Long Head Biceps: Distal Fixation is the Only Way

R. Alexander Creighton MD

Chicago Sports Medicine Symposium

8/14/15

Disclosures

- Arthrex: Institutional Support
- Depuy/Mitek: Institutional Support

We are a product of our training

"Blue Plate Special"

- Worker's compensation address all pathology
  - Rotator Cuff
  - Labral
  - SAD
  - DCR
  - Open subpectoral biceps tenodesis.

Who needs biceps surgery?

- Failure on non-op Rx
- Associated with concomitant pathology

Does it Hurt?

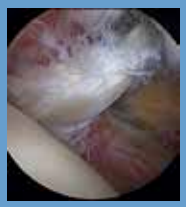
Case

- 54 RHD work-related injury trying to catch computer falling off desk. Complains of deep seated shoulder discomfort. Has tried PT with limited improvement. No relief from subacromial injection, short lasting relief from glenohumeral injection. Xrays normal. MRI revealed superior labral changes and fluid around biceps in groove.
- PE
  - No atrophy
  - FE 160, ER 55, IR T12, AB/ER 90, AB/IR 45
  - 5/5 strength
  - + biceps groove pain
  - + O'Briens

Case

Tenotomy

- Good pain relief
- But
  - 35% poor funtion (ASES<70)
  - 19% Cramping
  - 38% Fatigue



Kelly-Arthroscopic Release of Long Head Biceps Tendon-AJSM 2005
Duff-Patient Acceptance of Long Head of Biceps Brachii Tenotomy-JSES 2012

Where Should We Tenodese?

- Rotator Interval (PITT)
- Top of groove
- Suprapectoral region
- Subpectoral region

Proximal biceps tendon: injuries and management

- Friedman DJ et al. Sports Med Arthrosc 2008
  - Retrospective review of 188 pts
    - Avg age 51, f/u 9.2 months (0.1 to 43.1)
  - Revision rates
    - Proximal arthroscopic tenodesis 35.7%
    - Proximal open tenodesis with sheath intact 12.5%
    - Proximal open tenodesis with sheath released 0%
    - Tenotomy 8.7%
    - Distal open biceps tenodesis 2.7%
  - Conclusion distal with lower revision rate, if go proximal release sheath

Proximal vs Distal

- Lutton et al. Clin Orthop Relat Res 2011
  - Retrospective review of 17 pts, min f/u 12 months
    - 5 suprapectoral
    - 12 subpectoral
  - ASES, Constant-Murley, VAS
  - 2/5 (40%) had persistent pain with suprapectoral
  - A more distal tenodesis may decrease incidence of persistent pain, additional research warrented

Complications associated with subpectoral biceps tenodesis: low rates of incidence following surgery

- Nho SJ et al. J Shoulder Elbow Surg 2010
  - Over 3 year period 7/353 (2%) had complication
    - 2 (0.57%) persistent biceps pain
    - 2 (0.57%) had failure of fixation leading to popeye deformity
    - 1 (0.28%) deep postoperative infection
    - 1 (0.28%) musculotaneous neuropathy
    - 1 (0.28%) RSD/CRPS
  - Subpectoral tenodesis has low complication rate

Arthroscopic suprapectoral and open subpectoral biceps tenodesis: a comparison of minimum 2-year clinical outcomes

- Werner et al. Am J Sports Med 2014
  - Cohort study, level III
    - 32 pts arthroscopic suprapectoral
    - 50 pts open subpectoral tenodesis
  - Constant-Murley, ASES, SANE, SST, ROM, Strength
    - No significant differences
  - Both yield excellent clinical and functional results

Tendon Quality and Not Fixation Strength

- Sethi PM et al. J Shoulder Elbow Surg 2013
  - 32 cadaver shoulders
  - Randomized to 4 groups
    - 1 7-mm screw with button 237.8 $\pm$ 120.4 N
    - 2 cortical button alone 99.4 $\pm$ 16.9 N
    - 3 7-mm screw 275.5 $\pm$ 56 N
    - 4 8-mm screw 277.1 $\pm$ 42.1 N
  - Fixation of interference screw not improved with cortical button augmentation, cortical button fixation alone much less, all specimens failed through tendon at screw-tendon-bone interface

Arthroscopic suprapectoral and open subpectoral biceps tenodesis: a comparison of restoration of length-tension and mechanical strength between techniques

- Werner BC et al. Arthroscopy 2015
  - 18 matched cadaver shoulders
  - Arthroscopic
    - 2.15 ± 0.62 cm of biceps overtensioning
    - 138 ±29.1 N load to failure
    - Implant pullout 7/9
  - Open
    - 0.78 ± 0.35 cm of biceps overtensioning
    - 197 ± 38.6 N load to failure
    - Implant pullout 1/9
  - Conclusion open technique has increased load to failure and less biceps overtensioning, clinical studies are needed to clarify

Clinical outcomes of revision biceps tenodesis

- Gregory JM et al. Int J Shoulder Surg 2012
  - Retrospective review 21 pts
    - 14 continued pain
    - 7 ruptured
  - VAS, SANE, SST, ASES, UCLA, SF-12 (M & P)
    - All scores demonstrated significant improvement except MCS-12
  - Revision can lead to significant pain relief and improvement in functional outcomes

Technique

- 2-3 cm incision

Technique

- Retractors
  - Pointed small hohman
  - Chandler (vertical)

Technique

Technique

- Go small as you can to fit tendon into canal

Conclusion

- Biceps common source of pain
- Sub-pectoral tenodesis my only way
  - Most predictable
  - Low complication rate

Thank You