

Abstract

The theoretical part of the diploma thesis describes the role of abdominal muscles in intra-abdominal pressure and the effect on postural stabilization. The issue of postural stabilization was analyzed in a physiological situation and frequent pathologies related with inadequate postural stabilization have been described. The current possibilities of evaluating the activity of abdominal muscles and intra-abdominal pressure were presented.

Methodology: 25 healthy probands (mean age 22.4 years, SD \pm 1.76) were evaluated in five posturally different situations – breathing stereotype test, intra-abdominal pressure regulation test, diaphragm test, hip flexion test and arm elevation test. Testing was performed with a prototype of the DNS Brace digital pressure sensor. The resulting pressure values of the abdominal wall expansion were correlated with the corresponding postural tests according to the DNS concept, which were performed by two DNS instructors with more than five years of experience.

Results: A statistically significant correlation ($p = 0.001$ to 0.24) between abdominal wall pressure values and palpation-evaluated postural tests was demonstrated in four of the five tested positions. Correlation was strong in diaphragm test ($r = 0.75$ and 0.661) and mean in other tests ($r = 0.567$ to 0.415). Only in the breathing stereotype test, the moderate correlation ($r = 0.415$) was not statistically significant in one evaluator ($p = 0.039$). The mean correlation between abdominal wall pressure and aspect evaluation ($r = 0.525$) was statistically significant only in the upper limb flexion test ($p = 0.007$) in only one of the DNS instructors.

Conclusion: The possibility to evaluate the quality of postural stabilization with the DNS Brace pressure device was proved. The resulting pressure values of the expanding abdominal wall correlate with the palpation evaluation of the abdominal muscles performed by experienced DNS instructors. The presented method could be used during standard clinical examination, especially with less experienced therapists, to objectify the effect of the performed therapy to the patient or to diagnose postural imbalances.

Keywords: intra-abdominal pressure, postural stabilization, objectification, postural tests