

**ANATOMICAL AND PHYSIOLOGICAL FEATURES OF THE NERVOUS
SYSTEM IN CHILDREN**

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Resume: This article discusses the anatomical and physiological characteristics of the nervous system in children, other organs of the nervous system, the number of nerve cells in the cerebral hemispheres of the baby, blood vessels, the subcutaneous fat layer of babies, baby care, brain development, spinal cord and peripheral nerves, the predominance of reflex activity, high excitability, insufficient development of inhibitory processes, the peculiarities of the development of the autonomic nervous system, and factors affecting the development of the nervous system in children.

Keywords: child, nervous system, anatomical and physiological characteristics, organs, the number of nerve cells, blood vessels, the subcutaneous fat layer of babies, baby care, brain development, spinal cord and peripheral nerves, the predominance of reflex activity, high excitability, inhibitory processes, autonomic nervous system.

During the development of the child's body, the nervous system is also formed and reaches maturity. In newborns, the nervous system is not fully formed, and its development, the formation of interneuronal connections (synapses) and the achievement of functional maturity occur gradually. At the time of birth, the child's nervous system is less developed than other organs and systems. In infants, the brain weighs relatively large and makes up 1/8 of the body weight. The child's brain tissue is rich in water, it contains less lecithin and other spastic proteins. The number of nerve cells in the cerebral hemispheres of the baby is the same as in an adult - but they are not yet mature. Children born on the lunar day have a number of innate or conditioned reflexes: sucking, swallowing, opening and closing the eyes, coughing, sneezing, urinating, among others. These reflexes adapt the organism to the surrounding environment. On the basis of these unconditioned reflexes, conditioned reflexes that are important in a person's life develop in a child.

By the end of the first month of a child's life, a number of conditioned reflexes related to all analyzers appear. This indicates that the brain and its family of knowledge - the cerebral cortex - have begun to perform their main function, and communication between the organism and the surrounding environment has begun to be established. The child's sense of smell is much better developed. The taste of bitter and sweet foods is different, and the sense of smell is less developed. From birth, the child sees objects and hears their sounds. The tear glands are developed, but due to the lack of impulses from the central nervous system, tears do not yet come out of the eyes. The skin of a newborn and nursing child mainly has the following anatomical features. The stratum corneum is thin, the epidermis is generally juicy and soft, and the basement membrane is immature and delicate.

Blood vessels are usually developed and abundant. The skin of a healthy baby who is breastfeeding is soft, smooth, and delicate, with a pinkish-white color. The skin glands are

not well developed, and these glands begin to function at the age of 3-4 months. The subcutaneous fat layer of babies is abundantly developed. The deep folds in the tissues of the baby's buttocks, thighs, elbows, and head are also due to this. The main function of the skin is protection, and this function is not fully developed in children. Therefore, the function of any skin is to regulate heat, and this function is also not well developed in children. For this reason, when the air temperature drops, the baby's body quickly cools down and when the temperature rises, it heats up.

In the process of growth and development, the child's skeleton undergoes complex changes. A number of internal and external factors influence these changes in the skeleton. The bone tissue of a nursing child is fibrous, has a structure, is poor in mineral salts, is rich in water and blood vessels. For this reason, the child's bones are soft, elastic, flexible, slightly deformed, and easily bend and take on the wrong shape when born in a crib under the influence of tight clothing or shoes. By the age of 2, the child's bones are similar in structure to those of an adult, and by the age of 12 they are no different from the bones of an adult. There are humps on the skull of a nursing child. This disappears by the age of 1, the spine of babies is straight, there are no physiological bends. As the child grows and new functions appear, physiological protrusions appear in the spine.

Cervical lasso appears at the age of 2 months and the child holds his head. When the child reaches 6 months of age, the chest wall develops and the child begins to walk. In the first months of life, the child's incorrect walking creates conditions for the spine and chest to become curved. The nose of a nursing child is smaller, shorter, and has a different shape than that of an adult. There is no lower nasal passage, the mucous membrane of the nose is rich in delicate blood vessels, which leads to blockage of the nasal passages during a cold, making it difficult to suck. The space of Geimar is poorly developed in nursing children. The right bronchus occupies an almost vertical position, so foreign bodies quickly fall into it. Due to the small number of mucous glands, the mucous membrane of the bronchi is dry, but rich in blood vessels. This facilitates the occurrence of inflammatory processes and stenotic phenomena.

In infancy, the lungs are rich in connective tissue and are richly supplied with blood vessels, the elastic tissue around the alveoli is poorly developed. Therefore, phenomena such as atelectasis, infizzyma, and blood stagnation in children's lungs occur more easily. Favorable conditions are created for the onset of inflammatory processes. Breathing in children is somewhat superficial and frequent. Babies take 50-60 breaths per minute. Children have a mixed type of breathing, that is, chest and diaphragmatic. The cardiovascular system of children differs from that of adults. The heart of a newborn is relatively large. It weighs 20-25 grams.

In nursing and infant children, the heart is oval, conical, spherical in shape. After 6 years, it becomes elongated in shape. In children, the arteries are relatively wider and better than the veins, the pulse in children is much faster than in adults, and the pulse rate is also higher. The arterial pressure in children is relatively lower. The maximum blood pressure in infants is 70-74 mm Hg. In infants, the blood circulates almost 2 times faster than in adults. Blood circulates completely in 12 seconds in infants, 15 seconds in a 3-year-old child, and 22 seconds in an adult. The oral cavity of infants and toddlers is relatively small. The chewing muscles are well developed, the tongue is large, short and thick.

In infants, saliva is not sufficiently developed, saliva is produced less, and the mucous membrane of the oral cavity is dry. Therefore, it is prone to injury. In children aged 3-4 months, saliva is secreted sufficiently, but due to the child's inability to swallow, saliva flows. The baby swallows some air along with milk, the air swallowed by the child during sucking rises when the child is held upright, causing burping and taking part of the milk out of the stomach with it, which turns out to be vomiting. The capacity of the stomach is 30-34 ml, 100 ml in a 3-month-old child, and 250 ml in a 1-year-old child. A specific and important feature of the intestines of a nursing child is the high permeability of its walls. For this reason, many diseases, especially in the brain, in intestinal diseases, toxins and products of poor digestion of food easily pass through the intestinal wall and enter the blood, leading to the onset of toxicosis. Therefore, intestinal infections develop rapidly in children in the first year of life. In infants, the renal pelvis and ureter are relatively wide, and the tone of the walls is lower due to the underdevelopment of muscle and elastic fibers. All this creates conditions that facilitate urine retention, which can lead to the formation of pathological processes in the renal pelvis.

Care of babies. Taking into account the anatomical and physiological characteristics of babies, it is necessary to observe cleanliness when caring for them. Before breastfeeding the baby, the mother must first wash the mammary glands with boiled water or furatsilin solution. Bathe the baby with a solution of potassium permanganate diluted in a ratio of 1/8000, and on hot days, it is necessary to wipe the natural folds frequently. The baby's face and eyes are washed with sterile cotton wool soaked in boiled water or potassium permanganate solution. If the baby has cuts on his body or the buttocks are red, the baby should be bathed frequently and powder should be applied to the cuts. After the umbilical cord stump falls off, a 2% diamond cookie is placed on the umbilical ring.

1. Anatomical features of the nervous system in children

1.1. Development of the brain.

- In newborns, the average weight of the brain is 340-400 g, which is 25-30% of the adult weight.
- In the first year of life, the weight of the brain increases by 2 times and by the age of 6 is 80-90% of the adult weight.
- The cortex of the cerebral hemispheres is not well developed, and mainly the lower (subcortical) structures are active.

1.2. Spinal cord and peripheral nerves

- The spinal cord is relatively long in infants and adapts to the general development of the body with age.
- Peripheral nerve fibers are poorly myelinated, therefore the speed of impulse conduction is slower than in adults.

- From the age of 1-2, myelination of nerve fibers accelerates, which leads to improved movement and sensations.

2. Physiological characteristics of the nervous system in children

2.1. The predominance of reflex activity

- In newborns, innate reflexes predominate:

- Sucking reflex

- Search reflex

- Grasp reflex (Babkin reflex)

- Moro reflex (fear reflex)

- Some reflexes disappear over the course of 3-6 months, and conditioned reflexes appear as their replacements.

2.1. High excitability

- Children's nerve cells have a higher excitability than adults.

- This is explained by the frequent mood swings and strong emotional reactions in children.

- Starting from the age of 3, the nervous system becomes balanced, and the processes of inhibition and excitation become coordinated.

2.3. Insufficient development of inhibitory processes

- In infants, the process of excitation in the nervous system prevails over the process of inhibition.

- Because of this, children get tired quickly, cannot sit still for a long time, cannot maintain attention for a long time.

- As they grow older, inhibition processes develop and the child acquires the ability to concentrate and control movements.

2.4. Peculiarities of the development of the autonomic nervous system

- Since the autonomic nervous system in children is not fully formed, the body is sensitive to the effects of the external environment:

- High sensitivity to heat and cold

- Frequent heartbeat (120-140 times / min)

- Intestinal and stomach activity is delicate
 - During childhood, the activity of the autonomic nervous system stabilizes and returns to a relatively normal level by the age of 6-7.
4. Factors affecting the development of the nervous system in children.
- Genetic factors - Heredity plays an important role in the development of the child's nervous system.
 - Development in the womb - Harmful factors during pregnancy (for example, lack of oxygen, toxins) affect the development of the nervous system.
 - Nutrition – The child's diet should contain enough vitamins (B group), minerals (calcium, magnesium).
 - Environment and upbringing – A good psychological environment and sufficient communication are necessary for the emotional and intellectual development of the child.
 - Physical activity – Movement has a positive effect on the development of the nervous system.

In conclusion, the nervous system in children is not fully formed at birth, and its development and achievement of functional maturity take a long time. In newborns, reflex activity predominates, and myelination of nerve fibers proceeds slowly. In childhood, excitability is high, and inhibitory processes are not sufficiently formed. This causes children to have mood swings, high activity, and rapid fatigue. With age, inhibitory processes develop, and the child acquires the ability to concentrate, manage emotions, and control movements.

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