

## THE EFFECT OF COURSES IN WEIGHT REDUCTION TO THE SELECTED SOMATIC CHARACTERISTICS

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Accelerated pace of life and consumerism leads to increase in obesity. Key element in programs to reduce overweight and obesity is the regular physical activity (PA) by means of healthy lifestyle. Appropriate PA that is accessible to everyone, regardless of age and gender, is walking, which can be simply assessed by pedometers. The aim of our work was to analyse the effect of courses in weight reduction to the selected body composition (BC) parameters in the obese and overweight women with various age and the level of PA. 124 women with existing sedentary lifestyle, which were differentiated by age (< 40 years: and ≥ 40 years) participated in the study. We divided the monitored sample into sub-groups according to the level of their PA. To determine the average daily number of footsteps during the PA the Yamax pedometer was used. InBody 720 device using the Direct Multi-frequency Bioelectrical Impedance Analysis Method (DSM-BIA Method) was used to measure and analyse the BC. Based on the monitoring of the PA and BC health risk indicators, the effect of the exercise program, which included cognitive behavioural therapy, showed decline in the body mass index (BMI) and body fat expressed in percentages (PBF) and in the decrease of the visceral fat area (VFA). The amount of fat-free mass (FFM) remained the same. Following the three months therapy we observed in women with a higher level of PA shift to the overweight group. Therapy contributed to a reduction in PBF from 2.4% to 3.9% even though the women's groups were still classified as obese (> 35%). Research studies have shown positive relationship between the increase in PA and changes in health risk indicators. Observance of the recommended number of 10,000 footsteps per day primarily prevents the increase in body fat mass (BFM) and maintains FFM.

*Key words: body composition health risk indicators, obesity, walking, healthy lifestyle, weight loss program*

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## MODERN TENDENCIES IN THE PHENOTYPE CHANGES OF HIGH-QUALIFIED ATHLETES

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Existing range of phenotypic diversity is considered as a result of human adaptation to complex civilization processes (V.A. Geodakjan etc.). Dynamics of modern population shifts is characterized with such trends as asthenization and juvenilization of body structure by increasing the duration of the growth processes and biological maturation. At the same time an increase in the sensitivity of the nervous system occurs, the growth of intellectual abilities with the expansion of human cognitive skills is observed, creativity manifestation of consciousness is shown (L.A.Rudkevich et al.). Our long-term cohort study of highly qualified swimmers showed significant differences between the winners in their age groups and elite athletes (T.S.Timakova). Comparative analysis between young athletes and elite swimmers showed that body structure of the elite swimmers has a trend to greater leptosomy, as well as higher electrodermal sensitivity and hypersensitivity toward vibratactile stimulation. Greater complications in the somatotype are accompanied with more signs of heteromorphism by lengthening the period of biological maturation in general. Our retrospective analyses of the three years observation data of elite racing skiers is of particular interest. Data processing was carried with the method of factor – typological description of the athletes. The analysis included anthropological char-

acteristics, the results of functional testing till total exhaustion, as well as 16-PF questionnaire of R.Cattell. Results of the study revealed the advantages of athletes with more complex somatotype characteristics, which manifest a tendency towards wonderful activity economization of energy supply. A comparison of the selected groups of athletes of different classes of professional success with the structural features of their personality showed the advantages of those with severe manifestations of reflection and action mechanism of the unconscious (intuition and fast-action).

**Key words:** *high-qualified athletes, factor-typological description, different classes of professional success, more complicated somatotype*

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### OVERWEIGHT AND OBESITY AS RISK FACTORS FOR FALLEN ARCHES

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Overweight and obesity are associated with structural and functional limitations, mainly in terms of fallen arches or other foot deformities. Static flat foot of the adults might appear at each age if an unbalance occurs in the rate of the applied load to load bearing capacity of the foot, for a long time. The most common external factor is an excessive body weight. The main aim of this study was to confirm that the foot arch significantly falls with increasing BMI values. The measurements were performed in a sample, which consisted of 139 adult women of average age  $56.67 \pm 4.80$  years. Body mass index (BMI [kg/m<sup>2</sup>]) was calculated for each person. We measured the foot dimensions in the widest and narrowest place of a plantogram to calculate the Chippaux-Smirak index (CSI). CSI values from 0% to 45% indicate normal healthy feet, over 45% – flat feet. Footprints were taken from both feet by the standard static plantography method. Data was statistically analyzed with the non-parametric tests (Spearman correlation coefficient ( $r$ ) and Kruskal-Wallis test ( $H$ )) with calculating of the effect size ( $\eta^2$ ). On the base of the increasing average CSI values in BMI categories (normal weight:  $n = 52$ , sin. = 37.27%, dex. = 35.82%; overweight:  $n = 51$ , sin. = 41.18%, dex. = 42.48; obesity:  $n = 36$ , sin. = 45.92%, dex. = 44.94%), we showed a significant increase of the CSI values (sin.  $H = 27.17$ ,  $p < 0.01$ ,  $\eta^2 = 0.2$ ; dex.  $H = 24.32$ ,  $p < 0.01$ ,  $\eta^2 = 0.18$ ). CSI values showed medium positive linear relation with BMI values (sin.  $r = 0.42$ ; dex.  $r = 0.40$ ;  $p < 0.05$ ), which confirmed that a foot arch significantly falls with increasing BMI values. Overweight and obesity have significant impact on the fall of the foot arch.

**Key words:** *flat foot, BMI, excessive body weight*

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