

## Unit 2 Lecture 7

### JOINTS OF THE SKELETAL SYSTEM

#### CLASSIFICATION OF JOINTS (Articulations between Bones)

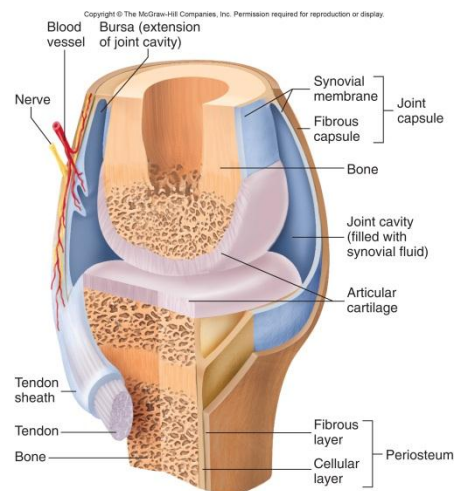
In **Fibrous** joints there is no joint cavity and the bones are held together by fibrous connective tissue; these joints are Immovable and are also known as **Synarthrosis**.

- **Sutures**: a fibrous joint, thin layer of dense fibrous connective tissue that unites the bones of the skull; becomes a synostosis in adult (by complete fusion of bones across joint).
- **Syndesmosis**: a fibrous joint that has more fibrous connective tissue (example is joint between distal articulation of tibia and fibula).
- **Gomphosis**: a cone shaped peg fits into a socket (roots of teeth).

Bones held together by cartilage in **cartilaginous** joints. These are slightly movable joint and are also called **Amphiarthrosis**.

- **Synchondrosis**: a cartilaginous joint in which the connecting joint is hyaline cartilage, this is only a temporary joint.
- **Symphysis**: a broad flat disc of fibrocartilage (outer area of intervertebral discs and pubic symphysis are examples).

In a **Synovial** joint, a synovial cavity is present. Bones forming joint are united by a surrounding articular capsule and frequently ligaments. Synovial joints are also known as **Diarthrosis** or freely movable joints. Many diarthroses also contain articular discs (menisci) and bursa. The factors that affect movement of diarthroses include its structure or shape of the articulating bones, which determines how they fit together, the strength and tension of the joint ligaments, the arrangement and tension of the muscles, the apposition of the soft parts may limit mobility (bent elbow) and the presence of hormones (relaxin).



#### Types of Synovial Joints

- **Ball-and-socket**: ball-like surface of one bone fits into cuplike depression of another bone, triaxial movement (hip and shoulder).
- **Hinge**: convex surface of one bone fits into the concave surface of another bone, monaxial movement (elbow and phalanges).
- **Saddle**: one bone is saddle shaped and other bone is shaped like legs of rider, metacarpal of thumb and carpal bone.

- Pivot: a rounded or pointed surface of one bone articulates within a ring of another, movement is rotation, (atlas-axis, proximal ends of radius and ulna).
- Planar or Gliding: side-to-side and back-and-forth movements (wrists and ankles).
- Condylod: oval shaped condyle of one bone fits into an elliptical cavity of another, biaxial movement, side-to-side and back-and-forth (between radius and carpals).

### Common movements of joints

- flexion: decrease in angle
- extension: increase in angle
- hyperextension: continuation of extension
- abduction: movement of a bone away from midline
- adduction: movement of a bone toward midline
- circumduction: combination of flexion-extension & abduction-adduction special movements at diarthroses.
- rotation: moving a part around an axis

### Special movements of joints

- elevation- depression: movement of part of the body upward/downward
- protraction-retraction: movement of mandible forward or backward
- inversion-eversion: movement of the sole of the foot inward/outward
- dorsiflexion-plantar flexion: bending of the foot upward/downward
- Supination - pronation: turns the palm of the hand anteriorly/superiorly or posteriorly/inferiorly

## Special Joints

The shoulder joint (humeroscapular joint) is formed by head of humerus and the glenoid cavity of scapula. It exhibits the most freedom of movement of all joints of the body. Most of the strength results from muscles surrounding joint (rotator cuff).

The elbow joint (humeroulnar joint) contains a hinge joint and a gliding joint.

The hip joint (coxal joint) is formed by head of femur and acetabulum. The fovea capitis is a pit in head of femur where a ligament attaches the femur and the coxal bone together.

The [knee joint](#) is the most complex joint and the largest joint of the body. It consists of two condylod joints and a gliding joint. The presence of menisci compensate for the irregular shapes of the articulating bones. Bursa are sacks of synovial fluid located at friction points.

## JOINT DISORDERS

A dislocation is a displacement of a bone from a joint with tearing of ligaments, tendons and articular cartilage. A sprain is the forcible wrenching or twisting of a joint with partial rupture or other injury to its ligaments without dislocation whereas a strain is the overstretching of the muscle around a joint. Torn cartilage usually occurs in the knee. Bursitis can be either acute or chronic inflammation of the bursa caused by repeated, excessive exertion of a joint or by trauma, infection or rheumatoid arthritis.

Arthritis is inflammation of one or more joints. Rheumatoid arthritis is an autoimmune disease where the synovial membrane becomes inflamed and thickened, fibrous tissue infiltrates further restricting movement, and in time joints may ossify. Osteoarthritis is the most common type of arthritis that usually occurs with aging. The articular cartilage softens and disintegrates, roughing the articular surfaces. Lyme arthritis is caused by a bacteria *Borrelia burgdorferi*, which is transmitted by the deer tick. In Gout arthritis, uric acid crystals are deposited in the joints.

### **Why is this chapter important?**

The joints of the skeletal system contribute to homeostasis by holding bones together in ways that allow for movement and flexibility. We explored the various classification schemes of joints and the types of joints that belonged to the different groups. The types of movements at synovial joints were described as well as angular movements. Also described were the some of the major joints of the body.