Words (not including headers) Objective – Conclusion: 299/300

Title: Reliability of Quantitative Rotator Cuff Ultrasonography for Manual Wheelchair Users with Pediatric-Onset Spinal Cord Injury

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Objective: We seek to establish the reliability of quantitative ultrasonography of the supraspinatus, infraspinatus, and subscapularis in pediatric manual wheelchair users with pediatric-onset spinal cord injury (SCI), which has only been reported in adults.

Methods: A physician performed clinical ultrasound imaging examinations of the dominant and non-dominant shoulder in n=6 asymptomatic manual wheelchair users (3 males, 3 females, mean (SD) age: 13.5 (6.5), years since injury: 8.3 (5.6)) with SCI of the thoracic or lumbar vertebrae. Two images each of the subacromial space, supraspinatus muscle and tendon, infraspinatus muscle, and subscapularis tendon were captured and saved for analysis. Quantitative assessment of each image was performed by two independent raters. Thickness (mm) of the tendons and infraspinatus muscle, supraspinatus muscle cross-sectional area ($mm^{2)}$, and acromiohumeral distance (mm) were computed using established methods [1]. Intraclass correlation coefficients (ICC 3,2) determined the inter-rater reliability of each metric. An ICC below 0.5 was considered poor, 0.5 to 0.75 was considered moderate, 0.75 to 0.9 was considered good, and 0.9 and above was considered excellent [2].

Results: Inter-rater reliability of tendon thickness measurements was good to excellent (supraspinatus (95% CI): 0.87 (0.79,0.92) and subscapularis: 0.95 (0.93,0.97)). Reliability of supraspinatus muscle cross-sectional area (0.95 (0.79,0.98) and infraspinatus muscle thickness (0.97 (0.95,0.99) measurements were also excellent. Inter-rater reliability of acromiohumeral distance measurements were moderate (0.52 (0.12,0.77)). Participant age did not influence reliability (all within subject median ICC ≥ 0.95).

Conclusion: Ultrasound of rotator cuff muscles and tendons is a reliable tool for use in manual wheelchair users with pediatric-onset SCI and is consistent with prior work in adults [3, 4]. Contrary to findings in adult manual wheelchair users with SCI [5], acromiohumeral distance measurements were the most challenging to reliably obtain. Future work is underway to establish the relationship among quantitative metrics that elucidate changes that precede clinically detectable rotator cuff pathologies in pediatric manual wheelchair users.

Learning Objective: To determine the reliability of quantitative ultrasound for the assessment of the rotator cuff in pediatric manual wheelchair users.

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