

Articulations (Joints) of Bone

- Arthrology- the scientific study of joints

Classification

- Structural- based on the absence or presence of a space between the articulating bones called a synovial cavity and the type of connective tissue that binds the bones together.
 - **Fibrous**- if there is no synovial cavity and bones are held together by fibrous tissue.
 - **Cartilaginous**- if there is no synovial cavity and the bones are held together by cartilage.
 - **Synovial**- if there is a synovial cavity and the bones are united by a surrounding articular capsule and accessory ligaments.

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Functional Classification- based on the degree of movement that the joint permits.

- **Synarthrosis**- immovable joint
- **Amphiarthrosis**- slightly movable joint
- **Diarthrosis**- freely movable joint

Synarthrosis

- **Suture**- a fibrous joint found between bones of the skull
- **Gomphosis**- a fibrous joint in which a cone-shaped peg fits into a socket. Ex: roots of the teeth in the alveoli (socket) of the maxillae and mandible.
- **Synchondrosis**- a cartilaginous joint in which the connecting material is hyaline cartilage. The joint is eventually replaced by bone.
 - Ex.: epiphyseal plate and joints between the rib and the sternum.

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Amphiarthrosis

- Synsdesmosis- (band or ligament joint)-similar to a suture but there is much more fibrous tissue between the bones and the joint is not as tight, which permits some flexibility.
 - Ex: distal joint of the tibia and fibula
- Symphysis- (growing together)-a cartilage joint in which the connecting material is a broad, flat disc of fibrocartilage.
 - Ex: intervertebral joints and the pubic symphysis

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Diarthrosis

Structure of diarthrosis

- has a **synovial cavity or joint** that separates the articulating bones.
- has **articular cartilage** that covers the surface of the articulating bones, where it reduces friction and helps absorb shock.

- A sleeve-like **articular capsule** surrounds the joint, encloses the synovial cavity, and unites the articulating bones.
 - Is composed of two layers
 - outer layer is a **fibrous capsule** composed of dense, irregular connective tissue. It attaches to the periosteum of the articulating bones. The fibers of some capsules are arranged in parallel bundles called **ligaments** which hold the bones together.
 - The inner layer is a **synovial membrane** composed of areolar connective tissue. It secretes synovial fluid that lubricates and reduces friction and supplies nutrients to and removes wastes from the cells of the articulating cartilage.

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Diarthrosis

Structure of diarthrosis (cont.)

- Some joints have **accessory ligaments** which may lie in or outside of the capsule. Inside some joints are pads of fibrocartilage called **articular discs (menisci)** that lie between two bones that have different shapes. This allows stabilization and a tighter fit. A tearing of the articular disc occurs commonly among athletes.

Bursae- fluid filled sac-like structures situated where bone and soft tissue meet to cushion the movement of one part of the body over another (between skin and bone, tendon and bone, muscle and bone, etc) .

- **Bursitis**- inflammation of the bursae.

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Diarthrosis

Types of Diarthrosis

Gliding Joint- provides gliding movement in which surfaces move back and forth and from side to side without any angular or rotary motion. Ex: carpals, tarsals, sternum and clavicle, and scapula and clavicle

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Diarthrosis

Types of Diarthrosis

Hinge Joint- the convex surface of one bone fits into the concave surface of the other.

Movement is in a single plane as that of a hinged door.

- Movement is usually flexion and extension
- **Hyperextension**- a continuation of extension beyond the anatomical position

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Diarthrosis

Types of Diarthrosis

Pivot Joint- a rounded or pointed surface of one bone articulates within a ring formed partly by bone and partly by ligament.

- Movement is primarily rotation, movement of a bone around its axis.

Ex:

- the rotation of the atlas around the axis when we turn our head from side to side.
- At the wrist with the proximal ulna and radius that allows us to pronate and supinate our hands.

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Diarthrosis

Types of Diarthrosis

Condylod Joint- oval shaped articulating surface of one bone fits into a depression of another bone.

- Movement is side-to-side and back-and-forth.

Ex.:

- flex/extension and adduct/abduct of the wrist
- Can combine above movements to form circumduction.

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Diarthrosis

Types of Diarthrosis

Saddle Joint

- the articular surface of one bone is saddle-shaped and the articular surface of the other is shaped like the legs of a rider sitting in a saddle.
- Movement is side-to-side and back-and-forth and circumduction

Articulations (Joints) of Bone

Diarthrosis

Types of Diarthrosis

Ball and Socket- a ball-like surface of one bone fitted into a cuplike depression of another bone.

- Permits movement in three planes
 - flexion-extension
 - abduction- adduction
 - rotation-circumduction