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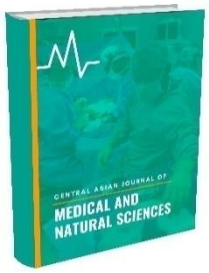

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Comparative Analysis of Ultrasound Anatomy of the Thyroid Gland and Physical Development in Children

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Abstract: The purpose of the study: To study the comparative analysis of ultrasound anatomy of the thyroid gland and morphometric changes in physical development in 8-year-old children.

Materials and methods: The study was conducted on the basis of the Bukhara Regional Endocrinological Dispensary and secondary school No. 7 in Bukhara. The physical development indicators of 90 8-year-old children (43 boys and 57 girls) and the results of ultrasound examination of the thyroid gland were studied.

Results and discussion. The results of the study showed that 8-year-old girls lagged significantly behind boys of the same age in terms of physical development (height, body weight, body length, chest circumference) and thyroid ultrasound parameters.

Key words: thyroid gland, childhood, ultrasound examination, anthropometric indicators.

The relevance of the topic. In recent decades, the number of endocrine diseases, including thyroid diseases, has increased significantly due to the global disturbance of the ecological balance in the world. Childhood, as with other diseases, is a very important and difficult period for the diagnosis and treatment of thyroid diseases [4,8]. Hormones produced by the thyroid gland in children mainly affect the growth and metabolism of the child, as well as mental development. Deficiency of these hormones leads to irreparable damage to physical and mental development [5]. Thyroid diseases occur in 8-20% of children worldwide among patients with endocrine pathologies. According to the World Health Organization (WHO), more than 200 million people suffer from this pathology, and in endemic foci this figure exceeds 50% [10]. Diseases associated with iodine deficiency are all pathological conditions associated with a lack of iodine in the environment.

Insufficient intake of iodine in the body leads to a violation of thyroxine synthesis. Diffuse changes in glandular tissue are observed as a result of hypo- or hyperfunction of the thyroid gland. This affects the physical and mental development of children [7,9]. The risk group for the development of iodine deficiency diseases includes, in particular, adolescents. Despite many years of preventive and curative work on iodine deficiency, the problem of iodine deficiency is still being studied in many countries of the world, including Uzbekistan. [12]. Cases of iodine deficiency are among the most common non-

infectious pathological changes in humans. According to WHO, about 2 billion people on Earth live in conditions of iodine deficiency. Currently, there are no areas where there is no risk of developing iodine deficiency. [13] Iodine deficiency is a stable factor in the biosphere, so the problems that arise due to it remain constant [3,8].

As with other thyroid diseases associated with iodine deficiency, the frequency of diffuse endemic goiter varies in different regions and depends on the environmental situation in them [1,14]. The problem of iodine deficiency in endemic regions, the fight against thyroid diseases (CB) is one of the most important social and medical problems of our time and one of the most important and priority projects of the national health system in many countries of the world. it exists because its dimensional and structural properties are directly related to the ecological well-being of the region [6]. Different levels of changes in thyroid activity also affect the physical performance of children in different ways. Anthropometric indicators are a conditional measure of the physical strength of the body, which determines its vital signs. This set of morphofunctional characteristics that determine the structural, mechanical and functional properties of the child's body is very clearly distinguished primarily by the ratio of the general (height, body weight, body length, chest circumference) [2].

The process of intensive growth in height and body weight is one of the main signs of the accumulation of body weight. In preschool, children quickly learn new forms of movement due to the high sensitivity of the nervous system. [11]. Examination of the thyroid gland plays an important role in assessing the development of a child at different stages of body formation.

In recent years, ultrasound examination of the thyroid gland in children has become of great importance, in which we can observe various morphological changes in the thyroid gland due to the influence of many negative factors on the developing child's body. The most important of them are heredity, iodine deficiency, unfavorable environmental conditions, urbanization and a busy rhythm of life, stressful situations and impacts. This is necessary both in the diagnosis of hypo- or hyperplasia of the organ, and to assess the feasibility of therapeutic treatment for the identified pathology. Growth and development are the result of many metabolic processes that occur at the cellular level and lead to an increase in body size, differentiation and formation of various organs and systems. The process of physical development can be divided into separate periods, since each of them indicates the beginning of the past stage and the future [2]. The body's ability to adapt, especially to a child's body, may include physical development data and morphological data, including morphometry. To date, comprehensive studies of thyroid morphology have not been conducted in many countries of the world, although these data could be useful in applied medicine and additionally supplement the regional database on the physical development of the population of the region [1, 3].

When conducting an ultrasound examination of the thyroid gland, in addition to assessing the structure of the tissue, it is also important to determine the size of the organ. This is especially important for children, because their physical development in the same age group may differ significantly.

The purpose of the study: To study the comparative analysis of ultrasound anatomy of the thyroid gland and morphometric changes in physical development in 8-year-old children.

Materials and methods: The study was conducted on the basis of the Bukhara Regional Endocrinological Dispensary and secondary school No. 7 of Bukhara on the basis of bilateral agreements of the Bukhara State Medical Institute. The children were divided into 2 groups (n = 90): I - group of boys aged 8 (n = 43) and II group of girls (n = 57). To carry out anthropometric measurements, the method of anthropometric research of children was used (morphometric features of assessing the physical development of children and adolescents - methodological recommendations // Shomirzaev N.H., Ten S.A., Tukhtanazarova I., 1998). Anthropometric studies included measurements of body length, body weight, body length and chest circumference.

Ultrasound examination revealed the results of ultrasound anatomy of the thyroid gland. The study was carried out on a SONOACE R3-RUS device with linear (7.5 MHz) and convex (3.5 MHz) converters. In this study, the linear dimensions of each part of the omentum, the thickness and volume of the omentum were studied using the formula of J. Brunn and co-authors (1981): V = K • [(L1 • W1 • T1) + (L2 • W2 • T2)], where V is an indicator of the volume of the gland (cm3), K - coefficient equal to 0.479; L, W, T - length, width and thickness of each piece of fabric.

Mathematical processing was carried out directly from the general Excel 7.0 data matrix using the capabilities of STTGRAPH 5.1, indicators of standard deviation and presentation errors were identified.

Research results and discussion. Studies have shown that 8-year-old girls have a height from 117.4 to 129.3 cm, on average 126.2 ± 0.73 cm, and boys of the same age - from 120.4 to 130.7 cm, on average 125.6 cm ± 0.64 cm. The body weight of girls ranged from 19.4 kg to 28.2 kg, on average 22.5 ± 0.54 kg, and boys of the same age - from 21.2 kg to 27.4 kg, on average 23.8 ± 0.38 kg. Body length varied from 24.2 to 32.7 cm on average in 8-year-old girls, 28.9 ± 0.53 cm on average and from 27.4 to 34.6 cm in boys, on average 30.5 ± 0.45 cm. The average breastcircumference in girls was 58.9 ± 0.49 cm, in boys - 58.6 ± 0.45 cm.

Indicators of physical development in 8-year-old children

№	Indicators	Children of 8 years of age (n= 90)	
		Girls (n = 57)	boys (n = 43)
1	height, cm	126,2 ± 0,92*	125,6 ± 0,77*
2	body weight, kg	22,5 ± 0,69*	23,8 ± 0,46*
3	body length, cm	28,9± 0,61*	30,5 ± 0,53*
4	chest circumference, cm	58,9 ± 0,49	58,6 ± 0,45

Note: *- relatively large differences p <0.05 in the previous group.

Ultrasound of the thyroid gland in children aged 8 years

In 8-year-old girls, the width of the thyroid gland in the right lobe ranged from 12.2 mm to 15.0 mm, on average - 13.4 ± 0.21 mm, in the left lobe - from 11.5 mm to 15.0 mm, on average 13.2 ± 0.26 mm, the right segment in boys of the same age from 12.2 to 15.3 mm, on average - 14.0 ± 0.23 mm, the width of the left segment is from 13.0 to 15.0 mm, on average 13.7 ± 0.15 mm. The length of the right thyroid gland in girls ranged from 27.0 to 41.0 mm, on average 33.6 ± 1.07 mm, and the length of the left thyroid gland - from 27.0 to 41.0 mm, on average 33.3 ± 1.07 mm. in boys of the same age, the length of the right lobe varied from 32.0 to 39.0 mm, on average 35.2 ± 0.53 mm, and the length of the left lobe - from 32.0 to 39.0 mm, on average 35.1 ± 0.53 mm. In 8-year-old girls, the thickness of the thyroid gland varied from 14.7 mm to 20.0 mm in the right lobe, on average 17.1 ± 0.40 mm, and in the left lobe from 15.2 mm to 19.0 mm, on average 17.0 ± 0.29 mm, in boys of the same age, the thickness of the right lobe varied from 15.4 mm to 18.0 mm, in the average is 16.9 ± 0.20 mm, the thickness of the left lobe is from 16.0 mm to 18.0 mm, on average 16.8 ± 0.15 mm. The average thyroid volume averaged 4.1 ± 0.26 ml in the right lobe and 3.9 ± 0.22 ml in the left lobe. In boys of the same age, the average volume of the right segment was 4.5 ± 0.17 ml, and the left segment was 4.3 ± 0.14 ml (see table).

Thyroid ultrasound indicators in 8-year-old children

№	Indicators	Girls (n = 57)		boys (n = 43)	
		right lobe	left lobe	right lobe	left lobe
1	width,mm	13,4± 0,21*	13,2±0,26	14,0±0,23*	13,7±0,15
2	length ,mm	33,6±1,07*	33,3±1,07	35,2±0,53*	35,1±0,53

3	thickness, mm	17,1±0,40*	17,0±0,29	16,9±0,20*	16,8±0,15
4	gland volume cm^3	4,1±0,26*	3,9±0,22	4,5±0,17*	4,3±0,14

Note: *- relatively large differences p <0.05 in the previous group.

Anthropometric studies among 8-year-old girls and boys have shown that the height of boys is 1.0 cm lower than that of girls of the same age, and that the body weight of boys is 1.3 kg higher than that of girls of the same age. In 8-year-old children, the body length of boys was 1.6 cm longer than that of girls. The size of the chest circumference in girls was 0.3 cm wider than in boys. Ultrasound examination of the thyroid gland showed that the width of the thyroid gland in the right lobe in 8-year-old girls was 0.66 mm larger than in boys of the same age, and 0.50 mm larger in the left lobe than in boys. In girls, the thickness of the gland in the right and left lobes is 0.20 mm greater than in boys. In 8-year-old boys, the length of the right segment of the thyroid gland was 1.60 mm longer than in girls of the same age, and the length of the left segment was 1.80 mm.Boys had an excess thyroid volume of 0.40 ml compared to girls in the right and left parts of the gland (see table).

Conclusion: According to the data obtained, girls of 8 years lag behind boys of the same age in all indicators of physical development. On ultrasound of the thyroid gland, girls 8 years old lag behind boys of the same age in all parameters of the gland (length, width, thickness and size). Based on the results obtained, it should be noted that in order to normalize the physical development of 8-year-old girls, it is necessary first of all to pay attention to the activity of the thyroid gland. To do this, it is recommended that children be under the constant supervision of an endocrinologist.

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