Assessment of Changes in Trunk Parameters in Children with Scoliosis

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<th>Article History</th>
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<td>Received: 06 June 2023</td>
<td>In this article, we examined the anthropometric data of the physical parameters of children with scoliosis under the age of 12. A total of 400 people of both sexes with asthenic, hypersthenic and normosthenic body types were under observation, divided into three age periods (newborns (the first 4 weeks after birth), the first period of childhood (3-7 years) and the second period of childhood (8-12 years). Physical indicators include body length and weight, gowdy circumference. Anthropometric studies of children were studied using a centimeter tape, the data obtained were statistically processed. In the statistical processing of the study data, the method of variational statistics was used with the calculation of the arithmetic mean (M), the error of the arithmetic mean (±m), the degree of reliable probability (P). The results of the study show that the curvature of the spinal column leads to the fact that the morphological parameters of different parts of the body become smaller compared to healthy children. In the first period of childhood, when these indicators were almost the same in both sexes, significant differences were found in the second period of childhood. Thus, it was found that during puberty, the lag of anthropometric indicators in children with scoliosis is aggravated in comparison with healthy children.</td>
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<td>Revised: 05 Sept 2023</td>
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<td>Accepted: 14 Nov 2023</td>
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<td>CC License</td>
<td>Keywords: Healthy Children, Hypersthenic and Normosthenic</td>
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1. Introduction

Scoliosis is a lateral curvature of the spine, which is dangerous for severe complications, especially for a growing child's body. In 80% of the number of people with this pathology, idiopathic scoliosis is diagnosed. In most cases, parents skip the initial stage of pathology development and turn to specialists when spinal deformity is very visible [1, 2].

One of the urgent tasks of modern clinical anthropology is to study the morphofunctional features of the human body in various periods of ontogenesis. In this regard, the issues of studying the child's constitution and morphological features of a growing organism are becoming more relevant. Scoliosis is a disease that is not only accompanied by curvature of the spine, but also causes various deformities in other parts of the child's body [3, 4].

To date, a significant omission in all ongoing research is the lack of scientific research that is aimed at the systematic study of the anthropometric-physical and physical parameters of the body from the point of view of their use in assessing the health of the population, diagnostics, as well as primary prevention [5, 6].

Given the chronic nature of scoliosis, the presence of concomitant pathology of internal organs, brain, and subsequently, with the progression of the disease, transformation into psychological and social problems, it should be concluded that scoliosis in children is a socially significant problem of physiology and medicine. One of the ways to solve this problem is the timely detection of the disease, understanding the causes of its development, especially in the early stages, when it is characterized by a pain-free form and less expression of orthopedic symptoms [7, 8].

Despite the standards in the study of physical development, to date there is no single approach in the methodology of its assessment in children. There is still a search for the most informative methods for assessing the indicators of physical development of children and their standards, morphometric changes
of individual body parts in postural disorders and scoliosis in children from infancy to 12 years have not been studied.

The aim of the study - is to study the anthropometric parameters of different body parts in children with scoliosis in postnatal ontogenesis and compare them with the parameters of healthy children.

2. Materials And Methods

400 children were examined, 250 of them healthy (120 boys and 130 girls) and 150 children with scoliosis (70 boys and 80 girls). Anthropometric measurements were carried out according to the methodological recommendations of N.H. Shomirzaev, S.A. Ten and I. Tukhtanazarova (1998). The research was carried out in secondary educational institution No. 61, in secondary school No. 2 and in boarding school No. 23 in Bukhara for children with scoliosis.

Anatomical and anthropometric features were evaluated: measurements of body length, chest circumference in pause, during inhalation and full exhalation, trunk length, body, chest height were carried out using a centimeter tape, and body weight using special scales.

3. Results and Discussion

Studies have shown that newly injured children have an average body length of 51 ± 0.24 cm, body weight - 3.5 ± 0.15 kg, chest circumference in pause 36.2 ± 0.25 cm, at the height of inspiration 38.0 ± 0.25 cm, and at full exhalation 35.8 ± 0.30 cm. The length of the trunk on average is 18.4 ± 0.22 cm, the length of the body is 30.1 ± 0.30 cm, the height of the chest is 11.6 ± 0.12 cm.

Studies have shown that the body length in healthy children of the first period of childhood is on average 112.9 ± 0.72 cm. Body weight on average was 20.2 ± 0.53 kg, chest circumference in pause 62.4 ± 0.72 cm, at the height of inspiration 65.2 ± 0.25 cm, and with full exhalation 61.8 ± 0.30 cm. The length of the trunk on average is 20.6 ± 0.52 cm, the length of the body is 41.3 ± 0.42 cm, the height of the chest is 17.6 ± 0.19 cm.

In the study of children of the first period of childhood with scoliosis, it was revealed that the average body length was 110.4 ± 0.87 cm. The average body weight is 19.3 ± 0.37 kg, the chest circumference in the pause is 60.0 ± 0.26 cm, at the height of inspiration - 63.2 ± 0.37 cm, and at full exhalation - 59.6 ± 0.30 cm. The length of the trunk on average is 20.1 ± 0.25 cm, the length of the body is 40.6 ± 0.14 cm, the height of the chest is 16.9 ± 0.30 cm.

As a result of the research, it was found out that the body length in healthy children of the second period of childhood was on average 134.0 ± 0.56 cm. The body weight of the healthy group is on average 29.3 ± 0.81 kg, the chest circumference in the pause is 65.5 ± 0.34 cm, at the height of inspiration - 68.8 ± 0.12 cm, and with full exhalation – 64.5 cm ± 0.14 cm. The length of the trunk on average is 44.1 ± 0.51 cm, the length of the body is 64.0 ± 0.42 cm, the height of the chest is 21.6 ± 0.27 cm.

During the study of children of the second period of childhood with scoliosis, it was found that the average body length was 125.8 ± 1.05 cm, body weight - 27.0 ± 0.62 kg, chest circumference in pause - 63.3 ± 0.23 cm, at the height of inspiration – 66.2 ± 0.22 cm, and with full exhalation - 64.3 cm ± 0.56 cm. The length of the trunk on average is 42.1 ± 0.37 cm, the length of the body is 60.4 ± 0.35 cm, the height of the chest is 20.2 ± 0.84 cm.

Thus, studies have found that the growth rate of body length in healthy children increases by 2.94 times in the interval between the age of the newborn and 12 years. In the first period of childhood, the highest growth rate of body length is detected in healthy children of both sexes at the age of 6, amounting to 7.09% compared to 5 years of age, and in the second period of childhood at the age of 10 (6.66%) compared to 9 years of age. The growth rate of body weight from newly injured to 12 years of age increases by 11.97 times. The highest rate of body weight gain is observed in the first period of childhood by the age of 4 by 15.61%, and in the second period of childhood by the age of 8 by 20.31% compared to the age of 7.

The growth rates of the chest circumference in the pause, at the height of inspiration and with full exhalation increased by 2.07, 2.21 and 2.06 times, respectively, to the newly damaged. The highest growth rates of the chest circumference in pause, at the height of inspiration and with full exhalation were revealed in the first period of childhood, at the age of 6 by 5.78%; 7.20%; 5.02%, and in the second period of childhood at the age of 12 by 8.20%; 10.78% and 8.92% respectively.

According to our study, it was found that body weight in healthy children and in children with scoliosis in postnatal ontogenesis up to 12 years of age increases faster than body length. Body length in boys with posture changes in scoliosis increases by 2.94 times, and body weight by 9.34 times.
The highest growth rates of body length are observed in the first period of childhood at 5 years of age (5.27%), body weight at 7 years of age (21.67%), and in the second period of childhood the highest growth rates are at 10 years of age (6.89%), body weight at 8 years of age (13.45%). As for the size of the chest circumference in the pause, at the height of inspiration and full exhalation, boys with posture changes with scoliosis increase by 1.90, 2.03 and 1.87 times, respectively. The highest growth rates of these parameters in the first period of childhood are detected at 7 years (8.53%, 8.31%, 9.19%, respectively), and in the second period of childhood at 11 years (3.28%, 5.43%, 3.31%, respectively).

4. Conclusion
The growth of children with scoliosis under the age of 12 increases by 1.52 times. The highest growth rates are observed in 5 (9.2%) and 7-year-olds (8.8%), and the lowest – in 8; 11 (3.0%) and 12 years (2.2%). Body weight in children with scoliosis increases by 2.65 times at the age of 12 years. The highest growth rates are observed in 6-year-olds (19.0%) and 8–year-olds (16.5%), and the lowest - in 11-year-olds (6.2%). The size of the chest circumference in postnatal ontogenesis before the age of 12 in healthy children of both sexes increases by 1.55 times, and in scoliosis increases by 1.40 times.

The anthropometric parameters of physical development in children of the first and second periods of childhood with various pathologies of posture in scoliosis are not the same, they reveal individual, sexual and age variability: in the period of the first childhood, the lag in the parameters of physical development in boys is expressed more than in girls by 0.54%, and in the period of the second childhood, on the contrary, girls lag more than boys by 2.82%.

Comparison of anthropometric parameters of children under 12 years of age with scoliosis with the parameters of healthy children of the same age shows that the growth rate in terms of chest circumference, trunk and body length, chest height is less than that of healthy peers.

References: