

6 The Skeletal System

Chapter Summary

The skeletal system includes the bones and joints. The anatomy of a long bone is discussed as are the actions of the bone building osteoblast and bone destroying osteoclast cells. Fractures are breaks in bone and the classification of fractures is explained. The repair of a fracture always involves the formation of a hematoma, a fibrocartilage callus, a bony callus, and finally, bone remodeling. The skeleton is divided into an axial portion and an appendicular portion. The structures and functions of the bones in each of these portions are described. The axial skeleton includes the skull, hyoid bone, vertebral column, and thoracic cage. The appendicular skeleton includes the bones of the pectoral girdle, upper limbs, pelvic girdle, and lower limbs. Joints are articulations between bones and are classified according to the amount of movement they allow as immovable joints, slightly movable joints, and freely movable joints. Various types of joints and classification of movement at joints are also discussed. The functions of the bones are support of the body and its organs, protection of soft body parts, production of blood cells, and storage of inorganic calcium and phosphorus salts. The skeletal system also works together with the muscular system to produce movement.

Chapter Outline

- I. Skeleton Overview
 - A. Functions of the skeleton
 - B. Anatomy of a Long Bone
 - 1. Compact Bone
 - 2. Spongy Bone
 - C. Bone growth and Repair
 - 1. Bone Development and Growth
 - 2. Remodeling of Bones
 - 3. Bone Repair
 - D. Surface Features of Bones
- II. Axial Skeleton
 - A. Skull
 - 1. Cranium
 - a. Frontal Bone
 - b. Parietal Bones
 - c. Occipital Bone
 - d. Temporal Bones
 - e. Sphenoid Bone
 - f. Ethmoid Bone
 - 2. Facial Bones
 - a. Maxillae
 - b. Palatine Bones
 - c. Zygomatic Bones
 - d. Lacrimal Bones
 - e. Nasal Bones
 - f. Vomer Bone
 - g. Inferior Nasal Conchae
 - h. Mandible
 - B. Hyoid Bone

- C. Vertebral Column (Spine)
 - 1. Intervertebral Discs
 - 2. Vertebrae
 - a. Atlas and Axis
 - b. Sacrum and Coccyx
- D. The Rib Cage
 - 1. The Ribs
 - 2. The Sternum
- III. Appendicular Skeleton
 - A. Pectoral Girdle
 - 1. Clavicles
 - 2. Scapulae
 - B. Upper Limb (Arm)
 - 1. Humerus
 - 2. Radius
 - 3. Ulna
 - 4. Hand
 - C. Pelvic Girdle
 - 1. Coxal Bones
 - a. Ilium
 - b. Ischium
 - c. Pubis
 - 2. False and True Pelvises
 - 3. Sex Differences
 - D. Lower Limb (Leg)
 - 1. Femur
 - 2. Tibia
 - 3. Fibula
 - 4. Foot
- IV. Joints (Articulations)
 - A. Fibrous Joints
 - B. Cartilagenous Joints
 - C. Synovial Joints
 - 1. Types of Synovial Joints
 - 2. Movements Permitted by Synovial Joints
- V. Effects of Aging
- VI. Homeostasis
 - A. Functions of the Skeletal System
 - B. Functions of Other Systems

Suggested Student Activities

1. Identify bones on a human skeleton.
2. Obtain, from a butcher, a cow femur or humerus that has been sectioned and identify the bone marrow, medullary cavity, spongy bone, and compact bone.
3. Have students demonstrate the categories of movement made possible by freely movable joints.

Answers to Objective Questions

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|-------|--------------------------------|
| 1. c | 11. f |
| 2. g | 12. b |
| 3. a | 13. e |
| 4. d | 14. longer |
| 5. f | 15. spongy |
| 6. e | 16. sinuses |
| 7. d | 17. vertebral column, rib cage |
| 8. c | 18. flexibility, strength |
| 9. g | 19. fingers, toes |
| 10. a | 20. hinge |

Answers to Medical Terminology Reinforcement Exercise

1. chondro/malacia - abnormal softening of cartilage
2. osteo/myel/itis - inflammation of bone marrow
3. cranio/syn/ost/osis - condition of bones together in the skull (premature closure of skull sutures)
4. myelo/graphy - making a record (X ray) of the spinal cord
5. acro/cyan/osis - abnormal condition of blue extremities
6. syn/dactyl/ism - condition of fingers or toes together (webbing)
7. ortho/ped/ist - one who specializes in orthopedics (originally one who straightened children)
8. pro/gnath/ism - condition of protruding jaw (jaw beyond the projection of the forehead)
9. micro/pod/ia - condition of unusually small feet
10. arthro/scopic - pertaining to a scope inserted into a joint
11. burs/ectomy - excision of a bursa
12. synov/itis - inflammation of a synovial joint
13. a/cephaly - without a head
14. sphenoid/ostomy - creating an opening in the sphenoid
15. acetabulo/plasty - reshaping of the acetabulum

Audiovisual Materials

1. Charts and Posters of the Skeletal System
2. Human Skeleton
3. Sectioned Long Bone