

An anatomical model of a human skeleton, shown from the front and slightly to the left. The model is white and appears to be made of plastic or a similar material. It is set against a solid teal background. The skull is at the top, with the jaw open, showing the teeth. The ribcage is prominent, with the ribs clearly visible. The spine is visible in the center, and the arms are partially visible on the sides. The model is held together by several small metal pins or screws. The overall appearance is that of a medical or educational model.

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## The Functions of the Skeletal System

The Skeletal System has many functions, one of the first being support. The Skeleton supports the body with structure, like our internal architecture. Between our Bones, to absorb shock and friction, is a cushion called cartilage. Our bones protect our internal organs, such as the skull, which encases the brain, and the ribs, which encase the heart and lungs. During fetal maturation, a process called Endochondral Ossification occurs, in which cartilage is replaced by Bone; therefore, the Skeletal System helps with development. Stabilization from our Skeletal System comes from our ligaments, which connect bones to other bones and reinforce the joints. Movement transmission is permitted when force is released, and muscles are contracted.

Along with transmission, there is also movement control, where each part of the body has a range of motion, and the ligaments are responsible for holding it in place. Force distribution occurs when muscles exert force across a bone to provide smooth movements. Last but not least, our Skeletal System facilitates all of our movement, and our joints allow our bones that meet through cartilage to move.

## The Purpose of the Skeletal System

The Skeletal System supports the body, provides movement, produces blood cells, protects organs, and stores minerals. It supports our body weight and serves as a framework beneath our skin. The structure holds us up and allows us to move freely within our self-regulated range of motion. The joints, connective tissue and muscles drive this movement whenever our brain gets the message—protection for internal organs, such as the skull protecting the brain and the ribs protecting the heart. Bones are made of minerals such as fluoride, phosphorus, calcium, magnesium, and manganese. These minerals are released into the bloodstream when the body needs them. Blood cell production occurs in the bone marrow of bones such as the skull, spinal bones, pelvic bones, and the femur. Bones also store energy in lipids within the bone marrow and can be used as an energy reserve. Bones also assist in regulating hormones through osteocalcin, which helps balance blood sugar and fat deposition.

## Some of the Bones of the Skeletal System

Long	Femur, Humerus, Tibia, Fibula, and Radius.
Short	Carpals, Tarsals, and the Patella.
Flat	Skull bones, Scapula, Sternum, and Ribs.
Irregular	Facial bones.
Sesmoid	Patella and Pisiform.
Accessory	Sutural bones, and the Os Trigonum found in the ankle.

## Compact vs. Spongy Bone

One of the easiest differences to note between these types of Bone is their structure and texture. Compact Bone is solid and forms the outermost layer of the Bone; it provides protection, support, and strength while having sufficient density to withstand force. It is composed of Osteons with a cylindrical shape and a central canal surrounded by osteocytes. Compact Bone is found mainly in the diaphysis of Long Bones and on the exterior of all bones. As for Spongy Bone, it has a porous texture and, because of its lighter weight, it helps support and structure. It is the hematopoietic site within the bone marrow and is composed of trabeculae. In the epiphyses of long bones, the interior of short bones, as well as irregular bones, is found.



## Diseases Related to the Skeletal System

The most common diseases and medical problems with the Skeletal System include a range of genetic disorders, auto-immune diseases, etc. Osteoporosis is reduced bone density that increases the risk of fractures. Osteoarthritis is a disease in which the cartilage in the body is broken down. Rheumatoid Arthritis is an autoimmune disorder that causes chronic inflammation and joint pain. Paget's Disease of the Bone disrupts normal Bone and causes enlarged and deformed bones. Osteomyelitis is an infection of the Bone, often caused by bacteria. Bone Cancer includes osteosarcoma, metastatic bone cancer, etc. Scoliosis is an abnormal curvature of the spine. Rickets is a condition in children characterized by impaired bone mineralization due to Vitamin D deficiency. Hyperparathyroidism is an overproduction of parathyroid hormone that leads to elevated Calcium levels. Achondroplasia is a genetic disorder that causes disproportionate short stature due to abnormal bone growth.

## How the Skeletal System Helps with Homeostasis

The Skeletal System helps maintain Homeostasis by storing Calcium and Phosphorus, which it releases when the body needs them. Because the body uses the Skeletal System as internal scaffolding, it gives the body posture and the ability to move. That is the main reason our body has stability and balance. Our internal organs are protected through our Skeletal System, and blood cell production happens in our Bone Marrow. The fat reserve in the yellow marrow stores energy needed during a caloric deficit.

## The Effects of Old Age on the Skeletal System

Bone density declines over time, increasing the risk of fractures. Joint Degeneration and slower remodeling make the Bone exceptionally spongy and thinner. Decreased muscle mass alters posture, giving a slouched appearance. Hormonal changes, such as lower estrogen and testosterone, contribute to overall bone loss. Still, an animal-product diet high in red meat and calcium, along with resistance training, is a great way to prevent and delay the effects of aging.

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