THE EFFECTS OF CERVICAL SPINE POSITION ON SHOULDER ROTATION STRENGTH

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Background: Shoulder rotation strength testing is commonly used in clinical examinations of the shoulder. Populations prone to shoulder injury, such as overhead athletes and manual trades workers, place their shoulders under tremendous amounts of stress when their cervical spine is in non-neutral positions. Given standard clinical assessments test strength with a neutral cervical spine, investigation into the effects of cervical spine rotation is warranted.

Purpose: The purpose of this study was to determine the effects of a rotated cervical spine on isokinetic shoulder internal and external rotation strength.

Study Design: This was a repeated measures, within subject, crossover study.

Methods: Fifty-two healthy individuals (170 ± 10 cm, 73 ± 18 kg) participated. Concentric shoulder internal and external rotation strength were tested through a 90º arc on an isokinetic dynamometer with the shoulder elevated 90º in the frontal plane and 45º anterior to the frontal plane (scapular plane). Tests were performed with the participant's cervical spine in neutral in both planes, maximally rotated contralaterally in the frontal plane, and maximally rotated ipsilaterally with the shoulder in the scapular plane. Testing order was randomized. Data were imported into MATLAB for statistical parametric mapping analysis.

Results: Rotating the cervical spine contralaterally with the shoulder in the frontal plane resulted in a significant decrease in external (p < 0.001) and internal (p = 0.023) rotation strength with the forearm within 15-20º of vertical. Rotating the cervical spine ipsilaterally with the shoulder in the scapular plane resulted in a significant decrease in external rotation strength (p < 0.001) throughout nearly the entirety of the motion with peaks roughly around 20º and 60º from the horizontal, and internal rotation strength (p < 0.001) the last 60º towards the horizontal.

Discussion/Conclusion: About 35% of patients with common neuromusculoskeletal shoulder pathologies have cervical involvement. Because populations like overhead athletes and trades workers require use of their shoulders in altered cervical spine positions, there is reason to believe cervical spine position may be responsible for the strength differences seen in this study.

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