

SUBSCAPULARIS IMPLICATIONS IN TSA: CLINICAL & BIOMECHANICAL

George S. Athwal, MD, FRCSC
University of Western Ontario
CURRENT SOLUTIONS
Feb 4-7, 2016



ROTH | McFARLANE
HAND & UPPER LIMB CENTRE



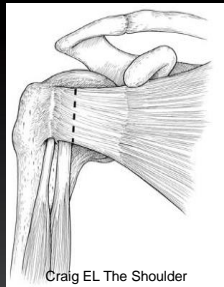
OUTLINE

- Standard Approaches
- Biomechanics
- Evidence Based Comparisons



TENOTOMY (Intra-Substance)

- Classic
- 1 cm of cuff
- Pros
 - Quick & Easy
- Cons
 - Healing
 - Shortening
 - Strength of repair

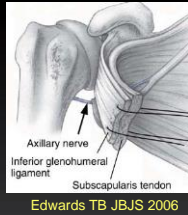


Craig EL The Shoulder



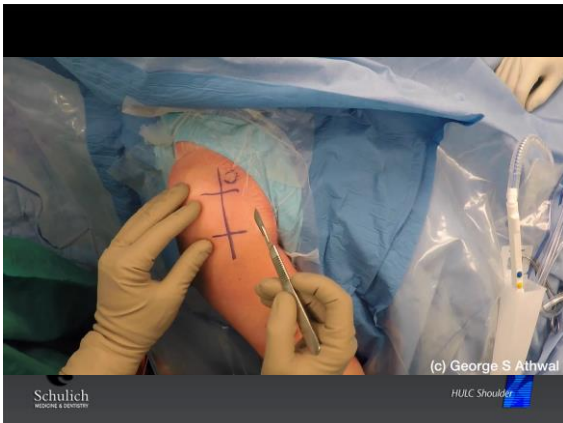
PEEL (Tendon Release)

- Detach from LT
- Transosseous repair
- Pros
 - Medialize tendon
- Cons
 - Healing to bone



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MEDICAL & SPORTS

HULC Shoulder

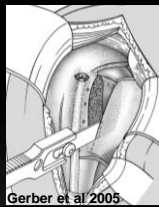


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HULC Shoulder

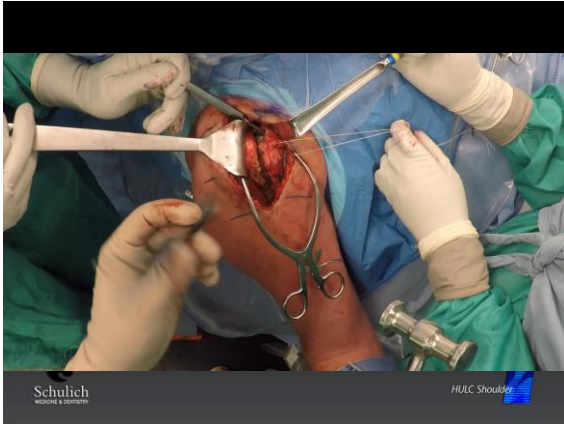
LESSER TUBEROSITY OSTEOTOMY

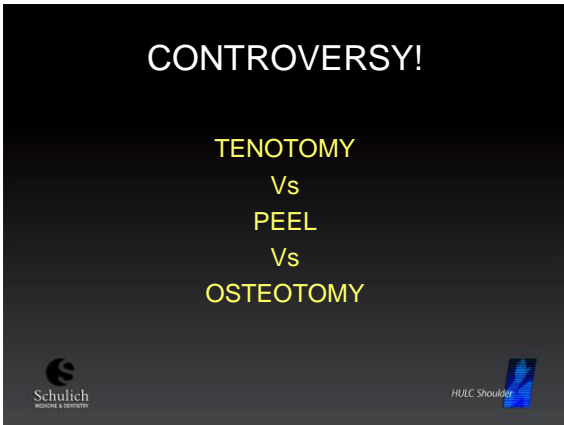
- Osteotomize LT
- Biceps groove – joint
- Pros
 - Bone-2-bone healing
 - Improved exposure
- Cons
 - Bone-2-bone healing
 - Stemless implants



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Levine







CONTROVERSY!



KEEP CALM AND Make Educated Decisions

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BIOMECHANICS

A biomechanical evaluation of three surgical techniques for subscapularis repair

Biomechanical comparison of lesser tuberosity osteotomy versus subscapularis tenotomy in total shoulder arthroplasty
Gregory L. Robert Ho

Biomechanical similarities among subscapularis repairs after shoulder arthroplasty
Steven J. Akin III, Scott P.

Biomechanical testing of small versus large lesser tuberosity osteotomies: effect on gap formation and ultimate failure load
Geoffrey Shane J. Anthon

Effect of lesser tuberosity osteotomy size and repair construct during total shoulder arthroplasty
Matthew Mark J. Michael

Subscapularis repair after shoulder arthroplasty: Biomechanical and clinical validation of a novel technique
Christ Martir Carne

Sumant G. Krishnan, MD*, David G. Stewart, MD, John R. Reineck, MD, Kenneth C. Lin, MD, Jonathan E. Buzzell, MD, Wayne Z. Burkhead, MD

Schulich MEDICAL EDUCATION

BIOMECHANICS

	Tenotomy	Peel	LTO
Van den Berghe et al JSES 2008			
Krishnan et al JSES 2010			
Van Thiel et al (Rush) JSES 2010			
Giuseffi et al (Mayo) JSES 2012			

BIOMECHANICS

	Tenotomy	Peel	LTO
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PYRAMID OF CLINICAL EVIDENCE BASED MEDICINE



RCT
 Case Control
 Case Series
 Case Studies
 Expert Opinion
 Editorials
 Ideas

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PEEL VERSUS LTO?

PEEL VERSUS LTO



Comparison of Lesser Tuberosity Osteotomy to Subscapularis Peel in Shoulder Arthroplasty

A Randomized Controlled Trial

Peter L.C. Lapner, MD, FRCSC, Elham Sabri, MSc, Kawan Rakhra, MD, FRCPC, Kimberly Bell, BA, and George S. Athwal, MD, FRCSC



JBJS 2012

Investigation performed at the University of Ottawa, Ottawa, and the University of Western Ontario, London, Ontario, Canada

INCLUSION CRITERIA

- Advanced OA
- Persistent pain >6months
- Failure of non-operative treatment

PRIMARY OUTCOME MEASURE

- Subscapularis strength measured with a hand held dynamometer
- Assessment:
 - Pre-Op
 - 3,6,12 & 24 months post-op



SECONDARY OUTCOMES

- WOOS (Western Ontario Osteoarthritis Shoulder index)
- ASES Score
- Constant Score



SAMPLE SIZE

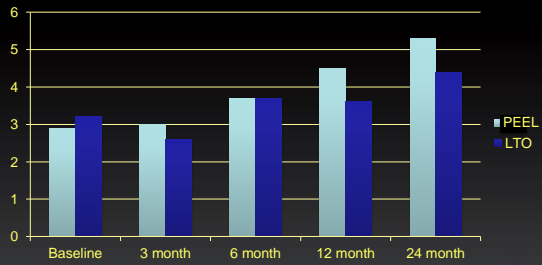
- Mean Strength 1.9kg, SD 2.4 kg
- Effect size = 0.79, $\beta=0.1$, $\alpha=0.05$
- Assume 15% loss to follow-up
- 40 participants per group



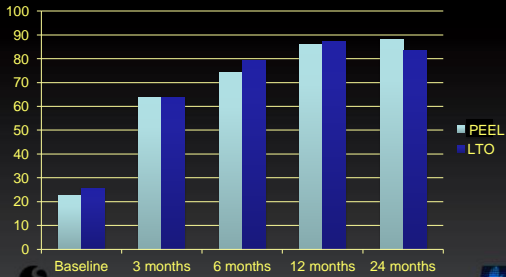
RESULTS

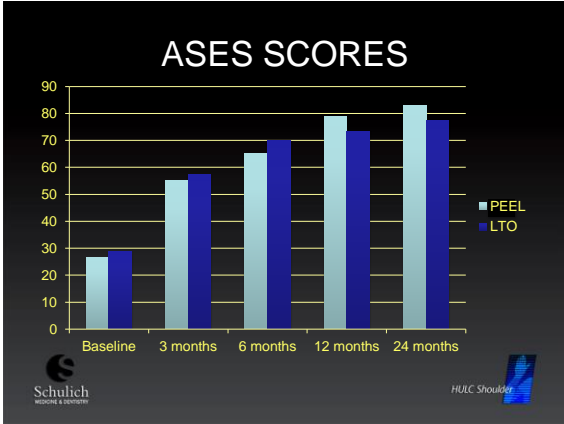


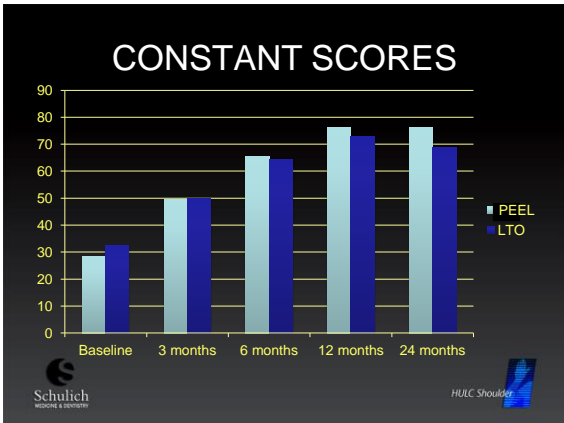
SUBSCAPULARIS STRENGTH



WOOS SCORES







HEALING RATES?

JOURNAL OF
SHOULDER AND
ELBOW
SURGERY

Healing rates and subscapularis fatty infiltration after lesser tuberosity osteotomy versus subscapularis peel for exposure during shoulder arthroplasty

Peter L.C. Lapner, MD, FRCSC^{a,*}, Elham Sabri, MSc^b, Kawan Rakhra, MD, FRCSC^c, Kimberly Bell, BA^d, George S. Athwal, MD, FRCSC^e

2013

^aThe Ottawa Hospital, University of Ottawa, Ottawa, ON, Canada
^bClinical Epidemiology Program, Ottawa Hospital Research Institute, Ottawa, ON, Canada
^cDepartment of Diagnostic Imaging, The Ottawa Hospital, University of Ottawa, Ottawa, ON, Canada
^dDivision of Orthopaedics, The Ottawa Hospital, Ottawa, ON, Canada
^eSt Joseph's Health Care, Hand and Upper Limb Centre, University of Western Ontario, London, ON, Canada

- No statistically significant difference

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SUMMARY

- No significant differences: Strength
- No significant differences: WOOS, ASES, Constant, and Healing rates
- Take Home Message:



LTO VS PEEL SUMMARY

- No significant differences: Strength
- No significant differences: WOOS, ASES, Constant, and Healing rates
- Take Home Message:

Do Whatcha Like



WHAT ABOUT TENOTOMY VS LTO?



WHAT ABOUT TENOTOMY VS LTO?

- No published RCT yet...
- Hsu, Ahmad & Levine et al.
 - Presented at AAOS 2012 and ASES
 - ST: 29 patients LTO: 29 patients
 - 2 year follow-up



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 - 2 year follow-up

- No statistical difference in outcomes



SUMMARY

- Peel vs LTO: Level 1
 - Peel = LTO @ 2 years
 - 5 year data?
- Tenotomy vs LTO: pending
 - ST = LTO @ 2 years
- Tenotomy vs Peel: pending
 - Lapner & Athwal
 - 2 year data collected



THANK YOU

...and now get ready to rumble
with the debate!!!!