

Overview of bones in the human body



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The skull is the top of the skeleton and consists of the cranium and mandible. The cranial part of the skull is composed of separate bones united at immobile joints called sutures. These sutures are held by sutural ligaments. The skull is made of compact bone, covered with periosteum, and a layer of diploe. The mandible is connected to the cranium by a synovial joint called the temporomandibular joint. The cranium houses the brain and supports the face. The number of bones in the skull totals 22. The skull bones can be divided into two groups. The bones of the cranium and facial. The five bones of the cranium consist of one frontal, two parietal, one occipital, two temporal, one sphenoid, and one ethmoid bone. The facial bones consist of two zygomatic bones, two maxillae, two nasal bones, two lacrimal bones, one vomer, two palatine bones, two inferior conchae, and one mandible.

In the thoracic cage we have the lateral ribs, costal cartilages, dorsal thoracic vertebrae, sternum, and the xiphoid. The thoracic cavity protects the heart and lungs. This cage

also supports the shoulder girdles and upper limbs and attached you will find the neck, chest, and

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muscles. The sternum or “ breastbone” has three fused bones. We have 12 ribs total. The ribs are

either floating ribs or true ribs. The true ribs 1-7 are attached to the sternum.

Ribs 8-10 are

considered false ribs. The ribs 11-12 are considered floating ribs and do not attach to the

sternum. The scapula is a flat, triangular bone which articulates laterally with the clavicle and

with the humerus. We have two identical pairs. The clavicles are a pair of long bones that

connect the scapula to the sternum. The clavicles are cylindrical bones around 6 inches long.

They are located in the thoracic region superior and anterior to the first rib.

Each clavicle runs

transversely and forms a joint with the sternum on its medial end and the scapula on its lateral

end. (Bones : structure and mechanics, Pg. 47) The clavicles, along with the scapulae, form

the pectoral girdle that attaches the bones of the arm to the trunk. The sternoclavicular joints are

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the only bony attachments between the pectoral girdles and the bones of the axial skeleton.

Several muscles of the neck and shoulder also attach to the clavicle, including the pectoralis

major, sternocleidomastoid, trapezius, and deltoid.

The vertebral column consists of 33 vertebrae. The first 24 vertebra are articulating

vertebrae, seven cervical, 12 thoracic, five lumbar, and the lower nine are fused. Then following

we have five fused in the sacrum and four in the coccyx. The spinal canal protects the spinal

cord. The human vertebral column is the backbone or spine, consisting of thirty three in total.

The vertebra are small bones forming the backbone and they have a hole through which the

spinal cord passes. The ilium is the uppermost and largest part of the hip bone. This bone is

wide, flat, and provides attachment points. The curved ischium forms the lower and back part of

the hip bone. This bone is below the ilium and behind the pubis. The superior portion of this

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bone forms approximately one third of the acetabulum. The body rests on these bones while in

sitting position. The pubic bone is the ventral and anterior of the three bones which make up half

of the pelvis. The pubic bone is covered the mons pubis. There is a superior ramus and an

inferior ramus noted. The pubis is the lowest and most anterior portion of the hip bones of the

pelvis. The pubic symphysis, is where the two hip bones of the pelvis are fused together. The

humerus is the upper arm long bone, it extends from shoulder to elbow. The proximal end has a

smooth round head that articulates with scapula.

The cylindrical shaped humerus has two rounded processes called the greater and lesser

tubercles. The distal end of the humerus has two articulating surfaces, the trochlea which

articulates with the ulna and the capitulum, which articulates with the radius at the elbow. The

ulna is a long bone located on the opposite side of the forearm from the thumb. It attaches to the

humerus on the larger end and joins with the carpal bones of the hand at its

smaller end. It lies

medially and parallel to the radius. The forearm has two large bones, the radius and the ulna, of

which the radius is the larger bone. The radius is located on the lateral side of the forearm

between the elbow and the wrist joints.

The pectoral girdle is the skeletal framework that provides attachment for the scapula's

and clavicles. The Pelvic Girdle is composed of 2 hip bones and sacrum. The talus bone,

astragalus, or ankle bone is one of the group of foot bones known as the tarsus. The tarsus forms

the lower part of the ankle through its articulations with the lateral and medial malleoli of the

two bones of the lower leg, the tibia and fibula. The tarsus transmits the entire weight of the body

to the foot. The calcaneus or heel bone is a bone of the tarsus of the foot which constitutes the

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heel. The metatarsal bones, or metatarsus are five long bones in the foot, located between the

tarsal bones of the hind- and mid-foot and the phalanges of the toes.

(Fundamentals of Anatomy

& Physiology) The metatarsal bones are numbered from the medial side: the first, second, third,

fourth, and fifth metatarsal. A tarsal is considered one of the seven bones of the tarsus. The

metacarpals are long bones within the hand that are connected to the carpals, or wrist bones, and

to the phalanges, or finger bones. The tops of the metacarpals form the knuckles where they join

to the wrist. On the palm side, they are covered with connective tissue.

There are eight small

carpal bones that sit between the distal ends of the radius and ulna. They have five metacarpals.

The size of these metacarpals vary and have different shapes. The phalanges are digital long

bones found in the hands and feet. There are generally three noted, distal, middle, and proximal

for each digit. The only exception is the thumbs and large toes.

The fibula is a leg bone located on the lateral side of the tibia, with which it is connected

above and below. It is the smaller of the two lower leg bones and the slenderest of all the long

bones. The tibia is the larger and stronger of the two lower leg bones and it connects the knee

with the ankle bones. The tibia is found on the medial side of the leg next to the fibula. It is the

second largest bone in the human body next to the femur. The patella is a circular-triangular

bone which articulates with the femur and covers the anterior articular surface of the knee joint.

The femur articulates with the acetabulum in the pelvic bone forming the hip joint, while the

distal part of the femur articulates with the tibia and patella forming the knee joint. The femur is

the strongest bone in the body.

1. Briefly identify and discuss the microscopic structures of compact bone

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Compact bone contains rigid organs that form parts of the endoskeleton.

Compact bone

assist the body to move, supports it, and protects organs. Compact bone produces red and white

blood cells and store minerals. The cortical bone is one of the two types of osseous tissue that

form bones. Cortical bone is often most prominent in the

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human femur and tibia. The outer layer

is dense and forms the shaft of the long bones. Compact bone is made up of concentric layers of

mineral deposits surrounding a central opening. The cylindrical shaped osteon is the main

structure that makes the outer layer of bones hard. They typically run parallel. The cortical bone

is considered approximately 80% of mature bone. Each unit is generally made up of the

Haversian canal, Volkmann's canals, osteocytes, and canaliculi's. (Bones structure and mechanics,

Pg. 212) Compact bone contains a central canal, called the Haversian canal, along with

concentric layers of bone called interstitial lamellae.

The Haversian canal is actually surrounded with rings of lamellae. Lamellae are made

up of bone matrix, collagen fibers, and mineral crystals. Interstitial lamellae are contained in the

spaces between osteons. Cancellous or spongy bone has less strength than compact bone and

within the Haversian canal is composed of a layer of endosteum. This connective tissue is rich in

nerve fibers and blood vessels. Blood cells within the canal carry nutrients and waste to and

away from the outer layer of the bone. These systems of canals and lamellae are also called

osteons. Spongy bone is hollow and appears like a sponge. They contain thin spicules are known

as trabeculae. In between these cavities you will find red or yellow bone.

Volkmann's canals are

small channels in the bone that transmit blood vessels from the periosteum into the bone and

these canals provide energy and nourish osteons. Trabecular bone is another name for spongy

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bone and can be found at the ends of long bones. (Haversian system, Pg. 12)

Long bones are most of the appendicular skeleton. The ends of the long bones are epiphysis,

its shaft is called the diaphysis. The surroundings or periphery of the epiphysis and diaphysis are

made up of compact bone. In between long bones are epiphyseal plates and this is the region

where bone growth occurs. The long bone is covered of the fibrous sheath called periosteum.

The periosteum protects the bone and allows it to attach to other bones.