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Morphometric Characteristics of Assessment of Physical Development of Children and Adolescents

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Abstract: In connection with the adoption of the "Law on Education" by the independent Republic of Uzbekistan, the study of the physical development of children and adolescents in different geographical and environmental conditions is an urgent problem. The Law specifies the need for a differentiated approach to the beginning of children's education in accordance with their level of physical and mental development. To assess the development and growth of children and adolescents, a unified scientific and methodological approach is needed. To satisfy this task to some extent, this work was compiled.

Keywords: Morphometry, adolescence, children, physical development, anthropometry.

Relevance of the study. For every person, the most important value in life is health. There is no unambiguous and precise definition of the concept of health, but each of the definitions emphasizes the importance of any aspect in a comprehensive description of the state of the body. Most often, the definition of health is used on the basis of medical and biological characteristics. It is worth noting that all definitions of the concept of health are united by the fact that they all reflect the quality of adaptation of organisms to environmental conditions and are the results of the interaction between a person and the environment. So N.M. Amosov believes that: "Health is the natural state of the body, characterized by its balance with the environment and the absence of any painful phenomena." G.I. Tsaregorodtsev says that "health is the harmonious flow of various metabolic processes between the body and the environment, the result of which is a coordinated metabolism within the body itself." Consequently, in this context, health is presented as a natural harmonious state of the body with normal metabolic processes occurring in it, which exclude any painful phenomena [10-12]. One of the founders of health science V.P. Petlenko gave the most complete description of the concept of "health". He believes that "health is a normal psychosomatic state of a person, capable of realizing his potential of bodily and spiritual forces and optimally satisfying the system of material, spiritual and social needs" [7-11].

Currently, the concept of "health" is also considered from a demographic and economic point of view. So, for example, I. N. Smirnov defines health as "the full-blooded existence of a person, as a result of which his life and activity are perceived by him as the natural self-development of his inherent essential properties and qualities that ensure optimal working capacity." R.I. Aizman notes that all major demographic indicators, in particular population size, birth rate, mortality, disability and general morbidity, depend on the health status of people in a particular region or in the country as a whole [8-12]. Consequently, health is the achievement of an optimal level of physical, neuropsychic, and intellectual development; sufficient functional and social adaptation; high degree of resistance [8].

Purpose of the study. To study the anthropometric parameters of the physical development of 8- and 9-year-old children, as well as 12- and 14-year-old children with a normal physique, healthy children, and also compare them with the anthropometric indicators of healthy children according to age characteristics.

Material and methods. Morphometric changes in body parts of 20 boys and 20 girls 8-9 years old healthy children were studied and compared with indicators of healthy children 12-14 years old (20

girls and 20 boys). It has been established that changes in anthropometric parameters within the normal range of childhood can lead to dysfunction of the musculoskeletal system, but also to the development of negative changes in anthropometric parameters. To measure the children, a simple measuring tape, scales, a pelvis meter and the Office Excel computer program were used.

Research results. To study human growth, there are two types of morphological studies: longitudinal and transverse. With a longitudinal research method (1 individualizing), the body growth parameters of the same children are studied over a number of years. In this case, measurements can be made annually or several times a year. With a cross-sectional research method (2-generalizing method), the development of children of different ages is measured over a certain period of time.

Thus, average data on the growth process of children of different age groups are established.

To determine the shape of the skull, the following parameters are measured (Fig. I).

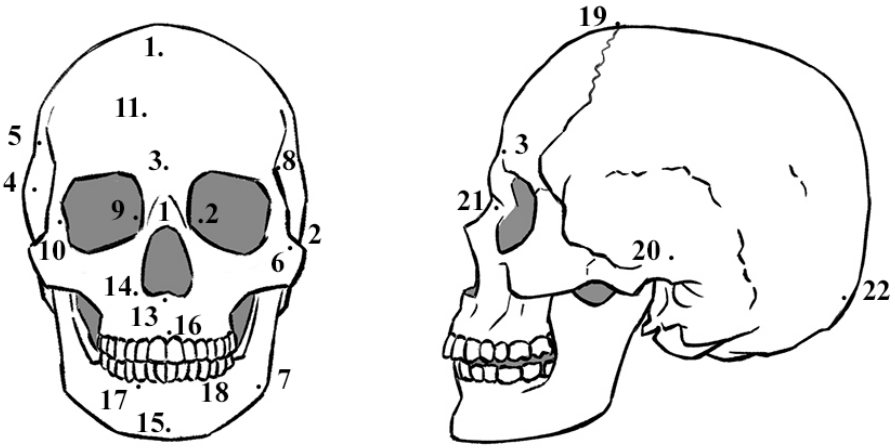

Fig. I. Anthropometric points on the head

1 - apical; 2 - tragus; 3 - glabella; 4 - temporal; 5 parietal; 6 - zygomatic; 7- mandibular; 8 - point of the frontal bone: 9 - point of the inner corner of the eye; 10 point of the outer corner of the eye; 11trichion; 12 - selion; 13 tray; 14 nasal wing point; 15-chin; 16-labial superior; 17 - labial lower; 18th point of the lip angle; 19 - bregma; 20 - ear: 21-nasion; 22 occipital.

All morphometric data on the development of individual parts of the body must be recorded in a special card (attached).

1. The longitudinal diameter is determined by a special compass. One leg of the compass is placed on the glabella (Fig. 1, 3), and the other - a point on the occipital bone (Fig. 1, 22) - in the medial sagittal plane, most distant from the glabella.

2. The transverse dimension (the largest width of the head) is measured using a compass, which is placed on the most outwardly protruding points of the side wall of the head on the left and right sides. These points can be located on the parietal (Fig. 1, 5) or on the temporal (Fig. 1, 4) bone. To determine the shape of skulls, an index was proposed by the Swedish anatomist A. Retzius (1842).

$$\frac{\text{Transverse diameter}}{\text{Longitudinal diameter}} * 100$$

To determine the morphological height of the face, measurements are carried out using a special compass from the cellion point (Fig. I, 12) - the deepest point of the bridge of the nose to the chin point (Fig. I, 15) - the lowest point of the chin in the medial sagittal plane, but it is also possible from the point nasion (Fig. I, 21) the place of intersection of the median plane with the nasofrontal suture.

The physiognomic height of the face is also determined using a special compass by measuring the trichion (Fig. I. 11), a point on the forehead lying at the intersection of the median plane with the hairline to the chin point.

In order to characterize the nasal area, it is necessary to measure the height and width of the nose: the height of the nose is measured using a special compass from the cellion point to the subnasal point (Fig. I.13) - the posterior point of the lower edge of the nasal septum, and the width of the nose is determined by measuring the distance between the nasal wings dots (Fig. I, 14).

To determine the size of the eye area, measure the distance between the outer corners of the eyes (Fig. I, 10) - the so-called external orbital width and the distance between the inner corners of the eyes (Fig. I, 9) - the interorbital width. The area of the mouth is measured using a special compass: the height of the mucous membrane of both lips - from the upper labial (Fig. I, 16) to the lower labial (Fig. I, 17) points and the width of the mouth between the labioangular (Fig. I, 18) points.

The following indicators are most often used to characterize the facial region:

Facial - $\frac{\text{Morphological height of the face}}{\text{Zygomatic diamter}}*100$

Nasal - $\frac{\text{Nose width}}{\text{Nose height}}*100$

In order to determine the ratio of the sizes of the facial and brain parts of the head, you need to be guided by the following indicators:

Transverse zygomatic - $\frac{\text{Zygomatic diameter}}{\text{Transverse diameter}}*100$;

Frontozygomatic - $\frac{\text{The smallest width of the forehead}}{\text{Zygomatic diameter}}*100$;

Frontomaxillary - $\frac{\text{The smallest width of the forehead}}{\text{Mandibular diameter}}$

For a more detailed examination of the head, other measurements must be taken.

The head circumference is determined with a centimeter tape, which is passed from behind through the most protruding point of the occipital protuberance, and from the front along the glabella or along the superciliary arches (Fig. III, a).

The transverse size of the forehead is also determined using a special compass installed on the most lateral points of the frontal bone (Fig. 1, 8), directly behind the zygomatic process.

The height or vertical diameter is measured using a special compass between the bregma point (Fig. I, 19) located at the intersection of the coronal and sagittal sutures and the tragus of the ear (Fig. I, 2).

Determination of the size of the base of the skull. The length of the base of the skull is measured as follows: one leg of a special compass is placed on the nasion (Fig. I, 21) - the intersection of the median plane with the nasofrontal suture, and the other leg on the opisthion, the intersection of the median plane with the posterior edge of the foramen magnum.

The width of the base of the skull is determined using a special compass, the legs of which are installed between two auricular (Fig. I, 20) points (biauricular width), that is, the distance on the cornesis of the temporal bone at the point where it intersects with a vertical line drawn through the center of the external auditory canal right and left sides.

The zygomatic diameter is determined using a special compass by measuring the greatest width of the face, that is, the distance between the most outwardly protruding points of the zygomatic arch (Fig. I, 6). The mandibular diameter is determined by placing the legs of a special compass on the most outwardly protruding points on the angle of the lower jaw (Fig. I, 7).

To measure, it is necessary to use anthropometric points on the torso and limbs (Fig. II, 2). To measure standing and sitting height, in most cases a standard type stadiometer is used.

The person being measured (when measuring height while standing) stands on the stadiometer platform with his back to the vertical stand, touching it with his heels, buttocks, back of the head and interscapular area. Arms should be lowered along the body, heels placed together, toes apart. A child or teenager should not be allowed to take an overly tense or relaxed position, or to rise on their toes and separate their heels from the stadiometer. The head is placed in a position in which the lower edge of the eye and the upper edge of the tragus of the ear are on the same horizontal line. The movable tablet of the stadiometer must be lowered so that without pressing it touches the highest - apical (Fig. II, 1) point of the head. It is advisable to achieve greater flattening of the hairline. If girls have their hair done or braided, then it must be loosened, that is, it is necessary to eliminate the factors that prevent the tablet from adhering to the top point of the head.

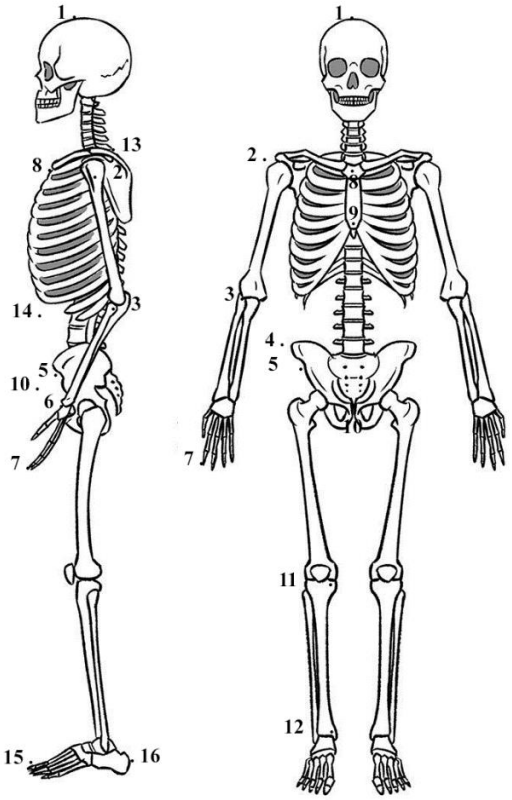

Fig. II. Anthropometric points on the trunk and limbs

1 - apical; 2 - shoulder; 3 - radial; 4 - iliopectineal; 5 - spinous-iliac; 6 - thyroid; 7 - finger; 8 - upper sternal; 9 - lower sternal; 10 - pubic; 11 - upper tibial: 12 - lower tibial; 13 - cervical: 14:15; 16-heel.

To measure height while sitting, the stadiometer is equipped with a special folding seat located at a height of 40 cm from the level of the stadiometer platform. To measure height while sitting, the person being measured sits on the folding seat of the stadiometer so that the sacrum and interscapular area touch the board.

The height of children in the first year of life and up to 2 years of age is measured with a special stadiometer in the form of a wide board 80 cm long and 40 cm wide. A fixed transverse bar is fixed in the upper part of the stadiometer. On the left side of the board there are divisions in centimeters and there is an easily movable bar for determining height.

The child is laid with his back so that his head tightly touches the transverse fixed bar of the stadiometer with the crown of his head. The head should be in a position in which the lower corner of the eye and the upper edge of the tragus of the ear are located on the same line. The helper firmly fixes the head. The knees should be straightened with light pressure from the left hand, and with the right

hand the movable bar of the stadiometer is brought to the soles of the straightened legs. The distance between the movable and fixed bars corresponds to the child's height.

Body mass (weight) is determined on adjusted children's (up to 2 years old) or medical scales. Weighing is done in the morning, on an empty stomach, after emptying the intestines and bladder, you must remove clothes and shoes. The subject should stand calmly in the middle of the scale platform.

The length of the body is measured from the upper sternal (Fig. II, 8) - a point on the upper edge of the jugular notch of the sternum (along the midline) to the pubis (Fig. II, 10) - a point on the upper edge of the pubic symphysis.

The length of the body is determined by subtracting the length of the lower limb from the length of the body.

Measurements are made using a metal measuring tape; if measurements are made using a fabric measuring tape, then it must first be calibrated and replaced with a new one once a month, since it stretches over time.

The chest circumference (Fig. III, b) is measured at rest (in a pause), at the height of inspiration and with full exhalation. The child should stand straight, put his heels together, straighten his knees, and raise his arms up. The tape is applied so that at the back it passes under the angles of the shoulder blades, and at the front it should capture the lower edge of the isola in boys (young men), and in girls (girls) it is applied above the mammary glands, at the level of the 4th rib. The tape should not be over-tightened.

When measuring, your arms should be down. Then the person being measured is asked a question (for example: How old are you? or asked to say "mom-dad") or asked to count to ten and at this time the chest circumference is noted in a pause. After this, the child is asked to inhale as much air as possible and the largest number obtained when measuring the chest circumference is recorded as the chest circumference during inhalation.

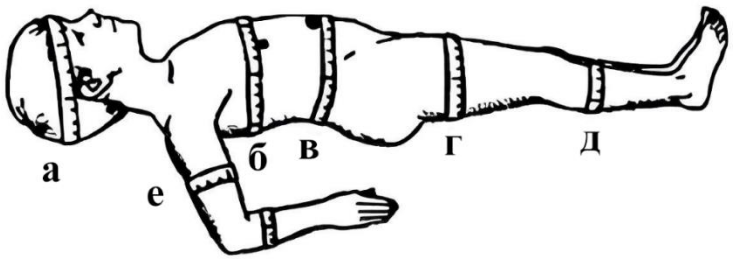

Fig. III. Measuring the circumference of the head (а), chest (б), abdomen (в), hips (г), lower leg (д), shoulder (е). (Russian letters)

Then the child is asked to exhale as much as possible and at this moment the chest circumference is measured and recorded as the exhalation value. You should pay attention to ensure that the position of the tape does not change, so that it does not move, that is, it is located at the angles of the shoulder blades. The size of the chest circumference can be judged by the indicator of its measurement during a pause. The difference in centimeters between the chest circumference at the height of inspiration and at maximum exhalation serves as an indicator of chest excursion. In order to measure the anteroposterior and transverse diameters of the chest, a special compass is used. To measure the anteroposterior diameter of the chest, one leg of the compass is placed at the place of attachment of the VII costal cartilage to the sternum (inferior sternal point (Fig. II, 9) - at the lower end of the body of the sternum), and the other leg - at the level of the corresponding spinous process of the thoracic vertebra.

To determine the transverse diameter of the chest, that is, the distance between the most distant points of the lateral surfaces of the 7th rib in the horizontal plane, the legs of the compass must be placed at the level of the lower edge of the sternum along the mid-axillary line. To measure the waist circumference, the tape is placed at the narrowest point of the waist. Abdominal circumference (Fig. III, c) is measured only in children under 3 years of age using a centimeter tape at the level of the navel (Fig. 1, 14) in a lying position.

The length of the upper segment (height of the head and neck) is determined in the following order.

To do this you need:

1. Measure your body length (height).

2. Determine the height above the floor to the cervical (Fig. II, 13) - the point at the top of the spinous process of the VII cervical vertebra.

Then subtract from the body length (height) the height above the floor to the point at the top of the spinous process of the VII cervical vertebra, for example:

1. Height is 100 cm.

2. Height above the floor to the point at the top of the spinous process of the VII cervical vertebra - 80 cm.

The length of the upper segment is 100 cm 80 cm = 20 cm.

The height of the chest is determined by measuring the distance from the jugular notch of the sternum to a line passing through the lower edges of the 10th ribs. Limb measurement. In order to measure the length of the upper limb, a centimeter tape is applied from the most outwardly protruding point on the edge of the acromial process of the scapula, that is, from the humerus (Fig. II, 2) to the finger (Fig. II, 7) - the most distal point on the flesh of the nail phalanges of the third finger. The length of the shoulder is from the humerus to the radius (Fig. II, 3) to the upper point of the head of the radius. The length of the forearm is from the radius - the upper point of the head of the radius to the styloid (Fig. II, 6) lower point of the styloid process of the radius. The length of the hand is from the styloid lower point of the styloid process of the radius to the finger - the most distal point on the flesh of the nail phalanx of the third finger. The width of the shoulders (acromial diameter) is determined using a compass, placing it between the right and left most outwardly protruding points on the edge of the acromial process of the scapula.

Shoulder girth (shoulder circumference) is measured in the area of greatest development of the biceps muscle in the upper third of the shoulder (Fig. III, e). It is necessary to measure in 2 states: 1. When the muscle is in a calm state, that is, with the arm freely lowered and the muscles relaxed; 2. in a tense state, that is, with the shoulder bent at the elbow joint and the muscle being maximally tense. The child should raise his arms to shoulder level and bend the elbow joint, straining the muscles as much as possible. Measurements in 2 conditions are necessary to assess the degree of muscle development.

To determine the length of the lower limb, it is necessary to measure the height above the floor to the spinoiliac (Fig. II.5) - the most protruding point of the upper anterior axis of the ilium and the height above the floor to the pubis - the point on the upper edge of the symphysis pubis (along the medial line). These data must be added and divided by 2, the resulting result is an indicator of the length of the lower limb.

For example:

1. Height above the floor to the most forward point of the top the anterior axis of the ilium is 50 cm.

2. The height above the floor to the point on the upper edge of the pubic symphysis is 40 cm, so the length of the lower limb is calculated as follows, that is, (50+40) : 2 = 45 cm.

The length of the femur is determined as follows: from the length of the lower limb, the length of the measurement above the floor to the upper tibia (Fig. II, 11) is subtracted (subtracted) - the highest

point in the middle of the medial condyle of the tibia. Thigh girth (thigh circumference) is measured at the widest part of the thigh, with the tape applied under the gluteal fold (Fig. III, d). The width of the pelvis is determined using a pelvis meter - this is the distance between the right and left iliopectineal (Fig. II, 4) - the most outwardly protruding points on the iliac crest. The length of the tibia is measured from the upper tibial point in the middle of the medial condyle of the tibia to the lower tibial (Fig. II, 12) - the lowest point on the inner malleolus. The calf circumference (calf circumference) is measured at the place of greatest development of the calf muscle (Fig. III, e). In order to clarify the age-related dynamics of growth of the foot and its segments, it is necessary to consider the patterns of their growth. The full length of the first ray of the foot can be measured from the age of one, and its segments only from the age of four due to the difficulty of determining the anatomical points. The length of the first ray is determined by measuring the distance from the heel, i.e. the most posterior part of the heel to the end of the first toe, i.e. to the most protruding point of the foot lying on the flesh | finger and the length of the first ray can be divided into the following segments: “length of the first finger” (I segment), “length of the first metatarsal bone” (II segment).

In the tarsal part, the foot can be conditionally divided into the following segments: III (the first wedge-shaped and medial part of the navicular bone) - according to Zernov’s terminology, they are conventionally called “round bones”, section IV (calcaneal and talus bones) is also conventionally called the “calcaneal segment ". The length of the foot is measured from the heel (Fig. II, 16) - the most prominent rear point of the heel to the terminal (Fig. II, 15) - the most forward point of the foot, lying on the terminal pulp of 1 or 2 toes.

The force of compression of the arm muscles is measured using a dynamometer. To measure the strength of the right and left hand in children of preschool and primary school age, dynamometers with a special scale of 30 kg are used. For children of senior school age - 90 kg. The child should stand straight, the hand in which the force of muscle compression is measured must be extended to the side and raised to shoulder level, so that the scale and arrow of the dynamometer are facing the surface of the palm. Do not press the hand with the dynamometer to the body or thigh. The force of muscle compression is measured first in the right, then in the left hand. The measurement is repeated 2-3 times and the highest number is recorded. Indicators of hand strength are obtained by dividing the dynamometry data of hand muscle strength (kg) by body weight (kg), multiplied by 100. The degree of development of subcutaneous fatty tissue is determined by a Best caliper. The Best caliper measures the thickness of the skin-fat folds in the following places: under the lower angle of the scapula, in the popliteal fossa, above the biceps and triceps muscles and above the iliac crest.

In the places where measurements are taken, the direction of the skin-fat fold must be strictly defined.

Fig. IV. Measuring the skin-fat fold using a caliper.

To measure the thickness of the skin-fat fold under the lower angle of the scapula, it is necessary to grab the fold outward from the angle of the scapula obliquely, taking measurements perpendicularly (Fig. IV). To measure the thickness of the skin-fat fold over the biceps and triceps muscles in the middle third, over the iliac crest and in the popliteal fossa, form a fold vertically and measure horizontally. The height of the fold should be about 10 mm. The fold of skin and fat located below the fingers is grasped by the jaws of the caliper (the jaws of the caliper must have a pressure of 10 g/mm^2) and its thickness is measured in millimeters. The thickness of each skin-fat fold must be measured 3 times and the average value found. And with the help of nomograms, after determining the size of the skin-fat folds, you can determine the percentage of fat in the child's body, and by comparing the data obtained with body weight, you can calculate the absolute amount of fat and lean body mass (active body mass), and also determine which is more developed - subcutaneous - adipose tissue or active body mass.

Active body mass index is determined as follows:

$$\text{IAM}=\frac{\text{Active body weight}}{\text{Body length (m3)}*10}$$

IAM allows you to assess the degree of muscle development.

The body surface is calculated using a nomogram taking into account body length and weight.

To identify structural differences in the body proportions of a growing organism, the following indicators are used:

$$\frac{\text{Body length}}{\text{Leg length}}*100 \quad \frac{\text{Shoulder diameter}}{\text{Body length}}*100$$

For mathematical processing of anthropometric data, it is necessary, first of all, to sort the cards by age.

To compare morphometric indicators obtained in different regions of the country, you can use the age periodization adopted at the International Symposium on Age-Specific Characteristics (Moscow, 1965).

Newborns 1-10 days.

Infant from 11 days to 1 year.

Early childhood - from 1 year to 3 years.

The first period of childhood is from 3 to 7 years.

The second period of childhood - from 8-12 years for boys,

from 8-11 years old for girls.

Adolescence - 13-16 years for boys,

12-15 years old for girls

Youth age - 17-21 years for men

16-20 years for women

Average age:

First period - 22-35 years for men

21-35 years for women

Second period - 36-59 years for men

36-55 years for women

Elderly people - 60-74 years for men

55-74 years for women

Senile age - 75-90 years for both sexes

Centenarians - over 90 years old.

The age of each individual child should be determined depending on the month of birth and the month of examination. To accurately determine the child's age, S.Sh.'s data is used. Shamsieva, N.P. Shabalova, L.V. Erman (1990). In the first year

The age of the child refers to:

- ✓ by 1 month - from 16 days to 1 month. 15 days;
- ✓ by 2 months - from 1 month 16 days to 2 months. 15 days;
- ✓ by 3 months - from 2 months 16 days to 3 months. 15 days;

After the first year to 3 years (36 months):

- ✓ 1.5 years (18 months) includes children aged 1 year 3 months. up to 1 year 8 months 29 days;
- ✓ 2 years (24 months) includes children aged 1 year 9 months. Up to 2 years 2 months. 29 days;
- ✓ 2.5 years (30 months) includes children aged 2 years 3 months. Up to 2 years 8 months. 29 days;
- ✓ 3 years (36 months) includes children aged 2 years 9 months. Up to 3 years 5 months. 29 days;

After 3 years at annual intervals:

- ✓ 4 years includes children aged 3 years 6 months. up to 4 years 5 months 29 days;
- ✓ 5 years includes children aged 4 years 6 months. up to 5 years 5 months 29 days; etc.

Let's assume that we need to calculate how many years, months and days the child is at the time of the study.

Example: Zakirov Ravshan - $\frac{\text{Date of birth } 20/5 - 2019}{2019\ y \text{ measurement date } 11/9 - 2024\ \text{y.}}$

In order to calculate how old the child was at the time of measurement, it is necessary to: subtract the year of birth from the year of the study. Yyear= 2024-2019=5 years

To calculate how many months the child is at the time of measurement, it is necessary to subtract the month of birth of the child from the month of measurement, so:

Mmonth= 9-5=4 months

To determine the exact age of the child (to which age group he belongs), after determining how many years and months the child was at the time of measurement, we also need to determine the number of days, for this we need to subtract the Birthday from the day of measurement, thus:

DDdays= 11-20 = -9, since -9 is less than 0, then from the resulting Mmonth= 4, you need to subtract the digit 1, so Mmonth= 4-1 = 3, since the child was born in the month of May (5th month), then by the calculated day DDdaysadd 31 days (there are 31 days in the month of May), so DDdays= -9+31 = 22, DDdays= 22

As a result of the calculation, it was established that Ilkhom Amirov was 5 years, 3 months, 22 days old at the time of measurement and belongs to the age group of 5 years.

If the month of birth is the 1st, 3rd, 5th, 7th, 8th, 10th, 12th, then we add 31 days to the calculated day, and in the remaining months - 30 days.

If this is the 2nd month (February), then we add 28 days, but if the year of birth is 2010, 2014, 2016, 2018 (leap year), in this case we add not 28, but 29 days to the calculated day.

If, when subtracting the month of measurement from the month of birth, the value turns out to be less than 0, then we add the number 12 to the calculated month, and subtract 1 from the calculated year.

When conducting anthropometric studies, an external examination is necessary to identify certain features of physical development and identify defects. You should pay attention to the development of muscles, the structure of the chest, the shape of the back, the condition of the bones and joints of the limbs, feet, the development of secondary sexual characteristics, the number of teeth, in order not to include in the development cards of children and adolescents who have severe defects in physical development or disease of the endocrine glands.

The discussion of the results. Studies have shown that body length in 8-year-old healthy male children ranges from 115.3 to 133.1 cm, with an average of 124.7 ± 1.16 cm. Body weight ranged from 18.5 to 39.2 kg, on average 25.4±1.30 kg. Body length in 8-year-old healthy girls ranged from 115.5 to 130.3 cm, with an average of 123.1 ± 0.93 cm. Body weight on average reached 22.5 ± 0.43 kg (from 19.3 up to 26.2 kg).

As a result of the research, it was found that the body length of healthy 12-year-old boys varied from 130.5 to 139.3 cm, averaging 134.0 ± 0.56 cm. The body weight of the healthy group ranged from 25.5 to 38.2 kg, on average reaching 29.3±0.81 kg. Body length in 12-year-old healthy girls also varied from 126.3 to 132.2 cm, with an average of 128.0 ± 0.37 cm. At the same time, body weight ranged from 20.9 to 30.3 kg, on average - 24.3±0.56 kg. In healthy 8-year-old boys, the chest circumference at pause ranged from 56.3 to 68.5 cm, at inhalation height - from 53.2 to 72.1 cm, and at full exhalation - from 55.5 to 68.0 cm. As a result of the research, it was found that in 8-year-old healthy girls, the chest circumference at pause ranges from 55.6 to 64.2 cm, at inhalation height - from 57.2 to 66.4 cm, with full exhalation - from 54 .4 to 62.2 cm. The study revealed that in 12-year-old healthy male children, the chest circumference in the pause ranged from 58.0 to 68.1 cm, at the height of inspiration - from 62.2 to 71.0 cm, with full exhalation - from 58.0 to 66.7 cm. In healthy girls of 12 years of age, the chest circumference in the pause ranges from 57.0 to 64.2 cm, at the height of inspiration - from 62.1 to 67 .2 cm, with full exhalation - from 55.4 to 62.5 cm (table No. 1).

Table 1. Anthropometric changes in the chest in children 8-9 and 12-14 years of age are normal

Chest circumference, cm	8-9 years (n=20)	12-14 years (n=20)	8-9 years (n=20)	12-14 years (n=20)
	Boys (n=40)		Girls (n=40)	
in a pause	61.0±0.74	64.6±0.74*	58.8±0.56	62.0±0.99*
at the height of inspiration	63.9±1.18	68.2±0.93*	60.7±0.56	65.1±1.05*
with a full exhalation	60.4±0.74	63.9±0.93*	57.9±0.50	61.0±1.99*

Anthropometric studies conducted among 8-year-old male and female children with scoliosis showed that the growth parameters of male children are 1.04 times, and those of female children are 1.01 times behind the parameters of healthy children. Boys and girls aged 12-14 years are 1.07 times shorter than their healthy peers. When measuring body weight, it was found that healthy 12-year-old boys are 1.20 times heavier, and girls of the same age are 1.04 times heavier than younger children. In 9-year-old male children with scoliosis, the body weight is 1.09 times less, and in female children it is 1.08 times less than in healthy young children. The chest circumference at rest in 12-year-old boys is 1.01 times, and in girls of this age 1.05 times greater than in healthy younger children. The chest circumference at the height of inspiration in 14-year-old boys is 1.02 times, and in girls 1.07 times greater than in healthy children of this age. The chest circumference at full exhalation in 8-year-old male children with scoliosis is 1.0 times greater, and in girls it is 1.05 times greater than in healthy children. When measuring the chest parameters of 9-year-old girls and boys, it was revealed that the chest circumference at pause in male and female children is 1.04 times greater, at the height of inspiration in

boys it is 1.05 times, and in girls it is 1. 02 times more, with full exhalation in boys it is 1.05 times, and in girls it is 1.04 times more than in healthy young children.

Conclusions. Young children lag behind healthy adolescents in height and weight. This is due to the fact that the skeletal system of children at this age is in the development stage, and with active movement than in adolescents, this sometimes affects the growth of the child's physical parameters. The chest circumference in all phases of breathing in adolescent children is greater than in healthy children. Compared to healthy children, in the 8th year of life, girls from adolescence experience an increase in chest circumference, and in boys a year later, i.e. at the age of 9. The reason for the increase in chest circumference in children at this age due to an unhealthy lifestyle is scoliosis and the phenomenon of curvature of the spinal column. The greater the curvature, the more the chest circumference increases.

During mass preventive examinations of children, special attention should be paid to the parameters of the physical development of children, especially to the parameters of height and body weight, as well as chest circumference. The data obtained as a result of the study will serve as the basis for an individual approach when conducting mass clinical examination of the child population and identifying groups at risk of the occurrence and progression of pathological changes in the physiological development of the physique (scoliosis, chest deformation).

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