

CHAPTER 7

SKELETAL SYSTEM

OVERVIEW

This chapter deals with the skeletal system—the bones that form the framework for the body. The chapter begins with a description of the living tissues that comprise bone (Learning Outcome 1). Knowledge of bone structure, growth and development, and function will allow achievement (Learning Outcomes 2–6). Specifics of the organization of the skeleton, the location and identifying characteristics, and differences between the male and female skeleton are addressed (Learning Outcomes 7–9). The chapter ends with a discussion of skeletal changes across the life span (Learning Outcome 10).

Movement is a characteristic of living things. A study of the skeletal system is necessary to understand how a complex organism, like the human, is organized to accomplish movement.

LEARNING OUTCOMES

After you have studied this chapter you should be able to:

- 7.1 Introduction (p. 193)
 1. Discuss the living tissues found in bone even though bone appears to be inert.
- 7.2 Bone Structure (p. 193)
 2. Classify bones according to their shapes, and name an example from each group.
 3. Describe the macroscopic and microscopic structure of a long bone, and list the functions of these parts.
- 7.3 Bone Development and Growth (p. 197)
 4. Distinguish between intramembranous and endochondral bones, and explain how such bones develop and grow.
 5. Describe the effects of sunlight, nutrition, hormonal secretions, and exercise on bone development and growth.
- 7.4 Bone Function (p. 202)
 6. Discuss the major functions of bones.
- 7.5 Skeletal Organization (p. 205)
 7. Distinguish between the axial and appendicular skeletons, and name the major parts of each.
- 7.6–7.12 Skull—Lower Limb (p. 206)
 8. Locate and identify the bones and the major features of the bones that comprise the skull, vertebral column, thoracic cage, pectoral girdle, upper limb, pelvic girdle, and lower limb.
 9. Describe the differences between male and female skeletons.
- 7.13 Life-Span Changes (p. 238)
 10. Describe life-span changes in the skeletal system.

FOCUS QUESTION

You are playing basketball. Despite your effort to avoid it, the ball strikes you in the head. How has the skeletal system contributed to your ability to move around the court and how has it protected you from injury?

MASTERY TEST

Now take the mastery test. Do not guess. Some questions have more than one correct answer. As soon as you complete the test, correct it. Note your successes and failures so that you can read the chapter to meet your learning needs.

1. Which of the following tissues is found in bones?
 - a. cartilage
 - b. nerve tissue
 - c. fibrous connective tissue
 - d. blood
2. A bone with a long longitudinal axis and expanded ends is classified as a _____ bone.
3. Ribs are examples of _____ bones.
 - a. long
 - b. short
 - c. flat
 - d. sesamoid
4. The shaft of a long bone is the
 - a. epiphysis.
 - b. diaphysis.

5. Which of the following statements about the periosteum is/are correct?
- The periosteum contains nerve tissue and is responsible for sensation in bones.
 - The fibers of the periosteum are continuous with ligaments and tendons.
 - The metabolic activity of bone occurs in the periosteum.
 - The periosteum has an important role in bone formation and repair.
6. The function of a bony process is to provide a
- passage for blood vessels.
 - place of attachment for tendons and ligaments.
 - smooth surface for articulation with another bone.
 - location for exchange of electrolytes.
7. Bone that consists of tightly packed tissue is called _____ bone.
8. Bone that consists of numerous bony bars and plates separated by irregular spaces is called _____ bone.
9. The medullary cavity is filled with
- spongy bone.
 - fatty connective tissue.
 - marrow.
 - collagen.
10. The intercellular material of bone is _____ and _____.
11. Severe bone pain caused by abnormally shaped red blood cells that obstruct circulation is characteristic of _____ disease.
12. Bones that develop from layers of membranous connective tissue are called _____.
13. Bones that develop from layers of hyaline cartilage are called _____.
14. The band of cartilage between the primary and secondary ossification centers in long bones is called the
- osteoblastic band.
 - calcium disk.
 - periosteal plate.
 - epiphyseal plate.
15. The primary ossification center in a long bone is found at the
- epiphysis.
 - center of the diaphysis.
 - epiphyseal plate.
 - articular surface of the joint.
16. Cells undergoing mitosis in the cartilaginous cells of the epiphyseal disk are found in
- layer one, closest to the epiphyseal end.
 - layer two.
 - layer three.
 - layer four.
17. Which of the following statements about osteoclasts is/are true?
- Osteoclasts are large cells that originate by the fusion of monocytes.
 - Osteoclasts are cells that give rise to new bone tissue.
 - Osteoclasts become inactive with aging, giving rise to osteoporosis.
 - Osteoclasts get rid of the inorganic component of the oldest cartilaginous cells and allow osteoblasts to invade the region.
18. List the factors that affect bone development, growth, and repair.
19. In a developing bone, compact bone is deposited
- on the outside of bone just under the periosteum.
 - in the center of the bone within the marrow.
 - on the inner surface of compact bone close to the marrow.
 - in a random fashion within compact bone.
20. Osteoclasts and osteoblasts remodel bone throughout life as osteoclasts resorb bone tissue and osteoblasts replace the bone.
- True
 - False
21. Vitamin D affects bone development and repair by
- influencing the rate at which calcium is deposited in bone.
 - exchanging phosphorus for calcium in bone tissue.
 - allowing absorption of calcium in the small intestine.
 - maintaining the degree of ionization of calcium salts.

22. The mass of fibrocartilage that fills the gap between two ends of a broken bone in the early stages of healing is called
- a hematoma.
 - cartilaginous callus.
 - hyaline cartilage.
 - granulation tissue.
23. The speed with which a fractured bone heals is dependent, in part, on how closely the fractured parts lie in relation to one another.
- True
 - False
24. Which of the following are functions of bone?
- shape and support of the body
 - protection of body structures
 - house the tissues that produce blood cells
 - store inorganic salts
25. The two types of bone marrow are _____ marrow and _____ marrow.
26. In an adult, the marrow in which blood cell formation takes place is found primarily in the
- skull.
 - long bones of the legs.
 - vertebrae.
 - metacarpals.
27. List the metabolic processes that require calcium.
28. Which of the following hormones stimulate/stimulates osteoclasts to break down bone tissue?
- anterior pituitary hormone
 - thyroid hormone
 - parathyroid hormone
 - adrenal hormones
29. Osteoporosis is characterized by a loss of _____ volume and _____ content.
30. Decreased amounts of the hormone _____ are associated with the development of osteoporosis.
31. The usual number of bones in the human skeleton is _____.
32. Small bones that develop in tendons where they reduce friction in places where tendons pass over bony prominences are called
- sesamoid bones.
 - irregular bones.
 - wormian bones.
 - flat bones.
33. List the four major parts of the axial skeleton.
34. List the four major parts of the appendicular skeleton.
35. The only movable bone of the skull is the
- nasal bone.
 - mandible.
 - maxilla.
 - vomer.
36. Air-filled cavities in the cranial bones (sinuses) function to
- reduce the weight of the skull.
 - act as a reservoir for mucus.
 - control the temperature of structures within the skull.
 - increase the intensity of the voice by acting as sound chambers.
37. The bone that forms the back of the skull and joins the skull along the lambdoidal suture is the _____ bone.
38. The bone containing the sella turcica, which protects the pituitary gland, is the _____ bone.
39. The bones with which all immovable facial bones articulate are the _____ bones.
40. A cleft palate is due to incomplete fusion of the _____ of the maxilla.
41. The membranous areas (soft spots) of an infant's skull are called _____.
42. The facial bones that form the orbit of the eye are the _____ and the _____ bones.

43. The adult vertebral column has how many parts?
 a. 33 c. 26
 b. 23 d. 30
44. The intervertebral disks are attached to what part of the vertebrae?
 a. lamina c. spinous process
 b. vertebral body d. pedicle
45. A type of vertebral crack or break experienced by athletes such as gymnasts and pole vaulters is a _____.
46. Which of the vertebrae contain the densest osseous tissue?
 a. cervical c. lumbar
 b. thoracic d. sacral
47. The posterior wall of the pelvic girdle is formed by the _____.
48. An exaggeration of the thoracic curve is called
 a. lordosis. c. kyphosis.
 b. scoliosis.
49. The function of the thoracic cage includes
 a. production of blood cells. c. protection of heart and lungs.
 b. contribution to breathing. d. support of the shoulder girdle.
50. True ribs articulate with _____ and the _____.
51. The middle body of the sternum is the
 a. manubrium. c. xiphoid process.
 b. tubercle. d. body.
52. The union of the manubrium and the body of the sternum is an important clinical landmark of the chest and is called the _____.
53. The pectoral girdle is made up of two _____ and two _____.
54. What is commonly referred to as the elbow bone is actually
 a. the surgical neck of the humerus. c. the radial tuberosity.
 b. the olecranon process of the ulna. d. the styloid process.
55. The wrist consists of
 a. 8 carpal bones. c. 14 phalanges.
 b. 5 metacarpal bones. d. distal segments of the radius and the ulna.
56. The bones of the palm of the hand are the _____ bones.
57. When the hands are placed on the hips, they are placed over
 a. the iliac crest. c. the ischial tuberosity.
 b. the acetabulum. d. the ischial spines.
58. The longest bone in the body is the
 a. tibia. c. femur.
 b. fibula. d. patella.
59. The lower end of the fibula can be felt as an ankle bone. The correct name is the
 a. head of the fibula. c. talus.
 b. lateral malleolus. d. lesser trochanter.
60. The largest of the tarsal bones is the _____.
61. Loss of bone mass begins at age
 a. 35. c. 55.
 b. 45. d. 65.
62. Loss of trabecular bone in the aging process increases the risk of _____ fractures.

STUDY ACTIVITIES

Definition of Word Parts (p. 192)

Define the following word parts used in this chapter.

acetabul-

ax-

-blast

canal-

carp-

-clast

clav-

condyl-

corac-

cribr-

crist-

fov-

glen-

inter-

intra-

lamell-

meat-

odont-

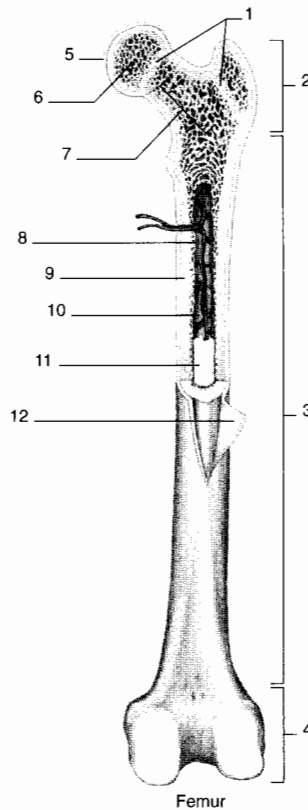
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7.1 Introduction (p. 193)

List the tissues that make up bones.

7.2 Bone Structure (p. 193)

- A. Describe the characteristics of each of the following types of bone: long bones, short bones, flat bones, irregular bones, and sesamoid bones.
- B. Answer the following questions about the parts of a long bone.
1. The expanded articular part of a long bone is called the _____.
 2. The articulating surface is coated with a layer of _____.
 3. The shaft of a long bone is known as its _____.
 4. Describe the periosteum and its functions.
 5. How is the shape of a bone related to its function?
 6. Describe compact and spongy bone and the functions of each.
- C. Label the following parts in this drawing of a long bone: proximal epiphysis, diaphysis, distal epiphysis, articular cartilage, spongy bone, space containing red marrow, compact bone, medullary cavity, yellow marrow, periosteum, epiphyseal plates, endosteum.



- D. Answer the following concerning the microscopic structure of bone.
1. Bone cells (osteocytes) are located in _____, which are arranged in concentric circles around _____ or _____ canals.
 2. What are the extracellular materials of bone? What are the functions of these materials?
 3. What are the structural differences in compact bone and spongy bone?
 4. Why do patients who suffer from sickle cell disease have bone pain?

7.3 Bone Development and Growth (p. 197)

- A. What bones are intramembranous bones? How do these develop?
- B. What bones are endochondral bones? How do these develop? Be sure to include descriptions of the primary ossification center, the secondary ossification center, and the epiphyseal plate.
- C. Describe the development of the periosteum.
- D. Locate the primary and secondary ossification centers.
- E. Answer these questions about growth at the epiphyseal plate.
1. In what layer of the epiphyseal plate is the process of mitosis occurring?
 2. How does the bone lengthen?
- F. What is the role of osteoclasts in bone growth and development?
- G. List the factors that affect bone development, growth, and repair.
- H. Describe the events in healing a fracture from rupture of the periosteum to formation of a bony callus.
- I. What factors influence the rate at which a fracture heals?

7.4 Bone Function (p. 202)

- A. What bones function primarily to provide support?

- B. What bones function primarily to protect viscera?

- C. Answer these questions concerning blood cell formation.
 - 1. Where are blood cells formed in the embryo? In the infant? In the adult?

 - 2. What is the difference between red and yellow marrow?

- D. Answer these questions concerning inorganic compounds in bone.
 - 1. What are the major inorganic salts stored in bone?

 - 2. How is calcium released from bone so that it is available for physiological processes?

 - 3. What physiological processes depend on calcium ions in the blood?

 - 4. Excessive loss of bone volume and mineral content associated with aging is _____.

 - 5. What are the effects of this process? How is this condition diagnosed?

 - 6. What measures are recommended to prevent osteoporosis?

7.5 Skeletal Organization (p. 205)

- A. The adult skeleton usually contains _____ bones. Why does this number vary?

- B. What are the two major divisions of the skeleton?

- C. List the bones found in each of these major divisions.

7.6–7.12 Skull—Lower Limb (p. 206)

A. Answer these questions concerning the number of bones in the skull.

1. How many bones are found in the human skull?
2. How many of these bones are found in the cranium?
3. How many are found in the facial skeleton?

B. Answer the following questions concerning the cranial bones.

1. Using your own head or that of a partner, locate the following cranial bones and identify the suture lines that form their boundaries: occipital bone, temporal bones, frontal bone, and parietal bones.
2. What are the remaining two bones of the cranium? Where are they located?

C. Answer the following concerning the facial bones.

1. Using yourself or a partner, locate the following facial bones: maxilla, palatine, zygomatic, lacrimal bones, nasal bones, vomer bone, inferior nasal conchae, and mandible.
2. Which of the facial bones is known as the keystone of the face? Why?
3. Which of the facial bones is the only movable bone of the skull?
4. How does a cleft palate develop?
5. Describe the differences between the infant skull and the adult skull.

D. Fill in the following chart.

Passageways through the Bones of the Skull

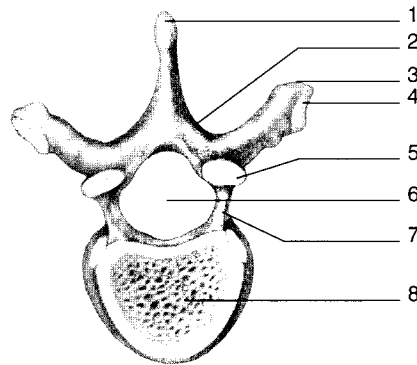
Passageway	Location	Major Structures Transmitted
Carotid canal		
Foramen lacerum		
Foramen magnum		
Foramen ovale		
Foramen rotundum		
Foramen spinosum		
Greater palatine foramen		
Hypoglossal canal		
Incisive foramen		
Inferior orbital fissure		
Infraorbital foramen		
Internal acoustic meatus		
Jugular foramen		
Mandibular foramen		
Mental foramen		
Optic canal		
Stylomastoid foramen		
Superior orbital fissure		
Supraorbital foramen		

7.7 Vertebral Column (p. 218)

A. Answer the following questions about the vertebral column.

1. What is the function of the vertebral column?
2. Draw the normal curves of the vertebral column in the margin of this page.
3. What is the difference between the vertebral column of an infant and that of an adult? How does this occur?

B. 1. Label the numbered parts identified in the drawing of a vertebra.



2. There are _____ cervical vertebrae.
3. The first cervical vertebra is the _____; the second is the _____.

C. In what ways is the structure of the thoracic vertebrae unique?

D. In what ways is the structure of the lumbar vertebrae unique?

E. What is the importance of the sacrum in obstetrics?

7.8 Thoracic Cage (p. 222)

A. Name the bones of the thoracic cage.

B. Describe the differences among true, false, and floating ribs. Include their articulations.

C. Describe the sternum including manubrium, body, sternal angle, and xiphoid process. Locate these structures on yourself or a partner.

D. What is a sternal puncture and why is it done?

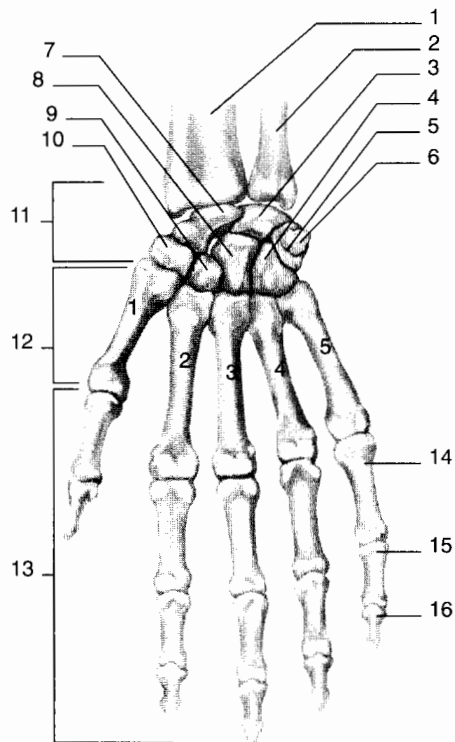
7.9 Pectoral Girdle (p. 225)

Use yourself or a partner to locate and list the bones of the pectoral girdle. What is the function of the pectoral girdle?

7.10 Upper Limb (p. 226)

A. Use yourself or a partner to locate and list the bones of the upper limb.

B. Label the numbered parts of a hand.



7.11 Pelvic Girdle (p. 231)

- A. List the bones of the pelvic girdle.
- B. Identify the bone in which each of the structures in the following chart is located, and explain the function of each structure.

Structures of the Bones of the Pelvic Girdle and Their Functions

Structure	Bone	Function
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Acetabulum

Anterior superior iliac spine

Symphysis pubis

Obturator foramen

Ischial tuberosity

Ischial spine

- C. Describe the differences between the male pelvis and the female pelvis.

7.12 Lower Limb (p. 234)

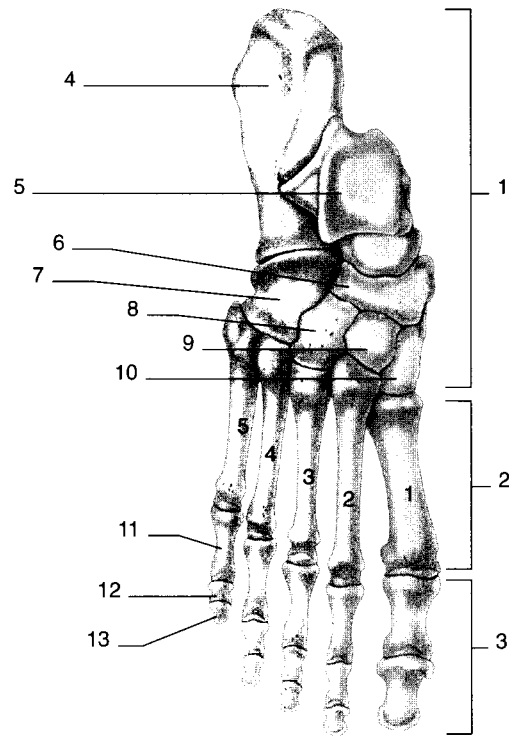
- A. List the bones of the lower limb.

- B. Identify the bone in which each of the structures in the following chart is located, and explain the function of each structure.

Structures of the Bones of the Lower Limb and Their Functions

Structure	Bone	Function
Fovea capitis		
Patella		
Medial malleolus		
Lateral malleolus		
Greater and lesser trochanters		
Tibial tuberosity		

C. Label the numbered structures in the illustration of a foot.



D. How is the foot able to support the weight of the body?

7.13 Life-Span Changes (p. 238)

List the changes in the skeletal system associated with aging.

Clinical Focus Question

Your neighbors' 2-week-old infant has been diagnosed as having a mild congenital hip displacement, and the doctor has told the parents that the use of a thick diaper should correct the problem. Both parents are very upset and state that they do not understand what is wrong with the baby or the reason for the heavy diaper. How would you explain the diagnosis and treatment to them?

When you have completed the study activities to your satisfaction, retake the mastery test and compare your performance with your initial attempt. If there are still areas you do not understand, repeat the appropriate study activities.

CHAPTER 8

JOINTS OF THE SKELETAL SYSTEM

OVERVIEW

An understanding of how joints work is basic to understanding how the body moves. You will study the functions of joints and how joints are classified according to the type of tissue that binds the bones together (Learning Outcomes 1–4). You will be able to describe the structure of a synovial joint and distinguish among the six types of these joints and name an example of each type (Learning Outcomes 5, 6). At the end of this chapter, you will be able to explain how skeletal muscles produce movements at joints, identify types of joint movements, and describe various joints and how their articulating parts are held together (Learning Outcomes 7–9). Finally, you will be able to describe life-span changes in joints (Learning Outcome 10).

An understanding of how joints work is basic to understanding how the body moves.

LEARNING OUTCOMES

After you have studied this chapter you should be able to:

- 8.1 Introduction (p. 261)
 1. List the functions of joints.
- 8.2 Classification of Joints (p. 261)
 2. Explain how joints can be classified according to the type of tissue that binds the bones together.
 3. Describe how bones of fibrous joints are held together.
 4. Describe how bones of cartilaginous joints are held together.
- 8.3 General Structure of a Synovial Joint (p. 263)
 5. Describe the general structure of a synovial joint.
- 8.4 Types of Synovial Joints (p. 265)
 6. Distinguish among the six types of synovial joints and name an example of each type.
- 8.5 Types of Joint Movements (p. 267)
 7. Explain how skeletal muscles produce movements at joints, and identify several types of joint movements.
- 8.6 Examples of Synovial Joints (p. 271)
 8. Describe the shoulder joint and explain how its articulating parts are held together.
 9. Describe the elbow, hip, and knee joints and explain how their articulating parts are held together.
- 8.7 Life-Span Changes (p. 278)
 10. Describe life-span changes in joints.

FOCUS QUESTION

You finish transcribing your class notes, rise from your chair, and stretch. How do the joints enable you to perform these movements?

MASTERY TEST

Now take the mastery test. Do not guess. Some questions may have more than one correct answer. As soon as you complete the test, correct it. Note your successes and failures so that you can read the chapter to meet your learning needs.

1. The function of joints is to
 - a. bind parts of the skeletal system together.
 - b. allow movement in response to skeletal muscle contraction.
 - c. permit bone growth.
 - d. all of the above
2. Name three classifications of joints according to movement and according to the type of tissue that binds them together.

3. Which of the following are characteristics of fibrous joints?
- The bones of the joint have a space between them.
 - The bones of the joint are held firmly together by fibrous connective tissue.
 - This type of joint is found in the skull.
 - The structure of these joints is fixed early in life.
4. Syndesmosis, suture, and gomphosis are types of _____ joints.
5. The epiphyseal plate is an example of a _____ or a _____.
6. Movement in a vertebral column and the symphysis pubis (is/is not) due to compressing a pad of cartilage.
7. The function of articular cartilage is to
- provide flexibility in the joint.
 - provide insulation.
 - minimize friction.
 - secrete synovial fluid.
8. Shock absorption in a synovial joint is the function of the _____.
9. Which of the following can lead to increased mechanical stress in synovial joints?
- less than normal amounts of fat tissue
 - ballet
 - obesity
 - increased mineralocorticoid activity
10. If aspirated synovial fluid is red-tinged and contains pus, the most likely cause is
- a fracture.
 - osteoarthritis.
 - gout.
 - a bacterial infection.
 - a collagen disease, rheumatoid arthritis.
11. The joint structures that limit movement in a joint in order to prevent injury are the
- articulating surfaces of the bones.
 - ligaments.
 - tendons.
 - synovial membranes.
12. The inner layer of the joint capsule is the _____.
13. Which of the following are functions of synovial fluid?
- lubrication of the joint surfaces
 - prevention of infection within the joint
 - nutrition of the cartilage within the joint
 - absorption of shock within the joint
14. Disks of fibrocartilage within a joint that help distribute body weight within the joint are called _____.
15. A fluid-filled sac within a joint is a _____.
16. Articular cartilage receives its supply of oxygen and nutrients from _____.
17. The type of joint that permits the widest range of motion is a _____ joint.
- pivot
 - hinge
 - gliding
 - ball-and-socket
18. Match the joint in the first column with the type of joint it represents.
- | | |
|-----------------|--------------------|
| ___ 1. shoulder | a. saddle |
| ___ 2. elbow | b. gliding |
| ___ 3. ankle | c. ball-and-socket |
| ___ 4. thumb | d. pivot |
| | e. hinge |
19. Bending parts of a joint so that the angle between parts of the joint is decreased is
- flexion.
 - extension.
 - inversion.
 - elevation.
20. Movement that brings the foot farther from the shin is
- adduction.
 - abduction.
 - plantar flexion.
 - dorsiflexion.
21. The two bones that form the shoulder joint are the _____ and the _____.
22. The shoulder (is/is not) an extremely stable joint.
23. The kind of injury to which the shoulder joint is prone is _____.

24. The _____ and the _____ make up the hinge joint of the elbow.
25. What movements are made possible by the rotation of the head of the radius?
26. An instrument used to visualize the interior of a joint is the _____.
27. The head of the femur fits into the _____ of the _____ bone.
28. List the six possible movements of the hip joint.
29. The largest and most complex of the synovial joints is the _____ joint.
30. Rotation at the knee joint is possible when the knee is
 - a. flexed.
 - b. extended.
 - c. abducted.
 - d. adducted.
31. A joint injury that involves stretching and tearing of ligaments and tendons is a _____.
32. Elderly persons should restrict regular exercise to limit wear and tear on increasingly fragile joints.
 - a. True
 - b. False

STUDY ACTIVITIES

Definition of Word Parts (p. 260)

Define the following word parts used in this chapter.

anul-

arth-

burs-

condyl-

fov-

glen-

labr-

ov-

sutur-

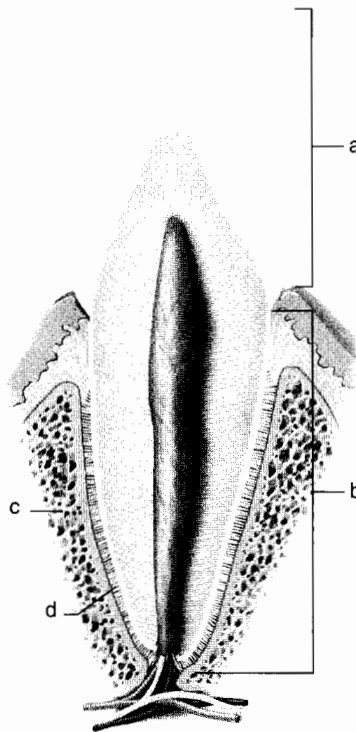
syndesm-

8.1 Introduction (p. 261)

- A. The place where two or more bones meet is called a _____ or an _____.
- B. List the functions of joints.

8.2 Classification of Joints (p. 261)

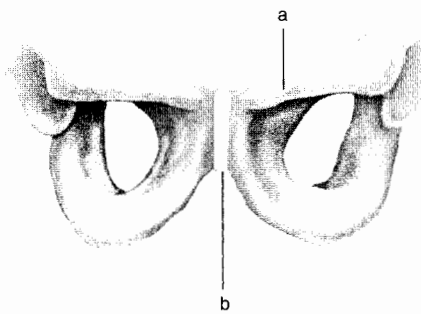
- A. Answer the following questions about fibrous joints (synarthroses).
1. List the characteristics of fibrous joints.
 2. Describe and give an example of each of the following fibrous joints.
 - a. syndesmosis
 - b. suture
 - c. gomphosis
 3. Label the drawing of a gomphosis.



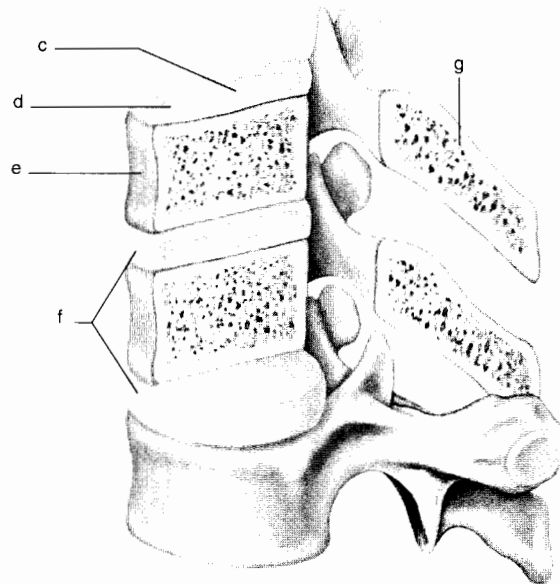
4. Areas in the infant skull that permit the shape of the skull to change during childbirth are called _____.

B. Answer the following questions concerning cartilaginous joints (amphiarthroses).

1. List and describe the two types of cartilaginous joints.
2. Label the lettered parts of cartilaginous joints.



(a)

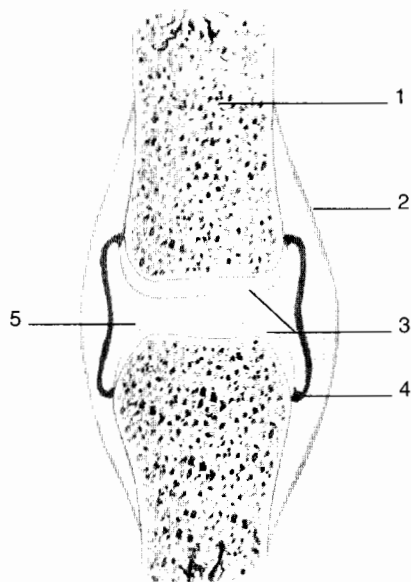


(b)

3. Describe the function of an intervertebral disk.
4. A symphysis important in childbirth is the _____.

8.3 General Structure of a Synovial Joint (p. 263)

A. Label the numbered parts of a synovial joint.



B. List the conditions that can be diagnosed by examining synovial fluid. Include the clinical findings for each condition.

C. Answer the following questions about the structure and function of synovial joints.

1. The parts of bones that come together in a joint are covered by a layer of _____.
2. Articular cartilage lies on the subchondral plate, which usually contains _____ bone.
3. What is the function of the subchondral plate?
4. Structures that divide a synovial joint into compartments are _____.
5. The bones of a diarthrosis are held together by a _____.
6. The outer layer of the structure in the previous question is composed of _____ connective tissue and is attached to the _____ of the bone.
7. _____ bind the articular ends of bone together.
8. The membrane that covers all surfaces within the joint capsule is the _____.
9. List the functions of the synovial membrane and synovial fluid.
10. Describe the menisci and their function.
11. Describe the bursae and their function.
12. How does immobility affect the supply of oxygen and nutrients to the articular cartilage?

8.4 Types of Synovial Joints (p. 265)

Complete the following chart related to synovial joints.

Type	Description	Possible Movement	Example
Ball-and-socket			
Condylar			
Plane			
Hinge			
Pivot or trochoid			
Saddle			

8.5 Types of Joint Movements (p. 267)

Describe the following joint movements. You may also wish to perform these movements as you describe them.

flexion

extension

hyperextension

dorsiflexion

plantar flexion

abduction

adduction

rotation

circumduction

supination

pronation

eversion

inversion

protraction

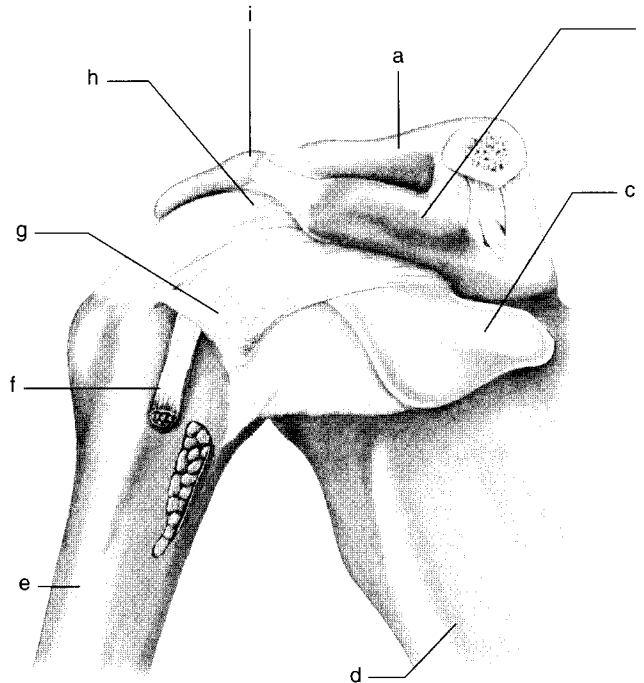
retraction

elevation

depression

8.6 Examples of Synovial Joints (p. 271)

- A. Answer the following questions regarding the shoulder joint.
1. Label the lettered parts on the drawing of a shoulder joint.

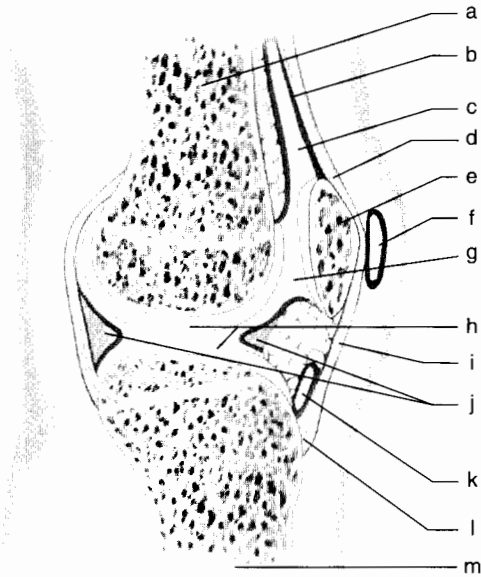


2. Explain the relationship between the wide range of movement at the shoulder joint and the relative ease with which the shoulder can be dislocated.
 3. List the ligaments that help prevent shoulder dislocation.
- B. Answer the following questions regarding the elbow joint.
1. Describe the structure of the elbow joint and list the movements possible at this joint.
 2. The procedure used to diagnose and treat injuries to the elbow, shoulder, and knee via a thin fiber-optic instrument is called _____.
 3. What condition is diagnosed using polymerase chain reaction?
- C. Answer the following questions concerning the hip joint.
1. The hip joint is a _____ joint.
 2. List the structures of the hip joint and describe their functions.
 3. The hip joint is (more/less) movable than the shoulder joint. Give the rationale for your answer.

4. List the major ligaments of the hip and identify the function of each.

D. Answer the following questions about the knee joint.

1. Label the lettered parts of the knee joint.



2. List the five major ligaments of the knee joint.
3. What is the function of the cruciate ligaments?
4. List the movements possible in the knee joint.

8.7 Life-Span Changes (p. 278)

Describe the joint changes that occur over the life span.

Clinical Focus Question

After fracturing your humerus just distal to the surgical neck, your arm was immobilized in a sling that bound your upper arm to your trunk for six weeks. The sling has just been removed and your physician has prescribed physical therapy for you. Why was your arm immobilized in this fashion? What kinds of exercises can you anticipate the physical therapist will prescribe for you?

When you have completed the study activities to your satisfaction, retake the mastery test and compare your performance with your initial attempt. If there are still areas you do not understand, repeat the appropriate study activities.