

# Articulations

## **I. Introduction to Articulations (p. 253)**

- A. Sites where two or more bones meet are called joints or articulations.
- B. Our joints give our skeleton mobility and hold it together.

## **II. Classification of Joints (p. 253; Marieb Table 8.1)**

- A. Structural classification focuses on the material binding the bones together and whether or not a joint cavity is present.
  - 1. In fibrous joints the bones are joined together by fibrous tissue and lack a joint cavity.
  - 2. In cartilaginous joints the bones are joined together by cartilage and they lack a joint cavity.
  - 3. In synovial joints, the articulating bones are separated by a fluid-containing joint cavity.
- B. Functional classification is based on the amount of movement allowed at the joint.
  - 1. Synarthroses are immovable joints.
  - 2. Amphiarthroses are slightly movable joints.
  - 3. Diarthroses are freely movable joints.

## **III. Fibrous Joints (pp. 253–254; Marieb Fig. 8.1; Marieb Tables 8.1–8.2)**

- A. Sutures occur between bones of the skull and use very short connective tissue fibers to hold the bones together.
- B. In syndesmoses, the bones are connected by a ligament, which is a cord or band of fibrous tissue.
- C. A gomphosis is a peg-in-socket fibrous joint.

## **IV. Cartilaginous Joints (p. 254; Marieb Fig. 8.2; Marieb Tables 8.1–8.2)**

- A. Synchondroses involve a bar or plate of hyaline cartilage uniting the bones, such as the epiphyseal plate.
- B. In symphyses, such as the pubic symphysis, the articular surfaces are covered with articular cartilage that is then fused to an intervening pad or plate of fibrocartilage.

## **V. Synovial Joints (pp. 255–272; Marieb Figs. 8.3–8.8, 8.10–8.13; Marieb Tables 8.1–8.2)**

- A. The general structure of a synovial joint contains five distinguishing features.
  - 1. Articular cartilage covers the ends of the articulating bones.
  - 2. The joint (synovial) cavity is a space that is filled with synovial fluid.
  - 3. The two-layered articular capsule encloses the joint cavity.
  - 4. Synovial fluid is a viscous, slippery fluid that fills all free space within the joint cavity.
  - 5. Reinforcing ligaments cross synovial joints to strengthen the joint.
- B. Bursae and tendon sheaths are bags of lubricant that reduce friction at synovial joints.
- C. Factors Influencing the Stability of Synovial Joints
  - 1. The shapes of the articular surfaces of bones found at a synovial joint determine the movements that occur at the joint, but play a minimal role in stabilizing the joint.

2. Ligaments at a synovial joint prevent excessive or unwanted movements and help to stabilize the joint; the greater the number of ligaments at the joint the greater the stability.
  3. Muscle tone keeps tendons crossing joints taut, which is the most important factor stabilizing joints.
- D. Movements Allowed by Synovial Joints
1. In gliding movements one flat, or nearly flat, bone surface glides or slips over another.
  2. Angular movements increase or decrease the angle between two bones.
    - a. Flexion decreases the angle of the joint and brings the articulating bones closer together.
    - b. Extension increases the angle between the articulating bones.
    - c. Dorsiflexion decreases the angle between the top of the foot (dorsal surface) and the anterior surface of the tibia.
    - d. Plantar flexion decreases the angle between the sole of the foot (plantar surface) and the posterior side of the tibia.
    - e. Abduction is the movement of a limb (or fingers) away from the midline body (or of the hand).
    - f. Adduction is the movement of a limb (or fingers) toward the midline of the body (or the hand).
    - g. Circumduction is moving a limb so that it describes a cone in the air.
  3. Rotation is the turning of a bone along its own long axis.
- E. Types of Synovial Joints
1. Plane joints have flat articular surfaces that permit gliding movements.
  2. Hinge joints consist of a cylindrical projection that nests in a trough-shaped structure, and allow flexion, extension, and sometimes hyperextension.
  3. Pivot joints consist of a rounded structure that protrudes into a sleeve or ring, and allow rotation of a bone around the long axis.
  4. Condylod, or ellipsoid, joints consist of an oval articular surface that nests in a complementary depression, and permit all angular movements.
  5. Saddle joints consist of each articular surface bearing complementary concave and convex areas, and allow more freedom of movement than condylod joints.
  6. Ball-and-socket joints consist of a spherical or hemispherical structure that articulates with a cuplike structure. They are the most freely moving joints and allow flexion/extensions, abduction/adductions, circumductions, and rotations.