Abstract

Title: EMG analysis of the influence of the water environment on walking in the elderly

Objectives: The main objective of this master thesis is to determine the degree of activation of selected muscles during walking on land and in water environment by using surface electromyography. The next component objective is to determine and compare dynamic co-contraction level of low extremity muscles during walking on land and in water.

Methods: It is a pilot study which was attended by 5 participants. The average age of the research group was 67,2 years and was represented 3 men and 2 women. Activity of m. tibialis anterior, m. gastrocnemius, m. rectus femoris, m. biceps femoris and mm. erectores spinae in the level of ThL transition was recorded during walking on land and in water environment. EMG signal has been adjusted, analyzed and after that normalized EMG signal to MVC was compared in both environments. The records were compared both intraindividually and interindividually. At the end dynamic co-contraction level of selected muscles was evaluated and compared during gait in both environments.

Results: Electromyographic analysis revealed that during walking in aquatic environment were analyzed muscles involved with less extent than during walking on land. Co-contraction level was lower in low extremity muscles during walking in water environment than on land.

Keywords: gait, water environment, surface EMG, WaS-EMG