

THE SLEEPER STRETCH: DOES IT REALLY DO WHAT WE HAVE ASSUMED?  
QUANTIFICATIONS OF 3-DIMENSIONAL SCAPULAR MOVEMENTS DURING VARIOUS  
SHOULDER INTERNAL ROTATION MOTIONS.

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**BACKGROUND AND PURPOSE:** Shoulder internal rotation (IR) range of motion (ROM) is typically gathered in a supine position, yet it has demonstrated only fair levels of reliability. In contrast, the sidelying position has demonstrated excellent reliability reportedly due to consistent scapular stabilization provided by the subject's body weight, thus limiting the scapular accessory motion of anterior tilting. This premise, however, has not been validated. The purpose of this study was to compare the amount of scapular anterior tilting during various shoulder IR ROM positions using 3-dimensional (3-D) motion analysis.

**METHODS AND MATERIALS:** Twenty-five asymptomatic subjects participated in this study. 3-D motions of the scapula and humerus were gathered during dominant-shoulder IR ROM positions of: 1) sitting global active; 2) sitting global passive; 3) supine global passive; 4) supine scapular palpation; 5) supine scapular stabilization; 6) semi-sidelying; and 7) sidelying.

**ANALYSES:** An analysis of covariance was performed to examine the effects of demographics on scapular motion. Repeated measures analyses of variance were utilized to examine group differences in: 1) glenohumeral IR ROM; 2) scapular tilting; and 3) scapular tilt/glenohumeral IR ROM ratio. The level of significance was set at 0.05.

**RESULTS:** Glenohumeral IR ROM was significantly different between positions, with sidelying IR ROM ( $22.4^{\circ} \pm 5.1^{\circ}$ ) being significantly less than other conditions. Scapular tilting was significantly different between positions, with posterior tilting accompanying sidelying ( $1.7^{\circ} \pm 1.9^{\circ}$ ) and semi-sidelying ( $2.8^{\circ} \pm 2.6^{\circ}$ ) IR ROM.

**CONCLUSIONS:** This study found that the scapula posteriorly tilted during IR ROM in sidelying and semi-sidelying, positions akin to the sleeper and modified sleeper stretch, respectively.

**IMPLICATIONS:** The absence of anterior scapular tilting in sidelying and semi-sidelying is an important factor in the smaller IR ROM values noted in these positions, with IR ROM in these positions isolated to the glenohumeral joint.