World Bulletin of Public Health (WBPH)
Available Online at: https://www.scholarexpress.net
Volume-23, June 2023
ISSN: 2749-3644

MORPHOLOGICAL CHANGES IN THE BONE TISSUE OF THE CHILD'S BODY IN THE AGE ASPECT

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Article history:

Received: April 11th 2023
Accepted: May 11th 2023
Published: June 20th 2023

Abstract:

It is known that the bone system, in addition to being a support that protects the body in a certain state, also participates in metabolism in the production of vitally necessary blood. It is important for family doctors to check the children's musculoskeletal system. Through this, doctors find solutions to issues such as early diagnosis of diseases, treatment of these diseases and prevention of disability among children.

Keywords: Ossification, epiphysis, Havers, hematogenous, arm, leg, muscle, spine, cartilage, fibrosis, humerus, tooth.

INTRODUCTION

The ossification process is not complete until the child is born . The diaphysis of tubular bones consists of bony tissue , and most of the epiphyses, all the spongy bones of the hand, and some of the tubular bones of the foot have cancellous tissue. Ossification points in the epiphyses begin to appear only in the last month of intrauterine development, and by the time of birth, they are detected in the bodies and arches of the vertebrae, in the epiphyses of the femur and tibia, as well as in the calcaneus, tarsus and cuboid bones . The ossification points in the epiphyses of the remaining bones appear in the first 5-15 years after birth , and the sequence of their appearance is quite stable.

The set of ossification cores that a child has is called "bone age." Bones grow rapidly after birth . Longitudinal growth of the bones occurs due to the presence of the epiphyseal plate. It performs the function of bone formation until the bone reaches its final size (18-25 years old). Later, it is replaced by bone tissue and fuses with the epiphysis. The growth of the bone in thickness takes place at the expense of the periosteum, in its inner layer, young bone cells form a bone plate (periosteal method of bone tissue formation).

The bone tissue of newborn babies has a porous, coarse fibrous mesh (bundle) structure. Bone plates are few, misplaced . Haversian canals appear as irregularly scattered spaces . Along with growth , a large amount of bone remodeling occurs, and by the age of 3-4 years, the fibrous mesh structure is replaced by a plate structure with secondary Haversian structures. According to its chemical composition , the bone tissue of a child holds more water and organic substances and less mineral substances than that of an adult. With age, the amount of hydroxyapatite (its main mineral component) in the bone increases. The characteristics of fiber structure and chemical composition determine the elasticity of bones in children and their tendency to compression.

Children's bones are less fragile, but they are easily bent and deformed. In children , the blood supply of bone tissue is more abundant than in adults, due to the large area of diaphyseal branching, well-developed metaphyseal and epiphyseal arteries. By the age of 2, the child develops a single intraosseous circulatory system. This creates anatomical conditions for the emergence of hematogenous osteomyelitis in children (often in epiphyses before 2-3 years of life, in metaphyses at older ages) . In children older than 2 years, the number of blood vessels in the bones decreases significantly and increases again only during prepubertal and pubertal growth spurts. In children, compared to adults, the periosteal membrane is much thicker, therefore, in cases of injury, subperiosteal fractures of the "green rod" type occur. In children, compared to adults, the functional activity of the periosteum is significantly higher, which ensures the rapid growth of bones transversely .

During the intrauterine period and in newborns, all bones are filled with red bone marrow, which contains blood cells and lymphoid elements and performs hematopoietic and protective functions. Only by the age of 12, the child's bones approach those of adults in their external structure and histological characteristics.

Skull box. By the time of birth , the cranium consists of a large number of bones connected by layers of connective tissue. The seams between the bones of the cranial dome (sagittal, coronal, occipital) are not formed and begin to close only from 3-4 months of the child's life. The edges of the bones are flat, teeth are formed only in the 3rd year of the child's life . The formation of sutures between the bones of the cranium stops at the age of 3-5. The healing of the sutures occurs at the age of 20-30. The most characteristic feature of the skull of a newborn baby is the presence of ligatures (non-ossified membranous areas of the cranial dome), as a result of which the cranial box is

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very elastic, its shape can change during the passage of the fetal head through the birth canal .

A large ligule is located at the intersection of the coronal and sagittal sutures. Its dimensions - when measured between the edges of the bones - from 1.5x2 cm to 3x3 cm. The lacrimal gland usually closes at 1-1.5 years of age (currently, it often occurs between 9-10 months of life). The small sphincter is located between the occipital and occipital bones, by the time of birth it is closed in 3/4 of healthy full-term babies, and in the rest it is closed by the end of 1-2 months. In full-term babies , the lateral lobes (anterior papillae and posterior papillae) are closed.

The skull grows rapidly up to the age of 7 years . In the first year of life, a rapid and uniform increase in the size of the skull is observed, the thickness of the bones increases by 3 times, the structure of the bones of the skull dome is formed. From 1 to 3 years, the ossification points merge , and the fibrous tissue is gradually replaced by bone tissue.

At the age of 1-2, two parts of the lower jaw are joined, at the age of 2-3, the growth of the facial bones of the skull increases due to the strengthening of the chewing muscles and the completion of the eruption of milk teeth. From 3 to 7 years, the base of the skull grows most actively , and by the age of 7, its growth in length ends. At the age of 7-13, the skull grows more slowly and evenly . By this time, the fusion of the individual bones of the skull is completed.

At the age of 13-20, mainly the facial part of the skull grows, sexual differences appear. Thickening and pneumatization of bones occurs , which leads to a decrease in their mass. The length of the spine of a newborn baby is 40% of its body length and doubles in the first 2 years of life . Different parts of the spine do not grow evenly, in the first year of life the lumbar part grows the fastest, and the lumbar part grows the slowest.

In newborns , the bodies of the vertebrae, as well as the transverse and sharp edges, are relatively poorly developed, the intervertebral discs are relatively thicker than in adults, they are well supplied with blood. Physiological curves begin to form only from 3-4 months. Neck lordosis develops after the child holds the head. When the child starts to sit (5-6 months), chest kyphosis appears. Lumbar lordosis begins to form after 6-7 months, when the child begins to sit, and increases after 9-12 months, when the child begins to stand and walk. Sacral kyphosis is formed at the same time. Spine bends are clearly visible at the age of 5-6 . The final formation of cervical lordosis and thoracic kyphosis is completed at the age of 7, and lumbar lordosis is completed during puberty.

Chest : "chicken chest" - keel-like protrusion of the sternum, "shoemaker's chest" - chest depression in the area of the heart, bulge - "heart ". " Rib beads" - osteoid hyperplasia, symptom of rickets; areas of palpable thickening at the level of 8-10 ribs at the transition of bone tissue to the ankle. The pelvic bone is mainly manifested by the meniscal tissue, it differs in its small size, it does not have sexual differences until 6-7 years of age . Limbs are relatively short in newborn babies . Later, the legs grow faster and are longer compared to the arms.

The highest growth rate of legs occurs in boys at the age of 12-15 years and in girls at the age of 13-14 years. A newborn baby and a child in the first year of life have flat feet. The line of the transverse joint of the paw on the palm is almost straight (in an adult it is S-shaped).

The formation of the articular surfaces, tendon apparatus and domes of the paw occurs gradually, after the child begins to stand and walk, together with the ossification of the bones of the paw. In children, milk teeth usually come out in a certain sequence from 5-7 months, the teeth of the same name in the right and left halves of the jaw appear at the same time. The order of milk teeth eruption is as follows: 2 inner lower and 2 inner upper incisors, then 2 outer upper and 2 outer lower incisors (at 1 year old - 8), at 12-15 months - front teeth (molars), 18-20 in the month - molars, in 22-24 months - back molars. Thus, at the age of 2, a child will have 20 milk teeth .

Newborns have all the anatomical elements of the joints, but the epiphyses of the bones involved in the joint are made of bone. Neonatal joint capsules are tautly elongated, and most ligaments differ in that the fibers that make them up are insufficiently differentiated, which makes them more extensible and less rigid than in adults. . These specific features determine the likelihood of dislocations, such as dislocations of the heads of the wrist and shoulder bones.

Joint development occurs most rapidly before the age of 3 and is associated with a significant increase in the child's motor activity. Between 3 and 8 years of age, the amplitude of joint movements in children increases, Reconstruction of the fibrous membrane of the tendon capsule and ligaments continues actively, their strength increases. At the age of 6-10-11 years, the structure of the joint capsule becomes more complex, the number of folds and folds of the synovial membrane increases, the formation of blood vessels and nerve endings of the synovial membrane takes place.

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Volume-23, June 2023
ISSN: 2749-3644

At the age of 9-14, the reconstruction of the joint cartilage slows down. The formation of joint surfaces, capsule and tendons is mostly completed at the age of 13-16.

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