

ABSTRACT

Title: Motion analysis of lower extremity during squatting

Aims: The aim of the thesis is to compare the squat without and with external load in a group of people who work under professional guidance and have experience with this movement, contrary to the people of the common population. Another objective will be the comparison of this movement among men and women of the common population. In the theoretical part, the main objective is to describe the basic characteristics of the squat, describe the kinesiological and biomechanical findings and the risks of this movement on the locomotive apparatus. The experimental part will focus on the observation of the determined kinematic parameters of squats and their comparison in the mentioned set of persons. The results of the work should clarify the possible side effects of the squat.

Methods: Kinematic analysis will be performed using Qualisys instrumentation. Infrared cameras accurately record and further perform a motion action through passive or active reflection markers. Data from the device will be processed in Microsoft Office Excel software and further evaluated statistically.

Results: The results show that there are significant variations in the performance of the movement among groups of men actively engaged in squats under professional guidance and a group of men of the general population. However, this fact has not been statistically proven due to work limits. When comparing the men and women of ordinary populations, these deviations can also be seen because men do a little better and with less variations in movement than women. Due to the limitations of work and the fact that the physical manifestation of the squat of men of the ordinary population was not ideal (compared to a group of people with the experience of correct squatting), this fact was not statistically proven. For the data analysis, the F-test was used (the scatter difference test) using the F critical value, which tests the zero hypothesis at a statistical significance level $p < 0.05$.

Key words: squats, lower limbs, sports movement, kinematic analysis, Qualisys, physiotherapy, rehabilitation, kinesiology, biomechanics