



SOME ANTHROPOLOGIC CHARACTERISTICS OF CHILDREN IN PODGORICA IN 2000 AND 2009

Andjelka ŠCEPANOVIĆ¹, Danijela BULATOVIĆ²

1 University of Montenegro, Faculty of Science, Department for Biology, e-mail:stasas@t-com.me

2 Public Primary School "Oktoih", Podgorica

SYNOPSIS

Key words:

height,
weight,
size of thorax,
growth acceleration.

The aim of this paper is to determine the values of the parameters: height, weight and the size of thorax in children aged 12, 13, and 14 from Podgorica, and to compare these values with the ones measured in children of the same age, but almost ten years earlier. The data have been processed by descriptive statistics and the means of a T-test. The importance of the difference between the arithmetic mean in boys and girls in each variable has been tested by Student's t-test, whereas the level of importance has been determined at the level of $p = 0.05$. What has been determined is that the anthropologic characteristics of the children from the beginning and the end of the decade are different, but the expected acceleration is present only in boys aged 14, but not in girls. Most statistically significant differences relate to the value of the size of thorax.

INTRODUCTION

Biological growth and development of children, their motor, intellectual and emotional development, their behavior, socialization, physical and other activities need to be measured, evaluated, monitored, controlled and corrected, what might be concluded from the abundance of papers in the field of anthropometrics (RAKIĆ, R. et al., 1999). This is of great importance especially with children in preschool or early school period, when their organism is extremely subject to various influences with the effects manifested later. Some negative effects are impossible, or hardly possible to be corrected in later periods.

Previous century has brought significant acceleration of physical growth among population in industrially developed countries – the average of 1cm in 10

years, but also greater dimensions of the body in all ages. This is defined as secular trend of growth acceleration. Still, in last two decades a mild regression of the trend can be noticed – for example, at the beginning of the twentieth century it was usual to grow until the age of twenty five, whereas nowadays the height growth ends somewhere between eighteen and twenty years of age (IVANOVIĆ, B. 1996).

Growth and development are two dynamic processes which cannot be observed separately. There are some rules concerning the child's growth which are important to know in work with children – these are that growth intensity of particular organs is not always the same, growth trend is not always linear, and during their growth the organs do not increase only their weight but they also change structurally (PAVLOVIĆ, M. 2000). Growth intensity is highest during intrauterine period of life, after which it gradually decreases. Child's height growth and weight increase as the most noticeable indicators of physical growth do not go alongside. Height growth mostly takes place on the basis of bone tissue (legs and spine), while width growth and body mass increase are consequences of bone tissue growth and growth of neural, respiratory and muscle systems.

The first phase of accelerated growth comprises the period from delivery until 3 years of age. The first phase of slow growth follows, lasting from 4 to 11 -13 years old (depending on the gender). The second phase of accelerated growth (so called puberty height growth) takes place from 11 to 14 with girls, i.e. from 13 to 16 years old with boys. Consequently, the second phase of slow growth starts from 14 with girls, i.e. 16 with boys (STIJEPIĆ et al., 2008).

The issue of this paper was to investigate the trend of development of anthropometric characteristics of boys and girls of puberty age between two decades in Podgorica. The aim of this paper was to determine the progress of growth and development of children using measurement and testing in two time points, via information gained by transversal measurement method.

Activities taking place in front of the screen, such as video games, internet, cell phone and home cinema are all 'sitting' activities, resulting in the fact that children spend less time in movement and playing.

Since positive effects of physical activities on health have been proved, the World Health Organization supports member states in strengthening the policy of physical activity enhancing.

In 2004, the Global Strategy on Diet, Physical Activity and Health was adopted, aiming at enhancing the health via healthy diet and physical activity. The amount of physical activity among children depends on individual influences, parents and peers influences, while there are also differences according to the gender (boys are mostly more physically active than girls!), as well as according to the age (children are more physically active than adolescents). Although growth and development take place continuously and they mutually pervade, strict barriers among periods cannot be drawn. The division into early, middle and late childhood

and adolescence serves mainly as a criterion for comparison of a specific child in a specific period with characteristics of the population to which the child belongs according to its age, based on which child's development is monitored.

MATERIAL AND METHODS

Within the framework of this research, the data used are gained via anthropometric analysis (measuring three basic anthropometric variables) of the children in an elementary school in Podgorica in 2000, by transversal measurement method, according to the IBP manual (WEINER & LOURIE, 1969). A decade later, the same research was conducted by the same examiners, using the same methodology, but on a new sample. The data have been processed by descriptive statistics and T-test. Anthropometric measurement is a noninvasive, not expensive and objective method providing adequate data for comparison with the results reached by the same methodology. It is possible to estimate growth acceleration only after the comparison with previous research conducted on the same area. (GLIGORIJEVIĆ, 2008).

RESULTS AND DISCUSSION

The results of the comparative research are presented graphically:

As the figures 1 and 2 show, expected acceleration in height at boys happens at the age of 13, and more importantly at the age of 14, while there is no acceleration at girls. However, based on t-test, even that difference in the height of the examined population is not statistically significant ($p=0,225$). Within separate populations in 2000 between the age of 13 and 14 there is an intersection between growth curves of boys and girls, whereas in 2009 this happens somewhat earlier, i.e. at the age of 13, which can be seen from figures 3 and 4.

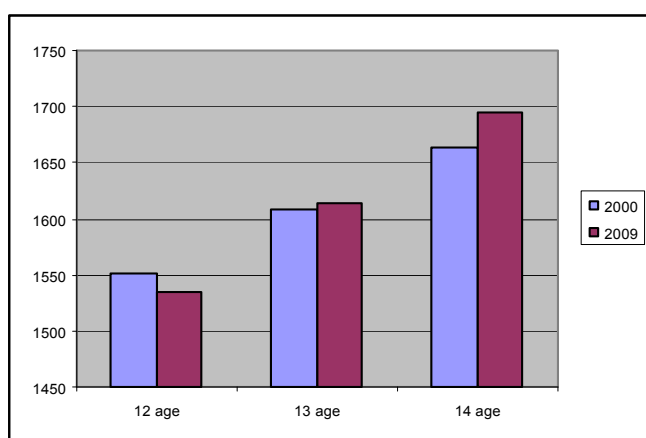


Figure 1:
Boys' height 2000/2009.

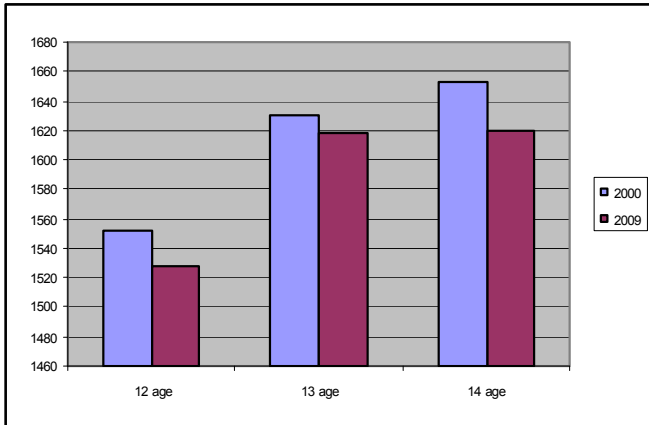


Figure 2:
Girls' height 2000/2009.



Figure 3:
Height in 2000.

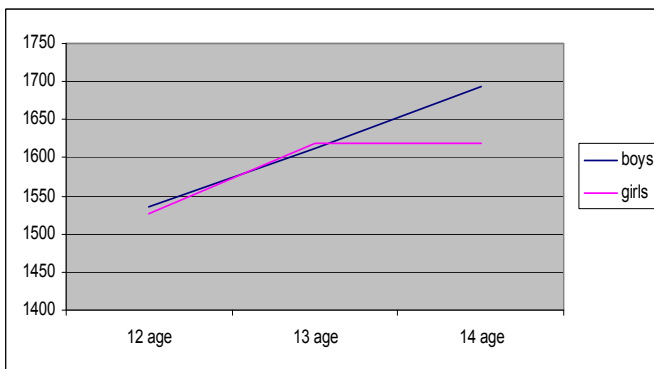


Figure 4:
Height in 2009.

As for the body weight, at the age of 13, and more significantly (and statistically $p=0,037$) at the age of 14, boys in 2009 have this parameter higher compared to their peers in 2000, which is not the case with the girls. Contrary to this, the girls in 2000 have from a statistical point of view significantly more weight at the age of 13 and 14 if compared to their peers in 2009 (0,006), which is shown in figures 5 and 6. Within separate populations in 2000 there is no intersection of body mass curves, but the girls constantly have more weight than boys, while in 2009 the boys are the ones who have higher values for this parameter, although there is a short curve intersection at the age of 13 (Figs. 7 and 8).

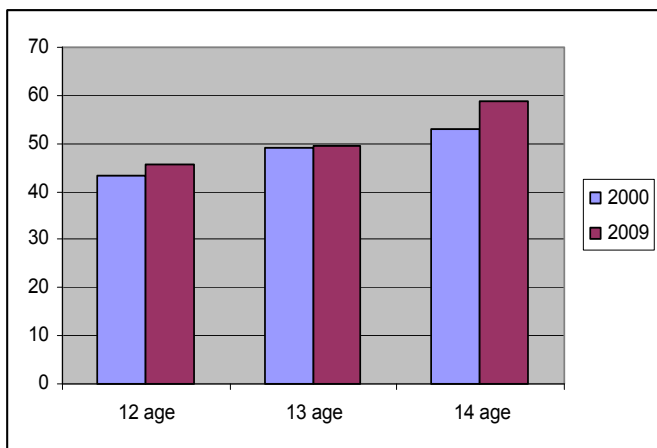


Figure 5:
Boys' weight 2000/2009.

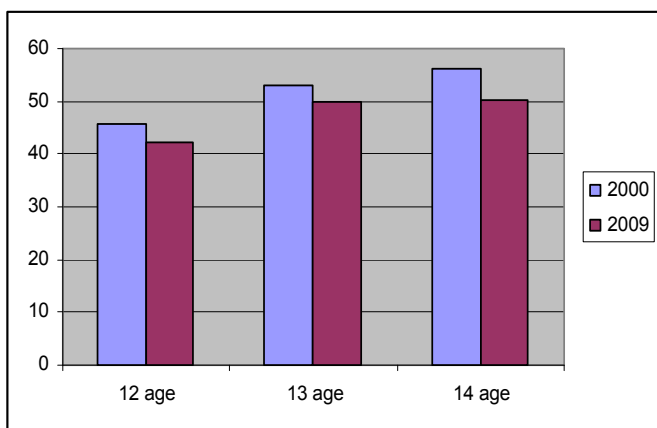


Figure 6:
Girls' weight 2000/2009.

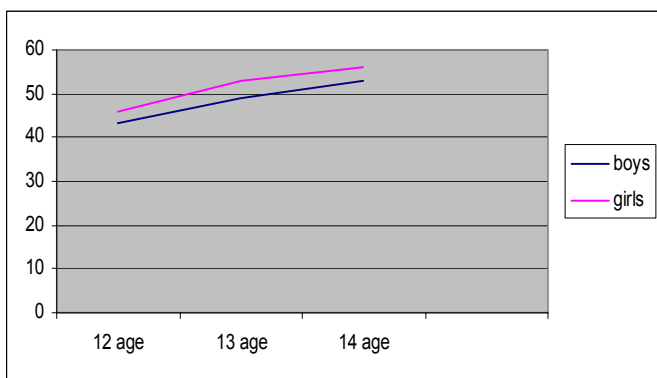


Figure 7:
Weight in 2000.

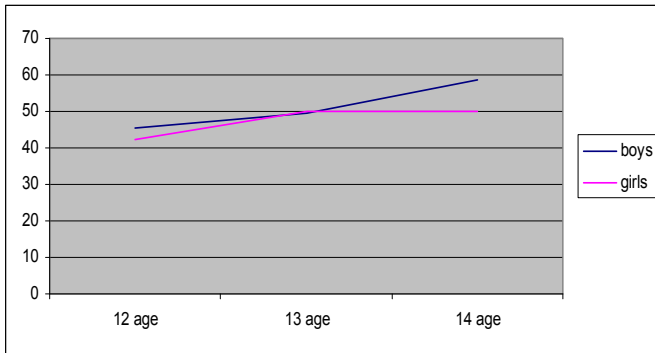


Figure 8:
Weight in 2009.

If taking into consideration the value of the size of the thorax, both boys and girls in all three age categories in 2000 had higher values of this parameter, these being even statistically of high importance at girls (Figs. 9 and 10). Through separate examination of these two populations, what is noticed is that in 2000 there is a curve intersection at the age of 12, after which the girls have this parameter value higher, with the tendency to have a curve intersection again after the age of 14. In 2009, however, there is no curves intersection and the boys constantly have higher values of the parameter for the size of the thorax (Figs. 11 and 12).

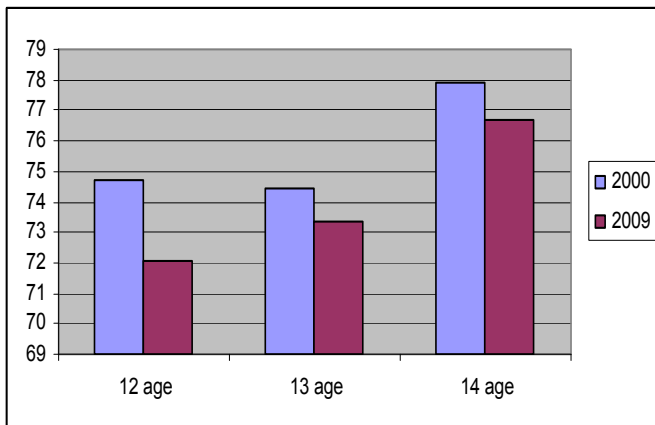


Figure 9:
The size of the thorax at boys 2000/2009.

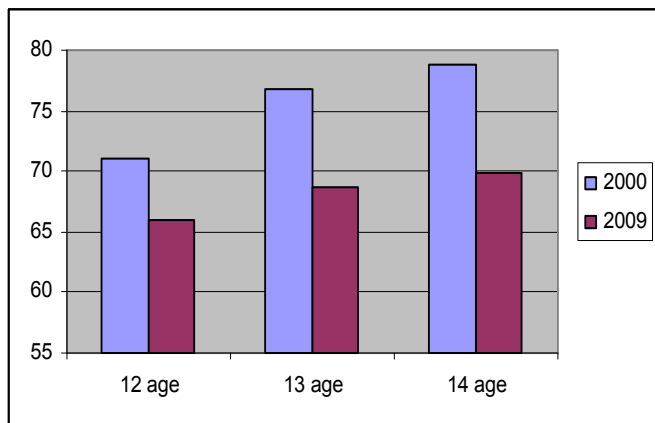


Figure 10:
The size of the thorax at girls 2000/2009.

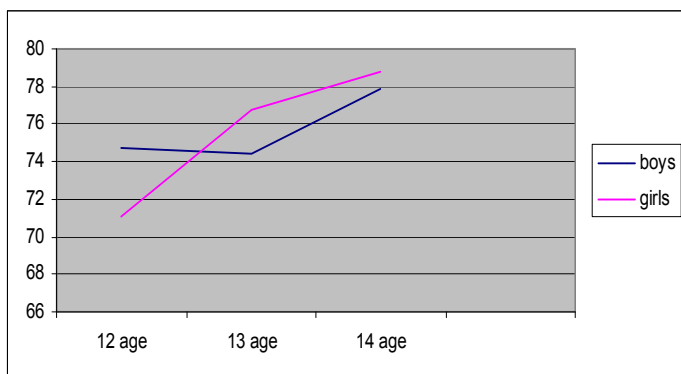


Figure 11:
The size of the thorax
in 2000.

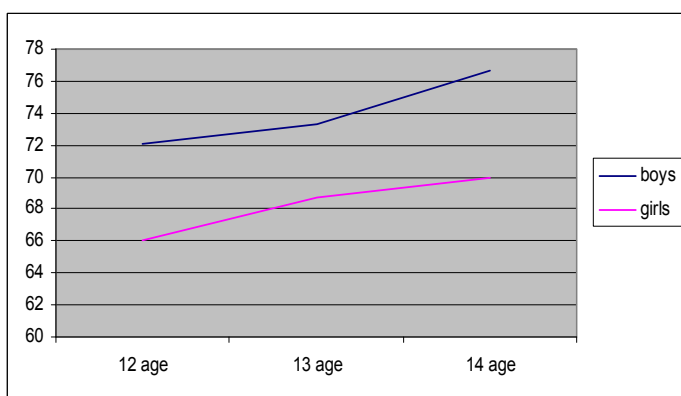


Figure 12:
The size of the thorax
in 2009.

Concerning boys, the interesting fact is that only at the age of 14 body weight value is higher in 2009 than in 2000. All parameters measured at girls have higher values in 2000 in all age categories, with the age of 14 representing even statistically significant difference. The main issue is why acceleration failed to appear as an expected phenomenon after 10 years? Similar data can be found with other authors (BOŽIĆ-KRSTIĆ et al., 2003) who examined pupils in Novi Sad. They find reasons for this in unfavorable impacts of external factors on growth, which can be reflected onto their development as well. Most probable "culprit" for this kind of situation is the development of technology, which inevitably causes the changes of life conditions, thus children spend more time in front of the computers rather than in nature, doing physical activities or some sports, which has negative influence on proper posture, as well as on healthy diet.

CONCLUSION

The populations examined in the interval of ten years fail to show expected growth acceleration. Moreover, the research shows that retrograde acceleration may

be detected. Taking into account that our findings concur with the findings of other authors from neighboring countries, we come to a conclusion that they are probably the consequence of the same, already stated, negative external factors. It is obvious that economic condition, as well as parents' support for various physical activities, their education, socio – economic status and other factors considerably influence proper growth and development of children.

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