Abstract

Author: Bc. Petr Valenta

Thesis Supervisor: PhDr. Jitka Malá Ph.D.

Title of the Thesis: Utilization of Superinductive System in the Treatment of Muscle Imbalances

Objectives: The aim of this thesis is to determine the immediate effect of repetitive peripheral magnetic stimulation (rPMS) on muscle strength and the involvement of stimulated muscles in functional movement patterns. Furthermore, the effect of repetitive magnetic stimulation on bilateral muscle asymmetries was investigated. The goal is to find answers to the formulated questions and confirm or refute the hypotheses.

Methods: A total of (n=40) professional athletes aged 24,45 (±3,98) years were included in the experiment and randomly divided into an intervention experimental group and a control group. Data collection included a testing battery comprising of the Y-balance test and isometric dynamometry. To assess the effect of repetitive peripheral magnetic stimulation, pre-test and post-test measurements were conducted in the same scope and content. The obtained data were statistically analyzed using descriptive statistics. Data normality was graphically verified using Q-Q plots. The hypotheses were tested using paired T-tests with Benjamini-Hochberg correction for p-values. The significance level α was set to 0.05 for all tests.

Results: rPMS has a positive effect on increasing muscle strength after a single stimulation of the gluteus maximus and vastus lateralis muscles. There is a statistically significant increase in maximum voluntary isometric strength in hip and

knee extension movements with a significance level of p=0.004 and p=<0.001, respectively, in the experimental group after the application of the stimulation program using the BTL-6000 Superinductive system. Furthermore, there is a statistically significant improvement in all three directions of the Y-balance test with a significance level of p=<0.001. The positive effect of rPMS on bilateral muscle imbalances was not demonstrated.

Conclusion: The use of repetitive peripheral magnetic stimulation can be recommended as a method to increase the strength of the stimulated gluteus maximus and vastus lateralis muscles. This approach can also be recommended for the purpose of increasing reach in all directions of the functional movement test assessed by the Y-balance test. However, the thesis did not confirm the effect of repetitive peripheral magnetic stimulation on reducing bilateral muscle imbalances.

Keywords: Superinductive system, repetitive peripheral magnetic stimulation, muscle imbalances, isometric dynamometry, Y-balance test