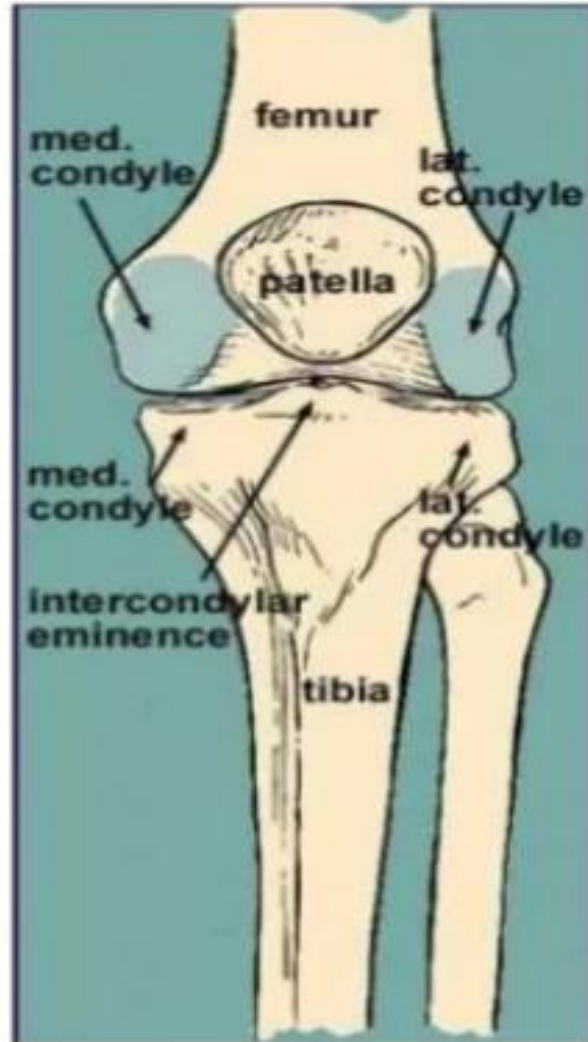


Anatomy of Joints (Arthrology)

Presented by-
Dr Abhilasha

CO (Course outcome)	PO(Programme outcome)
CO 3 Recall the classification of Joints	<p data-bbox="1335 294 2135 405">PO1 Demonstrate the examination of synovial joints</p> <p data-bbox="1335 546 2160 719">PO2 Describe and demonstrate all the Joints with attachments of associated structures and its clinical application</p>
CO 3 Demonstrate movements of Synovial Joints and comprehend the structural aspect helping in movements.	
CO 3 Describe constitutional anatomy of joint	
CO 3 Describe joints of upper limb and lower limb region, TM joint, and its related applied aspect	

Introduction of Joints



- ▶ Joint is a junction between two or more bones or cartilages. It is a device to permit movement.
- ▶ With the exception of the hyoid bone, every bone in the body is connected to or forms a joint.
- ▶ There are 230 joints in the body

Classification of joints

- ▶ Joints are classified into structural and functional.
- ▶ Structural classification is determined by how the bones connect to each other, while functional classification is determined by the degree of movement between the articulating bones.

Structural Classification of Joints

❖ Fibrous (Fixed)

A. Sutures

1. Plane
2. Squamous
3. Serrate
4. Dentate
5. Schindylesis

B. Gomphosis

C. Syndesmosis

❖ Cartilaginous (Slightly movable)

A. Primary

Cartilaginous joints
(Synchondrosis)

B. Secondary

Cartilaginous joints
(Symphysis)

❖ Synovial Freely (movable)

1. Plane
2. Hinge
3. Pivot
4. Bicondylar
5. Ellipsoid
6. Saddle
7. Ball and socket

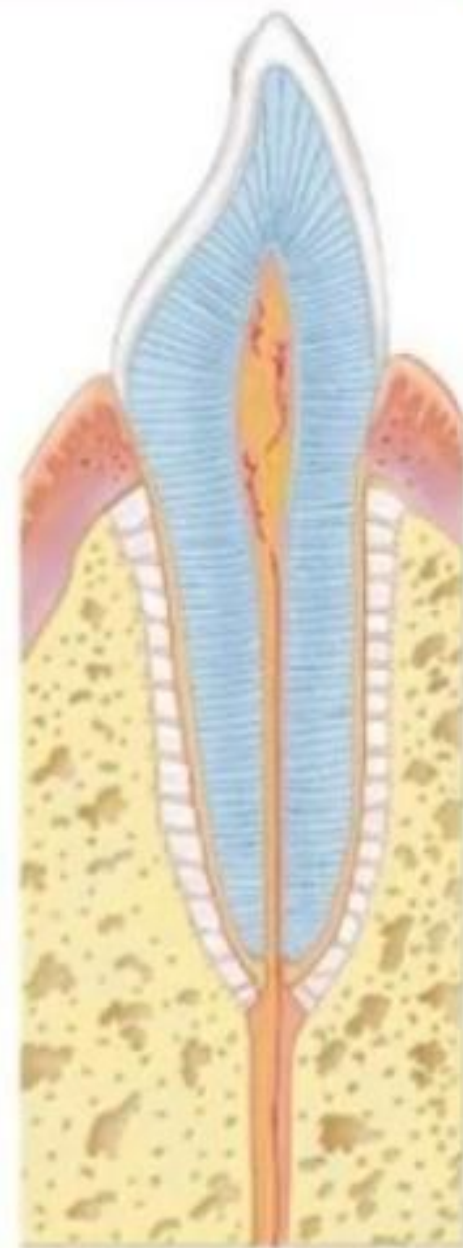
► **Fibrous Joints :-** Bones are joined by fibrous tissue/dense connective tissue, consisting mainly of collagen. The fibrous joints are further divided into three types:-

1. **Sutures or synostoses :-** Found between bones of the skull. In fetal skulls the sutures are wide to allow slight movement during birth. They later become rigid (synarthrodial).

- ▶ **2. Syndesmoses** are joints where two adjacent bones are joined together by a greater amount of connective tissue than in sutures in the form of interosseous ligaments and membranes.
- ▶ Eg-interosseous radioulnar joint, interosseous tibiofibular joint.



► **3. Gomphoses :-** It is a specialized fibrous joint restricted to fixation of teeth in alveolar sockets of the maxilla or mandible. The root of tooth is attached to the socket with in alveolus by periodontal ligament.

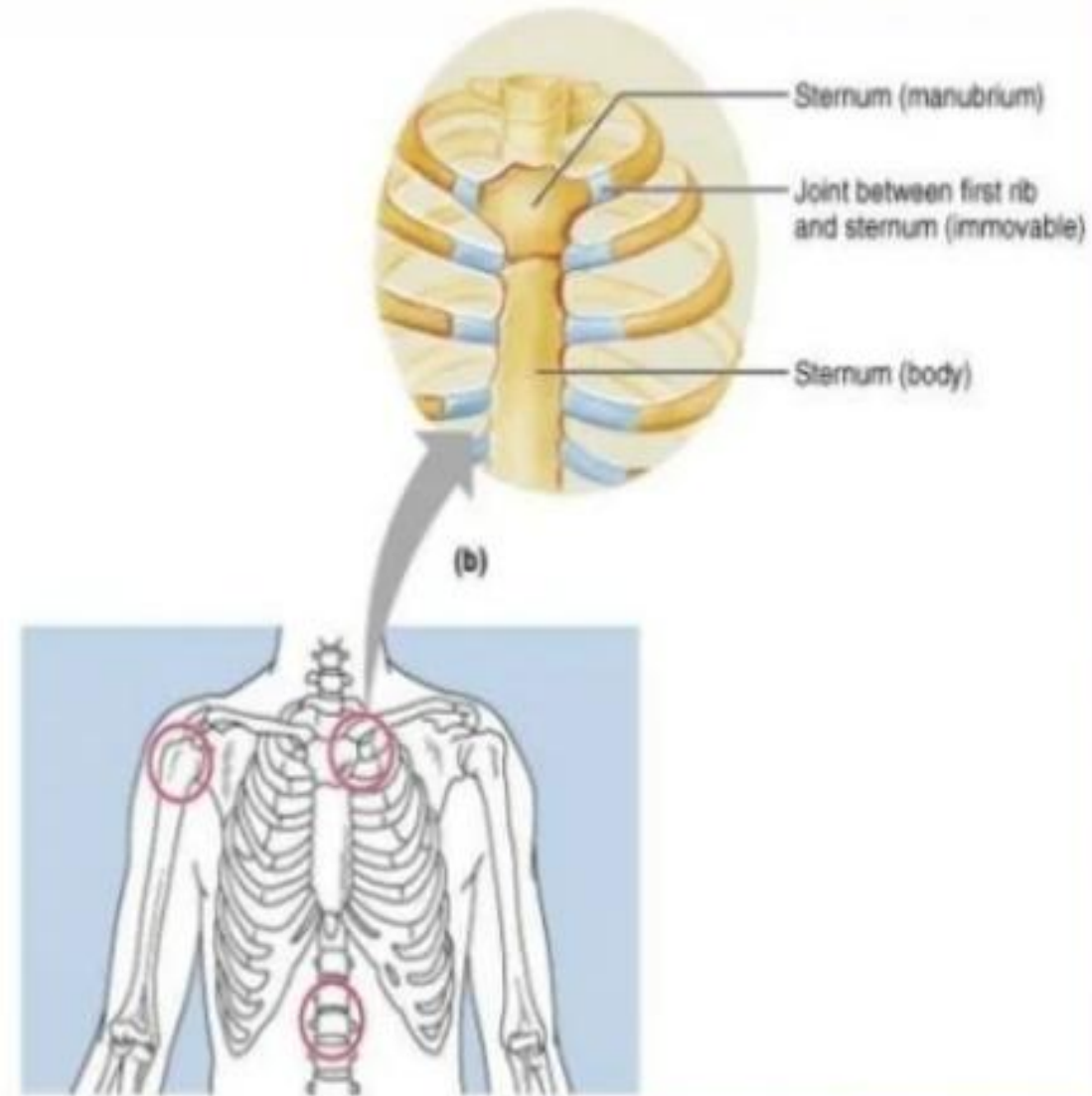


CARTILAGINOUS JOINTS

- ▶ In this type of joint the bones are joined by cartilage.
- ▶ There are two types of cartilaginous joints:
 1. Primary cartilaginous joints
 2. Secondary cartilaginous joints

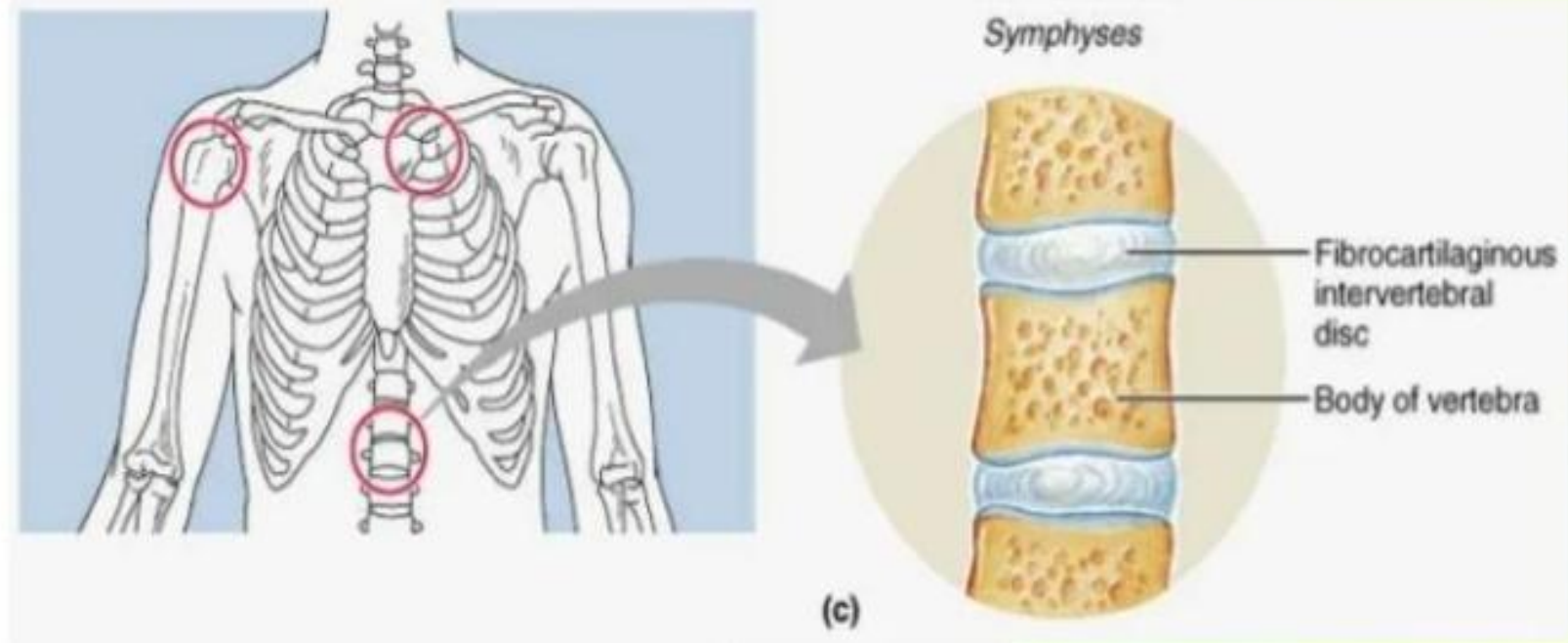
1. Primary cartilaginous joints

- ▶ joints - Known as "synchondroses". Bones forming joints are connected by a plate of hyaline cartilage. These joints are immovable and mostly temporary in nature. This cartilage may ossify with age.
- ▶ Examples in humans are the joint between the first rib and the manubrium of the sternum
- ▶ Joint between epiphysis and diaphysis of growing long bone.



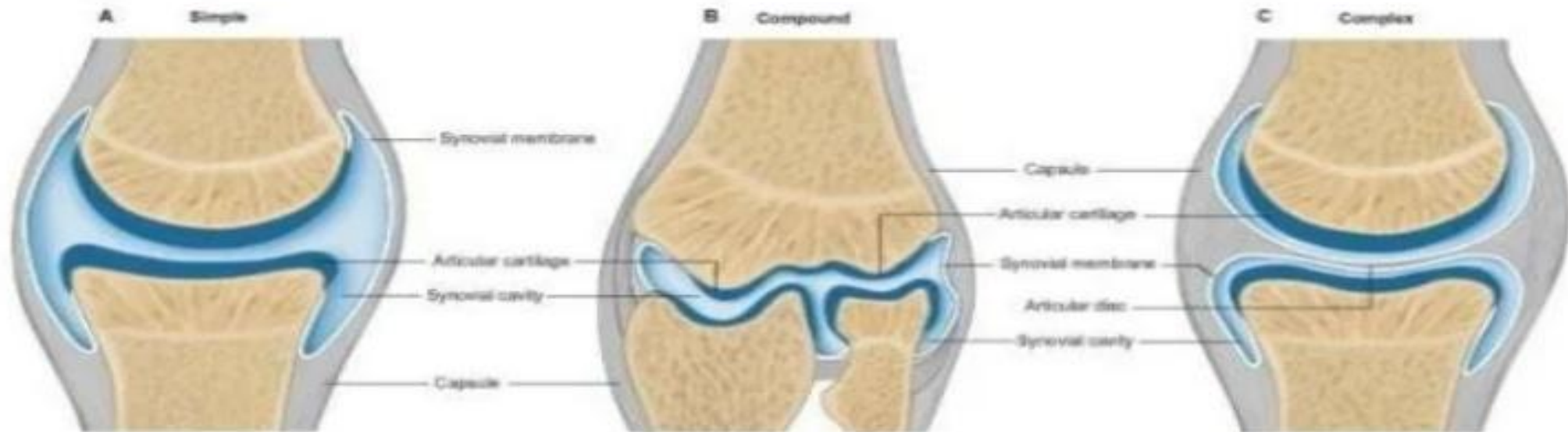
2. Secondary cartilaginous joints

- ▶ Known as "symphysis". In these joints the articular surfaces of bone forming the joints are covered by thin plates of hyaline cartilage, which are connected by a disc of fibrocartilage.
- ▶ Example: -symphysis pubis
- ▶ Intervertebral disc
- ▶ Manubriosternal joint
- ▶ Symphysis menti.



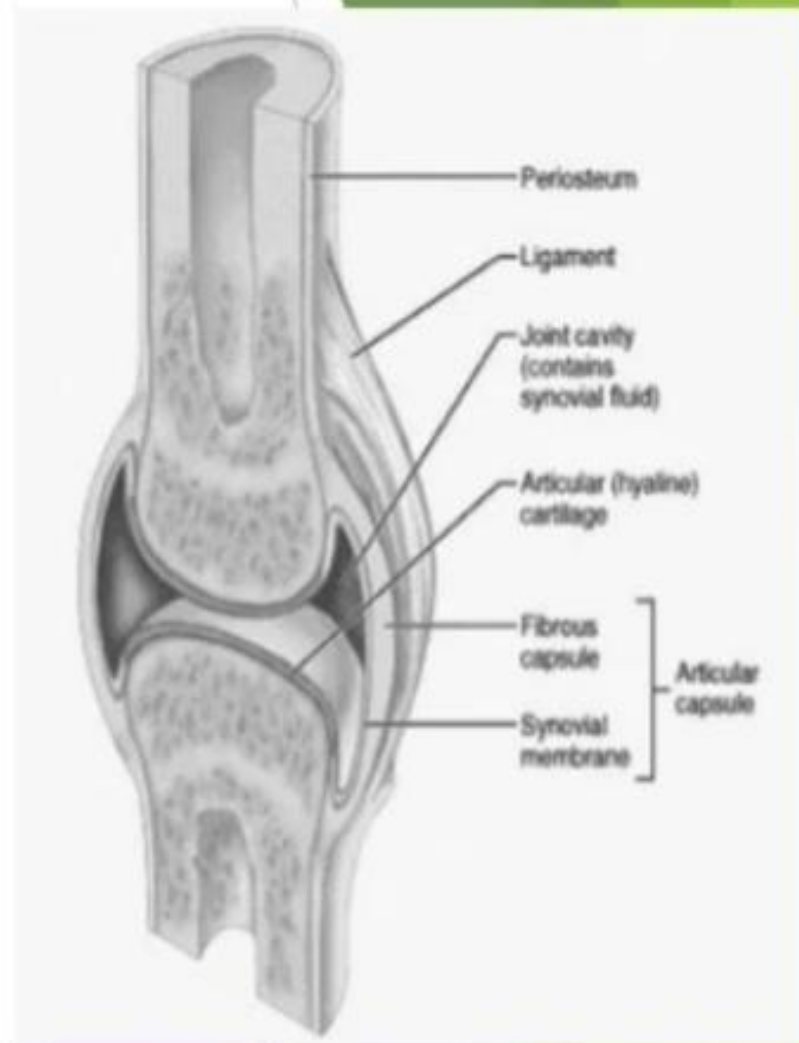
SYNOVIAL JOINTS

- ▶ These joints possess a cavity and the articular ends of bones forming the joint are enclosed in a fibrous capsule. As a result they are separated by a narrow cavity, the articular cavity, which is filled with a fluid called synovial fluid.



Characteristic features

- ▶ The articular surfaces are covered by a thin plate of hyaline cartilage.
- ▶ The joint cavity is enveloped by an articular capsule which consists of outer fibrous capsule and inner synovial membrane.
- ▶ The cavity of joint is lined everywhere by synovial membrane except over articular cartilages.
- ▶ The cavity is filled with synovial fluid secreted by synovial membrane which provides nutrition to articular cartilage and lubrication of articular surfaces.
- ▶ Some joint cavity completely or incompletely divided by articular disc/ menisc.

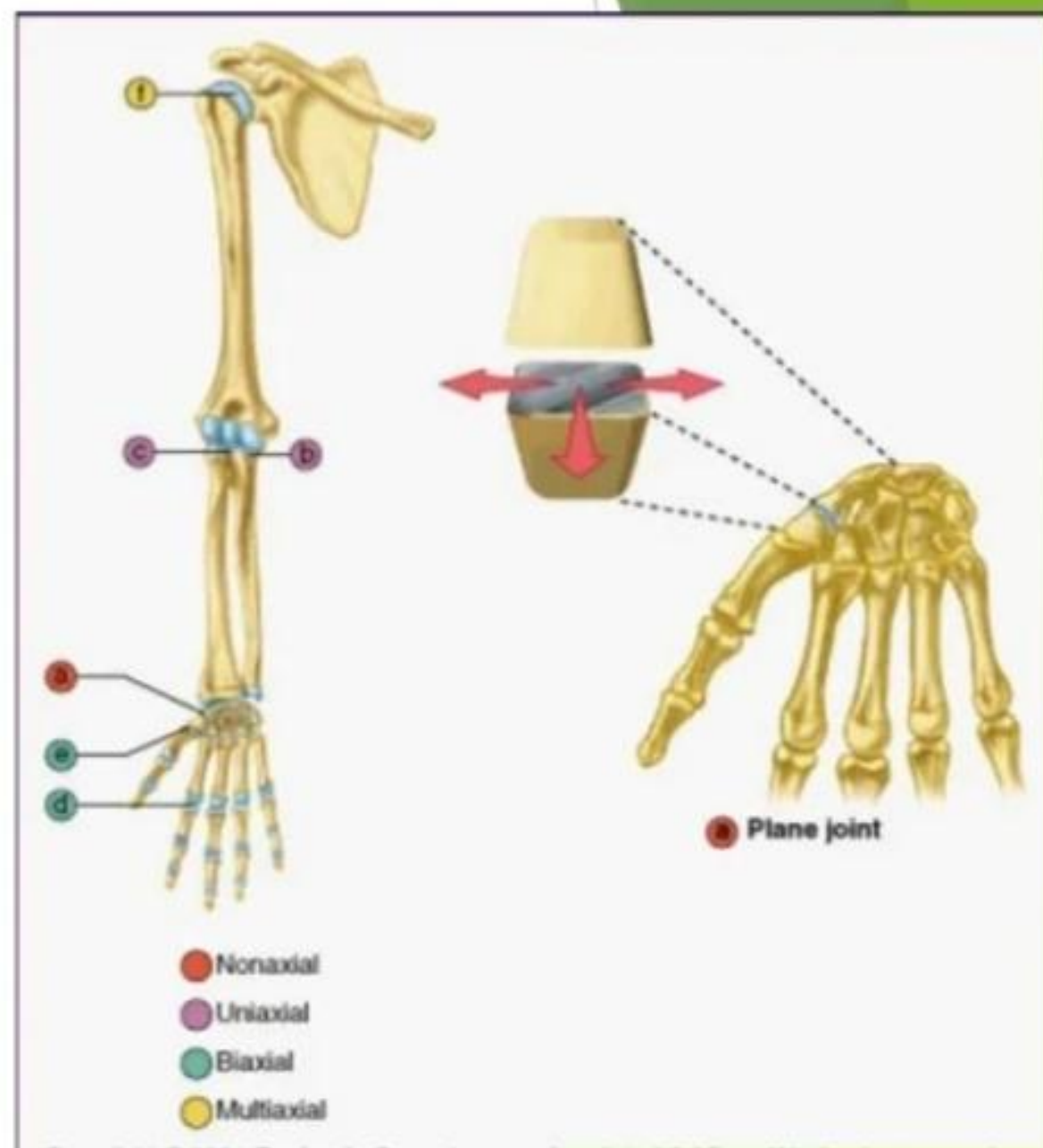


Types of synovial joints

- ▶ Plane Joint
- ▶ Hinge Joint
- ▶ Pivot Joint
- ▶ Condylar Joint
- ▶ Ellipsoid joint
- ▶ Saddle Joint
- ▶ Ball-and-Socket Joint

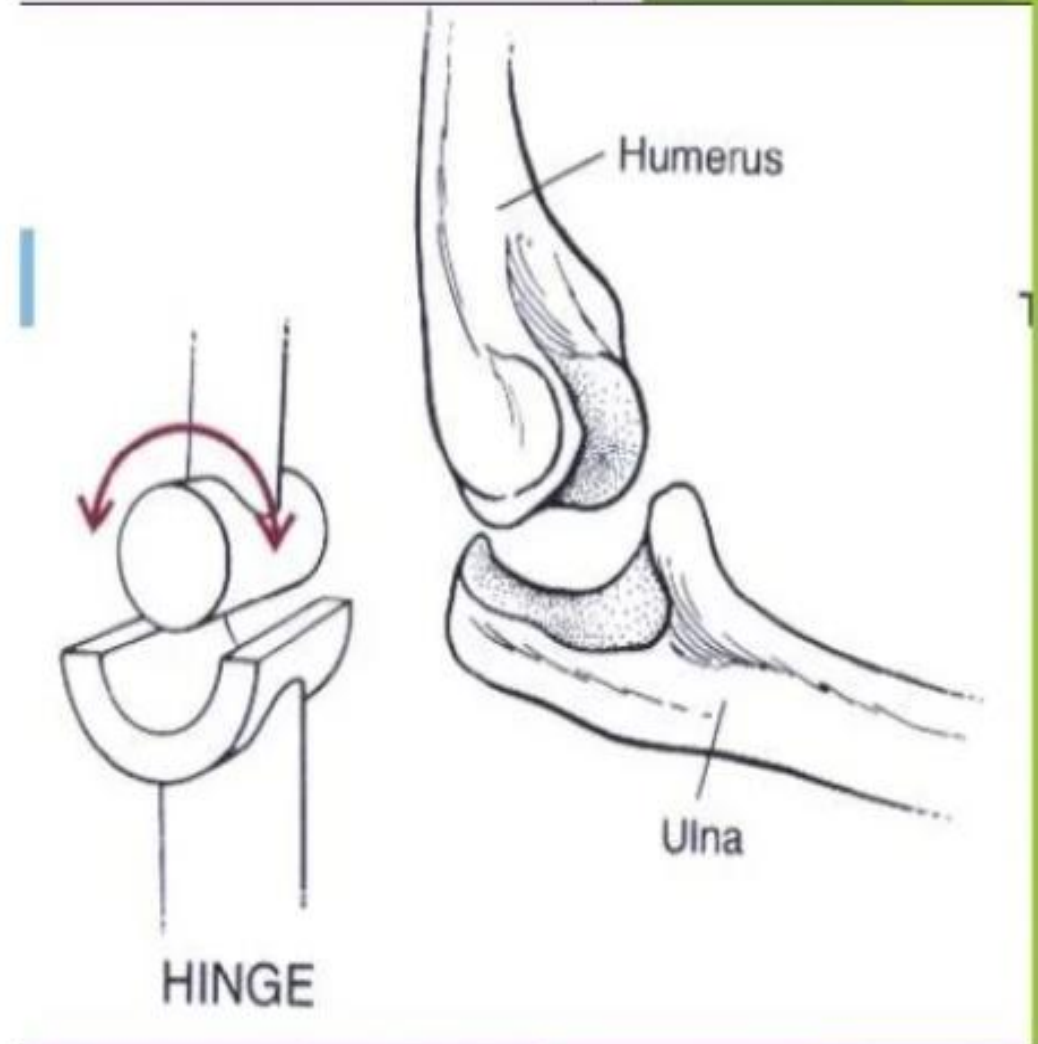
Plane Joint

- ▶ Articular surfaces are more or less flat.
- ▶ They permit gliding movements in various directions.
- ▶ Examples; intercarpal joints, intertarsal joints, jts between articular process of adjacent vertebrae.



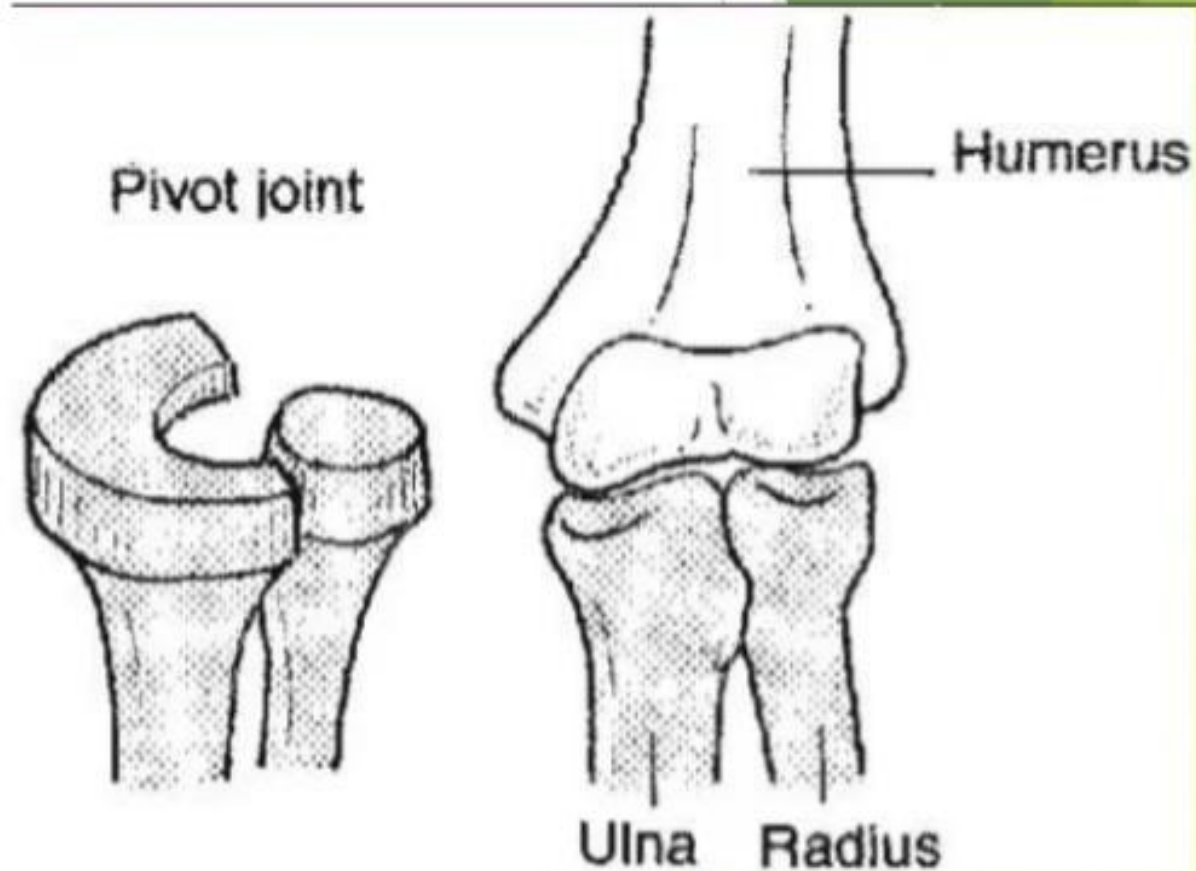
Hinge Joint

- ▶ Hinge Joint: the articular surface are pulley shaped. This type of joint permits movement in one plane around transverse axis. This movement consists of flexion and extension.
- ▶ These joints have strong collateral ligaments to prevent other movements. Two examples are the elbow joint, knee joint, interphalangeal joint ,ankle joint.



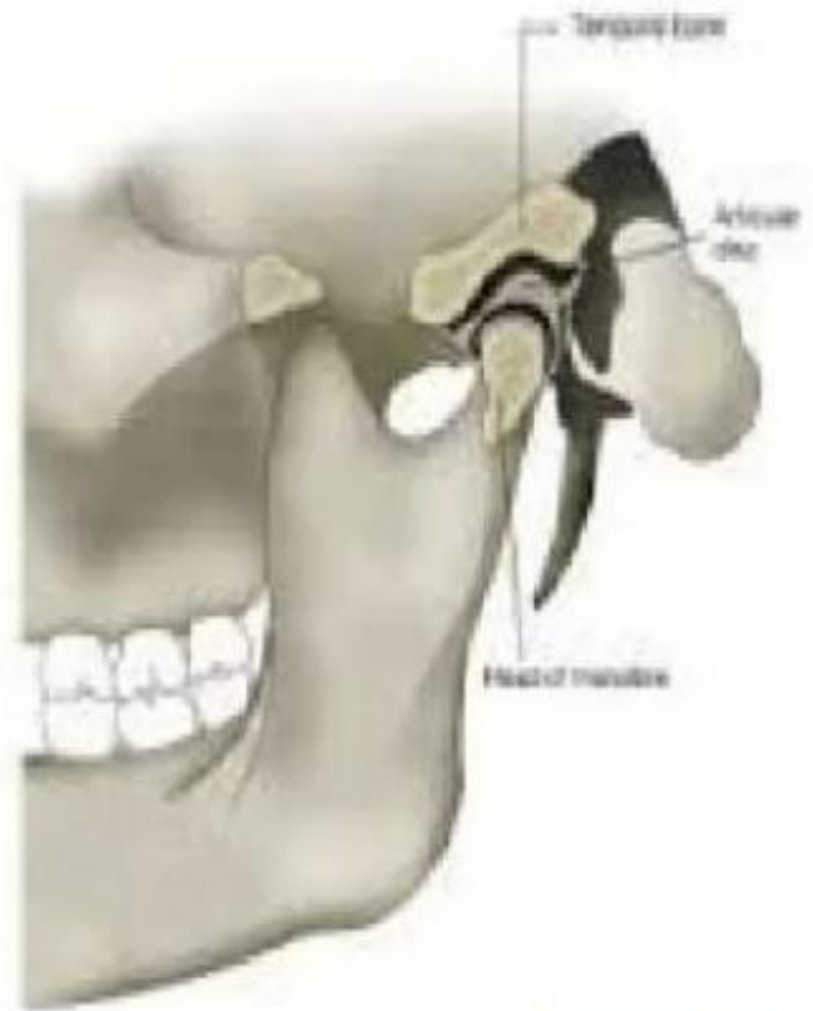
Pivot Joint

- ▶ The articular surface of one bone is rounded and fits into concavity of another bone. further, rounded part is surrounded by a ligamentous ring.
- ▶ Movement is limited to the rotation around a central axis.
- ▶ Examples of this type of joint are the joints between the proximal ends of the radius and ulna .atlanto axial joint.



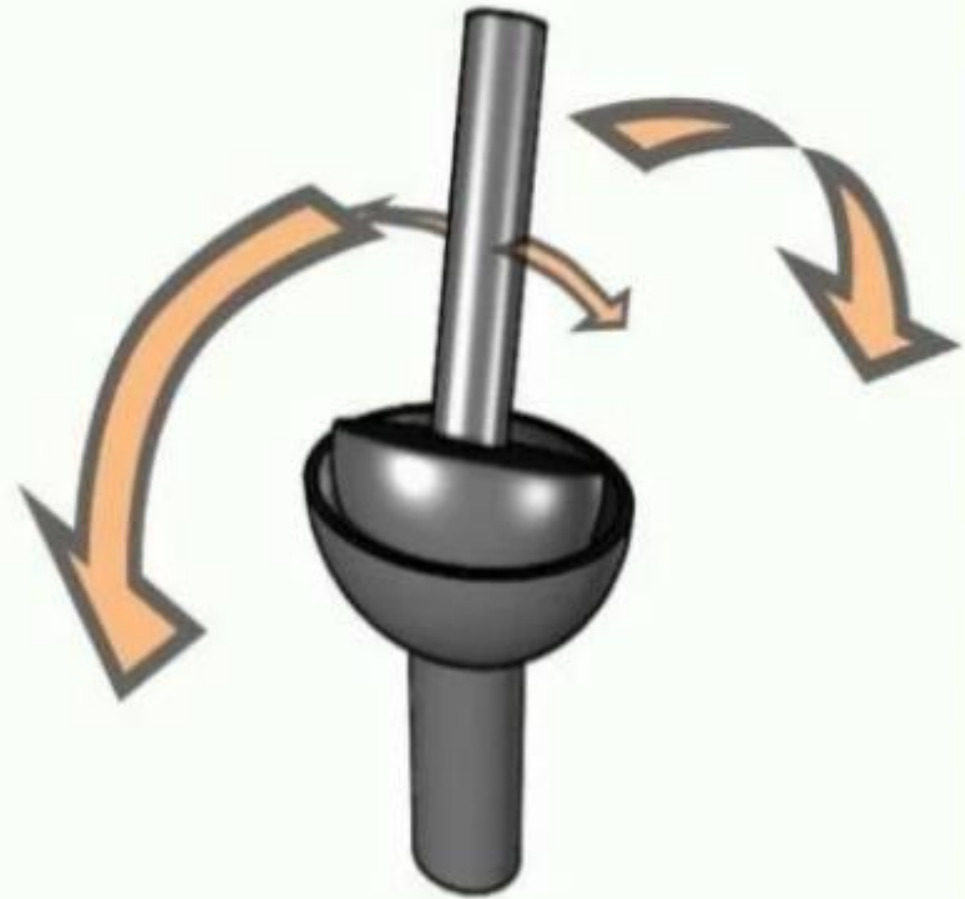
Condylar Joint

- ▶ The round articular surface of one bone fits into socket type articular surface of another bone.
- ▶ The end of bone bearing round articular surface is called condyle. these joint permit movements in 2 direction.
- ▶ Examples - right and left temporomandibular joints. knee joint



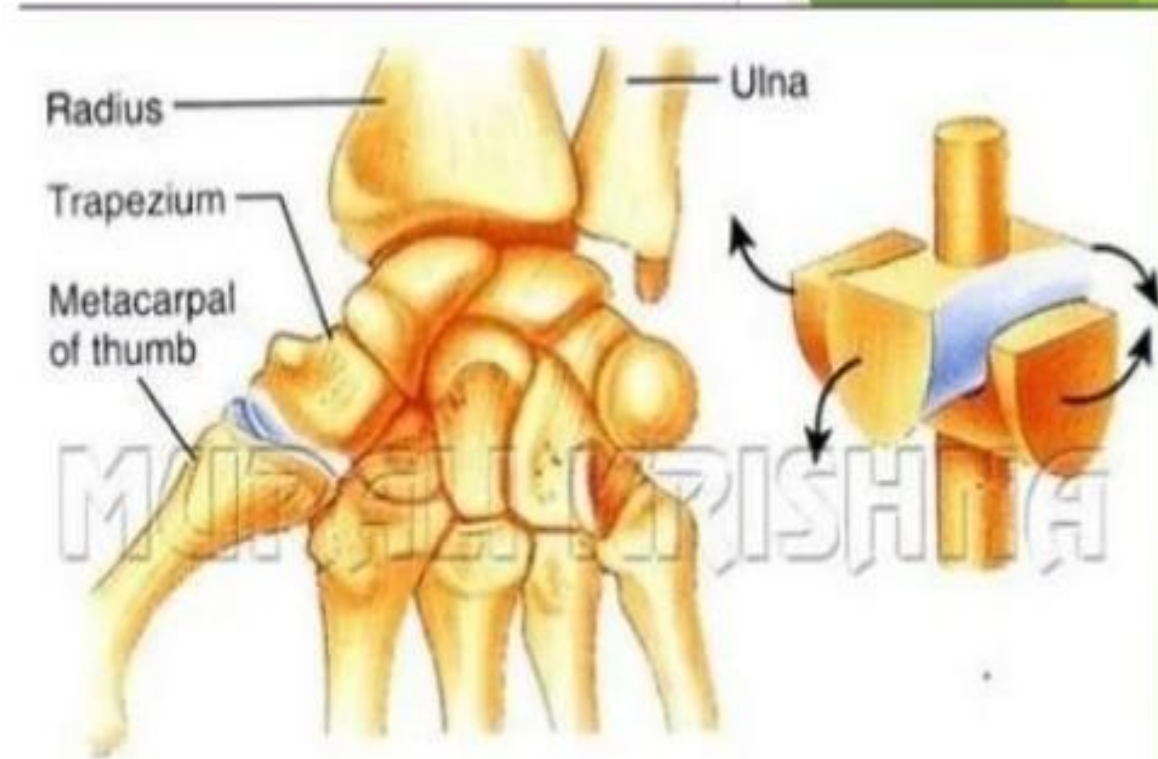
Ellipsoid joint

- ▶ Elliptical convex surface of one bone articulates with elliptical concave surface of another bone.
- ▶ The movements are permitted in two directions.
- ▶ Eg; wrist joint , atlanto occipital joint,metacarpo phalangeal joints,metatarso phalangeal joint



Saddle Joint

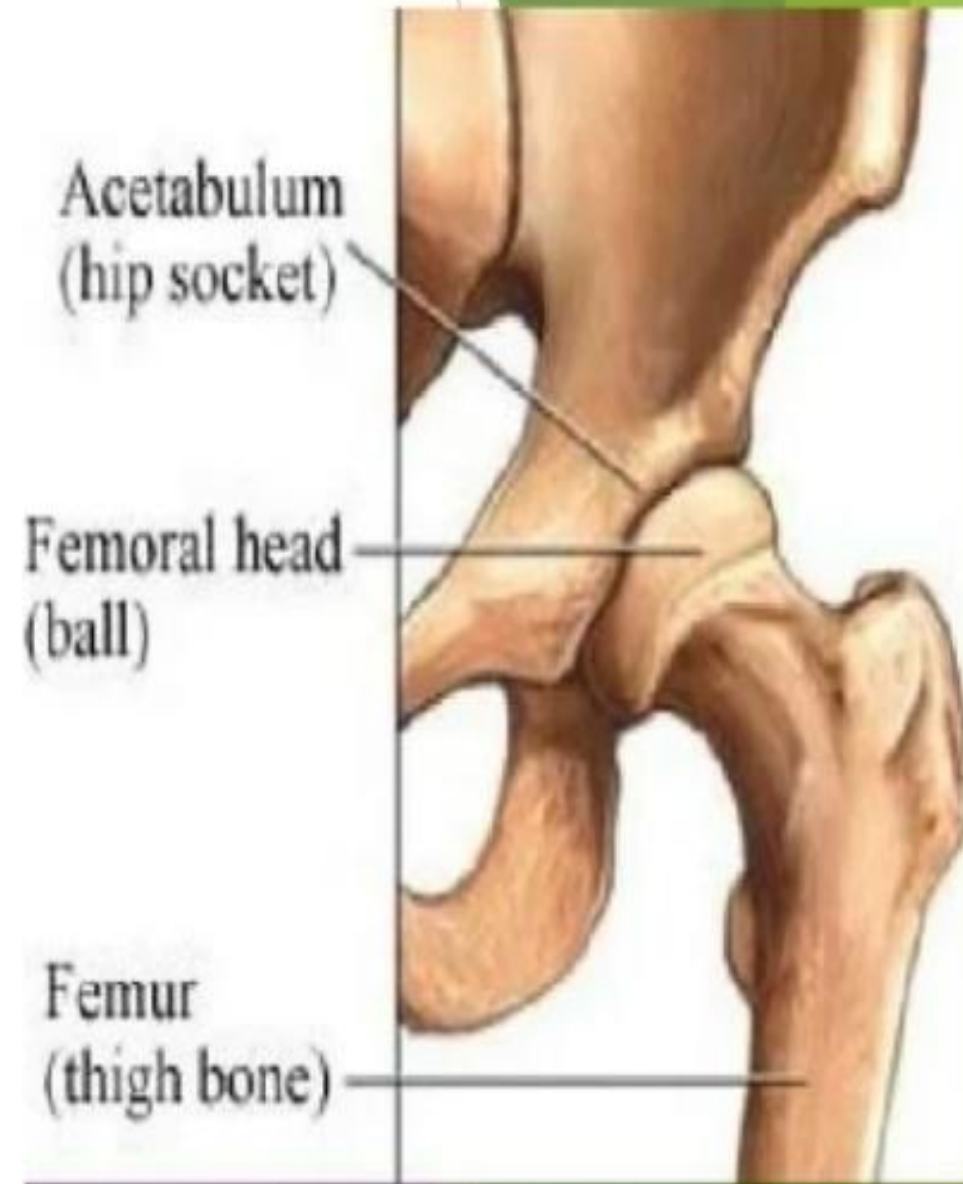
- ▶ Saddle Joint: The articular surfaces are reciprocally saddle shaped i.e. concavo-convex. This unique articulation is modified condyloid joint that allows a wide range of movement.
- ▶ An example would be the joint between the trapezium and the metacarpal bones of the thumb, sternoclavicular joint.



Saddle joint between trapezium of carpus (wrist) and metacarpal of thumb

Ball-and-Socket Joint

- ▶ Ball-and-Socket Joint: consists of a bone with a ball-shaped head that attaches with the cup-shaped cavity of another bone.
- ▶ This type of joint allows for a wider range of motion than any other kind.
- ▶ It permits movement in all planes, and a rotational movement around a central axis.
- ▶ Two examples of this type of joint would be the hip, shoulder joints and incudostapedial joint.

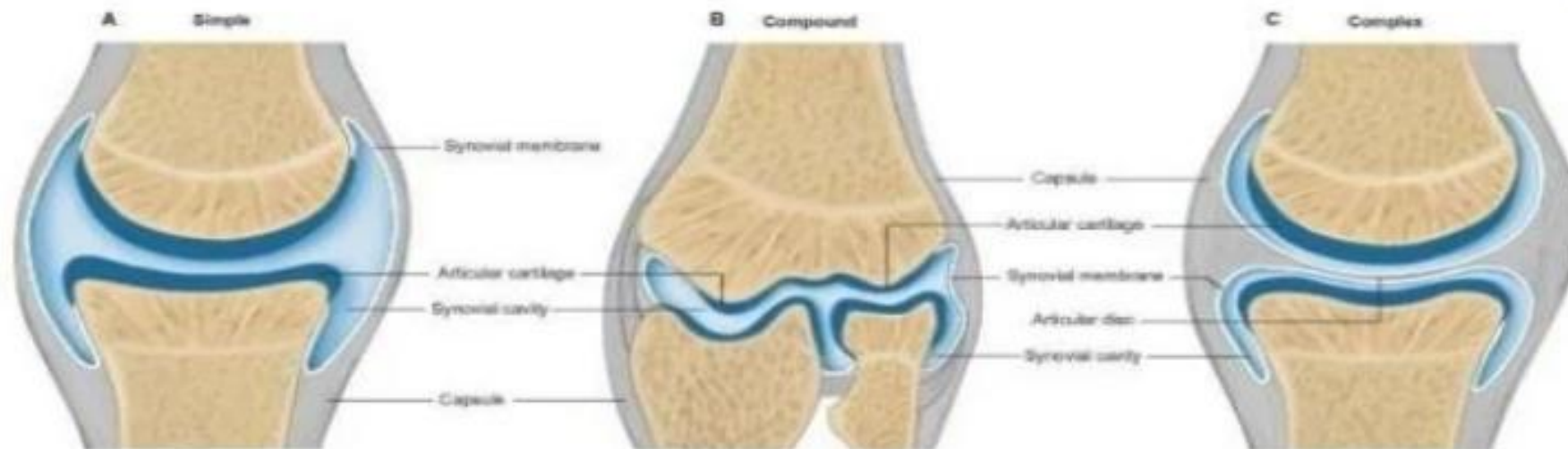


FUNCTIONAL CLASSIFICATION

- ▶ **Synarthrosis** :- Synarthroses permit little or no mobility. Most synarthrosis joints are fibrous joints. Eg: cranial sutures in adult.
- ▶ **Amphiarthrosis** :- Amphiarthroses permit slight mobility. The two bone surfaces at the joint are both covered in hyaline cartilage and joined by strands of fibrocartilage. eg: secondary cartilaginous joints
- ▶ **Diarthrosis** :- Permit a variety of movements. Only synovial joints are diarthrodial.

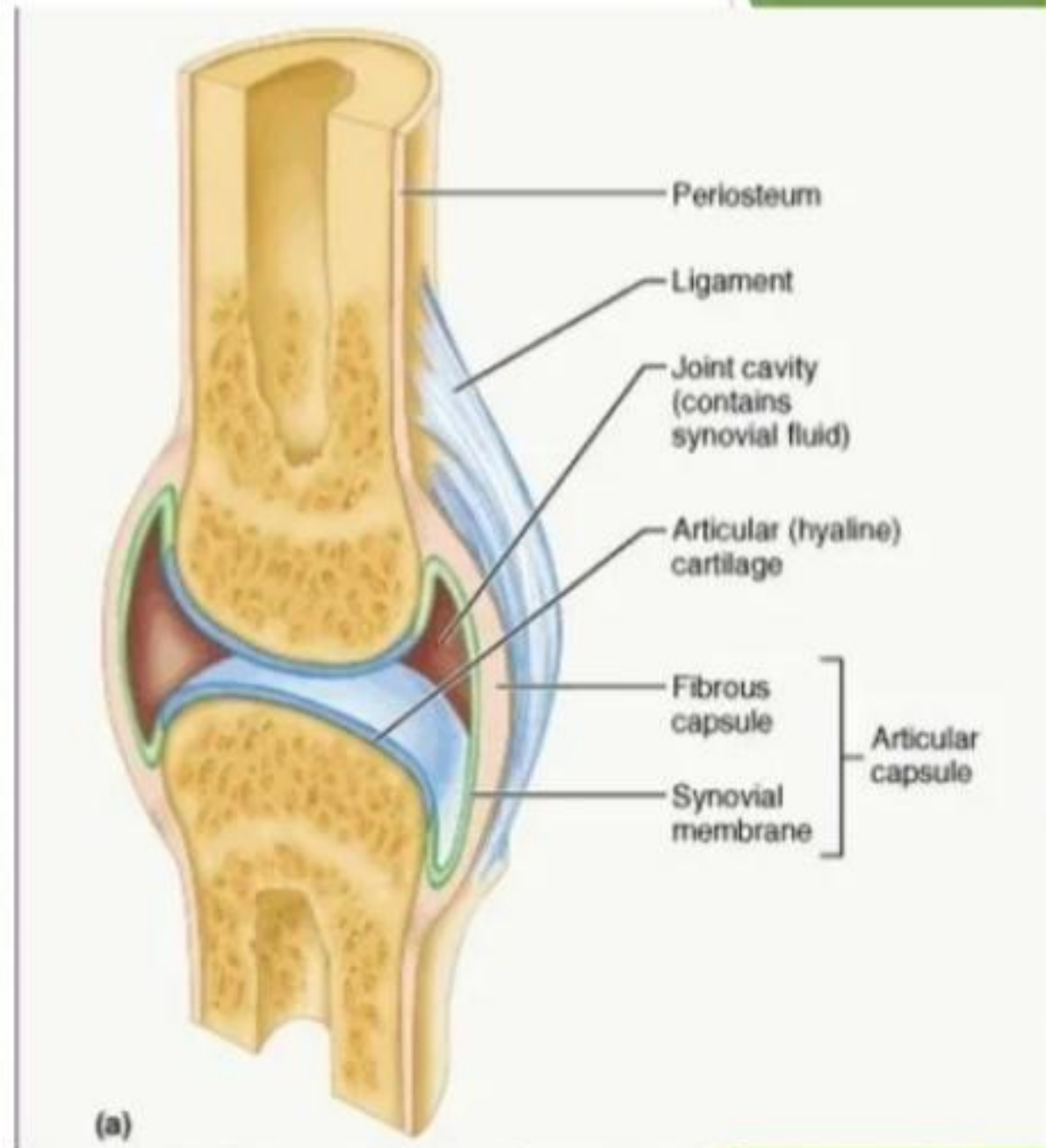
Classification According to number of articulating bones

- ▶ Simple Joint: 2 articulation surfaces (eg. shoulder joint, hip joint)
- ▶ Compound Joint: 3 or more articulation surfaces (eg. radiocarpal joint)
- ▶ Complex Joint: 3 or more articulation surfaces and an articular disc or meniscus (eg . knee joint)



PARTS OF A JOINTS

- ▶ A). fibrous Capsule
- ▶ B). Reinforcing Ligaments
- ▶ C). Synovial membrane
- ▶ D). Articular Cartilage
- ▶ E). Articular Discs
- ▶ F). Fatty Pads
- ▶ G). Bursae Flattened sacs that contain synovial fluid. Function to reduce friction



Thank
You...!