

## Subscapularis Footprint Anatomy Revisited With 3-Dimensional Perspective and its Relationship With Supraspinatus 1st Facet

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### Summary:

Subscapularis tendon footprint should be looked into different facet concept.

### Abstract:

#### Introduction:

Advances in shoulder arthroscopy have led to the detection of more subscapularis tendon (SBT) tears, especially partial tears. There are several footprint anatomy studies, however we noticed that subscapularis insertion is very broad and long in the anterior aspect of the humerus with different plane and orientation of fibers. So the purpose of this study was to redefine the footprint anatomy in 3-D perspective and correlate with supraspinatus plane and humeral shaft axis.

#### Methods:

Footprint anatomy of the SBT was analyzed using 42 human cadaveric shoulders by digitizing the bony insertion using a MicroScribe 3DLX. Inclusion criteria for footprint study were intact SBT attached to humerus with no visible tear. Ten additional pilot studies revealed that approximately 4 distinctive planes (termed-facet) were defined and these margins were outlined by small blades that were inserted outer margin of the tendon to the bone. The geometry of the humerus was divided into two parts: one articular humeral head surface and other the remaining surface of the humerus. The dimension and the centroid-slope relative to humeral-shaft axis were evaluated. The first plane of supraspinatus was also digitized. All digitized data were reconstructed using 3-D graphic tool.

#### Results:

Bony ridges revealed a SB-footprint divided into four distinct facets. The tendon insertion areas of the four facets decreased from facet-1 superiorly to facet-4 inferiorly from 174.3 (34% of footprint), to 145.8 (28%), 115.7 (22%), and 77.0 mm<sup>2</sup> (15%), respectively. With respect to 1st-facet of supraspinatus the area was approximately equal to 3rd-facet of subscapularis. The mean medial-lateral and superior-inferior for 1st subscapularis facet were mean 13.8 and 13.5 mm respectively. Facet angles relative to the humeral-shaft-axis were found to increase from facet-1 to facet-4 from 58.2° to 94.3°, 148.2°, and 155.0° respectively.

#### Discussion:

The first facet of subscapularis tendon area consist of approximately 1/3 of the entire footprint area. The first two facet area consist of 60% of its entire footprint. In routine arthroscopic finding with subscapularis tendon upper leading edge tear, due to its different plane, it might be possible that we are only seeing the first or first two superior facet.