joints

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defination

- an articulation of union or junction between two or more bones or parts of bones of skeleton.
- **functional classification**—

(acc. To degree of mobility)

Synarthrosis (immovable)/fibrous joints

Amphiarthrosis(partially movable)

Diarthrosis (freely movable)

synthrosis

- fixed joints with no movement
- articular surfaces are joined by tough fibrous tissue.
- e.g—sutures of skull

amphiarthrosis

- joints with slight movement is possible
- pad of cartilage between the bone surfaces ,and a fibrous capsule to hold bones and cartilage in place.
- cartilage here act as shock absorber.
- E.g –intervertebral discs .

Diarthrosis/ synovial joints

- freely movable joints
- a synovial joint has a fluid filled cavity b/w articular surfaces.
- articular surfaces are covered by articular cartilage

Regional classification

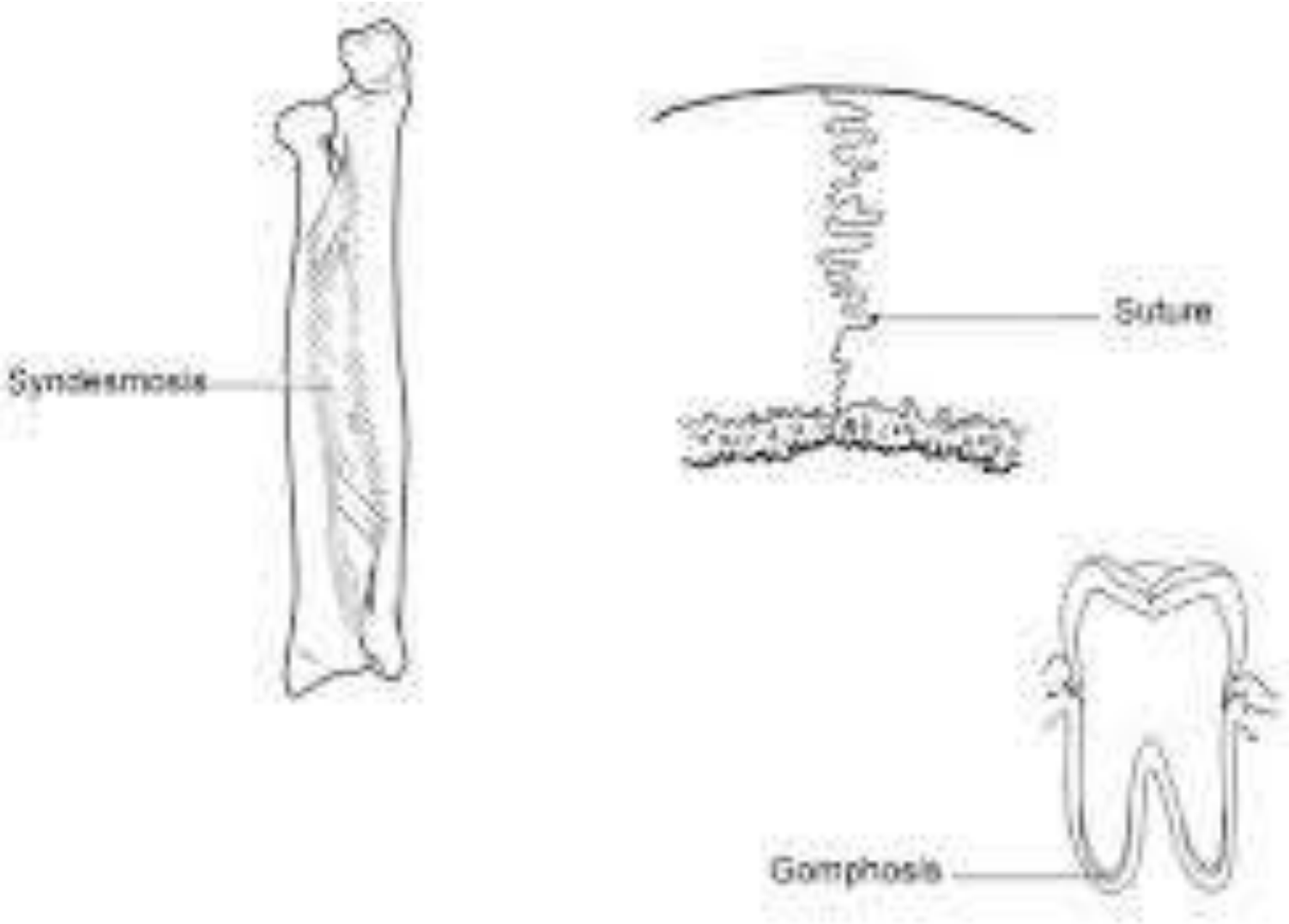
- skull type—immovable
- vertebral type—slightly movable
- limb type---freely movable

Fibrous joints

- With no or very slight movement.
- Joint are united by fibrous tissue

fibrous joints are of three types—

- sutures,
- Syndesmosis
- gomphosis



Adapted from The Human Body on File, Library Association Publishing

sutures

- found in skull mainly, immovable.
- Types---
- 1) **serrate—saggital** suture of skull,(edges of bones present saw tooth appearance.)
- 2**) denticulate** –the margins present teeth with tips being broader than roots(e.g **lambdoid** suture)
- 3) **squamous suture**—edges of bone are overlapping **e.g—parietal bone and squamous** part of temporal bone.
- 4) **plane suture**-borders are plane and united by sutural ligaments.e.g articulation **b/w palatine processes of maxilla**.

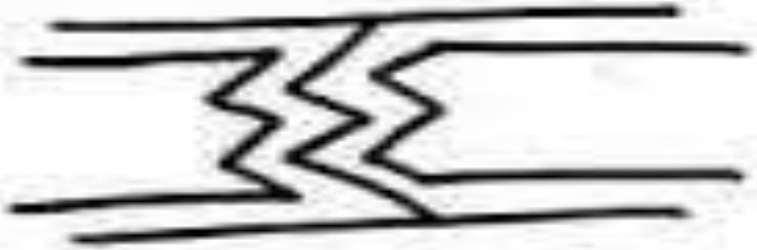
- wedge and groove suture (schindylesis)-edge of one bone fits in the groove of other bone, e.g—rostrem of sphenoid and ala of vomer.

gomphosis (peg & socket joint)

- Root of teeth fit in the sockets of jaw & are united by fibrous membrane.

Plane Suture

Denticulate Suture



Serrate suture

Schindylesis

Squamous suture

syndesmosis

- fibrous joint where surfaces of bone are united by interosseus ligaments,
- ligaments persist throughout life and slight movement is possible.
- E.g –interosseus membrane of forearm,leg
- inferior tibiofibular joint.

Cartilagenous joints

- primary/ synchondroses
- secondary/ symphysis
- **Primary**
- bones are united by hyaline cartilage, joint is immovable and strong,
- these joints are temporary in nature as cartilagenous plate is replaced by bone.
- No movement is possible at this joint
- designed for growth.
- e.g—joint b/w epiphysis and diaphysis of long bone,
- 1st condrosternal joint,joint b/w basioccipu t and basisphenoid.

Secondary cartilagenous joint

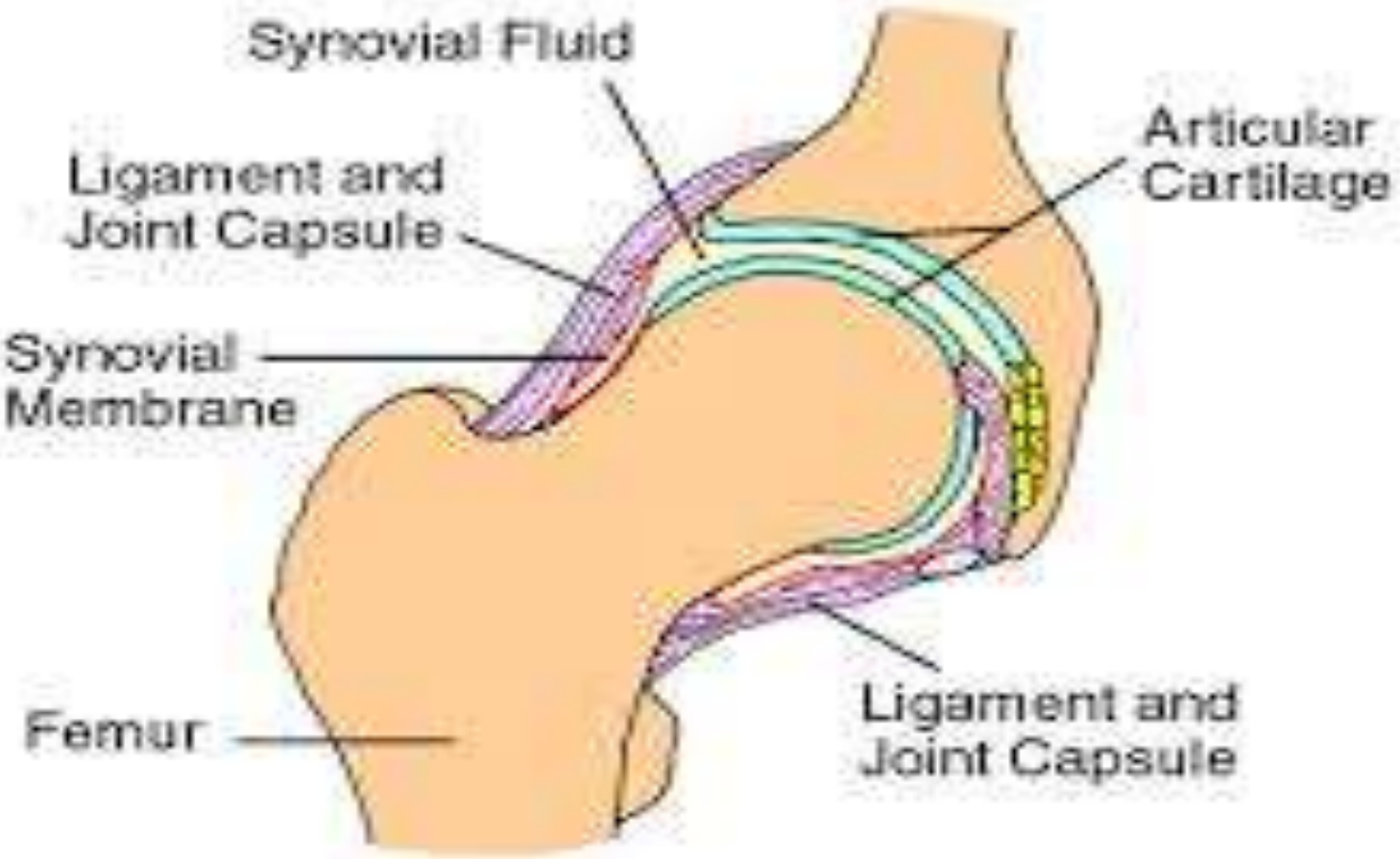
- Strong & slightly movable joints
- Permanent joint
- Articular surface are covered by hyaline cartilage & united by disc of fibrocartilage.
- Typically seen in median plane of body.
- E.g –
- Intervertebral joint,
- Symphysis menti
- Manubriosternal joints.

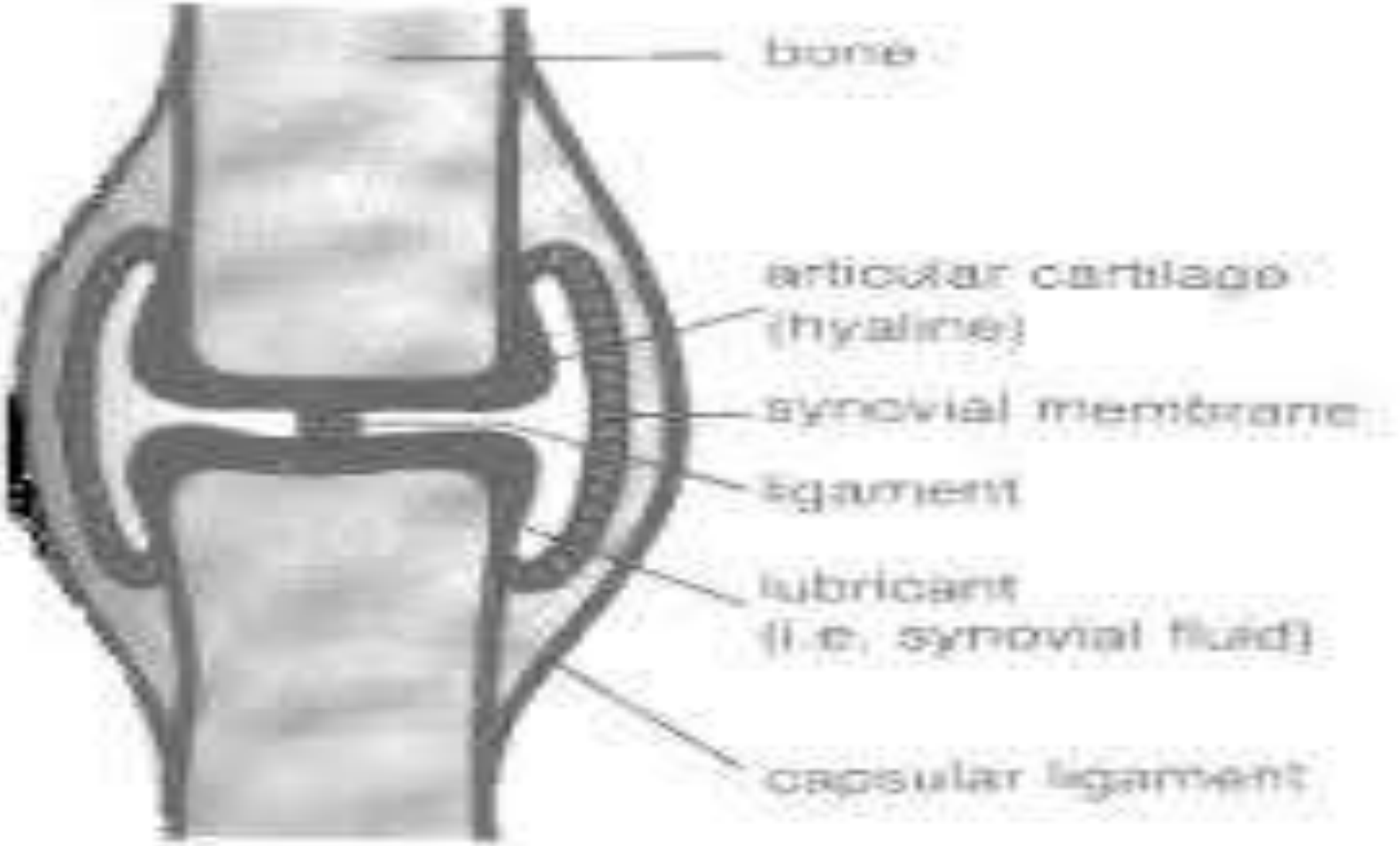
- Intervertebral (fibrocartilagenous disc) disc consist of annulus fibrosis at periphery and nucleus pulposus in center.
- nucleus pulposus is a gelatinous mass containing abundent water, cartilage cells and occasional multinucleated notochordal cells.
- as age advances notochordal cells disappear and nucleus is replaced by fibrocartilage.
- This intervertebral disc act as shock absorber, it offers resistance to compressive forces of vertebral column.
- sometimes when disc is prolapsed posteriorly results in radiating root pain due to involvement of spinal nerves.

Synovial joints

- **defination—**
- most mobile joints,most common joints specially in limbs.
- their name comes from lubricating substance (synovial fluid) present in joint cavity lined with synovial membrane or articular cartilage .the synovial membrane consists of vascular connective tissue that produces synovial fluid

Hip Joint


Synovial Fluid
Articular Cartilage
Ligament and Joint Capsule
Synovial Membrane
Femur
Ligament and Joint Capsule


bone
articular cartilage
(hyaline)
synovial membrane
ligament
lubricant
(i.e. synovial fluid)
capsular ligament

- characterstics—
- Joint is surrounded by articular capsule ,with rich nerve supply
- joint cavity filled with viscous synovial fluid,
- Joint cavity allows joint to be freely movable.
- articular surface is covered with hyaline (articular cartilage)
- articular cartilage is avascular , non-nervous,elastic .
- Joint space is lubricated with synovial fluid,(lubrication & nourishment)
- Cartilage provide slippery surface for free movements,
- joint space may be partially or completely subdivided by articular disc or meniscii.

Classification of joints

- acc. To no of bones articulating—
- A)**simple**—two bones joint—**IP** joint
- b) **compound**—more than two bones involved—**ankle** joint.
- C**) complex**—joint space is divided into two compartments by an articular disc or meniscus, --**knee** joint.

- acc. To axis of movements and shape of articular surfaces---
- A) uniaxial joint ,
- b) biaxial joint
- c) polyaxial
- d) plane joint

Uniaxial joint

A**)** **hinge** or ginglymus joints

- moves on transverse axis,
- one articular surface is convex
- e.g **elbow joint**.

b) **pivot /** trochoid joint

- movements in vertical axis
- one bone act as a pivot,encircled by osseoligamentous ring.
- **E.g—atlantoaxial ligament**.,superior radioulnar joint

Biaxial joint

- has two degree freedom of movements.
- Two types---**ellipsoid** e.g wrist/radiocarpel joint

  ---condylar

  Ellipsoid joint----one articular surface is convex and elliptical,
- movements around transverse and anteroposterior axis,

- **Condylar joint**
- Moves mainly on transverse axis & partly on vertical axis.
- also called modified **hinge joint**, e.g knee joint, each bone consist of condyles for articulation.

Polyaxial joints

- possess three degree freedom of movements,
- **axis**—transverse, vertical and anteroposterior.
- **movements** possible—
  flexion,extension.adduction,abduction,
  rotation and circumduction,
- **ball & socket type of joints**.—shoulder joint.
- **saddle**/ first carpometacarpel joint

- **saddle joint-**---
- the opposing articular surfaces are concavo-convex,
- flexion, extension,adduction,abduction,circumduction

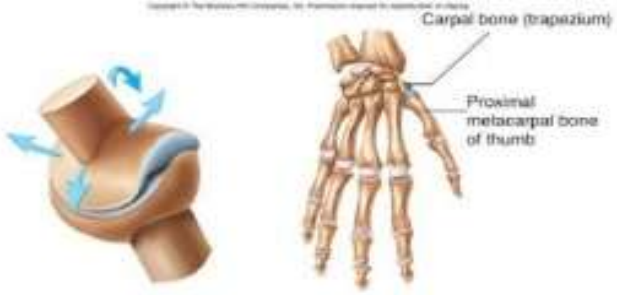
Plane joint

- articular surfaces are flat and produce gliding movements in various directions e.g— **intercaral** & **intertarsal joint**.

6 Types of Synovial Joints

Plane / Gliding

Saddle

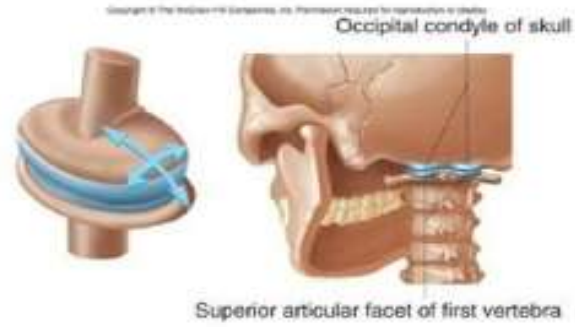


Hinge

Pivot

Ball-and-Socket

Ellipsoid



Applied anatomy

- a) **dislocation of joint-**---in which articular surfaces are abnormally displaced,
- b) **sprain—**pain in joint due to ligamentous tear , without any dislocation or fracture.
- C**) arthritis**—inflammation of one or more joints, can be caused in diseases like—rheumatic arthritis, osteoarthiritis.
- d) **neuropathic joint—result** of complete denervation,so reflexes are eliminated and joint left nprotected and liable to mechanica damage.
- seen **in leprosy**, **tabes dorsalis** and **syringomyelia**.

mcq

Articular cartilage of most joints is—

- A) elastic
- B) hyaline
- C) white fibrocartilage
- D) cellular/embryonic
- example of saddle joint is-
- a) first carpometacarpel joint,
- B) metacarpophalangeal joint
- C) first interphalangeal joint
- D) intercarpel joint.

first chondrosternal joint is –

- A) secondary cartilagenous joint
- B) primary cartilagenous joint
- C) synovial joint
- D) fibrous joint
- example of pivot joint is—
- A) metacarpiphalangeal joint
- b) superior radioulnar joint
- C) elbow joint
- D) radiocarpel joint

- subtype gomphosis is classified under—
- A) biaxial synovial joint
- B) symphsis
- C) fibrous joint
- D) synchondrosis.