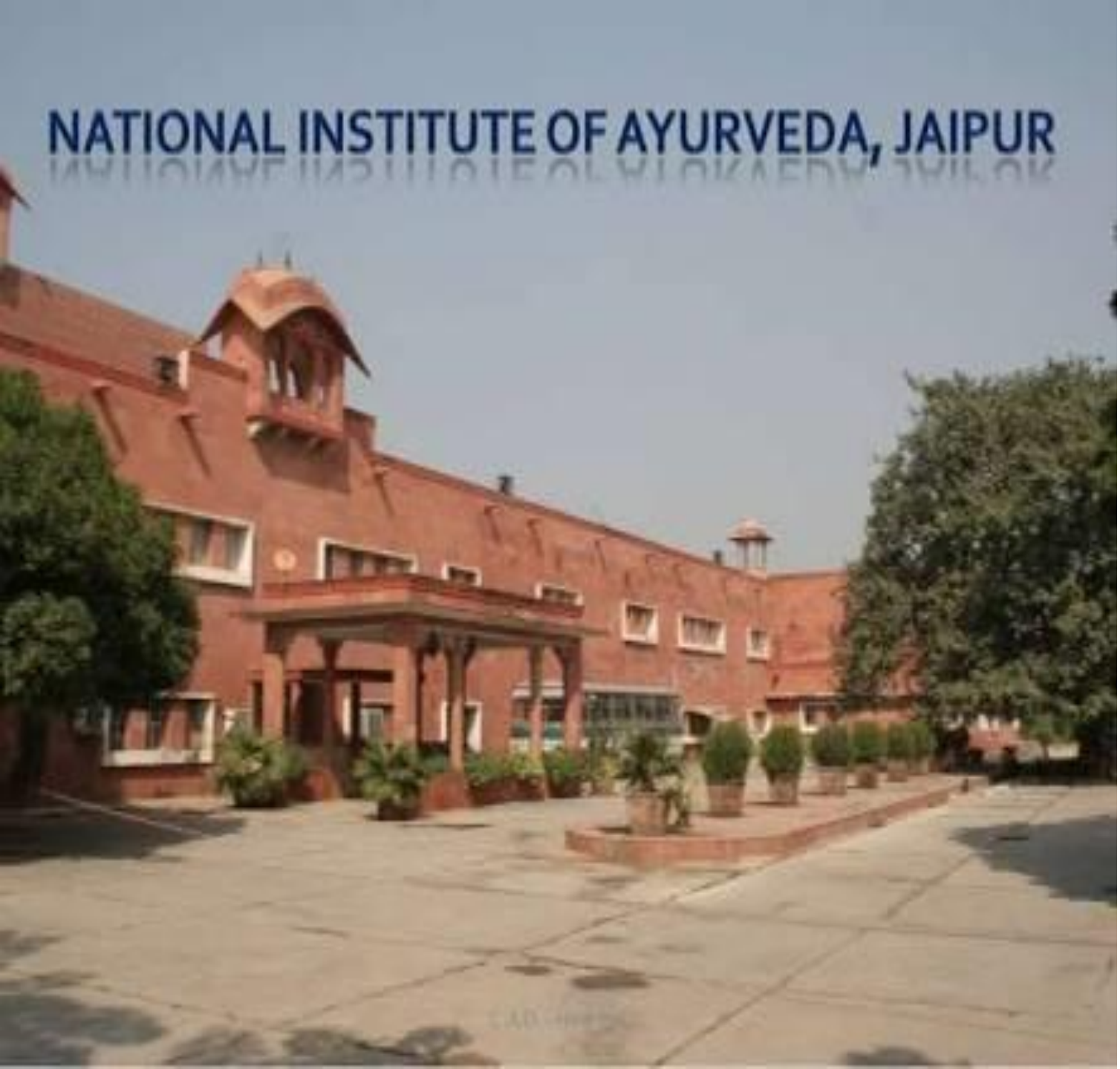
NATIONAL INSTITUTE OF AYURVEDA, JAIPUR

JOINTS

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M.S.(Anatomy)

DEFINITION OF JOINT

Arthrology -: artho (joint)+ logus (study)

Joint is a junction of two or more bones or cartilages (human anatomy Dr. B. D. Chaurasia)

The joints are merely the meeting phase of bones (gray,s Anatomy)

An articulation is a point of contact between bones & between cartilages and bones, or between teeth and bones (J. Tortora)

Synonyms of Joint

- Artho
- Articulation
- Junctura
- Junction
- Union
- Combination

CLASSIFICATION OF THE JOINTS

- Based on anatomical characteristic joints can be categorized into structural classes or based on the type of movement joints can be categorized into functional classes.

1. Structural classification:

- The structural classification of joints is based on the presence and absence of space between articulating bones called as joint cavity and the type of connective tissue that bind the bones together. Structurally, a joint is classified as

    1. Fibrous joints.
    2. Cartilaginous joints.
    3. Synovial joints.

1. Fibrous joints

- The articulating surfaces of the bones are joined by fibrous tissue.
- These can be grouped in the following three subtypes.

➢ Sutures.

➢ Syndesmosis

➢ Gomphosis

❖**Suture:** A suture is fibrous joint compounds of a thin layer of dense fibrous connective tissue .

- This is peculiar to skull, and is immovable.

- According to the shape of bony margins, the suture can be:
  - Plane- e.g. internasal suture
  - Serrate- e.g. interparietal suture
  - Squamous- e.g. temporo-parietal suture
  - Denticulate- e.g. lambdoid suture

- **Syndesmosis:** A syndesmosis is a truly fibrous connection between bones. It may be represented by an interosseous ligament.

  e.g. inferior tibiofibular joint

❖ **Gomphosis-** A gomphosis is a peg-and-socket junction between a tooth and its socket.

2. Cartilaginous joints

- In Cartilaginous joints the articular surfaces of the bones forming the joints are attached to each other by means of white fibro-cartilaginous, which allow only a limited degree of movement.

  These are two types.

A. primary cartilaginous joints (synchondrosis)

The bones are united by a plate of hyaline cartilage so that the joint is immovable and strong

e.g. spheno-occipital joint, costochondral joint, first chondrosternal joint, joint between epiphysisand daiphysis

B. Secondary cartilage joint (symphyses)

The articular surfaces are covered by a thin layer of hyaline cartilage, and united by a disc of fibrocartilage and permit limited movements due to compressible pad of fibrocartilage

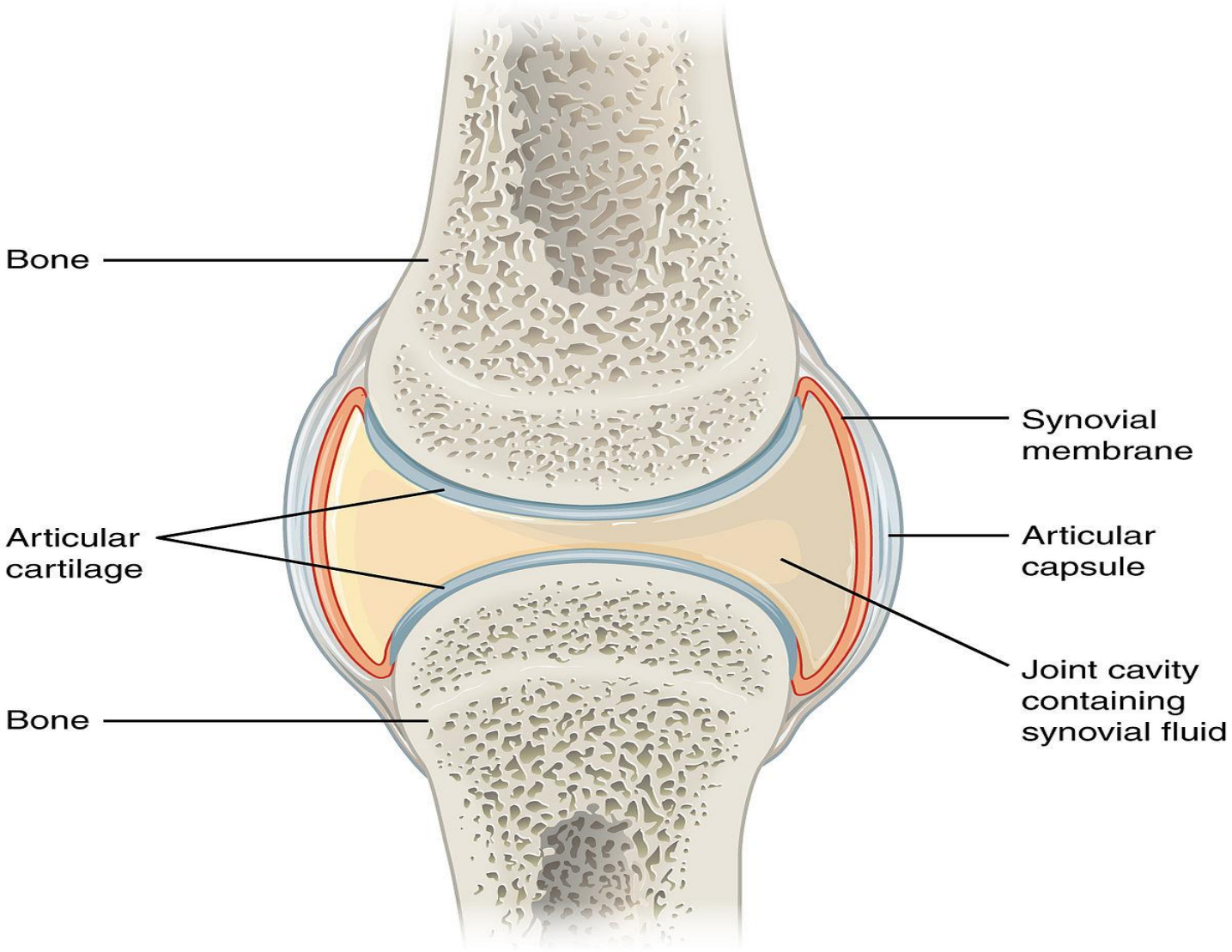
e.g. symphysis pubis, manubriosternal joint, intervertebral joint.

3. Synovial joint

These are freely movable joints. Most of the joints in the body are of the synovial type.

The following are the main characteristics of a synovial joint:

- The ends of the bones are covered with a layer of smooth hyaline cartilage, called articular cartilage in the joint regions.


Bone
Articular cartilage
Bone
Synovial membrane
Articular capsule
Joint cavity containing synovial fluid

- The joint is completely enclosed by a bag-like capsular ligament which holds the joint together and helps to contain the synovial fluid.
- The capsular ligament is lined with a synovial membrane. This membrane secretes synovial fluid which lubricates the joint.
- In addition to the capsule, the bones are also attached and held together by strong, tough ligaments made of dense connective tissue.

Stability of Synovial Joint

- The various factors maintaining the stability at a joint are described below in order of their importance.

❖ **Muscles**

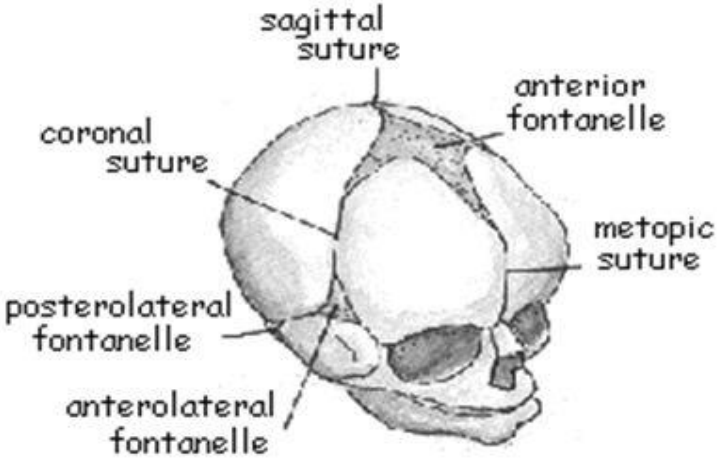
❖ **Ligaments**

❖ **Bones**

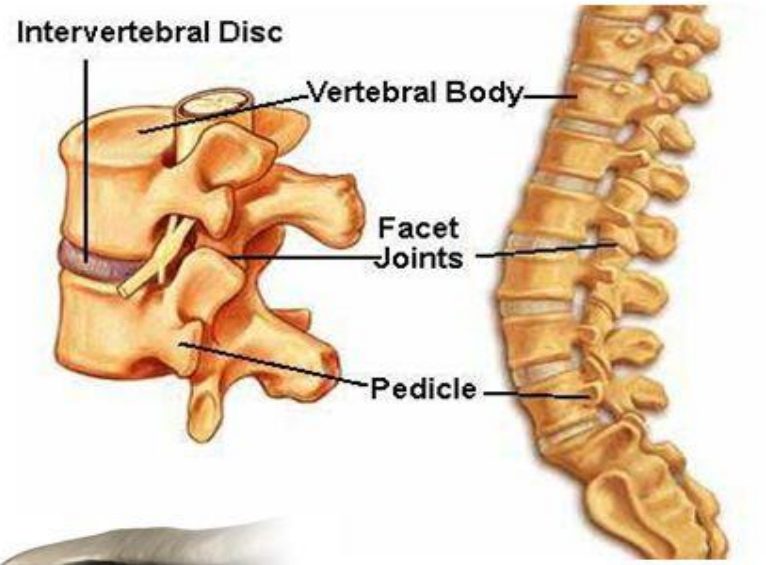
❖ **Tendon**

- **Synovial joints can be subdivided into the following groups according to the type of movement they carry out**.
  - Plane joint
  - Hinge joint
  - Pivot joint
  - Condylar joint
  - Ellipsoid joint
  - Saddle joint
  - Ball and socket joint

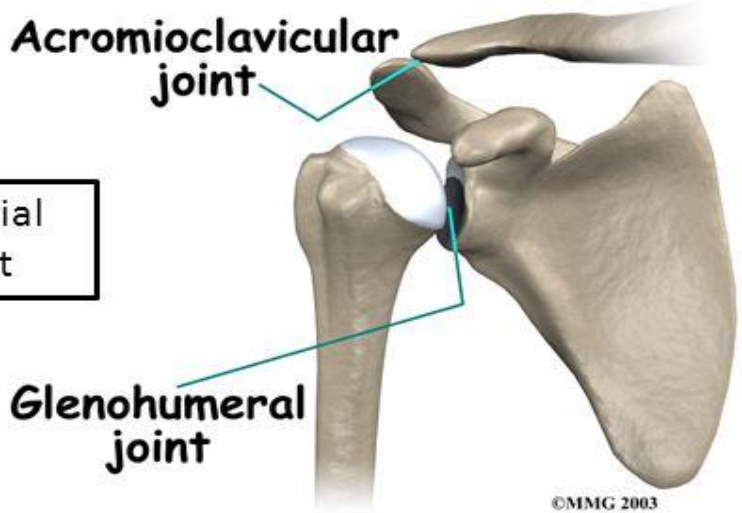
Fibrous Joint



Cartilaginous Joint

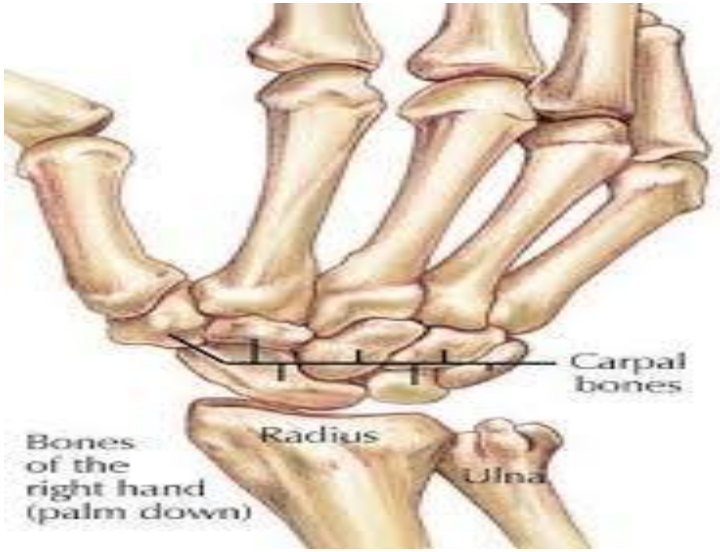


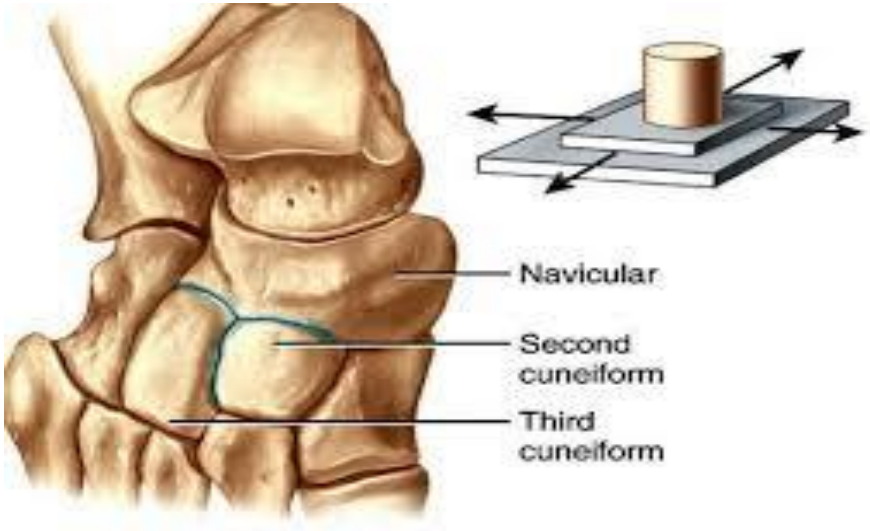
Synovial Joint



1. Plane Joint

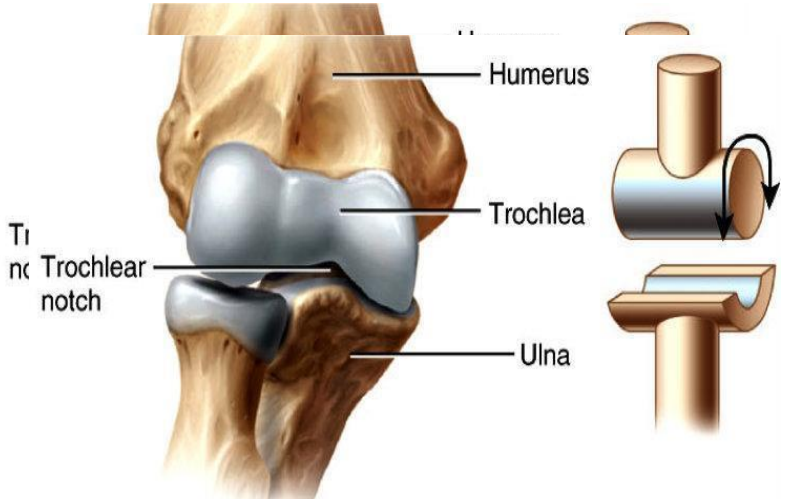
- The plane, or arthrodial, joint has meeting surfaces are more and less flat (plane)
- They permit gliding movement (translations) in various directions.
- Examples- intercarpal joints, intertarsal joints

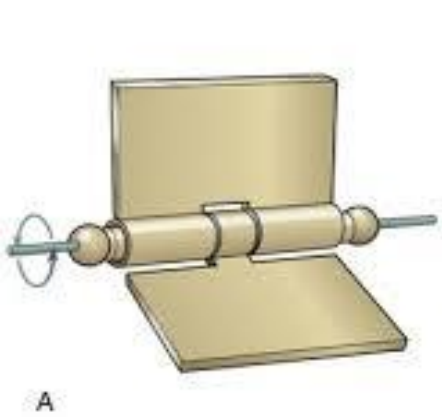


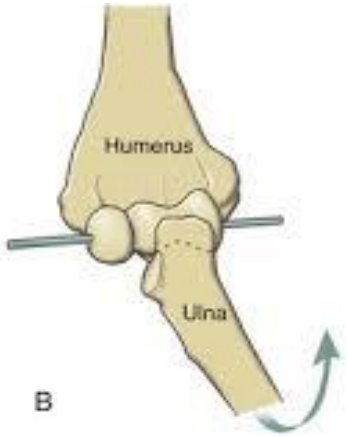


2. Hinge Joints

- Articular surfaces are pulley shaped. These joints occur where the convex surface of one bone fits into the concave surface of another bone
- Movements are permitted in one plane around a transverse axis
- Example- knee joint , elbow joints, ankle

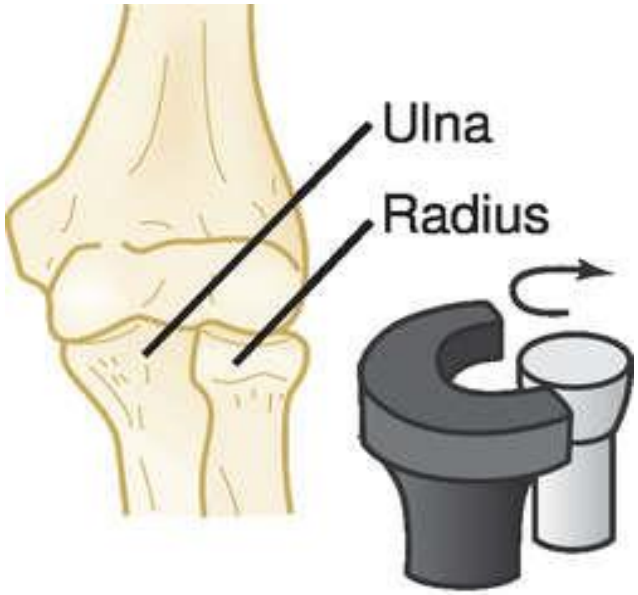




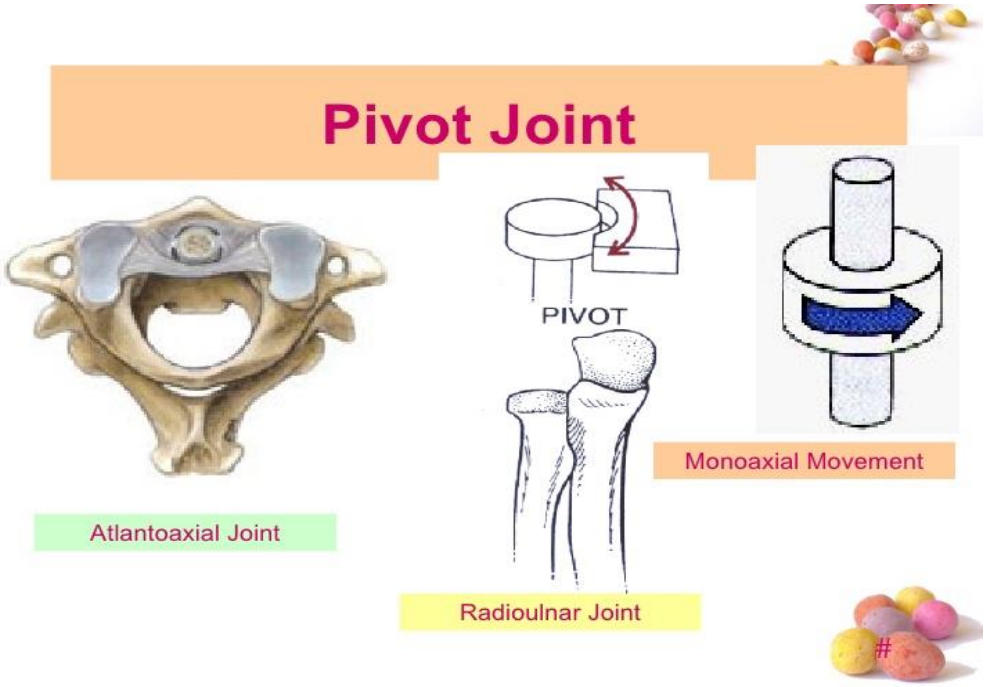


3. Pivot joint

- The pivot, or trochoid, joints are of two forms: in one a pivot rotates within a ring; in the other a ring moves around a pivot
- example-: superior and inferior radio-ulnar joint

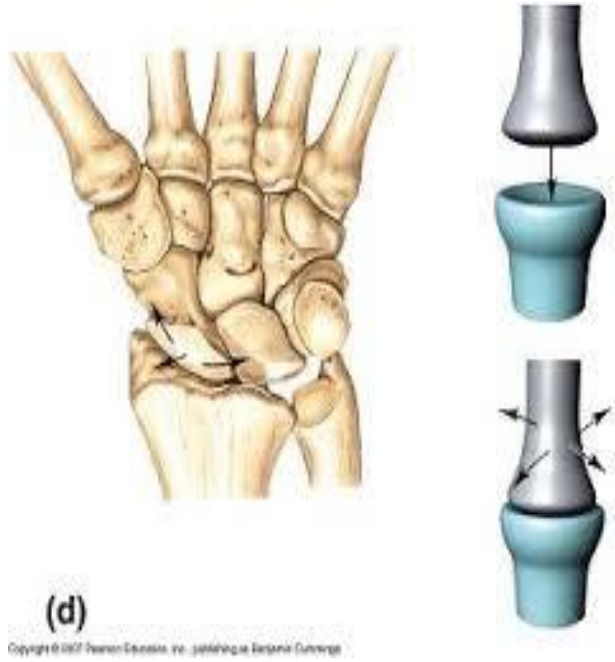


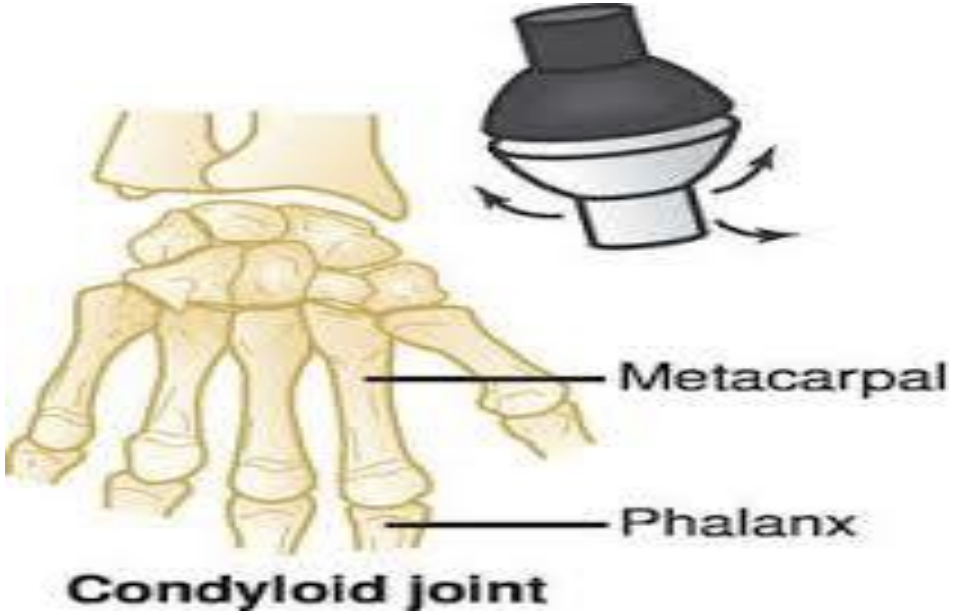
Pivot joint



4. Condylar joint

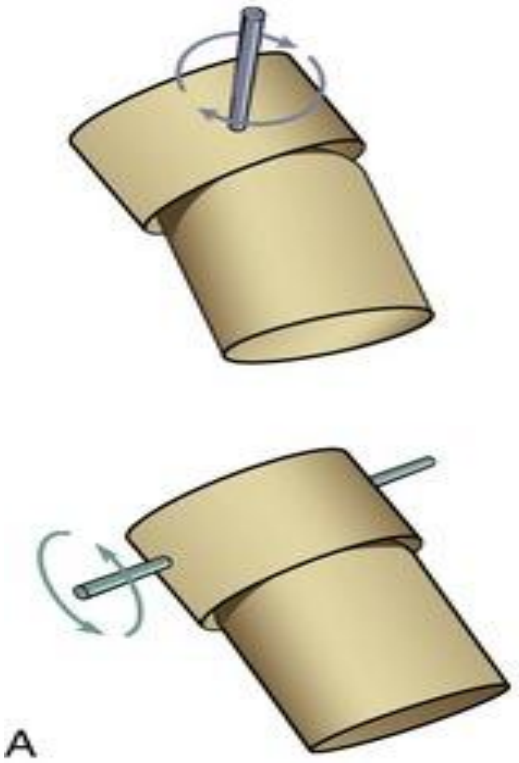
- Rounded articular surface
- Modified ball and socket joint
- Biaxial movement
- Example-: metacarpo-phalangeal joint

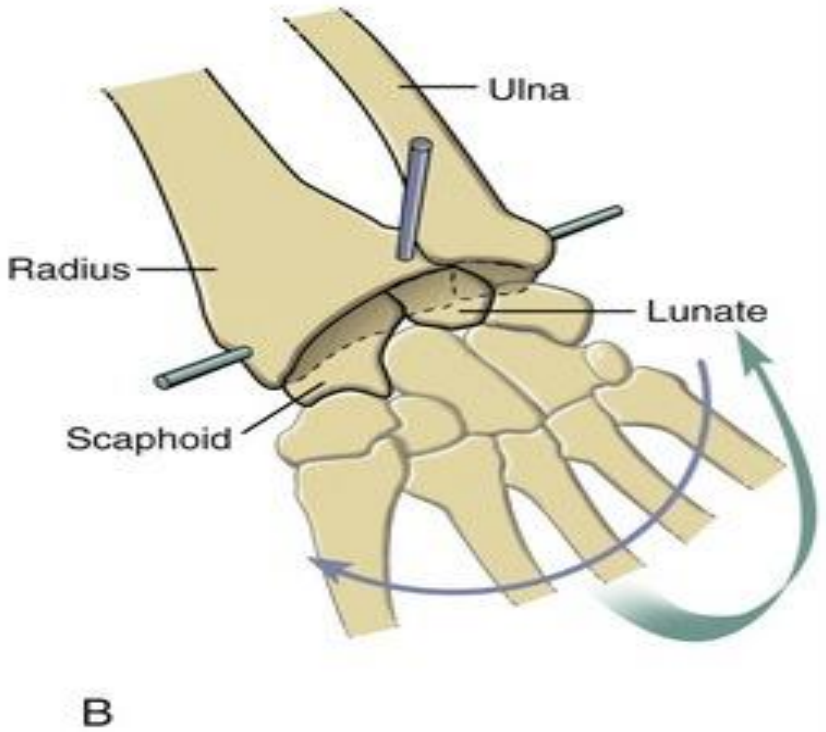




5. Ellipsoid joint

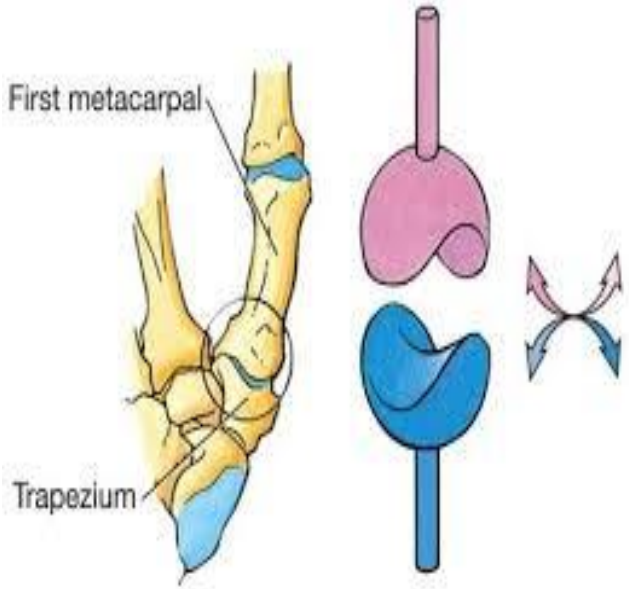
- Ellipsoid joint is ovoid shaped joint allows flexion, extension, abduction, adduction movement
- Example-: radio-carpal joint (wrist joint)

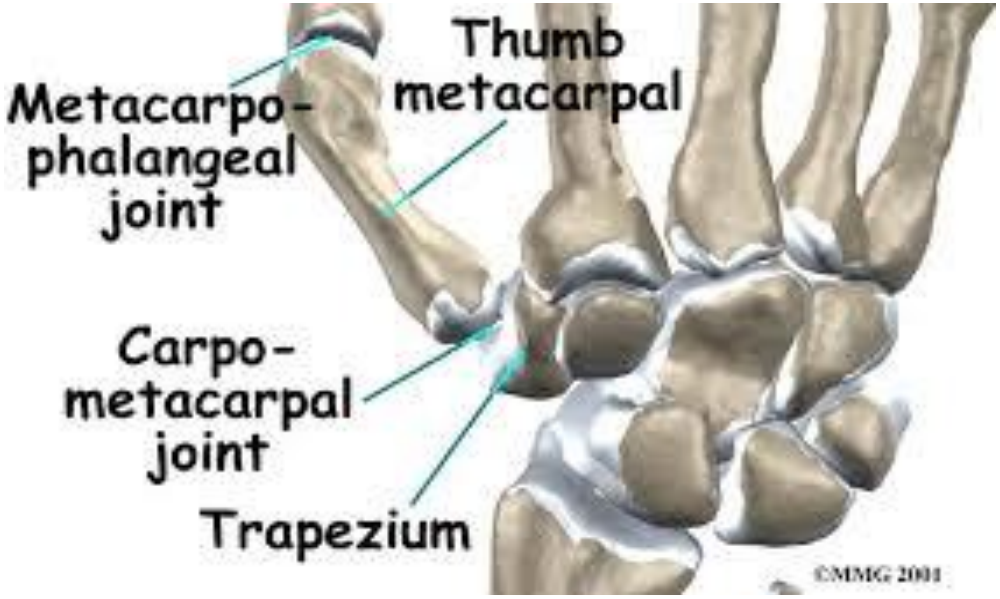




6. Saddle joint

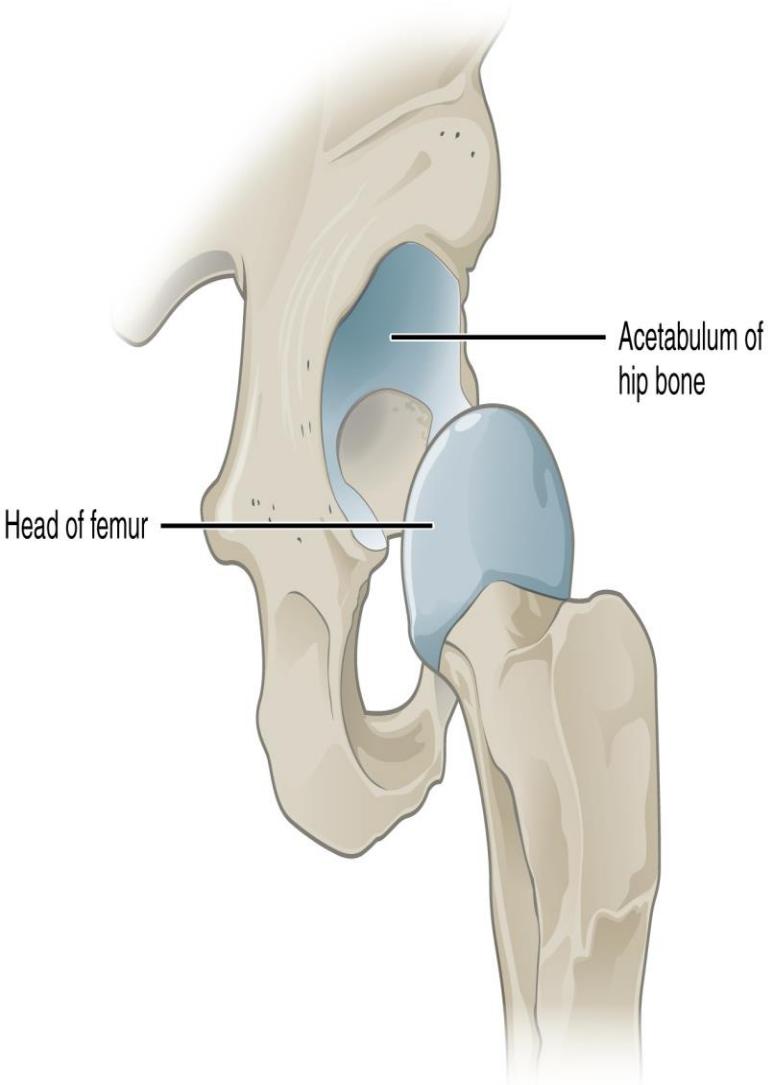
- The articular surface are shaped like a saddle (i.e. they are reciprocally concave and convex)
- Permit abduction and adduction as well as flexion , extension and Circumduction
- Example -: first carpo-metacarpal joint

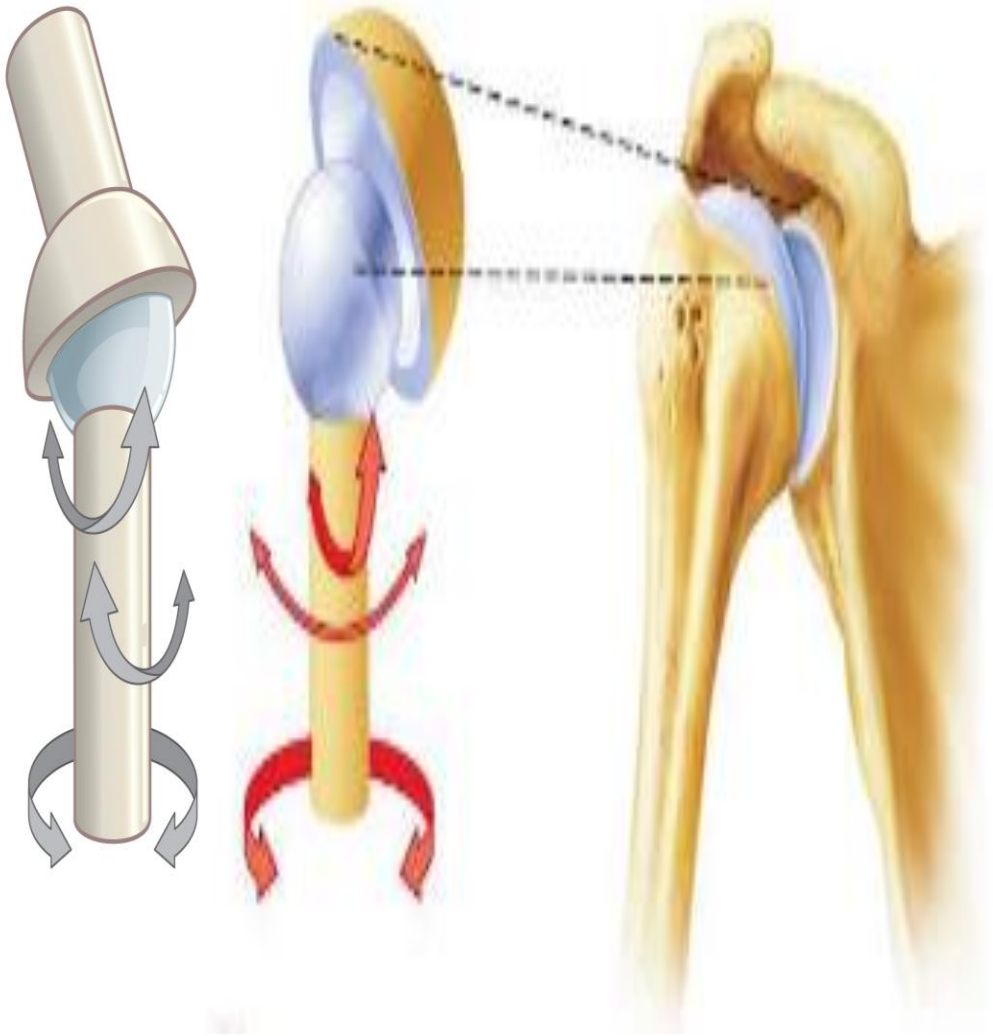


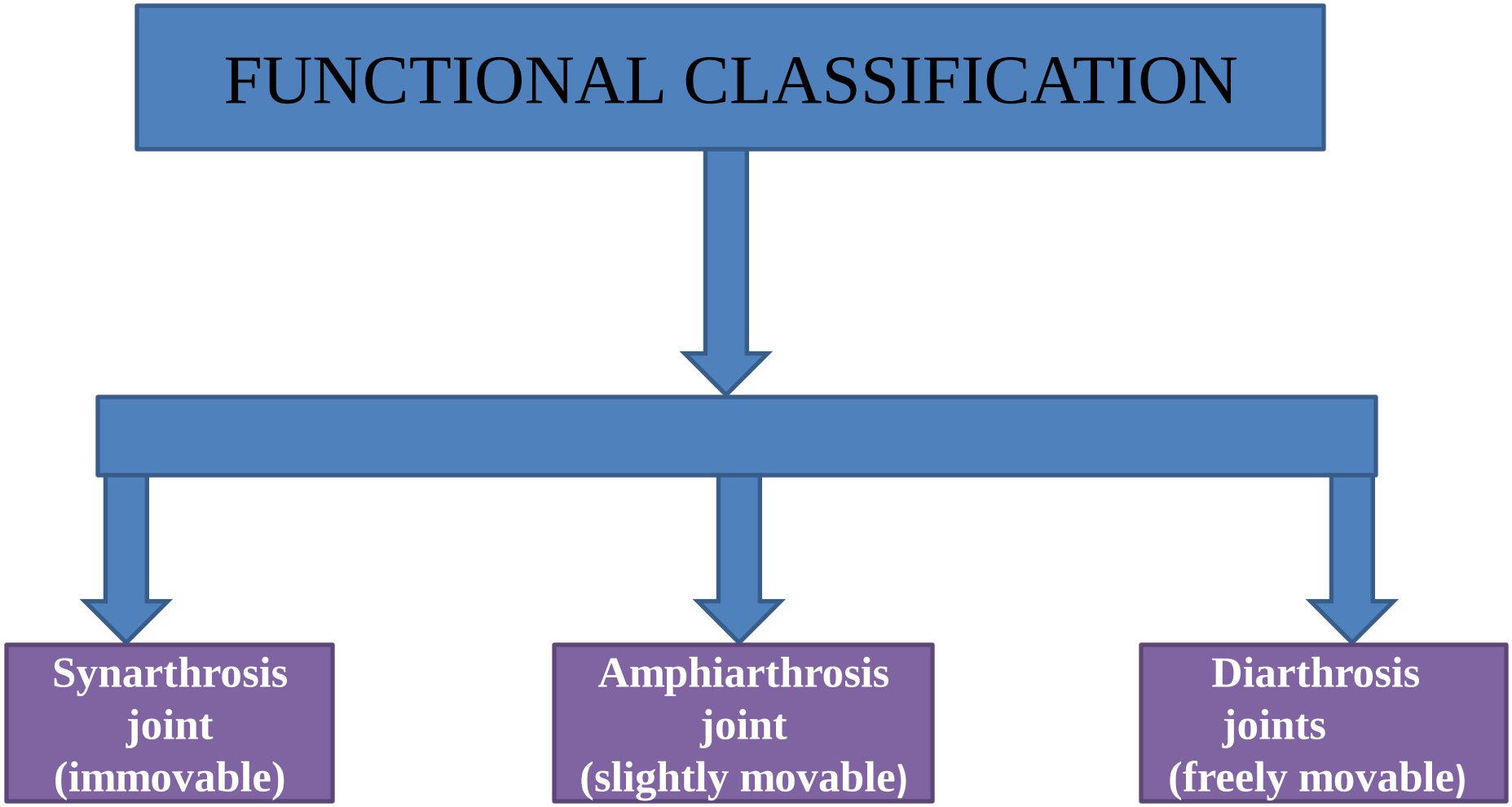


7. Ball and Socket joint

- These joints are formed where the rounded head of one bone fits into the hollow, cup-shaped socket of another bone.
- Movement occurs around an indefinite number of axis which has one common center.
- Flexion, extension, abduction, adduction, medial rotation, lateral rotation and cirumduction
- Examples-: shoulder joint, hip joint


Acetabulum of hip bone
Head of femur




FUNCTIONAL CLASSIFICATION
Synarthrosis joint (immovable)
Amphiarthrosis joint (slightly movable)
Diarthrosis joints (freely movable)

1. Synarthrosis joint (immovable)

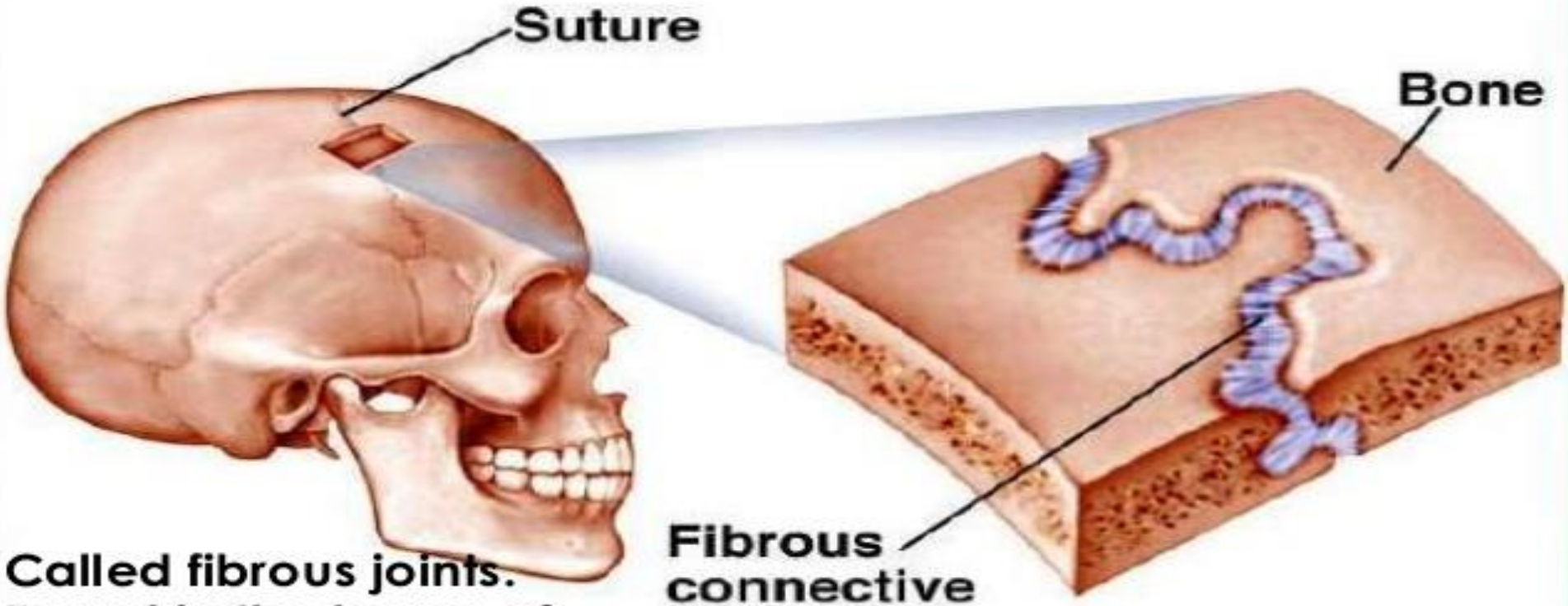
- Synarthrosis is fixed joints at which there are no movements

- The articular surfaces are joined by tough fibrous tissue

- Synarthrosis or immovable joint may be one of three types: suture, gomphosis, or synchondrosis

1. Immovable or Synarthroses Joints

Joints—Immovable

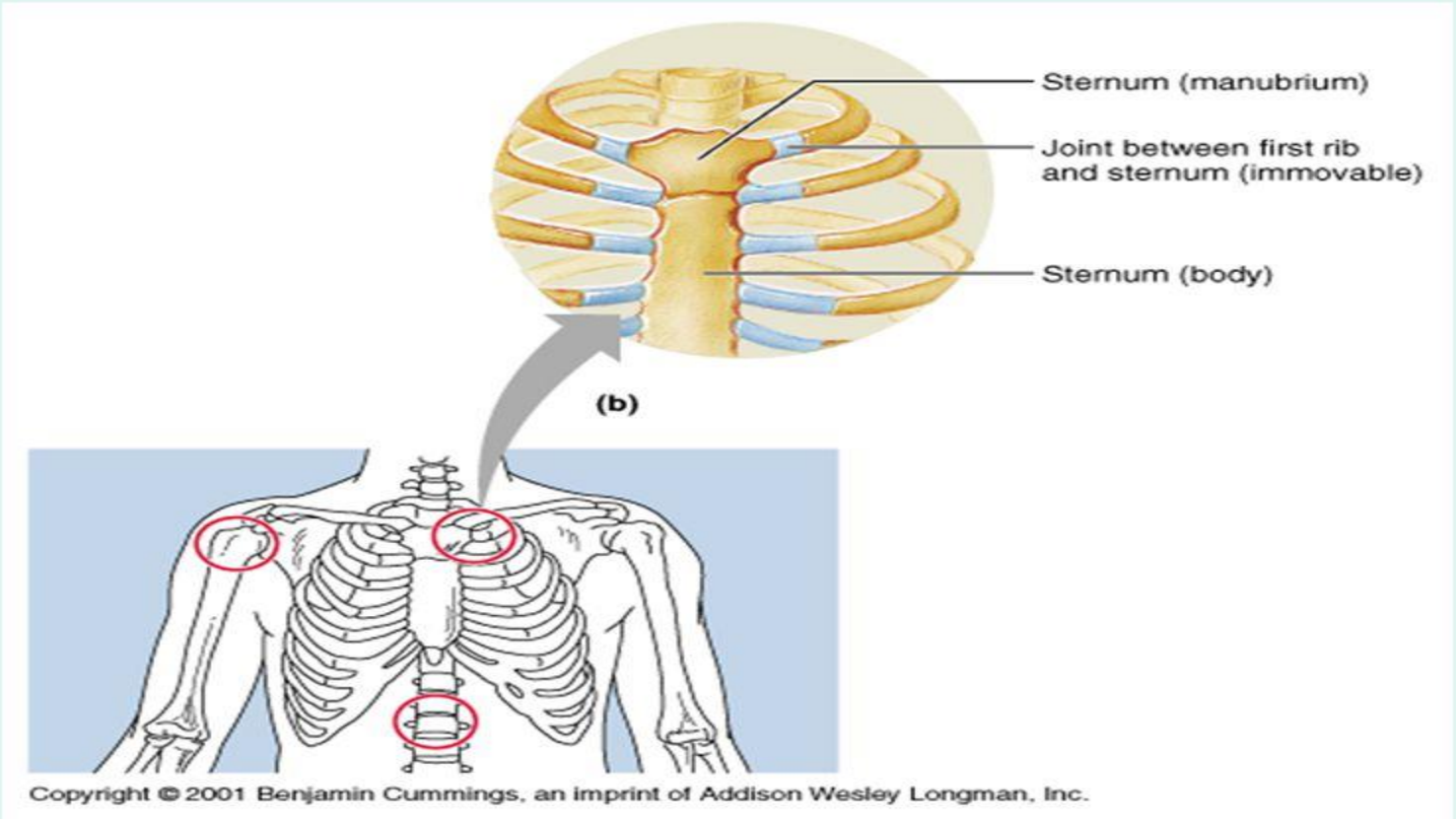


Called fibrous joints. Found in the bones of skull

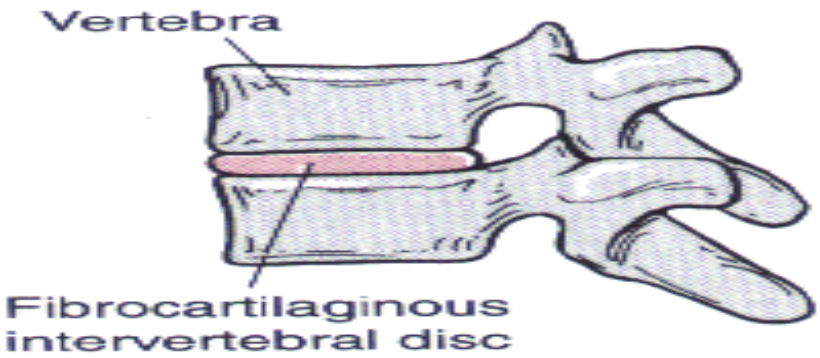
2. Amphiarthrosis joint (slightly movable)

- Amphiarthrosis is joints at which slight movement is possible. A pad of cartilage lies between the bony surfaces
- The cartilages of such joints also act as shock absorbers
- It may be of two type: syndesmosis or symphysis
- EXAMPLE-: the intervertebral disc between the bodies of the vertebrae.

An amphiarthrotic synchondrosis



B. Amphiarthrodial



Intervertebral Disc

Epiphysis

3. Diarthrosis joints (freely movable)

- These joints are known as freely movable joints

- All synovial joint these types of joint include all synovial joints of the body, which provide the majority of body movement

- Most of diarthrosis joint are found in the appendicular skeleton and thus give the limbs a wide range of motion

SYNOVIAL JOINT

- Most evolved joint.
- Freely movable joint.
- Possess a joint cavity that consists of synovial fluid.


Thank You