Hole's Human
Anatomy and Physiology

Chapter 8
Joints of the Skeletal System

- **Articulations**
- **Functional junctions between bones**
- **Bind parts of skeletal system together**
- **Make bone growth possible**
- **Permit parts of the skeleton to change shape during childbirth**
- **Enable body to move in response to skeletal muscle contraction**

Classification of Joints

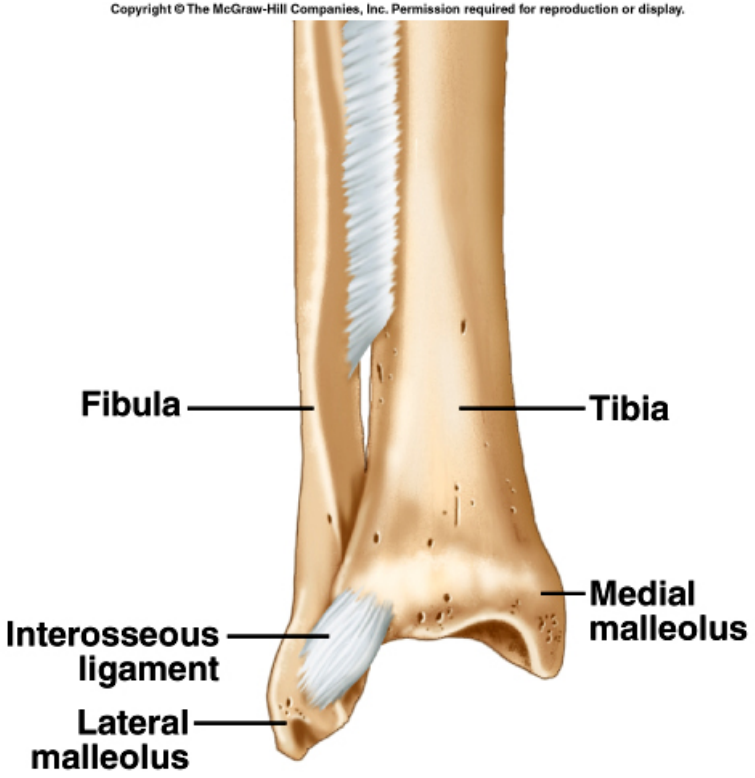
- **Fibrous Joints**
  - **dense connective tissues connect bones**
  - **between bones in close contact**
- **Cartilaginous Joints**
  - **hyaline cartilage or fibrocartilage connect bones**
- **Synovial Joints**
  - **most complex**
  - **allow free movement**

- **synarthrotic**
  - **immovable**
- **amphiarthrotic**
  - **slightly movable**
- **diarthrotic**
  - **freely movable**

Fibrous Joints

3 Types

- **Syndesmosis**
- **Suture**
- **Gomphosis**



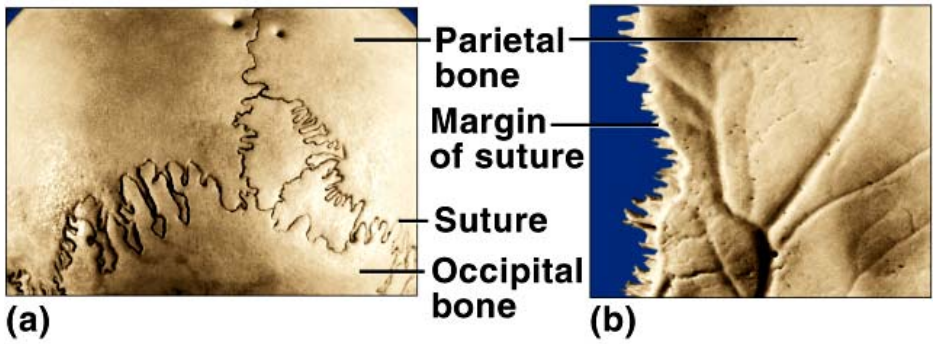
Syndesmosis

- **a sheet or bundle of fibrous tissue connects bones**
- **amphiarthrotic**
- **lies between tibia and fibula**

Fibrous Joints

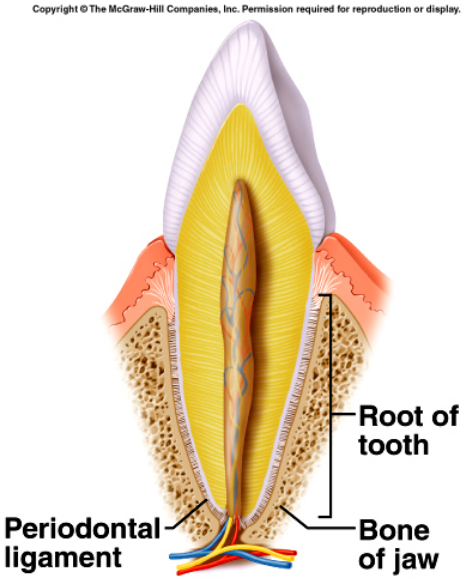
Suture

- between flat bones
- synarthrotic
- thin layer of connective tissue connects bones



Gomphosis

- cone-shaped bony process in a socket
- tooth in jawbone
- synarthrotic



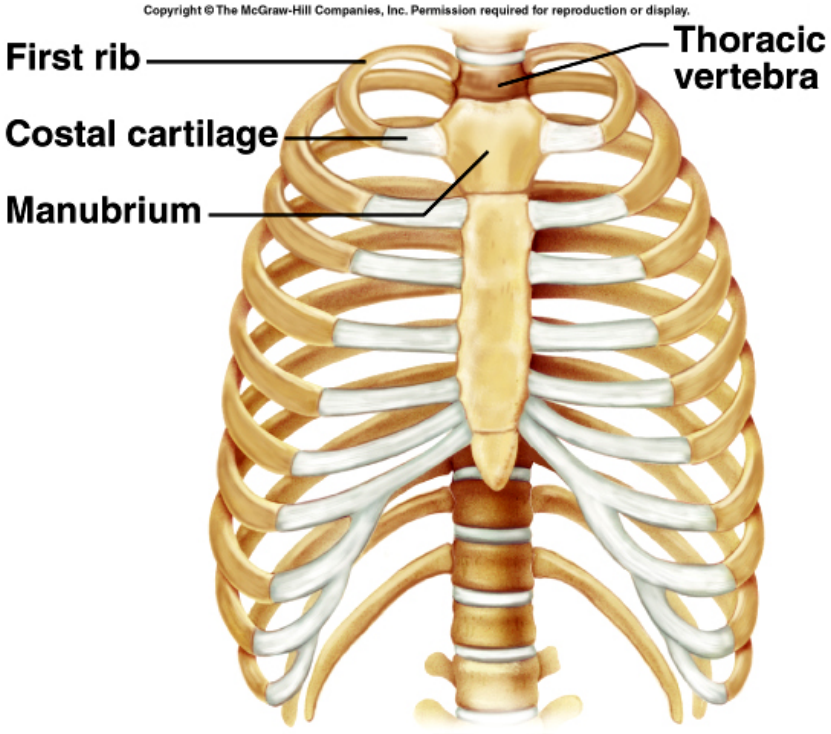
Cartilaginous Joints

2 Types

- **Synchondrosis**
- **Symphysis**

Synchondrosis

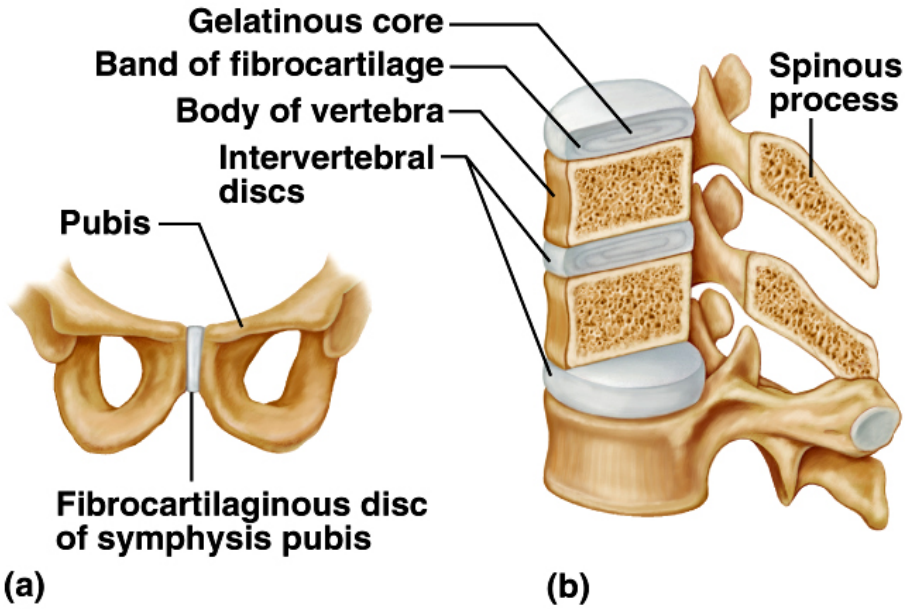
- **bands of hyaline cartilage unite bones**
- **epiphyseal plate (temporary)**
- **between manubrium and first rib**
- **synarthrotic**



Cartilaginous Joints

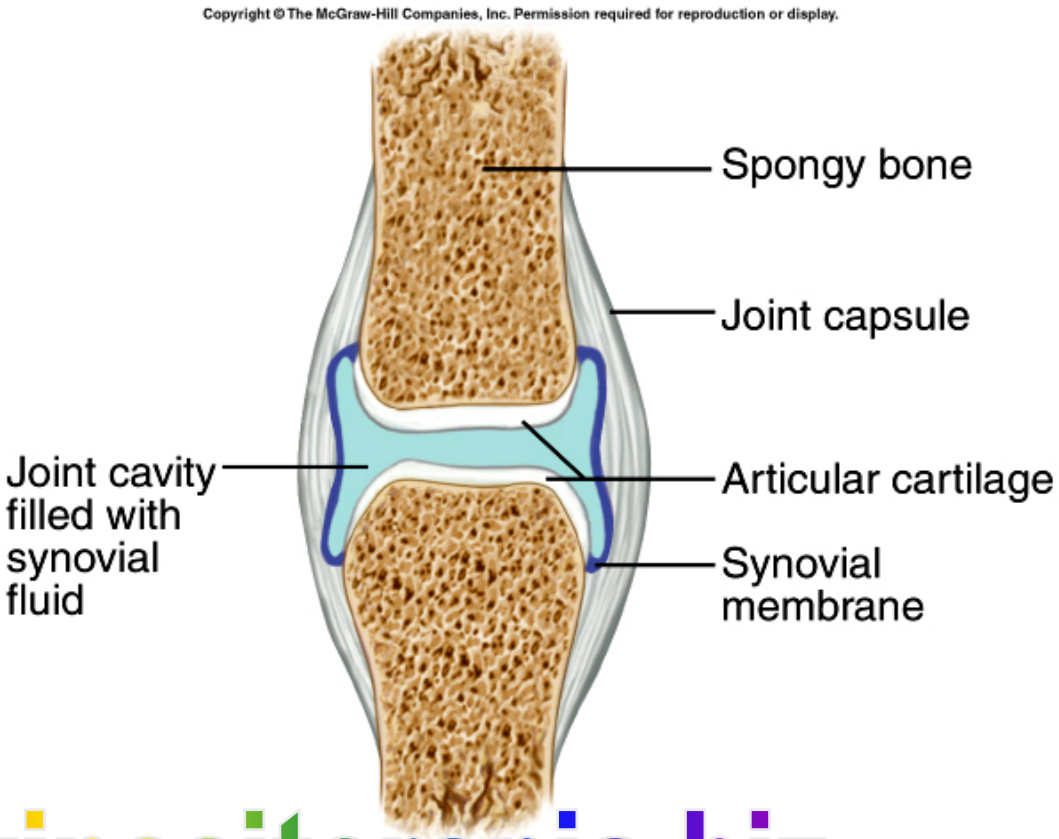
Symphysis

- pad of fibrocartilage between bones
- pubis symphysis
- joint between bodies of adjacent vertebrae
- amphiarthrotic



Synovial Joints

- **diarthrotic**
- **joint cavity**
- **synovial fluid**
- **joint capsule**
- **synovial membrane**
- **bursae**



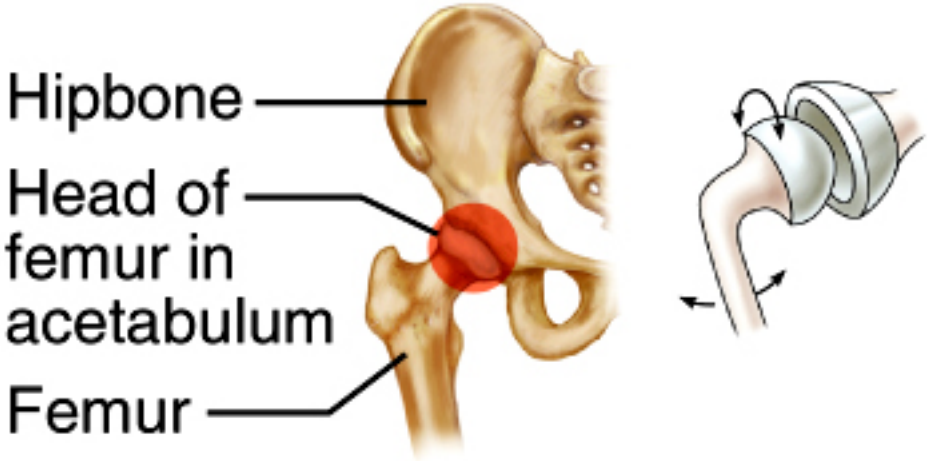
Types of Synovial Joints

Ball-and-Socket Joint

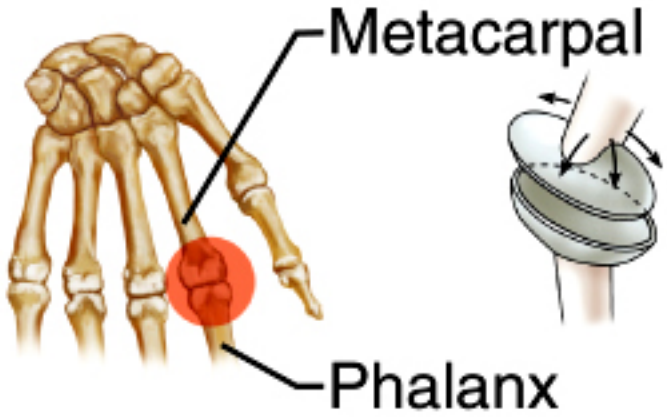
- **hip**
- **shoulder**

Condyloid Joint

- **between metacarpals and phalanges**



(a) Ball-and-socket joint

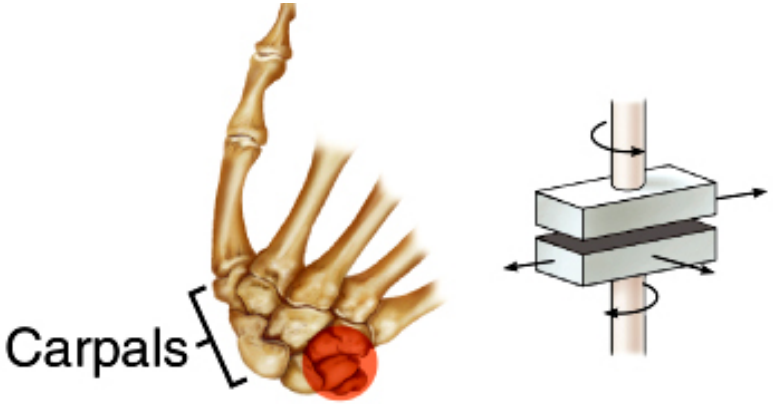


(b) Condyloid joint

Types of Synovial Joints

Gliding Joint

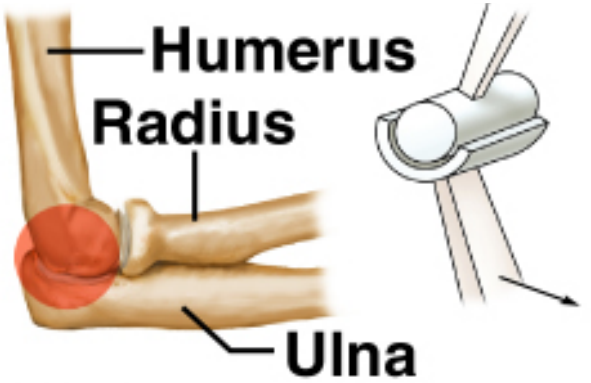
- between carpals
- between tarsals



(c) Gliding joint

Hinge Joint

- elbow
- between phalanges



(d) Hinge joint

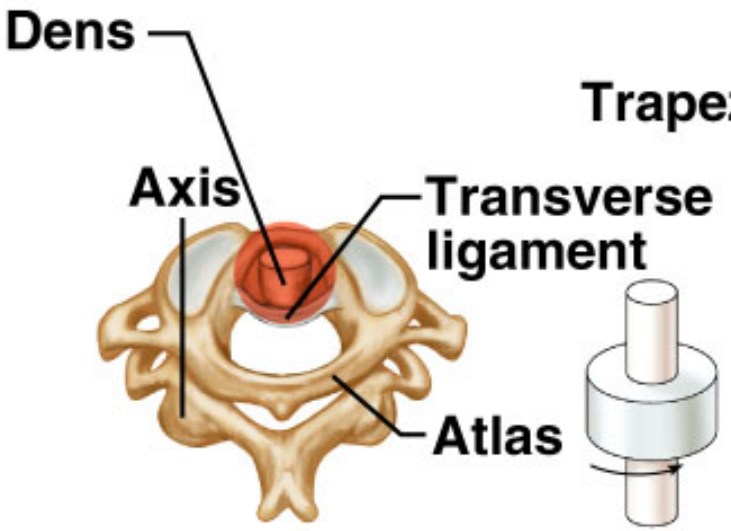
Types of Synovial Joints

Pivot Joint

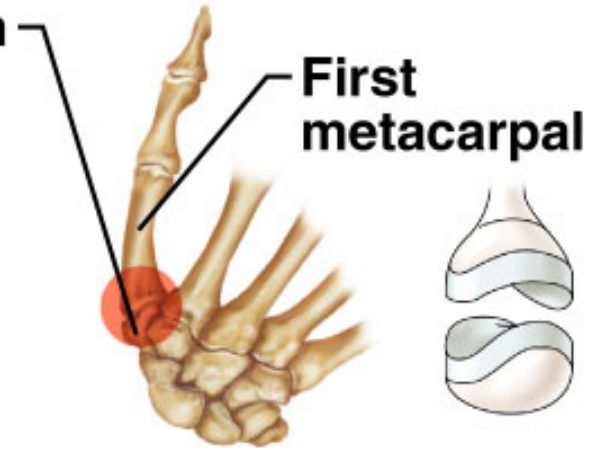
- between proximal ends of radius and ulna

Saddle Joint

- between carpal and metacarpal of thumb



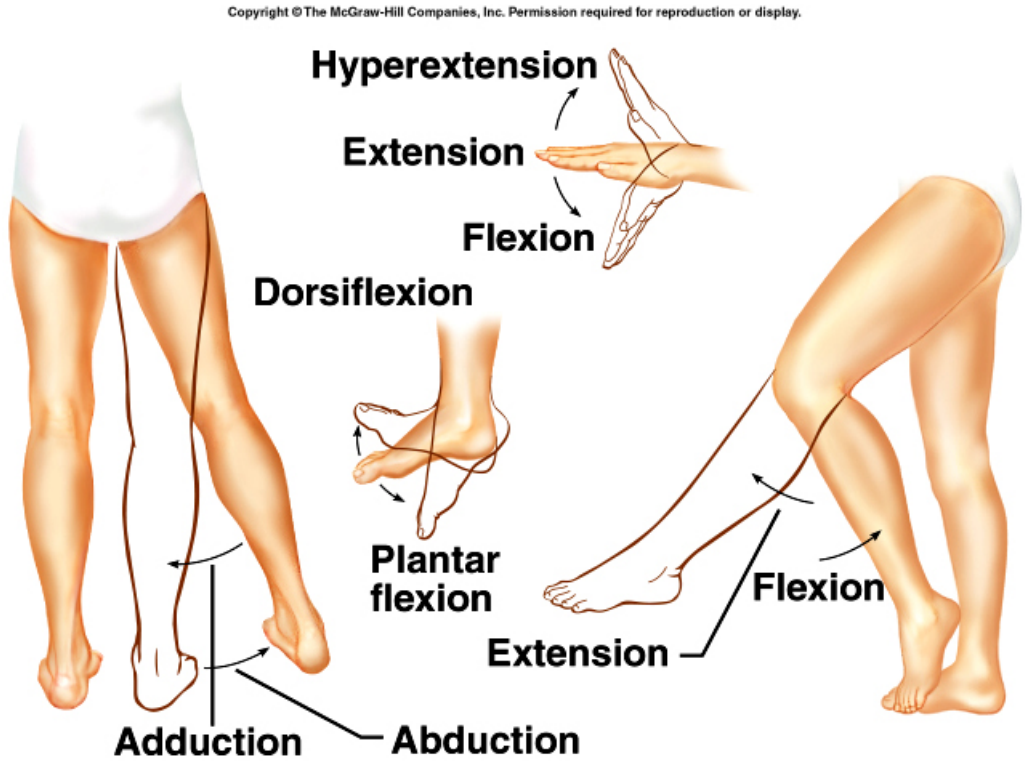
(e) Pivot joint



(f) Saddle joint

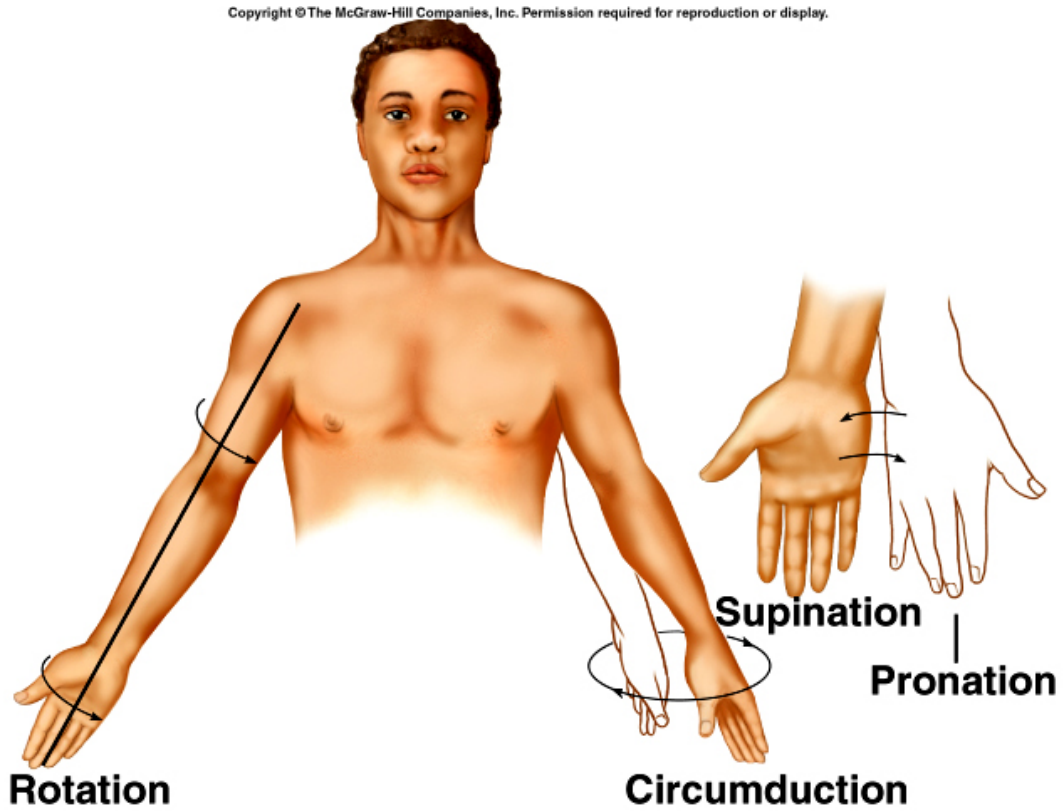
Types of Joint Movements

- **abduction/adduction**
- **dorsiflexion/plantarflexion**
- **flexion/extension/hyperextension**



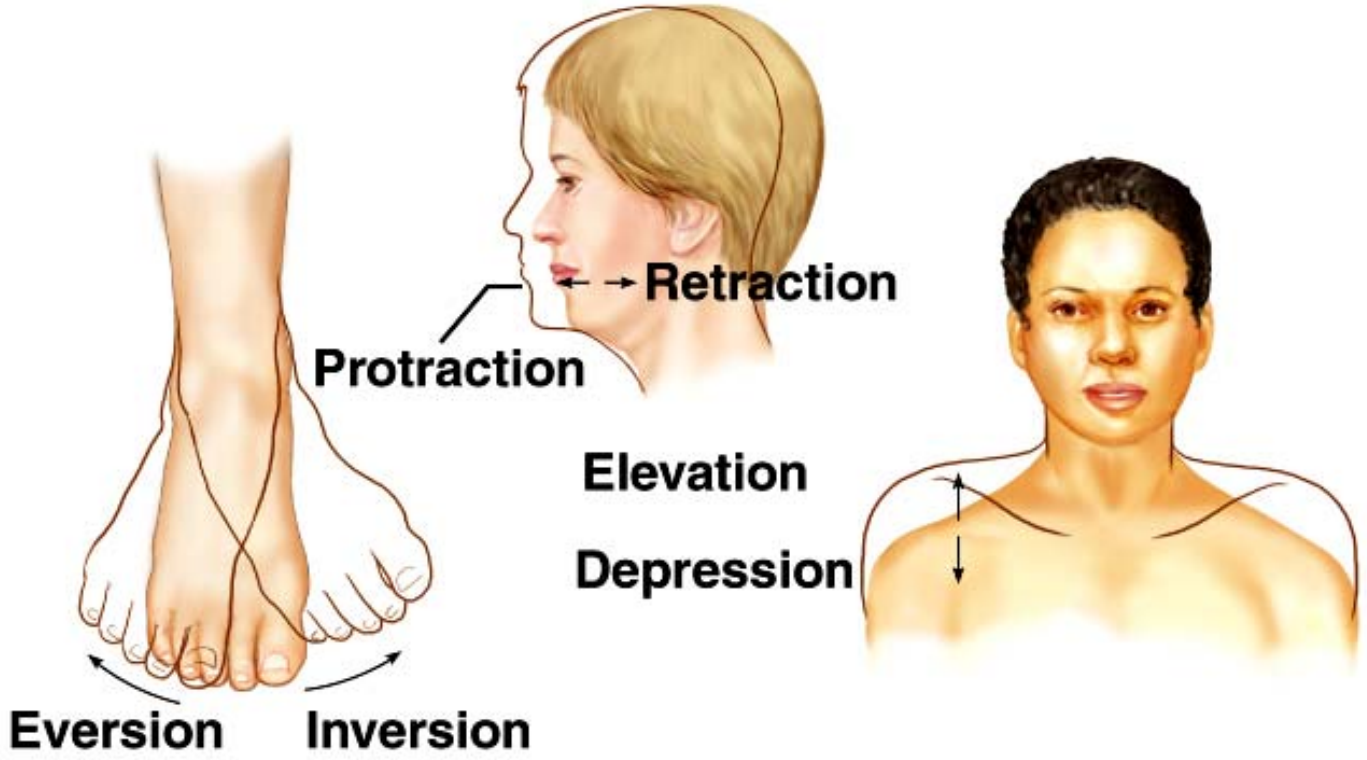
Types of Joint Movements

- **rotation/circumduction**
- **supination/pronation**



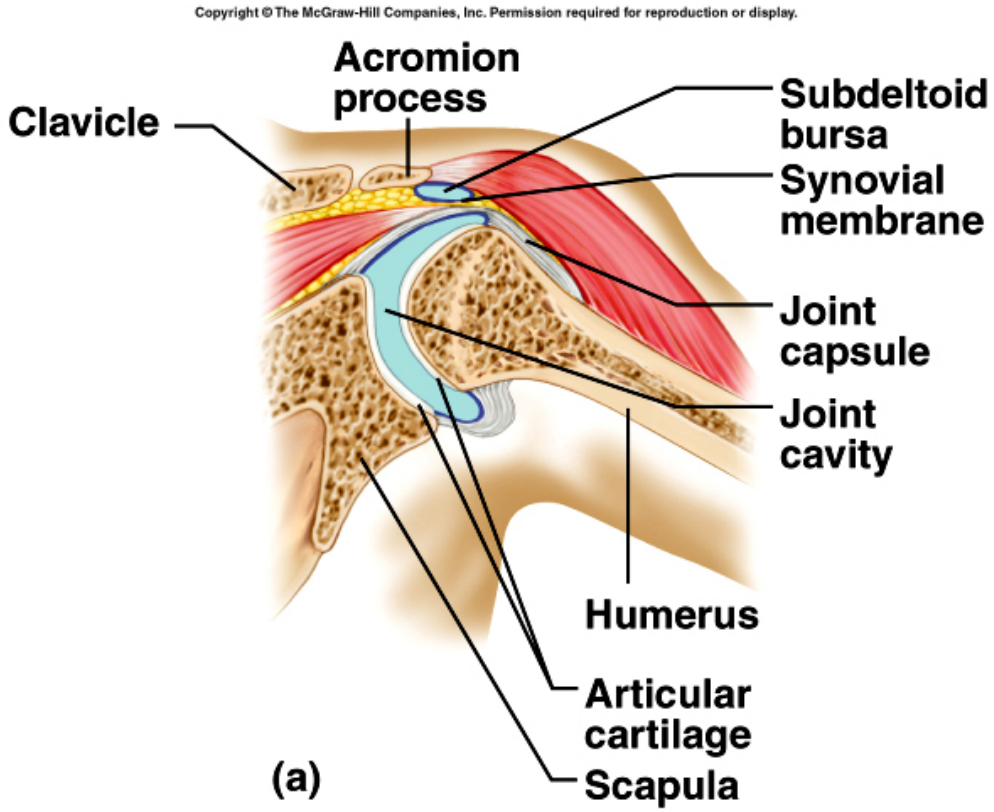
Types of Joint Movements

- **eversion/inversion**
- **protraction/retraction**
- **elevation/depression**

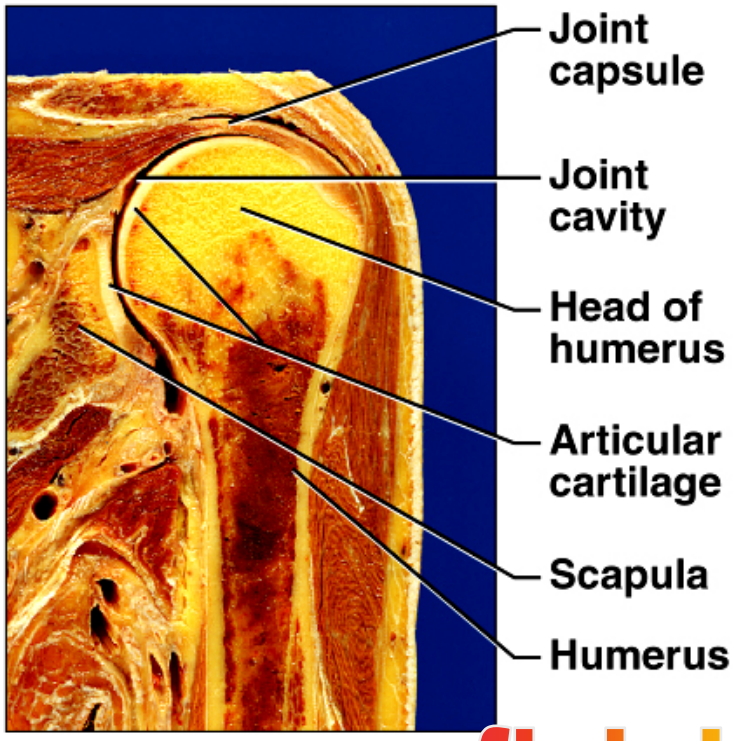


Shoulder Joint

- ball-and-socket
- head of humerus
- glenoid cavity of scapula
- loose joint capsule
- bursae
- ligaments prevent displacement
- very wide range of movement



Shoulder Joint



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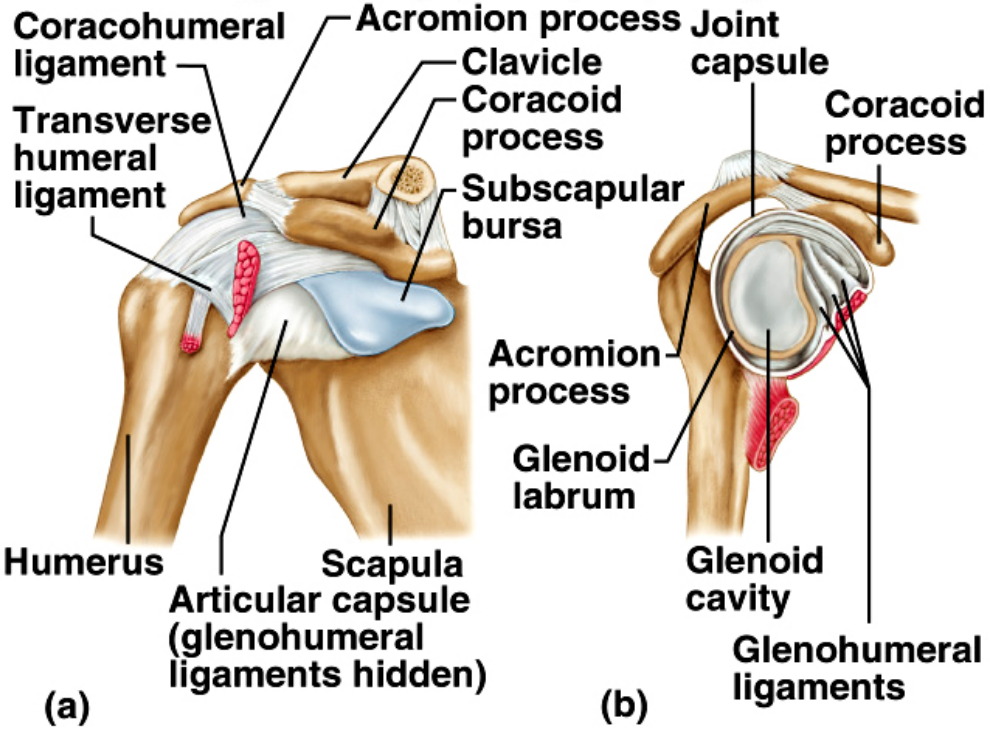
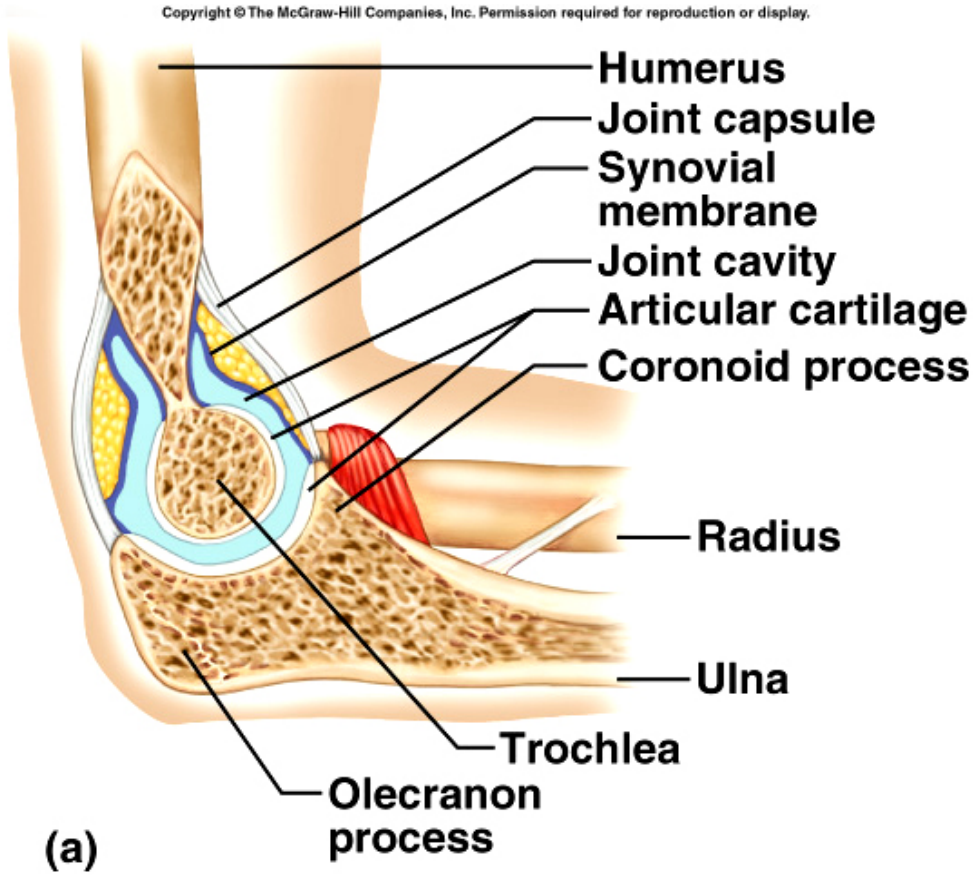
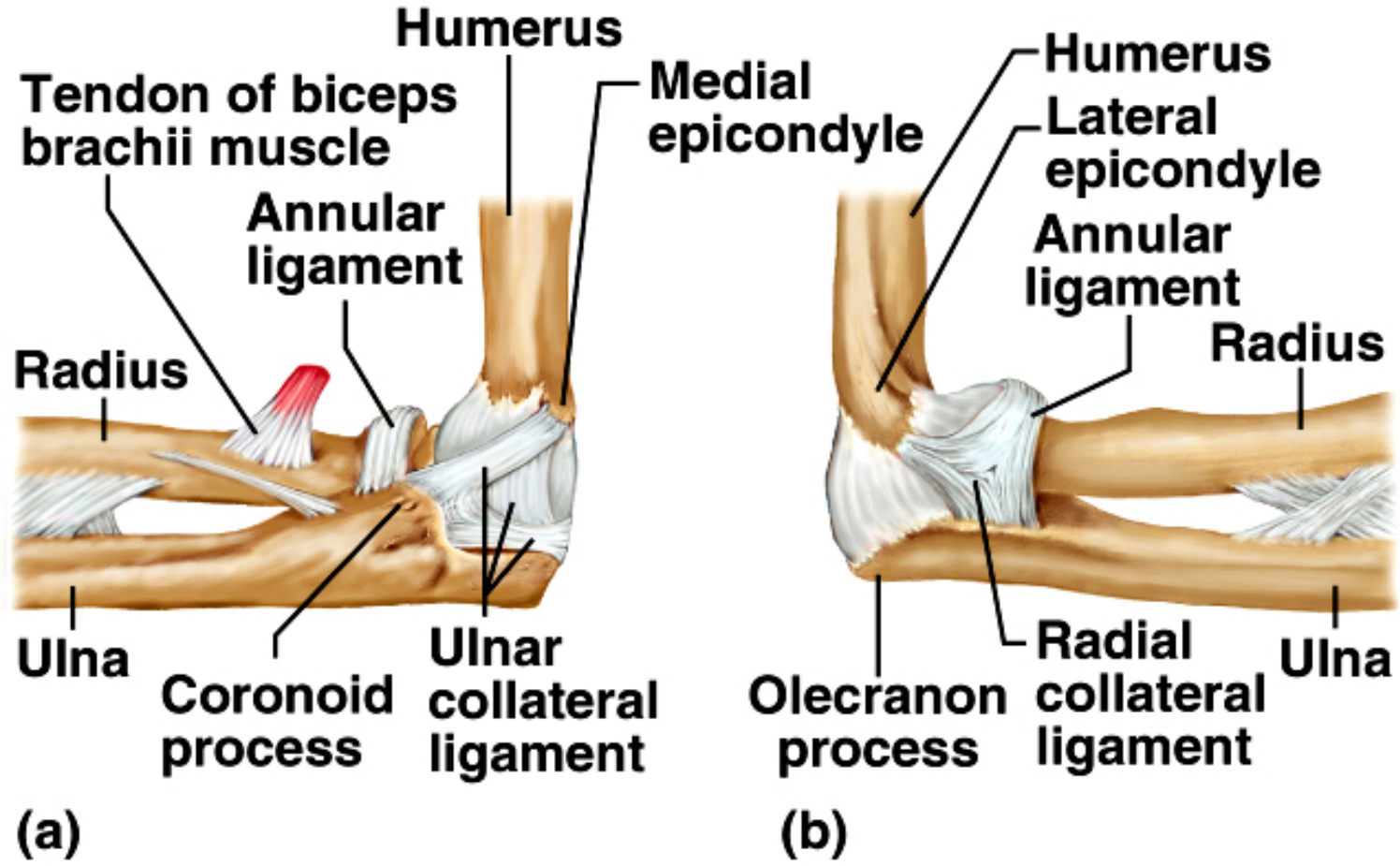


Elbow Joint

- hinge joint
  - trochlea of humerus
  - trochlear notch of ulna
- gliding joint
  - capitulum of humerus
  - head of radius
- flexion and extension
- many reinforcing ligaments
- stable joint

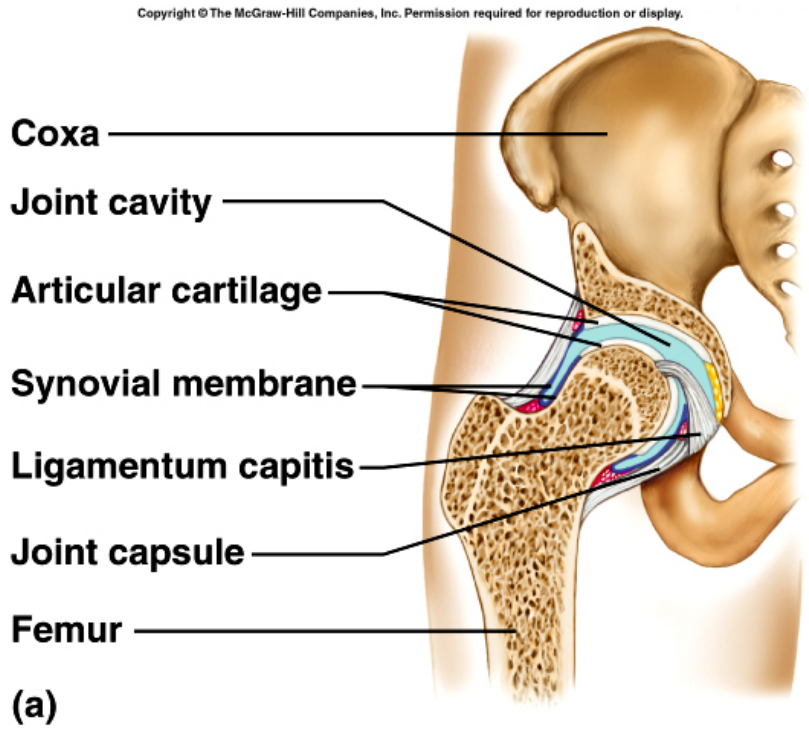


Elbow Joint

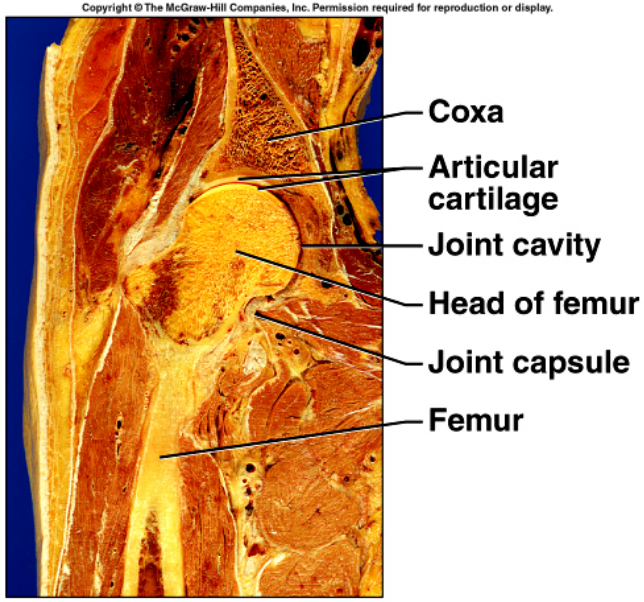


Hip Joint

- ball-and-socket joint
- head of femur
- acetabulum of coxa
- heavy joint capsule
- many reinforcing ligaments
- less freedom of movement than shoulder joint



Hip Joint



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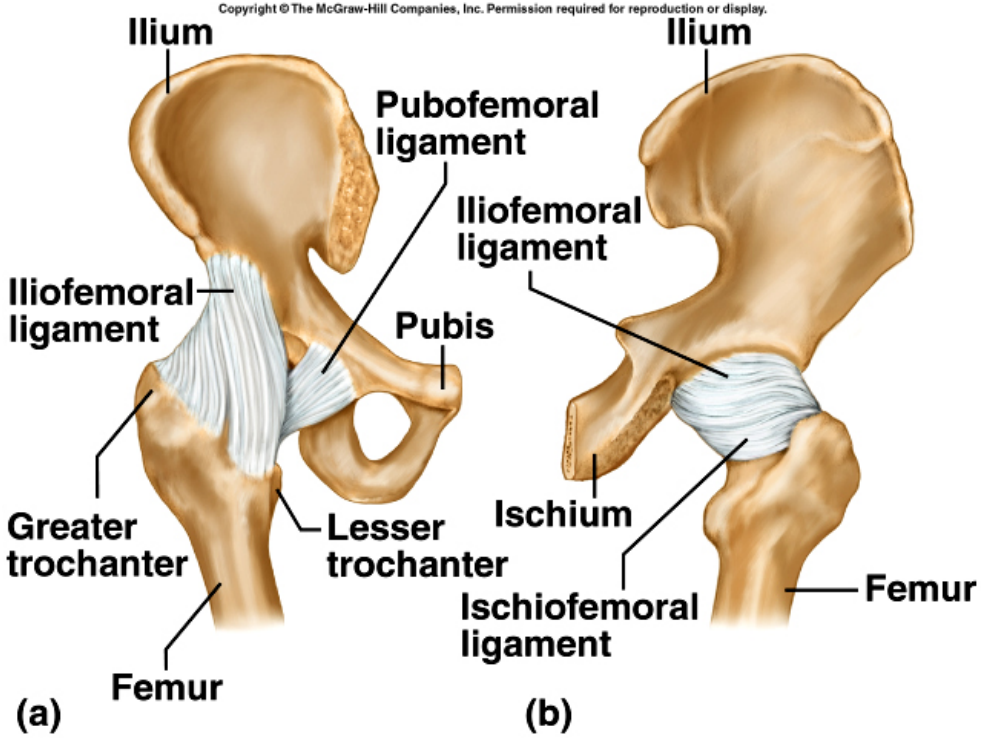
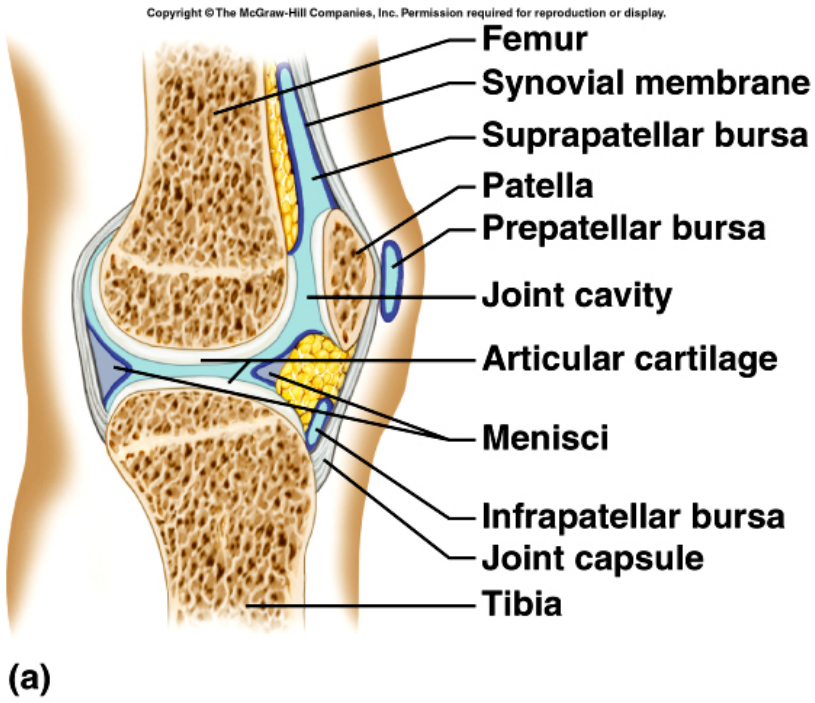
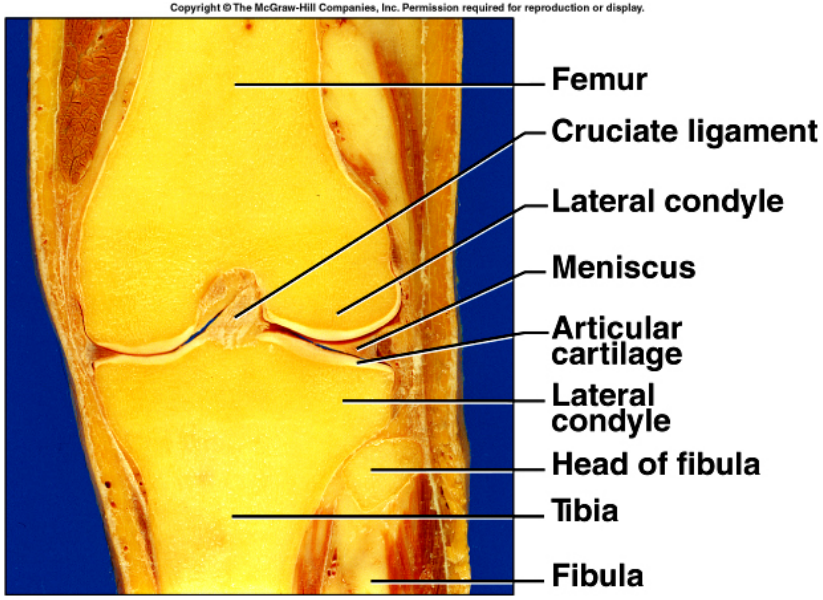


Knee Joint

- largest joint
- most complex
- medial and lateral condyles of distal end of femur
- medial and lateral condyles of proximal end of tibia
- femur articulates anteriorly with patella
- modified hinge joint
- flexion/extension/little rotation
- strengthened by many ligaments and tendons
- menisci separate femur and tibia
- bursae



Knee Joint



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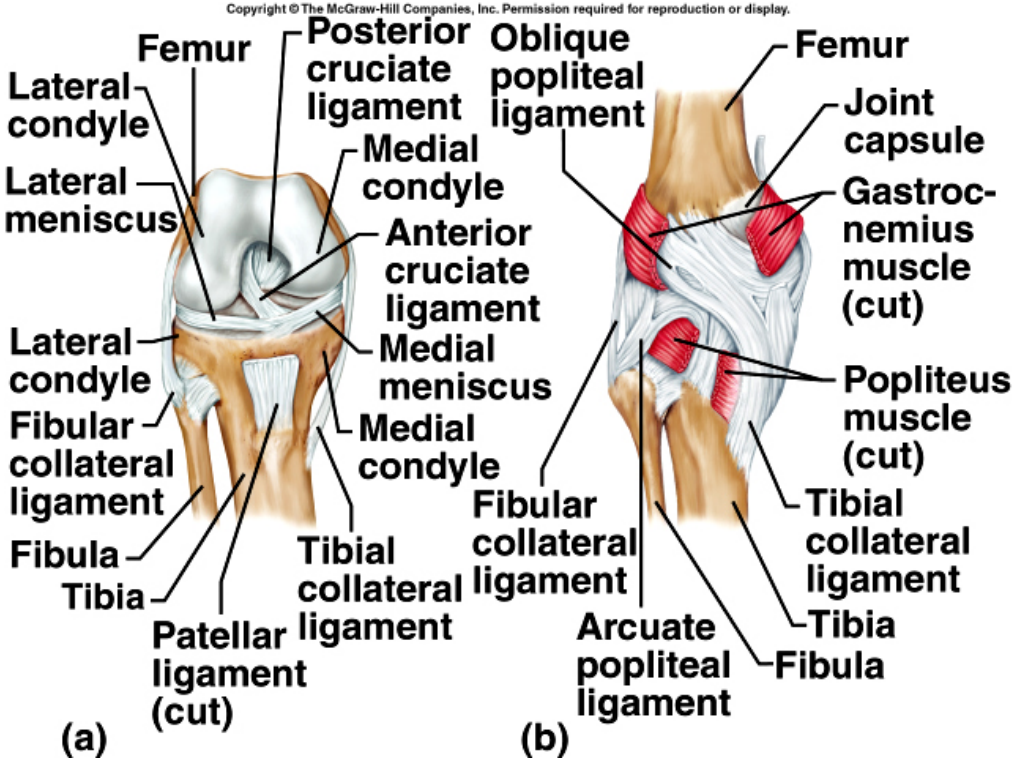

Life-Span Changes

- **Joint stiffness is an early sign of aging**
- **Fibrous joints first to change; can strengthen over a lifetime**
- **Changes in symphysis joints of vertebral column diminish flexibility and decrease height**
- **Synovial joints lose elasticity**
- **Disuse hampers the blood supply**
- **Activity and exercise can keep joints functional longer**

Clinical Application

Joint Disorders

Sprains

- damage to cartilage, ligaments, or tendons associated with joints
- forceful twisting of joint

Bursitis

- inflammation of a bursa
- overuse of a joint

Arthritis

- inflamed, swollen, painful joints
  - Rheumatoid Arthritis
  - Osteoarthritis
  - Gout