PHYSICAL DEVELOPMENT OF CHILDREN OF PRESCHOOL AGE

T. Traykova*

Theory of the Physical Education Department, National Sports Academy ''Vassil Levski'', Sofia, Bulgaria

ABSTRACT
Purpose of the study: To register the dynamics of the basic parameters of the physical development of children from the fourth preparatory group, as a result of the implementation of an enriched educational content in physical culture pedagogical situations. 54 girls and 67 boys were investigated and measured twice – at the beginning and at the end of the pedagogical experiment. Anthropometric parameters assessed: height, body weight, chest circumference.
Methods: Theoretical analysis, pedagogical experiment, anthropometry, statistical methods.
Results: Height: the highest increase in that parameter was found in the Experimental Group of boys and the smallest one – in girls of the Control group. Body weight: boys from the EG showed the highest increase, while the lowest one was found in boys from CG. Chest circumference: the greatest increase was measured in CG of, while the smallest one in the EG of girls. In conclusion, we can underline that the changes in the anthropometric parameters are due both to the laws of biological developments of children at that age, as well as to the applied enriched educational content.

Key words: Preparatory group for school, anthropometric parameters, enriched educational content

INTRODUCTION
Preschool age is a particular period in the child's growth characterized by intense physical and mental development (1). The question is whether the changes at that age are due to the biological developmental laws or to some external factors (2). Physical education and sport have a very important role for proper psychophysical improvement and physical development of the preschool-age child's personality before entering the first class of primary school (3-4). One of the main goals of the Physical education process is to stimulate the harmonious physical development of adolescents. That was the reason to investigate its impact on kid's organism and especially on their morphological characteristics (5).

METHODS
The purpose of the study was to register the dynamics of the basic parameters of physical

development of children from the fourth preparatory group (6-7-year-olds), as a result of the implementation of an enriched educational content in physical culture pedagogical situations for a period of one school year (6).

The object of the study was the physical development of children of preschool age.

The basic anthropometric parameters were measured: height, body weight and chest circumference (in pause).

In the pedagogical experiment 121 children were included (54 girls and 67 boys), from the fourth preparatory age group for school (6-7-year-old), divided into Experimental group (EG) and Control Group (CG). They attended two Sofia kindergartens and one primary school.

The following methods were used for the approach of our purpose:
- Theoretical analysis of various information sources;
- Pedagogical experiment;

_____
*Correspondence to: *Tsveta Traykova, National Sports Academy ''Vassil Levski'', Theory of the physical education Department, 1700, Sofia, Studentski grad, Bulgaria, E-mail: CvetaDimitrova@abv.bg, Mobile: 0896 63 01 63*

- Anthropometry;
- Variation, comparative and graphic analysis.

The educational content was applied within one school year. It includes appropriate and diverse physical and sports activities adequate for this age and was implemented 3 times a week in pedagogical situations. The children were examined twice – before and after the pedagogical experiment using the chosen anthropometric parameters.

RESULTS
Height

The height is the most important anthropometric parameter that determines the physical development of the individual (7). It is genetically predetermined, but rarely it can be influenced by some external factors (lifestyle, physical activity, nutritional habits, etc.) but the impact is not so high. Its significance is determined not only by its absolute values but also by its relationship with the other lengths, diameters, and body mass.

In **Figure 1**, the average values of the first and second investigation of the children from the fourth preparatory group are illustrated.
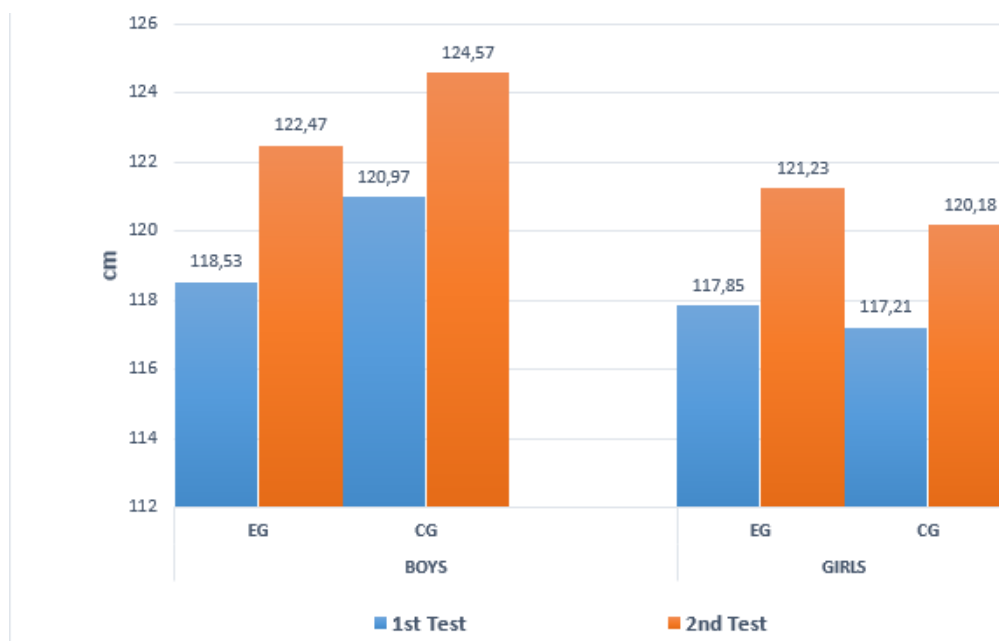

Figure 1. Mean values of height – boys and girls from a fourth preparatory group

From **Figure 1** it is obvious that in the first measurement the average value of the height in EG- boys is lower – 118.53 cm, compared with that of the CG – 120.97 cm. However, at the end of the study, the highest growth rate (d = 3,94 cm or 3.32%) is found just in that group, in comparison with all the other groups we studied, as the height mean value reaches 122.47 cm while in the CG it reaches 124.57 cm, but the percentage of increase in that group is only 2.98%. or 3.60 cm. The recorded differences are statistically significant (α < 0.05). The same figure presents the changes in the height mean values of the girls. The initial values are almost the same in the two groups – EG – 117.85 cm and CG – 117.21 cm as the difference between them is statistically insignificant (α > 0.05). In the second measurement, the percentage of growth increase significantly in both groups (α <

0.05), as in the experimental group it is greater (d = 3,38 cm or d% = 2,90%) The difference between EG and CG is statistically insignificant (α > 0.05).

From **Figure 1** it appears that boys excel girls according to that parameter in both measurements. The growth percentage of height has the largest values in EG – boys (3.32%), in comparison with all other groups while in the girls from the CG (2.53%) it has the lowest values.

Body Weight
Body weight is the other basic morphological characteristic, which determines the specificity of the physical development of the individual. It depends on both endogenous and some exogenous factors such as diet, physical activity, social and economic status, etc.

Recently many authors – Vl. Chernev (8), P. Peeva, Ts. Dimitrova (9), etc. – point out an alarming tendency of continuously increase of the Earth's population body weight, as about 30% of people are overweight or obese. In

Bulgaria, the data is even more disturbing. Every fifth child is overweight or obese.

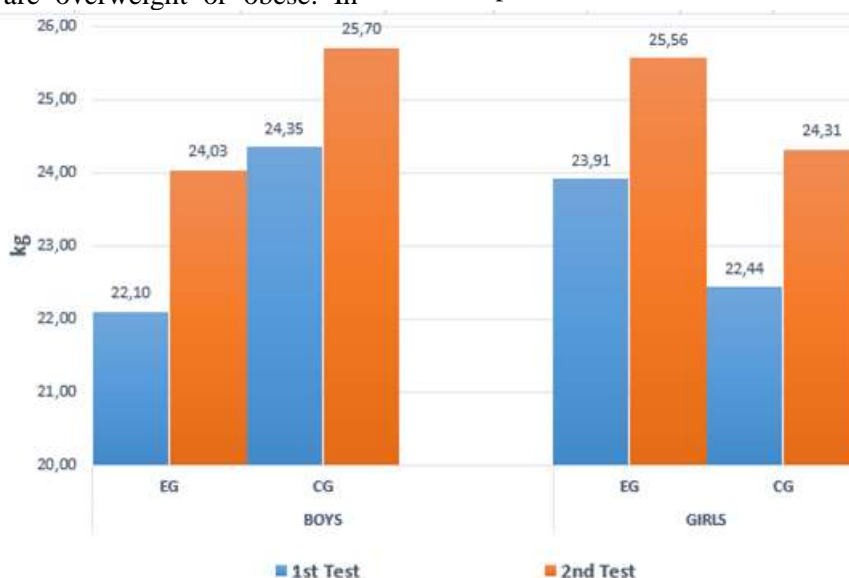In **Figure 2** the mean values of that parameter are presented.

Figure 2. Mean values of body weight – boys and girls from a fourth preparatory group

In the first measurement the boys of the CG has a bigger body weight (the difference is 2.243 kg) than their peers from the EG. (Figure 2). In the final testing this difference decreases up to 1.670 kg, in favor of CG, whose mean value of the body weight is 25.70 kg, while the value of the EG reaches 24.03 kg.

The registered differences are statistically significant ($p \geq 95\%$).

In the initial investigation the girls from CG have a lower mean values of body weight – 22.440kg, while those of the EG have mean values of 23.910 kg. **(Figure 2)**. In the final investigation, the body weight of the girls from the EG is higher again than that of the control group as the difference is 1.240 kg. In both groups, statistically significant growth was established as it was higher in the control group (8,37%). As a whole at the end of the experiment the girls from the EG has the highest values of body weight – 25.560 kg, while those of the CG has lower ones – 24,310 kg.

The data for that morphological parameter tend to have higher values in the girls from the EG than in the boys (EG) both the in initial and in the final measurement. The tendency observed in the CG – girls and boys – has just an opposite character.

Chest Circumference (In Pause)
The circumference of the chest is also one of the basic morphological characteristics, which together with the other two anthropometric parameters (height and body weight) gives a real idea about the physical development of the individual.

The following graphics **(Figure 3)** illustrates the dynamics of the chest circumference (in pause) in both girls and boys.

The initial mean value of the EG – boys is 58.25 cm and of the control one – 59.89 cm. or a little bit higher – 1.63 cm. In the second measurement it is observed that the mean values of the two groups are almost the same. The increase of the chest circumference is 0.72 cm (1.23%) in the EG and 0.74 cm (1.24%) in the CG or the changes are similar. The differences observed are statistically significant.

In girls of the same age, small and insignificant differences are detected in the chest circumference. In the initial test the mean value of EG is 58.12 cm, while that of the control group is 57.61 cm. The mean values of the final test are increased with 0.72 cm (1.23 %) in the EG and with 0.74 cm (1.24 %). The difference between the two groups is very small – 0.49 cm and statistically insignificant ($\alpha > 0.05$).
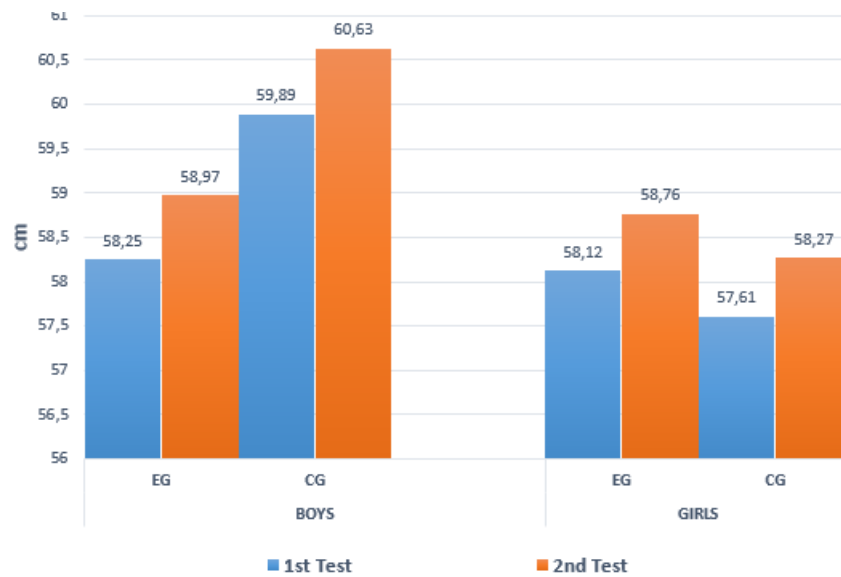
Figure 3. Mean values of chest circumference – boys and girls from fourth preparatory group

The highest increase of the chest circumference is found for the boys of the CG (1.24%) while the lowest percentage of 1.10 % is found in the girls of the EG. The recorded differences are statistically significant.

According to the chest circumference some gender differences are observed in favor of the boys, but the differences found are insignificant.

Coefficient of variation – V% – is an important parameter showing the diversity of any individual value around the mean value for a given group.

In the initial measurement, the coefficient of variation of the anthropometric parameters for the different groups studied range from 3.45% to 22.29%. Concerning "height," and "chest circumference", the groups of the investigated boys and girls can be defined as homogeneous (V% < 12%). According to body weight the groups are approximately homogeneous (V% varies between 12 and 30 %). It should be mentioned that the EG – boys are less homogeneous according to the body weight in comparison with the other groups. The less variation is found in the height of the CG – boys than in the other groups studied.

In the final measurement, the values of the coefficient of variation of the assessed of the anthropometric parameters varied from 3.27% to 20.28%. It is obvious that they decrease as a result of the implementation of the enriched physical education program in the EG – boys (in all parameters) and in the EG – girls,

concerning the chest circumference. The final study found the same tendency as the initial one, namely that the values of the coefficient of variation define the different groups of girls and boys as homogeneous according to height and chest circumference and according to body weight as approximately homogeneous.

The analysis of the coefficient of variation gives us the opportunity to make the following conclusion: Body weight is one of the most variable anthropometric parameters in comparison with the others. It depends on various factors – endogenous and exogenous as the last have a high impact on its values so it is normally to demonstrate a greater dispersion in all studied groups in comparison with the values of the height which is highly genetically determined and the exogenous factors have less impact on it.

CONCLUSIONS
✓ The changes in the basic anthropometric parameters in our study are statistically significant with some exceptions.
✓ Slight gender differentiation is observed in favor of boys concerning the state and dynamics of the studied parameters.
✓ With regard to the variability of the examined anthropometric parameters – in both sexes, it varies within limits, which determine the groups surveyed as homogeneous and relatively homogeneous at the beginning of the experiment. The variability of the parameters studied decreases at the end of the experiment.

906

✓ In conclusion, we can underline that the changes in the basic anthropometric parameters are due both to the laws of biological developments of children at that age, as well as to the applied enriched educational content in the physical culture pedagogical situations.

REFERENCES

1. Slanchev, P. et. al., Physical development, physical fitness, and neuro-psychological reactivity of the Bulgarian population. III-rd National Survey (1980-1982), NSA "V. Levski", Sofia, 1992.
2. Bachvarov, M., Thematic Dictionary of Sportology. NSA PRESS, Sofia, 2005.
3. Nikolova, E., Alipieva, L., Didactic system for the preparatory group in the kindergarten (6-7 years old). MOLIVKO – teachers' book. Physical Culture Area. "WORD", Veliko Tarnovo, 2008.
4. Hadzhiev, N. et. al., Sports terminology dictionary. NSA PRESS, Sofia, 2010.
5. Rachev, K., Theory and methodology of physical education. NSA PRESS, Sofia, 1998.
6. Traykova, Ts., State of physical development and motor abilities of children attending preparatory group for school (5-7 years old). Dissertation, NSA, Sofia, 2018.
7. Yordanov, Y., Physical development of children and youths in Bulgaria on the borderline between 20 th and 21 st century. BASc,, Academic press "Prof. Marin Drinov", Sofia, 2012.
8. Chernev, V., Morpho-functional characteristics of boxing athletes. Dissertation, NSA, Sofia, 2007.
9. Peeva, P., Dimitrova, Ts., Overweight distribution in adolescents. *Sport and Science – Extraordinary Issue*, 1: 622-627, Tip-Top Press, Sofia, 2005.