



## The Current View on the Anthropometric Indicators of the Development of Healthy Males

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**Abstract:** Assessment of the physical health of the child population is an informative criterion for studying anthropometric indicators of growth and development, including the spinal column of various age groups. "In practical vertebratology, one of the important studies is the study and evaluation of morphometric parameters of the vertebral column, which allows early detection and prevention of the development of pathology in this area." "Anthropometric parameters, including data from the vertebral column of children, differ between different regions of the population, as there are differences in climatogeographic, ecological, socio-economic living conditions, national customs and traditions of peoples." Therefore, the identification of physical development features, including spinal changes, as well as the development of national standards of physical development for our region is one of the important tasks of modern medical science and practice.

**Keywords:** anthropometry, development, male gender, evaluation

According to I. M. Vorontsov (1986), after the age of 6, the growth rate decreases, reaching a minimum in boys at 9.5 years old. After that, boys have moderate uniform stretching until the age of 13. The absolute value of the increase in body length during the prepubertal growth leap in boys reaches 47-48 cm, the stretching of boys at 10-11 years is due to the lower extremities, between 14-15 years – the peak of the growth rate for the trunk comes.

Researchers from Kyrgyzstan (Miklashevskaya N. N., Soloviev V. S., Godina E. Z., 1988) measured the body length of Kyrgyz boys in the highlands and found that in 8 years, still 118,5-4.2 cm, girls – 117,9-4.7 cm, 9 years, respectively: 123,2-5.1 124,0-5.5 cm; 10 years was 126.4-4.6 and 126,9-5.2 cm; in 11 years – 130,4-of 5.4 and 130.1-5.7 cm in 12 years – 136,6-4,9, and 135,6-7,6 cm Girls and boys have the same body length at 8 and 9 years old. At about the age of 9, girls begin to accelerate their growth and at the age of 12 they are 3.5 cm taller than boys, which reaches a maximum between the ages of 13 and 14. At the age of 14, 1 month. – there is an intersection of growth curves and in the future boys are much taller than girls (at 15 years old – by 4.8 cm, at 16 – by 9.6 cm and at 17 – by 11.9 cm). The growth process in girls practically ends at the age of 16, and in boys the growth process continues after the age of 17.

According to T. I. Kot (1992), the length of the body and body, all latitudinal dimensions, chest and neck girths are larger in boys at most ages.

Research by N. F. Avelyanov-Yazykov (1996) showed that the growth phases from birth to adulthood had a wave-like character: the growth rates are highest in the first 3 years of life, from 9 to 11 years there is a slowdown in growth processes, 11-12 years corresponds to the phase of puberty jump, then the growth rate gradually slows down and by 17-18 years – growth stops.

Having measured the length and body weight in children aged 7-15 years, J. Wang, J. C. Thornton (2000) found that the body length among urban school-age children exceeds that of boys: in body length 7-9 and 14-15 years, in body weight at 7, 9, 15 years.

According to F. H. Alimkhodzhaev, F. N. Bahadirov, T. A. Ashurov (2003), the body length at 8 years is  $125.6 \pm 0.9$  cm, at 11 years  $142.7 \pm 1.6$  cm, at 11 years –  $142.7 \pm 1.6$  cm and at 15 years –  $165.6 \pm 2.4$  cm.

In children from 7 to the end of 12 years, the body length in both sexes increases by 1.2 times and the most intensive growth is observed in boys at 9 and 11 years, and in girls at 10 and 12 years. The body length of boys from 7 to 16 years of Nalchik increased by 27.3%, while the increase in body length in both sexes has a spasmodic character: in boys – at 12 and 16 years.

The results of the research (Koinosov A. P., Kudryashov E. V., 2008) allowed us to establish that the average male growth rate is 15-18 years increases from  $170.0 \pm 18.5$  cm to  $178.0 \pm 16.4$  cm. Against the background of a uniform increase in body length, school athletes at 10-11 years of age slow down the growth process, at 11-12 years of age there is a significant increase and the rates in the two groups coincide, and at 13-14 years of age, football players already surpass their peers in growth rates, having the most significant growth jump (more than 10 cm) at 14 years of age. According to some authors, over the past 4 years, with a continued increase in growth, both the mass and breast circumference have begun to grow.

Studies have shown that estimates of the physical development of children 3-10 years old boys living in areas in an unfavorable environmental situation have significantly lower values for almost all anthropometric indicators. The nature of the variability of individual signs of the child's body depends on the ecological situation in the area of his birth and residence, and its intensity is associated with the age and sexual characteristics of the organism, as well as with the manifestation of the urban factor, the social component and the degree of accumulation over time of the effect of anthropogenic load.

Analysis of the results of the study of 786 students showed that the body length in boys of group 1 at 7 years was  $123.2 \pm 0.62$  cm, at 8 years -  $126.3 \pm 0.67$  cm, at 9 years -  $131.6 \pm 0.75$  cm and at 10 years -  $136.6 \pm 0.73$  cm, and in sports –  $122.9 \pm 1.42$ , respectively;  $127.2 \pm 1.11$ ;  $131.3 \pm 0.82$  and  $137.2 \pm 1.01$  cm there was no significant difference between the body length indicators of boys of different age groups engaged and not engaged in sports. In three years, the body length in boys of group 1 increased by 13.4 cm, and in boys of group 2 – by 14.3 cm. In boys who do not play sports, the greatest increase in body length was observed in the age period from 8 to 9 years (5.3 cm), in athletes, the greatest increase in body length was noted a year later, i.e. at 9-10 years (5.9 cm).

According to a study by some authors (Miklashevskaya N. N., Solovyova V. S., Godina E. Z., 1988), at 8 and 9 years of age, boys have more body weight, At 15 years of age there is a second intersection of growth curves, and already at 16 years of age boys weigh more than girls by 3.0 kg, at the age of 17 – by 6.0 kg. The authors found that the maximum weight gain and body length are observed in girls two years earlier than in boys.

Some researchers have noted that the most intense growth of the muscle component is detected from 12 to 15 years. After 15 years, the quantitative growth of muscle tissue is at an average pace. The growth curve of the indicators of the bone component also has an age variability from 8 to 11 years, the growth of bone mass is at a minimum pace. The period from 12 to 15 years is characterized by intensive processes in the development of bone tissue and maximum in the development of increases in digital indicators. After 15 years, the relative stabilization of the ratios of the bone component and total body weight is determined. In boys from 7 to 12 years old living in high-altitude conditions, body weight increases by 1.4 times (from  $21.5 \pm 0.3$  to  $31.4 \pm 0.2$  kg), the most intense weight increases in boys at 10-11 years of age, Body length increases by an average of 21.3 cm in boys during this period, intensive growth occurs in boys at 10 years old.

According to T. V. Per Annum (2009), when comparing the antero-posterior and transverse dimensions of the chest in Chukotka boys at the end of puberty with the indicators in Even boys,

indicates greater adaptive capabilities of children of the Magadan region, despite their smaller initial sizes at the beginning of puberty. The aborigines of the North-East have different types of adaptation changes associated with social conditions. The aborigines of Chukotka are characterized by a large longitudinal growth due to an increase in the length of the lower extremities, an increase in body fat mass, while the aborigines of the North Even region retain the genetic type, having a large trunk length, body proportion and indicators of the component composition of body weight during puberty.

A number of authors (Kiselevski Y., Strigan A., 1999), having studied 196 boys aged 10-19 years, indicated that the longitudinal diameter of the head increases from 177 mm in 10-11 years, to 187 mm in 18-19 years, the transverse – from 134 mm to 142 mm, and the head index decreases – from 77.4 to 74.8. According to A.V. Shipitsina, 2000, it follows that if we take the final dimensions of the head of adolescence for 100%, then at birth on time all sizes average 58.7%; the facial section in boys is 54.3%, the brain section in boys reaches 63.2%. Sexual features of the structure of the head begin to manifest themselves in early childhood, but the final formation of sexual dimorphism occurs during puberty and persists at all other age stages.

According to the authors' research, in boys aged 17-19, the longitudinal diameter of the head is  $18.7 \pm 0.04$  cm, the transverse diameter is  $14.7 \pm 0.02$  cm, the circumference of the head is  $57.2 \pm 0.06$  cm.

Researchers averaged 1.0 cm (from  $50.5 \pm 0.9$  to  $51.5 \pm 0.7$  cm). In boys, the growth of the head circumference occurs evenly, and in girls – abruptly, especially at the age of 8. The longitudinal diameter of the head in boys at the studied ages increases by an average of 0.6 cm (from  $17.0 \pm 0.2$  to  $17.6 \pm 0.16$  cm), the longitudinal diameter in boys increases most intensively at 8 years old, and in girls the growth occurs almost uniformly. The transverse diameter of the head in boys from 7 to 12 years increases by 0.3 cm (from  $12.1 \pm 0.1$  to  $12.4 \pm 0.1$  cm), intensive growth in boys is observed at 8 and 10 years, and in girls at 11 years. The height of the head in both sexes increases by 0.8 cm (in boys from  $17.8 \pm 0.1$  to  $18.6 \pm 0.1$  cm, in girls – from  $17.6 \pm 0.1$  to  $18.4 \pm 0.1$  cm) and the most intensive growth occurs in boys at 9 years old, in girls at 11 years old.

The authors (Klementa J., Kratozka J., Komenta S., 1983) note that from 4 to 17 years the circumference of the head increases by 10%. At the age of 17, boys have a head circumference of 2-3% less than girls.

Works (Astanakulova S. A., Jalilov, 1998) have established that Uzbek boys at primary school age have an interosseous distance ranging from  $18.9 \pm 0.2$  to  $24.7 \pm 0.4$  cm. Boys Uzbeks (Astanakulov S. A., M. M. Jalilov, 1998) at the age of 7 dot 12 years of longitudinal size of the head is increased from  $24.4 \pm 0.2$  to  $27.6 \pm 0.1$  cm, transverse, respectively: from  $19.0 \pm 0.2$  to  $22.2 \pm 0.6$  cm vertical –  $15.0 \pm 0.2$  to  $19.8 \pm 0.5$  cm

The results of the study (Astanakulova S. M., 1998) showed that at the age of 8, the Uzbeks of Asaki had a chest circumference at the level of the armpit –  $55.0 \pm 3.0$  cm, at the level of the nipple –  $57.0 \pm 5.0$  cm; at the level of the base of the xiphoid process of the sternum –  $56.0 \pm 3.0$  cm, the transverse size of the chest at the level of the axillary the depression is  $18.1 \pm 1.1$  cm, at the level of the nipple –  $18.8 \pm 1.1$  cm and at the level of the base of the xiphoid process –  $18.5 \pm 1.4$  cm; the antero-posterior size of the chest at the level of the armpit is  $12.6 \pm 1.6$  cm, at the level of the nipple –  $13.1 \pm 0.9$  cm and at the level of the base of the xiphoid process of the sternum –  $13.3 \pm 1.1$  cm.

Studies by the authors (Baranova E. N., Yurchuk O. A., Tsikin V. I., 2004) showed that in girls from 10 to 17 years old, the circumference of the chest increases from 66.08 cm to 83.3 cm; the transverse diameter – from 19.8 cm to 24.18 cm. According to J. S. Soorbekov (2004), in Kyrgyz children from 7 to 12 years old, the chest circumference at the levels of the armpit and nipple increases in boys by 1.1 times, at the level of the base of the xiphoid process of the sternum – 1.1 times. At the same time, the chest girth increased, in boys by an average of 7.0 cm, and in girls – by 11.0 cm. The circumference of the chest at the level of the armpit in boys aged 7-12 years in the conditions of the middle mountains increases by an average of 9.2 cm (from  $59.4 \pm 0.3$  cm to  $68.7 \pm 0.2$  cm), at the level of the base of the xiphoid process.

According to A. T. Baigazinova (1999), body length among boys increased from  $64,0 \pm 0,2$  to  $72,1 \pm 0,4$  cm, body length, respectively: from  $39,4 \pm 0,2$  to  $43,9 \text{ per} \pm 0,2$  cm and between  $38,5 \pm 0,1$  to  $44,8 \pm 0,3$  cm. The maximum annual increase in these parameters was observed in boys aged 8 and 12. In boys, the transverse diameter of the chest at 8 years is  $16,7 \pm 0,4$  cm; anterior-posterior - respectively:  $14,1 \pm 0,2$  cm and  $17,1 \pm 0,4$  cm (Alimkhodzhaev F. H., Bahadirov F. N., Ashurov T. A., 2003).

The authors (Tlakadugova M. Kh., Yakushchenko M. N., Urusbambetov A. Kh., 2010) studied the anthropometric indicators of 2,428 schoolchildren of 7-18 years of Nalchik. It was found that the first intersection of the curves of the absolute values of the studied values in boys and girls occurs at 9-10 years, the second – at the age of 12-14. Thus, sexual dimorphism manifests itself from the age of 9-10. In boys, the first peak of the growth rate reaches the length of the lower limb (6.3-6.4%) in 10-11 years. In all parameters, the greatest variability was found in the body mass index, in boys at 10 years old ( $C_v=23,7\%$ ). In boys, there is a smaller increase in the width of the pelvis, the transverse diameter of the chest, the width of the shoulders and the circumference of the chest.

The authors (Astanakulova S. A., 1999; Astanakulova S. A., Jalilova M. M., 1998) determined that the length of the free upper limb in Uzbek boys from 7 to 12 years increases by 1.2 times (right - from  $48,6 \pm 0,3$  to  $61,7 \pm 0,5$  cm; left – from  $48,6 \pm 0,3$  to  $61,6 \pm 0,5$  cm), the length of the right and left upper limbs is the same. The most intensive growth is observed in boys aged 8, 9 and 12 years. Intensive growth of the length of the upper and lower limbs is observed from 2 to 4 years. The authors found that children under 17 years of age are characterized by uneven growth of individual parts of the skeleton, in particular the length of the free upper and lower limbs.

Researchers (Jeenbaev Zh. Zh., Kosimkhodzhaev I., Mirbabayeva S. A., 2004) found that the length of the right and left upper limbs in boys from 7 to 12 years increases by 1.2 times, the most intensive growth in the first occurs at 9 and 11 years, in the second – at 9 and 12 years of age.

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