

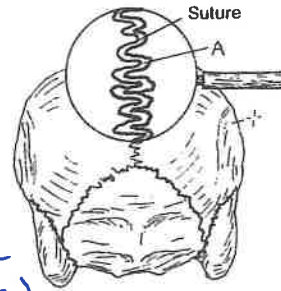
**SKELETAL AND ARTICULAR SYSTEMS**

**CLASSIFICATION OF JOINTS**

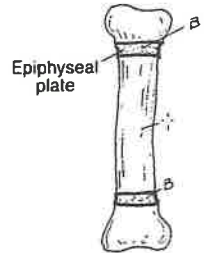
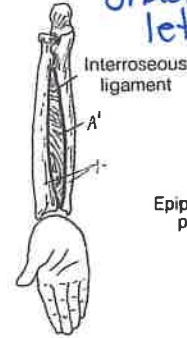
Bones are connected at joints (articulations). All bones move at joints. Joints are functionally classified as immovable (synarthroses), partly movable (amphiarthroses), or freely movable (diarthroses). The structural classification of joints is given below.

**FIBROUS JOINT: (Synarthrotic)**  
**IMMOVABLE<sub>A</sub> / PARTLY MOVABLE<sub>A'</sub>**

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.



means color the structure a lighter or varied shade of the letter only structure.



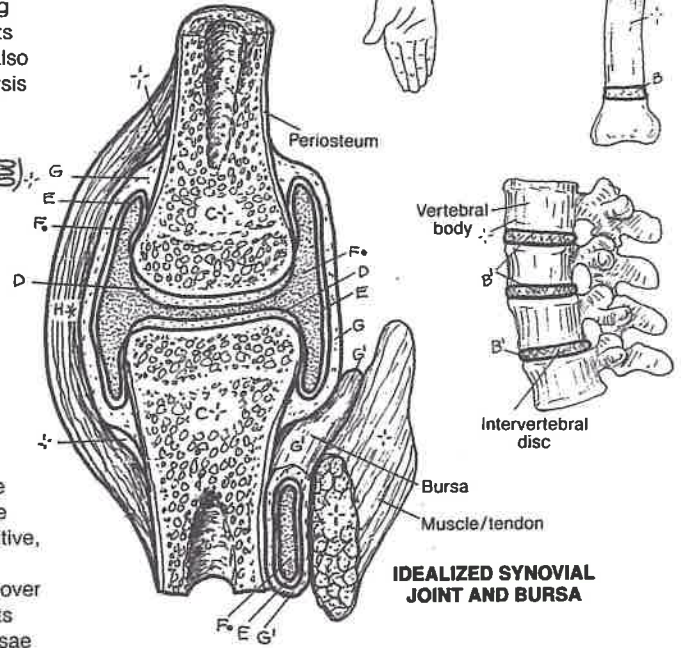
**CARTILAGINOUS JOINT: (Amphiarthrotic)**  
**IMMOVABLE<sub>B</sub> / PARTLY MOVABLE<sub>B'</sub>**

Cartilaginous joints (synchondroses) are essentially immovable joints seen during growth—e.g., growth (epiphyseal) plates (see Plate 168). Fibrocartilaginous joints (amphiarthroses) are partly movable—e.g., the intervertebral disc. Symphyses also are partly movable fibrocartilaginous joints, as between the pubic bones (symphysis pubis) and the manubrium and body of the sternum (sternal angle).

**SYNOVIAL JOINT (FREELY MOVABLE)**  
**(Diarthrotic)**

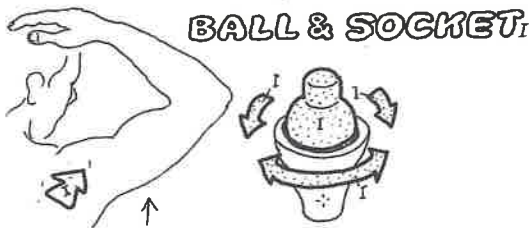
- ARTICULATING BONES<sub>C</sub>
- ARTICULAR CARTILAGE<sub>D</sub>
- SYNOVIAL MEMBRANE<sub>E</sub>
- SYNOVIAL CAVITY (FLUID)<sub>F</sub>
- JOINT CAPSULE<sub>G</sub>
- BURSA CAPSULE (discussed in Muscular System)
- COLLATERAL LIGAMENT<sub>H\*</sub>

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. A fibrous tissue-lined synovial sac of fluid (bursa) often exists between moving structures outside the joint, as between tendon and bone. Bursae facilitate friction-free movement; friction may induce painful inflammation (bursitis).

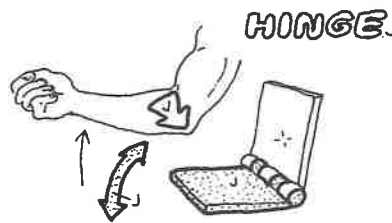


**IDEALIZED SYNOVIAL JOINT AND BURSA**

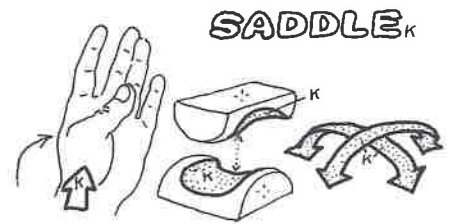
**TYPES OF SYNOVIAL JOINTS**



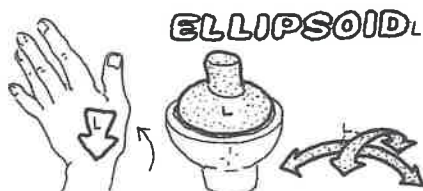
Ball-and-socket joints are best seen at the hip and shoulder. Movements in all direction are permitted—i.e., flexion, extension, adduction, abduction, internal and external rotation, and circumduction.



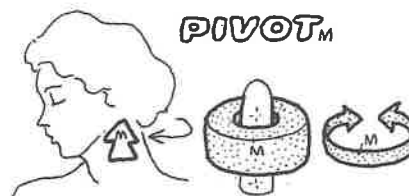
A hinge joint permits movement in only one plane: flexion/extension. The ankle, interphalangeal, and elbow (humeroulnar) joints are hinge joints.



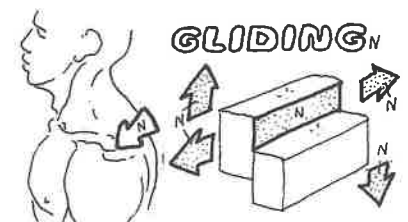
A saddle (sellar) joint—e.g., carpometacarpal joint at the base of the thumb—has two concave articulating surfaces, permitting all motions but rotation.



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; e.g., 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 acromio-clavicular, intercarpal, and intertarsal joints) has generally flat articulating surfaces.