12. ABSTRACT

Title: Influence of whole body vibration training on selected endogenous risk factors of falling and on interleukin-6 blood level of women aged 60+

Introduction: Changes in the human body with aging increase the frequency of falls and injuries in the elderly, which in turn reduces their independence and quality of life, and leads to disability and social isolation.

According to scientific studies, the main risk factors for falls in the elderly are postural control disorders, decreased muscle strength and exercise endurance, and increased fear of falling. Endogenous risk factors for falls also include increased levels of pro-inflammatory factors in the body, which contribute to the development of the frailty.

Physical activity is an important form of preventive treatment for people with risk of falling. Systematic exercises improve motor coordination, reduces body imbalance, prevents body muscle loss and reduces level of pro-inflammatory factors in blood.

Efforts are already being made to perform trainings with use of vibrations in the treatment of body imbalance and movement disorders of elderly humans. Modern researches confirms that Whole Body Vibration Training (WBVT) may reduce endogenous risk factors of falling amongst older people, but those are only initial studies, and it would be wise to continue them in a clinical conditions.

Research purpose: The aim of the study was to obtain knowledge on the impact of Whole Body Vibration Training on a selected endogenous risk factors of falling for women 60+ years old.

Whereas the application objective of the research was to obtain knowledge on the methodology of Whole Body Vibration Training, which aim is to reduce endogenous risk factors of falling for women over 60s.

Material and methods: The study 46 women over 60 years old who were randomly assigned to the experimental group (EG n=23) and the control group (CG n=23). In both groups, the participants continued their previous physical activity related to everyday tasks, for 12 weeks. In the control group, no additional physical activities were introduced, while in the experimental group, women additionally apply WBVT. Vibration workout was carried out 2 days per week for 12 weeks, it consisted of five 1-minute vibrations of the whole body, separated by a 1-minute break. The frequency of the generated vibrations was 20Hz, and the amplitude was 2mm. The study was completed by 42 women (EG n=22; CG n=20). Before the start of the study, both groups were tested for mobility in everyday activities with the Barthel Scale and cognitive status with the Mini Mental Test. Immediately before the start of the study and after its completion, the severity of fall anxiety was also tested in both groups using the FES-I questionnaire, as well as gait and dynamic balance using the "Up and Go Test" (TUG), aerobic endurance using the "6 Minute Walk Test" (6MWT), and lower body fitness and strength using the "30 Second Chair Stand up Test "(30SCST). Before and after the test, the concentration of interleukin-6 (IL-6) in the blood of the patients was also tested.

Results: After the 12-weeks of Whole Body Vibration Training in the EG statistically significant improvement in mobility and dynamic balance (p=0.029) was observed, as well as aerobic endurance (p=0.0001), and lower body muscle strength (p=0.029). However, vibration training, had no effect on the severity of anxiety of falling (p=0.322) and on the level of interlukin-6 in the blood (p=0.398).

After 12 - weeks treatment period, in the CG, mobility and dynamic balance (p=0.0560), aerobic endurance (p=0.352) and lower body muscle strength (p=0.367), were consider as statistically insignificant improvement. In the CG no changes of severity of anxiety of falling (p=0.868) and the level of interlukin-6 in the blood (p=0.999) were noted.

After 12 - weeks of treatment in the EG, statistically significant improvement compared to the CG in mobility and dynamic balance (p=0.009), aerobic endurance (p=0.001), as well as lower body muscle strength (p=0.027) were noted. There were no statistically significant differences on the severity of anxiety of falling (p=0.655) and on the level of interlukin-6 in the blood (p=0.377) between the groups after the treatment compared to their condition before the treatment.

There were no statistically significant correlations between blood level of interlukin-6 and functional test results evaluating mobility and dynamic balance, lower body muscle strength and aerobic endurance.

Conclusions: Whole body vibration training increases gait and dynamic balance, exercise capacity, as well as strength of the lower body muscle, thus reducing endogenous risk factors for falls in women aged 60+.

Application form: Recommendation to improve dynamic balance, increase aerobic endurance and strength of lower body muscle in women at age 60+, is to implement Whole Body Vibration Training twice per week for over 12 weeks, with frequency of the generated vibrations 20Hz and amplitude of 2mm, in 5 series consisting of vibrations and breaks between them, lasting respectively 60 second vibration, 60 second break. It is essential to remember that above recommendations are resulting only from own studies and is related only to WBVT methods, used in this study. It is important to remember that WBVT treatment is not universal principal

for woman with risks of falling. Introduced WBVT methodology should be validated in further clinical tests and in comparison with other WBVT techniques.

Key words: IL-6, TUG, 30SCST, 6MWT, WBVT, FES-I, body imbalance, risk of falling, geriatric rehabilitation