

Abstract

Title: Coordination changes in a selected remote part of the locomotor system when walking in straight shoes and high heels.

Objective: The aim of the dissertation is to find out how walking on a high heel affects the coordination changes and timing of the beginning of muscle activation in a selected part of the musculoskeletal system in comparison with walking in shoes with straight soles.

Methods: This research work has an empirical, comparative intra-individual character. Comparative analysis of coordination characteristics of the locomotor system with the experimental character of obtaining quantitative data. We used a portable electromyograph BIOMONITOR ME6000 (Mega Electronics Ltd., Finland) to monitor changes in the timing of muscle coordination during walking in flat-soled and high-heeled shoes on flat terrain and on a treadmill. We recorded the synchronized video on a Sony HDR-SR12 digital video camera (SONY Co., Japan). Motor units and their electrical potential were sensed by self-adhesive homologated hydrogels electrodes MEDICO LEAD-LOK (Medico Electrodes Int., India, ISO 13485: 2003). The research group consisted of 30 healthy women (age 25 ± 5 years, weight 57 ± 7 kg, height 16 ± 5 cm, BMI 21 ± 3), all respondents are occasional wearers of high-heeled shoes.

Results: We confirmed the statistical significance of changes in muscle coordination and timing due to high-heeled shoes in all measured muscles and situations, except the monitored muscle m. cross-sectional trapezius. As a result of walking in high-heeled shoes and a treadmill, the length of muscle contraction changes. The time of contraction of the muscles of the upper torso is shortened and, conversely, the duration of contraction of the muscles of the lower torso is prolonged. We found the highest values of microvolts in individual situations in the area of the knee joint and the lumbar part of the spine.

Key words: timing, muscle coordination, surface electromyography, step cycle, high heels.