Abstract

Title: Observing of the skeletal muscle shape changes depending on human body surface temperature

Objectives: The aim of this work is to observe the cross-section changes of the m. rectus femoris depending on human body surface temperature changes. The cross section of the muscle was characterized by two dimensions: VDDM (ventrodorsal dimension of muscle) and LMDM (lateromedial dimension of muscle). The body temperature was affected by local positive and negative thermotherapy methods.

Methods: The first part of the experiment focused on the selection of appropriate local positive and negative thermotherapy forms. Four of them were selected (two positive thermotherapy methods – Peat thermotherapy bags and infrared heater InfraPhil HP3616 and two negative thermotherapy methods – gel bag Cryoflex and Cryogen 3 device) for the main research. Twelve subjects participated on the main experiment. Selected local positive thermotherapy methods were applied on the centre of the subject´s thighs, subsequently selected negative thermotherapy methods were applied. The body surface temperature was measured immediately before application, after 30 minutes of positive thermotherapy and after subsequent negative thermotherapy application. Ultrasound images of m. rectus femoris were taken at same time. VDDM and LMDM values were obtained from ultrasound images.

Results: The results show that VDDM and LMDM in dependence on the human body surface temperature change from one-tenth to several millimetres. VDDM and LMDM after the application of selected forms of local positive thermotherapy tended to diminish, after the negative thermotherapy application VDDM and LMDM values did not obtain steady results. Subcutaneous adipose tissue and sex do not affect muscle shape changes.

Keywords: skeletal muscle, human body surface temperature, thermotherapy, muscle tone