

Subscapularis Tendon, Tear Characteristics and Implications For Repair Based on New Footprint Morphology

Jae Chul Yoo, MD, KOREA

Thay Q. Lee, PhD, USA

Michelle H. McGarry, MS, USA

Nickul S. Jain, MD, USA

Samsung Medical Center, Sungkyunkwan University
Seoul, KOREA

Summary:

Subscapularis tendon footprint should be looked into different facet concept.

Abstract:

INTRODUCTION:

Presently there is no consensus on the tear pattern and which anchor location to use for a partial SB repair. The purpose 1) Evaluate two partial tear patterns of the superior half of the SB tendon and their strain behavior, 2) Evaluate anchor position in repair of a partial SB tears. The hypothesis was 1) Full thickness, partial SB tears are more likely to propagate vs. partial-thickness, partial SB tears 2) Medial (articular) anchor will result in higher biomechanical parameters than lateral (bursal) location in SB partial tear repair

METHODS:

5-matched pairs of human cadaveric shoulders were tested using an Instron machine and video-digitizing-system. The proximal humerus was potted and mounted creating a perpendicular loading angle between the Instron and SB tendon footprint. 10 markers were placed on the articular side (2 rows x 5 columns) for strain analysis. 10N-preload followed by cyclic loading from 10-100N for 30 cycles at 1mm/second, followed by load-to-failure. Two partial tears: partial and full-thickness facet-1 tears were tested. Tears were extended into facet-2 creating identical full-thickness partial-SB tears. Tears were repaired with a double-loaded suture anchor and mattress suture. Anchor position was randomized to one of two locations, medial or lateral, in the 1st-facet of SB tendon.

RESULTS:

After normalizing strain of each specimen post-tear creation to intact specimens, we found a negative strain gradient from the tear edge to the remaining inferior tendon in full-thickness facet-1 tears (-0.7 , $R^2=0.78$, $p=0.04$) and a positive strain gradient for partial-thickness facet-1 tears (0.7 , $R^2=0.54$, $p=0.13$). There were no statistically significant differences between the two anchor locations for linear stiffness, yield-load, or energy absorbed to failure. Medial repair anchor location had a significantly higher ultimate load vs. lateral anchor location.

DISCUSSION:

Full-thickness tears involving the first facet have a higher propensity for propagation than partial thickness tears, indicating a clinical need for repair. The anchor position for subscapularis repair did not have an effect on biomechanical parameters. For patients with osteoporotic bone or concerns of slow bone healing, a medial anchor position may provide improved resistance to suture anchor pull-out or tendon repair failures.