Articulations
Articulations

- A joint, or articulation, is the place of contact between bones, between bone and cartilage, or between bones and teeth.
Naming of Joints

- Usually derived from the names of the articulating bones.
Mobility and Stability in Joints

- Motion permitted ranges from none to various extensive motions.
- Structure determines both its mobility and its stability.
  - more mobile = less stable
Classification of Joints

- **Type of connective tissue** that binds the articulating surfaces of the bones.
- **Whether a space occurs** between the articulating bones.
Classification of Joints

- A **fibrous joint** occurs where bones are held together by dense regular (fibrous) connective tissue.

- A **cartilaginous joint** occurs where bones are joined by cartilage.

- A **synovial joint**
  - has a fluid-filled synovial cavity
  - bones are enclosed within a capsule
  - bones are joined by various ligaments
Classification of Joints

- Functionally based on the extent of movement they permit:
  - Synarthrosis is an immovable joint.
  - Amphiarthrosis is a slightly movable joint.
  - Diarthrosis is a freely movable joint.
Fibrous Joints

- Most are immovable or only slightly movable.
- Have no joint cavity.
- Three types.
  - gomphoses
  - sutures
  - syndesmoses
Types of Fibrous Joints – Syndesmoses

- Fibrous joints in which articulating bones are joined by ligaments only.
- Allow for slight movement.
  - classified as amphiarthroses
Cartilaginous Joints

- Bones are attached to each other by cartilage.
- Lack a joint cavity.
- Two types.
  - synchondroses
  - symphyses
  - symphyses are amphiarthroses
(a) Synchondroses (contain hyaline cartilage)

(b) Symphyses (contain fibrocartilage)
Insert Fig. 9.4 Synovial Joints

- Periosteum
- Yellow bone marrow
- Fibrous joint capsule
- Synovial membrane
- Joint cavity (containing synovial fluid)
- Articular cartilage
- Ligament

Typical synovial joint
Synovial Joints

- Freely movable articulations
- Classified as diarthroses
- Bones are separated by a space called a joint cavity
- Most of the commonly known joints in the body
  - glenohumeral (shoulder) joint
  - temporomandibular joint
  - elbow joint
  - knee joint
General Anatomy of Synovial Joints

- Basic features:
  - articular capsule
  - joint cavity
  - synovial fluid
  - articular cartilage
  - ligaments
  - nerves
  - blood vessels
General Anatomy of Synovial Joints – Accessory Structures

- Bursae
  - fibrous, saclike structure that contains synovial fluid and is lined by a synovial membrane
- Fatpads
  - often distributed along the periphery of a synovial joint
  - act as packing material and provide some protection for the joint
  - fill the spaces that form when bones move and the joint cavity changes shape
- Tendons
  - attaches a muscle to a bone
  - help stabilize joints
(a) Bursae of the knee joint, sagittal section
Tendon sheath (opened)

Tendon of flexor digitorum profundus

Tendon of flexor digitorum superficialis

Digital tendon sheaths

Tendon sheath around flexor pollicis longus tendon

Common flexor tendon sheath

Tendon of flexor carpi radialis

Tendon of flexor pollicis longus

Tendons of flexor digitorum superficialis and flexor digitorum profundus

(b) Tendon sheaths of wrist and hand, anterior view
Types of Synovial Joints

- Classified by the shapes of their articulating surfaces
- Types of movement they allow
  - uniaxial if the bone moves in just one plane
  - biaxial if the bone moves in two planes
  - multiaxial (or triaxial) if the bone moves in multiple planes
Types of Synovial Joints

- From least movable to most freely movable, the six specific types of synovial joints are:
  - planar (gliding) joints
  - hinge joints
  - pivot joints
  - condyloid (ellipsoid) joints
  - saddle joints
  - ball-and-socket joints
Pronation
(d)

Supination

Protraction

Retraction
(e)

Opposition of thumb and pinky

(f)
Lateral epicondyle
Articular capsule
Radial collateral ligament
Anular ligament
Radius
Tendon of biceps brachii (cut)

(a) Anterior view

Humerus
Medial epicondyle
Ulnar collateral ligament
Radius
Ulna
(b) Lateral view
(d) Sagittal section

- Trochlea
- Articular capsule
- Coronoid process
- Humerus
- Radius
- Ulna
- Articular cartilage
- Olecranon
Radiocarpal joint
Radial collateral ligament
Scaphoid
Intercarpal joints
Carpometacarpal joint of thumb
Distal radioulnar joint
Articular disc
Ulnar collateral ligament
Lunate
Pisiform
Triquetrum
Right radiocarpal joint, coronal section
(a) Anterior view

- Iliofemoral ligament
- Greater trochanter
- Pubofemoral ligament
- Lesser trochanter
(c) Coronal section
Fibula
Tibia
Talus
Lateral ligament
Calcaneus
Metatarsal V

(b) Anterolateral view
Arthritis

- A group of inflammatory or degenerative diseases of joints that occur in various forms.
  - swelling of the joint
  - pain
  - stiffness

- Most prevalent crippling disease in the United States.
  - gouty arthritis
  - osteoarthritis
  - rheumatoid arthritis