

Upper limb proprioception and rotator cuff tendinopathy

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Background: Deficits in integration of sensory information could participate in the reduced movement performance observed following rotator cuff (RC) tendinopathy. While deficits in shoulder proprioception have been reported in individuals with shoulder pain during shoulder-specific tasks, proprioception has never been assessed in this population during more functional multiarticular tasks.

Purpose: To compare upper limb proprioception in individuals with and without RC tendinopathy during multiarticular tasks. The hypothesis is that proprioceptive deficits will be observed in individuals with RC tendinopathy.

Design and Setting: Cross-sectional descriptive design.

Participants: Seventeen subjects with RC tendinopathy (mean symptoms duration: 27.7 ± 28.9 months) and 20 control subjects.

Methods: Subject sat facing a large box with open sides and a transparent top. Their evaluated arm rested on a molded orthosis mounted on wheels to allow low-resistance arm movements inside the box. A laser pointer attached to the orthosis projected hand position on the box top. Subjects wore a blindfold to eliminate visual cues. The first task measured *Joint position sense*. A slow passive movement was imposed on the evaluated arm to a predetermined location. With the index finger of their non-evaluated arm, the subjects had to point the location of their evaluated hand. The second task measured *Repositioning*. A slow passive movement was imposed to the evaluated arm to a predetermined location. It was then passively placed back to its starting position. Subjects had to actively move their evaluated arm back to the position initially imposed. For each task, 12 trials were performed and the absolute error in pointing/repositioning was measured. Between group differences were evaluated with independent *t*-tests.

Results: Individuals with RC tendinopathy had significantly larger errors during the Joint position sense task than Controls ($P < 0.001$; RC group: 36.8 ± 10.5 mm; Control group: 25.8 ± 6.2 mm); while no between-group differences were observed for the Repositioning task ($P = 0.71$; RC group: 29.5 ± 9.5 mm; Control group: 30.6 ± 7.3 mm).

Conclusions: Individuals with RC tendinopathy present proprioceptive deficits in their upper limb position sense during multiarticular tasks. Sensorimotor cortex reorganization or degradation in limb afferent information could contribute to these deficits. In contrast with other studies that evaluated proprioception during shoulder-specific tasks, no deficits in repositioning were observed.

Clinical Relevance: The Joint position sense task described in this study could be used in clinical settings to assess the presence of proprioceptive deficits in individual with RC tendinopathy. Given the importance of proprioception for shoulder control, future studies are needed to evaluate the effect of rehabilitation on measures such as position sense.