

**The effectiveness of resistance training
using a patient suspension system
after myocardial infarction.**

The aim of the study was to assess the impact of resistance training using a suspension system on exercise tolerance assessed by exercise test and changes in selected echocardiographic parameters of patients after myocardial infarction. The study involved 44 males as part of a physiotherapy stay (2nd stage of rehabilitation). Patients who received the best result during the initial exercise test (≥ 7 MET or 100W) were qualified for the study. The examined were divided into two groups, Standard (20) and Suspension System (24). All patients were after the angioplasty with stent implantation procedure.

Both groups have been provided with a 24-day improvement program covering 22 training units. Each session included endurance, general fitness and resistance training. The experimental group performed exercises with the suspension system instead of the traditional resistance training (stepper, elliptic, rowing machine). The training unit with the use of a suspension system included four multi-joint exercises: squats, lunges, pulling the handles to the chest and raising the arms.

Electrocardiographic exercise test, an ultrasound examination of the heart, and a blood lipid profile were taken alongside the physiotherapy period. Basic descriptive statistics were used and the measure unit included: number of observations (N), maximum and minimum values, standard deviation (SD), arithmetic mean. To verify the assumptions of parametric tests, the Shapiro-Wilk normality test and the Brown-Forsythe variance homogeneity test were used. A parametric Student's t-test was also carried out for dependent variables whose distribution is consistent with the normal distribution, and a non-parametric Wilcoxon pairs order test for dependent variables whose distribution is not compatible with the normal distribution. Student's t-test was also carried out for independent variables whose distribution is consistent with the normal distribution and its non-parametric equivalent - the Mann-Whitney U test for independent variables whose distribution is not compatible with the normal distribution. The database collected in Excel was used and analyzed in Statistica 12 (StatSoft). The significance level was assumed to be $p \leq 0.05$.

Significant changes in two groups were attained with the parameters of the echocardiographic exercise test such as: time, distance, MET, VO₂max, RRsksp, DPsp. In addition, RRskmax has improved in the suspension system group. In the results of cardiac echocardiography in both examined groups, LVEF - Left Ventricular Ejection Fraction significantly improved - Suspension system 52.29 ± 3.29 53.33 ± 3.27 $p = 0.001$, standard 53.30 ± 3.06 55.30 ± 4.13 $p = 0.005$. In the study of lipid profiles in the suspension system group, statistically significant parameters changed: TC 180.92 ± 6.30 178.58 ± 5.36 $p = 0.003$, HDL 49.13 ± 4.62 50.83 ± 4.32 $P = 0.000$ and LDL 88.04 ± 3.83 85.92 ± 4.32 $p = 0.005$.

Training with the use of a suspension system as well as a standard improvement program, can enhance exercise tolerance (assessed by an exercise test) as well as improvement in left ventricular echocardiographic indicators in patients after myocardial infarction.

Key words: physical activity, suspension system training, Minnesota questionnaire, comprehensive cardiac rehabilitation, percutaneous coronary angioplasty, ischemic heart disease, myocardial infarction