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CONTENT

MORPHOMETRIC INDICATORS OF PHYSICAL DEVELOPMENT AND SPINE IN GIRLS UNDER 8 YEARS OF AGE

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Abstract. The aim of the study was to study the parameters of the physical development of healthy girls under the age of 8 years and compare them with the parameters of the spinal column. It was found that the highest rate of increase in body weight, height and length of the spinal column is observed in 1- and 2-year-old girls, and the smallest at 3 years and 7 years. Longitudinal parameters and body weight in females up to 8 years of age grows more in 1- and 2-years of life, and transverse dimensions in 1- and 3-years of life. It was revealed that at the age of 3 and 7 years, the growth of longitudinal sizes slows down, and at 5 and 6 years of age - the transverse. The parameters of the spinal column in girls aged 0-7 years change abruptly, depending on the period of development of children. morphometric parameters of the spinal column changed with age - in the early period of childhood they were noted in the cervical and lumbar spine, and in the second period of childhood they were more pronounced in the thoracic and sacral spine.

Keywords: morphometric parameters, physical development, spinal column, female children.

INTRODUCTION. One of the most important tasks of morphologists is the study of age, individual, sex and anthropometric characteristics of the organism at different stages of ontogenesis under different specific conditions and on this basis the development of preventive measures [4, 7, 13].

The preschool period is a special period of postnatal development, which is characterized by a change in many morphometric parameters of various parts of the human body, especially a peculiar change in the spinal column [1, 9].

An informative criterion for assessing the physical health of children is the study of anthropometric indicators of growth and development of various age groups. Without studying the anthropometric normative parameters of different age groups, it is impossible to predict pathologies among children [3, 7, 12, 13].

The anthropometric parameters of children differ between different regions of residence of the population, since there are differences in climatogeographic, ecological, socio-economic conditions of residence, national customs and traditions of peoples living in different territories [5, 8, 11].

It is known that in childhood, the child's spine not only performs all its functions, but is also in conditions of postnatal development. The vertebral column is a biomechanically important system-forming element of the skeleton. Its anatomical, physiological and biomechanical properties significantly affect the formation of posture and the state of human health. The spine and related structures play a leading role in maintaining and maintaining an upright posture. This task is associated with the antigravity work of each of the elements of the spine [2, 6, 14].

Consequently, the identification of the features of physical development, as well as the development of national standards for changes in the spinal column depending on the age and gender of children for our region is one of the important tasks of modern medical science and practice.

Purpose of the study. To study the parameters of the physical development of healthy girls in a comparative aspect at the age of up to 8 years and compare them with the longitudinal parameters of the spinal column.

MATERIALS AND METHODS. The material for the study was practically healthy children from maternity hospitals, inmates of kindergartens and schools in the city of Bukhara. A total of 216 girls under the age of 8 (0-7 years) were examined. By age the girls were distributed as

follows: newborns (n = 10); up to 1 year (n = 20); 2-year-olds (n = 20); 3-year-olds (n = 35); 4-year-olds (n = 25); 5-year-olds (n = 32); 6-year-olds (n = 34); 7-year-olds (n = 40).

Body weight is measured using medical scales for newborns (up to 1 year old) and for adults in kilograms (kg).

Standard height meters were used to measure height. In this case, the child's body was free, without touching the vertical bar. The measurements of the length of the body while standing, sitting, as well as the length of the body were carried out.

Measurement of the chest circumference was carried out using a meter measuring tape.

To measure the height of the spinal column, its parts separately, the height of the intervertebral discs and the longitudinal dimensions of the vertebral foramen, we used images of digital radiography, computed tomography (CT), and magnetic resonance imaging (MRI). To analyze the parameters of the spinal column, the program “MLV. Ink. Philips ".

The obtained data were subjected to statistical processing on a computer with a Pentium-IV processor using the Microsoft Office Excel-2003 software package, including the use of built-in statistical processing functions.

RESULTS AND DISCUSSION. Studies have established that the body weight of newborns ranged from 3.30 kg to 3.78 kg - the average was 3.54 ± 0.18 kg. As shown in the first 3-5 days after birth, there was a physiological weight loss of 200-245 g of the initial weight. This weight was restored within 10-12 days after birth.

The growth indicators of female newborn children ranged from 46.0 cm to 52.0 cm, averaging 49.0 ± 2.23 cm.The chest circumference ranged from 10.7 cm to 13.7 cm, averaging 12. 2 ± 0.48 cm, and the transverse diameter of the chest ranged from 6.9 cm to 10.8 cm, averaging 8.85 ± 0.35 cm.

The measurements showed that the total length of the spinal column in newborns ranged from 21.5 cm to 27.0 cm (on average 24.25 ± 1.2 cm). The length of the cervical spine varied from 2.0 cm to 3.0 cm - on average, 2.5 ± 0.3 cm (10.3% of the total length of the spinal column). The length of the thoracic region was in the range of 10.5-14.5 cm - on average 12.5 ± 0.5 cm (51.5% of the total length). The length of the lumbar spine ranged from 4.0 cm to 6.5 cm, on average 5.25 ± 0.4 cm (21.6% of the total length). The length of the sacrococcygeal region varied from 3.5 cm to 6.0 cm - on average 4.75 ± 0.3 cm (1% of the total length of the spinal column).

The height of girls of infancy (1 year old) varied from 60.6 cm to 76.0 cm - on average 68.3 ± 2.72 cm.Body weight ranged from 6.8 kg to 9.6 kg - on average it was 8 , 2 ± 0.41 kg. The chest circumference in the pause ranged from 28.3 cm to 33.3 cm - an average of 30.8 ± 1.0 cm.The transverse chest diameter ranged from 7.9 cm to 11.0 cm - an average of 9.45 ± 0, 58 cm.

The longitudinal parameters of the spinal column in girls 1 year old did not change evenly. The total length of the spinal column ranged from 31 cm to 33.5 cm, which averaged 32.25 ± 1.5 cm.The length of the cervical spine varied from 2.5 cm to 3.5 cm - on average 3.0 ± 0, 3 cm (9.3% of the total length of the spinal column). The length of the thoracic region ranged from 17.5 cm to 20.5 cm - on average 19.0 ± 0.5 cm (58.9% of the total length). The length of the lumbar spine ranged from 6.0 cm to 8.5 cm - on average 7.25 ± 0.4 cm (22.4% of the total length). The length of the sacrococcygeal region varied from 4.5 cm to 6.0 cm - on average, 5.25 ± 0.3 cm (16.2% of the total length of the spinal column).

With increasing age, the parameters of physical development of children also gradually increased. So the growth of 2-year-old girls was from 78.6 cm to 89.4 cm - on average 84.0 ± 4.12 cm.The weight of their body ranged from 11.7 kg to 14.5 kg - on average it was equal to 13.1 ± 0 , 65 kg. The chest circumference in the pause ranged from 33.4 cm to 36.0 cm - on average 34.7 ± 1.35 cm.The transverse diameter of the chest ranged from 10.2 cm to 12.0 cm - on average 11.1 ± 0.44 cm.

In the second year of life of the surveyed girls, the total length of the spinal column ranged from 36.0 cm to 38.5 cm, averaging 37.25 ± 1.2 cm. The length of the cervical spine varied from 3.0 cm to 3.5 cm, being in average -3.25 ± 0.5 cm (8.7% of the total length of the spinal column). The length of the thoracic spine was in the range of 20.5-21.5 cm, on average - 21.0 ± 0.7 cm

(56.3% of the total length). The length of the lumbar spine ranged from 6.0 cm to 6.5 cm, averaging 6.25 ± 0.4 cm (16.7% of the total length). The length of the sacrococcygeal region varied from 5.5 cm to 6.2 cm, averaging 5.85 ± 0.3 cm (15.7% of the total length of the spinal column).

Studies have found that the height of 3 year old female children varied from 83.0 cm to 94.0 cm, averaging 88.5 ± 4.40 cm, and body weight ranged from 11.4 kg to 14 kg, on average. was equal to 12.7 ± 0.87 kg. In girls of this age, the chest circumference in the pause ranged from 46.3 cm to 52.2 cm, on average 49.25 ± 2.26 cm. The transverse diameter of the chest ranged from 13 , 9 cm to 18.0 cm, on average 15.95 ± 0.48 cm.

The total length of the spinal column of 3-year-old girls ranged from 37 cm to 39.3 cm, averaging 38.15 ± 1.2 cm.The length of the cervical spine varied from 3.5 cm to 4.0 cm, on average 3.75 ± 0.4 cm (9.8% of the total length of the spinal column). The length of the thoracic region ranged from 21.5 cm to 22.5 cm, on average 22.0 ± 0.5 cm (57.6% of the total length). The length of the lumbar spine ranged from 6.5 cm to 7.8 cm, with an average of 7.15 ± 0.3 cm (18.7% of the total length). The length of the sacrococcygeal region varied from 5.5 cm to 6.2 cm, averaging 5.85 ± 0.3 cm (15.3% of the total length of the spinal column).

It was found that the height of 4 year old female children varied from 88 cm to 104 cm - an average of 96.0 ± 4.55 cm.The body weight ranged from 12.6 kg to 15.6 kg - on average it was 14, 4 ± 0.99 kg. Their chest circumference in the pause ranged from 49 to 55 cm - on average 52.0 ± 2.34 cm, and the transverse diameter of the chest ranged from 12.4 cm to 18.6 cm - on average 15.5 ± 0.43 cm.

It was revealed that the total length of the spinal column in 4 year old female children ranged from 36.8 cm to 47.8 cm, averaging 42.3 ± 2.42 cm. The length of the cervical spine varied from 3.5 cm to 5.96 cm, on average 4.73 ± 0.28 cm (11.1% of the total length of the spinal column). The length of the thoracic region ranged from 15.72 cm to 29.9 cm, averaging 22.81 ± 1.14 cm (53.9% of the total length). The length of the lumbar spine ranged from 4.78 cm to 8.58 cm, averaging 6.68 ± 0.34 cm (15.7% of the total length). The length of the sacrococcygeal region varied from 5.32 cm to 9.8 cm, averaging 7.56 ± 0.43 cm (17.87% of the total length of the vertebral column).

In the course of the studies, it was revealed that the height of 5 year old female children varied from 101.0 cm to 108.0 cm, averaging 104.5 ± 4.96 cm.The weight of their body ranged from 15.6 kg to 18.2 kg, on average was equal to 16.9 ± 0.80 kg. In girls of this age, the chest circumference in the pause ranged from 52.0 cm to 57.0 cm, averaging 54.5 ± 2.67 cm, and the transverse diameter of the chest ranged from 13.2 cm to 24.6 cm, in averaging 18.9 ± 0.24 cm.

The measurements showed that the total length of the spinal column in 5 year old female children ranged from 38.0 cm to 44.8 cm, on average 41.4 ± 2.12 cm. The length of the cervical spine varied from 4.18 cm to 6.2 cm, on average 5.19 ± 0.28 cm (12.5% of the total length of the spinal column). The length of the thoracic region ranged from 14.96 cm to 30.9 cm, on average 22.93 ± 1.14 cm (55.38% of the total length). The length of the lumbar spine ranged from 5.67 cm to 8.79 cm, with an average of 7.23 ± 0.34 cm (17.4% of the total length). The length of the sacrococcygeal region varied from 6.09 cm to 9.8 cm, averaging 7.94 ± 0.43 cm (19.17% of the total length).

The height length in 6 year old female children varied from 107 cm to 117.5 cm, which averaged 112.25 ± 5.12 cm.The body weight ranged from 15.9 kg to 22.1 kg, on average was 19 , 0 ± 1.09 kg. In addition, in these girls, the chest circumference in the pause ranged from 53.4 cm to 60.4 cm, averaging 56.9 ± 0.27 cm, and the transverse diameter of the chest ranged from 14.8 cm to 19.5 cm, which averaged 17.15 ± 0.45 cm.

Careful measurements of the spinal column showed that in 6 year old girls its length fluctuated between 40.0 cm and 50.1 cm, averaging 45.05 ± 2.64 cm. The length of the cervical spine varied from 6.0 cm to 6.8 cm, averaging 6.4 ± 0.34 cm (14.20% of the total length of the spinal column). The length of the thoracic region ranged from 17.7 cm to 30.8 cm, averaging 24.25 ± 1.53 cm (53.82% of the total length). At the same time, the length of the lumbar spine

fluctuated between 7.64 cm and 8.58 cm, averaging 8.11 ± 0.4 cm (18.0% of the total length). The length of the sacrococcygeal region varied from 7.8 cm to 10.2 cm, averaging 9.0 ± 0.54 cm (19.97% of the total length of the spinal column).

The above measurements were also carried out in girls of 7 years of age. Studies have found that the length of height in female children of this age group varied from 117.0 cm to 127.0 cm, averaging 122.0 ± 5.12 cm, and body weight ranged from 16.2 kg to 21.8 kg, on average was equal to 19.0 ± 1.06 kg. In the same girls, the chest circumference in the pause was in the range from 54.0 cm to 64.2 cm, averaging 59.1 ± 3.11 cm, measurements of the transverse diameter of the chest gave the following results: the range of fluctuations from 16.9 cm to 19.5 cm, the average figure is 18.2 ± 0.53 cm.

The total length of the spinal column in the same 7-year-old female children ranged from 36.29 cm to 56.61 cm, averaging 46.45 ± 2.45 cm. The length of the cervical spine varied from 3.94 cm to 7.58 cm, averaging 5.76 ± 0.4 cm (12.4% of the total length of the spinal column). The length of the thoracic region ranged from 18.87 cm to 29.8 cm, averaging 24.33 ± 1.53 cm (52.37% of the total length), and the length of the lumbar region ranged from 6.2 cm to 9.2 cm. averaging 7.7 ± 0.54 cm (16.5% of the total length). The length of the sacrococcygeal region varied from 6.76 cm to 10.6 cm, averaging 8.68 ± 0.4 cm (18.68% of the total length).

Comparing the growth rates of morphometric parameters of physical development and parameters of the spinal column of girls from newborn to 7 years of age, we found that the highest rate of increase in body weight, height and length of the spinal column is observed in 1- and 2-years of life, and the smallest at 3 years and 7 years (Table 1).

It was found that the rate of increase in the size of the chest circumference and the transverse diameter of the chest in girls from newborn to 7 years old was highest at 1 and 3 years old, and the lowest at 5- and 6 years old.

The study found that the longitudinal parameters and body weight in females up to 8 years of age grows more in 1- and 2-years of life, and the transverse dimensions in 1- and 3-years of life. It was revealed that at the age of 3 and 7 years the growth of longitudinal sizes slows down, and at 5 and 6 years of age - the transverse ones.

Table 1

Indicators of the growth rate of morphometric parameters of the body and spinal column up to 8 years of age in females, in%

Age	Height	Weight	Chest circumference	Transverse chest diameter	Vertebral column length
1 year	39,4	131,6	38,7	8,7	33,6
2 year	20,9	54,8	12,7	15,4	17,2
3 year	6,7	3,5	37,2	39,6	2,7
4 year	9,1	9,5	7,7	5,2	10,0
5 year	10,7	9,0	4,1	3,7	2,3
6 year	8,7	21,0	4,5	3,6	5,1
7 year	8,9	1,1	7,9	4,0	2,1

Such changes, in our opinion, are associated with a change in the type of nutrition (from breastfeeding to mixed and from mixed to independent) and lifestyle (from diaper to crawling, from crawling to walking, as well as the beginning of school age).

The morphometric parameters of the spinal column in the examined girls 0-7 years old are summarized in table. 2. This table can be used to judge the longitudinal parameters of the spinal region in a comparative aspect with the increase in the age of the studied girls.

Analysis of the results obtained for measuring the spinal column shows that the length of the thoracic spine is more than half of its total length. Of all the departments, the thoracic part of the spinal column in the 1st year of life and in subsequent years (at the age of 7 inclusive) increases at a high rate (Table 2).

This is apparently associated with the growth and development of the organs of the chest cavity and their functions, depending on the age of the studied female children.

Table 2

Morphometric parameters of the spinal column in girls under 8 years old

Age	Total length	Cervical length	Thoracic length	Lumbar length	The length of the sacrococcygeal region
Newborn.	24,25±1,20	2,5±0,30	12,5±0,5	5,25±0,40	4,75±0,3
1 year	32,25±1,5	3,0±0,30	19,0±0,5	7,25±0,40	5,25±0,3
2 year	37,25±1,2	3,25±0,50	21,0±0,7	6,25±0,40	5,85±0,3
3 year	38,15±1,2	3,75±0,40	22,0±0,5	7,15±0,30	5,85±0,3
4 year	42,3±2,42	4,73±0,28	22,81±1,14	6,68±0,34	7,56±0,43
5 year	41,4±2,12	5,19±0,28	22,93±1,14	7,23±0,34	7,94±0,43
6 year	45,05±2,64	6,4±0,34	24,25±1,53	8,11±0,40	9,00±0,54
7 year	46,45±2,45	5,76±0,40	24,33±1,53	7,7±0,54	8,68±0,4

We found that the growth rate of the cervical spine until 2 years of age was relatively slow. We argue that this is due to the function of vertical holding of the girls' head, which is supported by the cervical vertebrae. It should be noted that at this age cervical lordosis begins to form.

Starting from 2 years of age in girls, the growth rate of the lumbar and sacrococcygeal spine markedly decreased. This was due to the beginning of the girl's direct walking, in which the main load falls on these parts of the spinal column.

In addition, the indicators of the growth rates of the morphometric parameters of the spinal column in girls under 7 years of age were determined in a comparative aspect (Table 3).

Table 3

Indicators of growth rates of morphometric parameters of the spinal column up to 8 years of age in females, in%

Age	Cervical length	Thoracic length	Lumbar length	The length of the sacrococcygeal region
Newborn.	10,0	51,4	21,52	17,1
1 год	11,0	51,4	20,56	17,0
2 года	11,4	55,15	14,73	17,98
3 года	11,5	54,45	15,7	18,35
4 года	12,0	54,45	15,8	17,75
5 лет	12,0	52,95	16,7	18,35
6 лет	12,0	52,95	16,7	18,35
7 лет	12,4	52,4	16,5	18,7

It was found that the growth rates of these parameters of the spinal column in girls are not the same depending on age and do not change in the same way. The relationship between the increase in the object under study and the increase in the functional activity of the girls' body was revealed.

It was proved that the growth rate of the spinal column in girls in length at 4-7 years old significantly decreased - cervical lordosis was formed, at 6 years old lumbar lordosis was completely formed, and at 7 years of age, sacral kyphosis was formed in the girls examined by us.

CONCLUSION.

1.It was found that the highest rate of increase in body weight, height and length of the spinal column is observed in 1- and 2-year-old girls, and the smallest at 3 years and 7 years. The rate of increase in the size of the circumference of the chest and the transverse diameter of the chest in girls from newborn to 7 years, inclusive, was the highest at 1 and 3 years, and the lowest at 5 and 6 years of age.

2.Longitudinal parameters and body weight in females up to 8 years of age grows more in 1- and 2-years of life, and transverse dimensions in 1- and 3-years of life. It was revealed that at the age of 3 and 7 years the growth of longitudinal sizes slows down, and at 5 and 6 years of age - the transverse ones. Such changes are associated with a change in the type of diet and lifestyle of the child.

3.It was found that the parameters of the spinal column in girls aged 0-7 years change abruptly, depending on the period of development of children. In the early period of childhood, there was a rapid growth of the spinal column in girls 0-7 years old.

4.The ratios of morphometric indicators of different parts of the spinal column (cervical, thoracic, lumbar and sacrococcygeal) changed with age - in the early period of childhood they were noted in the cervical and lumbar spine, and in the second period of childhood they were more pronounced in the thoracic and sacral spine.

5.In newborns, the intervertebral discs were half the length of the entire spinal column. In newborns, the long bends (kyphosis) of the thoracic spine is completely completed by the age of 6-7 years. Lordosis of the lumbar spine in newborns is poorly expressed, but cervical lordosis is absent. They become pronounced by 9-12 months and are formed by 6-7 years of age, regardless of the sex of the child.

6.It has been proven that the length of the thoracic spine is more than half of the total length of the spinal column. Of all parts of the spinal column, the thoracic part in the first year of life and in subsequent years (up to 4 years of age) increased at a high rate, this is due to the growth and development of the organs of the thoracic cavity and their functions.

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