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# The Basis is Age Characteristics and Hygiene of the Movement System

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The musculoskeletal system includes the skeleton and skeletal muscles. Bones and joints in the skeleton are passive organs of movement, and muscles are active organs of movement.

The skeleton consists of more than 206 separate bones, 85 of them are even, 36 are odd.

The skeleton performs three main functions: support, movement and protection.

Skeletal muscles covering the bones in the body are active organs of movement, and when the muscles contract, movement occurs in the joints. The movement of a person occurs due to the arrival of centrifugal impulses to the muscles through motor nerves, which ensures the life and labor activity of a person. Thus, muscles and bones are involved in the movement. In addition, the bone system protects the nervous system and internal organs from various influences.

All physiological processes are interconnected in a whole organism. This connection can be seen in the following example. When the muscles contract, the breathing, heart activity, metabolic process, and circulatory nervous system change at the same time as the human movement. In other words, breathing in the muscles, heart activity increases. Blood circulation accelerates, blood vessels expand. Metabolism increases and so on. Contraction of skeletal muscles is very important in the development of the nervous system. Because muscle contraction is caused by external influences and sensory organs, and impulses go to the back and brain. This develops the nervous system. Movement coordination in children is related to the development of the nervous system, especially nerve fibers. Irregular movements in a newborn child are associated with the lack of a myelin layer of most efferent motor nerve fibers. thus, the development of the child's nervous system and other functions of the locomotion apparatus is important for the normal growth of the body.

Chemical composition, physical properties and structure of bone.

Bone is mainly made of bone tissue. The surface of the bone is covered with the periosteum, which is very mature in children and does not tear even when the bone is broken. Not only the bone surface is covered with periosteum. The periosteum is provided with a large number of blood vessels and nerves, which pass through the holes in the periosteum to the inner part of the bone. When the bone is damaged and diseased, the bone is regenerated at the expense of the cells of the periosteum. Ligaments and muscles on the periosteum are attached. At the bottom of the periosteum there is a compact layer or a dense layer of bone. There is a porous layer under the compact layer. In the interior of the long bone, there is a space along the entire length of the bone. There is a red marrow in the hollow part of the long tubular bone of newborns and infants, and in the process of growth, the place of the red marrow is replaced by the yellow marrow. Red marrow is stored at both ends of tubular bones, sometimes in flat bones up to 15 years. Depending on the shape and structure, bones are divided into tubular, flat, short and mixed bones. Tubular bones are part of the limb skeleton.

Among tubular bones there are long bones (humerus, wrist, elbow bones, femur, tibia) and short bones (palm bones, foot bones, finger bones). Each tube-shaped bone has a body (daiphysis) and two ends (epiphyses). The shape of flat bones is different. They include the covering bones of the head, the bones of the chest and pelvis. Mixed bones have different shapes. On the surface of the bones there are bumps, edge holes, and ridges. Muscles, tendons, ligaments are attached to them, or veins and nerves pass through them. Entering the bone connective tissue, it consists of two types of chemical substances: organic and inorganic substances. The organic substance of the bone is called ossein, 1F3 part of the bone composition is organic and 2F3 part is inorganic substance. If we put a part of the bone in hydrochloric or nitric acid, after some time we will see that it becomes soft and elastic. If the bone is burned in the fire, it becomes brittle due to the burning of organic substances. The elasticity of the bone depends on the presence of ossein, and the hardness depends on inorganic substances. Bone is elastic and hard due to the presence of organic and inorganic substances. As age increases, the amount of bone ossein and inorganic substances changes. Children have more organic substances. Therefore, their bones are elastic. As the age increases, the amount of inorganic substances increases, so their bones become brittle. As age increases, calcium, phosphorus, magnesium and other elements in bones change relatively. The bones of young children contain more calcium, and the bones of older school-aged children contain more phosphorus salts. At the age of 7, the structure of the tubular bones is similar to that of adults. But at the age of 10-12, the porous substance of the bone changes intensively. The younger the child, the more dense the skin on the bone is. At the age of 7, the bone surface separates from the dense layer. Up to 7-10 years, the growth of the medullary part of tubular bones slows down. Between the ages of 11-12 and 18, the tubular bones are fully formed.

Bones are connected by interstitial, spongy tissue, bony tissue, and connective tissue. Joining with the help of connective tissue - bandages, curtains, head stitches. Connecting with the help of connective tissue - through intervertebral joints. Bone fusion includes the formation of the coccyx and coccyx. Joints include joints.

Head skeleton.

The skull is divided into 2 parts: bones of the brain box and bones of the face. In children, the facial part of the head skeleton is smaller compared to the part of the brain box, and this difference disappears with the age of the child. The head skeleton of a child grows evenly until the age of 2 years. At the age of 1.5 years, the bones of the skull are completely ossified. At the age of 4, the sutures of the brain box are formed. Skull bones grow rapidly at 3-4 years, 6-8 years, 11-15 years. This growth lasts up to 20-30 years.

Spine.

The spine is made up of individual vertebrae and intervertebral discs. It forms the axis and support of the skeleton of the spine and protects the spinal cord from various external influences. The spinal canal ends with the cavity of the brain stem from above, and with the opening of the coccyx from below. Next to the spine is the intervertebral foramen, through which spinal nerves, blood vessels and lymphatic vessels enter and exit. The spine consists of 33-34 vertebrae, 7 of which are cervical, 12 thoracic, 5 lumbar, 5 coccyx and 4-5 coccyx. An adult's spine consists of 4 curves. 1. The curvature protrudes forward in the neck. 2. Curvature in the chest area backwards. 3. Curvature at the waist forward. 4. It bulges backwards in the tail and rump.

At the end of kindergarten, curvatures of the spine are formed. Back curvature occurs during adolescence. At the age of 23-26, the entire spine is ossified. Inflexibility of the spine as a result of incorrect sitting on desks and tables due to the presence of spongy tissue and incomplete ossification, incorrect formation of the spine - bending of the spine to one side, scoliosis and leads to other pathological conditions. The neck and lumbar part of the spine are very mobile. The length of the spine is 75 cm in men, 68 cm in women. is equal to The spine bends and writes, bends to the right and left, rotates around the sun's axis.

Chest skeleton.

The chest is formed by the fusion of 12 pairs of ribs and the temporal bone. The shape of the chest is 2 types: long narrow and short wide. The main shapes of the chest can be conical, cylindrical and flat. The shape of the chest changes with the age of the child. When a child is one year old, the chest is cone-shaped. When the child is 12-13 years old, his shape is similar to that of an adult. The sexual difference of the chest begins at the age of 15. When breathing, the lower ribs of the chest rise in boys, and the upper ribs rise in girls. There is also a gender difference in the circumference of the chest. From 3 to 10 years, the circumference of the chest increases by 1-2 cm in 1 year, and by 2-5 cm during puberty from 11 years. As the child's body weight increases, the chest circumference also increases. In the period of puberty, the circumference of the chest grows rapidly in the summer and winter months. Its development also depends on skeletal muscles. Swimming, boating has a good effect. The chest is deformed as a result of improper transfer of the child to the desk, as a result of the child pushing his chest on the desk. In addition, various rickets and colds have a negative effect on its development.

Hand skeleton.

The bones of the arm skeleton are the bones of the shoulder girdle - humerus and humerus, wrist, elbow, paw

consisting of bones. Humerus 20-25 years old, wrist 21-25 years old, elbow 21-24 years old, metacarpals 10-13 years old, palmar bones 12 years old,

finger: the bones of the phalanges are ossified at the age of 9-11. It should be taken into account in education, work, physical education, drawing and writing.

Leg skeleton.

The skeleton of the foot includes the bones of the pelvis and femur, the bones of the shins and the bones of the feet. Pelvic bone ossification should be taken into account in physical education and work. Improper connection of pelvic bones occurs as a result of sitting incorrectly for a long time, walking upright, carrying heavy loads, and insufficient nutrition. 20-24 femurs and small bones of the lower leg

at the age of 17-21 years, the bones of the palm of the hand are completely ossified, the phalanges of the feet are completely ossified at the age of 15-21 years. Standing for a long time, wearing tight shoes flattens the foot and causes flat feet.

Muscular system.

The movement function of the skeleton occurs due to muscle contraction. There are about 600 muscles in the human body. Contraction of skeletal muscles depends on a person's discretion. When skeletal muscles contract, centripetal impulses from muscle receptors reach the central nervous system. As a result, the coordinated movement of skeletal muscles occurs. All muscles in the body are divided into two types: smooth and striated muscles.

Transverse muscles.

Most of the muscles supporting the skeleton are called transverse muscles. They include arms, legs, torso, respiratory muscles. They shrink quickly. Muscles in the body have a contractile body and a passive part - tendons. Skeletal muscles are long, short, serbar depending on their shape. Long muscles are located in the arms and legs. Cerberus muscles are located in the body. Skeletal muscles give the body a certain shape.

Contraction of skeletal muscles.

Skeletal muscles respond to the excitation impulse coming from the nerve fiber by contraction. A single contraction occurs when the muscles receive a single contraction. The contraction of muscles in the body consists of a sum of individual contractions. A single contraction can be recorded only in laboratory conditions by a special instrument. Impulses from the central

nervous system to the muscles are constantly shortened. Muscles contract long to these impulses. Due to the frequent arrival of impulses in the nerve fiber, this contraction of the muscle is called tetonic contraction or tetanus. There are two types of tetanus: serrated and smooth tetanus.

The work of the muscle is measured in kilometers, which means high expectations. it is measured by multiplying the weight of the load by the height. Muscles perform static and dynamic work. Static work is when the muscles can stand for a long time without contracting. Muscles are expected to be loaded during dynamic work. Static posture includes standing. Muscles use less energy in static work than in dynamic work. Dynamic work consumes a lot of energy, metabolism increases. Muscles are less tired in dynamic work.

In static work, the blood flow to the muscles decreases, nutrition decreases. An ergograph is used to measure the working capacity of muscles. Muscle strength increases from the age of 6-7. At the age of 8-9, the increase in muscle strength is much faster. Muscles get tired when they contract for a long time during work or in static situations or when doing any physical work. The younger the child, the faster and easier he gets tired, especially in various muscle activities, he gets tired faster than adults. Sechanov I.M., Pavlov I.P., Vvedenskyi that the central nervous system plays a decisive role in the onset of muscle fatigue

N.E. and Ukhtomsky showed in their investigations. Children under 7-8 years of age do not have sufficient coordination of small muscle contractions, so they perform precise, small and delicate movements with great difficulty. Therefore, they get tired quickly. 7-12-year-old children get tired quickly due to lack of coordination of movements. Therefore, physical education should not exceed 40-45 minutes. 7-8 year old children perform many small actions compared to adults, but spend less energy. Due to insufficient development of the nervous system and movement apparatus, 14-year-old children are 2:5 times more tired than adults, and 16-year-olds are 2 times more tired. This information should be taken into account when carrying out various physical activities, in the pre-school plot, in production. During the period of physical work, it is necessary to change the working position, pace, posture, to give frequent rest, to create a positive emotional state. 7-8-year-old children do not have the agility of muscles to perform precise, delicate movements. Such agility appears gradually. Physical exercise is one of the factors that increase movement speed and agility. After the age of 30, the latent period of muscle contraction increases, the speed of movement decreases. The maximum frequency of the group of muscles on the left side is higher than that of the group of muscles on the right side. From 7 to 16 years, the speed of movement increases by 1.5 times. Muscle strength increases rapidly during puberty in adolescents. When the child is 6-7 years old, the strength of the writing muscles is greater than the strength of the bending muscles. 8-10

From the age, the power of the right hand is more. This is because the right hand is supplied with a lot of blood. The hand strength of boys at 8-10 years old is 1-3 kg more than that of girls. more than 7 kg at 13 years old, 15 kg at 16 years old, 17.5 kg at 19 years old, 18 kg at 22 years old. Endurance is characterized by the ability to maintain the working capacity of a certain group of muscles for a longer period of time. As age increases, resistance to dynamic work increases. Endurance increases significantly in boys at the age of 12-15.

Hygiene of musculoskeletal system.

In the organization of educational and working activities of children, the educational and working conditions do not correspond to hygiene, classroom equipment is not suitable for the purpose, they always carry their portfolios in one hand, and the workplace is not hygienically organized when organizing life at home. Lack of fit, excessively soft and uneven bedding, underestimating the development characteristics of the spine will lead to improper growth and development of the musculoskeletal system. Non-observance of the hygienic laws of the musculoskeletal system leads to the development of the spine, that is, to the deterioration of the stature. These are called elevated, kyphotic, lordotic, scoliotic cad-comat.

When children are standing, their head is bent slightly forward, their shoulders hang forward, their chest is more concave, and their stomach protrudes forward.

In children with kyphotic stature, the eyeballs rise like wings. A situation arises.

In people with lordotic stature, the back part of the body is flat, the chest is flat, the abdomen is protruding, and the lumbar part of the spine is bent forward more than normal.

In tall children with scoliosis, when standing, one shoulder is low and one is high, the chest is low and high, and one side of the chest is

it is curved, the other side is more concave. Distortion of stature affects not only the appearance, but also the development and function of internal organs (such as the liver, heart, liver, kidney, stomach, and intestines).

For the normal formation of the spine in children, it is necessary to follow the following hygienic rules: teach the child to sleep on a flat and slightly harder mattress from a young age, the pillow should be lower; the child should not be carried until he is 6 months old, he should not stand on his feet for a long time until he is 10 months old; young children, elementary school students should not sit in one place for a long time, walk long distances, carry heavy loads, or do work with one hand all the time; - Pupils should sit on desks, tables and chairs suitable for their height, while sitting on desks, tables and chairs, their bodies should be straight, their shoulders should be level, their backs should lean against the back of the chair or desk, and their legs should be at the knees. 3-5 cm between the chest and the edge of the table, bent to form a right angle. should be close to

Flat feet. The lower part of the palm of the human heel acts as a spring of the support-movement system. When children stand for a long time, when they carry a heavy load, when they wear narrow shoes, the dome of the foot is flattened; resulting in flat feet. As a result of flat feet, there is pain in the muscles of the heel-paw and calf of the foot. Flat feet is congenital and acquired in life. The causes of flat feet after birth are as follows: walking the child from a very young age (8-10 months), standing for a long time, wearing shoes with soft heels to a young child, students walking all day in sports shoes without heels. , wearing shoes with high heels and narrow ends, carrying heavy loads. Taking this into account, care should be taken to prevent flat feet.

There is a hygienic requirement for pouring into classroom equipment.

Equipment of classrooms and laboratories is important for effective education and labor training. School furniture should be suitable for children's height, age, body proportions, and physiological characteristics. The main equipment of the classroom will be such parts as a chair and a writing table. Suyanchik

the child's spine should match the curvature of the spine. The horizontal distance between the backrest and the backrest of the chair is 3-5 cm from the diameter of the student's body. distance must remain. Distance can be positive, negative and zero. If the distance between the backrest increases, the student will sit bent, if it decreases, he will be cramped. The front edge of the desk is 3-5 cm from the seat. passing is appropriate. The writing table of the desk is made with a slope of 15-20 degrees. This makes it easier to see. When transferring students to their desks, it is necessary to adjust their height to the desk number. The smallest child is 110 cm tall, the youngest is 179-180 cm. will be All students are divided into 7 age groups. Desk numbers are also from 6 to 12 A.F. Listov recommends the following formula for determining the number of a child's desk based on his height, that is, if the previous number of the child's height is subtracted by 5 from the decimal, the number of the desk where this child sits is derived. For example, the child's height is 148 cm. We subtract 5 from 14, and 9 remains. So, 148 cm. a tall child should sit at desk number 9. Currently, many schools use desks with new numbers. These are designated as A, B, V, G, D. The height of the child who can sit at the desk, the desk number or a colored conditional sign are placed on the backrest of each desk. For example, A is yellow, B is red, V is blue, G is green, and D is white. It is recommended to paint classroom desks,

tables, chairs in colors with a reflection coefficient of 35% to 50%. It is recommended to paint desks, tables, chairs in light gray, light green or other lighter colors. Class desks are placed in 3 rows, the lower ones are in front, and the higher ones are in the back. The distance between rows of desks is 70-75 cm, the distance between the inner wall and the row of desks is 7-8 m. placed as In addition to height, health, vision and hearing characteristics are taken into account when students are transferred to a desk. A near-sighted child, even if he is tall, should be transferred to the front desk.

The surface of the blackboard should be smooth and non-shiny. Its size depends on the class, its length is 175 cm. from 300 to 350 cm. up to 85 cm wide. 90 cm in upper classes. set high. The board is painted in brown and dark green colors. A fluorescent lamp is installed on top of the board to put bur, cloth. The student's desk and chair are placed in front of the first desk or the middle desk.

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