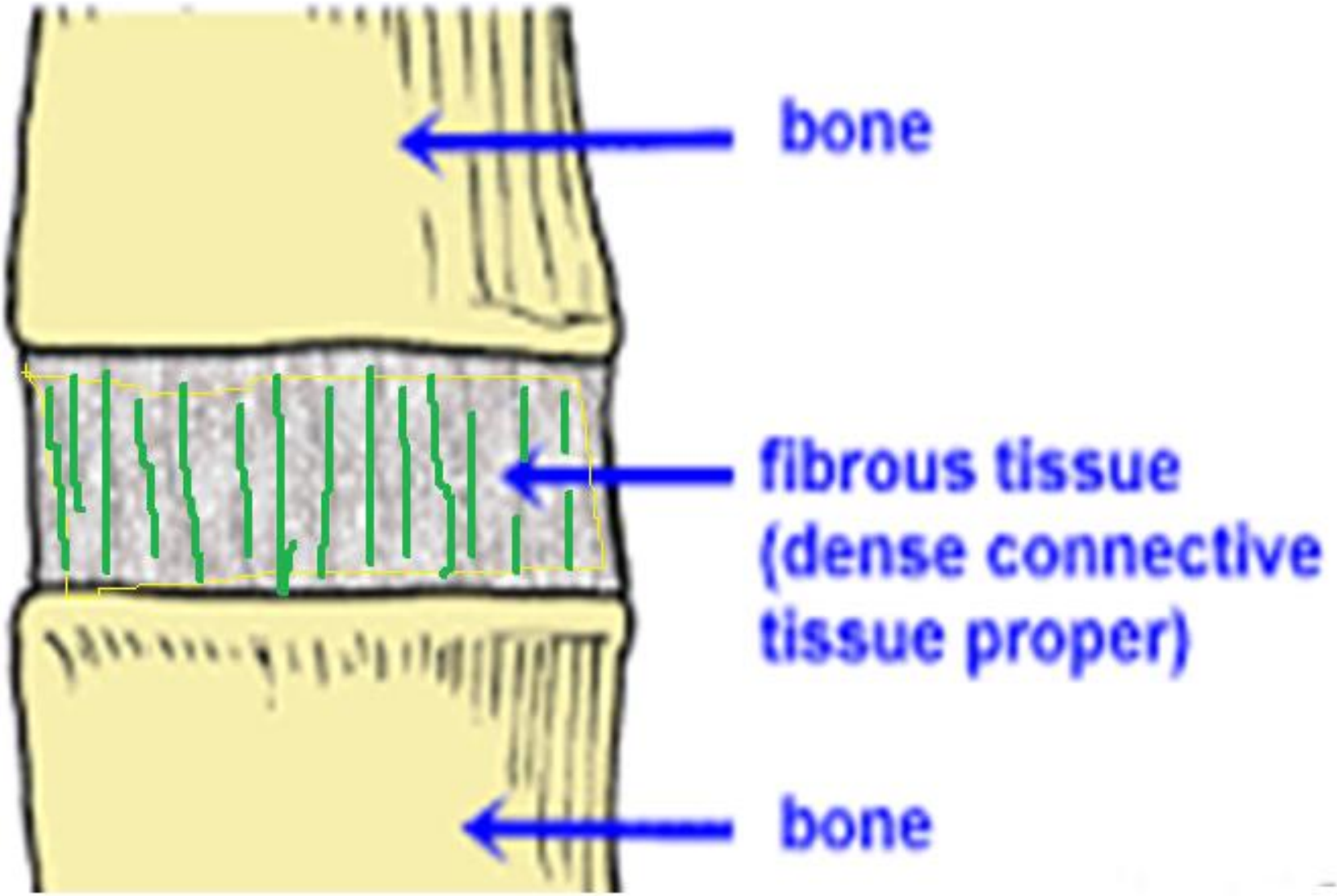

بسم الله الرحمن الرحيم


لا إله إلا الله محمد رسول الله


bone
fibrous tissue
(dense connective
tissue proper)
bone

JOINT

Definition:

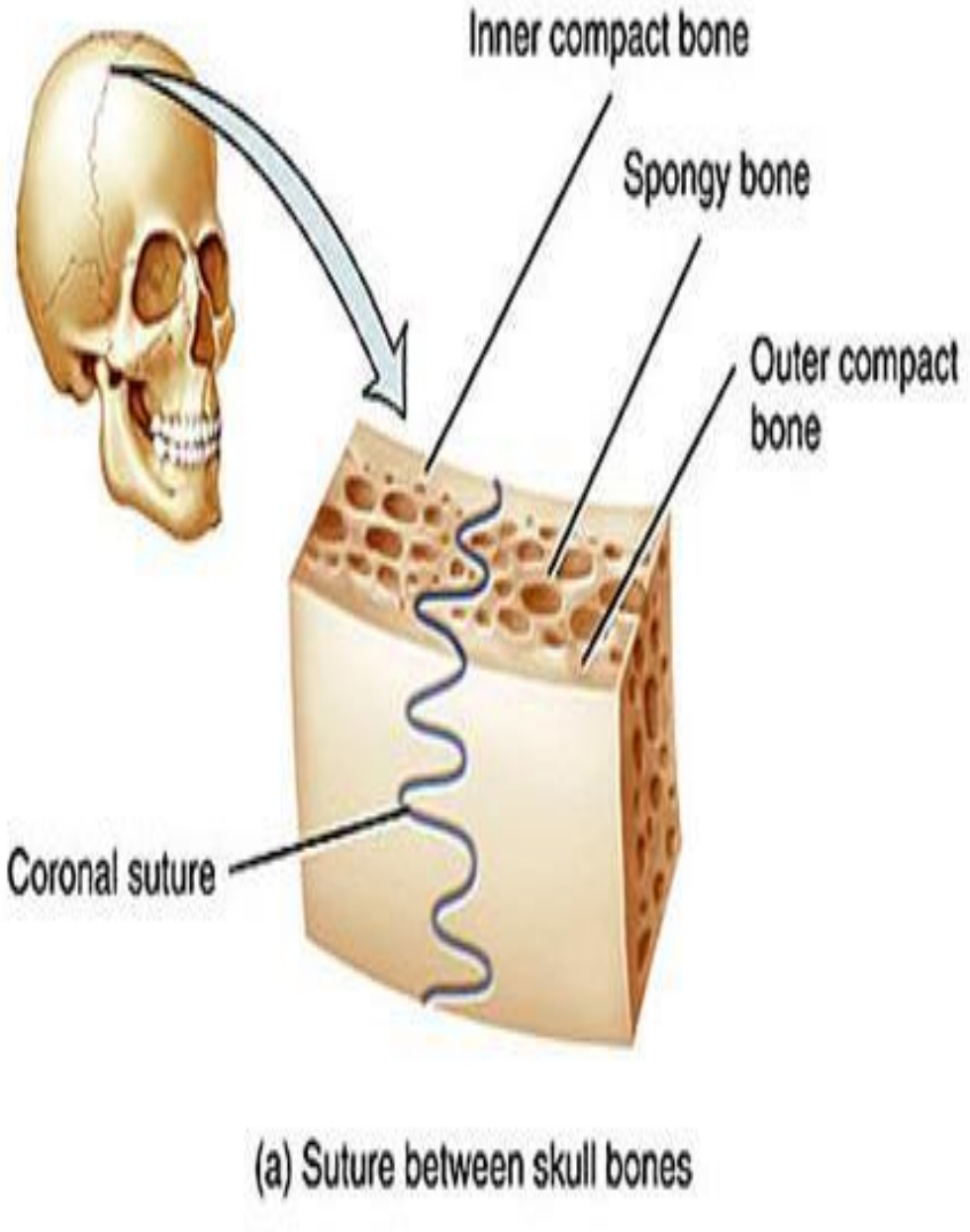
A joint is the site where two or more bones come together or a joint is the junction between two or more than two cartilages covering the related bones. It may be classified as fibrous, cartilaginous and synovial joints.

Fibrous Joints:

In case of fibrous joints the surfaces are simply joined of the fibrous tissue which has very little movements. The inferior tibiofibular joints and sutures of the vault of the skull are good examples of such joints. It is further subdivided into three types.

Sutures:

The suture has a very little fibrous tissue between the two bones. It is found in skull bones and helpful in baby delivery and brain growth. It ossify with time which is called synostosis .



The suture may be

(a) serrate suture (saw-like),

(b) dentate suture (tooth like),

(c) squamous suture (flat) and

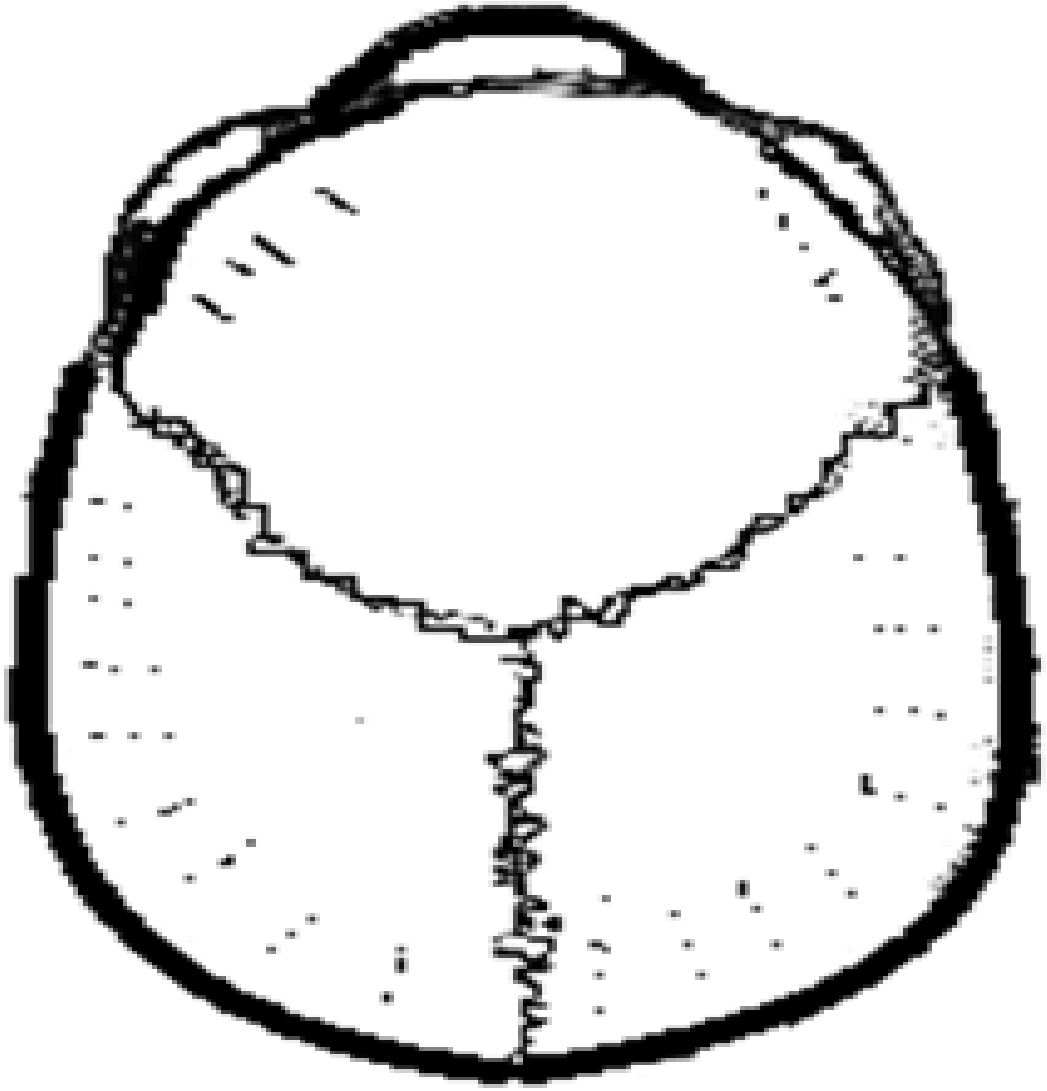
(d) plane suture depending on shape of these joints. These joints gradually ossify with increasing age and this process of ossification is called synostosis.

Syndesmosis: **A syndesmosis is defined as a fibrous joint in which two adjacent bones are joined by a strong ligament. In these slightly movable fibrous joint, bones such as the tibia and fibula are joined together by connective tissue. Example: Inferior tibiofibular joint.**

Gomphosis:

This is also called peg-and-socket joint in which small quantity of fibrous tissue holds the two bones together. The root of a tooth in alveolar its socket belongs to this variety of joint.

Sutures of skull bones

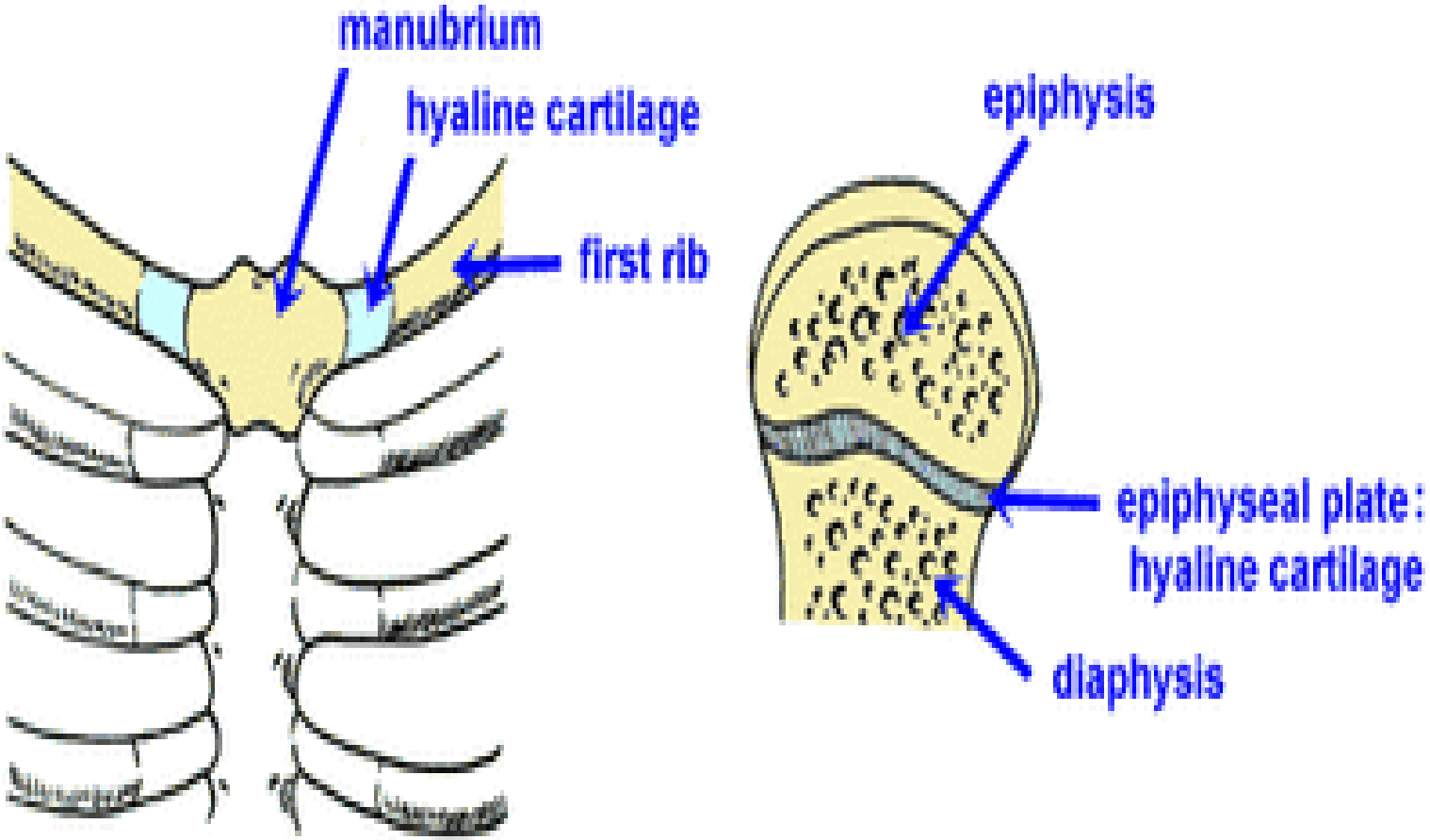


Cartilaginous Joints:

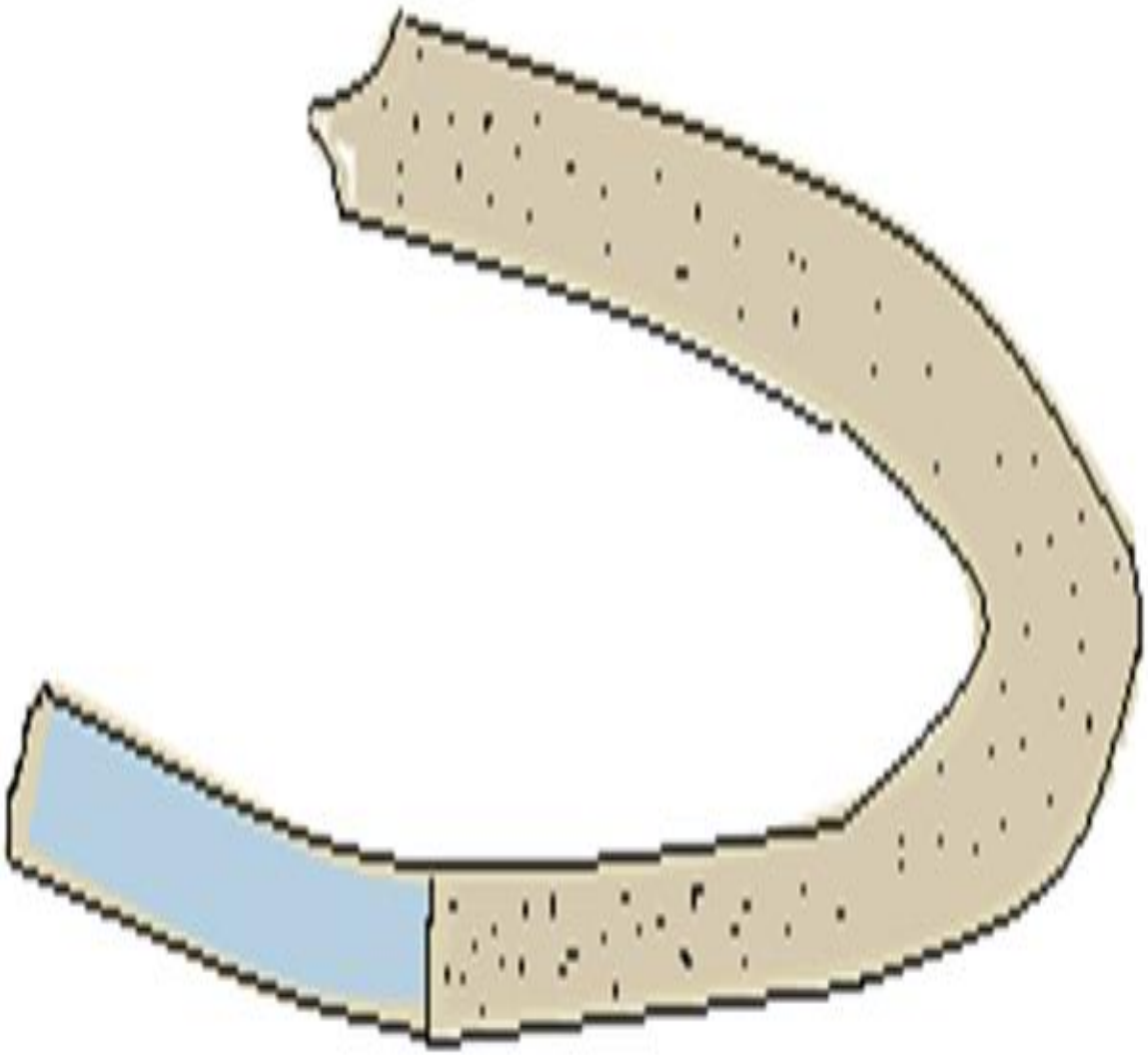
In case of cartilaginous joint two bones are connected to each other by a cartilage which are of two types, the primary cartilaginous joint and secondary cartilaginous joints.

The primary cartilaginous joint is one where bone and hyaline cartilage join together. No movement is possible in this type of joint.

Example: The posterior bony part of rib meeting the anterior cartilaginous part and similarly growth plate connecting epiphysis and diaphysis of bone are good examples of primary cartilaginous joint.


manubrium
hyaline cartilage
first rib
epiphysis
epiphyseal plate:
hyaline cartilage
diaphysis

Bony part of rib meeting the cartilaginous part

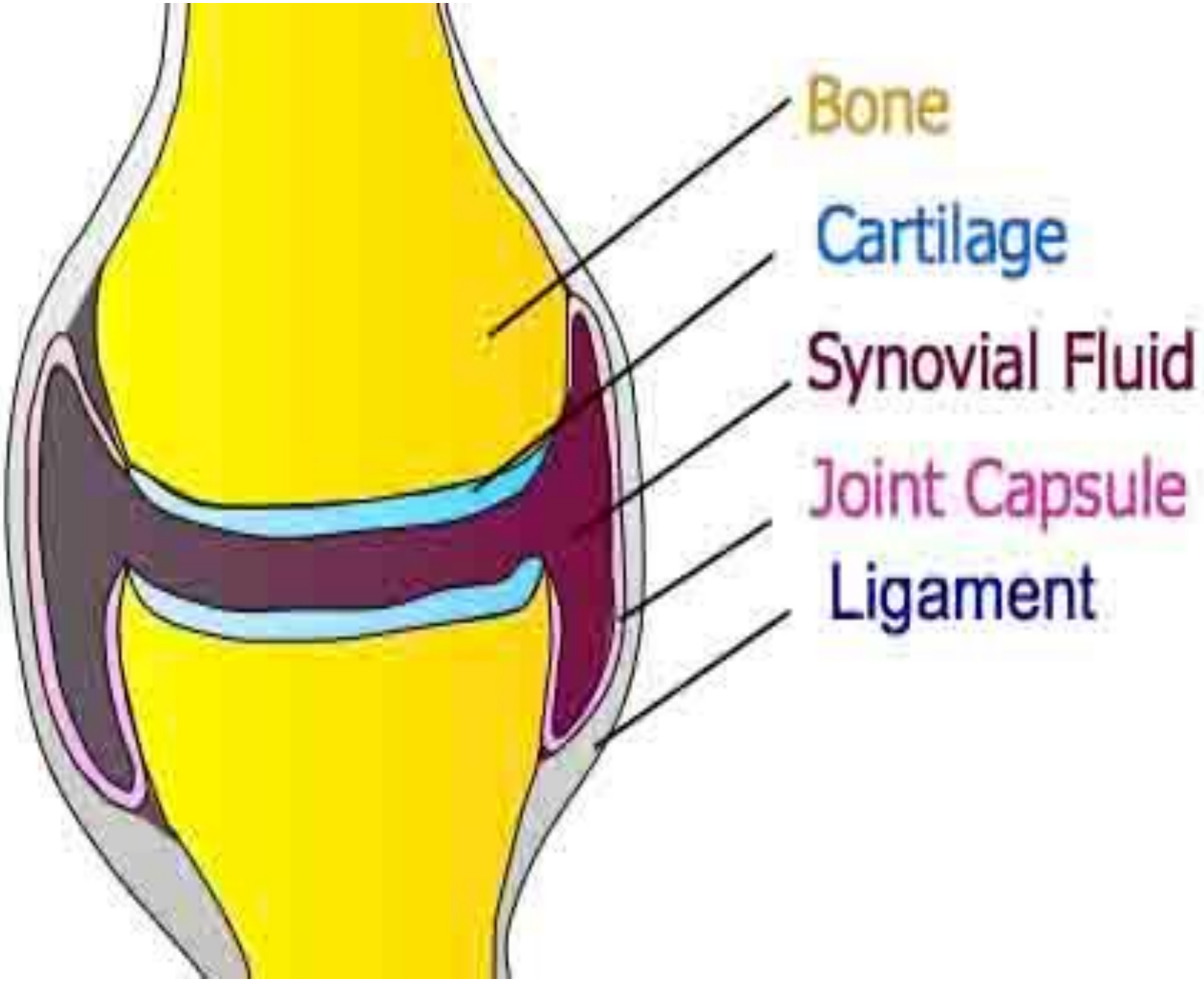


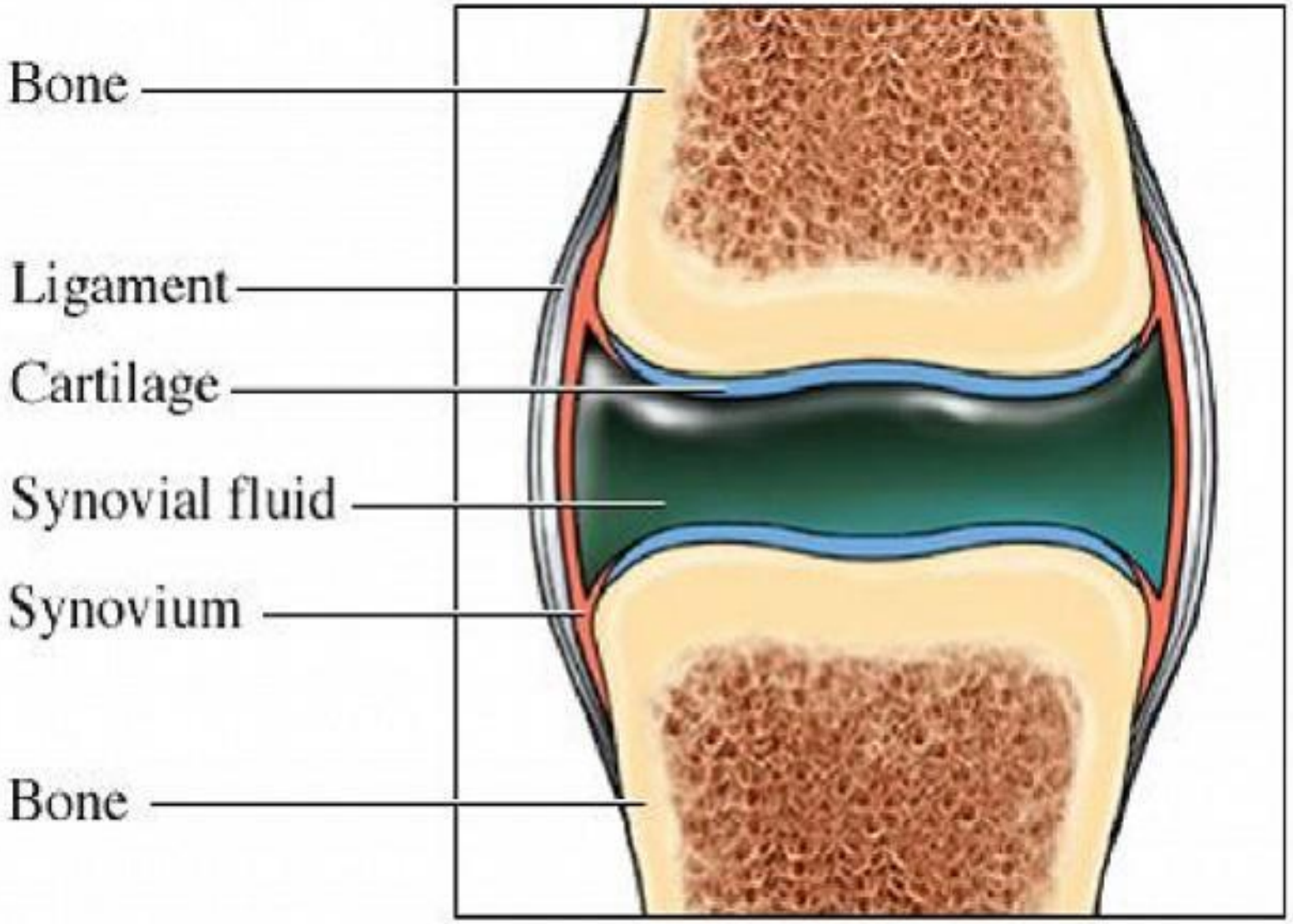
In case of secondary cartilaginous joint (Symphysis), the bones are united by a plate of fibrocartilage and the articular surface of the bones is covered by hyaline cartilage.

Examples: The symphysis pubis and joints between the vertebral bodies. In this type of joint a small amount of movement is possible. Most of secondary cartilaginous joints are permanent but a slow and gradual process of synostosis occurs in sacral and coccygeal segments of vertebral column.

Synovial joints:

A synovial joint is the most developed and therefore, the most mobile type of joint. Its articular surface is covered by hyaline cartilage. This is important to note that the joint cavity is lined by synovial membrane in such a way that it never lines or covers the articular cartilage. Synovial fluid is responsible for lubrication of synovial joint cavity. A tough fibrous tissue, the capsule covers the synovial membrane from outside.

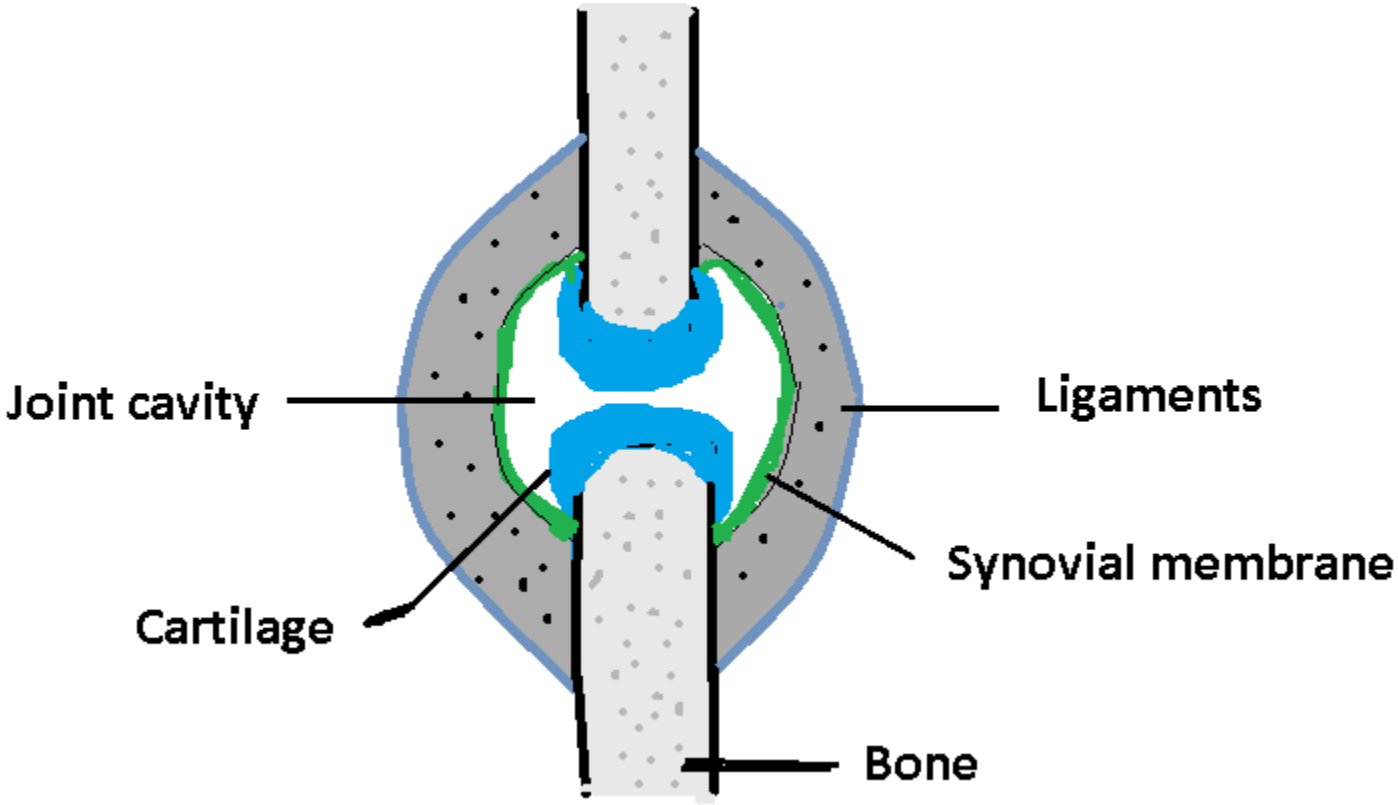

Bone
Cartilage
Synovial Fluid
Joint Capsule
Ligament



Cut-away view of a joint

The movement in a synovial joint depends on the shape of related bones and ligaments. The ligaments commonly lie outside the capsule. The capsule is sensitive to stretch and painful stimuli which can control the joint movements and avoid over stretching .

A typical synovial joint



Classification of synovial joint: The synovial joints are classified according to their shape of articular surface and the types of possible movements.

Plane Joint: Has flat or plane articular surfaces which allow the joint to have a sliding type of movement. Examples: Sternoclavicular and Acromioclavicular joint.

Ball-and-socket joints: These joints are also called spheroidal joints in which the ball-shaped head of one bone fits into a cup shaped socket of another bone. A wide range of movements are possible in this type of joint which includes, flexion, extension, abduction, adduction and both medial and lateral rotation along with circumduction. These are example:

(a)Shoulder joint,

(b) Hip joints

(c) Incudostapedial joint

(d) Talocalcaneonavicular joint.

Hinge Joints:

It resembles the hinge of a door, so that only flexion and extension movements are possible. Examples: (a) Ankle joint, (a) elbow joint, (c) Intrphalangeal joint

Condyloid joint:

It has two convex surfaces which articulate with two concave surfaces. Apart from a small movement of rotation, flexion, extension, abduction, and adduction are the main possible movements. Example: (a) Knee joint, (b) Temporomandibular joint

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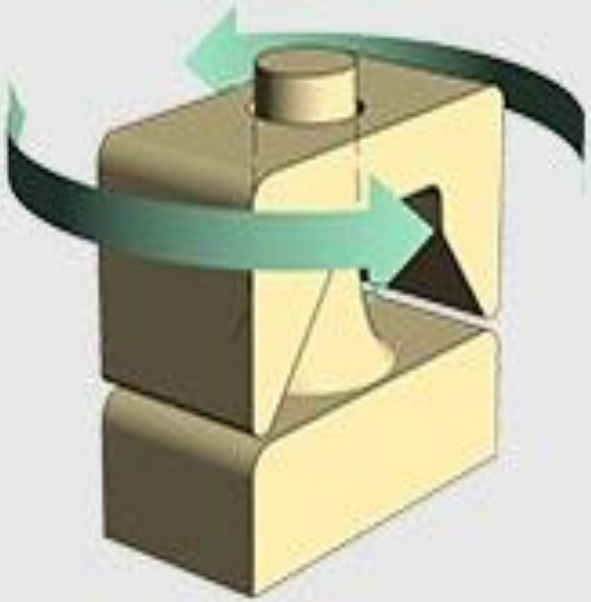
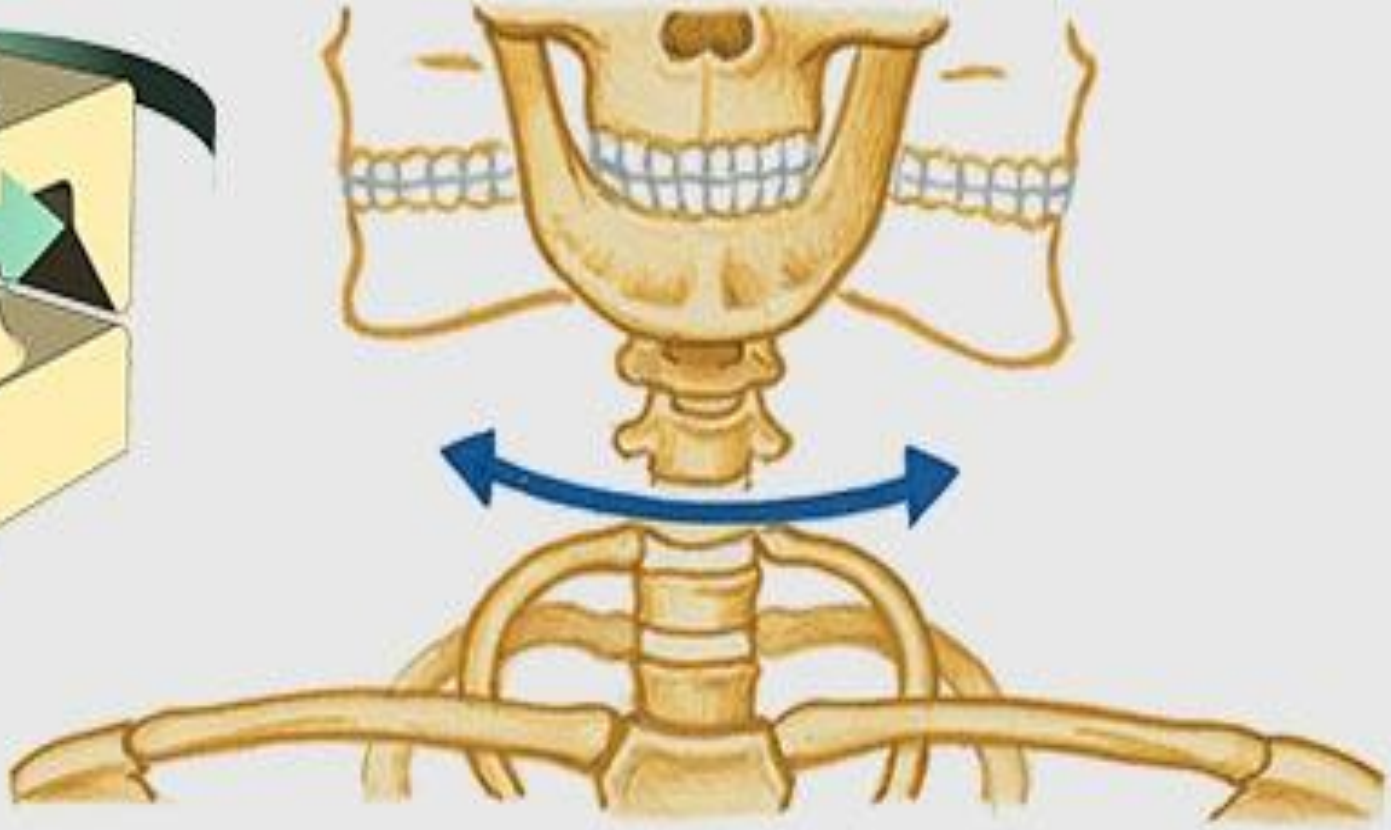
Pivot Joint:

Is also called trochoid joint (like a wheel) in which the bony pivot is surrounded by a color of ligament which make a hole for rotatory movement of containing bone. Examples: (a) Atlantoaxial joint and (b) Superior radioulnar joint.

Pivot Joint





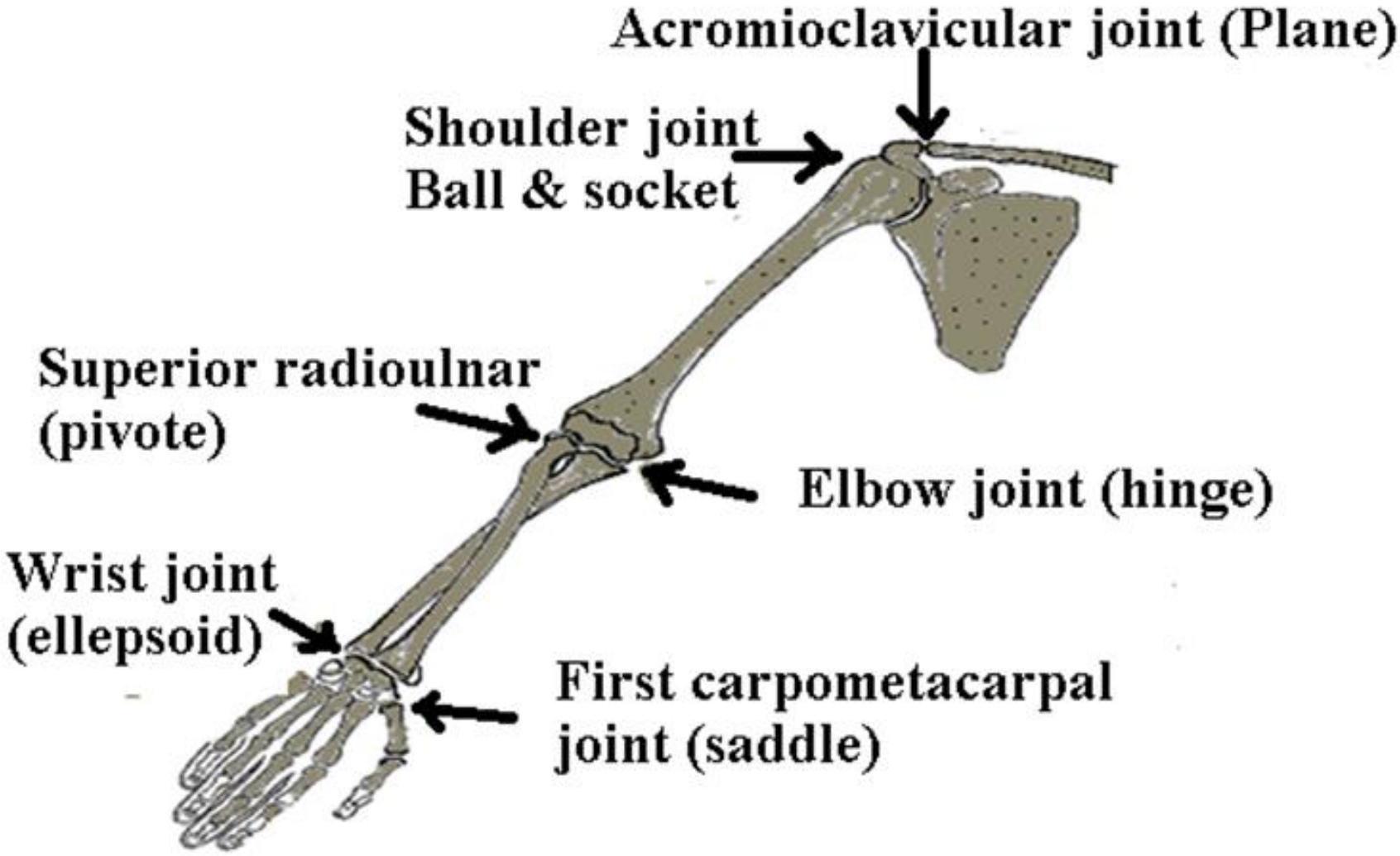
Ellipsoid joints:

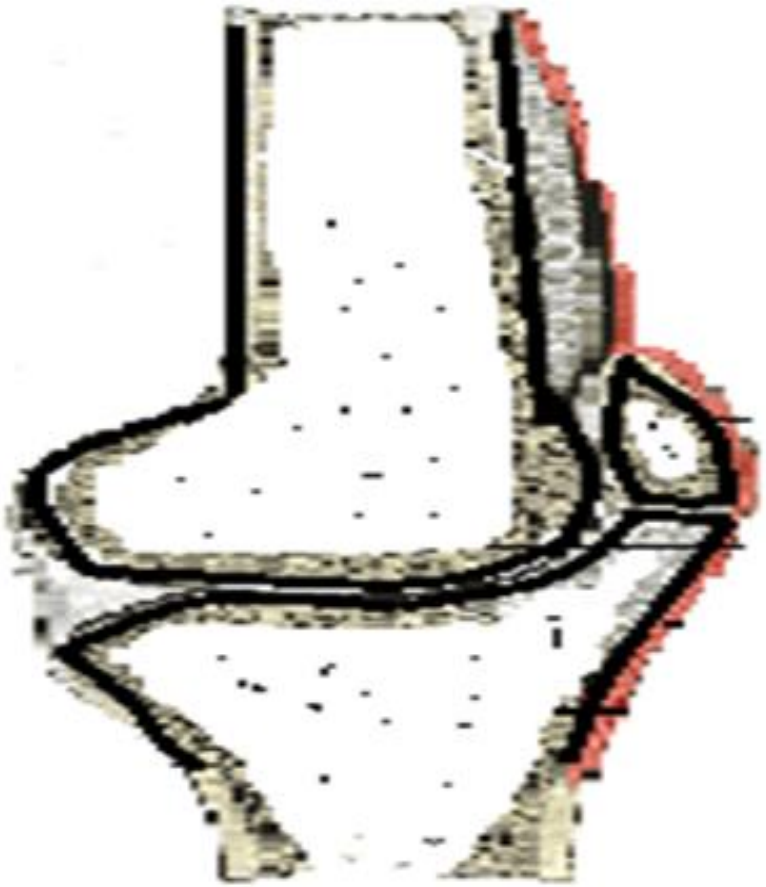
In this type of joint an elliptical (oval) convex articular surface fits into an elliptical concave articular surface. In this type of joint the rotation is not possible but abduction, adduction, flexion and extension are the possible movements. Examples: (a) Wrist joint, (b) Metacarpophalangeal joint, (c) Metatarsophalangeal joint

Saddle joints:

The saddle joint is also called sellar joint which mean saddle of a horse. The concavoconvex articular surfaces of this joint fit into each other reciprocally. Saddle joint allow all movements like abduction, adduction, flexion, extension and rotation. Examples: (a) Carpometacarpal joint of the thumb, (b) Sternoclavicular joint (c) Calcaneocuboid joint

Shows types of joints in upper limb.





Knee joint (Condyloid)

Blood supply of synovial joint: The local arteries give epiphyseal and articular branches which from a periarticular plexus supply the capsule, synovial membrane and epiphysis while the articular cartilage is avascular.

Nerve supply of synovial joint: There is only sensory supply to the capsule and ligaments of a joint which follows the principles that a nerve supplying a particular muscle will also supply the joint on which that muscle acts.

Stability of a joint:

The joint stability depends on three main factors, bones, ligaments and muscles.

(a) Bones the shape, size, and arrangement of the articular surfaces are important factors which can affect the stability of a joint. The ball-and-socket arrangement of the hip joint provides more stability as compared to the ball-and-socket arrangement of shoulder joint.

(b) Ligaments also provide stability to a joint by preventing excessive movement and so dislocation of the joints. A prolong and continuous stress on ligament causes stretching which reduces its role in supporting joint.

For example the tone of the muscles which normally support the arches of foot, may get impaired by certain problems which make them unable to support the arches of foot, will certainly cause stretching of foot ligaments causing flat footedness.

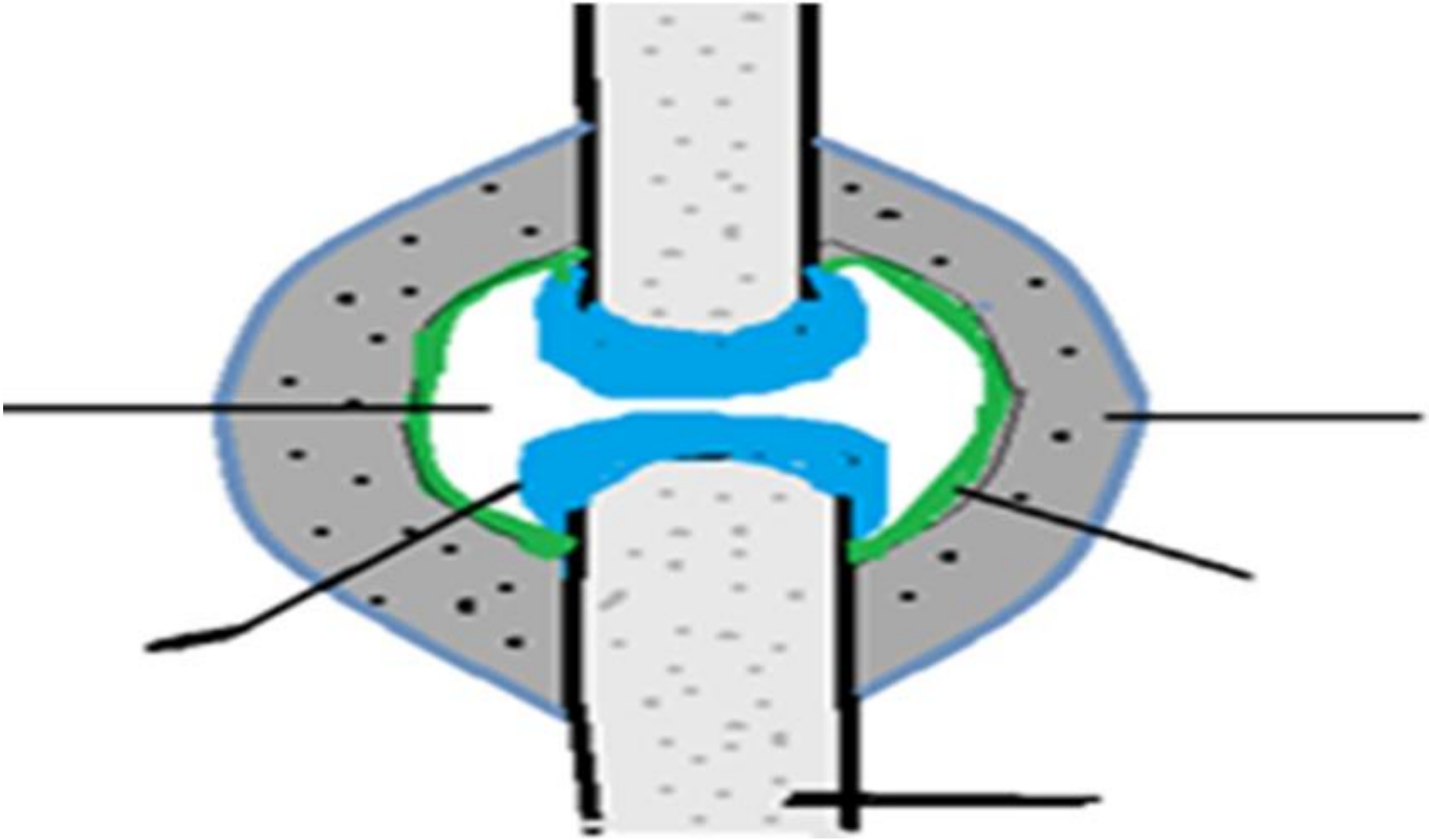
(c) Muscles tone is the most important factor in controlling stability of a joint. For example, the muscle tone of the shoulder joint keeps the large head of the humerus in the small and shallow glenoid cavity of the scapula without much risk of dislocation.

But without the action of these muscles a very little force would be sufficient to dislocate this joint easily. Similarly quadriceps femoris muscle keeps the knee joint stable and arches of the feet are mainly supported and maintained by local muscle tone.

Clinical Anatomy: Dislocation of shoulder joint is a common condition which may be due to excessive mobility at the cost of stability. The intervertebral disc prolapse may be a cause of sciatica, paralysis or severe backache and other problems like urine incontinence or numbness.

Rheumatic fever present as joint pain which may be due to throat infection. Stiffness of joints can be controlled with careful exercise which is a common condition in cold weather especially in aged patients.

Label the different parts of joint given in diagram.



THANKS