

5

Medical Terminology and Anatomy and Physiology

Standard: Anatomy and Physiology; Medical Terminology

Competency: Applies fundamental knowledge of the anatomy and function of all human systems to the practice of EMS.

Uses foundational anatomical and medical terms and abbreviations in written and oral communication with colleagues and other health care professionals.

OBJECTIVES

After reading this chapter you should be able to:

- 5.1 Define key terms introduced in this chapter.
- 5.2 Describe the importance of the proper use of medical terminology.
- 5.3 Apply definitions of common prefixes, suffixes, and roots to determine the meaning of medical terms.
- 5.4 Recognize the meaning of acronyms and abbreviations commonly used in EMS.
- 5.5 Give examples of when it is better to use a common or lay term to describe something than it is to use a medical term.
- 5.6 Use anatomical terms of position and direction to describe the location of body structures and position of the body.
- 5.7 Utilize topographical anatomical landmarks as points of reference.
- 5.8 Describe the structures and functions of each of the following body systems:
 - a. Musculoskeletal
 - b. Respiratory
 - c. Cardiovascular
 - d. Nervous
 - e. Digestive

- f. Integumentary
 - g. Endocrine
 - h. Renal
 - i. Male and female reproductive
- 5.9 Given a series of models or diagrams, label the anatomical structures of each of the following body systems:
- a. Skeletal
 - b. Respiratory
 - c. Cardiovascular
 - d. Nervous
 - e. Skin
 - f. Endocrine
 - g. Renal/urinary
 - h. Male and female reproductive
- 5.10 Describe differences in the reproductive anatomy of children compared to adults.
- 5.11 Apply understanding of anatomy and physiology to explain the function of the life support chain.

MATCH TERMINOLOGY/DEFINITIONS

▶ PART A

- | | |
|--|----------------------------------|
| A. The front of the body or body part | _____ 1. Abdominal quadrants |
| B. The standard reference position for the body in the study of anatomy; in this position, the body is standing erect, facing the observer, with arms down at the sides and the palms of the hands forward | _____ 2. Acetabulum |
| C. A small tube located near the junction of the small and large intestines in the right lower quadrant of the abdomen, the function of which is not well understood | _____ 3. Acromioclavicular joint |
| D. The microscopic sacs of the lungs where gas exchange with the bloodstream takes place | _____ 4. Acromion process |
| E. The study of body structure | _____ 5. Aerobic metabolism |
| F. The largest artery in the body; it transports blood from the left ventricle to begin systemic circulation | _____ 6. Alveoli |
| G. The ability of the heart to generate and conduct electrical impulses on its own | _____ 7. Anaerobic metabolism |
| H. The highest portion of the shoulder | _____ 8. Anatomical position |
| I. Any blood vessel carrying blood away from the heart | _____ 9. Anatomy |
| J. The conversion of glucose into energy without the use of oxygen | _____ 10. Anterior |
| K. Four divisions of the abdomen used to pinpoint the location of a pain or injury | _____ 11. Aorta |
| L. The two upper chambers of the heart; the right chamber receives unoxygenated blood returning from the body, and the left chamber receives oxygenated blood returning from the lungs | _____ 12. Appendix |
| M. The conversion of glucose into energy by the use of oxygen | _____ 13. Arteriole |
| | _____ 14. Artery |
| | _____ 15. Atria |
| | _____ 16. Automaticity |

- N. The pelvic socket into which the ball of the proximal end of the femur fits to form the hip joint
- O. The smallest kind of artery
- P. The joint where the acromion and the clavicle meet

► **PART B**

- A. The system made up of the heart and the blood vessels
- B. Blood vessels that supply the muscle of the heart
- C. The ring-shaped structure that forms the lower portion of the larynx
- D. The carotid and femoral pulses, which can be felt in the central part of the body
- E. The top, back, and sides of the skull
- F. The brain and spinal cord
- G. The wrist bones
- H. Specialized involuntary muscle found only in the heart
- I. The collarbone
- J. The cardiovascular system
- K. A system of specialized muscle tissue that conducts electrical impulses that, in turn, stimulate the heart to beat
- L. The large neck arteries, one on each side of the neck, that carry blood from the heart to the head
- M. A thin-walled, microscopic blood vessel where the oxygen/carbon dioxide and nutrient/waste exchange with the body's cells takes place
- N. Artery of the upper arm; the site of the pulse checked during infant CPR
- O. The division of the peripheral nervous system that controls involuntary motor functions
- P. The heel bone
- Q. The two large sets of branches that come off the trachea and enter the lungs
- R. On both sides
- S. The pressure caused by blood exerting force against the walls of the blood vessels
- T. The round saclike organ of the renal system used as a reservoir for urine

- _____ 1. Autonomic nervous system
- _____ 2. Bilateral
- _____ 3. Bladder
- _____ 4. Blood pressure
- _____ 5. Brachial artery
- _____ 6. Bronchi
- _____ 7. Calcaneus
- _____ 8. Capillary
- _____ 9. Cardiac conduction system
- _____ 10. Cardiac muscle
- _____ 11. Cardiovascular system
- _____ 12. Carotid arteries
- _____ 13. Carpals
- _____ 14. Central nervous system (CNS)
- _____ 15. Central pulses
- _____ 16. Circulatory system
- _____ 17. Clavicle
- _____ 18. Coronary arteries
- _____ 19. Cranium
- _____ 20. Cricoid cartilage

► **PART C**

- A. The bone of the upper arm, between the shoulder and the elbow
- B. The proximal opening of the trachea
- C. A sitting position
- D. Further away from the torso
- E. Inadequate perfusion of the cells and tissues of the body caused by insufficient flow of blood through the capillaries

- _____ 1. Dermis
- _____ 2. Diaphragm
- _____ 3. Diastolic blood pressure
- _____ 4. Digestive system

- F. A sac on the underside of the liver that stores bile produced by the liver
- G. The inner layer of the skin, rich in blood vessels and nerves, found beneath the epidermis
- H. A hormone produced by the body; as a medication, it dilates respiratory passages and is used to relieve severe allergic reaction
- I. The muscular structure that divides the chest cavity from the abdominal cavity
- J. System by which food travels through the body and is broken down into absorbable forms
- K. Artery supplying the foot, lateral to the large tendon of the big toe
- L. Referring to the back of the body or the back of the hand or foot
- M. The outer layer of the skin
- N. The pressure in the arteries when the left ventricle is refilling
- O. The large bone of the thigh
- P. System of glands that produce chemicals called hormones that help to regulate many body activities and functions
- Q. A leaf-shaped structure that prevents food and foreign matter from entering the trachea
- R. A passive process in which the intercostal muscles and the diaphragm relax, causing the chest cavity to decrease in size and air to flow out of the lungs
- S. The lateral and smaller bone of the lower leg
- T. The major artery supplying the leg

▶ **PART D**

- A. The lower, posterior portions of the pelvis
- B. The voicebox
- C. The two fused bones forming the upper jaw
- D. To the side, away from the midline of the body
- E. Toward the midline of the body
- F. The free-floating bone in the neck that provides structure to the larynx
- G. The lower jaw bone
- H. The superior and widest portion of the pelvis
- I. Organs of the renal system used to filter blood and regulate fluid levels in the body
- J. Away from the head; usually compared with another structure that is closer to the head
- K. The largest organ of the body; produces bile to assist in breakdown of fats and assists in the metabolism of various substances in the body

- _____ 5. Distal
- _____ 6. Dorsal
- _____ 7. Dorsalis pedis artery
- _____ 8. Endocrine system
- _____ 9. Epidermis
- _____ 10. Epiglottis
- _____ 11. Epinephrine
- _____ 12. Exhalation
- _____ 13. Femoral artery
- _____ 14. Femur
- _____ 15. Fibula
- _____ 16. Fowler's position
- _____ 17. Gall bladder
- _____ 18. Glottic opening
- _____ 19. Humerus
- _____ 20. Hypoperfusion

- _____ 1. Hyoid bone
- _____ 2. Ilium
- _____ 3. Inferior
- _____ 4. Inhalation
- _____ 5. Insulin
- _____ 6. Involuntary muscle
- _____ 7. Ischium
- _____ 8. Joint
- _____ 9. Kidney
- _____ 10. Large intestine

- L. An active process in which the intercostal muscles and the diaphragm contract, expanding the size of the chest cavity and causing air to flow into the lungs
- M. The superior portion of the sternum
- N. A hormone produced by the pancreas or taken as a medication by many diabetics
- O. Protrusion on the side of the ankle
- P. Muscle that responds automatically to brain signals but cannot be consciously controlled
- Q. The point where two bones come together
- R. The muscular tube that removes water from waste products received from the small intestine and removes anything absorbed by the body toward excretion from the body
- S. The organs where exchange of atmospheric oxygen and waste carbon dioxide take place
- T. Tissue that connects bone to bone

► **PART E**

- A. The basin-shaped bony structure that supports the spine and is the point of proximal attachment for the lower extremities
- B. The kneecap
- C. Referring to the palm of the hand
- D. The area directly posterior to the mouth
- E. The bony structures around the eyes; the eye sockets
- F. The nose bones
- G. The radial, brachial, posterior tibial, and dorsalis pedis pulses, which can be felt at peripheral points of the body
- H. A gland located behind the stomach that produces insulin and juices that assist in digestion of food in the duodenum of the small intestine
- I. The hand bones
- J. A line drawn vertically from the middle of the armpit to the ankle
- K. The supply of oxygen to and removal of wastes from the cells and tissue of the body as a result of the flow of blood through the capillaries
- L. The nerves that enter and leave the spinal cord and travel between the brain and organs without passing through the spinal cord
- M. An imaginary line drawn down the center of the body, dividing it into right and left halves
- N. The foot bones
- O. Tissue that can contract to allow movement of a body part
- P. The line through the center of each clavicle
- Q. The system of brain, spinal cord, and nerves that governs sensation, movement, and thought

- _____ 11. Larynx
- _____ 12. Lateral
- _____ 13. Ligament
- _____ 14. Liver
- _____ 15. Lungs
- _____ 16. Malleolus
- _____ 17. Mandible
- _____ 18. Manubrium
- _____ 19. Maxillae
- _____ 20. Medial

- _____ 1. Metacarpals
- _____ 2. Metatarsals
- _____ 3. Mid-axillary line
- _____ 4. Mid-clavicular line
- _____ 5. Midline
- _____ 6. Muscle
- _____ 7. Musculoskeletal system
- _____ 8. Nasal bones
- _____ 9. Nasopharynx
- _____ 10. Nervous system
- _____ 11. Orbits
- _____ 12. Oropharynx
- _____ 13. Palmar
- _____ 14. Pancreas
- _____ 15. Patella
- _____ 16. Pelvis
- _____ 17. Penis
- _____ 18. Perfusion
- _____ 19. Peripheral nervous system
- _____ 20. Peripheral pulses

- R. The system of bones and skeletal muscles that supports and protects the body and permits movement
- S. The organ of male reproduction responsible for sexual intercourse and the transfer of sperm
- T. The area directly posterior to the nose

► **PART F**

- A. Lying on the side
- B. The body system that regulates fluid balance and filtration of blood
- C. The lateral bone of the forearm
- D. A flat surface formed when slicing through a solid object
- E. Components of the blood that carry oxygen to and carbon dioxide away from the cells
- F. Artery of the lower arm; it is felt when taking the pulse at the wrist
- G. The toe bones and finger bones
- H. Lying face down
 - I. The area directly posterior to the mouth and nose; it is made up of the oropharynx and the nasopharynx
- J. Referring to the sole of the foot
- K. The back of the body or body part
- L. The fluid portion of the blood
- M. Artery supplying the foot, behind the medial ankle
- N. The study of body function
- O. The rhythmic beats caused as waves of blood move through and expand the arteries
- P. Components of the blood; membrane-enclosed fragments of specialized cells
- Q. Closer to the torso
- R. The vessels that carry blood from the right ventricle of the heart to the lungs
- S. The vessels that carry oxygenated blood from the lungs to the left atrium of the heart
- T. The medial anterior portion of the pelvis

► **PART G**

- A. An organ located in the left upper quadrant of the abdomen that acts as a blood filtration system and a reservoir for reserves of blood
- B. Muscular sac between the esophagus and the small intestine where digestion of food begins
- C. Toward the head
- D. The pressure created in the arteries when the left ventricle contracts and forces blood out into the circulation

- _____ 1. Phalanges
- _____ 2. Pharynx
- _____ 3. Physiology
- _____ 4. Plane
- _____ 5. Plantar
- _____ 6. Plasma
- _____ 7. Platelets
- _____ 8. Posterior
- _____ 9. Posterior tibial artery
- _____ 10. Prone
- _____ 11. Proximal
- _____ 12. Pubis
- _____ 13. Pulmonary artery
- _____ 14. Pulmonary vein
- _____ 15. Pulse
- _____ 16. Radial artery
- _____ 17. Radius
- _____ 18. Recovery position
- _____ 19. Red blood cells
- _____ 20. Renal system

- _____ 1. Reproductive system
- _____ 2. Respiration
- _____ 3. Respiratory system
- _____ 4. Scapula
- _____ 5. Shock
- _____ 6. Skeleton

- E. Tissue that connects muscle to bone _____ 7. Skin
- F. The wing-shaped plate of cartilage that sits anterior to the larynx and forms the adams apple _____ 8. Skull
- G. The bony structure of the head _____ 9. Small intestine
- H. The bones of the body _____ 10. Spleen
- I. The shoulder blade _____ 11. Sternum
- J. The process of moving oxygen and carbon dioxide between circulating blood and the cells _____ 12. Stomach
- K. The system of nose, mouth, throat, lungs, and muscles that brings oxygen into the body and expels carbon dioxide _____ 13. Subcutaneous layers
- L. The body system that is responsible for human reproduction _____ 14. Superior
- M. The layer of tissue between the body and the external environment _____ 15. Supine
- N. Hypoperfusion _____ 16. Systolic blood pressure
- O. The muscular tube between the stomach and the large intestine, divided into the duodenum, the jejunum, and the ileum, which receives partially digested food from the stomach and continues digestion _____ 17. Tarsals
- P. The breastbone _____ 18. Tendon
- Q. The layers of fat and soft tissue found below the dermis _____ 19. Thorax
- R. The ankle bones _____ 20. Thyroid cartilage
- S. Lying on the back
- T. The chest

▶ PART H

- A. The female organ of reproduction used for both sexual intercourse and as an exit from the uterus for the fetus _____ 1. Tibia
- B. Any blood vessel returning blood to the heart _____ 2. Torso
- C. The tubes connecting the bladder to the ureter or penis for excretion of urine _____ 3. Trachea
- D. The process of moving gasses (oxygen and carbon dioxide) between inhaled air and the pulmonary circulation of the blood _____ 4. Trendelenburg position
- E. A position in which the patient's feet and legs are higher than the head _____ 5. Ulna
- F. The two lower chambers of the heart _____ 6. Urethra
- G. The trunk of the body; the body without the head and the extremities _____ 7. Uterus
- H. The 33 bones of the spinal column _____ 8. Vagina
- I. Components of the blood; they produce substances that help the body fight infection _____ 9. Valve
- J. Form the structure of the cheeks _____ 10. Vein
- K. The medial and larger bone of the lower leg _____ 11. Vena cava
- _____ 12. Ventilation
- _____ 13. Ventral

- L.** The windpipe; the structure that connects the pharynx to the lungs
 - M.** The medial bone of the forearm
 - N.** Female organ of reproduction used to house the developing fetus
 - O.** A structure that opens and closes to permit the flow of a fluid in only one direction
 - P.** The superior vena cava and the inferior vena cava, which return blood from the body to the right atrium
 - Q.** Referring to the front of the body
 - R.** The smallest kind of vein
 - S.** Muscle that can be consciously controlled
 - T.** The inferior portion of the sternum
 - U.** The male organ that produces sperm
 - V.** Word endings that form nouns, adjectives, or verbs
 - W.** The foundation of a word
 - X.** Roots that are combined in medical terms
 - Y.** Two or more whole words combined to form another term
 - Z.** Used to modify or qualify a root word
- _____ **14.** Ventricles
 - _____ **15.** Venule
 - _____ **16.** Vertebrae
 - _____ **17.** Voluntary muscle
 - _____ **18.** White blood cells
 - _____ **19.** Xiphoid process
 - _____ **20.** Zygomatic arches
 - _____ **21.** Combining form
 - _____ **22.** Compound
 - _____ **23.** Prefix
 - _____ **24.** Root
 - _____ **25.** Suffix
 - _____ **26.** Testes

MULTIPLE-CHOICE REVIEW

- _____ 1. All the following are body systems *except*:
- A. respiratory.
 - B. cardiovascular.
 - C. abdominal.
 - D. musculoskeletal.
- _____ 2. If a patient is lying on his or her left side, the patient is said to be in the _____ position.
- A. Fowler's
 - B. recovery
 - C. left supine
 - D. left prone
- _____ 3. When a patient who has been having difficulty breathing is placed in a sitting-up position on a stretcher, this position is called:
- A. prone.
 - B. supine.
 - C. Fowler's.
 - D. Trendelenburg.
- _____ 4. When treating a patient who is dizzy and passing out, the EMT should place the patient lying flat with her or his head lower than her or his legs. This position is called:
- A. prone.
 - B. supine.
 - C. Fowler's.
 - D. Trendelenburg.
- _____ 5. The musculoskeletal system has three main functions. It gives the body shape, provides for body movements, and:
- A. gives the body sensation.
 - B. protects vital internal organs.
 - C. provides for the body's outer covering.
 - D. allows transport of oxygen into the cells.

- _____ 6. Your patient was involved in a fight in a bar. You suspect he may have broken his upper jaw. What is the name of the bone involved?
- A. Mandible
B. Orbit
C. Maxillae
D. Nasal bone
- _____ 7. The spinal column includes the _____ vertebrae.
- A. thoracic and coccyx
B. cervical and orbit
C. lumbar and sternal
D. sacrum and pelvic
- _____ 8. An injury to the spinal cord at the _____ level may be fatal because control of the muscles of breathing arise from the spinal cord at this level.
- A. lumbar
B. sacral
C. cervical
D. thoracic
- _____ 9. Your patient was standing on the street corner when suddenly a truck cut the corner too close and ran over his legs. The bones in the lower extremities that he may have broken include the:
- A. femur, calcaneus, and phalanges.
B. ischium, tibia, and ulna.
C. orbit, lumbar, and shin.
D. radius, fibula, and metatarsals.
- _____ 10. Bones in the upper extremities include the:
- A. humerus and radius.
B. humerus and calcaneus.
C. phalanges and tibia.
D. ulna and cervical.
- _____ 11. The types of muscle tissue include:
- A. striated.
B. involuntary.
C. cardiac.
D. all of these.
- _____ 12. When a patient is walking, she is using which type of muscle?
- A. Voluntary
B. Involuntary
C. Cardiac
D. Smooth
- _____ 13. Involuntary, or smooth, muscle is found in the:
- A. trachea.
B. walls of the blood vessels.
C. heart.
D. quadriceps and biceps.
- _____ 14. The structure in the throat that is described as the voicebox is called the:
- A. pharynx.
B. larynx.
C. trachea.
D. sternum.
- _____ 15. A leaf-shaped valve that prevents food and foreign objects from entering the trachea is called the:
- A. pharynx.
B. epiglottis.
C. larynx.
D. bronchi.

- _____ 16. Oxygen passes from the environment to the lungs in what order?
A. Nose, bronchi, larynx, trachea, lung
B. Larynx, esophagus, trachea, bronchi, alveoli
C. Mouth, pharynx, trachea, bronchi, alveoli
D. Epiglottis, trachea, cricoid, bronchi, alveoli
- _____ 17. When the diaphragm and intercostal muscles relax, the size of the chest cavity:
A. increases, causing inhalation.
B. increases, causing exhalation.
C. decreases, causing exhalation.
D. decreases, causing inhalation.
- _____ 18. The difference between the adult airway and the pediatric airway is that:
A. the adult's tongue takes up proportionately more space in the mouth than the child's.
B. the trachea is softer and more flexible in an adult.
C. the cricoid cartilage is softer in an adult.
D. all structures are smaller and more easily obstructed in a child.
- _____ 19. The body system that is responsible for the breakdown of food into absorbable forms is called the _____ system.
A. nervous
B. digestive
C. endocrine
D. integumentary
- _____ 20. An organ containing acidic gastric juices that begin the breakdown of food into components that the body will be able to convert to energy is the:
A. large intestine.
B. small intestine.
C. stomach.
D. liver.
- _____ 21. The major artery in the thigh is called the:
A. carotid.
B. femoral.
C. radial.
D. brachial.
- _____ 22. The vessel that carries oxygen-poor blood from the portions of the body below the heart and back to the right atrium is called the:
A. posterior tibial.
B. internal jugular.
C. inferior vena cava.
D. aorta.
- _____ 23. The heart has a right and left side as well as upper and lower chambers. The left atrium:
A. receives blood from the veins of the body.
B. receives blood from the pulmonary veins.
C. pumps blood to the lungs.
D. pumps blood to the body.
- _____ 24. The fluid that carries the blood cells and nutrients is called:
A. platelets.
B. urine.
C. plasma.
D. none of these.
- _____ 25. The blood component that is essential to the formation of blood clots is called:
A. plasma.
B. platelets.
C. white blood cells.
D. red blood cells.

- _____ 26. The pressure on the walls of an artery when the left ventricle contracts is called the _____ pressure.
- A. systolic
B. arterial
C. diastolic
D. residual
- _____ 27. The two main divisions of the nervous system are:
- A. central and peripheral.
B. bones and muscles.
C. brain and skin.
D. spinal cord and brain.
- _____ 28. Patients have many different types of nerves. Nerves that carry information from throughout the body to the brain are _____ nerves.
- A. motor
B. cardiac
C. spinal
D. sensory
- _____ 29. One of the functions of the integumentary system is to:
- A. eliminate excess oxygen into the atmosphere.
B. regulate the diameter of the blood vessels in the circulation.
C. protect the body from the environment, bacteria, and other organisms.
D. allow environmental water to carefully enter the body.
- _____ 30. The system that secretes hormones, such as insulin and adrenaline, and that is responsible for regulating many body activities, is called the _____ system.
- A. integumentary
B. nervous
C. endocrine
D. gastrointestinal
- _____ 31. Your patient was in a car wreck, and on assessment you note he has no sensation and movement in both of his legs. When documenting this on the prehospital care report, you should note that the patient:
- A. demonstrated quadriplegia.
B. demonstrated paraplegia.
C. had extreme pain in his extremities.
D. was completely paralyzed.
- _____ 32. Your patient is being treated for lung disease and was referred to a specialist for further treatment. The type of physician he is going to see is most likely a(n):
- A. cardiologist.
B. internist.
C. asthmatoologist
D. pulmonologist.

COMPLETE THE FOLLOWING

1. List the names of nine arteries in the body.

- | | |
|----------|----------|
| A. _____ | F. _____ |
| B. _____ | G. _____ |
| C. _____ | H. _____ |
| D. _____ | I. _____ |
| E. _____ | |

2. List five functions of the skin.

- A. _____
- B. _____
- C. _____
- D. _____
- E. _____

3. Define the following directional terms:

- A. lateral _____
- B. medial _____
- C. proximal _____
- D. distal _____
- E. superior _____
- F. inferior _____

INSIDE/OUTSIDE: RECOGNIZING SYMPATHETIC NERVOUS SYSTEM REPOSE

The 62-year-old male patient discussed on page 122 of the book is having a "silent-MI," which is an MI that is painless.

Elderly patients, females, and what other group of patients have silent MIs? _____

When the brain signals to the adrenal glands that the body is undergoing severe stress, such as that which occurs during an MI, the adrenal glands secrete two chemicals: adrenalin (epinephrine) and norepinephrine. What do these two chemicals cause the body to do? _____

What body system is the adrenal gland a component of? _____

What body system is the heart a component of? _____

LABEL THE DIAGRAMS

Fill in the name of each anatomical position on the line provided.

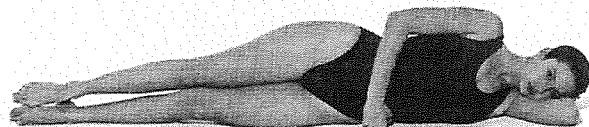
▶ ANATOMICAL POSITIONS



1. _____



2. _____



3. _____

Fill in the appropriate directional term or landmark on the line provided.

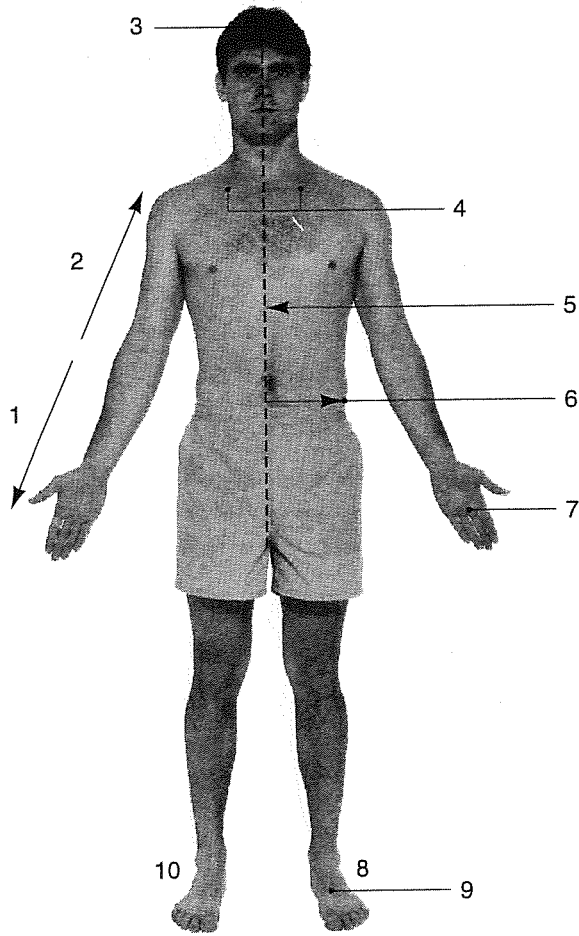


Diagram 1

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

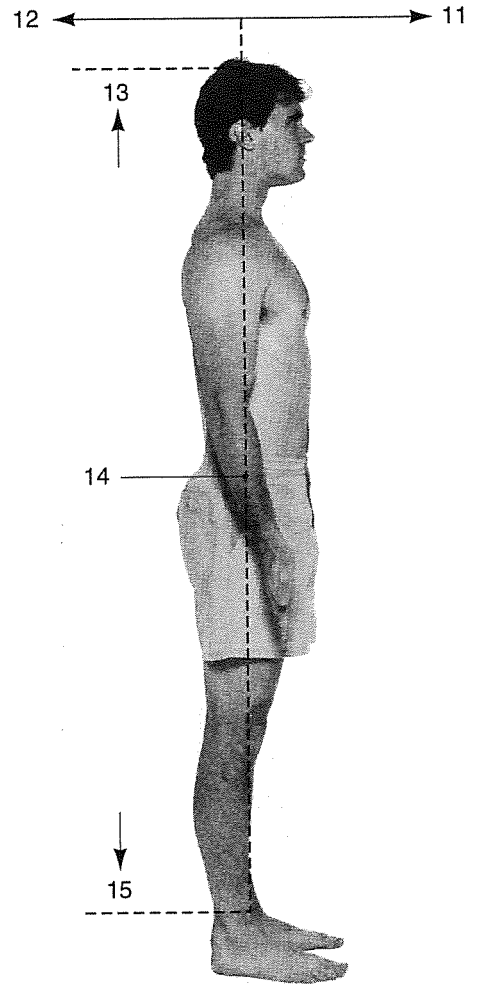
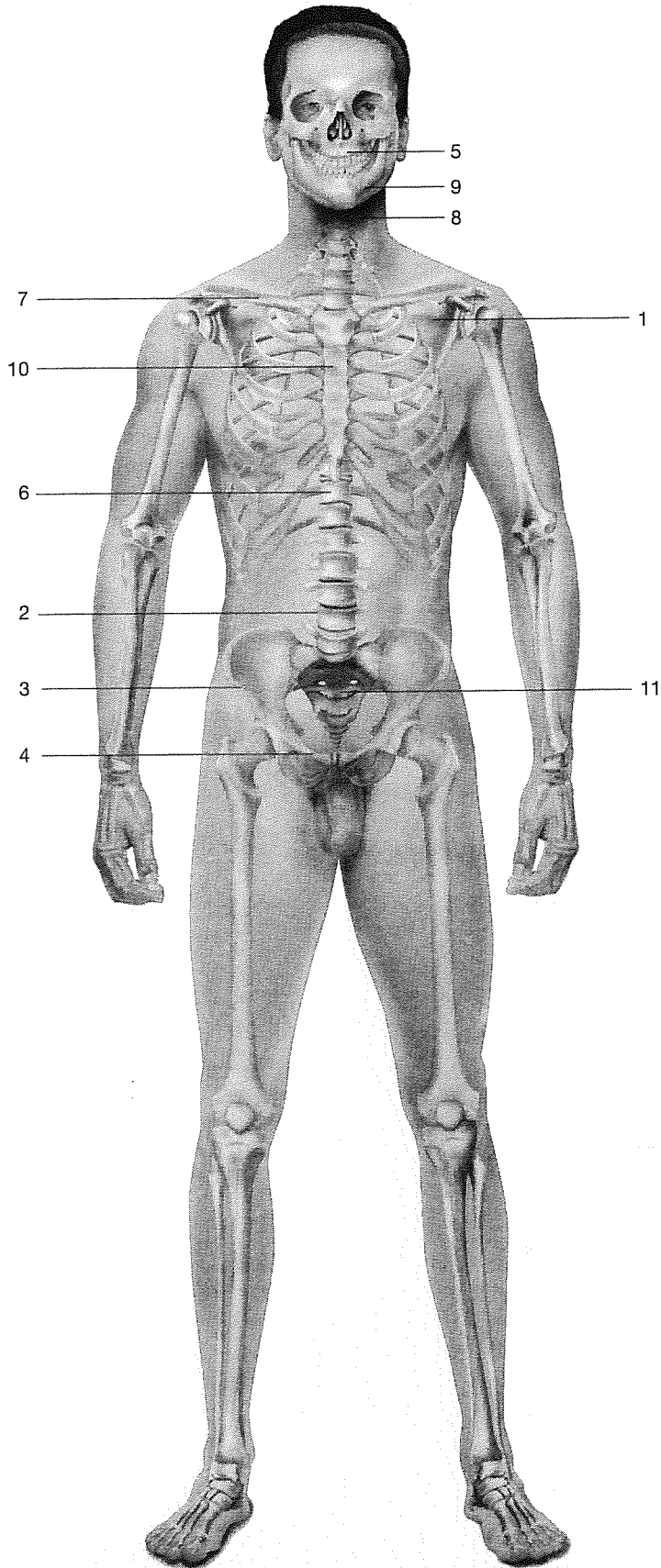


Diagram 2

11. _____
12. _____
13. _____
14. _____
15. _____

Fill in the name of each body region or structure on the line provided.



1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____