

## THE EFFECTS OF THE WALKING PROGRAM ON FUNCTIONAL ABILITIES OF WORKING, MIDDLE-AGED WOMEN

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### Abstract

The purpose of this research was an analysis of the effects created by an application of experimental treatment on functional abilities of middle-aged women. The research included 45 female subjects. The sample of subjects included women aged 35 to 50 years. The walking program was designed so as to keep the subjects in aerobic working zone at any moment of exercise. On the grounds of the obtained results it was determined that the changes in functional abilities of the subjects happened in the course of longitudinal processes. In the final measurement, three variables including diastolic blood pressure at rest, and working pulse at 65% and 85% of loading have shown lower results after treatment of the walking program.

**Key words:** walking, middle age, pulse, aerobic training

### Introduction

From the physical aspect, „homo sedens“ at work and out of work is already recognisable and characterises a static loading in the muscles supporting sedentary or standing position and, on the other hand, an inactive muscle and joint groups. Such a disproportion of the muscle load disturbs a fundamental function of movement system, and as an organism functions synergistically each disbalance happens and reflects on the overall psychophysical status. A lack of physical stimulus reduces the level of abilities that is adapted to actual physical requirements, thus they reduce the work of organic systems particularly of cardiovascular and respiratory systems (Andrijašević, 2012). The researches related to benefits from body exercise indicate to a need for paying more attention to the body, as only with a balanced assessment of the mind and body it can be spoken of complete development, and of the right lifestyle of a modern man (Croatian Journal for Public Health, 2005). At today's level of comprehension a number of reasons may be mentioned for which the people of all ages, regardless of their health condition and age must walk regularly, in duration and at the pace that is possible. When it comes to working people, the following benefits from walking to their organisms can be emphasized, in particular: it affects favourably the work of heart and blood vessels (circulation of blood), regulates blood pressure (lowers high, and raises low blood pressure), eliminates excess weight by causing losing weight in the most natural way, lowers „bad “ and raises „good “ cholesterol, lowers high triglycerides in blood, lowers high blood sugar, increases lung capacity and oxidation in the blood, regulates digestion, increases functional and working abilities of the organism. The objective of this research is to determine effects of the walking program on functional abilities of working, middle-aged women.

### Methods

#### *Sample of subject*

The sample of subjects in this research has been defined as a female population, aged 35 to 50 years. The research included 45 subjects who are employed and clinically healthy.

#### *Sample of measuring instruments*

The sample of measuring instruments for assessment of functional abilities in this research consisted of 5 tests covering an area of a bigger number of hypothetical factors, for which it may be assumed that they are responsible for positive cardiovascular health condition, as follows: 1. Heart rate at rest (FFSM), 2. Systolic heart rate at rest (FSKPM), 3. Diastolic blood pressure at rest (FDKPM), 4. Working pulse (FRP65), 5. Working pulse (FRP85).

#### *Methods of data processing*

The results of research were processed by means of Statistical package „STATISTICA 8.0 for Windows“. For the needs of this research, the following statistical analyses were made: 1. Descriptive statistics, where the results of the mean arithmetical values were presented (Mean), minimum (Min.) and maximum (Max.) results, standard deviations (Std. Dev.) and standard error of arithmetical mean (Std. Error). 2. Testing the normality of data distribution, where the results of symmetry (Skew.) and kurtosis of distributions (Kurt.) have been presented, 3. Student's T-test for dependant samples, by which significance of differences between the initial and final state was tested.

### Results

Results of basic central and dispersion parameters and indicators of normality of distribution for the subjects in initial measurement are presented in Table 1.

Table 1. Basic statistical parameters of the subjects in initial state

Var.	N	Means	Min.	Max.	Std.Dev.	Std. Err.	Skew.	Kurt.
FFSM	45	74,49	50,00	105,00	13,39	2,00	0,46	0,07
FSKPM	45	120,02	79,00	162,00	19,44	2,90	0,44	0,05
FDKPM	45	83,22	65,00	114,00	12,44	1,85	0,74	-0,15
FRP65	45	159,98	148,00	173,00	5,62	0,84	0,56	0,28
FRP85	45	183,91	175,00	191,00	3,42	0,51	0,43	0,61

Legend: N – number of participants; Means – arithmetic means; St.Dev. – standard deviation; St.Err. – standard error of the arithmetic means; Skew. – skewness of distribution of results; Kurt. – kurtosis of distribution of results

Table 2. Basic statistical parameters of the subjects in final state

Var.	N	Means	Min.	Max.	Std.Dev.	Std. Err.	Skew.	Kurt.
FFSM	45	79,76	61,00	102,00	11,63	1,73	-0,01	-1,15
FSKPM	45	119,42	82,00	162,00	19,13	2,85	0,21	-0,56
FDKPM	45	72,02	50,00	108,00	11,84	1,77	1,02	1,56
FRP65	45	148,93	138,00	157,00	5,62	0,84	-0,37	-0,93
FRP85	45	174,00	166,00	179,00	3,62	0,54	-0,55	-0,62

Legend: N – number of participants; Means – arithmetic means; St.Dev. – standard deviation; St.Err. – standard error of the arithmetic means; Skew. – skewness of distribution of results; Kurt. – kurtosis of distribution of results

Table 3. Analysis of difference between the initial and final state

Var.	Means Ini.	Means Fin.	Diff.	t	df	P
FFSM	74,49	79,76	5,27	1,82	44	0,08
FSKPM	120,02	119,42	-0,60	-0,15	44	0,89
FDKPM	83,22	72,02	-11,20	-4,52	44	0,00
FRP65	159,98	148,93	-11,04	-10,22	44	0,00
FRP85	183,91	174,00	-9,91	-14,10	44	0,00

Legend: Means Ini. – arithmetic mean of the initial measurement; Means Fin. – arithmetic mean of the final measurement; Diff. – differences between the initial and final measurement; t – the value of the t-test for testing the significance of the differences of the arithmetic means; df – the degree of freedom; p – the coefficient of the significance of the differences in the arithmetic means

With an insight into those data it can be ascertained on the grounds of the relation between the standard deviation and arithmetical mean that the variables recorded homogenous characteristics, and parameters referring to symmetry and (elongation) distribution, describe normality of distributions with a slight epikurtic and platykurtic tendency.

Descriptive parameters of final measurement (Table 2.) also describe homogeneity of the analysed sample in the searched areas. The indicators of symmetry of distribution of the results for the subjects are within the limits of normality with a slight epikurtic tendency at the measuring instruments describing systolic blood pressure at rest (FSKPM), while the indicators of heart rates at rest (FFSM), and at the loading of 65% and 85% (FRP65; FRP85) recorded a slight hipokurtic tendency, and with diastolic blood pressure at rest the results were distributed asymmetrically and are bigger than the marginal ones, with a tendency of grouping toward the lower results (hipokurtic distribution). The values of statistical parameters of elongation distribution of the subjects' results (Kurt.) describe platykurtic distribution with all tests conducted. Results of the applied t-test for dependant samples were presented in the table 3.

Algorithm of the mentioned test has proved the significance ( $p=0.00$ ) of differences with measuring instruments for assessment of diastolic blood pressure at rest (FDKPM), as well as with loading of 65% and 85% (FRP65; FRP85). The mentioned statements indicate to a conclusion that there is a statistically significant difference between the results of subjects measured at two different time points. Judging from the results of the table depicting a probability of zero hypothesis ( $p$ ), according to which there is no differentiation between the observed dependant sample at initial and final measurement, it can be ascertained that although a certain deviation of numerical values of arithmetical means is evident, there is no a statistically significant difference in tests for assessment of heart rate at rest (FFSM) and systolic blood pressure at rest (FSKPM).

### Discussion and conclusion

When we are aware of the fact that an increase in quantity of physical activity (within normal limits) causes the improvement of health status of individual of any age (Young & Dinan, 2005.), then we are also aware that health condition of an individual largely depends on their doing physical activity, which is particularly important for middle-aged or elderly people, who do not move

sufficiently due to everyday business obligations or comfort of modern lifestyle. Even the activities of low intensity, if conducted regularly, are sufficient for a considerable decrease in appearance of cardiovascular diseases (Erikssen, 2001.). When it comes to high blood pressure, which is deemed the most frequent illness in the civilised world today, many measures are taken in its treatment: change of lifestyle, change in eating habits, taking medications, application of physical activity. Chronic effects of physical activity, if applied three times per week, are often related to a lower blood pressure and decreased risk for development of cardiovascular diseases. However, physical activity that is performed seven times a week has a minimum additional influence in the sense of improvement of the state. In many researches, chronic effect of physical activity caused, on average, lowering of blood pressure by the average 10 mmHg. An exercise with participation of big muscle groups in duration of 20-60 minutes, with intensity of 50-85% of maximum oxygen uptake, if there are no contraindications, (Duraković, et al., 2007) is recommended. Such an activity that is not too strong, but is sufficient to cause positive changes, is recommended to middle-aged and elderly people, with the walking program that has been designed so that the subjects are at aerobic work zone at any moment. It is believed today that at least 50% of changes that are attributed to aging in populations of the developed world are not the consequences of aging but the consequences of atrophy due to inactivity. With aging, the function of cardiovascular system decreases, often at rate of reduction of the minute volume by 1% per year

starting from the beginning of the fourth decade, stroke volume decreases by 0.7% per year, and peripheral vascular resistance increases at the rate of 1.2 % per year. Cardio-respiratory capacity decreases in persons being very active in physical activities only by 1-2%, in those actively doing physical activity by around 4%, while in those physically inactive it reduces by at least 8-10%. After the 30<sup>th</sup> year of life, the minute volume of the heart reduces by around 30%, the highest heart rate by around 25%, systolic blood pressure by 10-40%, while diastolic pressure increases by 5-10%. Walking has a potential of playing the key role in primary and secondary prevention of cardiovascular diseases. It enables maintenance and even an increase in oxygen uptake of the myocardium, decreases the work of myocardium and its need for oxygen, increases the electrical stability of the myocardium, increases myocardial function at rest and at submaximum loading, increases the ejection fraction of the myocardium, increases contractile ability of the myocardium and reduces systolic load. It can be concluded that this research, which aimed at determining the effects of the walking program on functional abilities of the working, middle-aged women, indicates to an undoubted effect of this extremely accessible form of recreation in avoiding today's health disasters and to importance of this basic form of human movement, so „ordinary“ that a modern man takes it for granted. On the other hand, it is concluded that this is one of the researches that should stimulate new, more comprehensive and more complex analyses in the future, similar researches in these areas.

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## UČINCI PROGRAMA HODANJA NA FUNKCIONALNE SPOSOBNOSTI ŽENA SREDNJE ŽIVOTNE DOBI

### Sažetak

*Cilj ovog istraživanja je bila analiza efekata nastalih primjenom eksperimentalnog tretmana na funkcionalne sposobnosti žena srednje životne dobi. Istraživanje je obuhvatilo 45 ispitanica. Uzorak ispitanica je obuhvatio žene starosne dobi od 35 do 50 godina. Program pješaćenja je bio koncipiran tako da se ispitanice u svakom trenutku vježbanja nalaze u aerobnoj zoni rada. Na temelju dobivenih rezultata utvrđeno je da je za vrijeme trajanja transformacijskih procesa došlo do promjene funkcionalnih sposobnosti ispitanica. U konačnom su mjerenju tri varijable: dijastolički krvni pritisak u miru, i radni puls pri 65% i 85% opterećenju pokazale niže rezultate nakon tretmana programa pješaćenja.*

**Ključne riječi:** pješaćenje, srednja dob, puls, aerobni trening

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Among women, middle-aged women. (the 1964-year age group) showed the highest rate (Ministry of Health and Welfare & Korea Centers for Disease Control and Prevention, 2010). Aging slows down the function of the entire body in the elderly; the elderly experience weakness and decline in percent body fat and bone density. Due to these problems, the elderly experience limits in their physical activity ability and are prone to injuries (Chung, Lee, Park, & Jin, 2008).  
Purpose The purpose of this study is to compare the effects of Nordic walking program to those of a normal walking program on the body composition, muscle strength and lipid profile of women who are over 65 years of age. Experiment 3 generalized the prior effects to outdoor walking. Experiment 4 tested the effect of walking on creative analogy generation. Participants sat inside, walked on a treadmill inside, walked outside, or were rolled outside in a wheelchair. Walking outside produced the most novel and highest quality analogies. The effects of outdoor stimulation and walking were separable. The effect is not simply due to the increased perceptual stimulation of moving through an environment, but rather it is due to walking. Whether one is outdoors or on a treadmill, walking improves the generation of novel yet appropriate ideas, and the effect even extends to when people sit down to do their creative work shortly after. The Mind-Body Connection. Effects of aerobic dance on physical work capacity cardiovascular function and body composition of middle-aged obese women. *Research Quarterly for Exercise and Sport*, 56, 227-233. [11]. Engels, H. J., Drouin, J., Zhu, W., & Kazmierski, J. F. (1998). Effects of low-impact, moderate-intensity exercise training with and without wrist weights on functional capacities and mood states in older adults. The effects of an active-assisted stretching program on functional performance in elderly persons: A pilot study. *Clinical Interventions in Aging*, 4, 115-120. [36]. Steffen, T. M., Hacker, T. A., & Mollinger, L. (2002). Age- and gender-related test performance in community-dwelling elderly people: Six-minute walk test, Berg balance scale, timed up & go test, and gait speeds. The walking program performed by W- and WR-group participants consisted of more than two sets per week. One set included at least 30 min of continuous walking without rest. These functional tests were chosen because they have been used in many previous studies as the index of lower limb strength, and the findings of several studies have shown that EI is associated with basic functional capacity and agility [ 28 , 29 , 32 ]. For the sit-up test, the participants lay in a supine position with their knees bent at approximately 80° and their feet flat on the floor. First, the positive effects of walking have been previously established. Rooks et al. [ 13 ] reported that self-paced walking improved physical function parameters, such as balance and stair climbing, and Ryan et al. This study was conducted to determine the effect of a resistive training intervention on body image in middle-aged women compared to an exercise walking program. Another purpose was to develop two multivariate models to explain improvement in body image among the lifters and walkers. Design Participants were 60 women recruited from the local community with an average age of 42.5 +/- 4.2 years. Intervention. Subjects were randomly assigned to a resistive training or exercise walking program, both of which were three days per week and 12 weeks in duration. Measures.