

ABSTRACT

Charles University

Faculty of Pharmacy in Hradec Králové

Department of Biological and Medical Sciences

Student: Sabina Voplakalová

Supervisor of master thesis: PharmDr. Miroslav Kovařík, Ph.D.

Title of master thesis: Evaluation of muscle strength among groups with varying degrees of physical activity

The aim of this thesis was to elaborate the existing knowledge about the composition of the human body, muscle strength depending on the different levels of physical activity and methods that can be used for evaluation. The next goal was to collect custom data on a selected group of people using available devices and finding statistically significant associations between individual parameters.

A total of 24 healthy individuals with variable physical activity, aged 21-27 years (10 males, 14 females), were divided into two groups, according to the average energy expenditure. Data collection included basic anthropometric measurements, determination of body composition by means of bioimpedance spectroscopy, spirometric parameters and muscle force by means of digital pinchgrip/myometer.

Significant statistical differences between the measured groups were found in body mass, body mass index and peak expiratory flow. When evaluating maximum strength, the groups were different in flexion of ankle and elbow. The maximum force correlates with energy expenditure in all muscle groups, but not everywhere when measured against kg of body weight and lean tissue mass. In the body composition, the expected connection of lean tissue mass with maximum force

has not been confirmed in the cases of flexion of the ankle nor abduction of the hips. Significant associations between the spirometric parameters and maximum force (apart from the group of hip abductors) have been demonstrated.

In the group with higher energy expenditure, we could observe trend of higher values in maximum force (significantly higher values in ankle flexion only). Statistically significant associations have been found between maximum force and energy expenditure, as well as some spirometric parameters and body composition parameters. However, the correlations have not been confirmed in all measured muscle groups and measurements against kg of body weight and lean tissue mass.

Key words: muscle strength, physical activity, body composition