

A Comparison of Plovdiv and Moscow Children's Height, Weight and BMI Values

M. Nikolova, E. Godina, D. Mollova*

Department of Human Anatomy and Physiology, University of Plovdiv

**Institute of Anthropology, University of Moscow*

This study compares the height, weight and BMI in children and adolescents from Moscow and Plovdiv. The results show that Plovdiv girls and boys experience an earlier growth leap than their Moscow coevals. During the period of puberty, growth rates are higher in Plovdiv's population and it associates with the higher values of BMI.

Key words: height, BMI, Bulgarians, Russians.

Introduction

Ethno-territorial differences in children's growth and physical development are an object of great importance for anthropologists in Bulgaria and abroad [1, 2, 3, 4]. The various territorial conditions determine the peculiarities of growth processes and give the opportunity to assess their role in these processes. Analyzing the alterations in some anthropometrical characteristics we can draw conclusions about the determining role of the different endo- and exogenic factors in growth processes. In the present study we compare children and adolescents from Plovdiv and Moscow in order to reveal the possible ethno-territorial differences in their growth and physical development.

Material and Methods

The subjects of observation are children and adolescents at the age of 7 to 17 years from Plovdiv and Moscow. The Russian children were studied in the years 1996-1999 and there were 1153 girls and 1152 boys. The Bulgarian children were studied in the years 2004-2006 r. and there were 1065 boys and 925 girls. The anthropometrical programmes for both excerpts include a wide range of anthropometrical characteristics, but the present study analyses the height in centimetres, done with a standard anthropometer, the weight in kilograms, read with a medical scale, and BMI proportions. The data were analysed with SPSS statistical set. The average values and standard deviations were calculated for each anthropometrical characteristic and index.

Results and Discussion

Table 1 shows the average values of the characteristics in both ethno-territorial groups of children and adolescents, as well as the differences between them in each age group. From 8 to 12 years the average height in Moscow boys is near the 50th percentile of their Plovdiv coevals and only the 7-year-olds have an average height up to the 25th percentile, i.e. they are shorter with 2.6 cm (Fig. 1). At the age of 16 and 17 Moscow boys are insignificantly taller than their Bulgarian coevals. The highest inter-population difference is at 13, when the boys from Plovdiv are taller with 4.60 cm than these from Moscow (Table 1). This is a result from the fact that their growth rate is the highest at the age between 12 and 13, while in Moscow boys it comes a year later but they retain, though insignificantly, taller in the end of the age period.

In Moscow girls, the average height to the age of 12 is near the 50th percentile of their coevals from Plovdiv and the inter-population height difference is the highest in

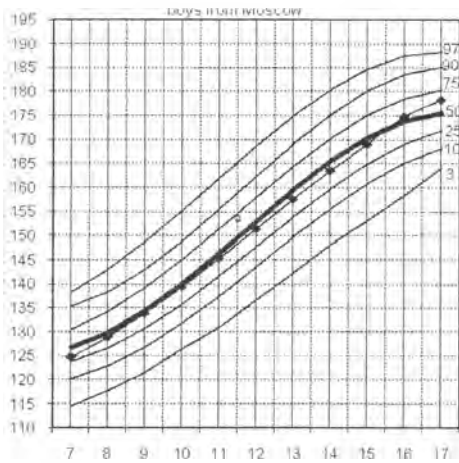


Fig. 1. Referent values of percentiles in boys from Plovdiv, compared to the 50th percentile in boys from Moscow

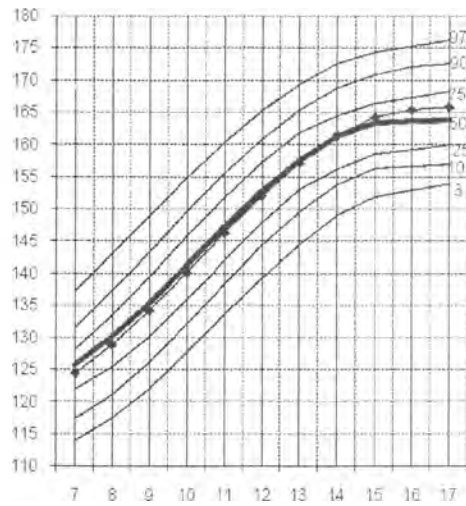


Fig. 2. Referent values of percentiles in girls from Plovdiv, compared to the 50th percentile in girls from Moscow

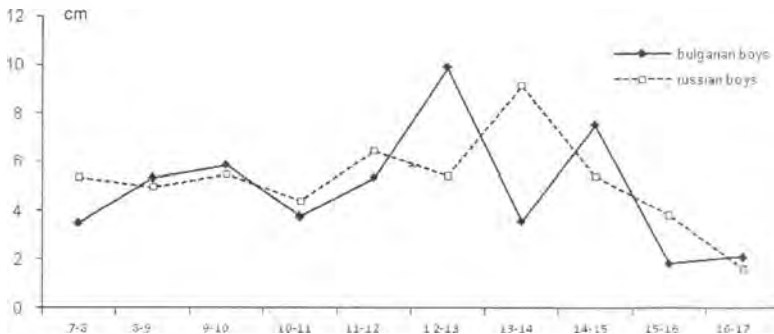


Fig. 3. Growth increments in Plovdiv and Moscow boys

11-year-olds (2 cm more for Bulgarian girls). After the age of 14 in Moscow girls, the average height is between the 50th and 75th percentile, i.e. they are significantly taller than these from Plovdiv (Fig. 2).

The growth rate cannot be assessed accurately in a transversal study, but as the both excerpts are transversal they can be compared. The growth curves are similar to the age of 12 in boys from both ethno-territorial groups, and after that the boys from Plovdiv experience a growth leap, and Moscow boys – a year later (Fig. 3). The growth rate in Moscow boys falls faster after the puberty growth leap in comparison with their coevals from Plovdiv. In girls, the growth curves are similar, taken as a whole, but in Moscow girls the growth rate is lower between the ages 8 and 10, and the growth peak is again a year later compared to these from Plovdiv (Fig. 4). The growth curve is more slanting in Moscow girls, while in these from Plovdiv, the growth rate is more concentrated between the ages of 9 and 10.

The inter-population differences in weight show that during the whole growth period Bulgarian boys are heavier than their coevals from Moscow and especially at the age of 13 (8.03 kg), while the girls from Moscow get heavier after the age of 14 (Table 1).

Table 1. Comparison of height, weight and BMI in children from Plovdiv and Moscow, at the age 7-17

Age	Height			Weight			BMI		
	Bulgarian	Russian	difference	Bulgarian	Russian	difference	Bulgarian	Russian	difference
Boys									
7	126.74	124.13	2.61***	26.72	24.69	2.03**	16.56	15.94	0.62*
8	130.66	129.48	1.18	31.81	27.61	4.20***	18.44	16.37	2.07***
9	135.98	134.45	1.53	32.17	30.75	1.42	17.30	16.92	0.38
10	141.83	139.92	1.89*	37.57	34.01	3.56**	18.51	17.23	1.28*
11	145.59	144.31	1.26	38.95	36.75	2.20*	18.24	17.51	0.73
12	150.93	150.75	0.18	45.51	41.92	3.59**	19.77	18.34	1.43**
13	160.77	156.17	4.60***	54.13	46.1	8.03***	20.72	18.76	1.96***
14	164.36	164.89	0.53	58.3	53.61	4.69**	21.41	19.45	1.96***
15	171.65	170.69	0.95	63.17	59.18	3.99**	21.71	20.69	1.02*
16	173.68	174.52	-0.84	65.63	63.20	2.43	21.71	20.69	1.03*
17	175.77	176.15	-0.38	67.73	66.29	1.44	21.94	21.34	0.60
Girls									
7	125.89	124.29	1.55	26.42	24.82	1.60*	16.66	16.00	0.66
8	129.05	129.33	-0.28	29.43	27.70	1.73*	17.57	16.44	1.13**
9	133.92	134.02	-0.1	31.62	29.85	1.77*	17.53	16.52	1.01**
10	140.80	139.26	1.54	37.16	32.53	4.63***	18.54	16.63	1.91***
11	147.76	145.75	2.01*	40.87	36.35	4.52***	18.55	16.94	1.61***
12	153.28	152.72	0.56	45.54	42.32	3.22*	19.27	18.05	1.22**
13	158.76	158.41	0.35	51.51	46.57	4.94***	20.39	18.49	1.9***
14	161.46	160.82	0.64	55.31	51.28	4.03**	21.15	19.79	1.36**
15	161.68	162.67	-0.99	52.82	55.23	-2.42	21.17	20.83	0.34
16	162.49	164.71	-2.21**	56.41	56.68	-0.27	21.35	20.53	0.82
17	162.63	164.58	-1.95*	54.67	56.68	-2.01	21.64	20.89	0.75

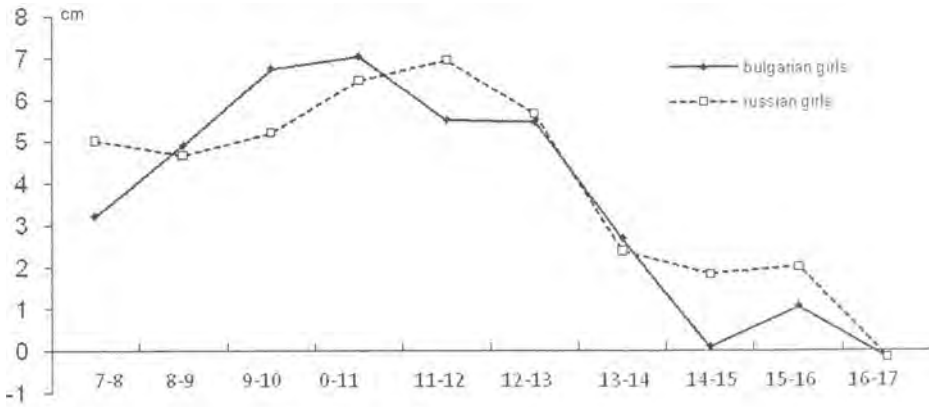


Fig. 4. Growth increments in Plovdiv and Moscow girls

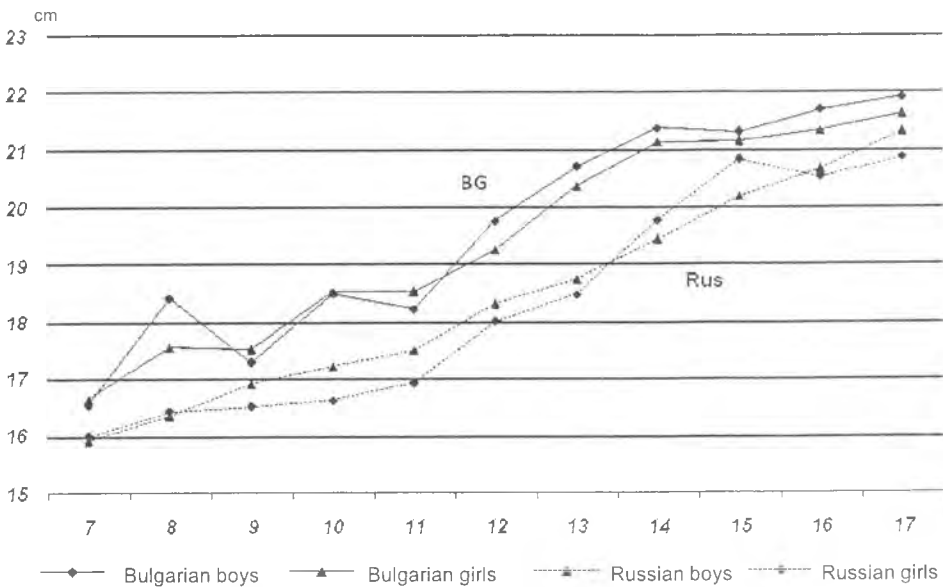


Fig. 5. Average values of BMI of Plovdiv and Moscow children

The higher values of BMI, in boys from Plovdiv at the ages 13 and 14 and in girls from 10 to 14, are associated with their heavier weight at these ages (Fig. 5).

Conclusion

Our findings show that growth processes have territorial and ethnic peculiarities. Boys and girls from Plovdiv experience an earlier growth leap than their coevals from Moscow. The growth rate falls faster in Moscow boys in comparison with these from Plovdiv, while Moscow girls have a longer growth leap. During the puberty, growth rates are higher in the population from Plovdiv, in comparison to that from Moscow. Plovdiv children's higher BMI values are associated with the higher growth rate and the lower height when growing.

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