Abstract

Title: Effect of intermittent compression on muscle fatigue in football players

Objectives: The first aim was to determine if and what effect of compression intermittent and cryo-compression intermittent therapy has on muscle fatigue parameters in soccer players. The second aim was to elucidate whether one of the interventions could be described as more effective for player's recovery (reduction of muscle fatigue).

Methods: This pilot study was designed to clarify whether compression intermittently affects muscle fatigue parameters and to compare the effect of each intervention with each other. Data collection was conducted on a research cohort of 21 soccer players ranging in age from 18 to 22 years with a mean age of 19.8 ± 1.33 years, height 176.1 ± 3.6 cm, weight 72.8 ± 4 kg, and BMI 23.5 ± 1.3 $^{kg/m2}$. Ten probands were from the U19 team, seven from the men's B team and four players from the men's A team. In total, the probands were divided into three groups, control, compression and cryo-compression (n=7,7,7). The monitored variable was the height of the Counter Movement Jump at different time points in this pilot study. Data were measured using OptoJump Next. Muscle fatigue at 24 hours after the intervention was assessed based on the differences in CMJ height of each proband, and the immediate effect of the intervention protocols on neuromuscular status was also assessed, again using differences in CMJ height. Seven hypotheses were selected for statistical analysis, which after statistical testing determined the effect on muscle fatigue of each therapy and also compared the results of the interventions with each other. Parametric two-sample T-tests, non-parametric Mann-Whitney test and paired Wilcoxon test were used. The chosen level of statistical significance was a uniform $\alpha=0.05$. Cohen's d test was used to determine clinical significance.

Results: The inclusion of compression and cryo-compression therapy in the micro-cycle periodization of MD+1 soccer players (n=21, 19.8 ± 1.33 years) had no statistically significant effect on promoting recovery, in other words, the intervention had no effect on reducing muscle fatigue as assessed by comparing the CMJ values of individual probands within groups. There was no statistical significance for six of the seven hypotheses stated at the $\alpha=0.05$ level of significance. The control group (p-value 0.498), the compression group (p-value 0.158) and the cryo-compression group (p-value 0.188) did not experience statistically significant changes in CMJ after the 30-minute intervention. After testing each other and comparing the differences in mean CMJ values

24 hours after the intervention, the compression versus control group experienced statistically insignificant changes (p-value 0.093). After comparing the mean CMJ values, the cryo-compression versus control group also did not show statistically significant changes (p-value 0.550). However, when comparing the compression versus control group, after a T-test of two independent samples, the change in the differences in mean CMJ values proved statistically significant (p-value 0.031). Also, the immediate effect of the intervention therapies was tested by comparing the mean differences before and after the application of the therapies. The change was found to be a statistically insignificant change (p-value 0.456).

Conclusion: After evaluating the results within this thesis, it is clear that there was no confirmation of the hypothesis of reduced muscle fatigue after the application of compression or cryo-compression intermittent therapy. Statistically significantly better results of change in CMJ parameters were achieved by probands with compression intervention compared to combined cryo-compression intermittent therapy. The low number of probands cannot be taken as strong enough evidence for the statistical argument. The hypotheses were also tested with Cohen's d test to determine the clinical significance and transferability of the results to practice. These results showed only for the last hypothesis a small even negative treatment effect (Point Estimate -0.164) on the variable of interest. Interpretation of the remaining hypotheses came out in favor of the effect of therapy with Point Estimate in order from 1st to 7th hypothesis (0,237; 0,609; - 0,695; 0.329; -0,977; 0,329; 1,306) with high degree of uncertainty expressed by negative values, and on the contrary with low degree of uncertainty are positive values). Thus, it is clear that the effect of intermittent compression therapy on CMJ jump height values [cm] is significant in practice.