Abstract

Title: Evaluation of the jump height of professional male handball players in correlation with dynamic postural stability

Aims: The aim of this thesis is to evaluate the jump height in professional handball players using the mobile application My Jump 2. Another goal is to evaluate dynamic postural stability, which was evaluated using a dynamic postural posturography device NeuroCom Smart EquiTest. The last goal of the thesis is the subsequent correlation of jump height and dynamic postural stability.

Methods: This diploma thesis is a quantitative correlation study, in which the research used a deliberately selected group of professional handball players n = 20 with an average age of 25.64 ± 3.66, who play in the highest domestic competition and have simultaneously played handball for at least 10 years, with no history of serious orthopedic, internal or neurological injury. The evaluation took place in the kinesiology laboratory of the Department of Physiotherapy, UK FTVS. The mobile application My Jump 2 was used to evaluate the jump height and the NeuroCom SMART EquiTest device was used to evaluate the dynamic postural stability. The deliberately selected group of handball players was subjected to a jump height assessment first performed in the form of a Countermovement jump (CMJ), and then from a rebound (dominant) and non-rebound (non-dominant) lower limb in the form of a Single-leg vertical jump (SLVJ). Subsequently, the test protocol of the NeuroCom device was used, namely the Sensory Organization Test (SOT). The data obtained from both devices were further subjected to statistical analysis. Standard one-way analysis of variance (ANOVA) was used to evaluate the data depending on the game post. Furthermore, Welch's version of the t-test and Bonferroni's correction were used for this work and its statistical evaluation. Finally, the Pearson correlation coefficient [r] was used and the level of statistical significance α = 0.05 was determined.

Outcomes: A high level of Pearson correlation coefficient was found when comparing Single-leg vertical jump (SLVJ) from rebound and non-rebound lower limb with [r] = 0.81223. Significant differences were found in the jump height between the individual game-posts in handball, for backs p = 0.00117, for wings p = 0.00150 and with total p-value = 0.00006. After joining the game posts into two pairs (goalkeepers + pivots; backs + wings), a statistically

significant value of p = <0.00001 was found. Statistically significant differences were found when comparing the jump height between players playing on the game post wings and pivots with p = 0.00114. Furthermore, significant differences were found in the evaluation of COG using the Sensory Organization Test (SOT) depending on the game post. Under condition 4 (COND4), a statistically significant value of p = 0.00088 was found when comparing the average distance of the goalkeeper's group together with the pivots and the backs group together with the wings from the Euclidean center in favor of the goalkeeper's group and pivoters. A small correlation relationship [r] = 0.28994 was found for the relationship between jump height and dynamic postural stability ability.

Conclusion: According to the obtained and processed data, 1 hypothesis out of a total of 5 hypotheses was rejected. The group of backs and wings was better than the group of goalkeepers and pivoters in most of the measured parameters, except for the results of the SOT testing protocol, in which this group was better. Based on these results, it was concluded that more attention should be paid to goalkeepers and pivots in the training. Another recommendation is to focus more on rebound training due to the high correlation between rebound or non-rebound lower limb. The correlation between the jump height and the dynamic postural stability ability was low, which refutes the claim that the jump height depends on the quality of the dynamic postural stability. In the future, it would be appropriate to repeat the study with a larger number of probands in all game positions and with the inclusion of other sports, for which the height of the jump is also important.

Key words: jump height, dynamic postural stability, dynamic posturography, mobile application My Jump 2, Neurocom Smart EquiTest, male handball players, handball