

## CLASSIFICATION OF JOINTS

Joint is an articulation or place where two adjacent bone or cartilage meet or joined with each other.

### Classification of joints

1. On the basis of structure
2. On the basis of extent of their function (degree of movement)

### Classification of joints on the basis of structure:

This classification is based on the presence or absence of joint cavity and kinds of supporting tissue that binds two bones together.

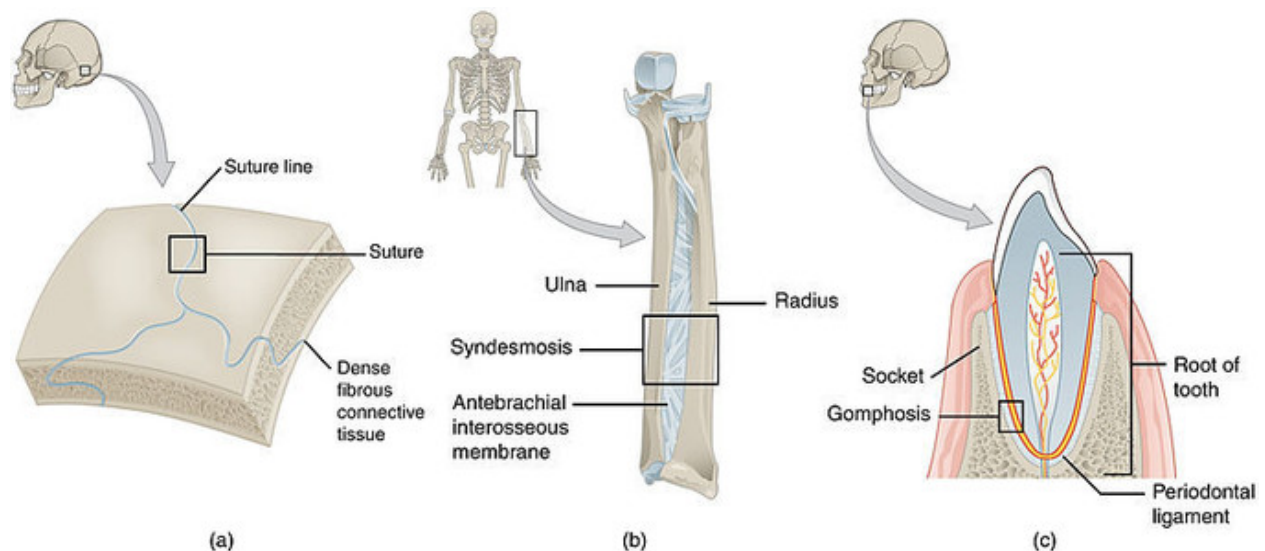
#### I. Fibrous joint

#### II. Cartilaginous joint

#### III. Synovial joint

#### I. Fibrous joint:

- Fibrous joint lacks joint cavity.
- Two bones are joined together by fibrous connective tissue.
- Fibrous joints are joined together tightly so they are generally immobile in adults although some allows slight movement.



#### Types of fibrous joints

1. Suture:
2. Syndesmosis
3. Gomphosis

#### 1. Suture:

- A suture is a tight union between two or more bones in a skull of adult.
- They are rarely movable.
- Example; sagittal suture, squamosal suture, lambdoidal suture and coronal suture

#### 2. Syndesmosis:

- In this joints, bones are close together but not touching each other

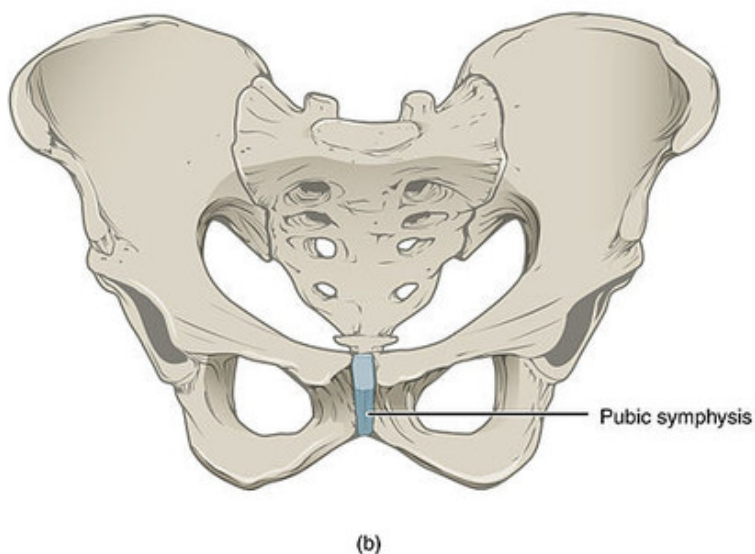
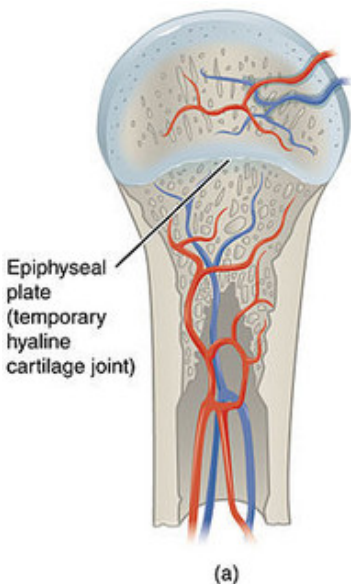
- Bones are held together by collagen fibers
- Examples; inferior Tibio-fibula joint, Radius-ulna joint

### 3. Gomphosis:

- It is fibrous joint made up of peg and socket.
- Example; the root of each teeth is anchored into its socket by fibrous ligament.

## II. Cartilaginous joints:

- In cartilaginous joints, bones are united together by a plate of hyaline cartilage.
- Cartilaginous joints lack joint cavity
- They are slightly movable or immobile



### Types of cartilaginous joints:

- Synchondrosis
- Symphysis

#### 1. Synchondrosis:

- It is primary cartilaginous joint.
- Synchondrosis is a temporary joint, composed of epiphyseal plate made up of hyaline cartilage that joints epiphysis and diaphysis.
- The chief function of synchondrosis is to permit growth of bone but not movement.
- A synchondrosis is eventually replaced by bone when large bone stops growth. However few synchondrosis are still present in adults.
- Example; sternoclavicular joint

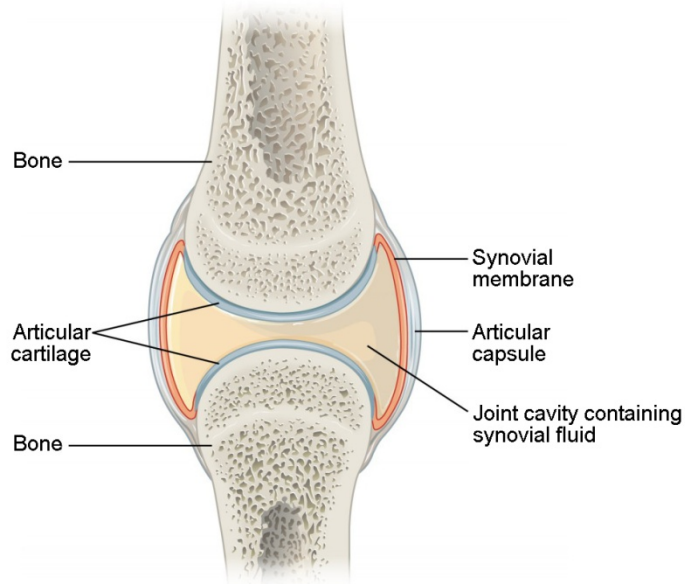
#### 2. Symphysis:

- In this joint, two bones are covered by thin layer of hyaline cartilage.
- There is presence of a disk of fibro-cartilage between two bones that acts as shock absorber.
- Example; pubis symphysis

## III. Synovial joints:

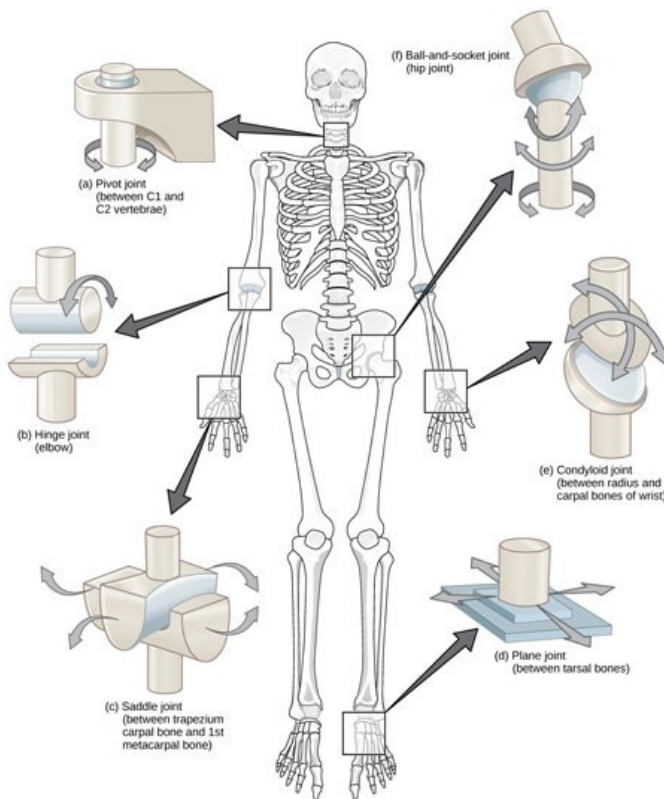
- Most of the permanent joints of body is synovial joint
- All of the synovial joints allow greatest range of movement.
- Movement is possible because, the end of bone at articulation is covered with smooth hyaline cartilage and joint is lubricated by thick fluid called synovial fluid.

- The joint is covered by flexible articular capsule



### Types of synovial joints;

1. Hinge joint
2. Pivot joint
3. Condyloid joint
4. Gliding joint
5. Saddle joint
6. Ball and Socket joint



### 1. **Hinge joint:**

- Hinge joint roughly resembles the hinge on the lid of a box.
- The movement of hinge joint is uniaxial.
- The convex surface of one bone fits on concave surface of other bone to permit uniaxial movement.
- Example; Knee joint, Elbow joint, Ankle joint

### 2. **Pivot joint:**

- Pivot joint is composed of a central bony pivot surrounded by a collar made partly of bone and partly of ligament.
- The movement of pivot joint is uniaxial and is able to rotate around a central axis.
- Example; Atlantoaxial joint between atlas and axis.

### 3. **Condyloid joint:**

- Condyloid joints are modification of ball and socket joint.
- The movement of condyloid joint is biaxial, because of ligament and muscles.
- Example; Metacarpophalangeal joint of fingers (except Thumb)

### 4. **Gliding joint:**

- Gliding joints are always small and formed by flat articular surface so that one bone slides on another bone.
- The movement of gliding joint is multiaxial
- Examples; Articular process of Vertebrae, Clavicular joint

### 5. **Saddle joint:**

- The saddle joint is so named because both the bones at articulation are shaped like saddle
- Bones have both concave and convex area at right angle to each other.
- Examples; Carpometacarpal joint of thumb.

### 6. **Ball and Socket joint:**

- Ball and socket joint is composed of globe like head of one bone that fits into a cup like cavity on another bone.
- It is the most freely movable joint of all joints.
- The movement of ball and socket joint is multiaxial.
- Examples; shoulder and hip joints.

## Classification of joints on the basis of degree of movement

1. **Immobile joint ( Synarthrosis):** examples; suture of skull, syndesmosis, gomphosis, synchondrosis
2. **Slightly movable joint ( Amphi-arthritis):** examples; symphysis
3. **Freely movable joint ( Diarthrosis):** examples; Synovial joints

| <b>Movement</b> | <b>Description</b>  |
|-----------------|---|
| <b>Gliding</b>  | Movement of relatively flat bone surfaces back-and-forth and side-to-side over one another; little change in the angle between the bones. |
| <b>Angular</b>  | Increase or decrease in the angle between the bones.  |
| <i>Flexion</i>  | Decrease in the angle between articulating bones, usually in the sagittal plane.  |

| <b>Movement</b>        | <b>Description</b>  |
|------------------------|---|
| <i>Lateral flexion</i> | Movement of trunk in the frontal plane.   |
| <i>Extension</i>       | Increase in the angle between articulating bones, usually in the sagittal plane.                                      |
| <i>Hyperextension</i>  | Extension beyond the anatomical position.   |
| <i>Abduction</i>       | Movement of a bone away from the midline, usually in the frontal plane.   |
| <i>Adduction</i>       | Movement of a bone toward the midline, usually in the frontal plane.  |
| <i>Circumduction</i>   | Flexion, abduction, extension, and adduction in succession, in which the distal end of a body part moves in a circle. |
| <b>Rotation</b>        | Movement of a bone around its longitudinal axis; in the limbs, it may be medial or lateral.                           |
| <b>Special</b>         | Occurs at specific joints.  |
| <i>Elevation</i>       | Superior movement of a body part.   |
| <i>Depression</i>      | Inferior movement of a body part.   |
| <i>Protraction</i>     | Anterior movement of a body part in the transverse plane.   |
| <i>Retraction</i>      | Posterior movement of a body part in the transverse plane.  |
| <i>Inversion</i>       | Medial movement of the sole.  |
| <i>Eversion</i>        | Lateral movement of the sole.   |
| <i>Dorsiflexion</i>    | Bending the foot in the direction of the dorsum.  |
| <i>Plantar flexion</i> | Bending the foot in the direction of the plantar surface.   |
| <i>Supination</i>      | Movement of the forearm that turns the palm anteriorly.   |
| <i>Pronation</i>       | Movement of the forearm that turns the palm posteriorly.  |
| <i>Opposition</i>      | Movement of the thumb across the palm to touch fingertips on the same hand.   |

## JOINT DISORDERS

### OSTEOARTHRITIS

**Osteoarthritis** is a degenerative disease that worsens over time, often resulting in chronic pain. Joint pain and stiffness can become severe enough to make daily tasks difficult. Depression and sleep disturbances can result from the pain and disability of **osteoarthritis**.

### SYMPTOMS

1. **Pain.** Affected joints might hurt during or after movement.
2. **Stiffness.** Joint stiffness might be most noticeable upon awakening or after being inactive.
3. **Tenderness.** Your joint might feel tender when you apply light pressure to or near it.
4. **Loss of flexibility.** You might not be able to move your joint through its full range of motion.
5. **Grating sensation.** You might feel a grating sensation when you use the joint, and you might hear popping or crackling.
6. **Bone spurs.** These extra bits of bone, which feel like hard lumps, can form around the affected joint.
7. **Swelling.** This might be caused by soft tissue inflammation around the joint.

### RHEUMATOID ARTHRITIS.

Rheumatoid arthritis is an auto-immune condition affect the lining of the joints. Cells of the immune system that normally don't belong in the joints accumulate there in large numbers, Fox says. As the immune cells interact with the local joint cells there is eventual damage and destruction of cartilage and bone.

### SPONDYLOARTHRITIS.

It is also known as spondylitis, this umbrella term covers certain other rheumatoid diseases.

#### Spondyloarthritis symptoms

The main symptoms of spondyloarthritis are pain, stiffness, and swelling

It may spread to the chest and neck. Tendons and ligaments may also be involved. In rare cases, AS will impact the heart and lungs.

#### Types of Spondyloarthritis

1. **Enteropathic arthritis** may cause pain in the spine, arms, and leg joints. It may also cause bloody diarrhea and abdominal pain due to inflammatory bowel disease.
2. **Juvenile arthritis** often causes pain in the pelvis, hips, ankles, and knees. The condition may also cause fatigue.
3. **Reactive arthritis** may cause inflammation in the urinary tract, the joints, and the eyes. It can lead to inflammation of the spinal joints.

**Gout**

This type of arthritis most often affects the joint connecting the big toe to the rest of the foot. In gout, excess uric acid – a waste product in the blood – forms crystals in the joints. Gout flare-ups, which are extremely painful, frequently strike in the middle of the night. Men are more likely to have gout, although women become more vulnerable after menopause.