

Comparison of muscle activity of wrist extensors and kinematics of wrist joint during wrist extension in automobile assembly line workers with and without lateral epicondylitis

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Abstract.

BACKGROUND: Overuse of the extensor carpi radialis (ECR) may play a role in the development of lateral epicondylitis (LE). However, no studies have investigated the muscle activity ratio between the ECR and extensor carpi ulnaris (ECU) associated with the kinematics during wrist extension in workers with LE.

OBJECTIVE: We compared the ratio (ECR/ECU) of muscle activity between the ECR and ECU and the kinematics of the wrist during wrist extension between workers with and without LE.

METHODS: Fifteen automobile assembly line workers with LE and 15 workers without LE participated in this study. The ratio of muscle activity was measured using surface electromyography, and wrist kinematics were measured by a three-dimensional motion analysis system while the workers extended their wrists actively to the maximum range to which they did not feel uncomfortable.

RESULTS: Significantly greater ratios of muscle activity, ranges of radial deviation, and combined motion of radial deviation and extension (CMDE) were shown in workers with LE compared to those without LE. Also, the range of wrist extension was significantly lower in workers with LE than in those without LE.

CONCLUSIONS: Quantifying the ratio of muscle activity with altered kinematics of wrist extension may help researchers to understand why overuse of ECR is occurring and explain LE development in automobile assembly line workers.

Keywords: Electromyography, extensor carpi radialis, extensor carpi ulnaris, workers

1. Introduction

Lateral epicondylitis (LE) is characterized by lateral elbow pain that is commonly associated with

resisted wrist or finger extension [1, 2]; the pain is provoked or aggravated by palpation of the lateral side of the elbow [3] and gripping and lifting activities [4]. The pathomechanics of LE seem to be related to the proximal tendons of the extensor carpi radialis (ECR) and extensor digitorum [5] and overuse that results in microscopic or macroscopic tears in the extensor aponeurosis [6]. In terms of

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