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Evaluation of morphological parameters of female students registered in the first year at the University of Bucharest

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ABSTRACT

The present report is part of a wider research aimed at optimization of physical education for female students by the application of aerobic gymnastics specific means in the physical education classes to increase the level of functional training. The research was performed during the physical education lessons conducted in the Department of Physical Education and Sport at the University of Bucharest. The sport hall has a good infrastructure that enables the application of experimental research in higher education in appropriate circumstances, in accordance with the specifications of the elaborated curriculum.

Keywords: *Physical education, female students, physical training, capacity effort*

1. INTRODUCTION

Once completed puberty, adolescents turn in young men which, in terms of morpho-functional development, exercise capacity and physical characteristics, are getting closer to adulthood. Different studies have shown [1-4] that physical development indices, height, weight, thoracic perimeter, are close to the morphological indices for adults. Growth slows to 18-19 years (girls usually stop), bone structure and strength approaching adult tissue, conjugation cartilage are thinning, marking the beginning of their bone ossification stopping the growth in height. Following the increasing height and weight by age, we have noted that these processes do not follow the same rhythm and that there is no perfect parallelism between them, slower to stagnation periods [5, 6] are unevenly distributed over the entire period of development, followed by more or less vigorous bursts. In the quantitative growth phases, especially in height and weight, organ development and function improvement is much slower. After these accumulation periods there is a quantitative decrease or stagnation of growth, in which a real qualitative jump is taking place, leading to an appreciable organic improvement. A clear alternation occurs between periods of rapid and intense growth slowed height and weight. There are certainly situations where height growth is stagnating, while there is a substantial weight gain. It is also to be noticed the alternation between the increase in leg length and height growth of the bust, which occurs at puberty and showing that change the direction and intensity increase of two main parts of the body marks the end of a period (childhood) and beginning of another (puberty). Body growth and development, under normal conditions, take place continuously until adulthood, but the intensity of processes and phenomena decreases gradually as we approach the end of evolution. Processes rate and phenomena in this period of life is variable in intensity and duration, comprising phases more or less active, with alternating

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acceleration and deceleration. The growth in height in girls generally stops around the age of 17-19 years and in boys from 21-23 years [1, 5]. It is thus clear that for vast majority of girls any increase in longitudinal dimensions after 16-17 years is quite insignificant, and for the boys, after 18-19 years as well. Thorax is growing in volume and elasticity, rather than members, which makes to increase the index of proportionality ("Erismann"). The purpose of our research is to determine the morphological development in female students from enrolled in the first year at the Bucharest University, before forming the groups that will participate in experiments on optimizing their functional training by applying the specific means of aerobic gymnastics.

2. EXPERIMENTAL SECTION

In order to assess the morphological development level of female students included in the study, there was conducted an ascertaining experiment (October 2010 - May 2011). The experiment was conducted on a number of 130 students attending courses of physical education and sport at the University of Bucharest. The results were statistically processed and compared with the standard model parameters [7-9] for women with an average height corresponding to the arithmetic mean of the investigated sample. Average values of the students height measurements were compared with the average height reported for Romanian women. In conducting the present research we have used the following methods: the experimental, observation, testing, statistical and mathematical data processing methods.

3. RESULTS SECTION

Somatic measured results were compared with the standard model reported in the literature and presented in table 1, and also are plotted in figure 1.

Table 1: Results of anthropometric indices comparatively with the standard model

Control parameters		$\overline{X}$ (E.I.)	Average error	Standard model
Height		170,24	0,51	1,67-1,70
Weight		63,21	1	57,7
Thoracic perimeter	Inspiration	89,68	0,38	94
	Expiration	84,9	0,38	88
Elastic chest		4,8	0,09	6
Abdominal perimeter		66,67	0,33	58,5
Hip perimeter		94,9	0,55	91,5
Thigh perimeter		53,11	0,34	52

Height is a very important criterion in assessing the subjects somatic indexes. For this reason special attention is given from specialists. Depending on the average height there can be appreciated other measured parameters resulting in normal values that could be correlated with subjects waist perimeter. According to the results the contingent subject participants to the ascertaining experiment had an average reached values of 170.24 cm, surpassing with 6.24 cm (average error 0.51 cm) the height average of women of Romania, which was calculated at 164 cm (Fig. 1). Arithmetic mean values of the weight (Fig. 2) of the investigated groups is 63.21 kg (average error 1) as compared to the standard value of 57.7 kg, the studied group surpassed with 5.71 kg the normal weight for this

height. Weight gain may be checked through physical education lessons, especially in terms of active muscle tissue accumulation, correlated with a suitable diet.

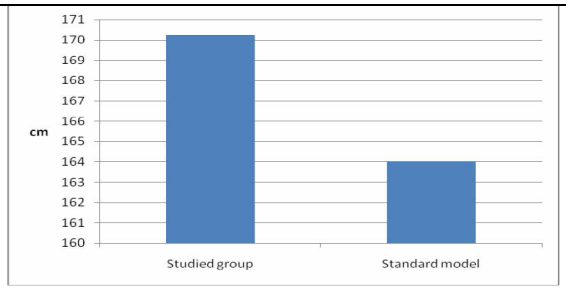

Figure 1: Height

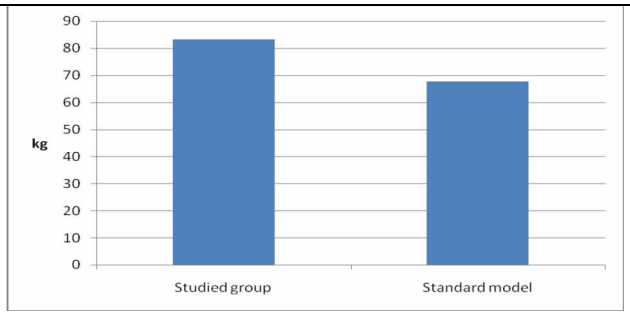

Figure 2: Weight

Comparison of the mean value of 89.68 cm of chest perimeter in inspiration for the investigated group with that of 94 cm for the average somatic model, showed a difference of 4.32 cm between the studied group and the standard model (mean error 0.38 cm), while for chest perimeter in exhalation a mean value of 84.9 cm for the investigated group was obtained *versus* 88.0 cm for the standard model (mean error 0.38 cm). A lower value was also noticed for chest elasticity (6 cm) as compared to the standard model (4.8 cm) (mean error 0.09 cm) (Fig. 3).

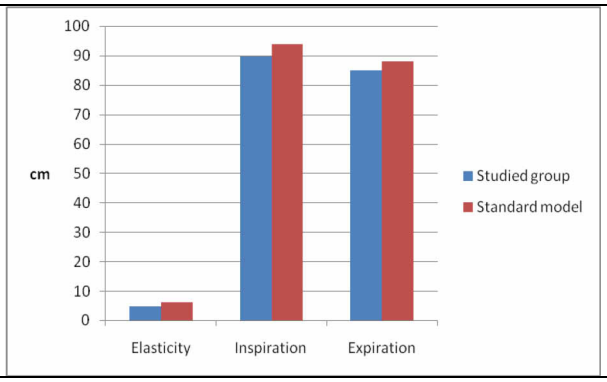

Figure 3: Thoracic perimeter

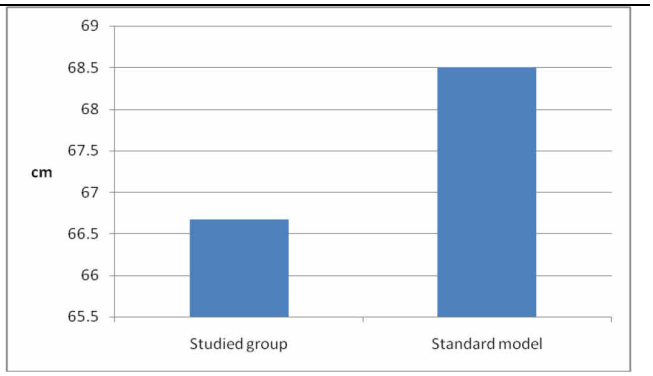

Figure 4: Abdominal perimeter

At this age the appearance of body fat is achieved mainly at the waist and hips and thus the study of these perimeters may be a good indicator of the degree of physical training of the students. In the proposed experiment an average value of 66.67 cm (mean error 0.33) was obtained, as compared with the average somatic model of 58.5 cm. This parameter exceeds the average normal values, probably due to be unreasonable nutrition or by the absence of regular physical exercises (Fig. 4).

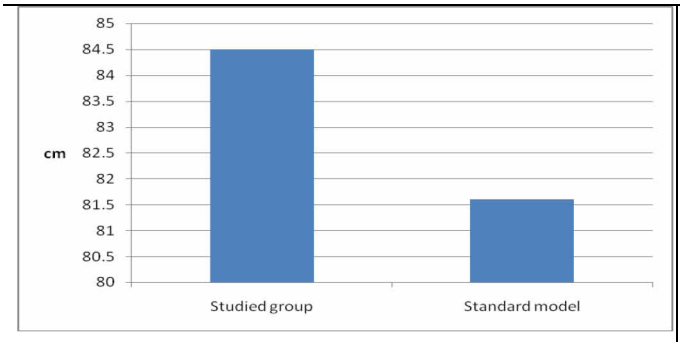

Figure 5: Hip perimeter

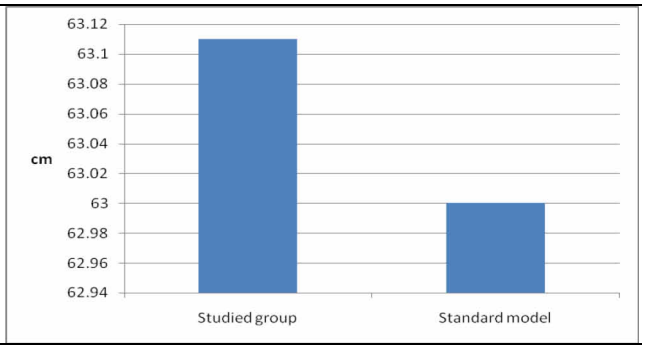

Figure 6: Thigh perimeter

The mean value of abdominal perimeter was 94.9 cm *versus* the standard value of 91.5 cm (mean error 0.55 cm). These indicators are characteristic for harmonious growth, so they may lead to a more efficient management of the educational process to correct any disorders that could occur at this age (Fig. 5). Closely related with waist and hip dimensions, thigh perimeter is also an important indicator of harmonious physical development. The investigated group presented an average value of 53.11 cm, being 1.11 cm bigger than the standard model (mean error 0.34 cm).

4. CONCLUSIONS

In terms of weight, female students exceed the normal values provided in the standard model reported in the literature for the recorded average height, with a slight disparity between these somatic indices. The dynamic elasticity of the chest determined by the inspiration and expiration chest perimeter shows that the studied group presented values below the average professional model. These results indicate a weak cardio-respiratory development of female students participating in this experiment. Proposals: Comparing perimeters waist, hip and thigh with specialized model, we find that the model dimensions are over values, subjects with chances to fall in coming years as expected by practicing regular exercise.

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