

SHOULDER TENDON ADAPTATIONS: A FOUR-YEAR LONGITUDINAL STUDY OF ELITE WHEELCHAIR RUGBY PLAYERS

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The purpose of this study was to investigate chronic biceps and supraspinatus tendon changes in elite wheelchair rugby (WR) players over a four-year period.

Methods: Seven male elite wheelchair rugby players (Spinal cord injury SCI: n=5, NSCI: n=2) underwent ultrasound imaging of their shoulders in January 2020 and January 2024. Quantitative Ultrasound Protocols (QUS) were used to assess supraspinatus and biceps tendon thickness, echogenicity, and echogenicity ratio for the dominant (DOM) and non-dominant (N-DOM) shoulders. Symmetry indices were calculated between DOM and N-DOM sides. Paired sample t-tests were performed to compare data between time points.

Results: Biceps tendon thickness significantly increased for the N-DOM shoulder (2.6 ± 0.5 mm vs. 3.1 ± 0.8 mm, 2020–2024, $P = 0.031$), while supraspinatus tendon echogenicity significantly decreased for the N-DOM shoulder (103.5 ± 7.0 vs. 78.6 ± 23.3 , 2020–2024, $P = 0.010$). No other measures showed significant differences. Individual changes over time varied widely: biceps tendon thickness ranged from -9.8% to 28.7%, and supraspinatus tendon thickness ranged from -62.8% to 30.7%. Echogenicity and echogenicity ratio changes in the supraspinatus tendon also varied (SCI: -74.4% to 5.5% and -14.4% to 33.3%; NSCI: -121.4% to 1.4% and -45.5% to 74.5%). Greater asymmetry, reflected by increased changes in the symmetry index of supraspinatus tendon echogenicity and echogenicity ratio, was observed progressively from 2020 to 2024.

Conclusion: This study reveals significant variability in chronic tendon adaptations among elite wheelchair rugby players. The N-DOM shoulder exhibited increased biceps tendon thickness, decreased supraspinatus echogenicity (indicating more fluid and tendinopathy), and considerable individual variation in tendon dimensions, echogenicity, and symmetry. These findings highlight the need for tailored assessments and interventions to address unique adaptations, enhance performance, and prevent injuries.