

Abstract

Title: Analysis of muscle activity during steering wheel movement

Objectives: The aim of this thesis is to process an automotive ergonomics issue. Furthermore, to analyse upper extremity movement and electrical activity of specified shoulder muscles during steering wheel movement with a different hand placement. Another aim is to compare measured electromyographic data with an optimal range of muscle activity during repetitive tasks.

Methods: The thesis has a character of a pilot study. Theoretical basis has been obtained by a review of literature dealing with similar questions. Experimental part has been concerned with electrical activity of specified shoulder muscles and motion analysis of upper extremity during contralateral and ipsilateral steering wheel movement with a different hand placement. Only two subjects have been chosen due to a technical difficulty of experiment. The electrical activity of muscles has been analysed with surface electromyography. There has been measured following muscles: m. deltoideus pars anterior, m. deltoideus pars medialis, m. pectoralis major pars clavicularis a m. triceps brachii caput longum, m. pectoralis major pars sternocostalis, m. biceps brachii, m. deltoideus pars posterior, m. infraspinatus a m. triceps brachii caput laterale. The electrical activity of muscles and the motion of upper extremity have been recorded all at once and data has been interpreted separately for each subject.

Results: Results suggest a difference in muscle activation in relation to different hand placement on steering wheel. Low activity of m. triceps brachii caput longum during ipsilateral steering wheel rotation has been observed in all three cases. Measured activity has been compared with the optimal muscle activity during repetitive tasks. There is no possibility to determine which hand position is optimal because of a small amount of measured subjects.

Keywords: Electromyography, muscle activity, steering wheel, hand placement, steering movement, motion analysis, automotive ergonomics.