

Abstract

Title: Influence of six-week training intervention with visual feedback on the NeuroCom SMART Equitest System on the postural stability of football players

Objectives: The first aim of this diploma thesis is to find out the effect of the six-week training intervention with visual feedback performed on the NeuroCom SMART EquiTest on the postural stability of football players. The second aim of this diploma thesis is to correlate the Maximum Excursion parameter from the Limits of Stability test on the NeuroCom with the Star Excursion Balance Test score performed on The MAT.

Methods: This research involved 20 football players in the age from 19 to 30 (age average = 23,85; SD = 2,79), who belong to the adult category. First, soccer players underwent initial postural stability measurements using seven tests on the NeuroCom SMART EquiTest and excursion distance measurements when performing the Star Excursion Balance Test (SEBT) on the MAT. Subsequently, they were randomly divided into two groups: control (n=10) and experimental (n=10). The experimental group underwent a six-week training intervention with visual feedback using training protocols on the NeuroCom SMART EquiTest. After the training intervention of the experimental group, postural stability was measured again on a NeuroCom SMART EquiTest and using the Star Excursion Balance Test (SEBT) on the MAT. The measured data were processed by the NeuroCom Balance Manager Software. Student's paired t-test was used to compare the examined data between the input and output measurements of the experimental and control groups. The effect of the training intervention in the experimental group in comparison with the control group was calculated using a two-sample t-test. Pearson's correlation coefficient was used to correlate the Maximum Excursion parameter and the SEBT score. The significance level for statistical tests was set at $\alpha = 0.05$.

Results: There was a significant improvement ($p < 0,05$) between the input and output measurements in the experimental group for the following parameters: Equilibrium Composite Score, Mean COG Sway Velocity Left Eyes Closed a Right Eyes Opened, Reaction Time, Directional Control and End Point Excursion. However, the aim of the study was to determine the effect of training intervention in the experimental group in comparison with the control group. A significant improvement ($p < 0,05$) between the experimental and control groups after the training intervention was achieved in the Mean COG Sway Velocity and End Point Excursion parameters. High correlation between the Maximum Excursion parameter and the SEBT score was not demonstrated.

Conclusion: The aims of this diploma thesis were accomplished. The effect of the training intervention on the NeuroCom SMART EquiTest device was determined, as well as the correlation between the Maximum Excursion parameter and the SEBT score. The results show that two hypotheses were confirmed. There was a significant improvement in the Mean COG Sway Velocity parameter in hypothesis no. 2 ($p = 0,0006$) and in the End Point Excursion in hypothesis no. 5 ($p = 0,0003$).

Keywords: Postural stability; Football; NeuroCom SMART EquiTest; Physiotherapy, Computerized dynamic posturography; Training intervention; Visual feedback