The Joint

Objective:
Know:
* Definition of joint
* Structural & functional classification of the joints
  * Features of synovial joint
  * Types of synovial joint

The Joint
Joint or articulation is the site where two or more bones come together. Joint is usually movable, but that is but many joints exhibit limited movement, and others are completely immovable.

Classification of joints:
1 - Functional classification, based on degree of movement:
   1. Synarthrosis----non-movable joint.
   2. Amphiarthrosis----slightly movable joint.
   3. Diarthrosis ----freely movable joint.

2 - Structural classification, based on the major connective tissue type that connect the bones together:

Fibrous joints; Consists of 2 bones united by fibrous tissue, exhibit little or no movement. It is subdivided into:
   a- Sutures --- the bones are closely adjacent, and firmly interlocking as in the flat bones of the skull.
b-Syndesmosis--- bone are separated by some distance and held together by ligaments. Little movement is possible as in distal tibiofibular joint.

c-Gomphosis----consists of pegs fitted into sockets and held in place by ligaments, as the joints between the teeth and the bone of the jaw.
Cartilaginous joints: the union of the bones by acartilage. Only slight movement can occur. It is of two types:

a- Synchondrosis (primary) The two bones united by a cartilages, only slight movement can occur, as in the cartilages between the first rib and maniburium sterni.

b- Symphysis (secondary); The bones are joined together by fibrocartilage, which allow a limited movement, as in joint between vertebral bodies and symphysis pubis.
Synovial joints: freely movable joints that contain synovial fluid in a cavity surrounding the end of articulating bones. Most joints that unit the appendicular skeleton are Synovial, this reflects the greater mobility of the appendicular skeleton compared to the axil skeleton.

**Features of synovial joints:**

1. The articular surface is covered by articular cartilages which provides a smooth surface.
2. Presence of joint cavity which is filled by Synovial fluid. This fluid is a complex mixture of polysaccharides, proteins fat, and cells, forming thin lubricating film covering the articular surface.
3. The cavity is enclosed by a joint capsule, which helps to hold bones together.
4. A portion of the capsule thickened to form a ligaments.
5. Synovial membrane lines the cavity except the articular cartilages. This membrane produces synovial fluid.
6. In some synovial joints the synovial membrane extend as a sac to form a bursa close to the joint filled with fluid and slippery inner surface presents between:
   * two bones
   * tendon and bone
   * Ligament and bone
   * muscle and bone
   * skin and bone. It acts to prevent friction between these structures during movement of the adjacent joint.
Types of synovial joints: The synovial joint classified according to the shape of the adjoining articular surface.

1-Gliding joints; two flat surfaces gliding on each other e.g. articular process between vertebrae, joints between intercarpal bone, joints between intertarsal bone.

2-Saddle joint; two saddle-shaped articulating surfaces oriented at a right angle on each other, e.g., is the joint between the carpal and metacarpal of thumb.
3-Hinge joint; at this joint the convexity of one bone applied on the concavity of the others in the elbow, knee joints.

4-Pivot joints; Cylindrical bony process rotates within a ring of bone and ligaments as in rotation of axis vertebra against the atlas when shaking the head, proximal radioulnar joint(head of radius rotates against the ulna).
5-Ball and socket joints; a head of one bone fits into socket of other bone as in shoulder and hip joint.

6-Ellipsoid or condyloid joints; are elongated ball and socket joint as in the joint between the occipital condyle of skull and atlas vertebra, metacarpal and phalanges.
Biomechanical classification

Joints can also be classified based on their anatomy into:

* Simple Joint: 2 articulation surfaces (e.g. shoulder & hip joints)
* Compound Joint: 3 or more articulation surfaces (e.g. Radio carpal joint)
* Complex Joint: 2 or more articulation surfaces and an articular disc or meniscus (e.g. Knee joint)