

Bones are connected at **joints** (*articulations*). All bones move at joints. Joints are functionally classified as immovable (*synarthroses*), partly movable (*amphiarthroses*), or freely movable (*diarthroses*). Structural classification of freely movable joints can be seen below.

**Fibrous joints** (*synarthroses*) are those in which the articulating bones are connected by fibrous tissue. Sutures of the skull are essentially **immovable** fibrous joints, especially after having ossified with age. Teeth in their sockets are fixed fibrous joints (*gomphoses*). *Syndesmoses* are **partly movable** fibrous joints, such as the interosseous ligaments between bones of the forearm or the bones of the leg.

**Cartilaginous joints** (*synchondroses*) are essentially **immovable joints** seen during growth, such as growth (epiphyseal) plates, and the joint between the first rib and the sternum. Fibrocartilaginous joints (*amphiarthroses*) are **partly movable** (e.g., the intervertebral disc, and a part of the sacroiliac joint). Symphyses also are partly movable fibrocartilaginous joints, such as between the pubic bones (symphysis pubis) and the manubrium and the body of the sternum (sternal angle).

**Synovial joints** (*diarthroses*) are **freely movable** within ligamentous limits and the bony architecture. They are characterized by **articulating bones** whose ends are capped with **articular cartilage** and are enclosed in a ligament-reinforced, sensitive, fibrous (**joint**) **capsule** lined internally with a vascular **synovial membrane** that secretes a lubricating fluid within the cavity. The **synovial membrane** does not cover articular cartilage.

Synovial or serous fluid-secreting membranes line fibrous tissue pockets (**bursa(e)** that exist throughout the body wherever there are areas of frictional contact between two adjacent structures). These sacs facilitate irritation-free movement. Often associated with synovial joints, several are associated with the hip, shoulder, and knee joints, to mention but a few.

**Ball-and-socket joints** are best seen at the hip and shoulder. Movements in all direction are permitted: flexion, extension, adduction, abduction, internal and external rotation, and circumduction.

A **hinge joint** permits movement in only one plane: flexion/extension. The ankle, interphalangeal, and elbow (humeroulnar) joints are hinge joints.

A **saddle** (sellar) **joint** (e.g., carpometacarpal joint at the base of the thumb) has two concave articulating surfaces, permitting all motions but rotation.

The **ellipsoid** (condyloid, condylar) **joint** is a reduced ball-and-socket configuration in which significant rotation is largely excluded (e.g., the bicondylar knee, temporomandibular, and radiocarpal (wrist) joints).

A **pivot joint** has a ring of bone around a peg; for example, the C1 vertebra rotates about the dens of C2, a rounded humeral capitulum on which the radial head pivots (rotates).

**Gliding joints** (e.g., the facet joints of the vertebrae, the acromioclavicular, intercarpal, and intertarsal joints) generally have flat articulating surfaces.