Title: Shoulder Pathology in Pediatric Manual Wheelchair Users with Spinal Cord Injury or Dysfunction

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Objective: To establish the incidence of rotator cuff pathology in pediatric manual wheelchair users with spinal cord injury or dysfunction (SCI/D) to inform musculoskeletal care for this population.

Methods: Musculoskeletal ultrasound was performed bilaterally in the shoulders of 20 pediatric manual wheelchair users with SCI/D (9 males, 11 females, mean (SD) age: 12.1 (3.1) years, years since injury: 8.6 (5.1), diagnoses: 12 spina bifida, 7 SCI, 1 transverse myelitis, levels of injury: T5-L5/S1). Four images each (two in the long axis, two in the short axis) and an ultrasound cine loop of the supraspinatus tendon, subscapularis tendon, and long head biceps tendon, and two images each of the supraspinatus muscle, infraspinatus muscle, and acromioclavicular (AC) joint, were captured. Clinical diagnosis of pathology was performed by a pediatric musculoskeletal radiologist with over 10 years' experience (JS).

Results: Seven children (4 males, 3 females) had pathology of the rotator cuff tendons or muscles or the AC joint. The mean (SD) age of those with shoulder pathology was 14.9 (1.3) years. Three children had bilateral pathology, and four had unilateral pathology. Four children had dominant-side shoulder pathology, and six had non-dominant shoulder pathology. Two children had supraspinatus tendon pathology: one child had bilateral full thickness supraspinatus tendon tears and one had unilateral supraspinatus tendinosis. Four children had subscapularis tendon pathology. One child had bilateral full thickness subscapularis tears. Three children had unilateral subscapularis tendon pathology: one had a full thickness tear, one had a partial thickness tear, and one had tendinosis. Bilateral AC joint osteophytic changes were noted in one child who also had subscapularis tendinosis and evidence of a prior AC joint injury on his nondominant side. Two children had bilateral rotator cuff muscle fatty infiltration and atrophy. Three children had only a single pathological finding, and four had multiple pathologies present.

Conclusion: Rotator cuff pathology is infrequently diagnosed in typically developing children outside of traumatic sports injuries which primarily involve the supraspinatus tendon. Due to their young age, it is thought that pediatric manual wheelchair users are unlikely to develop shoulder pathology in the absence of injury. However, these data indicate that rotator cuff pathology is far more prevalent and severe among pediatric manual wheelchair users than expected. Specifically, the identification of full-thickness rotator cuff tears is remarkable, since they are typically diagnosed and surgically treated in adults. Given the relatively long lifespan of those with pediatric SCI/D, onset of rotator cuff pathology in childhood has significant implications for maintaining shoulder function and mobility through adolescence and adulthood. Further research is needed to determine the etiology of shoulder pathology in this population so preventative measures can be developed.

Learning Objective: To describe the incidence and nature of shoulder pathology in pediatric manual wheelchair users with SCI/D.

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