

# Skeletal System Overview

- Axial anatomy
- Diagram
- Appendicular anatomy
- Function
- Conditions
- Health tips

## What is the skeletal system?

The human skeletal system consists of all of the bones, cartilage, tendons, and ligaments in the body. Altogether, the skeleton makes up about 20 percent of a person's body weight.

An adult's skeleton contains 206 bones. Children's skeletons actually contain more bones because some of them, including those of the skull, fuse together as they grow up.

There are also some differences in the male and female skeleton. The male skeleton is usually longer and has a high bone mass. The female skeleton, on the other hand, has a broader pelvis to accommodate for pregnancy and child birth.

Regardless of age or sex, the skeletal system can be broken down into two parts, known as the axial skeleton and the appendicular skeleton.

## Axial skeleton anatomy

The adult axial skeleton consists of 80 bones. It's made up of the bones that form the vertical axis of the body, such as the bones of the head, neck, chest, and spine.

# Skull bones

The adult skull comprises 22 bones. These bones can be further classified by location:

- **Cranial bones.** The eight cranial bones form the bulk of your skull. They help to protect your brain.
- **Facial bones.** There are 14 facial bones. They're found on the front of the skull and make up the face.

## Auditory ossicles

The auditory ossicles are six small bones found within the inner ear canal in the skull. There are three auditory ossicles on each side of the head, known as the:

- malleus (hammer)
- incus (anvil)
- stapes (stirrup)

They work together to transmit sound waves from the surrounding environment to the structures of the inner ear.

## Hyoid

The hyoid is a U-shaped bone found at the base of the jaw. It serves as a point of attachment for muscles and ligaments in the neck.

## Vertebral column

The vertebral column is made up of 26 bones. The first 24 are all vertebrae, followed by the sacrum and coccyx (tailbone).

The 24 vertebrae can be further divided into the:

- **Cervical vertebrae.** These seven bones are found in the head and neck.

- **Thoracic vertebrae.** These 12 bones are found in the upper back.
- **Lumbar vertebrae.** These five bones are found in the lower back.

The sacrum and coccyx are both made up of several fused vertebrae. They help support the weight of the body while sitting. They also serve as attachment points for various ligaments.

## Thoracic cage

The thoracic cage is made up of the sternum (breastbone) and 12 pairs of ribs. These bones form a protective cage around the organs of the upper torso, including the heart and lungs.

Some of the ribs attach directly to the sternum, while others are linked to the sternum via cartilage. Some have no attachment point and are referred to as “floating ribs.”

# Appendicular skeleton anatomy

There are a total of 126 bones in the appendicular skeleton. It consists of the bones that make up the arms and legs, as well as the bones that attach them to the axial skeleton.

## Pectoral girdle

The pectoral girdle is where the arms attach to the axial skeleton. It's made up of the clavicle (collarbone) and scapula (shoulder blade). There are two of each of these — one for each arm.

## Upper limbs

Each arm contains 30 bones, known as the:

- **Humerus.** The humerus is the long bone of the upper arm.

- **Radius.** The radius is one of two long bones of the forearm, found on the thumb side.
- **Ulna.** The ulna is the second long bone of the forearm, found on the pinky finger side.
- **Carpals.** The carpals are a group of eight bones found in the wrist area.
- **Metacarpals.** The metacarpals are five bones found in the middle area of the hand.
- **Phalanges.** The phalanges are 14 bones that make up the fingers.

## Pelvic girdle

The pelvic girdle, commonly known as the hips, is where the legs attach to the axial skeleton. It's made up of two hipbones — one for each leg.

Each hip bone consists of three parts, known as the:

- **Ilium.** The ilium is the top portion of each hip bone.
- **Ischium.** The ischium is a curved bone that makes up the base of each hip bone.
- **Pubis.** The pubis is located in the front part of the hip bone.

## Lower limbs

Each leg is composed of 30 bones, known as the:

- **Femur.** The femur is the large bone of the upper leg.
- **Tibia.** The tibia is the main bone of the lower leg. It forms the shin.
- **Fibula.** The fibula is the second bone in the lower leg, found in the outer leg.
- **Patella.** The patella is also called the kneecap.
- **Tarsals.** The tarsals are the seven bones that make up the ankle.
- **Metatarsal.** The metatarsals are the five bones that make up the middle area of the foot.
- **Phalanges.** The phalanges are 14 bones that comprise the toes.

# What is the function of the skeletal system?

The skeletal system's main function is to provide support for the body. For example, the spinal column provides support for the head and torso. The legs, on the other hand, support and bear the weight of the upper body while a person stands.

But the skeletal system has several additional functions, including:

- **Protecting internal organs from injury.** For example, the skull protects the brain, while the thoracic cage protects the heart and lungs.
- **Allowing for movement.** Muscles attach to bones through tendons. This connection allows the body to move in many different ways.
- **Producing blood cells.** The soft bone marrow inside of many bones produces red blood cells, white blood cells, and platelets.
- **Storing minerals and nutrients.** Bones can store and release minerals, including calcium and phosphorus, which are important for many bodily functions. Additionally, adipose (fat) tissue that can be used as energy can be found in part of the bone marrow.

# What kinds of conditions affect the skeletal system?

## Fractures

A fracture can also be referred to as a broken bone. Fractures typically occur due to an injury or trauma, such as a car accident or a fall. There are many different types of fractures, but they're generally categorized by the nature and location of the break.

## Metabolic bone diseases

Metabolic bone diseases refer to a group of conditions that affect bone strength or integrity. They can be due to things such as a deficiency in vitamin D, loss of bone mass, and use of certain medications, such as steroids or chemotherapy.

## Arthritis

Arthritis is an inflammation of the joints. This can cause pain and a limited range of movement. Several things can cause arthritis, including the breakdown of cartilage that's found in joints, autoimmune conditions, or infection.

## Cancer

Cancer can develop in the tissues of the bone or in the cells produced by bones. Cancer that forms in the primary bone tissue is actually quite rare. Cancers of the blood cells produced by bone, such as myeloma or lymphoma, are more common.

## Spinal curvatures

A spinal curvature is when the spine doesn't curve in its usual shape. Typically, the spine follows gentle forward and backward curves.

There are three main types of spinal curvature:

- **Kyphosis.** Kyphosis creates a rounding in the upper back.
- **Lordosis.** Lordosis causes the lower back to curve inward.
- **Scoliosis.** Scoliosis causes an S- or C-shaped curve in the spine.

## Tips for a healthy skeletal system

The skeletal system provides the foundation for all of the body's movements, in addition to other important functions.

Follow these tips to keep it in good working order:

- **Consume calcium.** Calcium-rich foods include leafy green vegetables, broccoli, tofu, and fish such as salmon.
- **Get enough vitamin D.** Most people get plenty of this by spending regular time outdoors, but a vitamin D supplement can help those in areas that don't get much sunlight.
- **Do weight-bearing exercises.** These include things like walking, jogging, and climbing stairs.
- **Wear protection.** Always wear protective gear when riding a bike or playing contact sports to avoid bone fractures and other potentially serious injuries.

•

•

•

•

•

•

•

•

•

•