

Abstract

Title: The relationship between Véle-test results and results of instrumented evaluation of postural stability

Objectives: The aim of this study is to determine the relationship between a clinical tool for measuring postural stability, Véle-test and instrumented evaluation of the same modality. The observed parameters are COM movement, range of motion in hip joints and in the functional complex of ankle and foot. An additional pedobarographic measurement was performed to define the relationship between Véle-test results and foot loading asymmetry. The characteristics of this study suggest that our objective is also to find an appropriate approach to further objectivization and standardization of the Véle-test. In the first part of this thesis, I define the theoretical background for the experiment. Also, the current insight of physical therapy and biomechanics on the functional complex of the ankle and foot is described.

Methods: The subjects (n=15, mean age 24y) were divided into two groups (S1, n1=7; S2, n2=8) according to the results of Véle test. Further, they underwent instrumented testing by *pliance-x*® sensing system, a 60s pedobarographic measurement was held in quiet standing. After, the *Xsens MVN Link* suit for 3D kinematic analysis was applied and the subjects were measured in two different postural situations – in quiet standing on solid ground and in standing on a balance board, both tasks were performed without visual control.

Results: We've proven, that the result of Véle-test has an effect on the movement in hip joint and in the complex of ankle and foot during defined postural situations. The range of motion was significantly higher in experimental group in all considered planes in quiet standing. In standing on a balance board, significantly higher range of motion was found in frontal plane for hip joint and in sagittal plane for ankle and foot. The COM movement did not show the expected differences. Furthermore, we found a connection between Véle-test results and loading asymmetry in quiet standing, but we weren't able to prove it statistically. 3D kinematic analysis using *Xsens MVN Link* suit and pedobarographic measurements using *pliance-x*® sensing system are recommendable for further objectivization of the Véle-test.

Keywords: foot, 3D kinematic analysis, *Xsens*, pedobarography, novel, movement strategies