

Alterations in Shoulder Kinematics and Associated Muscle Activity in People with Symptoms of Shoulder Impingement

Ludewig, P.M. and Cook, T.M., 2000. Alterations in shoulder kinematics and associated muscle activity in people with symptoms of shoulder impingement. *Physical therapy*, 80(3), p.276.

Setting the scene:

Treatment of patients with impingement symptoms commonly includes exercises intended to restore "normal" movement patterns. Evidence that indicates the existence of abnormal patterns in people with shoulder pain is limited. The purpose of this investigation was to analyse glenohumeral and Scapulothoracic kinematics and associated Scapulothoracic muscle activity in a group of subjects with symptoms of shoulder impingement relative to a group of subjects without symptoms of shoulder impingement matched for occupational exposure to overhead work.

What did they do?

Fifty-two subjects were recruited from a population of construction workers with routine exposure to overhead work. Surface electromyographic data were collected from the upper and lower parts of the trapezius muscle and from the serratus anterior muscle. Electromagnetic sensors simultaneously tracked 3-dimensional motion of the trunk, scapula, and humerus during humeral elevation in the scapular plane in 3 handheld load conditions: (1) no load, (2) 2.3-kg load, and (3) 4.6-kg load. Relative to the group without impingement, the group with impingement showed decreased scapular upward rotation at the end of the first of the 3 phases of interest, increased anterior tipping at the end of the third phase of interest, and increased scapular medial rotation under the load conditions. At the same time, upper and lower trapezius muscle electromyographic activity increased in the group with impingement as compared with the group without impingement in the final 2 phases, although the upper trapezius muscle changes were apparent only during the 4.6-kg load condition. The serratus anterior muscle demonstrated decreased activity in the group with impingement across all loads and phases.

Takeaway home message:

Scapular tipping (rotation about a medial to lateral axis) and serratus anterior muscle function are important to consider in the rehabilitation of patients with symptoms of shoulder impingement related to occupational exposure to overhead work.