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General Anatomy of Bone Structure

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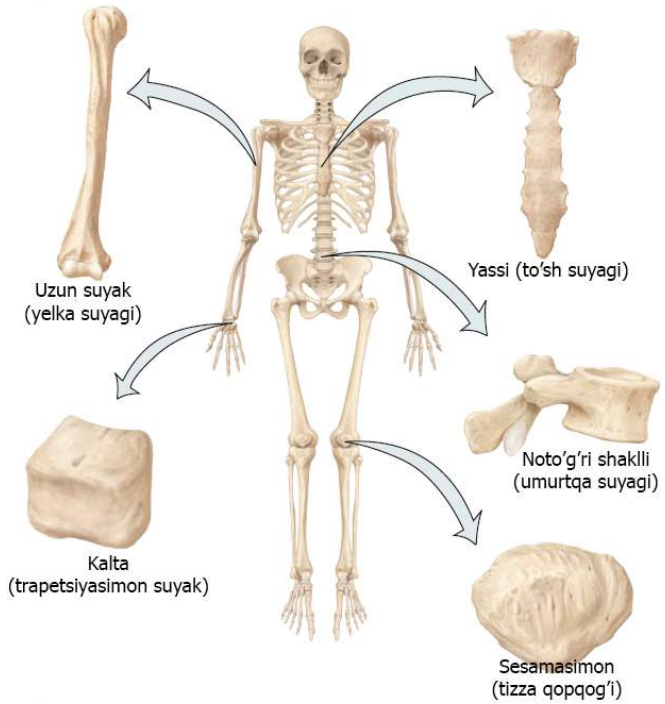
Abstract
When we talk about human anatomy, first of all, the skeletal image is embodied in our imagination. Be careful! How clear is the clarity of the skeletal image in your imagination? Not so clear, right? That is, you don't have a clear idea of the small accessories of each bone… Now let's try to clarify these images in your mind significantly and try to change your imagination from 2D to 3D. All you need to do is pay attention!

Keywords: proximal , locomotor, periosteum , metaphyseal.

There are 206 bones in our body that are involved in locomotor activity. These bones combine to form a skeletal system with and without movement (of which only the tibia is not joined to the others). In newborns, the number of bones exceeds 270, and there are some differences in structure. As a person grows older, individual bones join together to form 206 bones. We know that bones are divided into several types according to their shape. The following figure shows the types of bones:



Now we also focus on the structure of the bones. This is the structure of the long tubular bone, and we distinguish several parts: the *proximal* near the body and the *distal* far from the body , where we see the proximal-distal epiphysis and the growing part metaphysis, the middle part being the diaphysis. The metaphyseal part allows the bone to grow along the neck. Parts of the pineal gland

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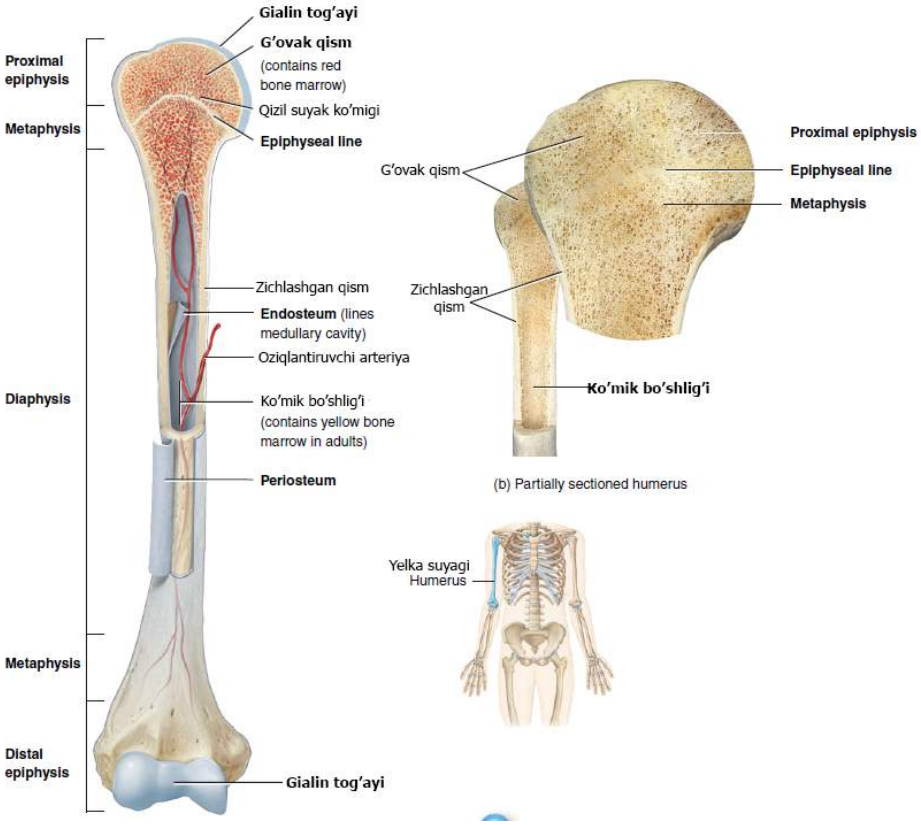
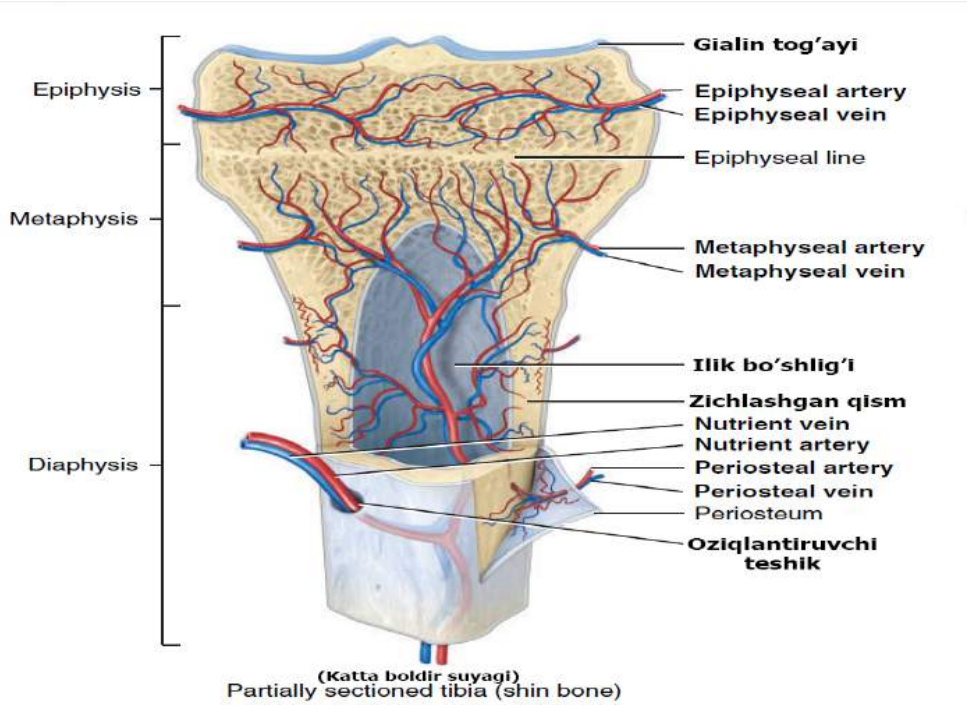
have joint surfaces lined with hyaline ridges. All bone surfaces are covered by the *periosteum of the periosteum* , while the tubular bones also contain the *endometrium of the* inner bone .



As you can see, there is a feeding hole in the bones through which the feeding arteries and veins pass. The blood circulation in the bones depends on these vessels.



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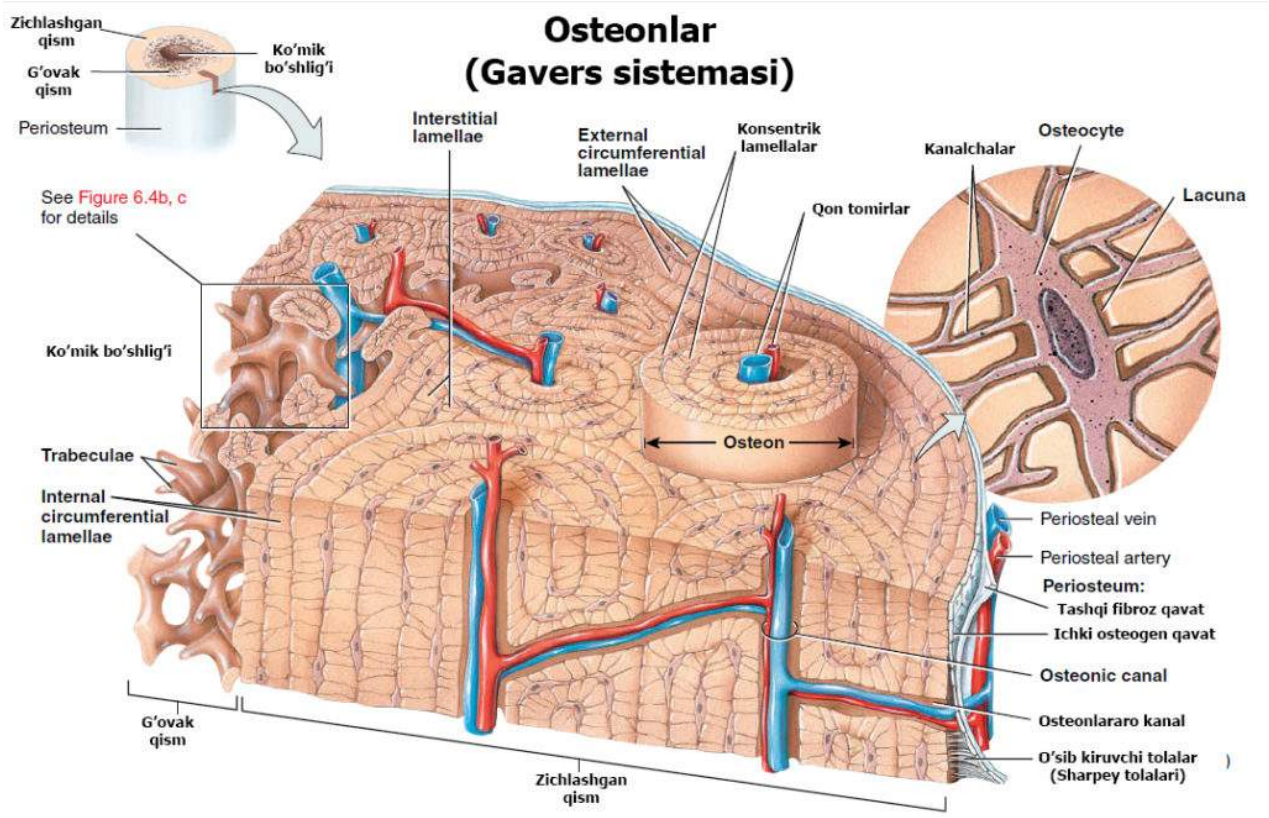
The following figure shows the histological structure of the tubular bone.



(a) Osteons (haversian systems) in compact bone and trabeculae in spongy bone

The base of this bone is made up of bone plates, the plates are made up of thin, parallel collagen fibers and osteocyte cells. The collagen fibers in each plate are arranged parallel to the collagen fibers in the adjacent plate. This orientation of the fibers in the plates strengthens the bone tissue.

Depending on the location of the bone plates, two types of bone material are distinguished: compact (dense) and porous bone. In a compact bone, the plates are placed parallel to each other, while in a porous bone, the plates are placed in different directions, at different angles to each other, and small gaps are formed between them.

Experiments with marked radioactive phosphorus show that the porous bone contains mobile phosphorus, which can be easily absorbed into the bloodstream. Compact bone, on the other hand, holds three times less mobile phosphorus than pores. Thus, porous bone plays a key role in the exchange of mineral salts.

The middle layer of the bone wall is formed by osteons (Gavers system), which are the structural unit of compact bone. Osteons also consist of plates that wrap around the blood vessels as concentric rings. The osteon wall is composed of a system of interlocking cylinders with a thickness of 5–20 μm. The blood vessels are located in the center of the osteons. Since the ossein fibers of the plates that form the osteon rings have their own direction, it is possible to clearly distinguish the plates in the longitudinal and transverse sections of the bone.

We mentioned above that the periosteum is surrounded by the periosteum on the outside of the bone. In addition to the nourishing blood vessels in the periosteum, there are also nerve fibers. It

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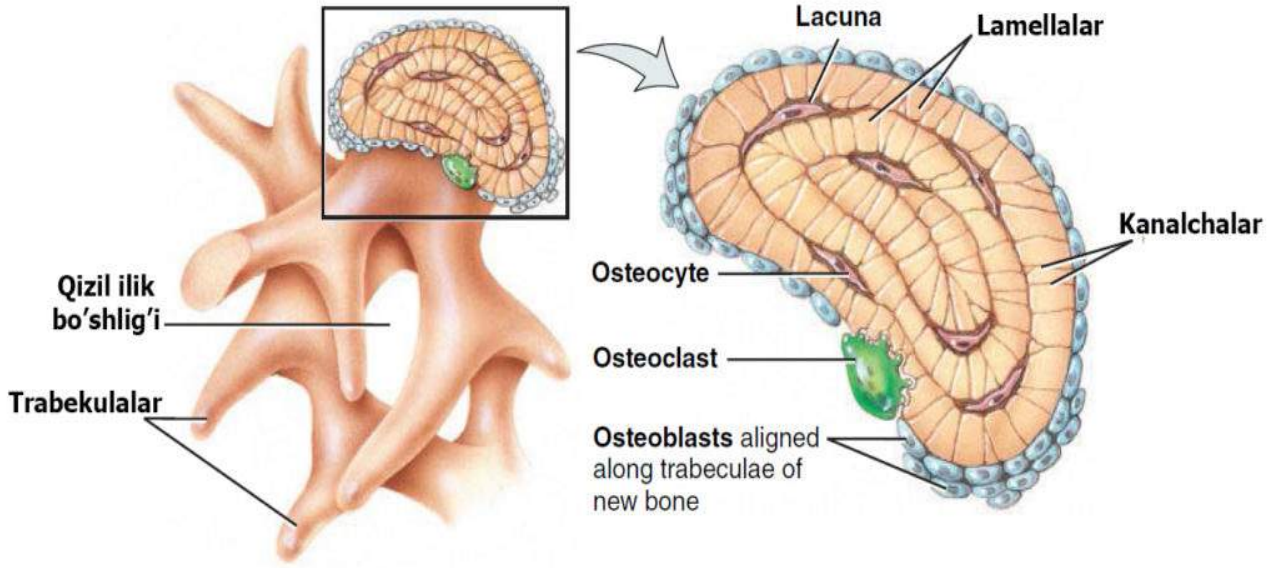
has tangles of myelinated and non-myelinated nerve fibers. Some of the nerve fibers reach the osteon canal, and from there to the bone marrow.



(b) Enlarged aspect of spongy bone trabeculae (c) Details of a section of a trabecula

As you can see, this image is an approximate position of the cross section of the image above, and here the focus is on the bone cells. Three types of bone cells are distinguished: osteocytes, osteoblasts, and osteoclasts.

Osteocytes are tumor cells that are located in cavities that correspond to their shape and are interconnected with the tumor. Osteocytes are the main cells of bone tissue and no cell center (centrosomes) has been found, so these cells do not have the ability to divide.

Osteoblasts (osteon - bone; blastos - bud) are found in the epithelium and in the newly formed areas of bone. These are young cells that form bone. These cells constantly synthesize protein and break it down into intercellular substance, which, when the formation of intercellular substance is complete, they turn into inactive bone cells - osteocytes.

(**Osteoclasts** - bone, *osteoarthritis, clasio* cells decay, decay) is the cartilage and bone tissue decay to actively participate in it. They are a special type of macrophages that form grooves (lat. - *lacuna*) where they meet the bone tissue . It is believed that the CO_2 they secrete plays an important role in the breakdown of bone tissue by osteoclasts .

The bones present in the body are shown by name in the following pictures:

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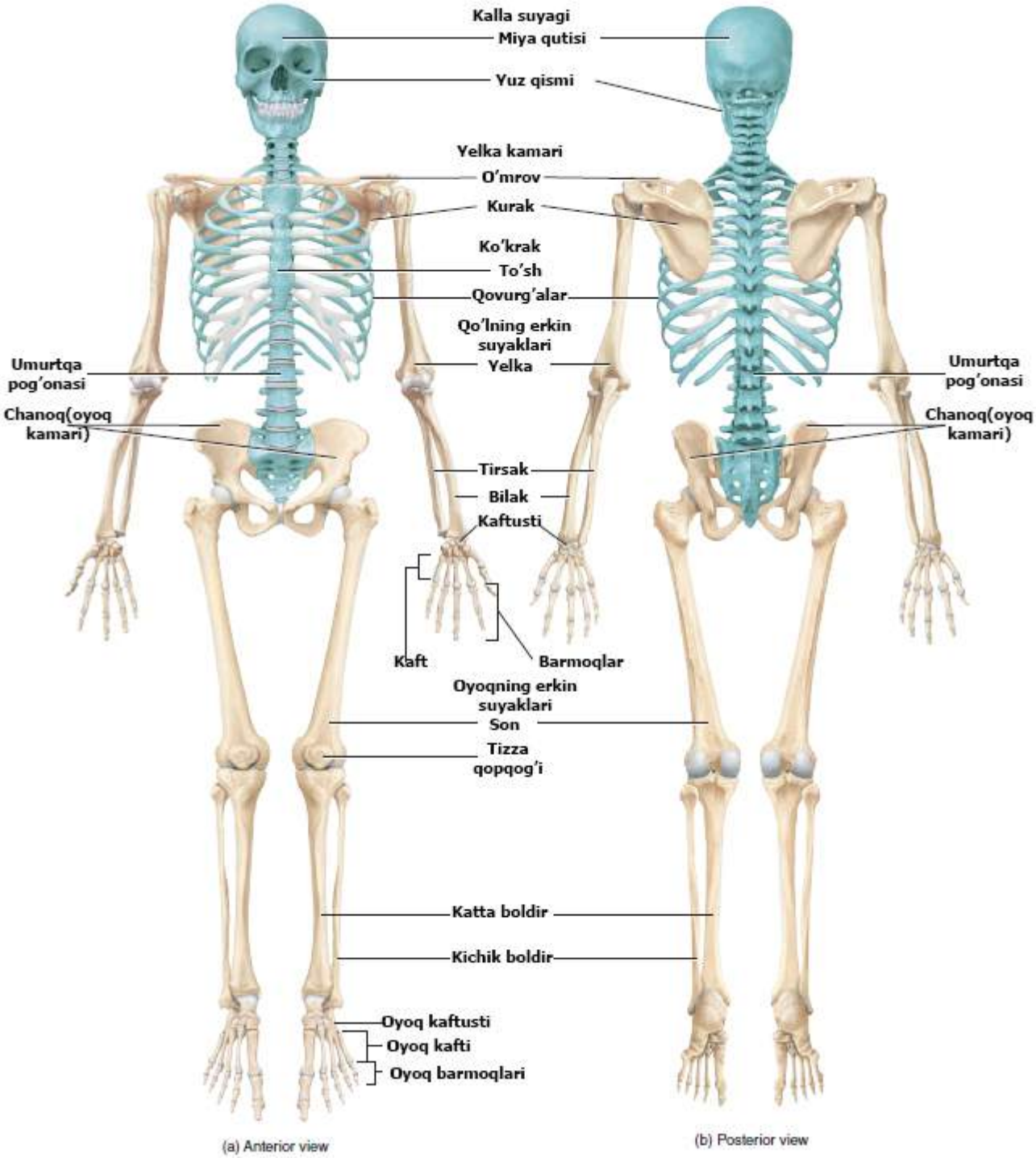

We decided to focus more on the skulls in terms of pictures, thinking that almost all of us would be interested in information about the structure of the skulls, in general, their number, the boundaries of aggregation.

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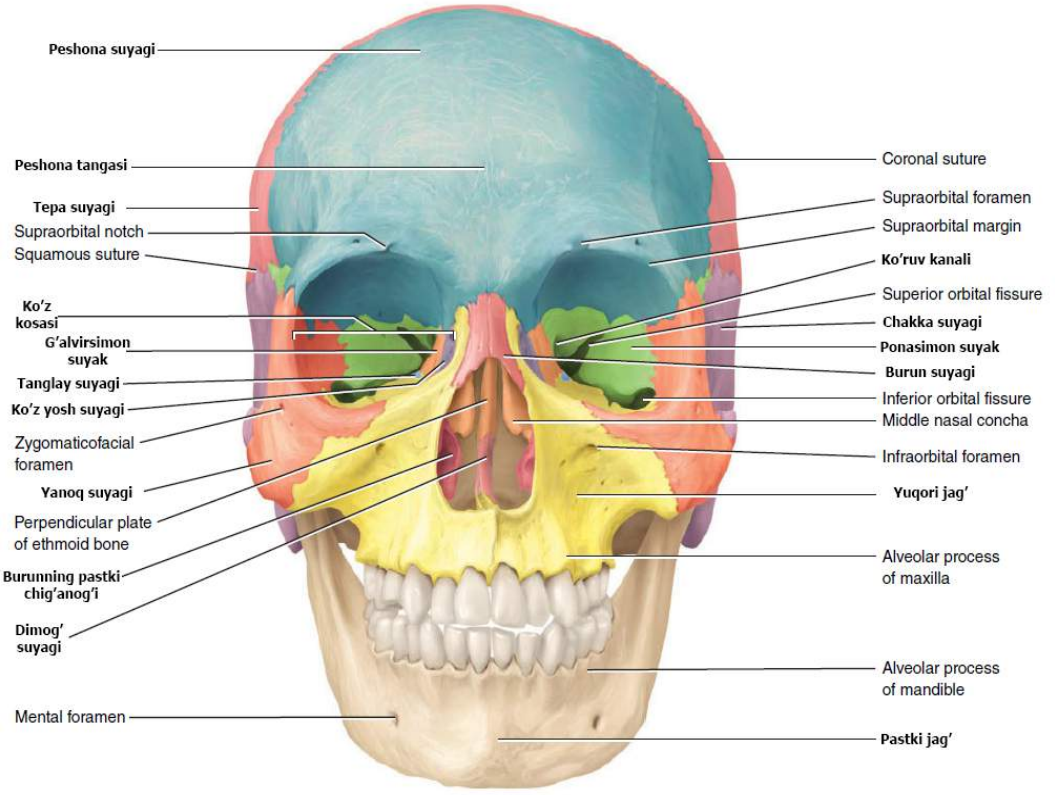
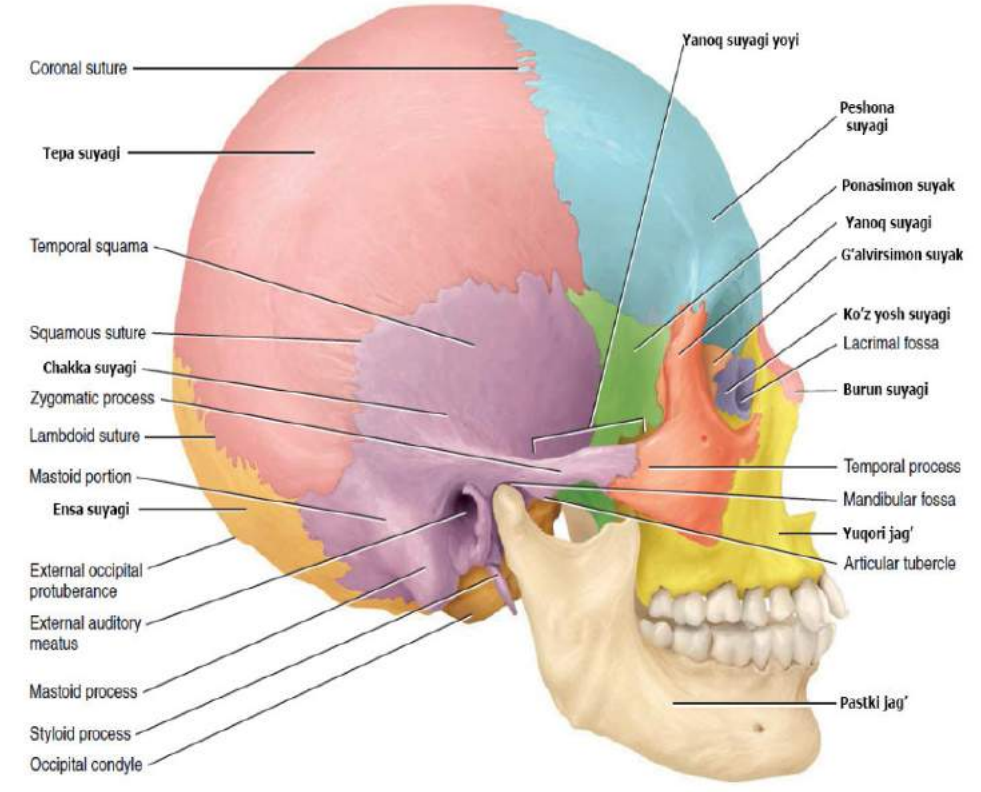


(a) Anterior view



(c) Right lateral view

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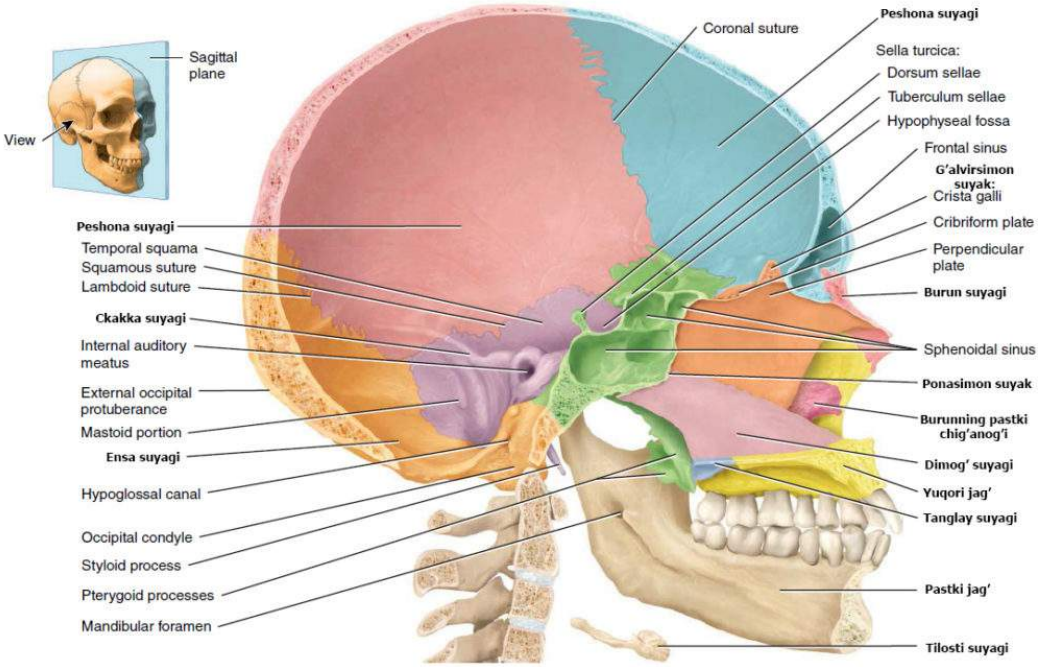
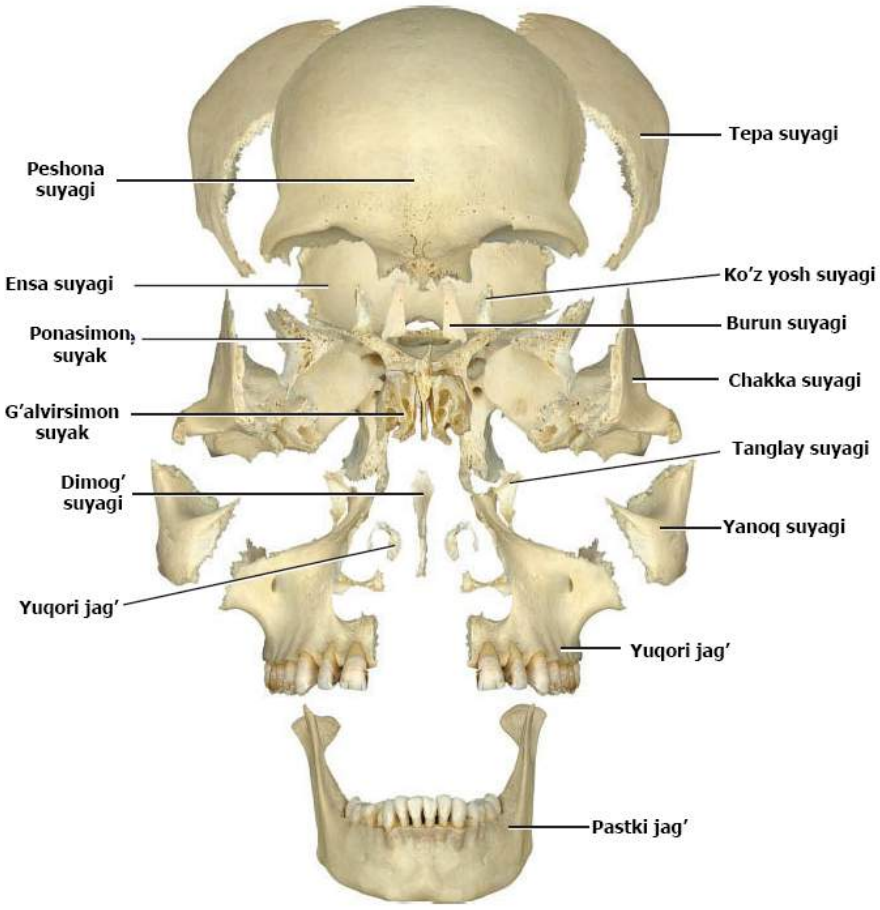


(a) Medial view of sagittal section



(c) Anterior view of disarticulated skull

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As you can see, the skulls are connected to each other in a unique way, forming different stitches. The strongest of these sutures is the squamous suture of the temple. The hip bone is the hardest bone in the body, while the cheekbone arch is the hardest bone in the human face.
Another piece of information is that on the inner surface of the bones of the cerebral cortex, there are branches of the venous sinuses that carry blood from the brain, which occurs when the head has not yet been ossified.

Gender differences

There are many differences in gender in the skeletal system. Now let's look at some of them:

- In women, the shoulder is narrower than the pelvis, in men, on the contrary (everyone knows this)
- Hemiarthrosis (symphisis) between the pelvic bones in the pelvis - there is a half-joint in the process ensures that the bones move away from each other
- the dagger-shaped growth of the stone is more blunt in women than in men.

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