

LESSONS 13

- **Joints**

Joints

- **Articulations of bones**
- **Functions of joints**
 - **Hold bones together**
 - **Allow for mobility**
- **Ways joints are classified**
 - **Functionally**
 - **Structurally**

Functional Classification of Joints

Based on amount of movement of the joint

- **Synarthroses**
 - **Immovable**
- **Amphiarthroses**
 - **Slightly moveable**
- **Diarthroses**
 - **Freely moveable**

Structural Classification of Joints

Based on what separates the bony regions at the joint

- Fibrous joints
 - Generally **immovable** & connected by **fibrous tissue**
- Cartilaginous joints
 - Immovable or slightly moveable & connected by **cartilage**
- Synovial joints
 - Freely **moveable** & separated by a **fluid filled joint cavity**

Summary of Joint Classes

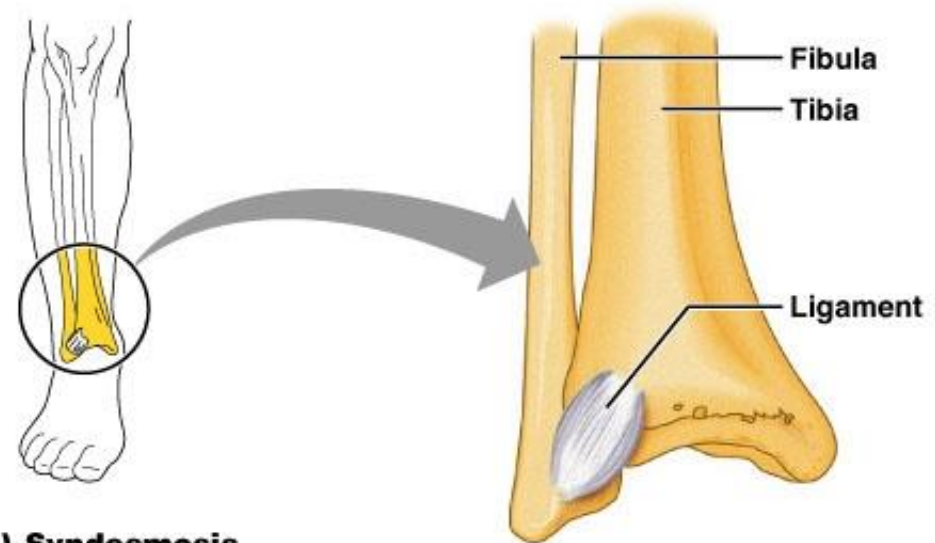
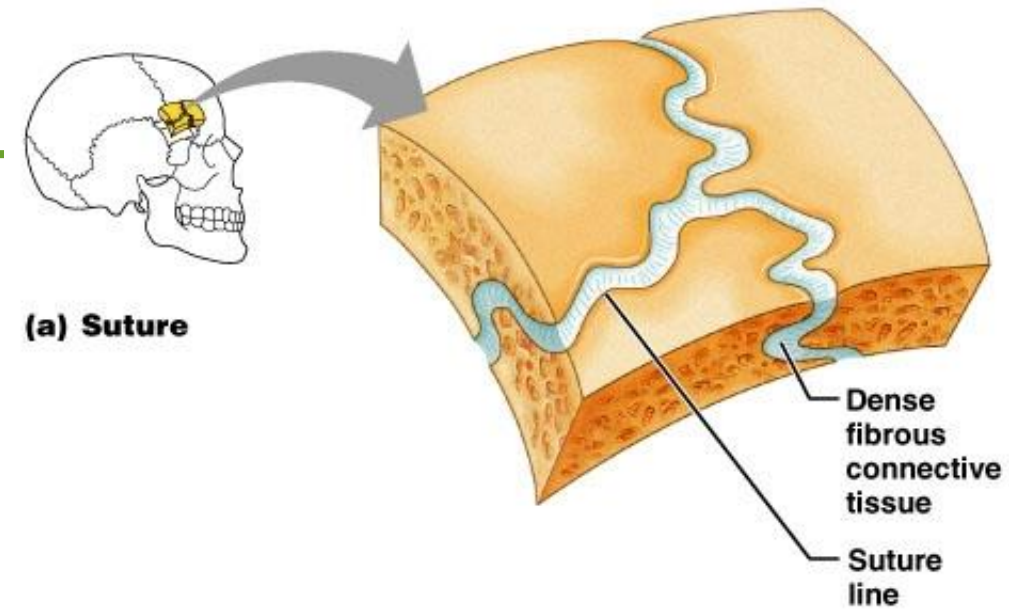
Table 5.3

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TABLE 5.3		Summary of Joint Classes		
Structural class	Structural characteristics	Types		Mobility
Fibrous	Bone ends/parts united by collagenic fibers	Suture (short fibers)		Immobile (synarthrosis)
		Syndesmosis (longer fibers)		Slightly mobile (amphiarthrosis) and immobile
		Gomphosis (periodontal ligament)		Immobile
Cartilaginous	Bone ends/parts united by cartilage	Synchondrosis (hyaline cartilage)		Immobile
		Symphysis (fibrocartilage)		Slightly movable
Synovial	Bone ends/parts covered with articular cartilage and enclosed within an articular capsule lined with synovial membrane	Plane	Condyloid	Freely movable (diarthrosis; movements depend on design of joint)
		Hinge	Saddle	
		Pivot	Ball and socket	

Fibrous Joints

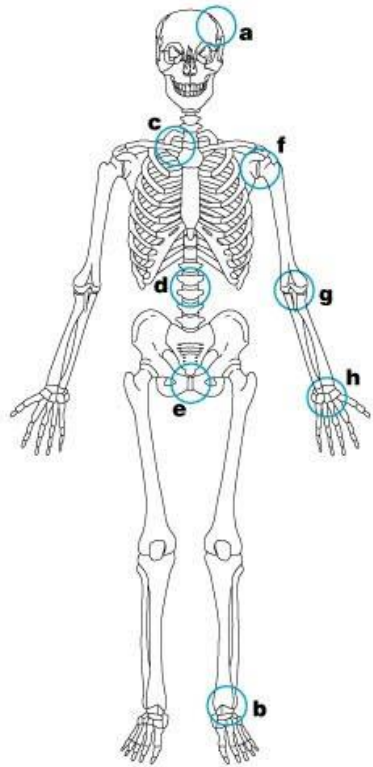
- Bones united by fibrous tissue
- **Examples:**
 - **Sutures** of the skull
 - Allow no movement
 - **Syndesmoses**
 - Allows more movement than sutures
 - **Example:** Distal end of **tibia** and **fibula**



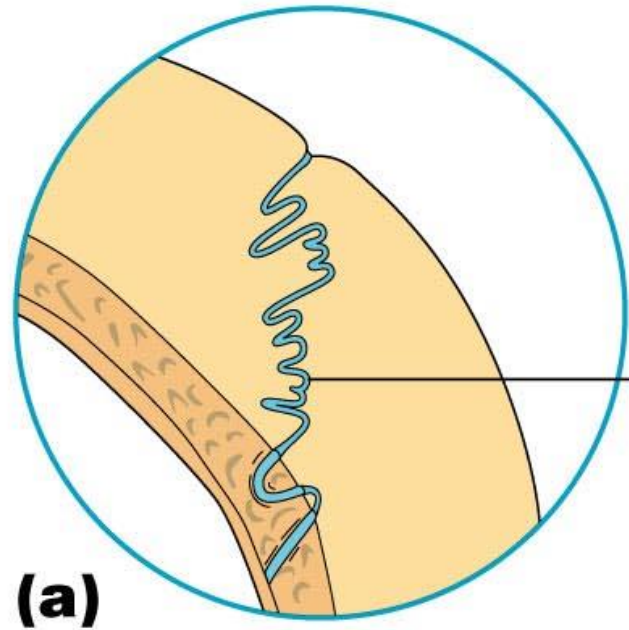
(b) Syndesmosis

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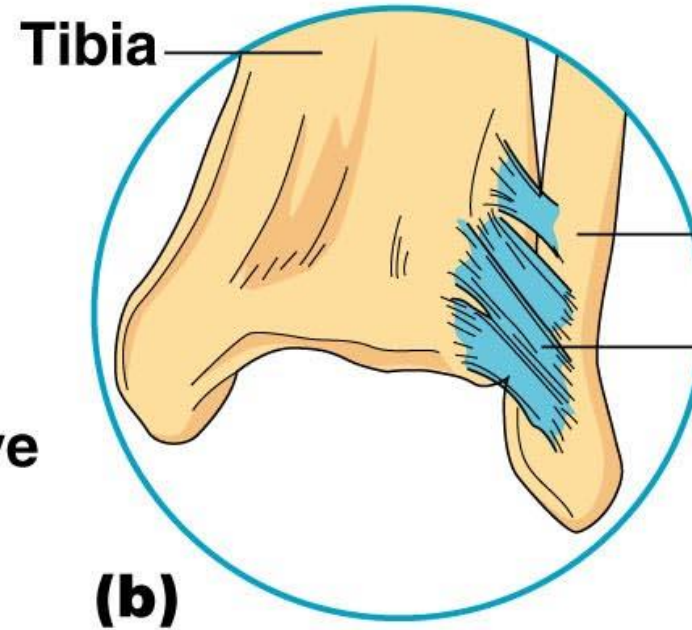
Fibrous Joints



Fibrous Joints



Fibrous connective tissue

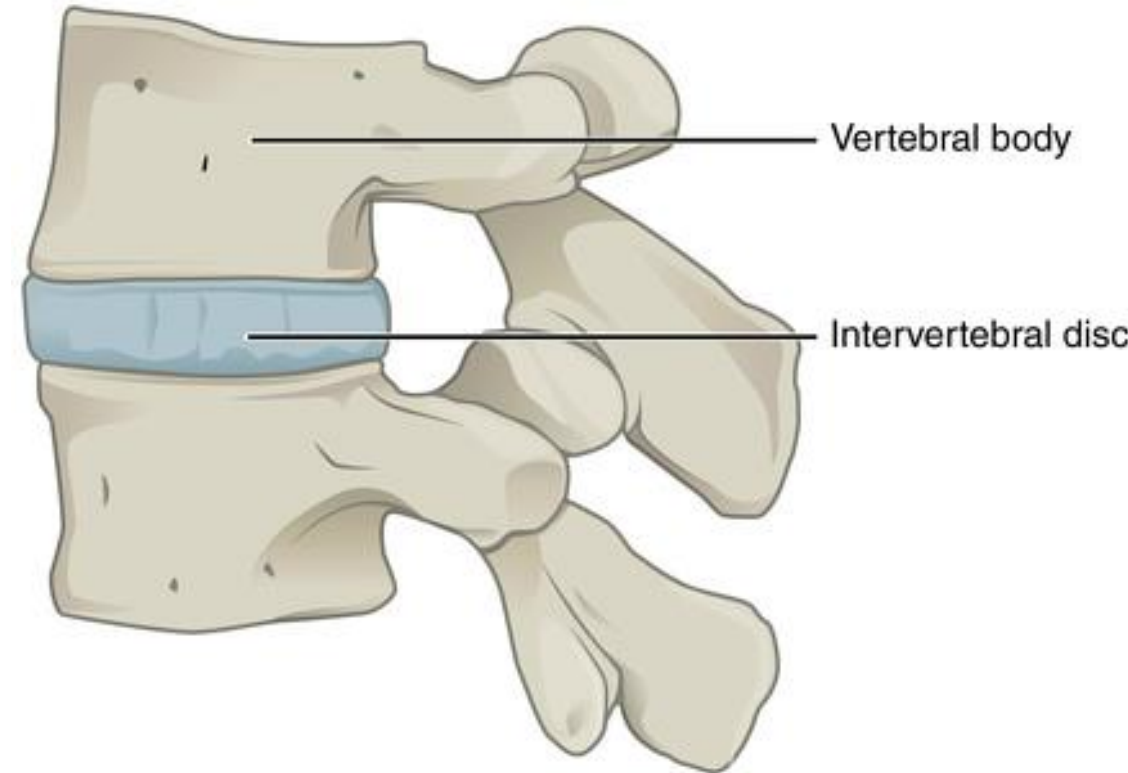


Fibula
Fibrous connective tissue

Figure 5.28a–b

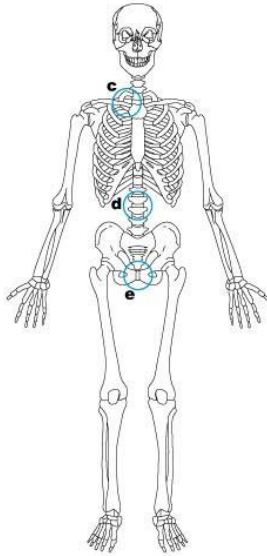
Cartilaginous Joints

- **Bones connected by cartilage**
- **Example:**
 - **Pubic symphysis** (connects hip bones)
 - **Intervertebral joints** (between vertebrae)



Lateral view

Cartilaginous Joints



Cartilaginous Joints

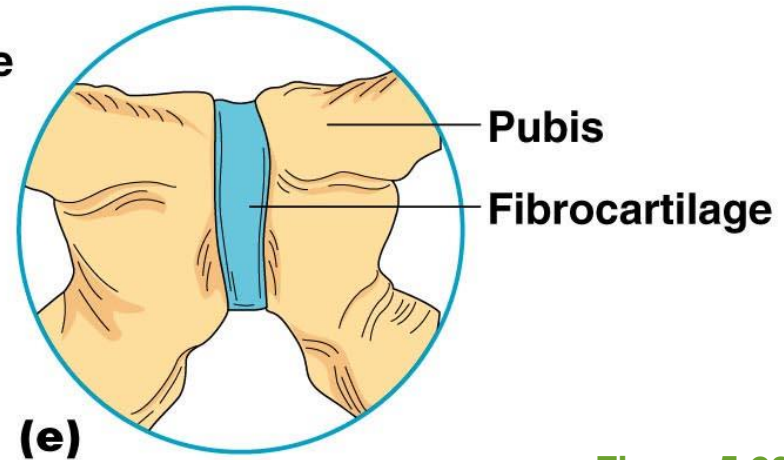
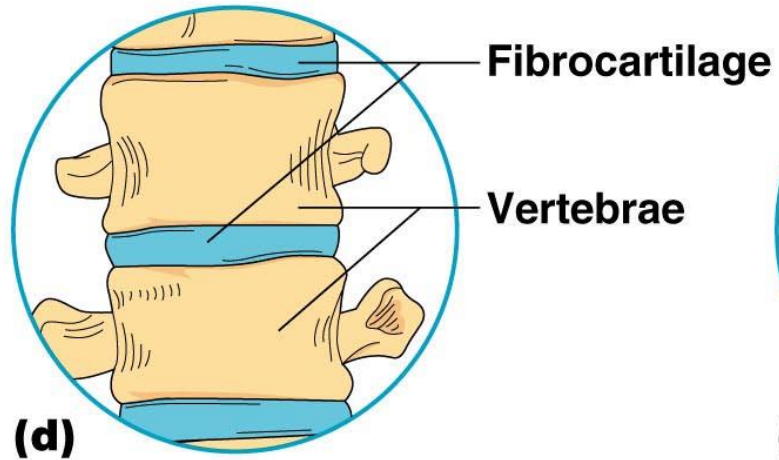
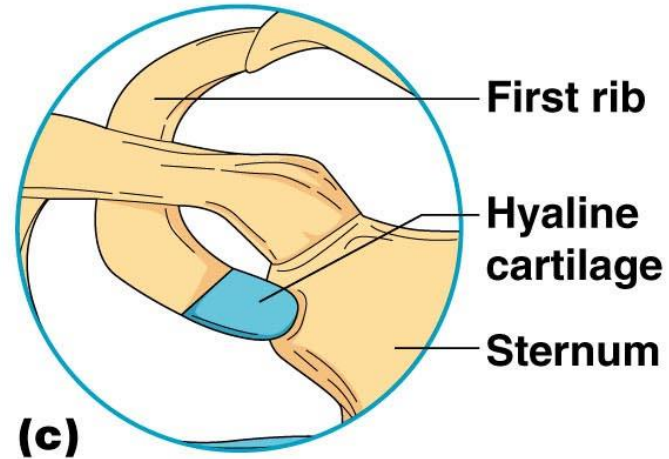
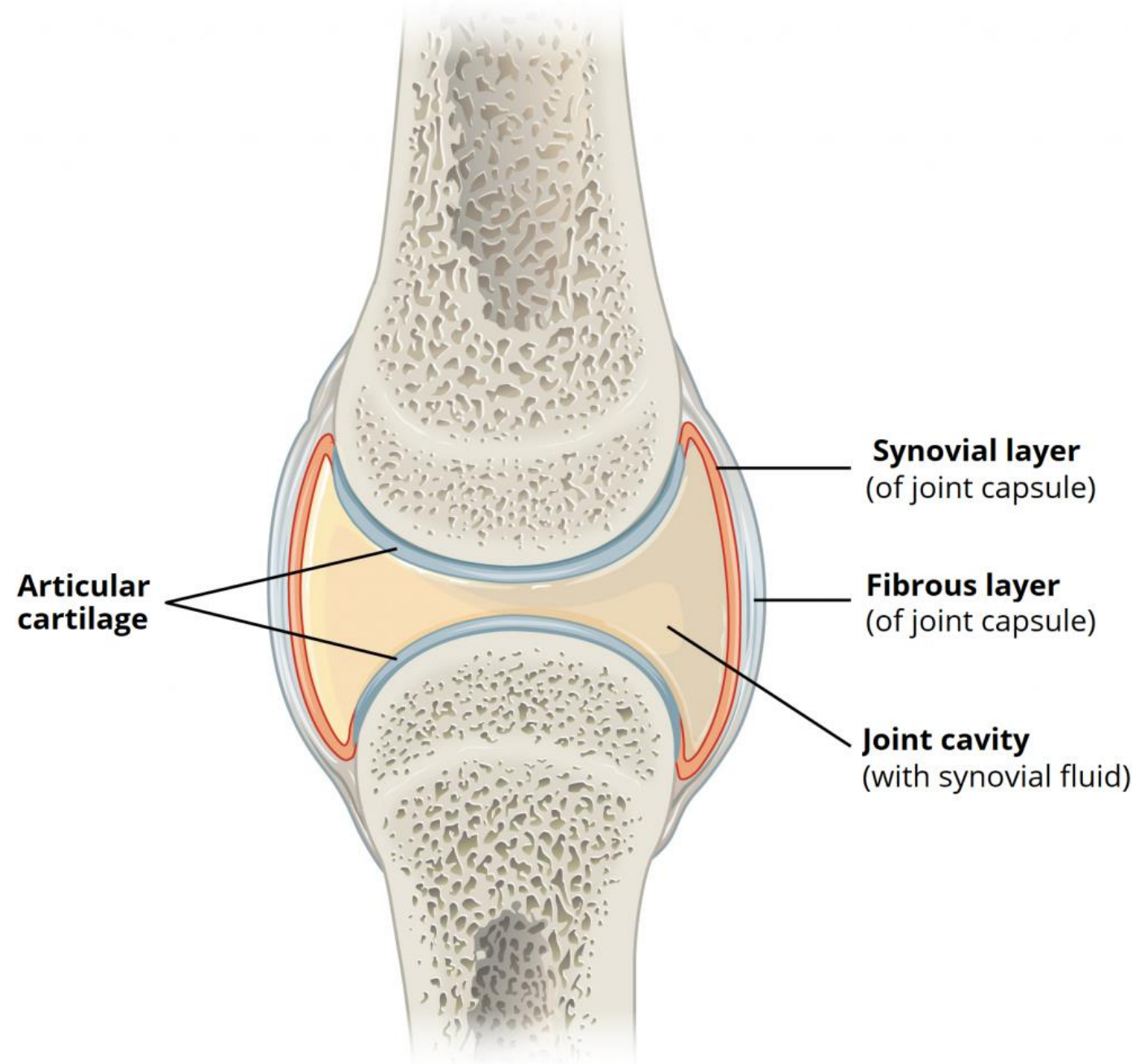


Figure 5.28c–e

Synovial Joints

- Articulating bones are separated by a joint cavity
- **Synovial fluid** is found in the joint cavity



Synovial Joints

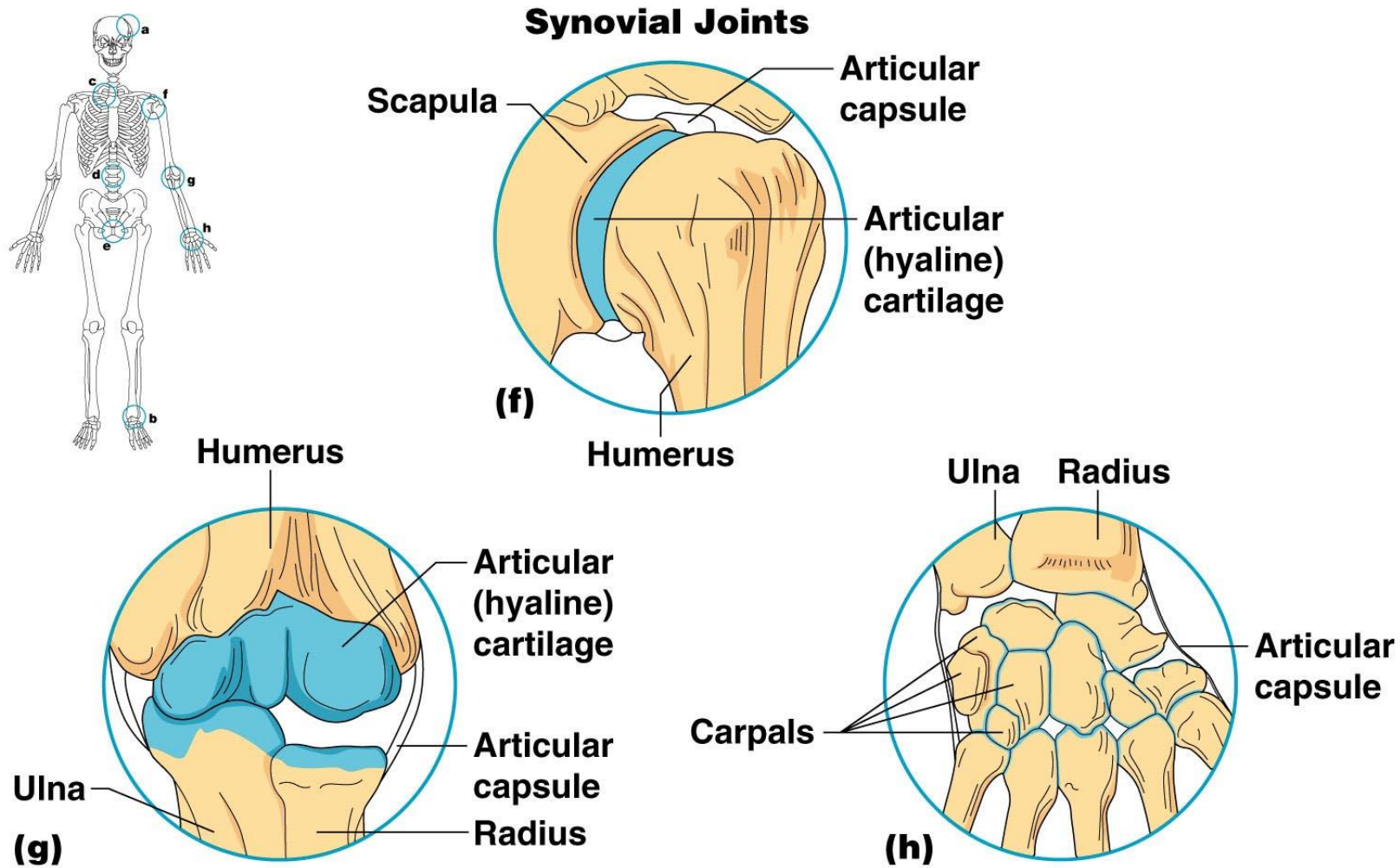


Figure 5.28f–h

Features of Synovial Joints

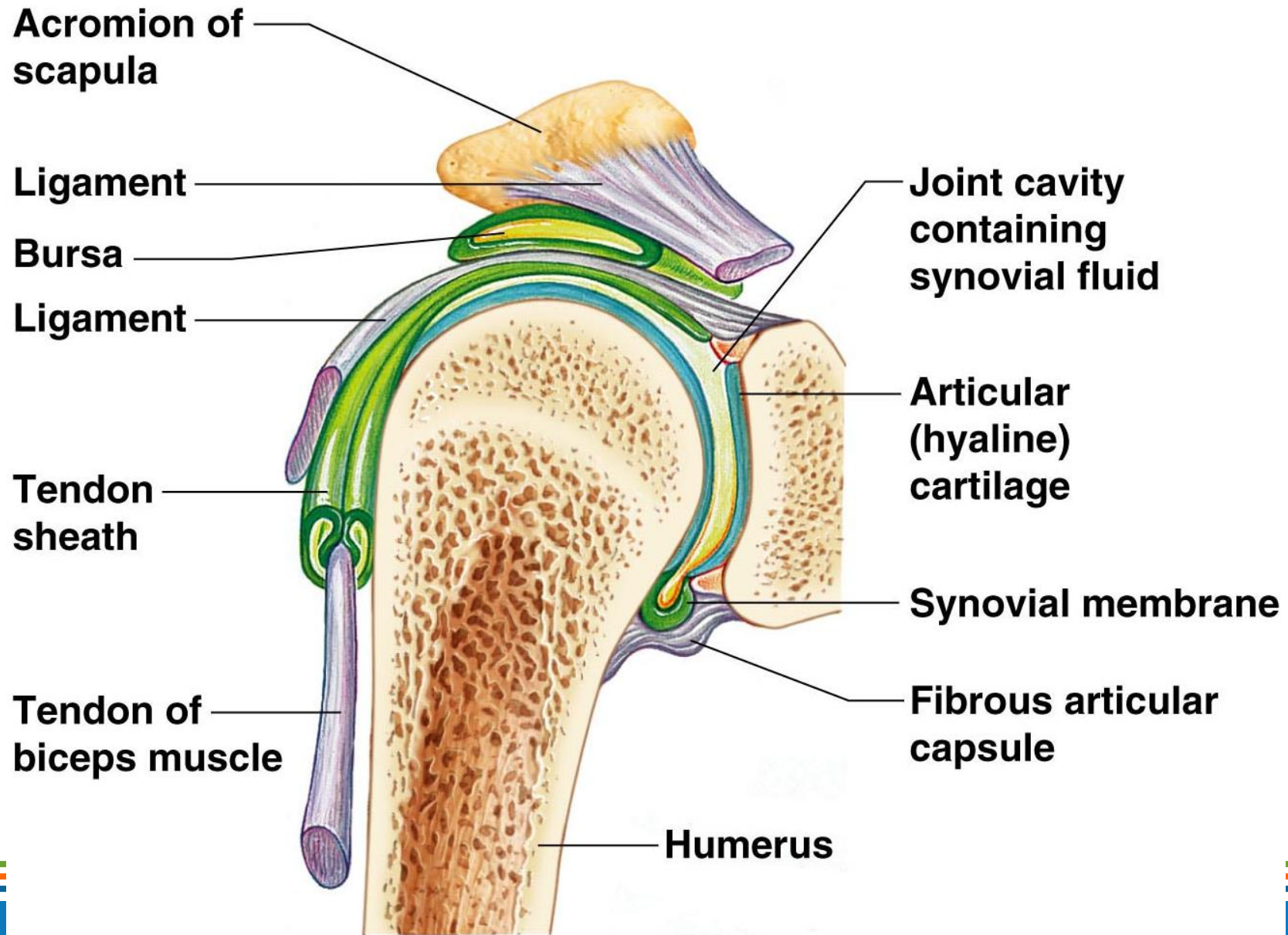
- Articular cartilage (**hyaline cartilage**) covers the ends of bones
- A fibrous articular capsule **encloses** joint surfaces
- A joint cavity is filled with synovial fluid
- **Ligaments** reinforce the joint

Structures Associated with the Synovial Joint

- **Bursae: flattened fibrous sacs**
 - Lined with **synovial membranes**
 - Filled with **synovial fluid**
 - Not actually part of the joint
- **Tendon sheath**
 - Elongated bursa that wraps around a tendon

The Synovial Joint

Figure 5.29



Types of Synovial Joints

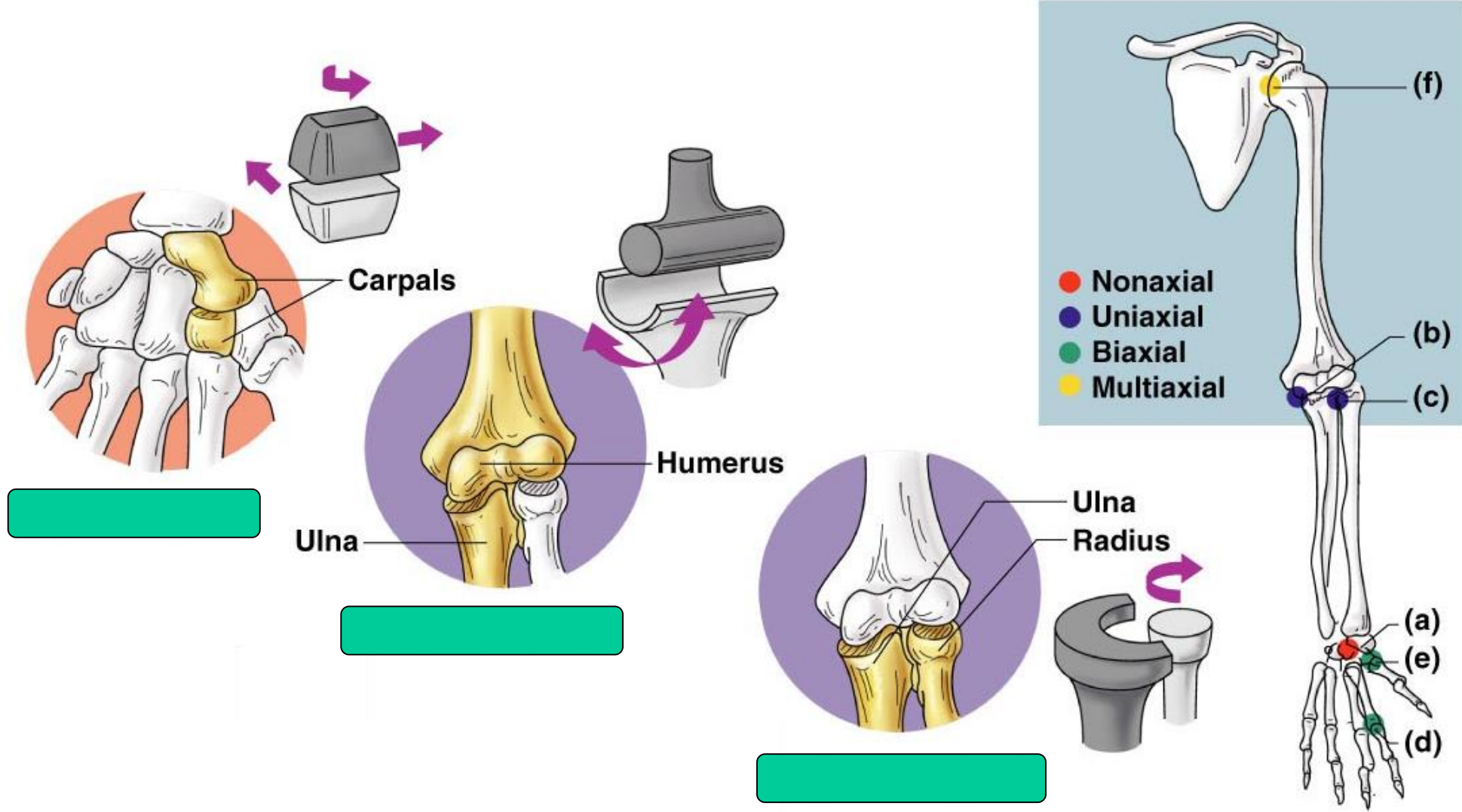


Figure 5.30a-c

Types of Synovial Joints

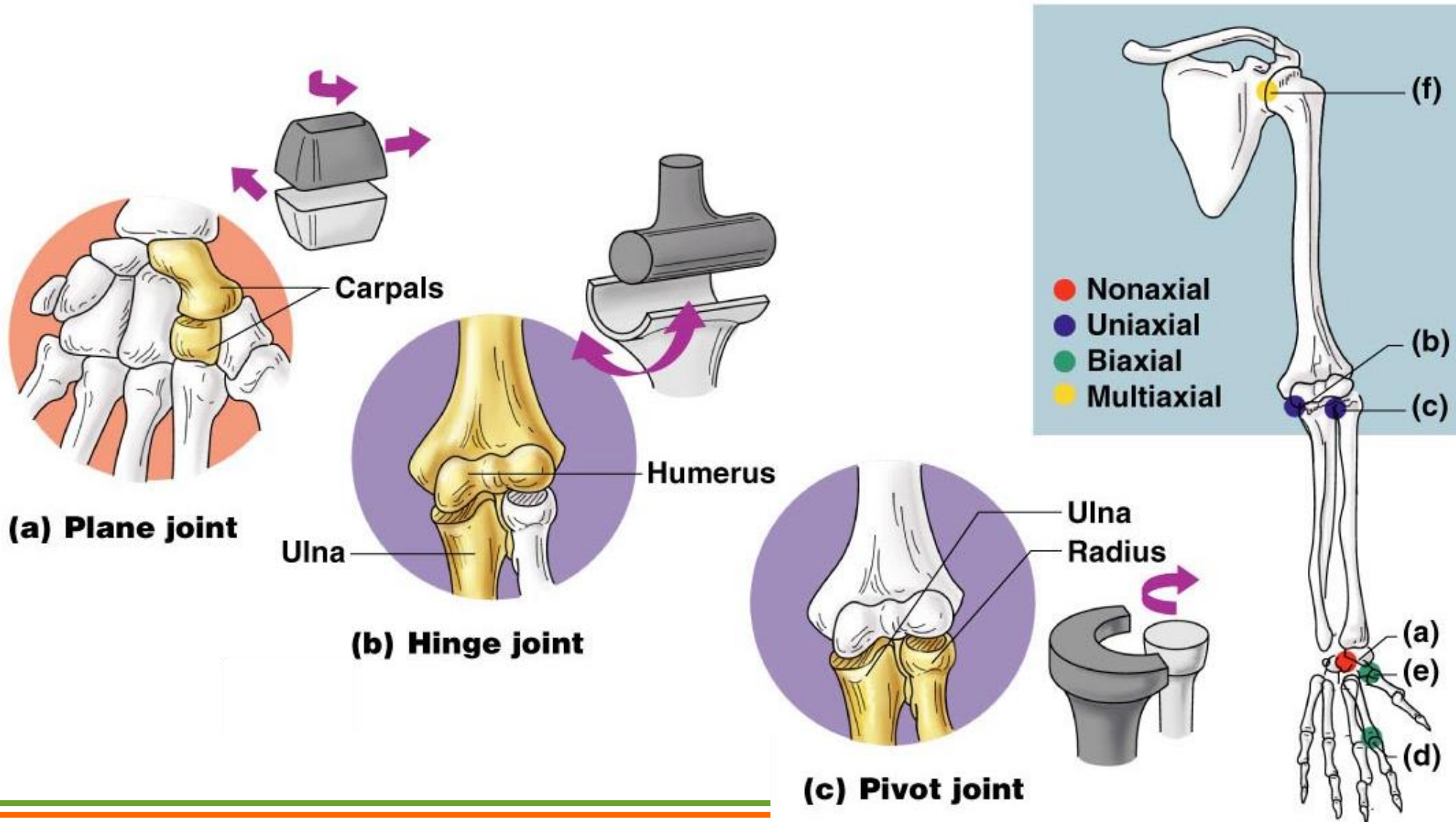
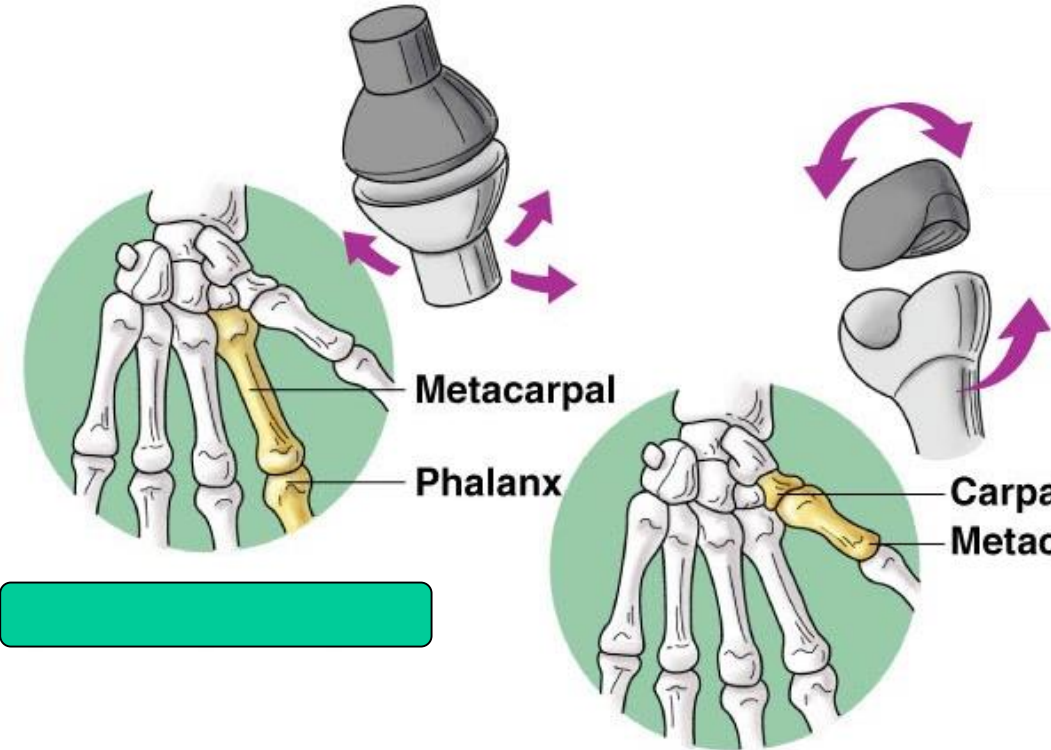


Figure 5.30a–c

Types of Synovial Joints



Head of humerus

Scapula

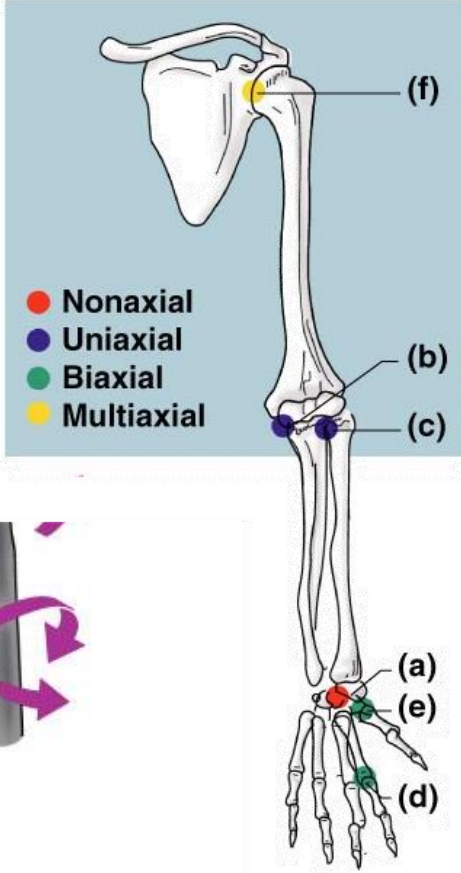


Figure 5.30d-f

Types of Synovial Joints

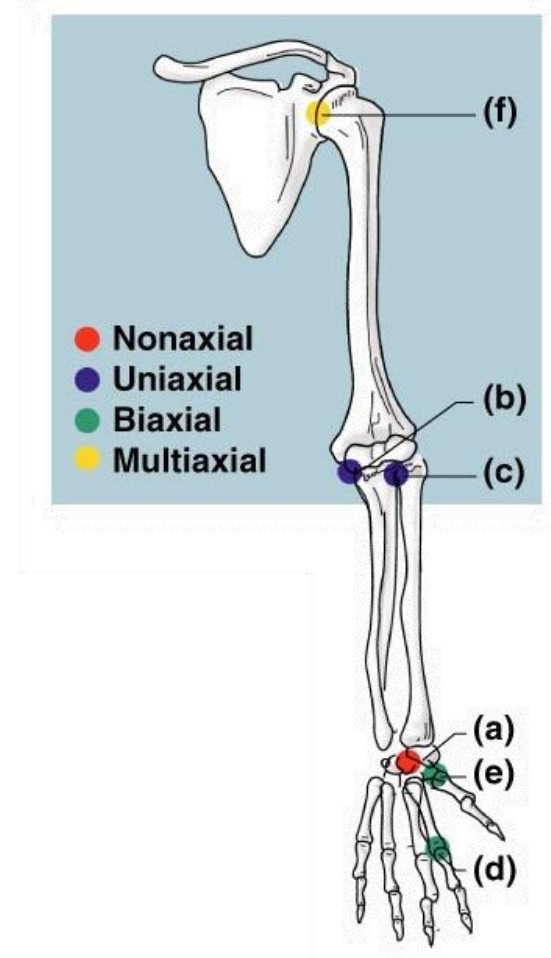
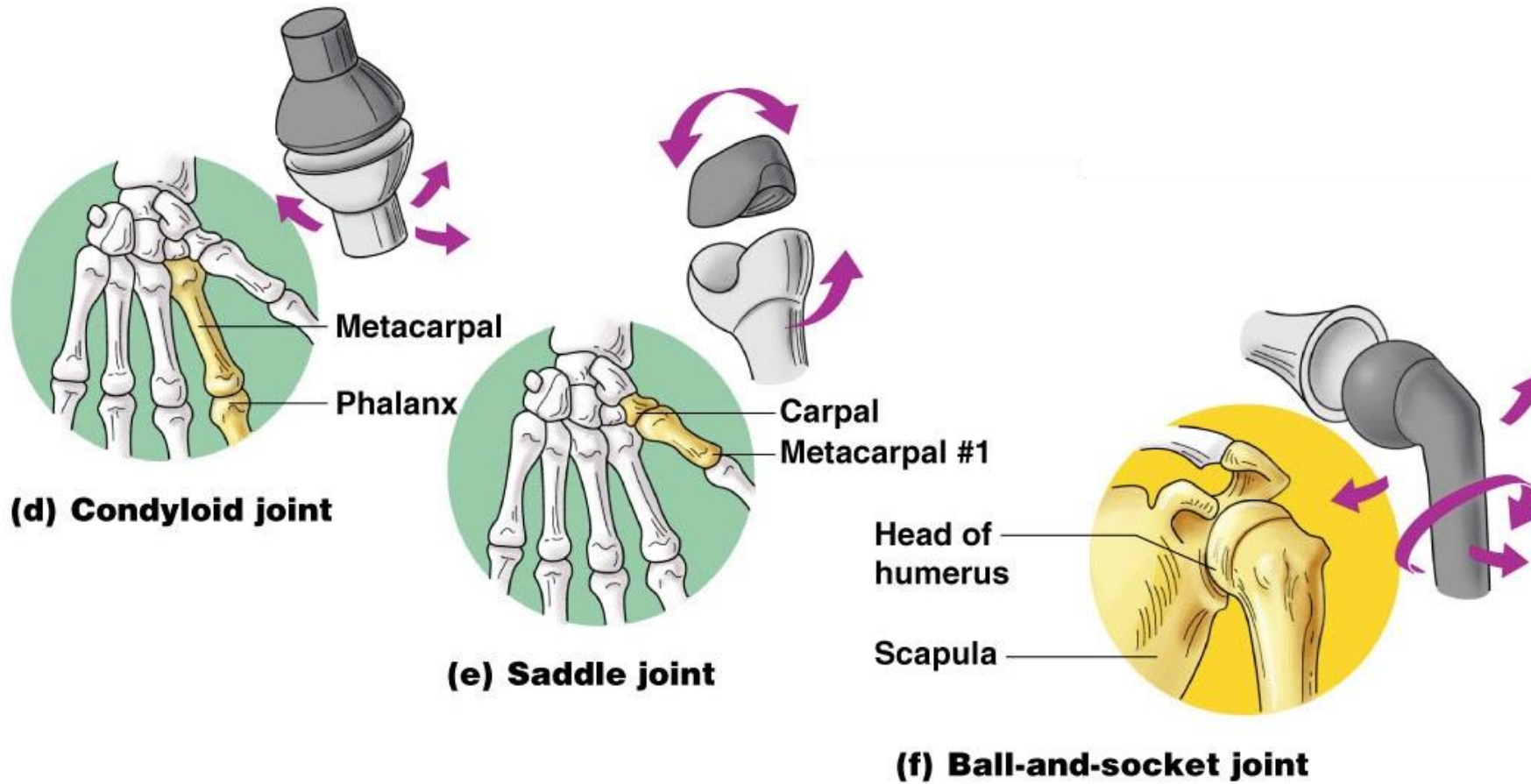
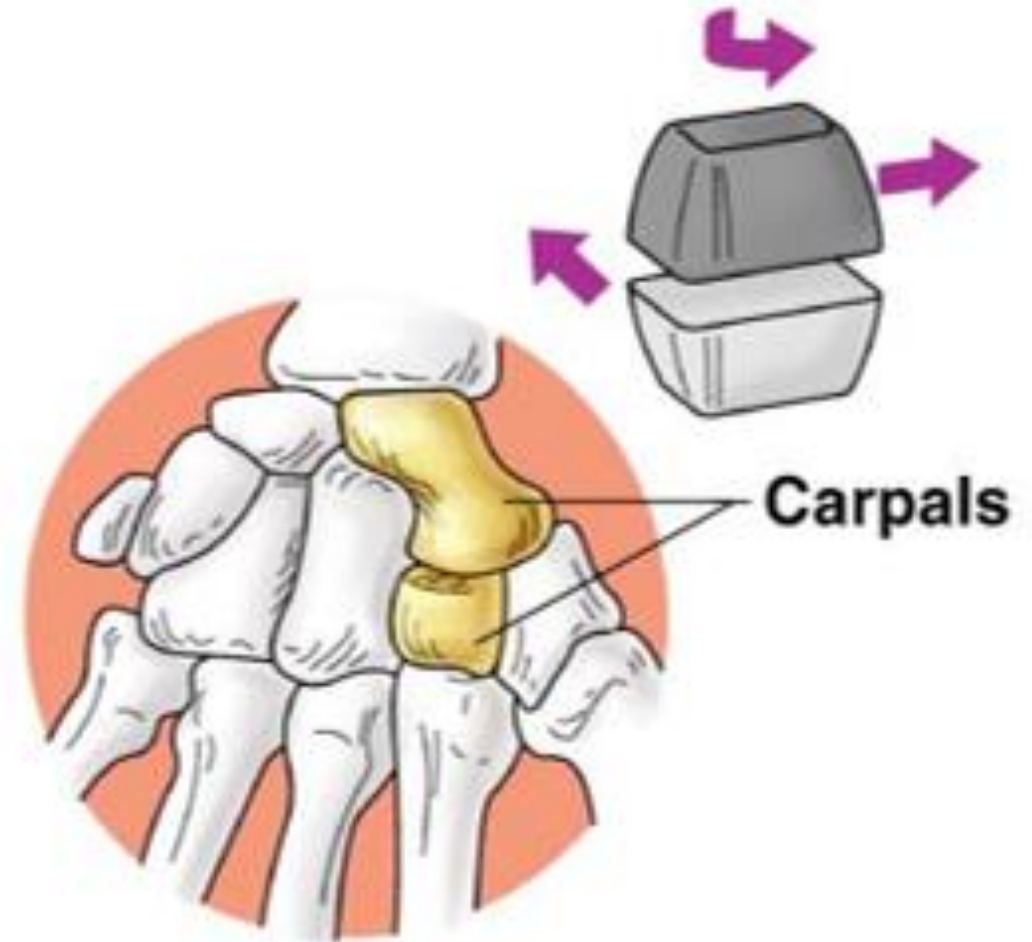


Figure 5.30d-f

Types of Synovial Joints

Plane Joint

- Flat articular surfaces
- Short **slipping** and **gliding** movements allowed
 - Example – intercarpal joints of the wrist

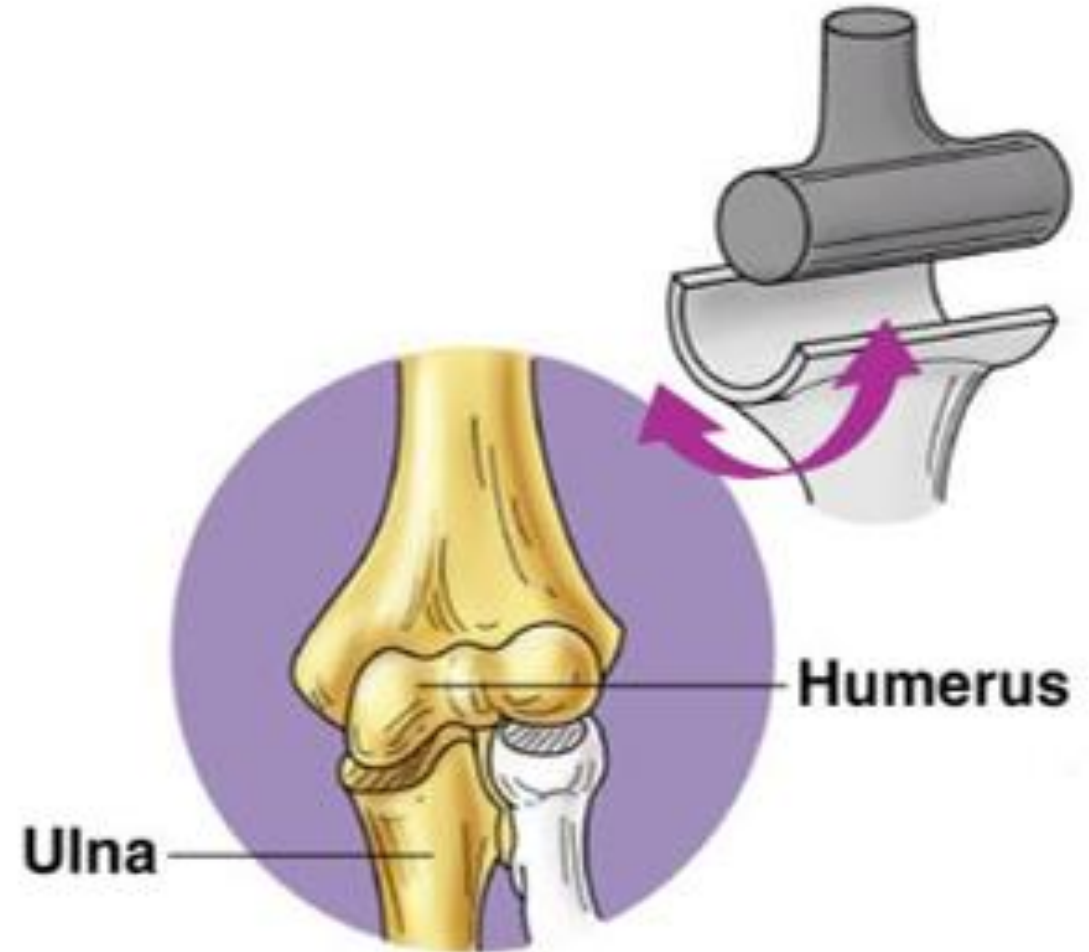


(a) Plane joint

Types of Synovial Joints

Hinge Joint

- Allows angular movement along **one plane**
- Like a door hinge
 - Examples: elbow, phalanges



(b) Hinge joint

Types of Synovial Joints

Pivot Joint

- Rotating bone can only turn around its **long** axis
- Examples:
 - Radioulnar joint
 - Dens of the axis (1st cervical vertebra)



(c) Pivot joint

Types of Synovial Joints

Condyloid Joint

- Egg shaped articular surface of one bone fits into **oval concavity** of another
- Allows moving bone to travel from side to side and back and forth
 - Example: knuckles

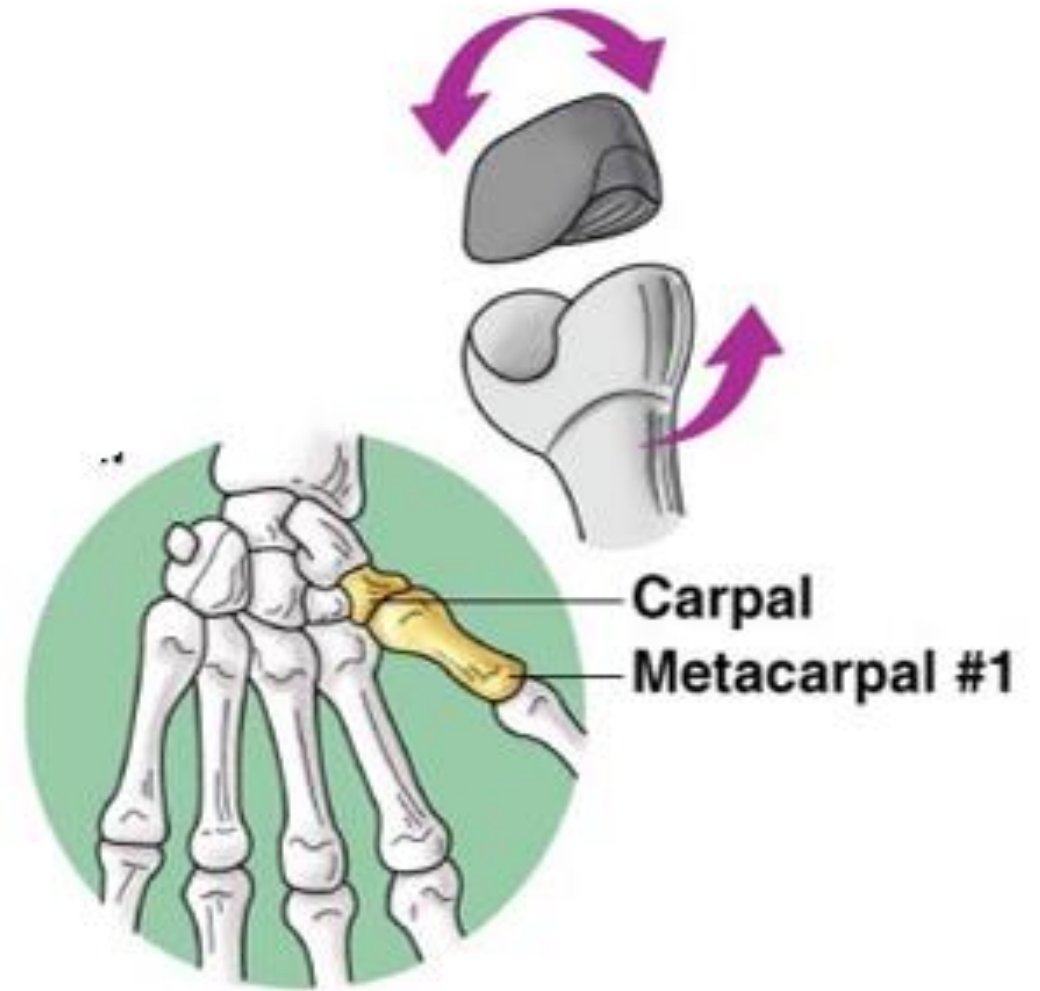


(d) Condyloid joint

Types of Synovial Joints

Saddle Joint

- Each bone has both **convex** and **concave** areas, like a saddle
 - **Example:**
carpometacarpal joint of thumb

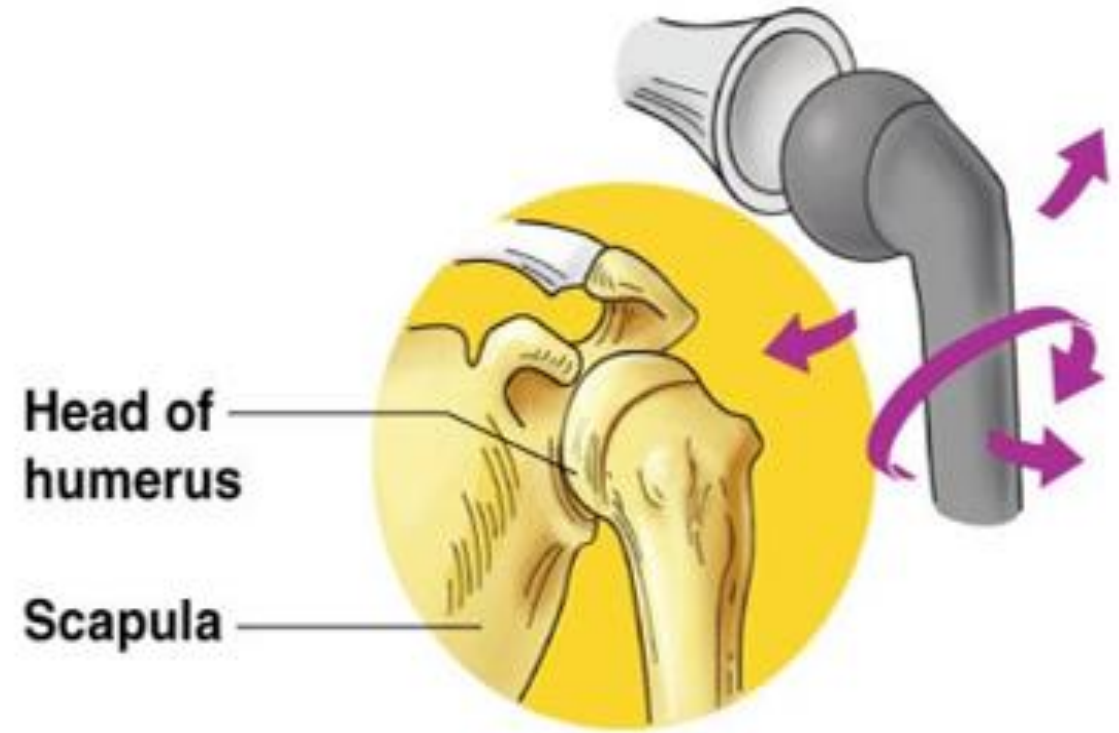


(e) Saddle joint

Types of Synovial Joints

Ball and Socket Joint

- Spherical head of one bone fits into a **round** socket in another
- Allows movement in all axes
- Most freely moving synovial joint
 - Examples: hips and shoulders



(f) Ball-and-socket joint

Structure of a Diarthrotic (freely moveable) joint

31. Figure 5-15 shows the structure of a typical diarthrotic joint. Select different colors to identify each of the following areas and use them to color the coding circles and the corresponding structures on the figure. Then, complete the statements below the figure.

- Articular cartilage of bone ends
- Fibrous capsule
- Synovial membrane
- Joint cavity

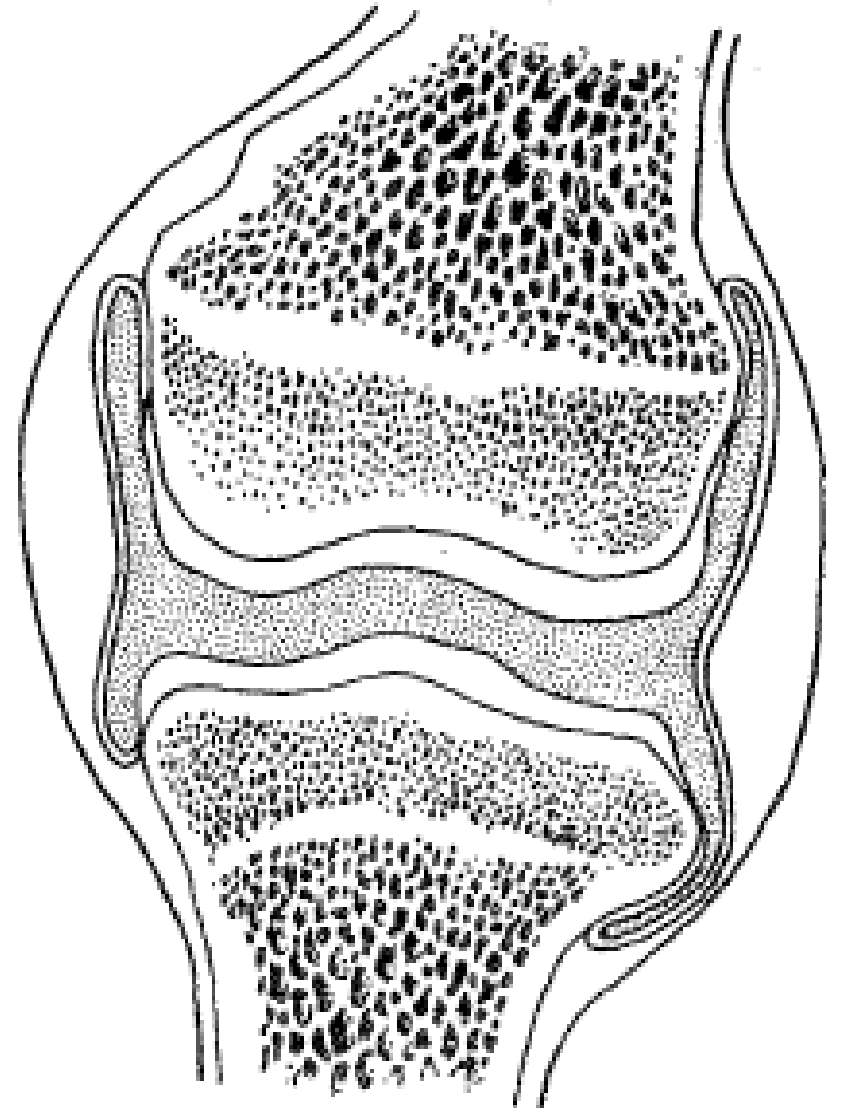






Figure 5-15

Structure of a Diarthrotic (freely moveable) joint

31. Figure 5-15 shows the structure of a typical diarthrotic joint. Select different colors to identify each of the following areas and use them to color the coding circles and the corresponding structures on the figure. Then, complete the statements below the figure.

-  Articular cartilage of bone ends
-  Fibrous capsule
-  Synovial membrane
-  Joint cavity (filled w/ fluid)

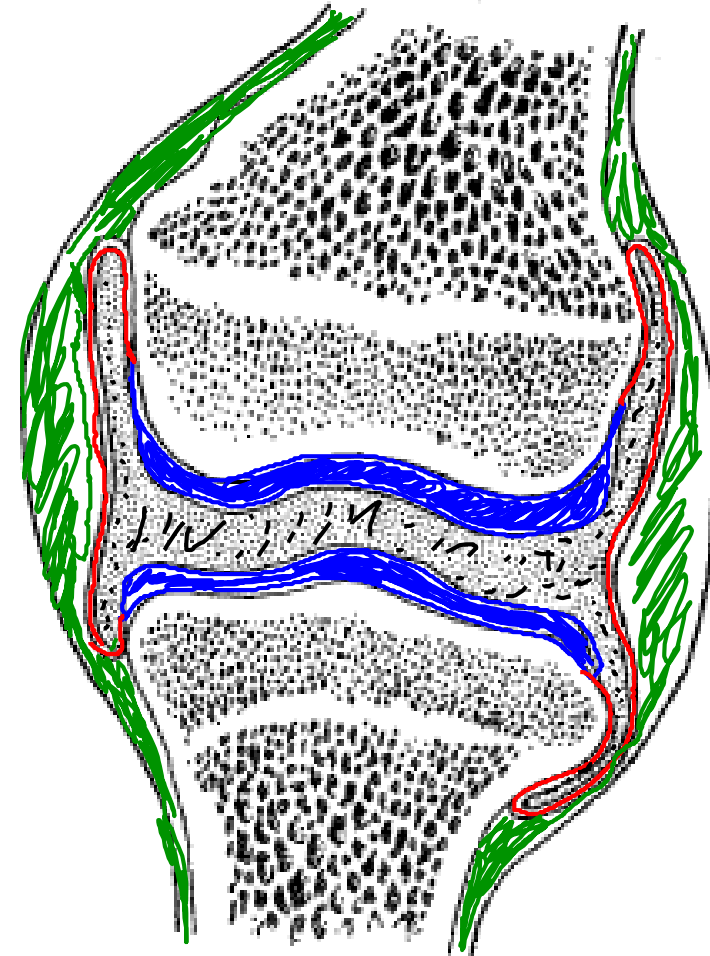


Figure 5-15

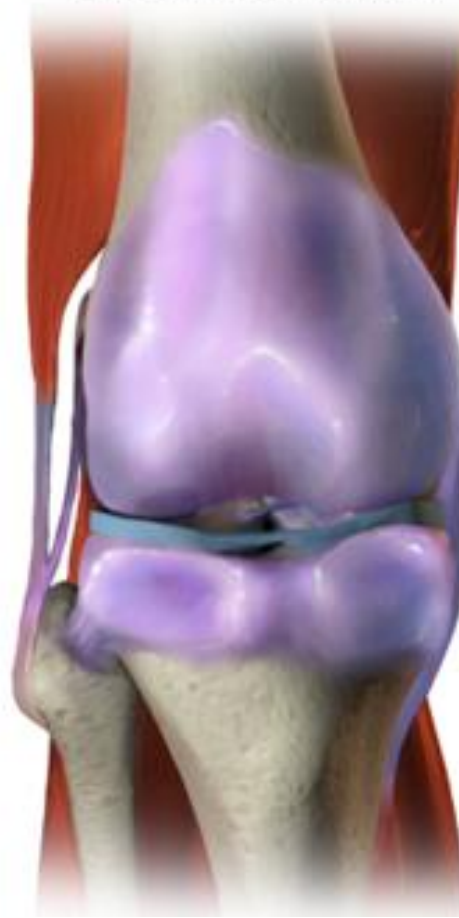
Inflammatory Conditions Associated with Joints

- **Bursitis:** **inflammation** of a bursa usually caused by a blow or friction
- **Tendonitis:** **inflammation** of tendon sheaths
- **Arthritis:** **inflammatory** or degenerative diseases of joints
 - **Over 100 different types**
 - **The most widespread crippling disease in the United States**

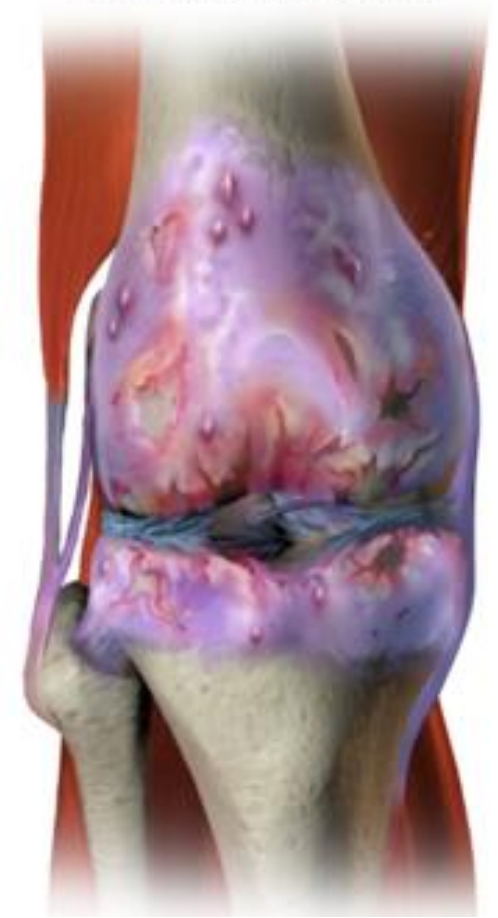
Clinical Forms of Arthritis

- **Osteoarthritis**
 - **Most common** chronic arthritis
 - Related to normal **aging** processes

Normal Knee

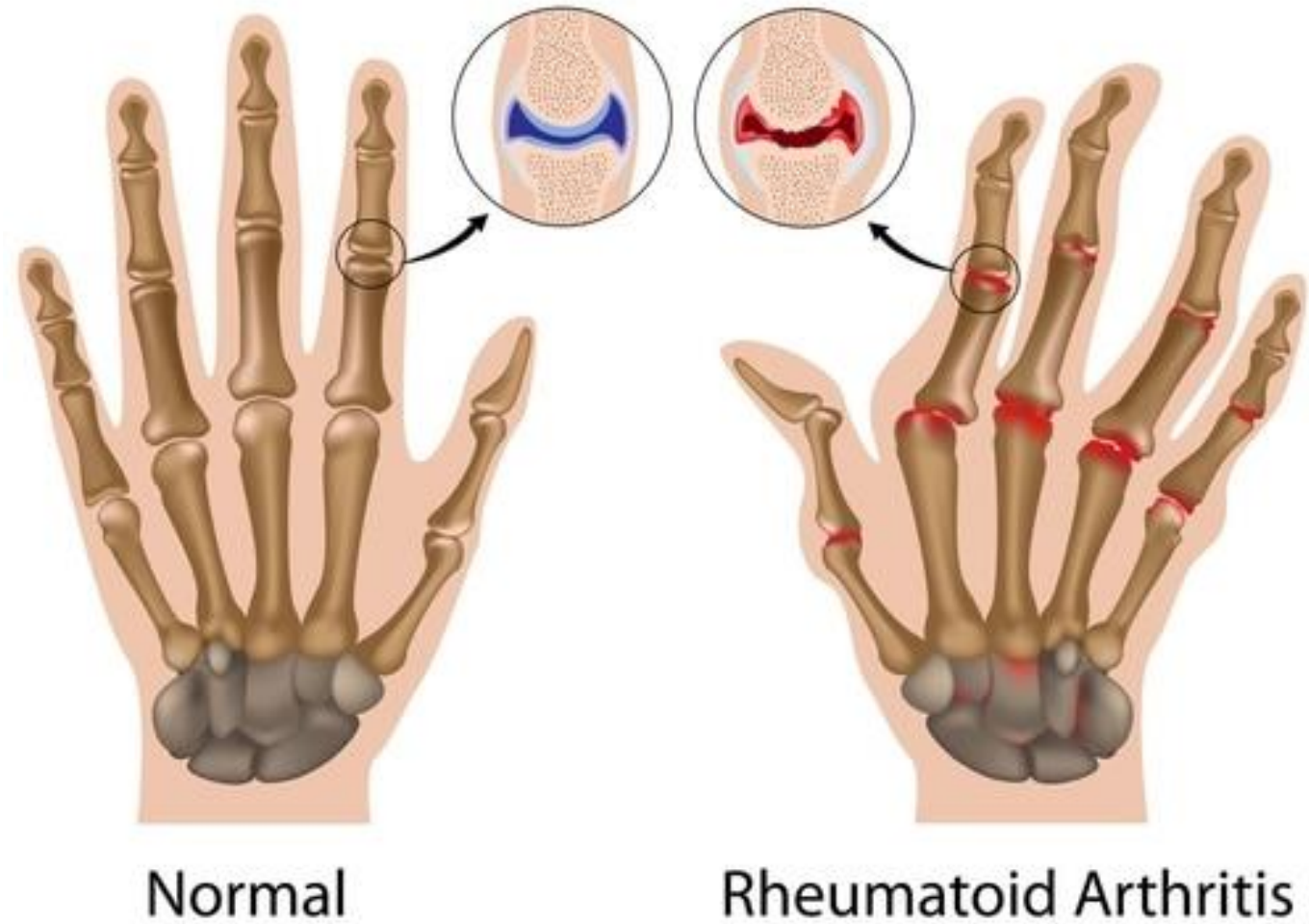


Osteoarthritis



Clinical Forms of Arthritis

- **Rheumatoid arthritis**
 - **Autoimmune disease**—immune system attacks joints
 - Symptoms begin with **bilateral inflammation of certain joints**
 - Often leads to **deformities**



TYPES OF ARTHRITIS

Healthy finger joint



Osteoarthritis



Rheumatoid arthritis



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Clinical Forms of Arthritis

■ Gouty arthritis

- Caused by a deposition of **uric acid** crystals from the blood
- Usually can be controlled with **diet**

