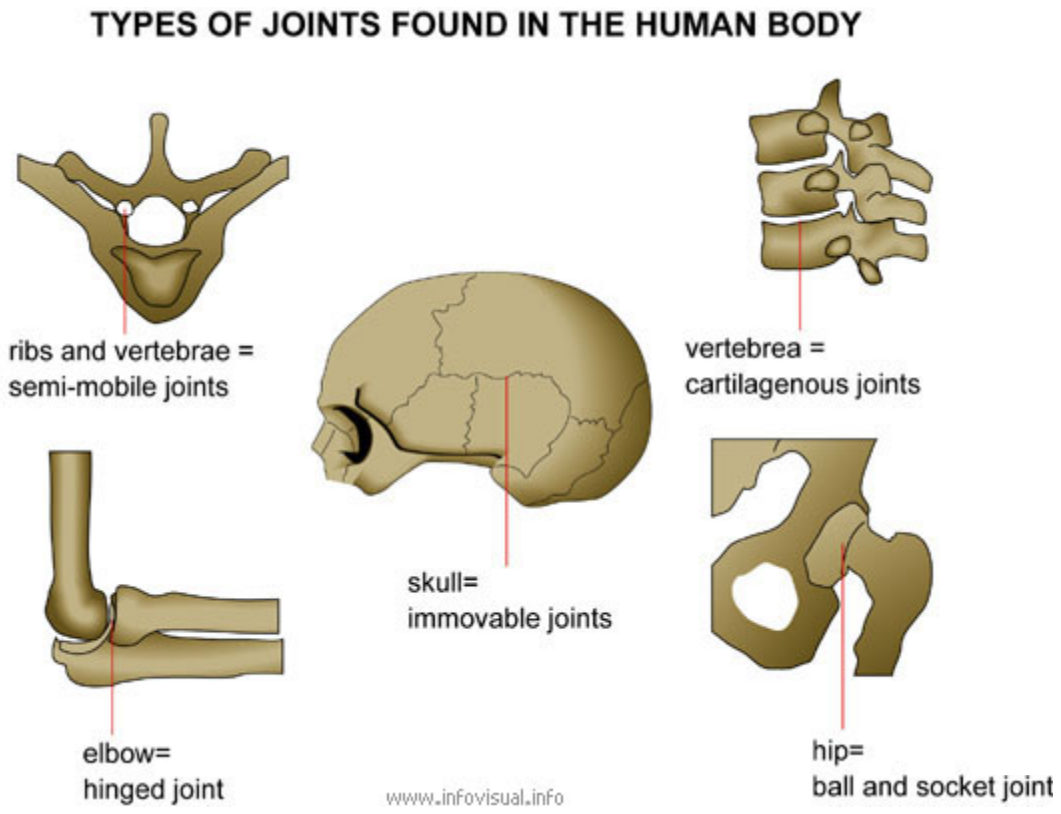
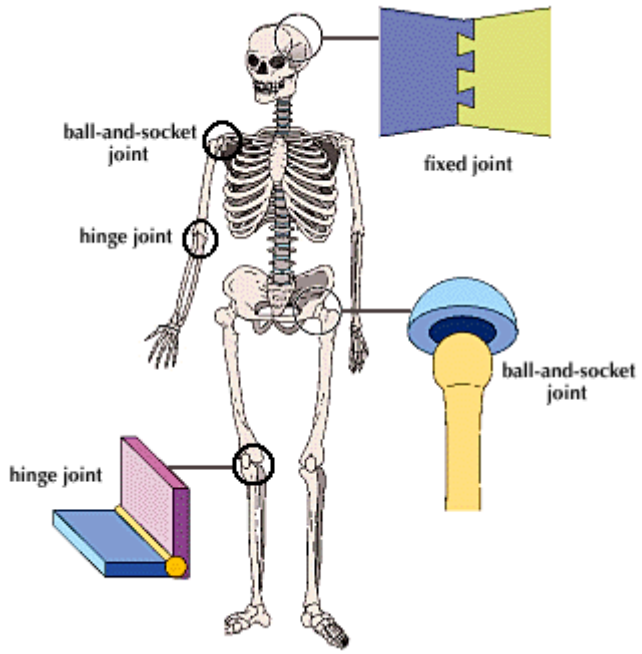
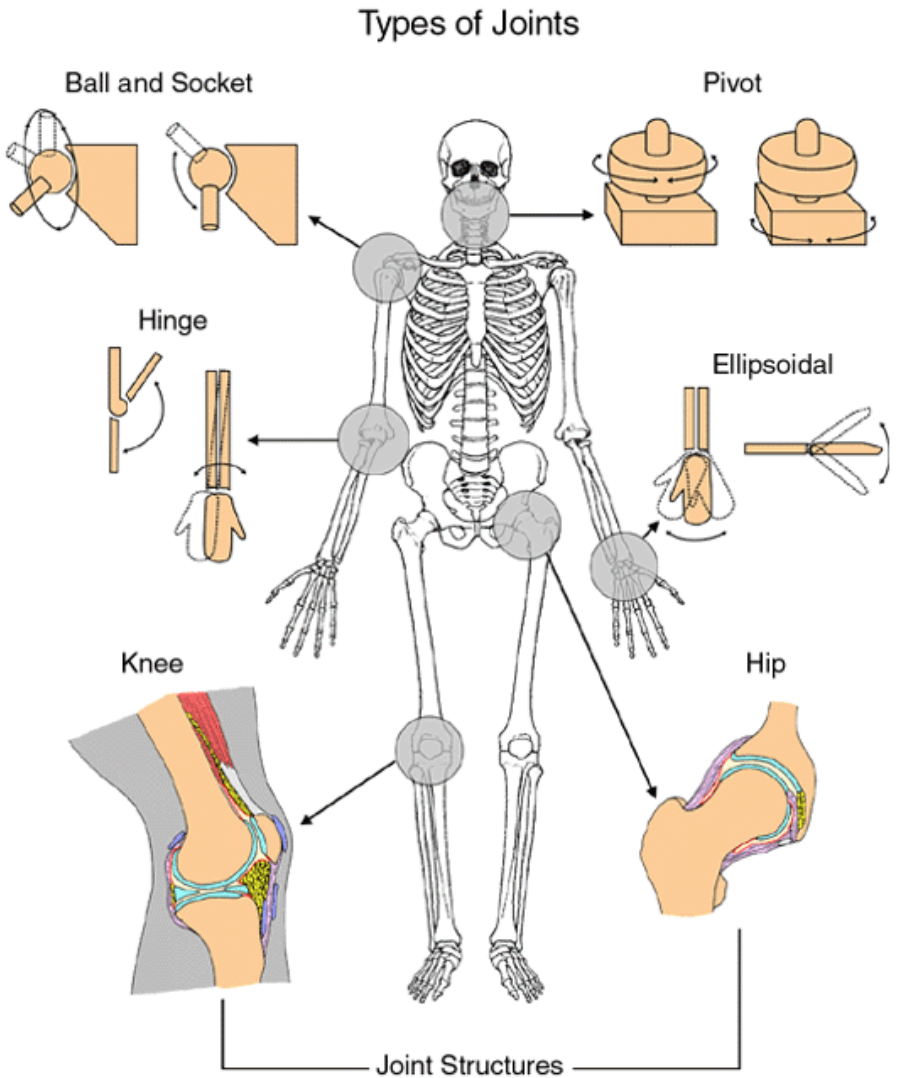
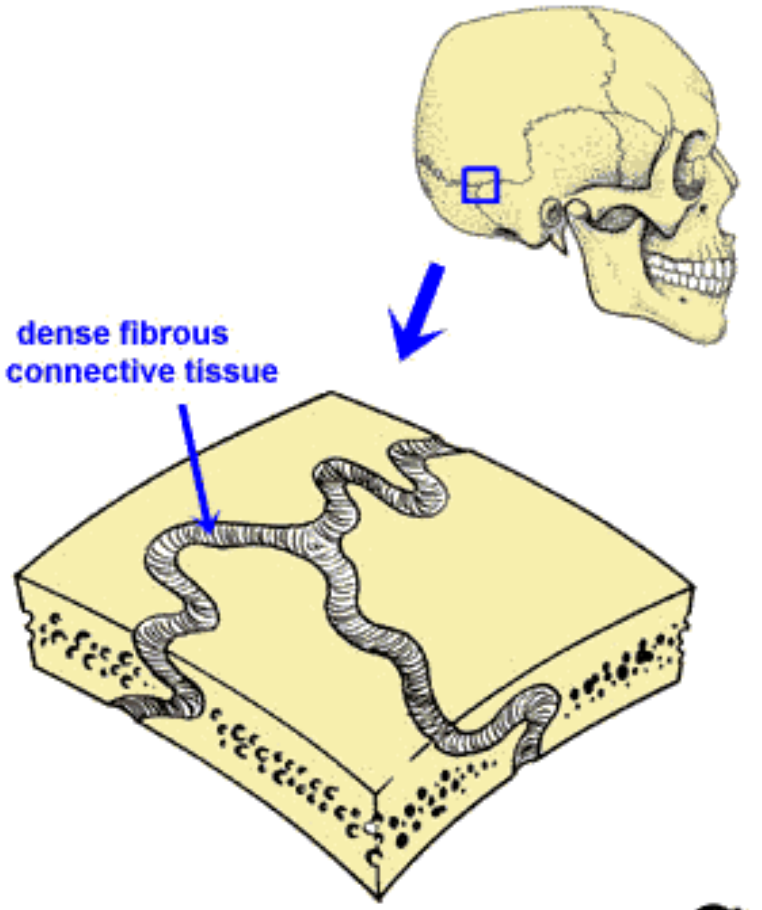
NOTES: Joints and Types of Movements, continued (Ch 5, part 4)





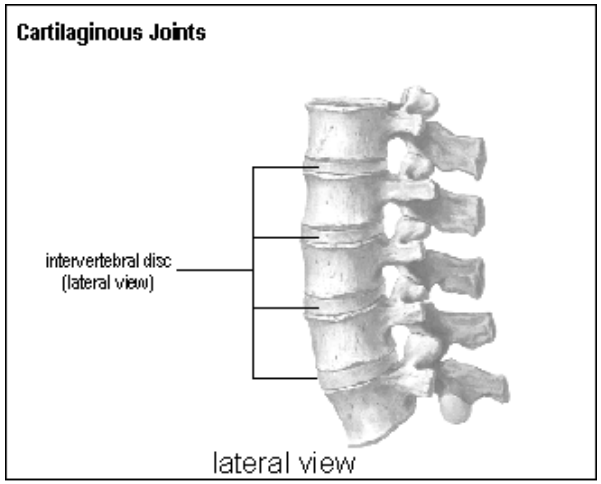
*Joints are functional junctions between bones.

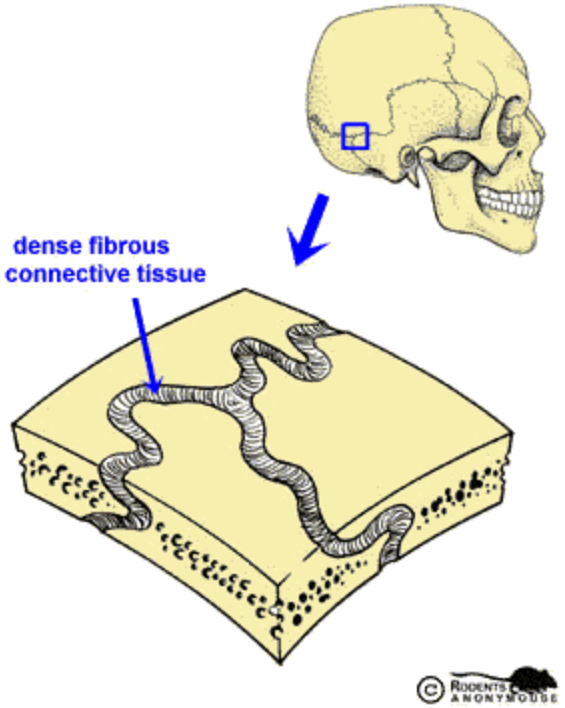


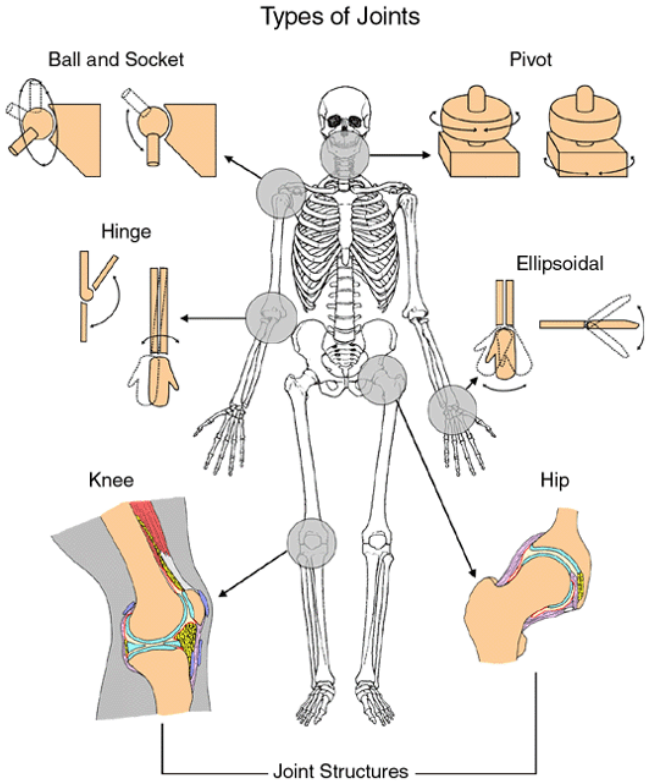


TYPES OF JOINTS

Joints can be classified according to the type of tissue that binds the bones together.

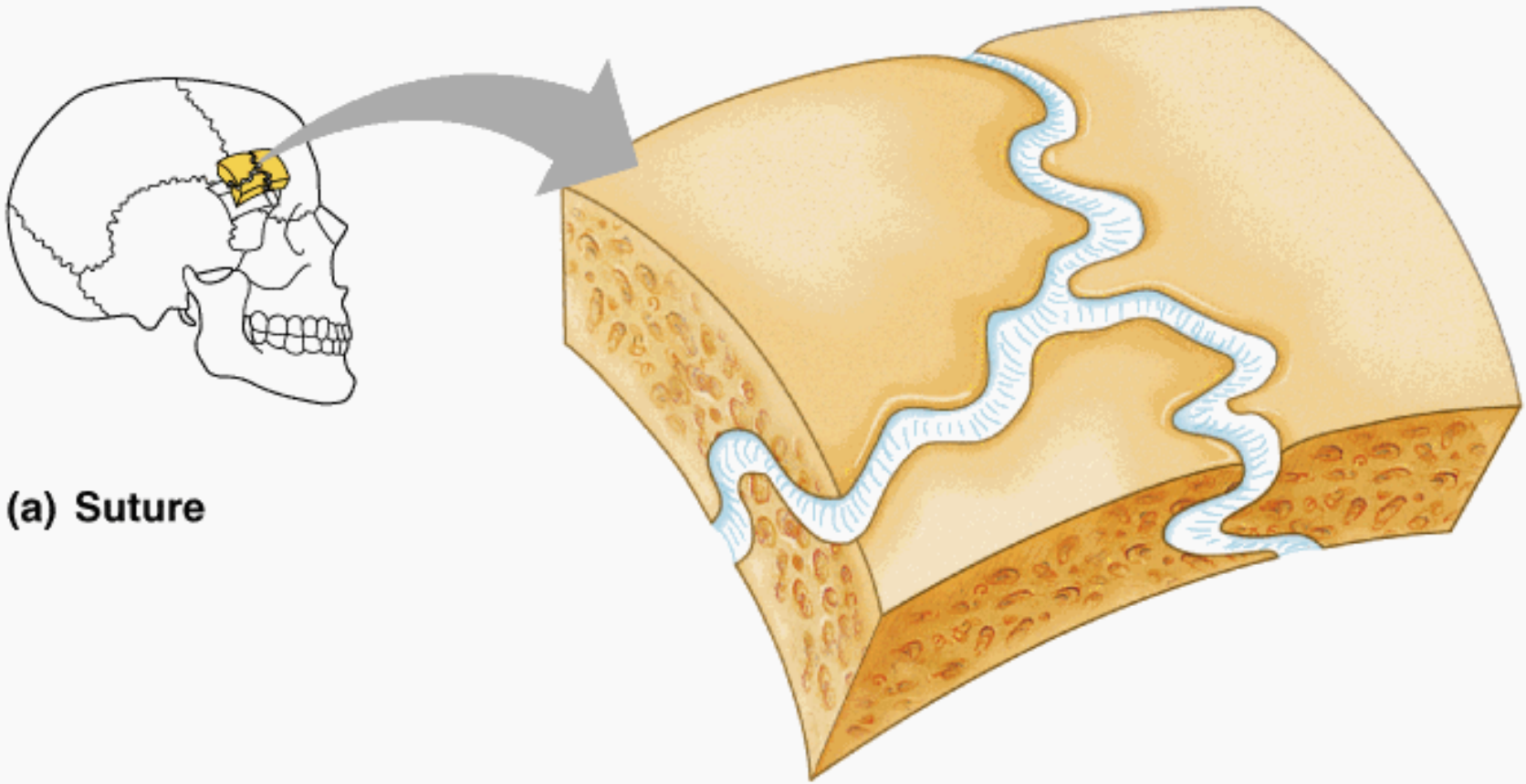






➔ FIBROUS JOINTS:

- bones at fibrous joints are tightly joined by a layer of dense connective tissue.
- **little or no movement** occurs at a fibrous joint
- **Example**: the sutures between the flat bones of the skull



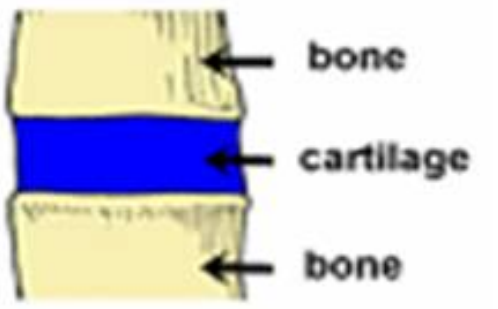
(a) Suture

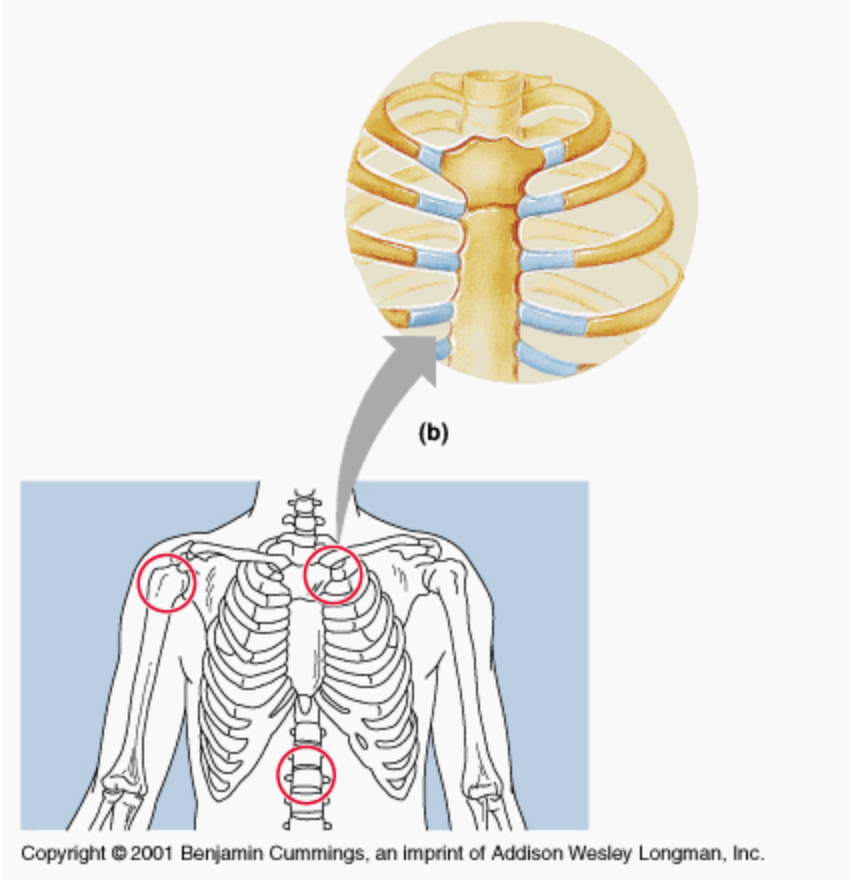
➔ CARTILAGINOUS JOINTS:

- a layer of **hyaline cartilage**, or fibrocartilage, joins bones of cartilaginous joints

- allow **limited movement**

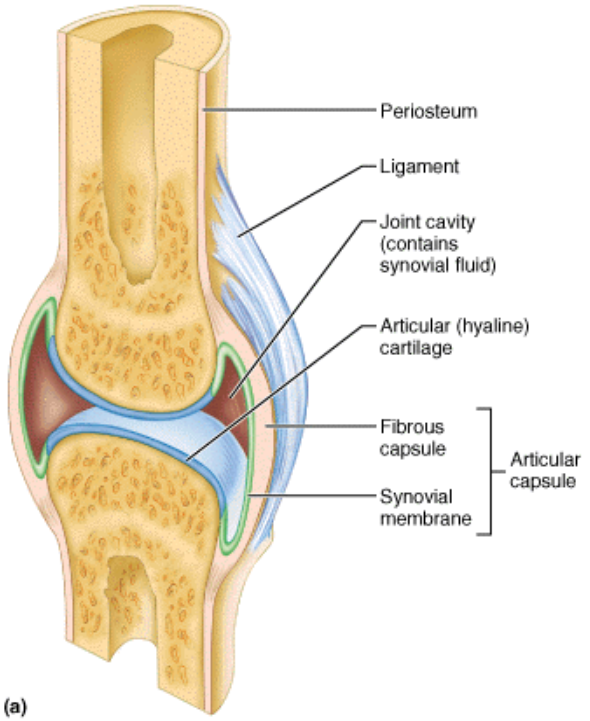
- **Example**: the joints that separate the vertebrae

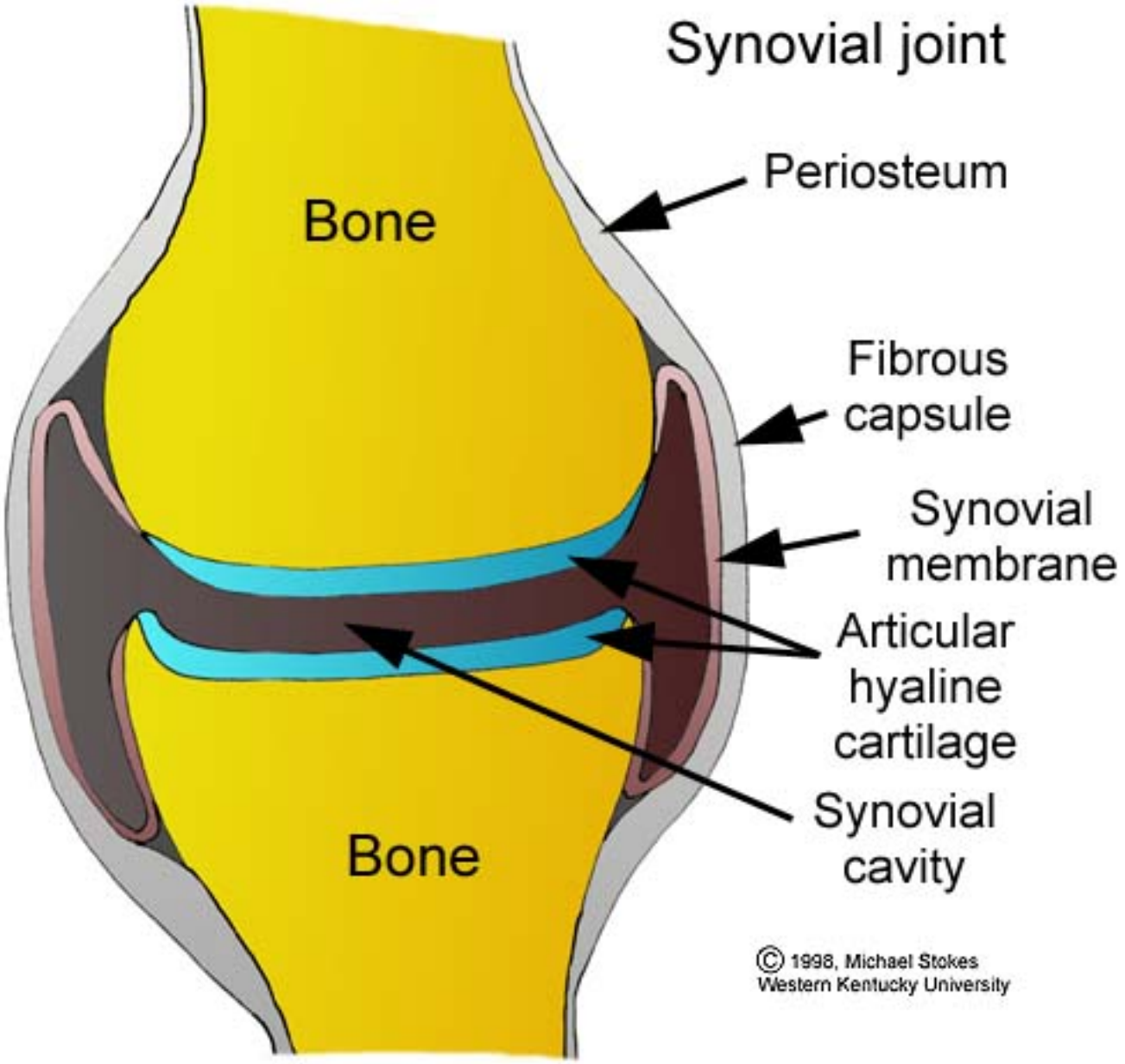




➔ SYNOVIAL JOINTS:

- most joints in the body are synovial joints
- allow **free movement**
- bones at synovial joints are covered with **hyaline cartilage** ("articular cartilage") and held together by a fibrous **JOINT CAPSULE**.

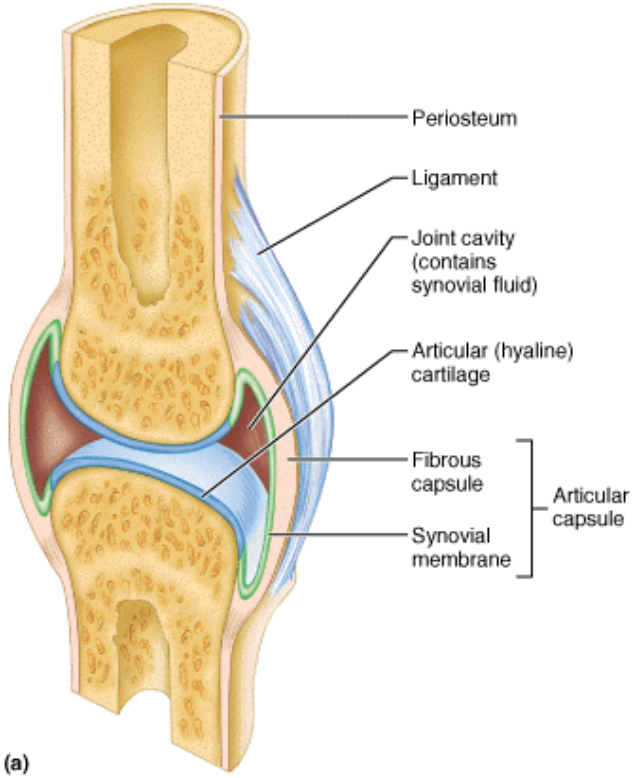



Synovial joint
Periosteum
Bone
Fibrous capsule
Synovial membrane
Articular hyaline cartilage
Synovial cavity
Bone
© 1998, Michael Stokes
Western Kentucky University

➔ SYNOVIAL JOINTS:

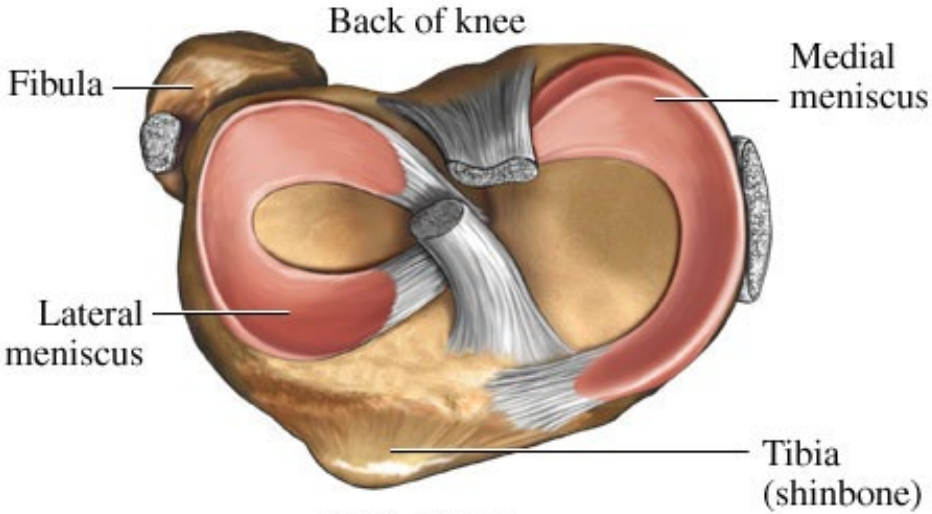
- the joint capsule consists of an outer layer of ligaments and an inner lining of **synovial membrane** (which secretes synovial fluid to lubricate the joint).

- some synovial joints have flattened, shock-absorbing pads of fibrocartilage called **MENISCI** between the articulating surfaces of the bones



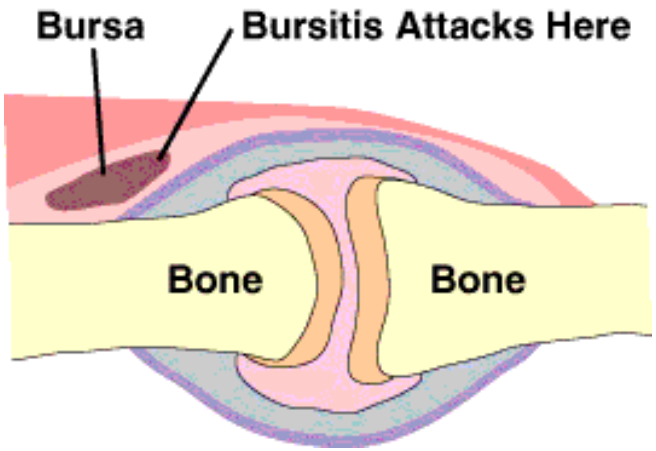
(a)

Superior (top) view of right knee



➔ SYNOVIAL JOINTS:

- some synovial joints may also have **BURSAE**, which are fluid-filled sacs located between the skin and the underlying bony prominences.
- **Example**: at the knee joint, the patella is sandwiched between 2 bursae.



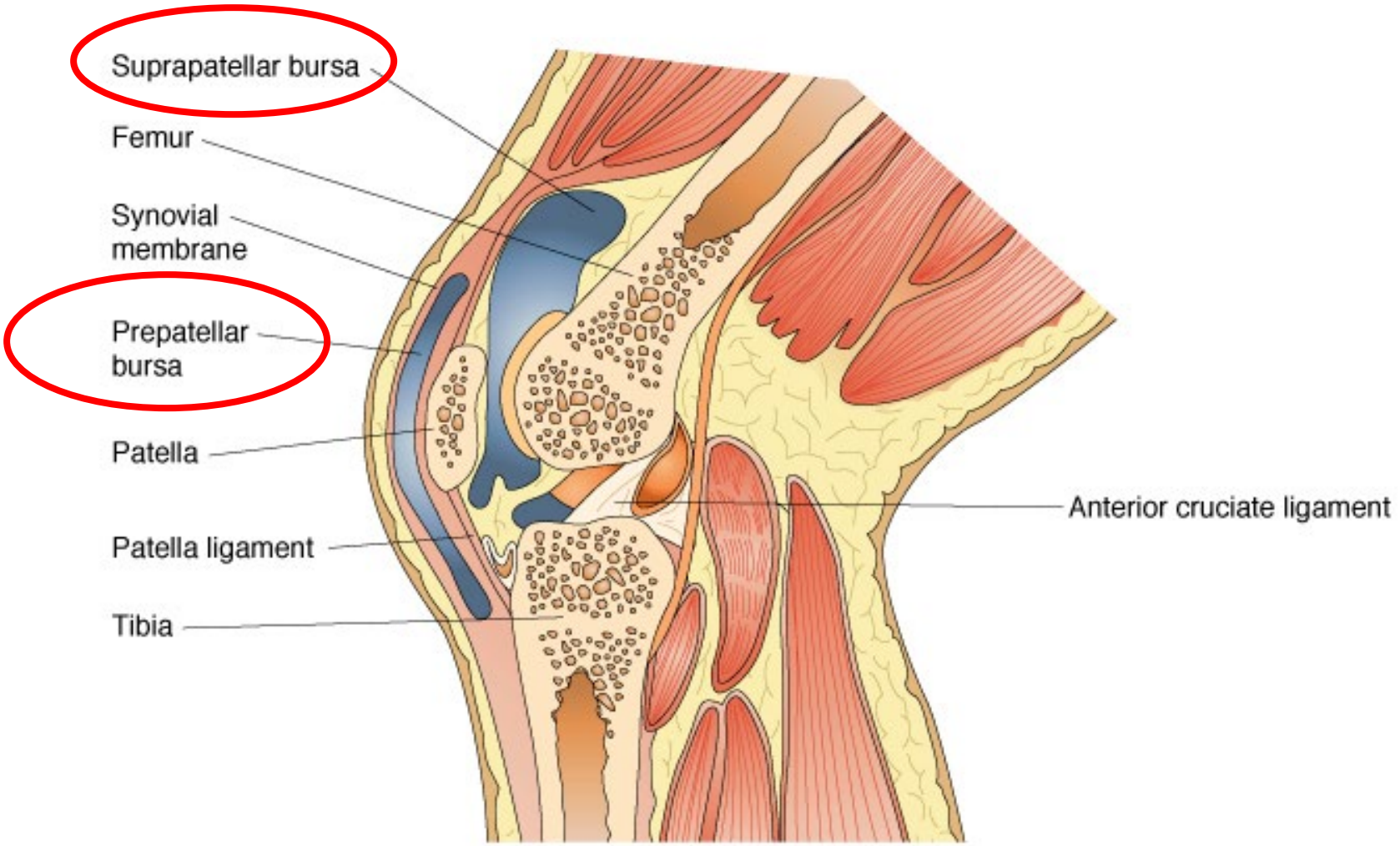


Figure 56-7 Sagittal section of knee joint, showing prepatellar and suprapatellar bursae.

TYPES OF SYNOVIAL JOINTS:

- Ball-and-socket

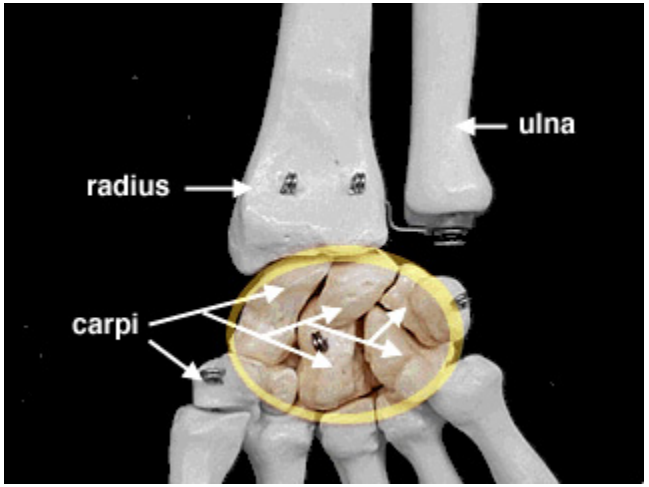
  - round head of one bone rests within a cup-shaped depression of another

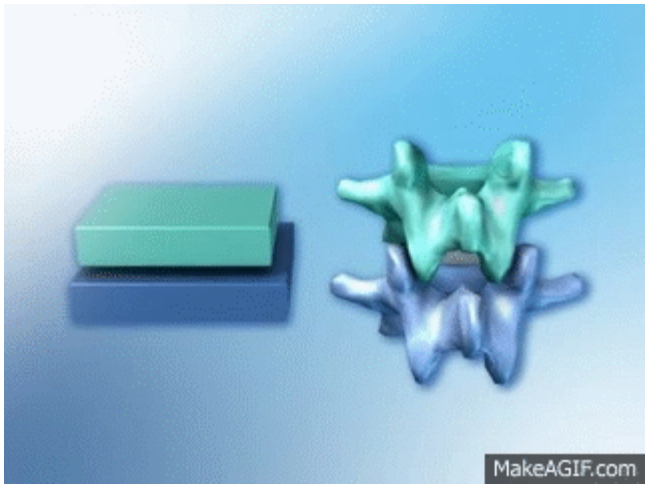
  - all angular and rotational movements, including circumduction can be performed by this joint

Carlyn Iverson

TYPES OF SYNOVIAL JOINTS:

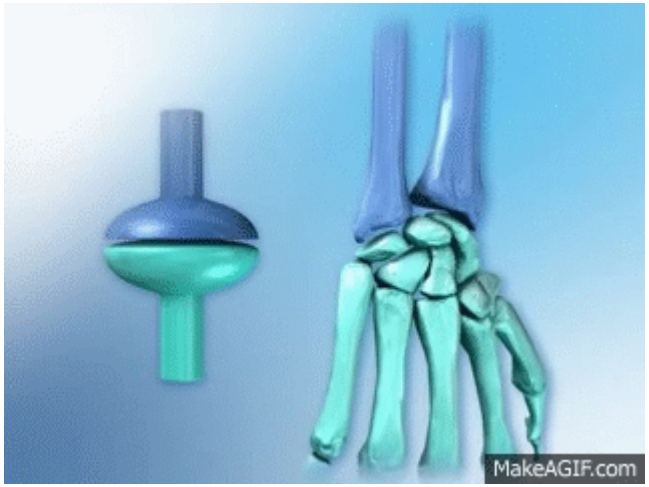
- Gliding (planar)
  - Have flattened or slightly curved faces
  - Flat articular surfaces slide across one another
  - Amount of movements is slightly





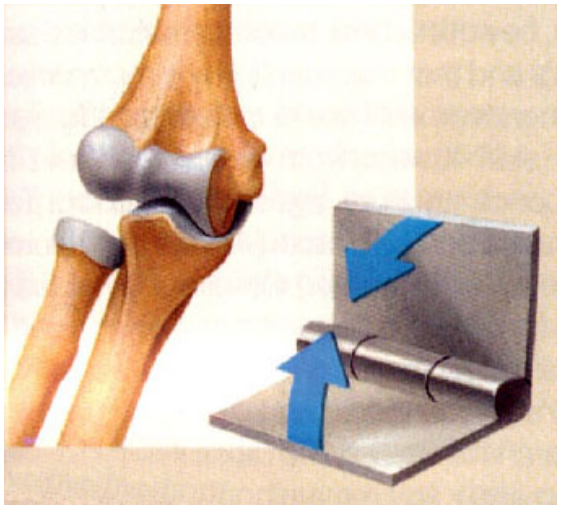
TYPES OF SYNOVIAL JOINTS:

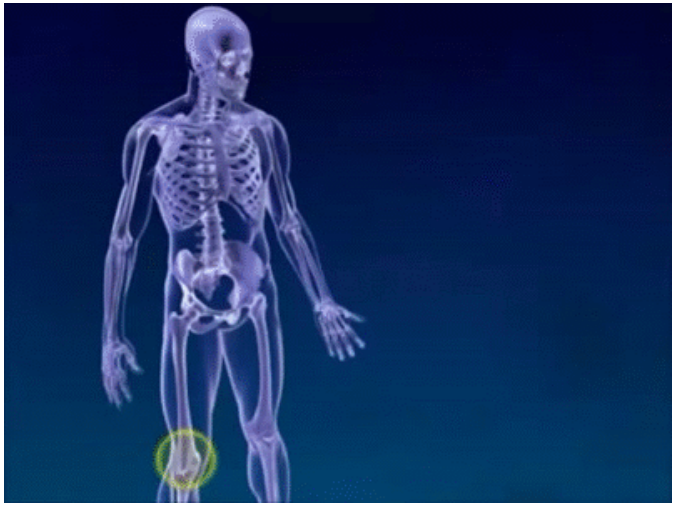
- Condylar (ellipsoid)
  - Oval articular face nests within a depression in opposing surface
  - Angular movements occur in 2 planes: along or across length of oval



TYPES OF SYNOVIAL JOINTS:

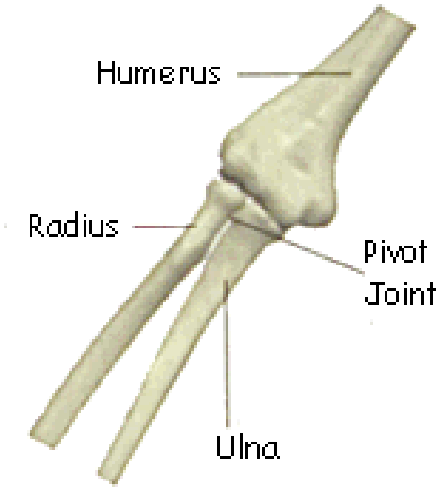
- Hinge
  - Permits angular motion in single plane (e.g. opening and closing a door)

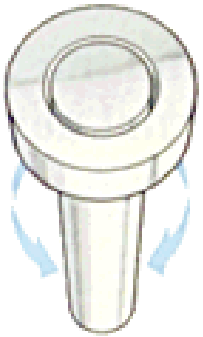




TYPES OF SYNOVIAL JOINTS:

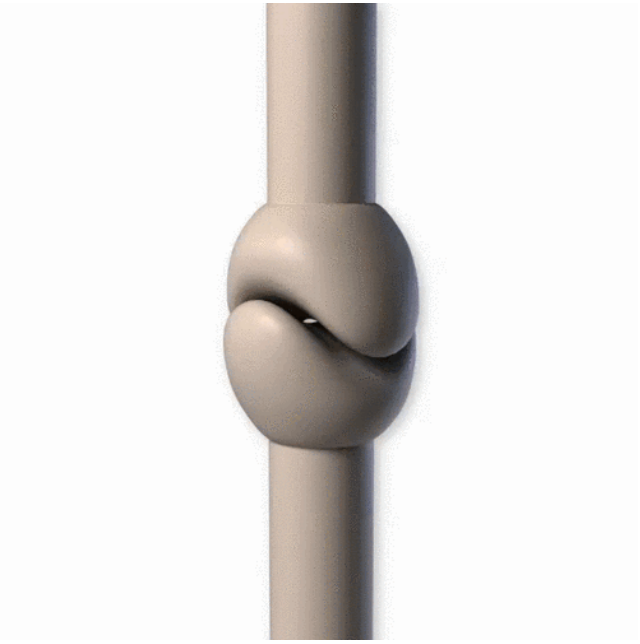
- pivot
  - are monoaxial (1 axis)
  - permits only rotation

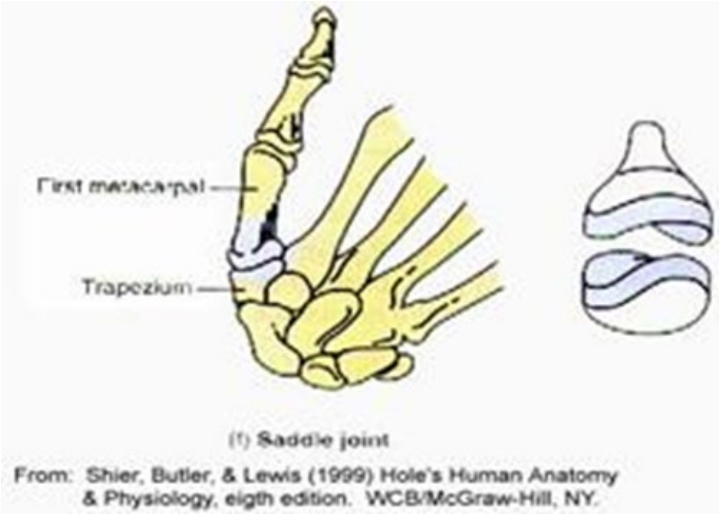




TYPES OF SYNOVIAL JOINTS:

- Saddle (sellaris)
  - Fit together like a rider in a saddle
  - Each surface is concave on one axis and convex on the other





(f) Saddle joint

From: Shier, Butler, & Lewis (1999) Hole's Human Anatomy & Physiology, eigth edition. WCB/McGraw-Hill, NY.

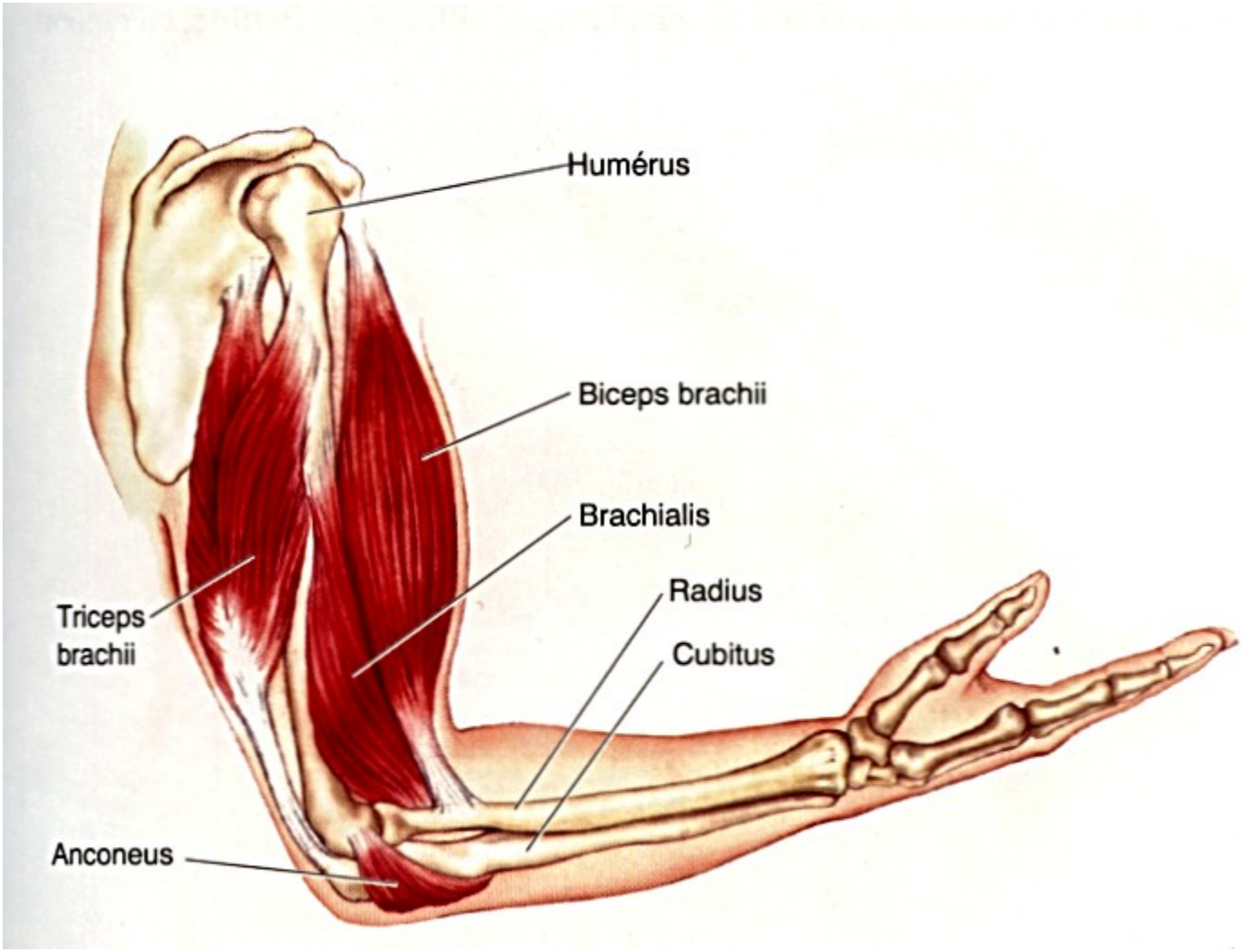
TYPES OF JOINT MOVEMENTS

- muscles fastened on either side of a joint produce movements of synovial joints.

- typically, one end of a muscle is attached to a relatively immovable or fixed part on one side of a joint, and the other end of the muscle is fastened to a movable part on the other side

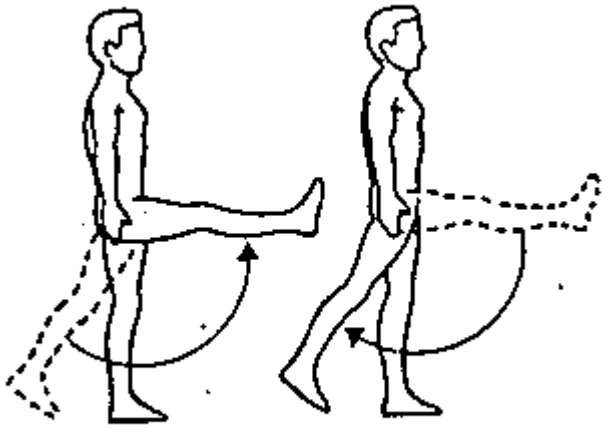
  ➔ the movable end of the muscle is called the **INSERTION**

  ➔ the fixed end of the muscle is called the **ORIGIN**


Humérus
Biceps brachii
Brachialis
Triceps brachii
Radius
Cubitus
Anconeus

➔ JOINT MOVEMENTS INCLUDE…

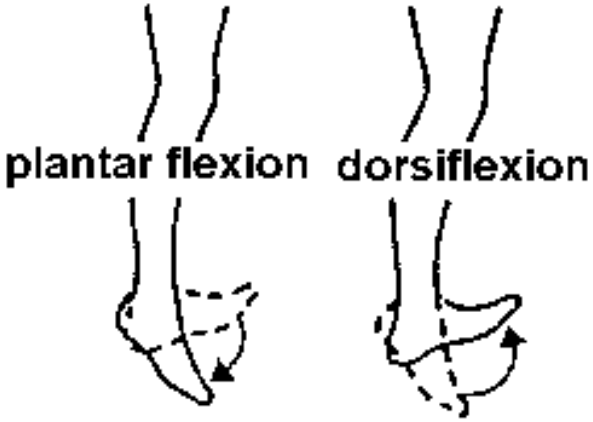
- flexion: movement in anterior/posterior plane that reduces angle
- extension: movement in anterior/posterior plane that increases angle

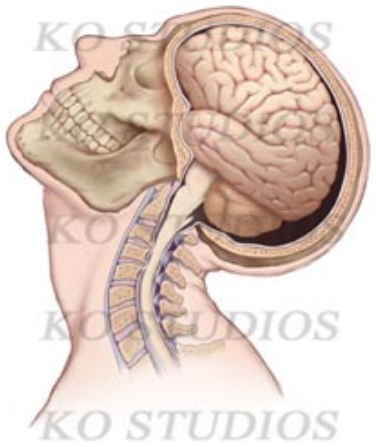


Flexion Extension

➔ JOINT MOVEMENTS (cont.)

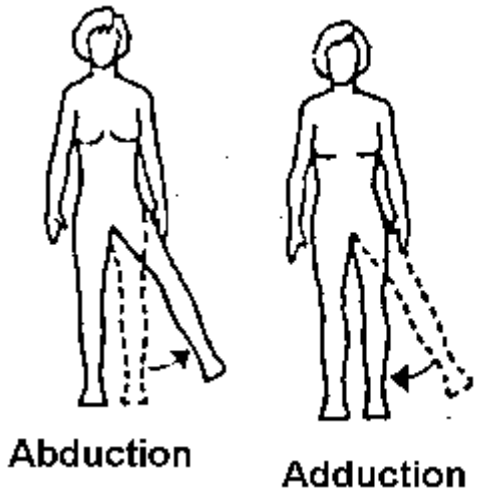
- dorsiflexion: flexion of ankle join and elevation of sole (e.g. digging in heel)
- plantar flexion: extends ankle joint and elevates heel (e.g.standing tip toe)
- hyperextension: extension past anatomical position





➔ JOINT MOVEMENTS (cont.)

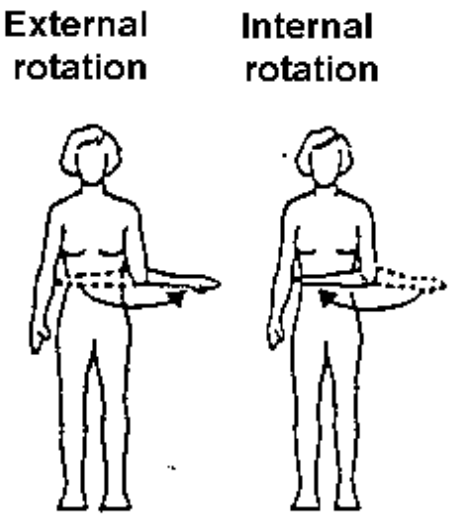
- abduction: move away from longitudinal axis of body



- adduction: move towards from longitudinal axis of body

➔ JOINT MOVEMENTS (cont.)

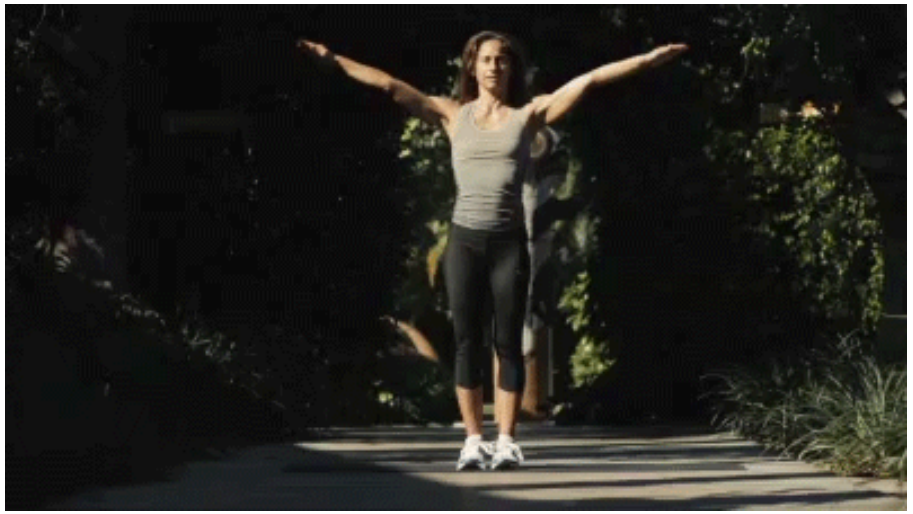
- rotation: spin around longitudinal axis



➔ JOINT MOVEMENTS (cont.)

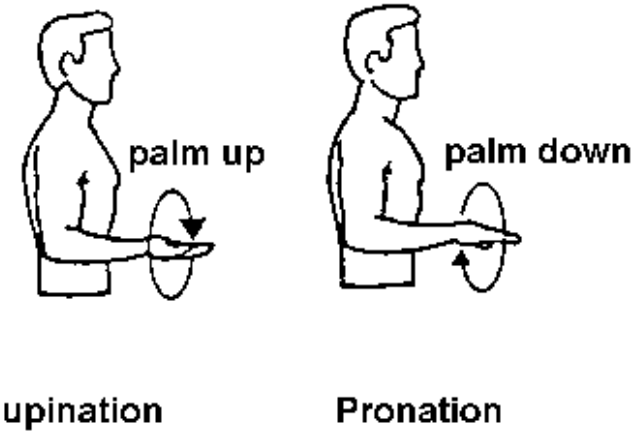
- circumduction: movement in circular direction, tip of bone does not move

Circumduction



➔ JOINT MOVEMENTS (cont.)

- pronation: rotation of forearm that makes palm face posteriorly

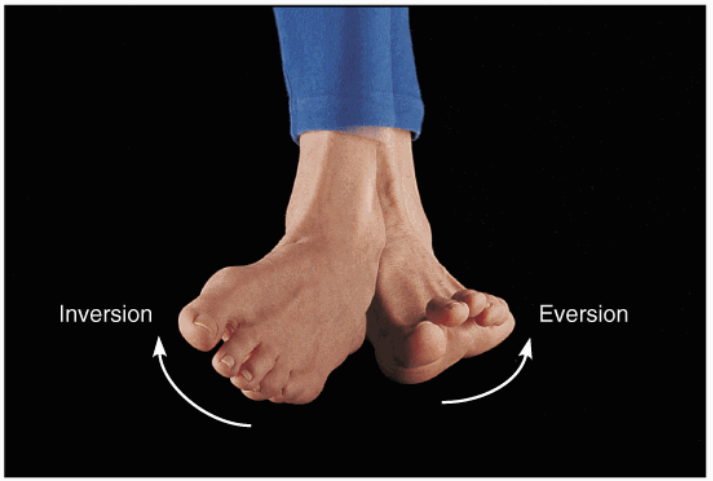


- supination: rotation of forearm that makes palm face anteriorly

➔ JOINT MOVEMENTS (cont.)

- eversion: turning foot so sole is outward

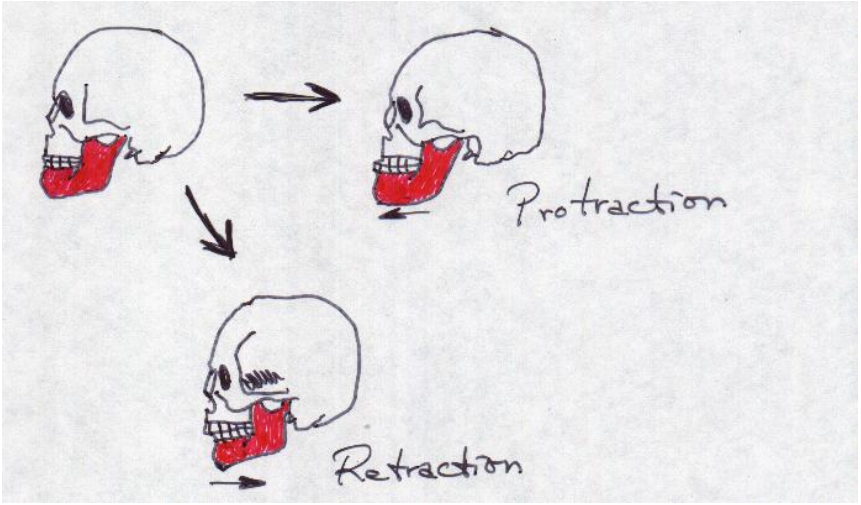
- inversion: turning foot so sole is inward



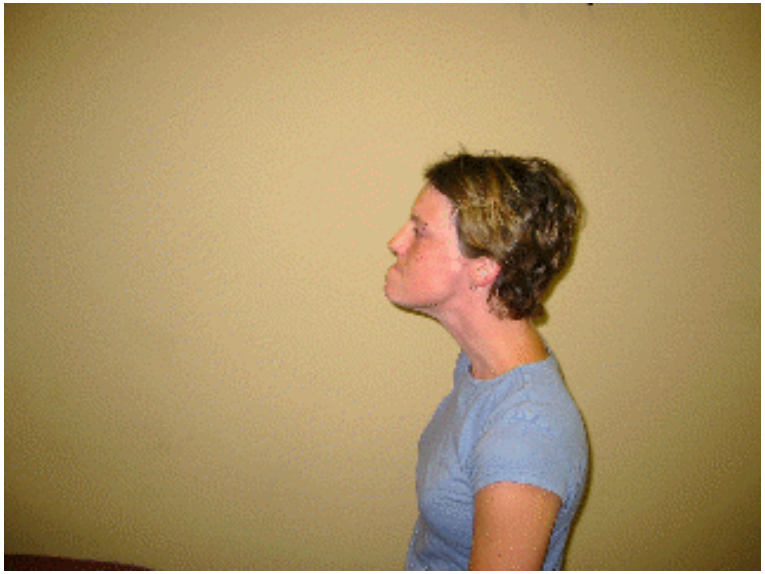
(b) Inversion and eversion

➔ JOINT MOVEMENTS (cont.)

- retraction: moves body part posteriorly on horizontal plane



- protraction: moves body part anteriorly on horizontal plane



➔ JOINT MOVEMENTS (cont.)

- elevation: body part moves in superior direction
- depression: body part moves in inferior direction