rotation in neutral: open >> arthroscopic

Begs the question:
- Does arthroscopic RIC have a role?
Mologne et al AJSM 2008 (Cadaveric)

- Cadaveric study
- Anterior or posterior capsulolabral repairs tested
- Same with addition of RIC (North-South)

Conclusions:
- No additional translational control adding RIC to posterior Bankart
- Anterior Bankart stability enhanced with RIC
- No effect on inferior translation
The “When” Has Been Answered (sort of):

- **Indications:**
  - Anterior instability
  - Associated ligamentous laxity with superimposed trauma
  - Revision Bankart
  - MDI-type cases
  - Adjunct to plication
  - Routine use of interval closure NOT indicated
How To Perform A Rotator Interval Closure
Surgical Closure of Rotator Interval: Issues

- What do you close and in what “direction”?
  - CHL included?
  - SSC or SST involved?
  - North-South or East-West
  - How medial vs how lateral suture placement
  - Absorbable vs permanent
Incorporating Coracohumeral Ligament into Closure

Green Arrow

Black Arrow

Courtesy: RL Angelo MD
Kelly et al 2014 (Abstract)
Mapping the CHL for East-West Plication
Rotator Interval Closure: Including CHL

17 y.o. R shoulder
traumatic injury superimposed on ligamentous laxity
Rotator Interval Closure

- Polled 6 expert arthroscopists who have published or given lectures recently on rotator interval closure

Questions:
- Do you still perform RI closure?
- If so, how many/year?
- Specific indication(s)
- Technique:
  - SGHL to MGHL
  - CHL+SGHL to MGHL
  - SS\text{t} to SS\text{c} (tendon to tendon)
Poll Results:

- Do you still perform:
  - 5 yes; 1 no

- How many/year?
  - 1 (none); 1 (75+/year); 2 (3-4 year); 1 (10+ year)

- Indications:
  - (1) most anterior instability cases
  - (4) MDI-type cases

- Technique
  - 2 SGHL-MGHL (north-south)
  - 2 CHL+SGHL - MGHL (north-south)
  - 1 CHL only (east-west)
Conclusions:

1. Rotator Interval is a complex, controversial area

2. “Arthroscopic Closure” of the interval (if CHL included) will potentially:
   - Decrease ER
   - Decrease flexion
   - **Not** decrease posterior translation
   - Decrease anterior translation
   - **Potentially limit** sulcus
   - Indications: anterior instability with laxity, revision cases, MDI