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Comparative Characteristics of Ultrasound Thyroid Gland Size and Parameters of Physical Development of Children 12 Years of Age

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ABSTRACT

The study compared ultrasound morphometric parameters of the thyroid gland and physical development in children (boys and girls) aged 12 years. We tried to establish the average value of the normal volume of the thyroid gland and find out whether there is a relationship between the volume of the organ and the size of the body.

Keywords: ultrasound, thyroid gland, anthropometric measurements, morphometric indicators.

Introduction

The endocrine system controls most of the body's functions, such as growth, puberty, energy levels, urination, and stress response. The thyroid gland is part of the body's endocrine system — a complex network of glands located throughout the body that produce hormones. The problem of thyroid pathology in young children remains one of the little-studied. Its relevance is due to the fact that thyroid diseases currently take the first place among all endocrine pathology in children [1]. The interest of pediatricians and pediatric endocrinologists in the problems associated with the state of the thyroid gland is determined both by the significance of its function for a growing organism and by the obvious tendency to increase thyroid diseases. Therefore, it is extremely important and necessary to study the state of iodine security in preschool and school-age children, since with iodine deficiency in children of this age category, due to the physiological characteristics of growth, there is a real risk of intellectual and physical development disorders, decreased immunity, and the formation of endocrine morbidity. The thyroid gland is an extremely sensitive organ to the effects of the natural and social environment, and is considered a marker of environmental distress. Residents of various natural and climatic regions have their own characteristics of the structure and function of the thyroid gland, on the basis of which the concept of the regional norm of the thyroid gland is introduced into the morphology of the thyroid gland [2]. On the scale of individual regions, it is determined by the fact that most of the territories of the Republic of Uzbekistan, including the Bukhara region, are characterized by iodine deficiency. Thyroid volume indicators can serve as local standards for

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conducting clinical and epidemiological studies and be used in practical healthcare [3, 4]. The thyroid gland (thyroid gland) is an important organ in the human body, and any violation in its functioning can lead to the development of serious pathologies. Ultrasound diagnostics of the thyroid gland will help to identify the problem in time and correctly prescribe treatment to the patient. Currently, it is impossible to imagine the diagnosis of thyroid pathology without ultrasound examination (ultrasound), which allows to assess its location, structure, volume. The question of the final interpretation of the standards of the dash-oid volume, especially in young children, is intensively studied, but not solved [5,7]. The structure of the human thyroid gland is not static: its morphological parameters are related to gender, age, and environmental environment [6]. Various thyroid pathologies are diagnosed in 20% of the child population. In some areas of the planet, this figure is more than 40%. The appearance of pathological changes in the tissues of the thyroid gland is affected by poor environmental conditions, heredity, lack of iodine.

The purpose of the study is to conduct a comparative characterization of the size of the thyroid gland and the parameters of physical development of children aged 12

Material and methods

The research was conducted at secondary school No. 7 in the city of Bukhara. The results of the examination of 86 children (44 boys and 42 girls) were studied 12 years of age.

Ultrasound examination was conducted on the basis of the Bukhara Regional Endocrinological Dispensary and was devoted to the study of ultrasound anatomy of the thyroid gland. The study was carried out on the SONOACE R3-RUS device with linear (frequency 7.5 MHz) and convex (frequency 3.5 MHz) sensors.

The anthropometric measurements used the method of anthropometric studies of children (methodological recommendations of N.H.Shomirzaev, S.A.Ten and I.Tukhtanazarova, 1998). The anthropometric study included the measurement of body length, body weight, trunk length and chest circumference.

Mathematical processing was performed directly from the general Excel 7.0 data matrix using the capabilities of the STTGRAPH 5.1 program, the standard deviation and representativeness errors were determined.

Results and discussions

Ultrasound indicators of the thyroid gland in 12-year-old children

At the 12th year of life in boys, the length of the right lobe of the thyroid gland reaches from 34.0 to 45.0 mm, on average – 42.6 ± 0.44 mm. The width of the organ ranged from 13.8 to 17.2 mm, on average – 16.3 ± 0.14 mm. And its thickness ranges from 17.0 to 24.0 mm, on average – 22.1 ± 0.28

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mm. The volume of the right lobe of the thyroid gland ranged from 3.82 to 8.90 cm^3, on average - 7.35 ± 0.20 cm^3.

At the age of 12, in boys, the length of the left lobe of the thyroid gland reaches from 33.0 to 44.0 mm, on average – 41.3 ± 0.48 mm. The width of the organ ranged from 13.2 to 17.0 mm, on average – 15.1 ± 0.15 mm. And its thickness ranges from 16.8 to 23.0 mm, on average – 20.5 ± 0.25 mm. The volume of the left lobe of the thyroid gland ranged from 3.51 to 8.24 cm^3, on average – 6.12 ± 0.19 cm^3, the height of the isthmus varied from 3.6 to 5.9 mm, on average 5.0 ± 0.09 mm.

It was found that the length of the right lobe of the thyroid gland in 12-year-old girls reaches from 38.0 to 46.0 mm, on average – 43.0 ± 0.30 mm. The width of the organ ranged from 16.0 to 23.0 mm, on average – 18.9 ± 0.27 mm. And its thickness ranges from 18.0 to 24.0 mm, on average – 22.3 ± 0.23 mm. The volume of the right lobe of the thyroid gland ranged from 5.24 to 12.2 cm^3, on average – 8.29 ± 0.26 cm^3.

At the 12th year of life in girls, the length of the left lobe of the thyroid gland reaches from 37.0 to 45.1 mm, on average – 42.6 ± 0.31 mm. The width of the organ ranged from 15.2 to 22.0 mm, on average – 18.6 ± 0.26 mm. And its thickness ranges from 17.4 to 23.2 mm, on average – 20.8 ± 0.22 mm. The volume of the left lobe of the thyroid gland ranged from 4.69 to 11.02 cm^3, on average – 7.89 ± 0.24 cm^3, the height of the isthmus varied from 3.8 to 7.0 mm, on average 5.6 ± 0.12 mm (see figure 1).

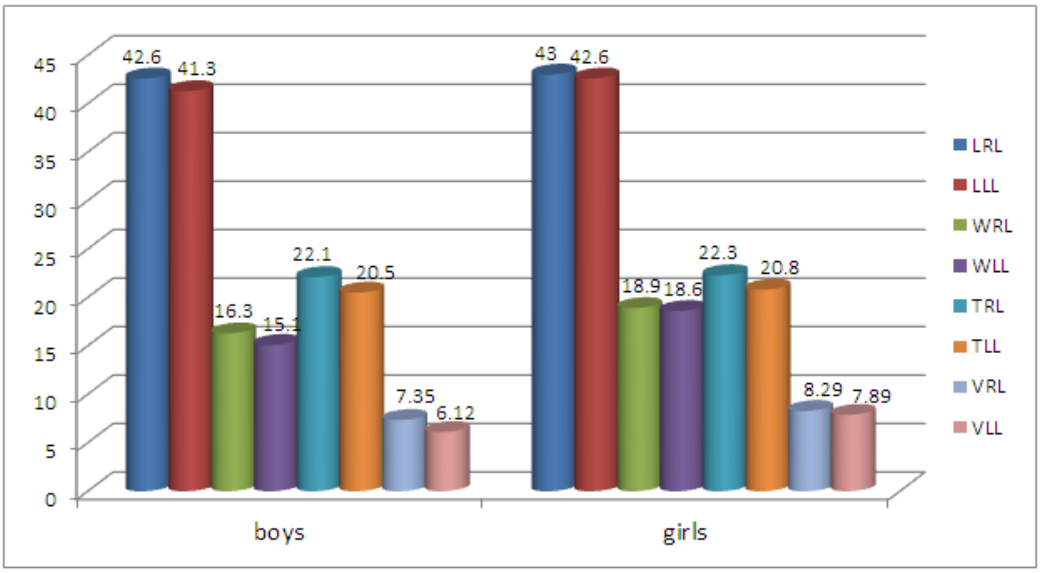

Figure 1. Comparative analysis of ultrasound morphometric parameters in 12-year-old children

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Data on anthropometric parameters of 12-year-old children.

At 12 years of age, the height of male children varies from 146.2 to 165.1 cm, on average – 150.1 ± 0.76 cm. At this age, body weight ranges from 30.3 to 48.4 kg, on average – 38.7 ± 0.72 kg. The length of the trunk reached from 60.2 to 80.5 cm, on average 71.8 ± 0.72 cm.

At the age of 12, male children have a breast circumference in the pause range from 60.2 to 80.5 , on average – 71.8 ± 0.77 cm. The chest circumference when inhaling varies from 65.4 to 83.5 cm, on average – 74.3 ± 0.69. cm, and the chest circumference when exhaling is from 59.5 to 77.8 cm, on average – 70.2 ± 0.70 cm.

Studies have shown that the height of 12-year-old girls ranges from 145 cm to 166 cm, averaging 152 ± 2.27 cm. Body weight ranged from 28 kg to 66 kg, on average it was equal to 40 ± 4.10 kg. The chest circumference of 12-year-old girls ranged from 60.0 cm to 86.0 cm, averaging 67.0± 2.80 cm.

Conclusions

1. Based on the data obtained, it was found that the physical development of boys of 12 years of age in comparison with girls tends to lag behind.
2. The prevalence of height and body weight in girls compared to boys may be associated with the early onset of puberty in them.
3. Anatomical ultrasound parameters of the thyroid gland (length, width, volume) in boys of 12 years of age lag behind compared to girls of the same age

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