

Suprapectoral vs Intra-Articular Biceps Tenodesis: A Comparison of Clinical Outcomes

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Disclosures

- Authors
 - Consultant
 - Conmed
 - Vericel
 - Depuy/ Mitek
 - Zimmer
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 - Arthrex
 - Smith and Nephew
 - Conmed
 - Mitek
- Please see meeting guide for full list of disclosures

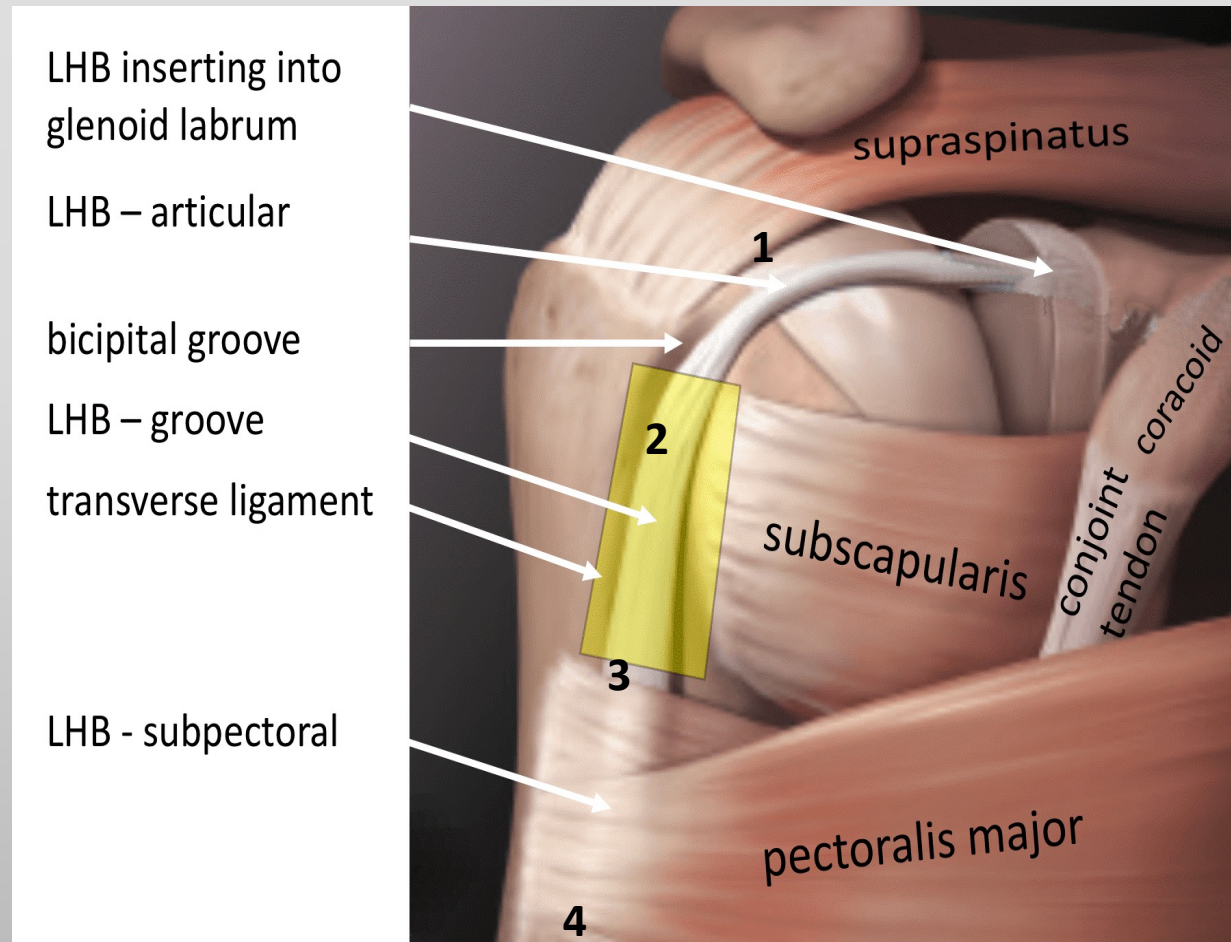
Introduction

- Long head of biceps brachii (LHB) tendon is potential pain generator
- Tortuous course of LHB tendon predispose to:
 - Degeneration
 - Inflammation/irritation
 - Trauma
 - Sports-related injuries
- Irritation -> anterior shoulder pain



Introduction

- Initial management:
 - Activity modification, NSAIDS, +/- corticosteroid injection
- Tenotomy -> cosmetic deformity, cramping, weakness
- Tenodesis: variety of techniques
 1. Intra-articular
 2. Inter-tubercular
 3. Supra-pectoral
 4. Sub-pectoral



<http://cambridgeshoulder.co.uk/shoulder/long-head-biceps/>

Purpose

Compare clinical outcomes of supra-pectoral vs intra-articular biceps tenodesis.

Hypothesis

Supra-pectoral group will have superior outcomes due to removing LHB tendon from intertubercular groove.



Methods

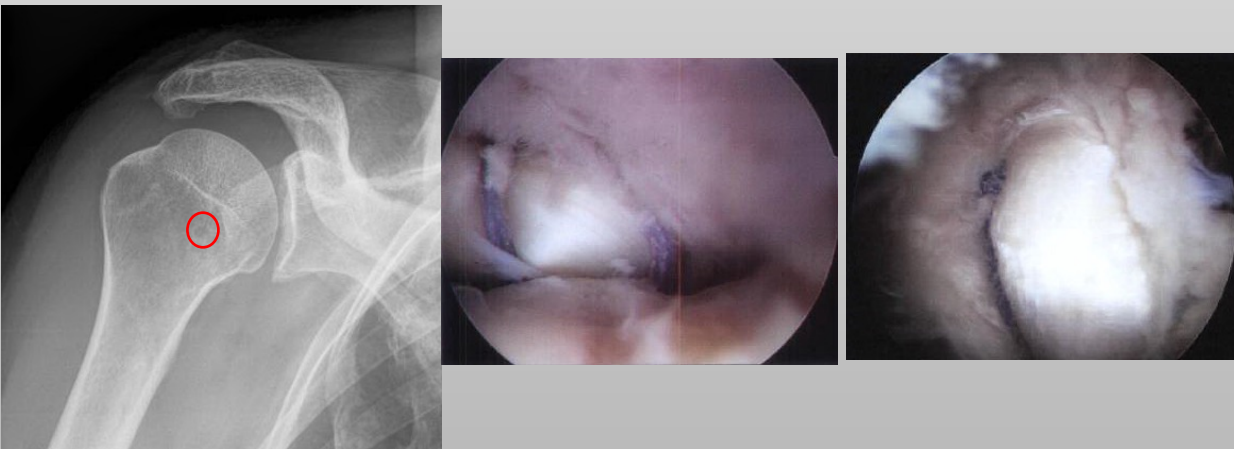
- IRB approved retrospective review
- Single surgeon
- 1/2010 – 1/2015
 - Intra-articular: 1/2010 – 2/2012*
 - Suprapectoral: 2/2012 – 1/2015*
- Outcomes:
 - SF-12 physical (PSF) and mental (MSF) components
 - American Shoulder and Elbow Surgeons score (ASES)
 - Pre-operative, post-operative intervals (3mo, 6mo, 1yr, 5yr)

* Change due to surgeon preference

Methods

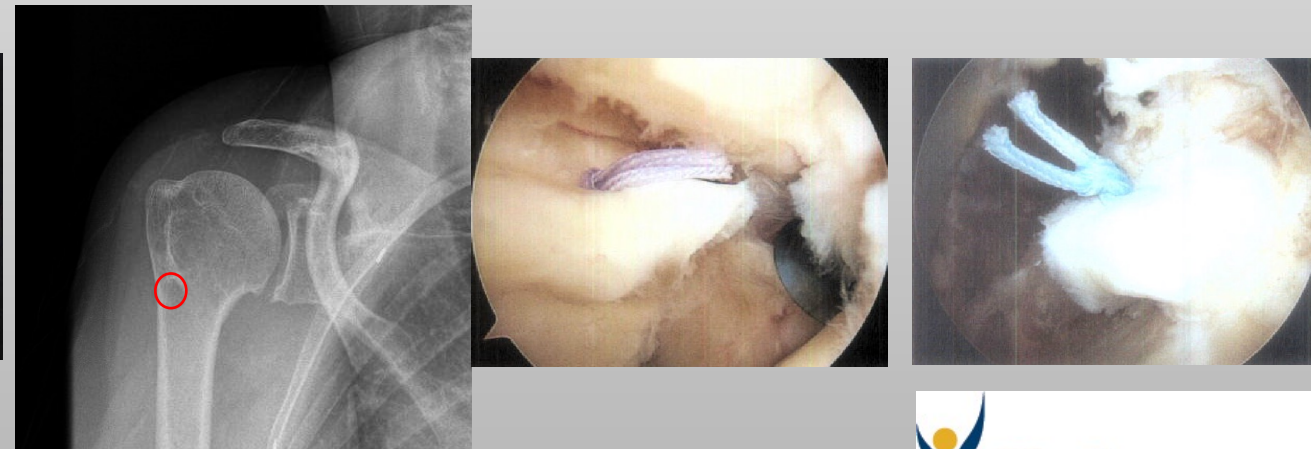
- Intra-Articular:

- Proximal bicipital groove debrided with shaver
- Mitek LUPINE Loop Anchor¹ placed at proximal bicipital groove
- Sutures through LHB
- LHB taken from origin and free edge debrided
- Through anterolateral portal within shoulder joint



- Suprapectoral:

- LHB tagged with #2 FiberLoop², then taken from origin
- Lateral portal: **intertubercular sheath removed**, LHB mobilized anteriorly
- SwiveLock² with LHB placed 1cm distal to proximal bicipital groove



1: DePuy Synthes Mitek Sports Medicine, Raynham, MA

2: Arthrex Inc, Naples, FL

Results

- 96 patients
 - 43 intra-articular
 - 53 suprapectoral

Table 1: Demographics

	Intra-Articular Group (N=43)	Suprapectoral Group (N=53)	P value
Age, mean (SD)	54.23 (12.35)	54.19 (9.81)	0.114
BMI, mean (SD)	28.61 (4.74)	31.83 (7.57)	0.013*
Male (%)	21 (48.84%)	25 (47.17%)	0.871
Female (%)	22 (51.16%)	28 (52.83%)	
Smokers (%)	3 (5.66%)	10 (18.87%)	0.224
Right Arm Dominant (%)	30 (69.77%)	48 (90.57%)	0.288
Left Arm Dominant (%)	4 (9.30%)	2 (3.77%)	

SD Standard Deviation, BMI body-mass-index, * indicates significance

Results

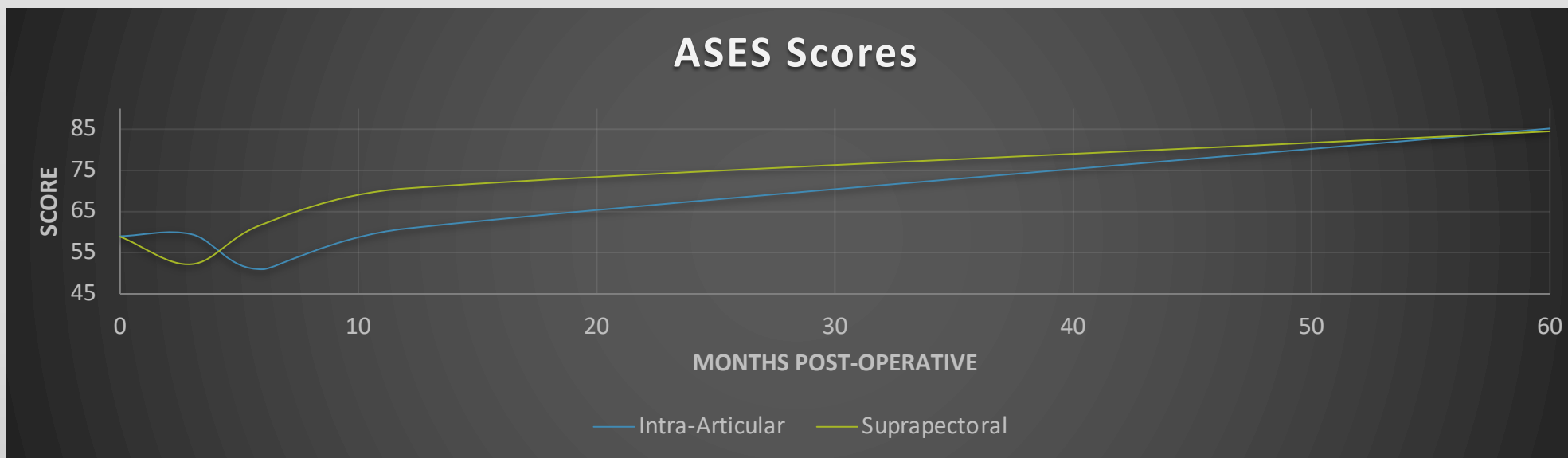
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Table 2: Procedures Performed

	Intra-Articular, n (%)	Suprapectoral, n (%)	p-value
Rotator Cuff Repair	23 (53.5%)	27 (50.9%)	0.805
Subacromial Decompression	41 (95.4%)	42 (79.3%)	0.023*
Distal Clavicle Excision	6 (14.0%)	23 (43.4%)	0.002*
Acromioplasty	1 (2.3%)	0 (0.0%)	0.448
Labral Repair	6 (14.0%)	14 (26.4%)	0.137
Rotator Cuff Debridement	5 (11.6%)	3 (5.7%)	0.295
Labral Debridement	7 (16.3%)	12 (22.6%)	0.439
Lysis of Adhesions	8 (18.6%)	4 (7.6%)	0.105
Synovectomy	6 (14.0%)	14 (26.4%)	0.137
Microfracture	1 (2.3%)	1 (1.9%)	1.000
Hardware Removal	1 (2.3%)	0 (0.0%)	0.448

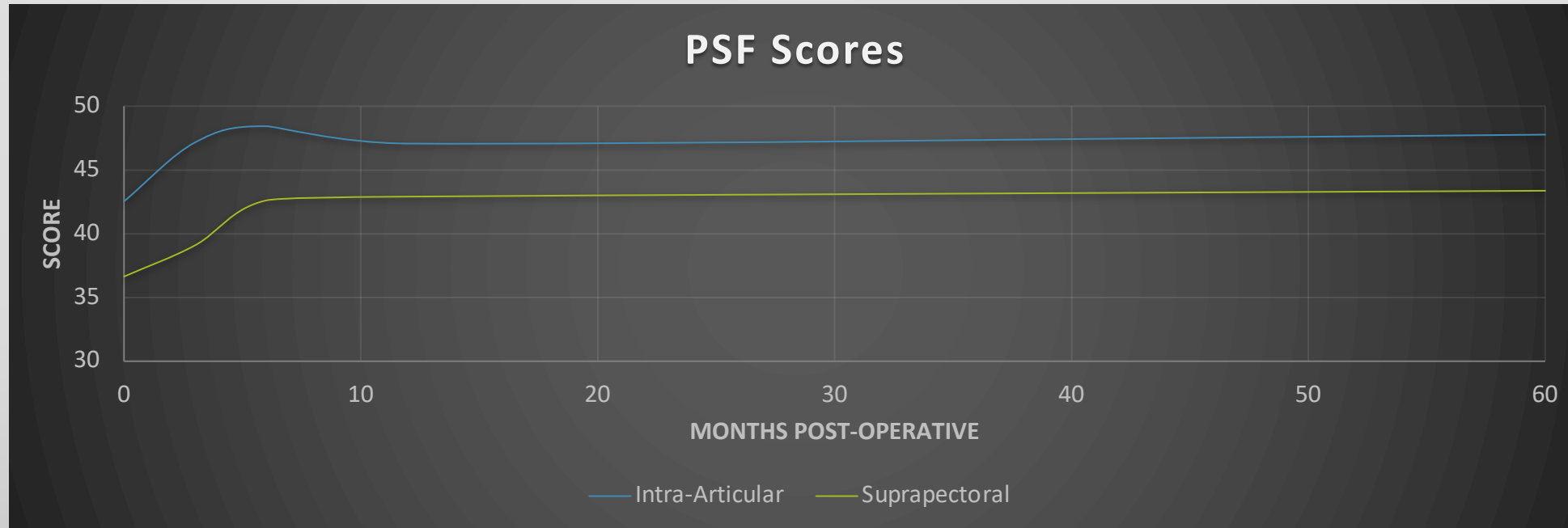
* indicates significance

Results: ASES



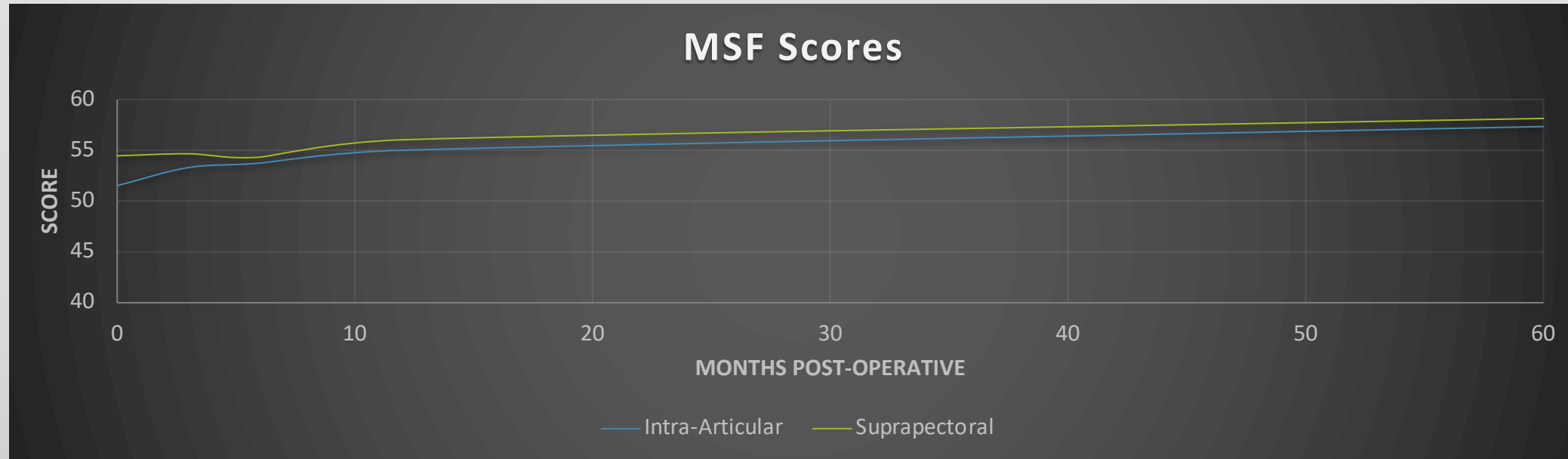
- Both Groups showed absolute improvement in ASES over time
- Intra-articular: non-significant improvement at 12mo ($p=0.3337$)
- **Suprapectoral: significant improvement at 12mo ($p=0.0044$)**
- **Both groups significant improvement at 5 years: Intra-articular ($p<0.001$), Suprapectoral ($p<0.001$)**
- **Suprapectoral: met MCID at 1 year**
- **Both groups met MCID at 5 year**
- No difference in scores between groups
 - Pre op: $p=0.9755$, 3mo: $p=0.3036$, 6mo: $p=0.1605$, 1yr $p=0.2715$, 5yr $p=0.91$

Results: PSF



- Intra-articular: non-significant improvement at 1 year ($p=0.3079$) or 5 year ($p=0.061$)
- Suprapectoral: non-significant improvement at 1 year ($p=0.1558$) or 5 year ($p=0.159$)
- **Both Groups: met MCID at 1 year and 5 year**
- Higher scores for **intra-articular, significant at 3mo**
 - Pre op: $p=0.207$, **3mo: $p=0.0156$** , 6mo: $p=0.0653$, 1 year: $p=0.2378$, 5 year: $p=0.19$

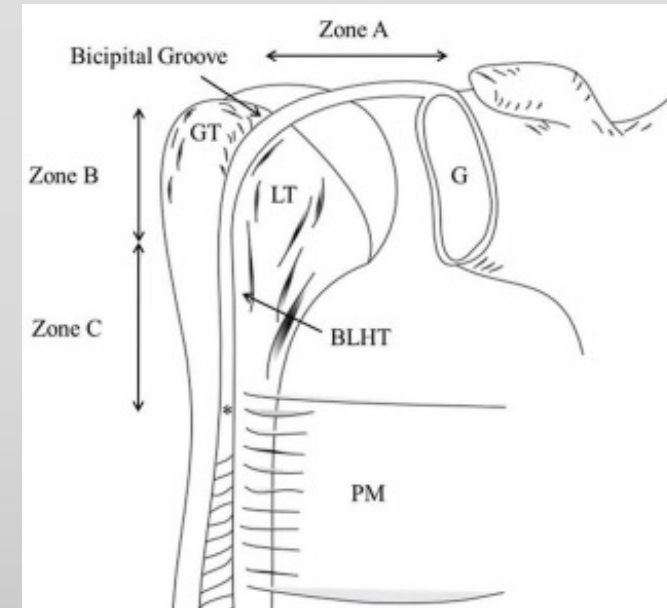
Results: MSF



- Intra-articular: non-significant improvement at 1 year ($p=0.3623$), **significant improvement at 5 year ($p=0.03$)**
- Suprapectoral: non-significant improvement at 1 year ($p=0.4975$) and 5 year ($p=0.096$)
- **Both groups met MCID at 5 year**
- No difference in scores between groups
 - Pre op: $p=0.2495$, 3mo: $p=0.6585$, 6mo: $p=0.8414$, 1 year: $p=0.7427$, 5 year: $p=0.68$
- No difference in score change between groups
 - $p=0.9072$

Discussion

- Theory: LHB can be irritated within glenohumeral joint or intertubercular groove
- Moon *et al*: divided LHB tendon to 3 zones
 - “Hidden Lesions”: Zone B or C damage
 - Lead to increased rate of clinical failure and revision
 - Zone B: 100% had tears and/or degenerative changes
 - Zone C: 77.8% had tears, 80.6% had degenerative changes
- Not addressing “hidden lesions” could possibly lead to increased rates of clinical failure and revision



Discussion

- Brady *et al*: 1083 patients with intra-articular biceps tenodesis
 - Low revision rate
 - Significant improvement in outcomes
- Sanders *et al*: retrospective review
 - Higher failure rate in tenodeses when transverse humeral ligament was not released (45.5% vs 7.7 %)
- Suprapectoral Tenodesis Literature Review: no LHB-related pain
 - Removing LHB tendon from intertubercular groove

Conclusion

- Equivalent outcomes of intra-articular and suprapectoral biceps tenodesis
 - No significant difference in ASES, PSF, or MSF scores
- Both groups met MCID in all outcome measurements at final follow-up (5 years)
- Suprapectoral: significant improvement in ASES scores at final follow up
- Intra-Articular: significant improvement in ASES and MSF at final follow up
- Despite leaving the biceps tendon within the glenohumeral joint the intra-articular technique offers similar improvement in outcome measures to suprapectoral technique
- Both techniques can be used with satisfactory outcomes

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