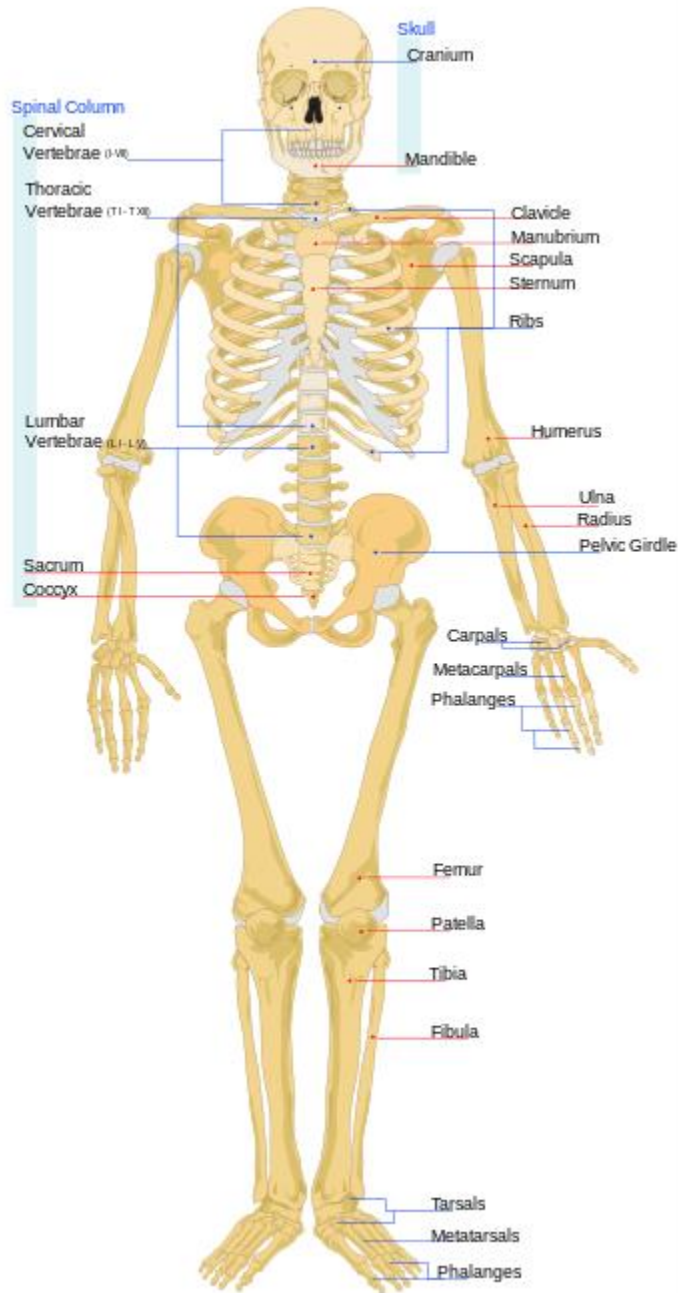


Human skeleton

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The **human skeleton** is composed of 300 bones at birth^{[1][2][3]} and by the time adulthood is reached, some bones have fused together to give a total of 206 bones in the body. The bone mass in the skeleton reaches maximum density around age 30. The human skeleton can be divided into the [axial skeleton](#) and

the [appendicular skeleton](#). The axial skeleton is formed by the [vertebral column](#), the [rib cage](#) and the [skull](#). The appendicular skeleton, which is attached to the axial skeleton, is formed by the [pectoral girdles](#), the [pelvic girdle](#) and the bones of the upper and lower limbs.

The human skeleton serves six major functions; support, movement, protection, production of [blood cells](#), storage of ions and endocrine regulation.

The human skeleton is not as [sexually dimorphic](#) as that of many other primate species, but subtle differences between sexes in the [morphology](#) of the [skull](#), [dentition](#), [long bones](#), and pelvis exist. In general, female skeletal elements tend to be smaller and less robust than corresponding male elements within a given population. The pelvis in female skeletons is also different from that of males in order to facilitate child birth.

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[Divisions](#)[\[edit\]](#)

[Axial skeleton](#)[\[edit\]](#)

Main article: [Axial skeleton](#)

The axial skeleton (80 bones) is formed by the [vertebral column](#) (32-34; the number of the vertebrae differs from human to human as the lower 2 parts, sacral and coccygeal bone may vary in length), the [rib cage](#) (12 pairs of [ribs](#) and the [sternum](#)), and the [skull](#) (22 bones and 7 associated bones). The upright posture of humans is maintained by the axial skeleton, which transmits the weight from the head, the trunk, and the upper extremities down to the lower extremities at the [hip joints](#). The bones of the spine are supported by many ligaments. The [erectors spinae](#) muscles are also supporting and are useful for balance. The vertebral column consists of 5 parts. The most cranial (uppermost) part is made up by the cervical vertebrae (7), followed by thoracic (12), lumbar (5), sacral (4-5) and coccygeal vertebrae (3-4). Cervical vertebrae make up the junction between the vertebral column and the cranium. Sacral and coccygeal vertebrae are fused and thus often called "sacral bone" or "coccygeal bone" as unit. The sacral bone makes up the junction between the vertebral column and the pelvic bones.

Appendicular skeleton[\[edit\]](#)

Main article: [Appendicular skeleton](#)

The appendicular skeleton (126 bones) is formed by the pectoral girdles, the upper limbs, the pelvic girdle or pelvis, and the lower limbs. Their functions are to make locomotion possible and to protect the major organs of digestion, excretion and reproduction.

Function[\[edit\]](#)



The skeleton serves six major functions; support, movement, protection, production of blood cells, storage of ions and endocrine regulation.

Support[\[edit\]](#)

The skeleton provides the framework which supports the body and maintains its shape. The pelvis, associated ligaments and muscles provide a floor for the pelvic structures. Without the [rib cages](#), [costal cartilages](#), and [intercostal muscles](#), the [lungs](#) would collapse.

Movement[\[edit\]](#)

The joints between bones allow movement, some allowing a wider range of movement than others, e.g. the ball and socket joint allows a greater range of movement than the pivot joint at the neck. Movement is powered by [skeletal muscles](#), which are attached to the skeleton at various sites on bones. Muscles, bones, and joints provide the principal mechanics for movement, all coordinated by the nervous system.

Protection[\[edit\]](#)

The skeleton protects many vital [organs](#):

- The [skull](#) protects the [brain](#), the [eyes](#), and the [middle](#) and [inner ears](#).
- The [vertebrae](#) protect the [spinal cord](#).
- The [rib cage](#), spine, and [sternum](#) protect the [lungs](#), [heart](#) and major [blood vessels](#).
- The [clavicle](#) and [scapula](#) protect the [shoulder](#).
- The [ilium](#) and spine protect the digestive and urogenital systems and the [hip](#).
- The [patella](#) and the [ulna](#) protect the [knee](#) and the [elbow](#) respectively.
- The [carpals](#) and [tarsals](#) protect the [wrist](#) and [ankle](#) respectively.

Blood cell production[\[edit\]](#)

The skeleton is the site of [haematopoiesis](#), the development of blood cells that takes place in the [bone marrow](#).

Storage[\[edit\]](#)

Bone matrix can store [calcium](#) and is involved in [calcium metabolism](#), and [bone marrow](#) can store [iron](#) in [ferroin](#) and is involved in [iron metabolism](#). However, bones are not entirely made of calcium, but a mixture of [chondroitin sulfate](#) and [hydroxyapatite](#), the latter making up 70% of a bone. Hydroxyapatite is in turn composed of 39.8% of calcium, 41.4% of oxygen, 18.5% of phosphorus, and 0.2% of hydrogen.

Endocrine regulation[\[edit\]](#)

Bone cells release a hormone called [osteocalcin](#), which contributes to the regulation of [blood sugar \(glucose\)](#) and [fat deposition](#). Osteocalcin increases both the [insulin](#) secretion and sensitivity, in addition to boosting the number of [insulin-producing cells](#) and reducing stores of fat.^[4]

Anatomical differences between human males and females are highly pronounced in some soft tissue areas, but tend to be limited in the skeleton. The human skeleton is not as [sexually dimorphic](#) as that of many other primate species, but subtle differences between sexes in the [morphology](#) of the [skull](#), [dentition](#), [long bones](#), and pelvis (*sing.* [pelvis](#)) are exhibited across human populations. In general, female skeletal elements tend to be smaller and less robust than corresponding male elements within a given population.

The skull[\[edit\]](#)

A variety of gross morphological traits of the [human skull](#) demonstrate sexual dimorphism, such as the [nuchal crest](#), [mastoid processes](#), [supraorbital margin](#), [supraorbital ridge](#), and [mental eminence](#).^[5]

Dentition[\[edit\]](#)

Human inter-sex dental dimorphism centers on the [canines](#), but it is not nearly as pronounced as in the other [great apes](#).

Long bones[\[edit\]](#)

Long bones are generally larger in males than in females within a given population. Muscle attachment sites on long bones are often more robust in males than in females, reflecting a difference in overall muscle mass and development between sexes. Sexual dimorphism in the long bones is commonly characterized by [morphometric](#) or gross morphological analyses.

The pelvis[\[edit\]](#)

Human pelvis exhibit greater sexual dimorphism than other bones, specifically in the size and shape of the [pelvic cavity](#), [ilia](#), greater sciatic notches, and the sub-pubic angle. [The Phenice method](#) is commonly used to determine the sex of an unidentified human skeleton by anthropologists with 96% to 100% accuracy in some populations.^[6]

Disorders[\[edit\]](#)

See also: [Bone disease](#)

There are many classified skeletal disorders. One of the most common is [osteoporosis](#). Also common is [scoliosis](#), a side-to-side curve in the back or spine, often creating a pronounced "C" or "S" shape when viewed on an x-ray of the spine. This condition is most apparent during adolescence, and is most common with females.

Osteoporosis^[edit]

Main article: [Osteoporosis](#)

Osteoporosis is a [disease](#) of [bone](#), which leads to an increased risk of [fracture](#). In osteoporosis, the [bone mineral density](#) (BMD) is reduced, bone microarchitecture is disrupted, and the amount and variety of non-[collagenous](#) proteins in bone is altered. Osteoporosis is defined by the [World Health Organization](#) (WHO) in women as a bone mineral density 2.5 [standard deviations](#) below peak bone mass (20-year-old sex-matched healthy person average) as measured by [DXA](#); the term "established osteoporosis" includes the presence of a [fragility fracture](#).^[7] Osteoporosis is most common in women after the [menopause](#), when it is called **postmenopausal osteoporosis**, but may develop in men and premenopausal women in the presence of particular hormonal disorders and other [chronic](#) diseases or as a result of [smoking](#) and [medications](#), specifically [glucocorticoids](#), when the disease is called **steroid- or glucocorticoid-induced osteoporosis** (SIOP or GIOP).

Osteoporosis can be prevented with lifestyle advice and medication, and preventing falls in people with known or suspected osteoporosis is an established way to prevent fractures. Osteoporosis can also be prevented with having a good source of calcium and vitamin D. Osteoporosis can be treated with [bisphosphonates](#) and various other medical treatments.