

Abstract

Title: Comparison involvement of muscle groups in the circular movements of the upper limbs on land and in water

Objectives: The aim of this thesis, is to determine the muscles activity inside the water and out of the water.

Methods: This is a pilot experimental study, which was done on one proband. Proband was a man – in the past professional swimmer. The surface EMG muscle activity was scanned on selected muscles during the circular movements by upper limbs on the land when the proband stand up and in the water where proband swam by crawl technique. Both movemenets were done by the same speed. The EMG signal was then analyzed and evaluated the average of muscule maximum voluntary contraction (MVC) and average of muscules working during the circular movement out of the water and inside the water. The results were compered each other.

Results: Based on the measurements, we can conclude that, the muscle activity is the same in both of the examined muscles, *M. Obliquus external* and *M. Thoracic erector spinae*. Other muscles *M. Deltoideus clavicularis*, *M. Triceps brachii*, *M. Trapezius ascendens* and *M. Trapezius descendens* work differently, the variation can be between $\frac{1}{3}$ to $\frac{1}{5}$ of muscle aktivity higher out of the water. The only muscle that works on land with a lower intensity than in water is *M. pectoralis major*.

Key words: crawl, EMG, muscle aktivity