COMPARISON OF INDEXES OF PHYSICAL DEVELOPMENT BIOLOGICAL OBJECTS MEASURED BY ANTHROPOMETRIC AND BIO-IMPEDANCE METHODS

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Abstract

Numerical estimates of individual physical development are currently carried out both on the basis of anthropometric measurements (height, weight, body mass index, waist circumference, hip circumference) taking into account gender and age, and using the registration of the parameters of the body's own physical fields of the biological object. Anthropometric measurements do not represent particular difficulties, while the registration of body parameters is carried out on rather expensive equipment: computed tomography, neutron activation analysis, X-ray densitometry, etc. Correlation between different methods of assessing physical development in the available literature is not shown, which stimulated studies on the comparison of the indices of physical development (Quetelet, Broca, Yarho-Kaupe and Rohrer) with the data of relative fat mass by bioimpedance analysis.

Anthropometrical and bioimpedance measurements for female persons of the youthful age period are presented in this study. In total 96 students participated in the research, average age was 19 ± 1.5 years. The indexes of physical development, connecting the weight and geometry of objects are defined on the basis of anthropometrical data for participating in an experiment. The distribution of relative fatty body weight is determined by the received electric characteristics (fatty weight, rated to all body weight) with use of the Medass analyzer Statistical calculations of the obtained experimental data of indexes of physical development and relative fatty weight are carried out. A pair exponential regression was chosen at a stage of the specification. Its parameters were estimated by method of the smallest squares. The statistical importance of the equation was checked by means of coefficient of determination and Fischer's criterion. The correlation coefficients between indexes of physical development and relative fatty weight are calculated.

As a result of statistical processing of the obtained experimental data correlation coefficients between three main, indexes of physical development and data of fatty body weight of objects are calculated. The maximum coefficient of correlation (b = 0.042) is noted between relative the fatty mass of objects and Quetelet's index. Thus, comparison of indexes of physical development of the studied persons of the youthful age period (the girl of 19 years) measured anthropometrical and bioimpedance by methods testifies to invariable advantage of a research of the body composition in Vivo by means of an indirect method.

The method of the bioimpedance analysis has proved as the reliable, safe and relatively accurate field method of assessment of the body composition. The main difficulty of development of this method is the problem of physiological interpretation of the results of bioimpedance measurements and the use of formulas and the coefficients for assessment of the body composition depending on properties of population. In this work it is shown that percent of fatty weight is the main indicator of physical development of a biological object, but not the body mass index (the Quetelet index).

***Key words**: Index of physical development, Bioimpedance method, Correlation coefficient.*