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**DEPARTMENT OF GENERAL HYGIENE
AND PHYSICAL CULTURE**

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HYGIENE OF CHILDREN AND ADOLESCENTS

**Methodical manual for independent work on General hygiene for students of
medical and dental faculties**

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Hygiene of children and adolescents: methodological recommendations for medical students

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This methodological manual contains material that reflects modern hygienic ideas about the patterns of growth and development of children, as well as about the main methods of research and assessment of their health. The data on somatometric, physiometric and somatoscopic methods for studying the physical development of the child population are presented., Methods for a comprehensive assessment of these indicators in order to identify the harmony or disharmony of development.

The manual contains a list of questions for self-control, test tasks, a list of basic and recommended additional literature.

The manual contains a list of used and recommended literature. Educational and methodological manual "Hygiene of children and adolescents", prepared in the discipline "Hygiene" in accordance with the Federal State Educational Standard of Higher Professional Education for students studying in the specialty of Medicine (31.05.01).

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Hygiene of children and adolescents is a preventive medicine that studies the living conditions and activities of children on the health and functional state of the growing organism and develops measures aimed at maintaining and strengthening health, supporting the optimal level of functions and favorable development of the body of children and adolescents.

THE MAIN REGULARITIES OF GROWTH AND DEVELOPMENT CHILDREN OF THEIR HYGIENIC SIGNIFICANCE

Regularities of growth and development of the body are the theoretical basis of hygienic regulation of environmental factors for children and adolescents. Knowledge of these laws allows the doctor to understand and explain the activities of individual organs and systems, their relationship, the functioning of the whole body of the child in different age periods and its unity with the environment.

At all stage of maturation (from the moment of birth to full maturity) the growth and development of the organism proceed in accordance with objectively existing laws:

* the uneven pace of growth and development;

* non-simultaneous growth and development of individual organs and systems (heterochronicity);

* sex-related growth and development (sexual dimorphism);

* biological reliability of functional systems and the body as a whole;

* genetic conditioning of growth and development;

* environmental determinants of growth and development;

* acceleration of growth and development.

Uneven growth and development. The processes of growth and development are continuous, progressive in nature, but their rate has a non-linear dependence on age. The younger the body, the more intensive the processes of

growth and development.

This is evidenced by changes in body length of children and adolescents. During the first year of life, the length of the newborn's body increases by 47%, for the second — by 13%, for the third — by 9%. At the age of 4-7 years body length increases annually by 5-7%, and at the age of 8-10 years-only 3%. In the period of puberty there is a growth jump, at the age of 16-17 years there is a decrease, and in 18-20 years the increase in body length practically stops.

There are individuals whose rate of development is accelerated, and the level of maturity they are ahead of their chronological (calendar) age. The inverse ratio is also possible. In this regard, the term "age of the child" should be specified: chronological or biological.

Chronological age — the period lived by the child from birth to the moment of examination, having a clear age limit (day, month, year).

Biological age — a set of morphological and functional features of the body, depending on the individual rate of growth and development.

Criteria of biological age: the level of ossification of the skeleton, the timing of the eruption and change of teeth, the appearance of secondary sexual characteristics, the beginning of menstruation, as well as morphological indicators of physical development (body length and its year-on-year increase).

With age, the degree of information content of indicators of biological age varies. From 6 to 12 years the main indicators of development are the number of permanent teeth ("tooth age") and body length. Between 11 and 15 years, the most informative indicators of the annual increase in body length, as well as the degree of severity of secondary sexual characteristics and the age of onset of menstruation. In 15 years and later a very important indicator of development is the appearance of secondary sexual characteristics.

Non-simultaneous growth and development of individual organs and systems (heterochronicity). Each age is characterized by certain morphological and functional features. The child's body as a whole, however, the growth and development of its separate organs and systems occur at different time

(heterochronic).

In the first years of the child's life, the mass of the brain and spinal cord mainly increases, which is not accidental: there is an intensive formation of the functional systems of the body. In contrast, the intensive development of the genitals and the formation of childbearing function occur only after 12 years.

The growth rates of individual body parts are also different. In the process of growth will change the proportions of the body, and the baby of a relatively large-headed, short-legged and glinosolomennogo gradually turns into malogolovy, long-legged and korotkolapye.

The system for transporting oxygen to the tissues also develops gradually and reaches maturity by the age of 16-17. Taking this into account, hygienists prescribe limiting physical activity to children. Only in adolescence, upon reaching the morphological and functional maturity of the cardiovascular and respiratory systems, long-term performance of large physical loads and the development of endurance are allowed.

Heterochronicity of growth and development of individual organs and systems is the scientific basis of differentiated regulation of environmental factors and the activities of children and adolescents.

The conditionality of the growth and development of gender (sexual dimorphism). Sexual dimorphism is manifested in the peculiarities of the exchange process, growth rate and development of individual functional systems and the body as a whole. Boys have higher anthropometric indicators before puberty. In the period of puberty, this ratio changes: girls in terms of length and body weight, chest circumference superior to boys. There is a cross-section of age curves of these indicators.

At the age of 15, the intensity of growth in boys increases, and boys are again ahead of girls in their anthropometric indicators. The second intersection of curves is formed. This double intersection of the curves of age-related changes in physical development is characteristic of normal physical development. At the same time there is a different rate of development of many functional systems,

especially muscle, respiratory and cardiovascular. For example, the strength of the hand or back extensor muscles in boys of all ages is higher than in girls.

Thus, along with the patterns common to both sexes, there are differences in the rates, timing and rates of growth and development of boys and girls. Sexual dimorphism is taken into account in the normalization of physical activity, the organization of the educational process.

Biological reliability of functional systems and the body as a whole. The body has a wide range of life possibilities. In 10 ml of human blood contains such an amount of thrombin, which can cause clotting of all human blood. Excessive thrombin content ensures the reliability of the coagulation system. The wall of the carotid artery has high strength. It is able to withstand a pressure of 20 ATM, whereas in reality it rarely exceeds 7 ATM. These examples show that the backup capabilities of the body's systems are huge. In addition, nature provides for duplication of many organs (kidneys, lungs, organs of vision, hearing).

However, despite the large margin of safety of systems in the organization of educational, labor and sports activities of children and adolescents should use the established optimal load.

Determination of growth and development factors heredity.

Genetic program provides the life cycle of individual development

In the process of growth, genetic regulation of metabolism and energy is complemented by increasingly advanced neuroendocrine regulation, linking the genetic development program with environmental conditions.

Conditionality of growth and development by environmental factors. The growth and physical development of children is influenced by environmental factors: the state of atmospheric air, the composition of drinking water, the amount of solar radiation, etc.the Influence of natural environmental factors on the physical development of children is regulated by the impact of social conditions.

Air pollution by various chemicals adversely affects the growth and physical development of the younger generation. In 35% of examined children marked delay and disharmonically development.

The body weight of children and adolescents is more exposed to environmental factors. This indicator is mainly determined by the composition of food, diet, motor activity, organization of physical education.

The type of higher nervous activity, strength and mobility of nervous processes are determined by genetic factors. The development of motor skills (strength, speed, endurance), the activity of the autonomic nervous system (heart rate, minute volume of blood circulation, frequency and depth of breathing, VEINS, reaction to physical activity, temperature, etc.) are influenced by factors.

The processes of growth and development are subject to certain biological laws and at the same time determined by environmental conditions.

Acceleration and deceleration of growth and development. Acceleration of development of an organism of children and teenagers in comparison with rate of last generations received the name acceleration (from lat. acceleratio-acceleration). Its essence lies in the fact that the modern generation stage of biological maturation is completed somewhat earlier than the previous one. Accelerated development of children has been observed from an early age.

In the biology of modern man over the last century, in addition to the acceleration of development, there have been other changes: increased life expectancy, increased duration of the reproductive period, increased definitive (final) body size, changed the structure of morbidity. Changes that occur throughout a person's life are called "secular trend" (secular trend— an age-old trend). In this General age-old trend, the acceleration of growth and development is an integral part and covers only the period of human maturation.

Acceleration is one of the mysteries of our time. What are its causes and consequences, how long we will observe its manifestations — these and many other questions have not yet been answered.

Manifestations of acceleration are typical for all age periods of children — from newborn to adolescence.

The main theories explaining the causes of acceleration (p. Lisitsyn):

* physico-chemical: 1) heliogenic (solar influence radiation); 2) radio wave,

magnetic (influence of electromagnetic field); 3) cosmic radiation; 4) increased concentration of carbon dioxide associated with the growth of production;

* the influence of certain factors of living conditions: 1) alimony; 2) nutritive; 3) increased information.

* genetic: 1) cyclic biological changes; 2) heterosis (mixing of populations);

* theories of complex factors of living conditions: 1) urban influence; 2) complex of socio-biological factors.

Since the end of the 90-ies of the last century, the acceleration slowed down, the reverse process began-deceleration (retardation).

AGE PERIODIZATION

There are: 1) age periodization based on the assessment of the features of growth and development of the body; 2) social periodization.

Biological age periodization

Period of life	Age
Neonatal period	1-10 days
Infancy	10 days-1 year
Early childhood	1-3 years
My first childhood	4 years-7 years
Second childhood	
boys	8-12 years
girls	8-11 years old
Adolescence	
boys	13-16 years old
girls	12-15 years old
Юношеский возраст	
юноши	17 years to 21 year
девушки	16-20 years

Социальная возрастная

Age	Year of life
Pre-school	Up to 3 years
Preschool	3 years-7 (6) years
School	
junior	7 (6) - 10 years
average	11-14 years old
Teenage	15-18 years old

PRINCIPLES OF ASSESSMENT

CHILDREN'S HEALTH

"Health is a state of complete physical, mental and social well-being, not just the absence of disease and injury" (who).

Assessment of the health of the child population is given taking into account the signs of health:

- absence at the time of examination of any disease;
- harmonious and age-appropriate development (physical and mental);
- normal level of functions;
- no inclination to diseases.

Health group

Based on the results of medical examinations, children are divided into 5 groups:

I-healthy, normally developing, without functional deviations;

II-healthy, with functional or small morphological abnormalities:

III-patients in compensated state;

IV - patients in subcompensated state;

V-patients in decompensated state.

The first group - a person who have no chronic diseases; persons who are not sick or rarely sick during the period of observation and have a normal, age-

appropriate physical and neuropsychic development (healthy, without abnormalities).

The second group consists of children and adolescents who do not suffer from chronic diseases, but have some functional and morphological abnormalities, as well as often (4 times or more per year) or for a long time (more than 25 days for one disease) ill (healthy, with morphological and functional abnormalities and reduced resistance).

The third group includes children with chronic diseases or congenital diseases in a state of compensation, with rare and not severe exacerbations of chronic disease, without a pronounced violation of the General condition and well-being (patients in a state of compensation.

The fourth group includes persons with chronic diseases, congenital malformations in the state of subcompensation, with disorders of General condition and well-being after exacerbation, a prolonged period of convalescence after acute intercurrent diseases (patients in the state of subcompensation).

The fifth group includes patients with severe chronic diseases in the state of decompensation and with significantly reduced functionality (patients in the state of decompensation). As a rule, such patients do not attend children's and adolescent General institutions and do not undergo mass examinations.

The following indicators are additionally used to characterize the health status of children.

Health index — the proportion of children who did not get sick during the year, among all surveyed (in percent).

Pathological lesions — the frequency of chronic diseases, functional abnormalities as a percentage of the total number of examined.

ANTHROPOMETRIC STUDIES

Physical development is one of the most important indicators of the health of children and adolescents, which is used for individual health assessment.

Physical development of children and adolescents is a set of morphological and functional properties of the body that characterize the process of its growth and

maturation. Systematic observation of the physical development of the same children (individualizing method) is necessary for individual assessment of their development. There are also mass studies of the physical development of children and adolescents living in a certain area in a relatively short time (generalizing method).

Anthropometric studies are carried out by a single unified methodology. At an individual assessment of physical development compare results of anthropometric inspection of school students with standards-standards of physical development.

When conducting anthropometric studies, the following requirements must be met:

1.   Anthropometric measurements are carried out on a stripped child, in the position of the "stand still" (the child is straightened, picking up the stomach and spreading his shoulders, lowering his hands along the body, putting his heels together, socks apart, the head is set in the "horizontal" position — the lower edge of the eye socket and the upper edge of the ear goat are in one horizontal plane).

2.   Anthropometric studies are carried out in the first half of the day, as the length of the body by the end of the day is reduced by 1-2 cm due to the flattening of the arches of the foot, intervertebral cartilage, a decrease in muscle tone, and body weight increases by an average of almost 1 kg.

3.   The room should be warm and bright.

4.   Anthropometric tools should be standardized, proven, easy to process des. means.

5.   Data of anthropometric measurements are recorded in an individual for each child anthropometric map, which varies depending on the goals and objectives of the study.

All anthropometric data of the subject should be accompanied by the following mandatory information about him:

1.   Date of examination.

2.   Last name.

3.   Floor.

4.   Year, month and date of birth (followed by the calculation of age on the day of the survey).

5.   The name of the institution where the survey is conducted.

Characteristics of physical development is based on the study of somatometric, physiometric and co - matoscopic signs.

Somatometry

Somatometry includes determining glinnikov body diameters, circumferences and weight.

To measure the length of the body "standing" and "sitting" you can use a height gauge. The growth of children up to 2 years is measured by a height meter of a different design.

To measure the diameters used large and small circulars.

A metal tape measure or measuring tape is used to measure the circumferences.

Weighing is carried out on the lever medical scales. The examinee stands on the middle platform scales and is quiet. Weighing of young children is carried out on special scales in the "lying" or "sitting"position.

The-old functional status

The-old functional status — definition functional performance. In the study of physical development measure vital capacity (VC) — spirometry, muscle strength of arms and dead lifts force dynamometry.

The GALL is an indicator of lung capacity and respiratory muscle strength and is measured by a spirometer.

Muscle strength of the hands-characterizes the degree of muscle development, measured by a hand dynamometer. The examinee stands straight, with the hand aside, the dynamometer is conveniently grasped by the brush and maximally compressed.

The study is carried out 2-3 times and the greatest result is recorded in kg.

Deadlift strength becomes measured by the dynamometer.

The examinee bends down, takes the handle of the dynamometer, located at the level of the knees, then slowly begins to unbend with effort, at the height of the effort is made a jerk. The result is recorded in kg. the study of the Stanovoi force is carried out only from adolescence.

Somatoscopy

The shape of the chest is determined during the examination. There are three version of the chest: normostenichesky, hypersthenic and aste technical.

Chest deformities-asymmetry can be a particular manifestation of the disease of the entire bone system or organs of the chest cavity. With rickets, thickening of the thoracic parts of the ribs at the border of the cartilaginous and bone parts can reach significant sizes - "rickets rosary".

When determining the shape of the legs, the subject stands at attention. When normal form of the feet they touch in the area of knee joints and inner ankles. X-shaped legs-the knee joints go one after another, and when the knee joints touch, the inner ankles stand apart from each other. In the future, the legs typically have a normal form. In people who are obese, X-shaped legs due to increased fat deposition in the hips. O-shaped legs-knee joints do not touch each other. This form of legs can be a manifestation of bone diseases, a sign of rickets.

To determine the shape of the foot, the method of plantography is used-obtaining an imprint with its subsequent calculation. On the print, a tangent to the most protruding points of the inner edge of the foot is drawn, from its middle the perpendicular to the outer edge of the foot is restored. Further, it is calculated what percentage is the segment passing through the painted part of the foot from the length of the entire perpendicular. If the isthmus AD is up to 50% of the length of the perpendicular CD-stop normal. 50-60% flattened, more than 60% flat.

Examination of the spine. Determined the presence of physiological curves of the spine: cervical, thoracic and lumbar, performing the function of depreciation when walking, running and other movements. In the frontal plane, normally the spine is a straight line, the shoulders are at the same level, the shoulder blades are symmetrical, the waist hips formed by the waist line and the lowered arm are equal to each other.

In pathological conditions may curvature of the spine:

in the sagittal plane-lordosis (forward) and kyphosis (back). This increases the physiological curves of the spine, as well as possible smoothing of the cervical

and lumbar curves and total kyphosis of all parts of the spine.

In the frontal plane-scoliosis, which can cover all parts of the spine (complete) and part of it (partial). Depending on the direction of the bending arc distinguish right - and left-sided scoliosis. When scoliosis marked asymmetry in the level of shoulders, shoulder blades and waist triangles, the presence of muscle compensatory rollers.

Posture-the usual posture of a person standing at ease, when the body and head are held without active muscle tension. It depends on the shape of the spine, the uniformity of development and muscle tone, and may also be associated with age-related features of the processes of growth and development and acquired skills to maintain the correct posture.

Types of posture:

Correct-cervical and lumbar bends exceed 3-5 cm, depending on the length of the spine, the head is raised, the shoulders are slightly set back, the chest is slightly protruded forward, the abdomen is tightened.

Straightened-all the physiological curves are smoothed, the back is sharply straightened, the chest is visibly protruded forward. With a pronounced straightened posture, the cushioning functions of the spine are violated, the gait changes, the activity associated with walking, sharp movements and physical efforts in the vertical position of the body is hampered.

Kyphotic-cervical and lumbar curves are sharply increased, the head and shoulders are lowered, the stomach is given forward.

Lordotic-sharply increased lumbar bend while smoothing the neck, the upper part of the body is slightly thrown back, and the abdomen is issued forward. This type of posture is observed in preschool children as a result of poorly developed muscles. Detection of lordotic posture in older ages indicates the possible presence of somatic pathology that affects the physical development of the body as a whole

Stoop-increased cervical flexion while smoothing the lumbar, head tilted forward, shoulders lowered. Stoop posture, often found in adolescence and is associated with a sharp increase in body length in the prepubescent period.

The degree of fat deposition is estimated by measuring the thickness of the skin-fat folds.

For measurements used a sliding caliper or co - Lipari of various kinds. The thickness of the fat fold is measured on the side wall of the abdominal area at the navel level, 2-3 cm to the right of it, on the chest-2-3 cm below the breast and in the scapula area.

Method of complex estimation of physical development of the child

ables are used that show the average values of biological development of boys and girls by age. Using these tables and compare the data of the child with the average age, determine the compliance of biological age calendar (passport), ahead of or behind him. In this case, take into account the change of informative indicators and depending on the age of the child.

In preschool and primary school age leading indicators of biological development are: body length, body length increase over the past year, the number of permanent teeth on the upper and lower jaw in total. As additional indicators in preschool age can be used: changes in the proportions of the body (the ratio of the head circumference to body length).

In middle school age, the leading indicators are body length, body length increase, the number of permanent teeth.

In high school age — an increase in body length and the degree of development of secondary sexual characteristics.

Second stage

Determine morphological and functional state indicators of body weight, chest circumference at the pause, the muscle power of hands and vital capacity of the lungs.

Morphofunctional state is defined as harmonious, disharmonious and sharply disharmonious.

Harmonious is the condition when the body mass and chest circumference are different from appropriate within a private Sigma of the regression. To harmoniously developed are children whose body weight and chest circumference

exceed due by more than l due to the development of muscles, the thickness of any of the skin-fat folds does not exceed the average. Functional parameters correspond to the age norm (m±a) or exceed it.

Disharmonious is a condition when the body weight and chest circumference are less than 1.1-2 or more due to 1.1-2 due to fat deposition, the thickness of the skin-fat folds exceeds the average. Functional indicators are less than the age norm.

Sharply disharmonious is the state, body weight and chest circumference less due to 2.1 l,l-2 and more or more due to 2,11,1 -2 or more due to fat deposition, the thickness of the skin-fat folds exceeds the average. Functional indicators are less than the age norm.

Thus, when assessing the physical development of the complex scheme, the General conclusion contains a conclusion about the correspondence of physical development to age and its harmony.

Analysis of the relationship between health and physical development, determined by a complex scheme, allowed to identify children at risk of three degrees, depending on their existing violations of the level of biological development and harmony of morphological and functional state.

Children whose biological age corresponds to the calendar, and physical development is harmonious, the most prosperous in terms of health.

Children are ahead of or behind the biological age while maintaining a harmonious morphological and functional state, as well as children with a biological age according to the calendar, but having a disharmonious morpho-functional condition due to deficiency of body weight constitute a group of first risk.

Children are ahead of or lag of biological age, combined with disharmonically morphofunctional state, as well as children with a biological age according to the calendar, but having disharmonies due to the excess body weight make up the second group of risk.

All children who have a sharp disharmony in physical development, both in

violation of the terms of age development, and developing according to age, constitute a group of the third degree of risk.

Thus isolated children and adolescents need a variety of diagnostic and treatment activities:

1-group in-depth examination;

2-in-depth examination and follow-up;

3 - inspection, follow-up care and outpatient or inpatient treatment.

SITUATIONAL TASKS

1. Note which health group the child belongs to. At medical examination of Ivanov I. with the participation of specialists diagnosed: stooped posture.

Physical and mental development corresponds to age, harmonious. In the year prior to the survey, he suffered 3 SARS

a) group 1

b) group 2

c) group 3

d) group 4

e) group 5

2. Note which health group the child belongs to. At medical examination of Ivanov I. with participation of experts of chronic diseases and morphofunctional deviations it is not revealed. Physical and mental development corresponds to age, harmonious. In the year before the survey, he suffered SARS, chickenpox, measles

a) group 1

b) group 2

c) group 3

d) group 4

e) group 5

3. Note which health group the child belongs to. During the medical examination Volkov I. with the participation of specialists diagnosed: chronic gastritis in the acute stage. Physical development corresponds to age, disharmonious due to weight deficit. Mental development corresponds to age, harmonious. In the year before the survey, suffered 3 SARS, parainfluenza

a) group 1

b) group 2

c) group 3

d) group 4

e) group 5