

## EFFECTS OF SCAPULAR ASSISTANCE TEST ON ACROMIOHUMERAL DISTANCE MEASURED IN VIVO USING ULTRASONOGRAPHY

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**Purpose:** Scapular dysfunction is theorized to cause pain by decreasing the subacromial space (SAS). The scapular assistance test (SAT), a clinical method used to identify scapular dysfunction in patients with shoulder pain, is theorized to decrease pain by increasing the SAS. The SAT is performed by manually assisting the scapula into upward rotation and posterior tilt as the patient elevates his/her arm. The purpose of this study is to determine the influence the SAT has on SAS, hypothesizing the SAT increases SAS when compared to non-SAT during humeral elevation. **Methods:** 16 healthy adults (mean age= 25.9±2.6 years) participated. The SAS was measured via the acromiohumeral distance (AHD), defined as the linear distance between inferior tip of the anterior aspect of the acromion and the humeral head, on ultrasound generated images of the SAS outlet captured with the arm at 0°, 45°, and 90° of active scapular plane elevation (SCAP) and abduction (ABD), under two conditions (SAT; non-SAT). An electromagnetic motion analysis system was used to collect 3-dimensional positional data of the scapula, humerus, and thorax during SAT and non-SAT conditions. Scapular angular position data were used to calculate scapular upward/downward rotation (UR) and anterior/posterior tilt with each condition at each arm angle. To determine the effect of SAT on AHD in each plane of motion (ABD and SCAP), two separate two-way mixed-model repeated measures ANOVAs were used to examine the main effects of condition (SAT; non-SAT) and interaction between arm angle and condition. **Results:** At 45° and 90° of SCAP, the SAT induced a mean of 7.6°±3.3° and 4.3°±4.2° of scapular UR, and 3.1°±2.9° and 3.8°±3.5° of posterior tilt. With SCAP, there was a statistically significant main effect of SAT condition (F=9.98, p=0.002) on AHD. There was greater AHD with the SAT compared to non-SAT regardless of arm angle (mean difference=1.18mm, 95% CI=0.44, 1.93). There were no statistically significant interactions of arm angle and condition. In ABD at 45° and 90°, the SAT induced a mean of 7.8°±4.1° and 4.2°±2.3° of scapular UR, and 3.9°±3.6° and 4.7°±3.1° of posterior tilt. In ABD, there were no statistically significant interactions or main effects of the SAT condition on AHD. **Conclusion:** Concurrent with an increase in scapular UR and posterior tilt, there was an increase in AHD with SAT as compared to the non-SAT with SCAP in healthy subjects. In ABD, despite increases in scapular UR and posterior tilt with the SAT, there were no significant changes in AHD compared to the non-SAT condition. **Clinical Relevance:** A proposed mechanism for a decrease in pain with the SAT with arm elevation is an increase in SAS. The SAT increases the SAS in scapular plane elevation, but not in abduction. This suggests that a change in pain will more likely be detected by performing the SAT in scapular plane elevation. Further study is warranted to determine the effect of the SAT on AHD and concurrent pain in patients with shoulder pain.