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A Study of the Proprioception in Patients with Rotator Cuff Tear

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[Background and aims]
Clinically, patients with rotator cuff tear show reduced proprioceptive information in addition to muscle weakness, and a restricted range of motion. Managing proprioception through physical therapy often improves symptoms. The effect of rotator cuff tear on shoulder proprioception concerning passive position sense and the detection of motion has not been evaluated. The purpose of this study was to evaluate the shoulder proprioception in patients with rotator cuff tear.
[Methods]
Twenty-three patients with unilateral rotator cuff tear were evaluated for their passive position sense and detection of motion with the shoulder in scapular plane abduction and external rotation before surgery. We performed evaluations using a modified dynamometer. To assess the passive position sense, patients were asked to hold their arm in the target position (abduction 40 degree and external rotation 15 degree) for 4 seconds, and then returned to the start position. The arm was brought beyond the target position, and then the patient pressed a stop button when they perceived the target angle. We subsequently evaluated the difference between the actual and perceived angle. For the detection of motion, the patient pressed a stop button when movement was detected. Comparisons of proprioception between the affected side and the non-affected side were analyzed with Wilcoxon's signed rank test.
[Results]
The detection of motion on the affected side was significantly delayed compared with the non-affected side. No significant differences were found in the passive position sense between sides.
[Conclusions]
This study revealed that there are significant delays in the detection of motion in patients with rotator cuff tear. Reduced proprioceptive information from an injured muscle-tendon may impair kinematics and muscle recruitment. The changes in proprioception between before and after surgery and the effects of different approaches to managing proprioception are still unclear. Further studies will be needed.