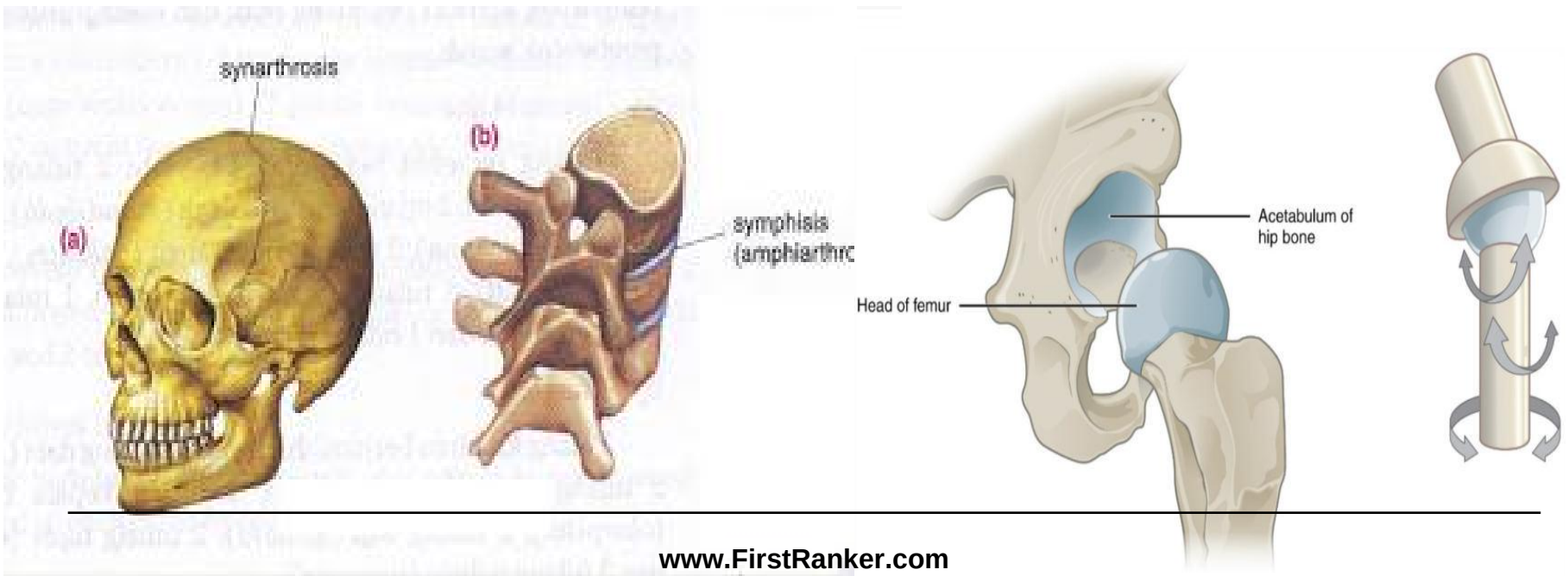
Learning objectives

- **Definition & classification - Joints**
- **General features of different types of joints.**
- **Clinical Anatomy**

JOINTS

A site where two or more bones come together, **whether or not** movement occurs between them, is called a joint.



Classification of Joints

- **Functional classification – movements**
  - ***Immovable joints (SYNARTHROSES)***
  - ***Movable joints (DIARTHROSES)***

- **Structural classification**
  - ***Fibrous joints,***
  - ***Cartilaginous joints,***
  - ***Synovial joints.***

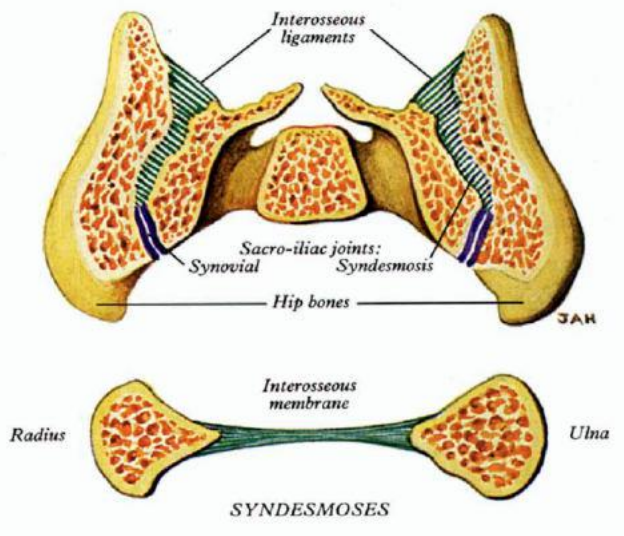
Functions:

- **Permit movement**
- **Growth**
- **Molding during childbirth**
- **Concerned with differential growth**
- **Transmission of forces**

Structural Classification

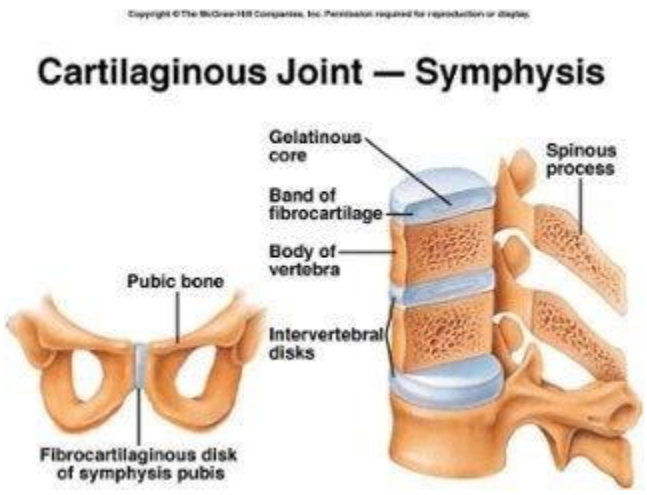
a) Fibrous

Fibrous connective tissue
Allows very little movement.



b) Cartilaginous

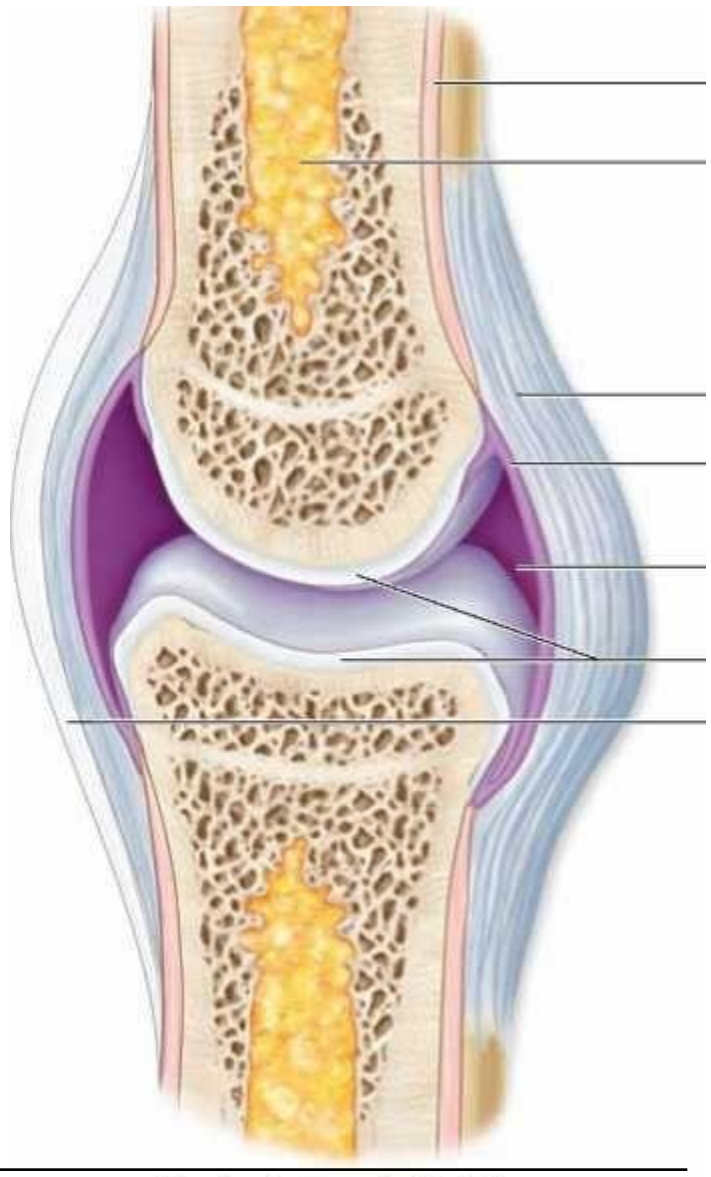
Cartilage either hyaline or fibrocartilage
Allows slight movement.



c) Synovial

Bony surfaces are covered in (hyaline) articular cartilage and separated by a film of viscous synovial fluid that serves as a lubricant.

Freely moving joints


Typical synovial joint

Structural Classification

a) Fibrous e.g. i) Sutures,

ii) Syndesmosis

iii) Gomphosis

b) Cartilaginous e.g. i) Primary Cartilaginous

ii) Secondary cartilaginous

c) Synovial e.g. i) Uniaxial: Pivot, Hinge-- Bicondylar

ii) Biaxial: Ellipsoid , Saddle

iii) Polyaxial: Ball & Socket

Movements

- Flexion
- Extension
- Adduction
- Abduction
- Circumduction
- Rotation

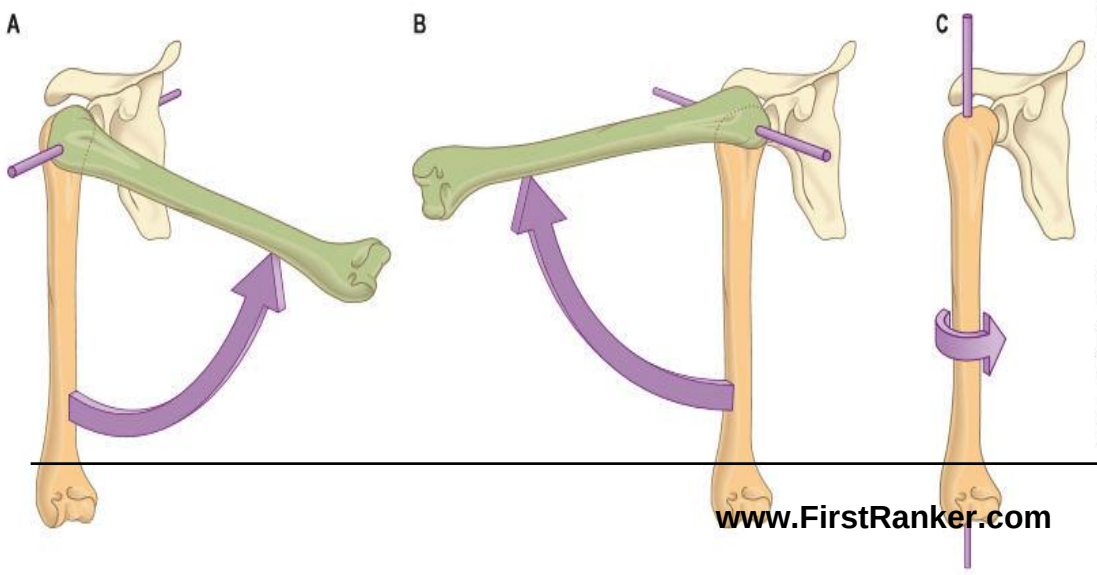
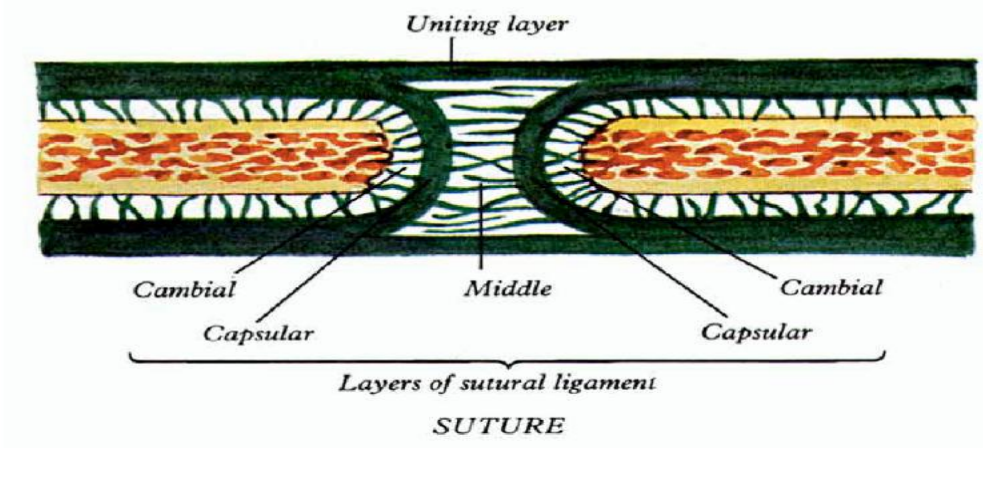


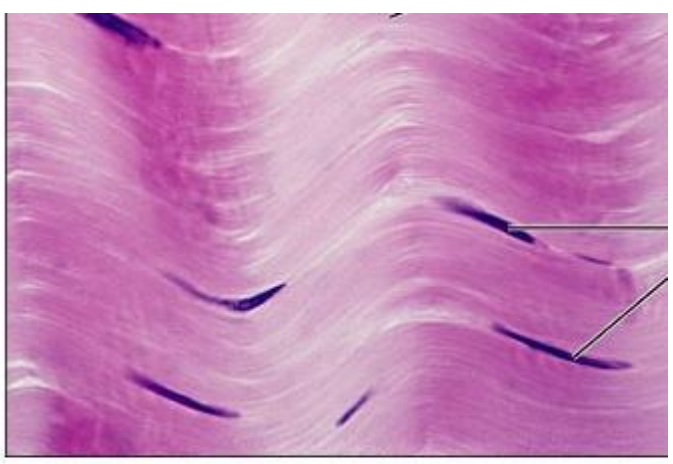
Fig. 5.34 The shoulder joint is multiaxial and possesses three degrees of freedom. The three mutually perpendicular axes are shown, around which the principal movements of flexion–extension (**A**), abduction–adduction (**B**) and medial and lateral rotation (**C**) occur. Note that these axes are referred to the plane of the scapula and not to the coronal and sagittal planes of the erect body. Although an infinite variety of additional movements may occur at such a joint, e.g. movements involving intermediate planes or combinations, they can always be resolved mathematically into components related to the three axes illustrated.

SYNARTHROSES / FIBROUS JOINTS

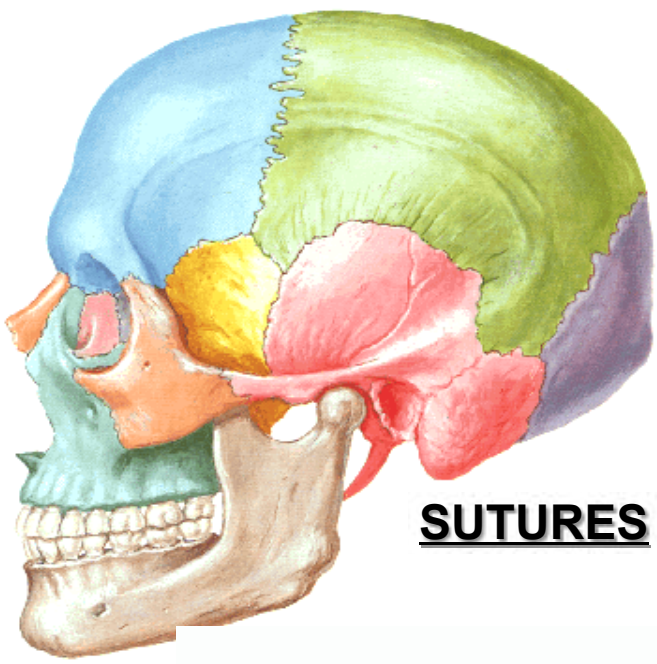
- Bones connected by fibrous tissue: dense regular connective tissue
- No joint cavity
- Slightly movable or immovable

BONE— fibrous connective tissue—BONE

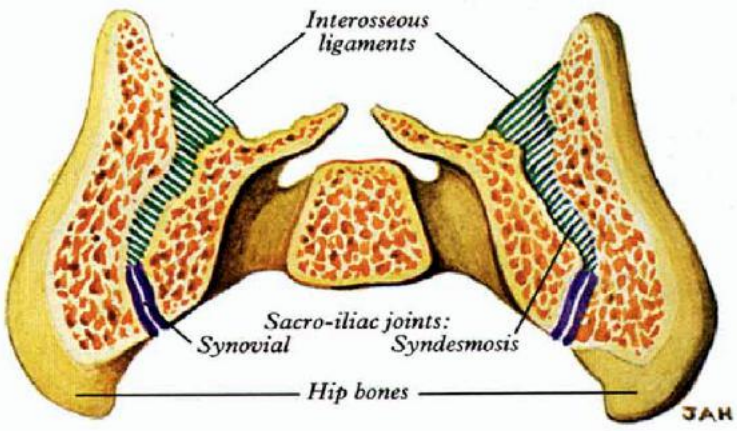




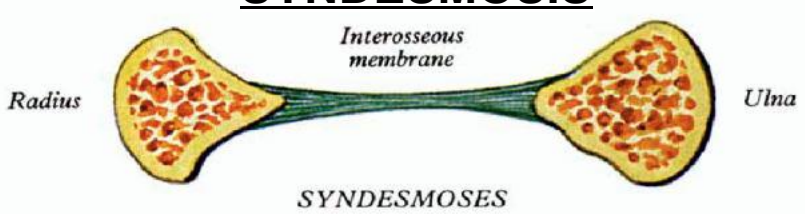
Photomicrograph: Dense regular connective tissue fron tendon (1000×).



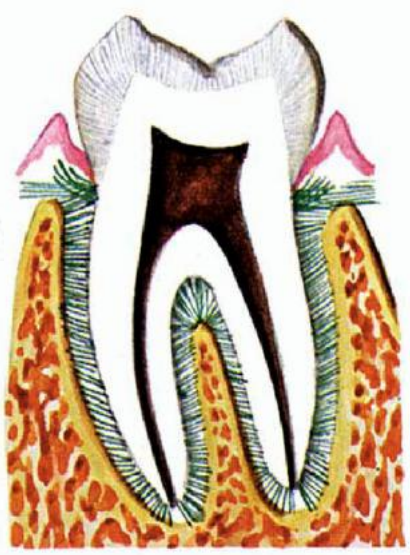
SUTURES

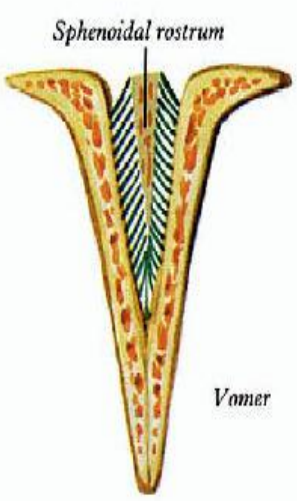


SYNDESMOSIS



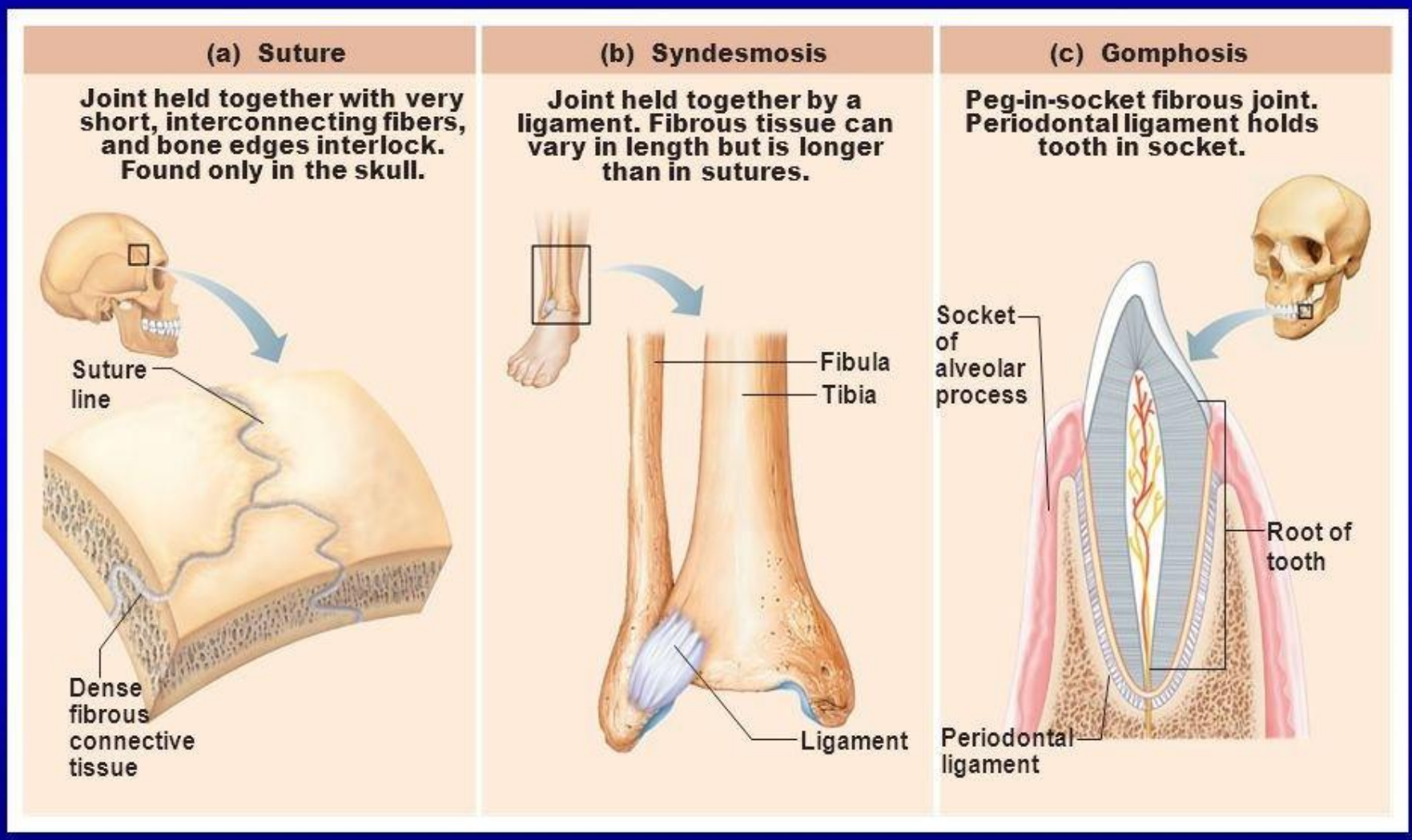
GOMPHOSIS





SCHINDYLESIS

Fibrous Joints



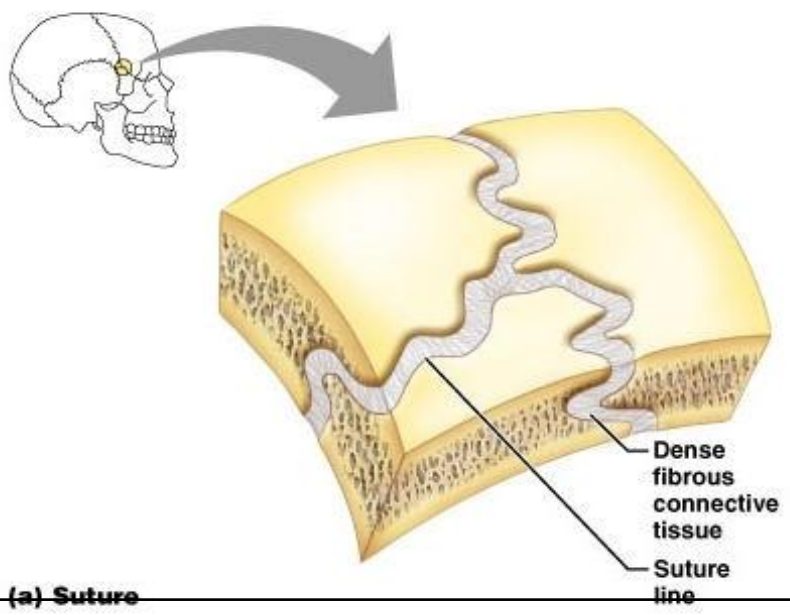
SUTURES

bone—collagenous sutural ligament—bone

-Present only between bones of skull.

-Fibrous tissue is continuous with *periosteum*

-Sutures ossify and fuse in middle age: Called **"synostoses"**



TYPES OF SUTURES

PLANE SUTURE

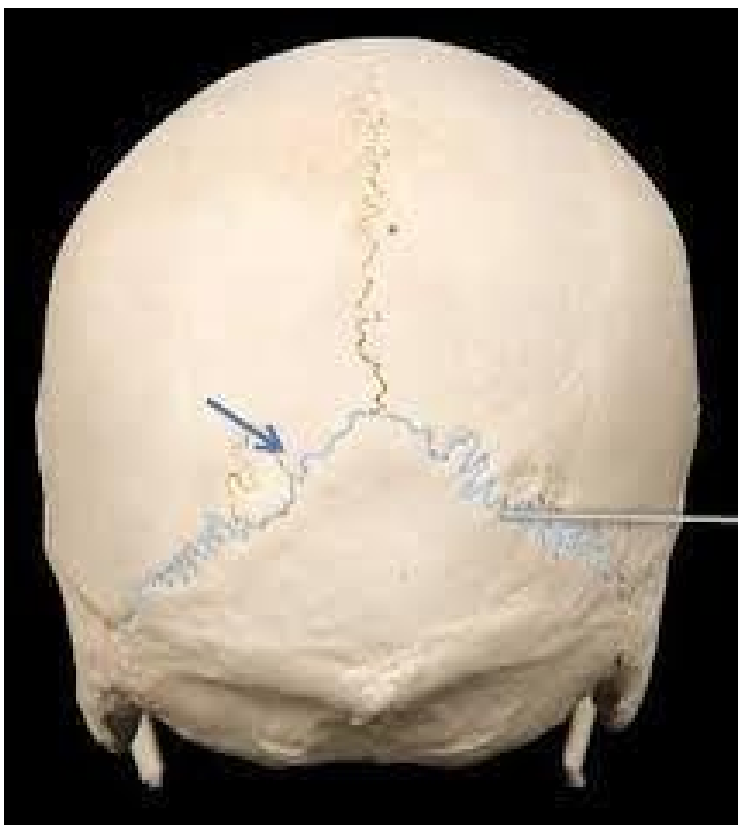
- Simple apposition of contiguous surfaces,
- usually rough and reciprocally irregular,

Examples

- sutures between the palatine bones,
- between the maxillae and at the palatomaxillary sutures.

Denticulate Suture

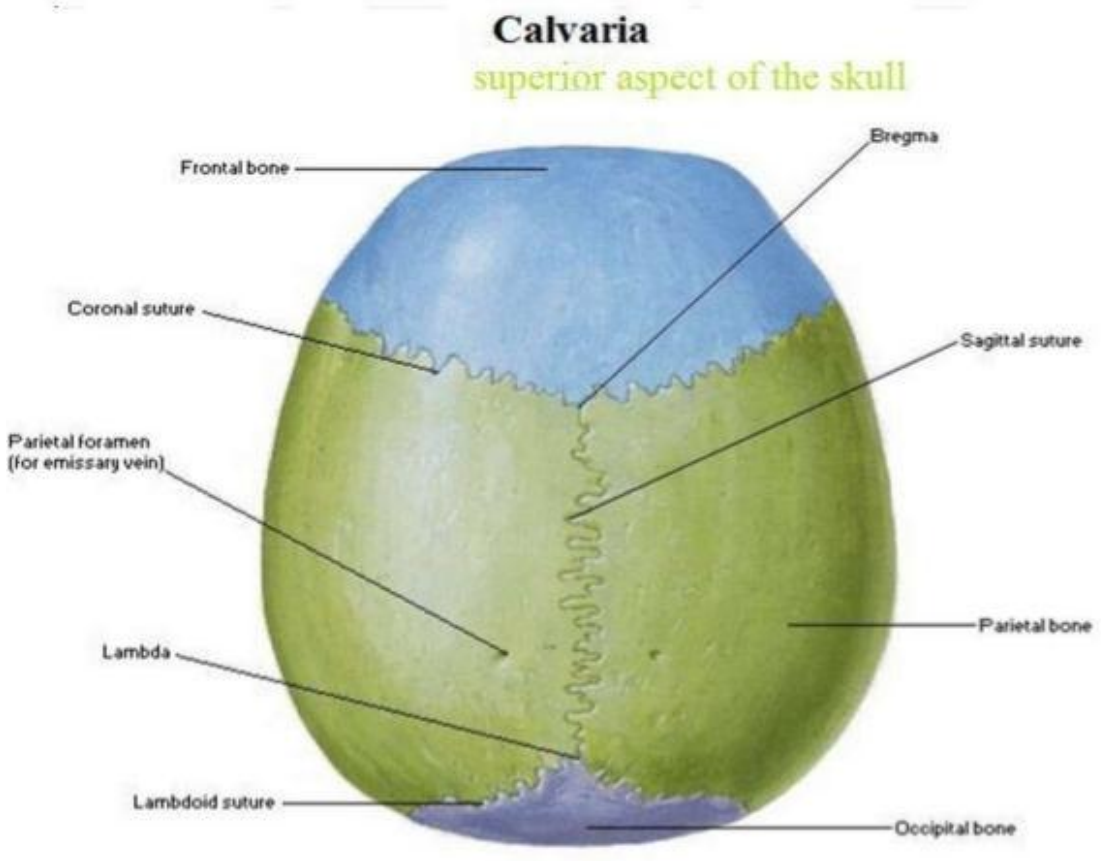
- Has small tooth like projections, often widening towards their ends to provide effective interlocking.
- When united by sutural ligament and periosteum, such sutures are almost completely immobile



- The lambdoid suture is a denticulate suture.

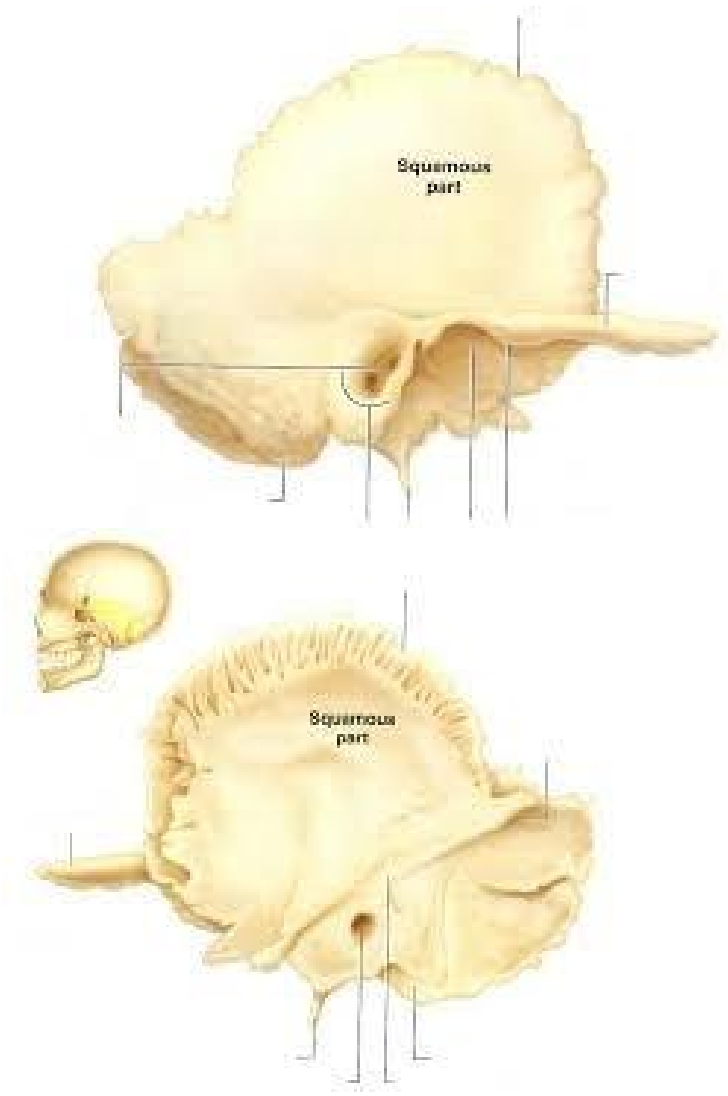
SERRATED SUTURE

The sagittal suture is serrated.



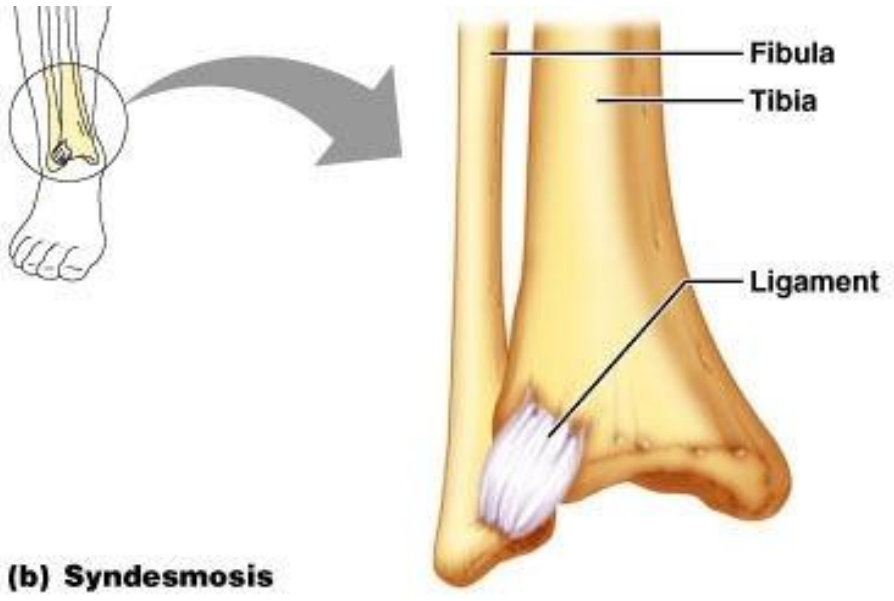
Squamous suture

Where bones overlap, as at the temporo-parietal suture, a squamous suture is formed; the adjacent bone surfaces are reciprocally bevelled.



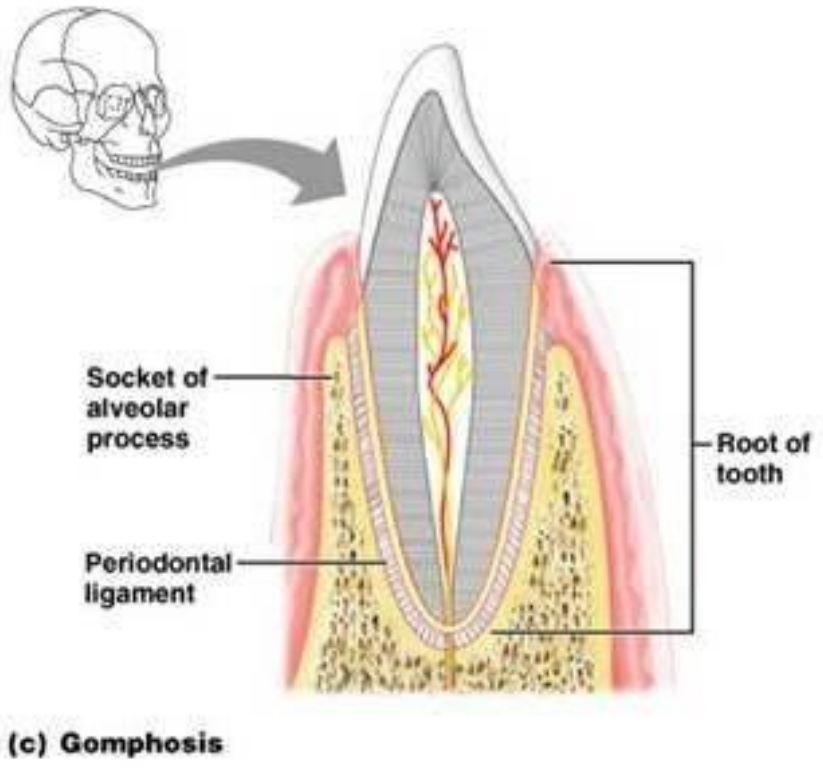
Syndesmoses

- In Greek: “ligament”
- Bones connected by ligaments only
- Amount of movement depends on length of the fibers: longer than in sutures



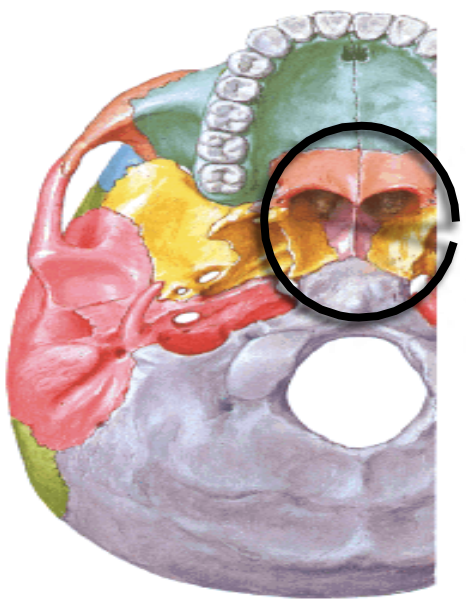
Gomphoses

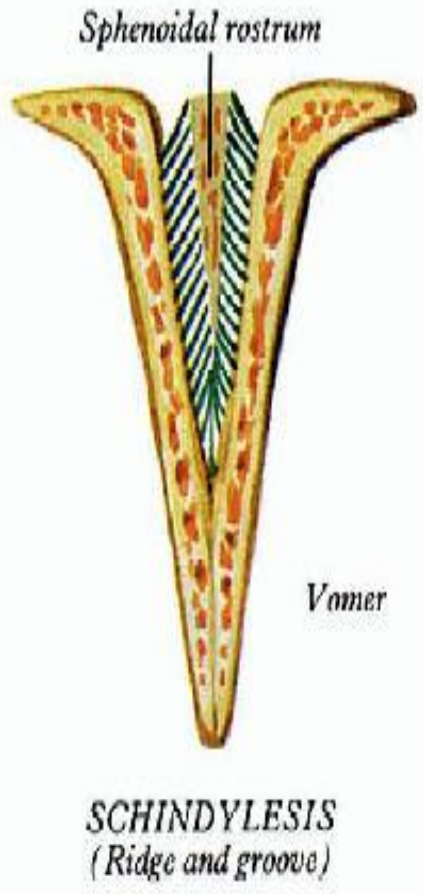
- Is a “peg-in-socket”
- Only example is tooth with its socket
- Ligament is a short ***periodontal*** ligament



Schindylesis

- Special kind of suture.
- Between Ala of Vomer and
- Rostrum of Sphenoid





SCHINDYLESIS
(Ridge and groove)

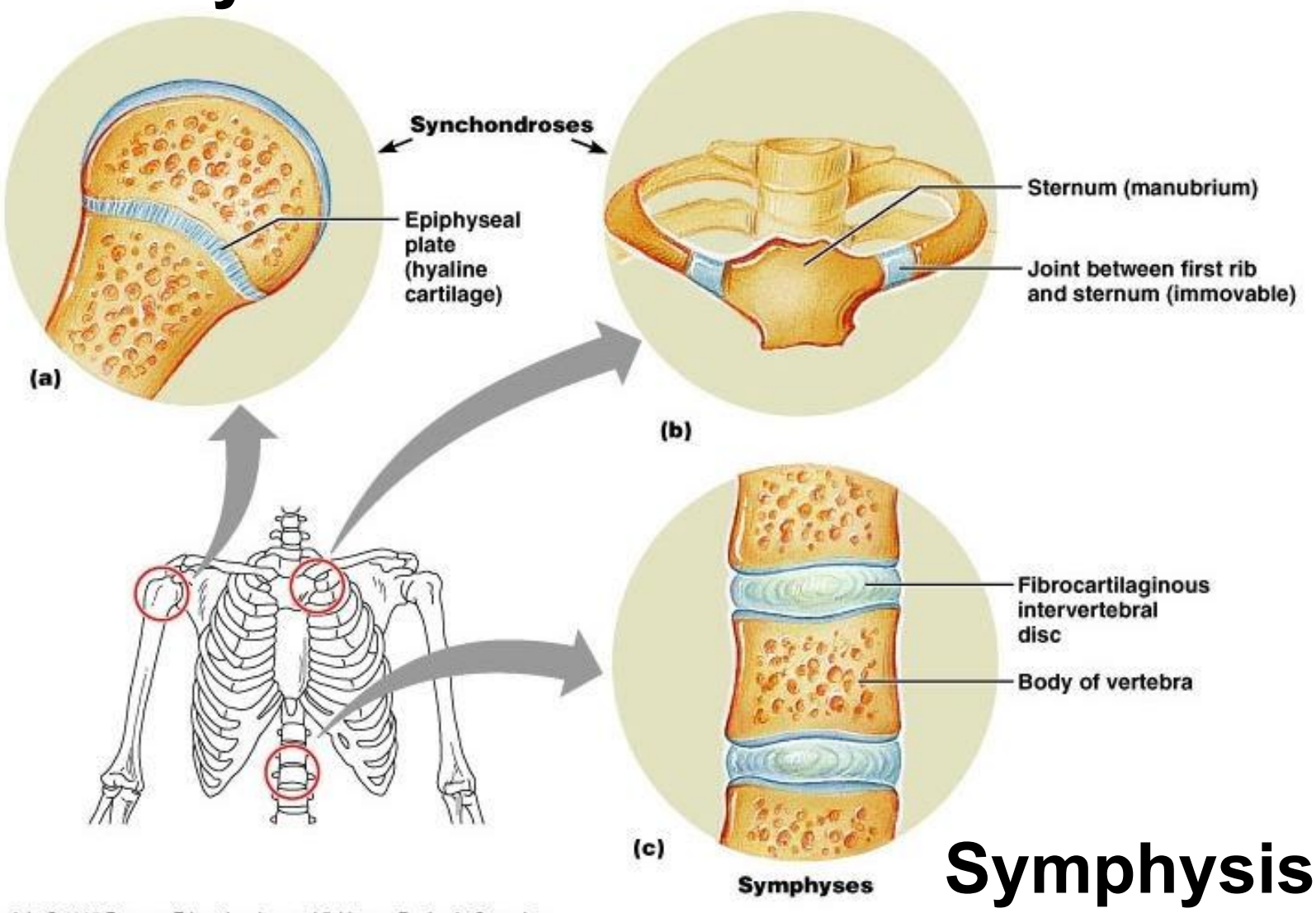
Cartilagenous joints

- Articulating bones united by **cartilage**
- Lack a joint cavity
- Slightly movable
- ***Two types***
  - **Synchondroses** (singular: synchondrosis)
  - **Symphyses** (singular: symphysis)

Synchondroses

Primary Cartilaginous Joints

- Literally: “junction of cartilage”
- A plate or bar of Hyaline cartilage unites the bones
- Immovable (**synarthroses**)
- Examples:
  - Epiphyseal plates between epiphysis and diaphysis of growing bone.
  - Joint between first rib’s costal cartilage and manubrium of the sternum



Symphyses
Secondary Cartilaginous Joints

- Literally "growing together"
- **Fibrocartilage** unites the bones
  - Slightly movable (**amphiarthroses**)
  - Resilient shock absorber
  - Provide strength and flexibility
- Hyaline cartilage on articular surfaces of bones to reduce friction
- Examples
  - Intervertebral discs
  - Pubic symphysis of the pelvis

Symphysis

Intervertebral Disc

Pubic Symphysis

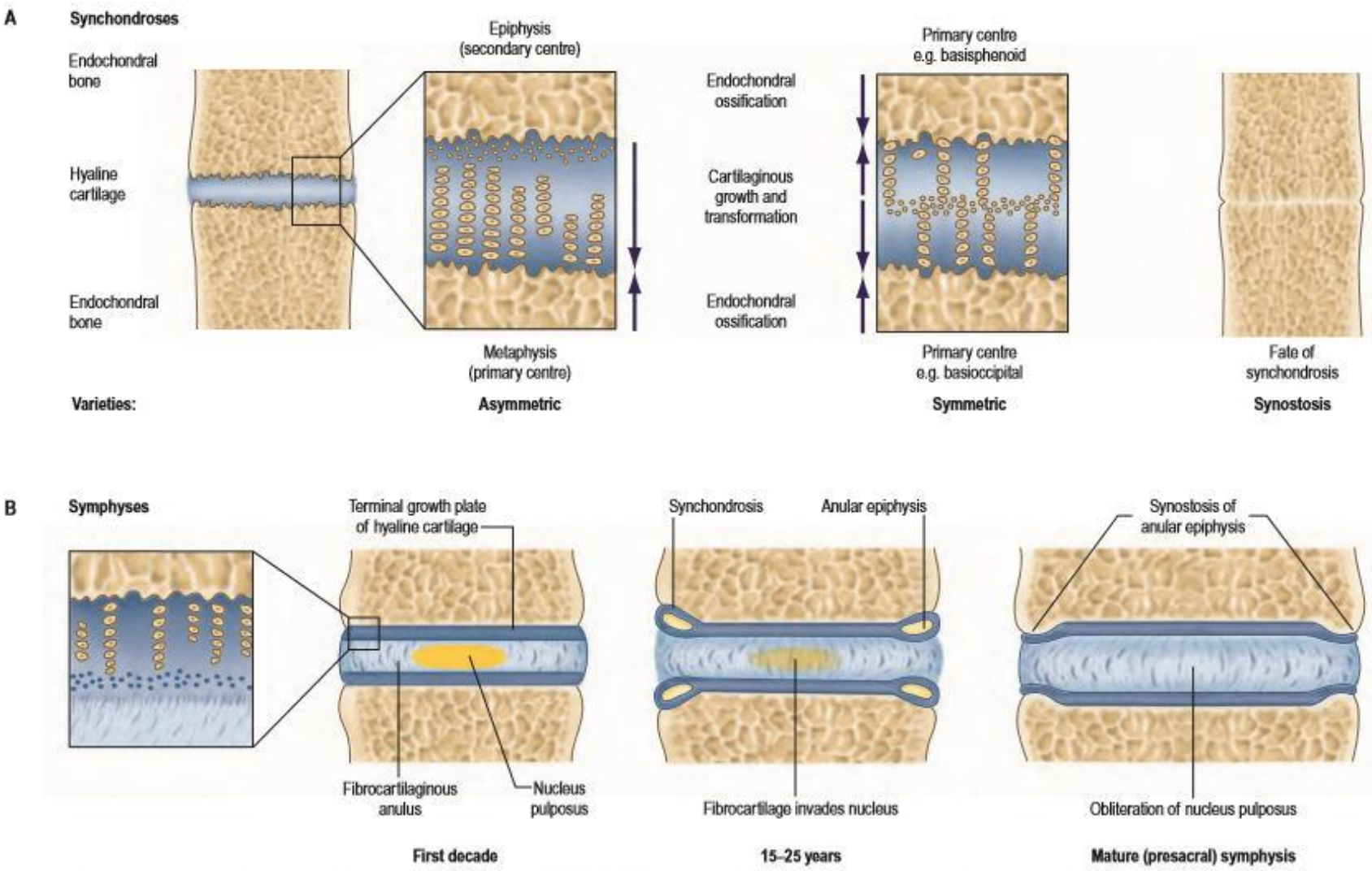


Fig. 5.29 Examples of varieties of cartilaginous joints (see also Fig. 5.30). **A**, A sectional view of the principal tissues involved, more detailed architecture and main growth patterns of symmetrical and asymmetrical synchondroses. Lesser degrees of asymmetry occur in some locations. Synostosis is the normal fate of almost all synchondroses when endochondral growth has ceased. **B**, Intervertebral symphyses (presacral), shown in section, displaying age-related changes. Partial or complete synostosis is the normal fate of sacral and coccygeal symphyses.

MCQS

In what joint is the root of a tooth attached to a periodontal ligament and held into a tooth socket?

A. Gomphosis
B. Sutures
C. Syndesmosis
D. Serrate suture

_____is a type of cushioning joint that allows limited movement and is found both in the symphysis pubis and in intervertebral discs.

A. Gomphosis
B. Symphysis
C. Synchondroses
D. Syndesmosis

An epiphyseal plate is what type of joint, even though it is temporary?

A. Suture
B. Symphysis
C. Synchondroses
D. Syndesmosis

The joint between adjacent vertebrae that includes an invertebral disc is classified as which type of joint?

1.diarthrosis
2.multiaxial
3.amphiarthrosis
4.synarthrosis