

Abstract

The goal of this thesis was to invent and perform a testing protocol, which can detect connective tissue mechanical and structural properties simultaneously in patients with clubfoot. Based on literature findings, it was presumed that connective tissue differ between medial and lateral side of foot. Because of low availability of specimen, it was important to draw and mention crucial alterations of testing protocol, for minimization of failed measurements. For reasons above, two specimens divided into two samples was used for experiment. Described and discussed methodics may enable of reader to insight to drawbacks of this examination.

For usability of this protocol, a setting and testing of few hypotheses was performed. One axis tensile testing with SHG microscopy examination was used in combination for experiment.

One of the main result was finding, that structural differences which were expected, were not distinctive in samples in untensioned state. But, distinctive differences may be drawn in tensioned samples. This differences for low number of specimen, cannot show any tendency. Results of tensile testing showed, that samples from medial side of foot can have higher toughness and higher fragility.

For future acquisition of tendencies in specimen differences, it is important to set particular structural parameters for measure, test higher number of specimen and compare by statistical methods. Then compare tensile testing results with image measurements. As second variant of examination can be to prioritize of tensile testing data, at the expense of lower number of SHG data.

Key words: Pes equinovarus congenitus, mechanical properties, tensile test, microscopy, extracellular matrix, collagen, stress-strain