TACSM Abstract

Common Drive to Rotator Cuff and Deltoid Muscles During Fatigue in Individuals With and Without Subacromial Pain Syndrome

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ABSTRACT

Individuals with subacromial pain syndrome have greater superior migration of the humeral head during fatiguing contractions. This may be due to lower common drive across the rotator cuff muscles that stabilize the glenohumeral joint. **PURPOSE**: To identify intermuscular coherence in the delta band (2-5 Hz), which is a measure of common descending drive to muscles associated with force production, across rotator cuff and deltoid muscle in symptomatic and asymptomatic individuals during an isometric fatiguing contraction. **METHODS**: Twenty symptomatic (12 F, 8 M, 22 ± 3 y/o) and 18 asymptomatic (7 F, 11 M, 25 ± 5 y/o) individuals participated in this study. Surface EMG was recorded from the middle deltoid (MD) and infraspinatus (IS). Intramuscular EMG was recorded with fine-wire electrodes in the supraspinatus (SS). Participants performed an isometric fatiguing contraction at 30° scaption at 25% maximal voluntary contraction until endurance limit. Z-transformed pooled coherence of three muscle pairs (SS-IS, SS-MD, IS-MD) were compared with two-way (time x group) repeated measures ANOVAs with Bonferroni post-hoc analysis. **RESULTS**: Endurance time did not differ between groups (asymptomatic: 5.7 ±1.1 min symptomatic: 6.5±1.4 min). There was a main effect of time ($p<0.01$) and a significant group x time interaction for SS-IS coherence ($p<0.05$). SS-IS coherence did not differ between groups during the initial fatigue phases (avg.=0.16 ± 0.02). SS-IS coherence increased with fatigue in the asymptomatic group (initial = 0.16 ± 0.03, final = 0.22 ± 0.03), but not in the symptomatic group (avg. = 0.15 ± 0.03). There was also a main effect of time on SS-MD coherence ($p<0.05$), which increased with fatigue in both the asymptomatic (initial=0.11 ± 0.02, final=0.18 ± 0.04) and the symptomatic (initial=0.11 ± 0.01, final=0.13 ± 0.02) groups. IS-MD coherence did not change with fatigue in either group (avg.= 0.22 ± 0.03). **CONCLUSION**: During neuromuscular fatigue, common drive to the SS and MD increased in individuals with and without subacromial pain. However, common drive to the rotator cuff muscles (SS and IS) only increased with fatigue in the asymptomatic group. Therefore, lower common drive to the SS and IS may be a cause of the decrease in joint stability and narrowing of subacromial space in patients with subacromial pain syndrome.