Body Structure

CHAPTER 4

Chapter Outline

Objectives

Upon completion of this chapter, you will be able to:

- List the levels of organization of the body.
- Define and identify the three planes of the body.
- Identify the cavities, quadrants, and regions of the body.
- List and identify the terms related to direction, position, and planes of the body.
- Recognize, pronounce, spell, and build words related to body structure and identify common abbreviations.
- Describe diagnostic and therapeutic procedures and other terms associated with body structure.
- Demonstrate your knowledge of this chapter by completing the learning and medical record activities.

Introduction

This chapter provides the basic foundation for understanding the body system chapters that follow. It presents the basic structural and functional organization of the body—from the cellular level to the organism level. It also presents terms used to describe planes of the body, body cavities, quadrants and regions of the abdominal cavity, and divisions of the spinal column. These terms are an essential part of medical terminology and are used in all body systems. General concepts of **pathology** and terminology associated with the disease process are also provided. Finally, this chapter presents and describes terms associated with diagnostic and therapeutic procedures.

Body Structure Key Terms

This section introduces important terms associated with body structure, along with their definitions and pronunciations. Word analyses are also provided for selected terms.

Term	Definition
chromatin KRŌ-mă-tĭn	Structural component of the nucleus, composed of nucleic acids and proteins ***Chromatin condenses to form chromosomes during cell division.***
chromosome KRŌ-mō-sōm	Threadlike structures within the nucleus composed of a deoxyribonucleic acid (DNA) molecule that carries hereditary information encoded in genes ***Each sperm and each egg has 23 unpaired chromosomes. After fertilization, each cell of the embryo then has 46 chromosomes (23 pairs). In each pair of chromosomes, one chromosome is inherited from the father and the other from the mother.***
cytoplasm SĪ-tō-plăzm *cyt/o:* cell *-plasm:* formation, growth	Jellylike substance found within the cell membrane composed of proteins, salts, water, dissolved gases, and nutrients ***All cellular structures, including the nucleus and organelles, are embedded in cytoplasm.***
deoxyribonucleic acid (DNA) dē-ok-sē-rē-bō-noo-KLĒ-ĭk ĂS-ĭd	Molecule that holds genetic information capable of replicating and producing an exact copy whenever the cell divides
diaphragm DĪ-ă-frăm	Muscular wall that divides the thoracic cavity from the abdominopelvic cavity ***Alternating contraction and relaxation of the diaphragm is essential to the breathing process.***
metabolism mĕ-TĂB-ō-lĭzm	Sum of all physical and chemical changes that take place in a cell or an organism ***Metabolism includes the building up (anabolism) and breaking down (catabolism) of body constituents.***
organelle or-găn-ĔL	Cellular structure that provides a specialized function, such as the nucleus (reproduction), ribosomes (protein synthesis), Golgi apparatus (removal of material from the cell), and lysosomes (digestion) ***The membranes of many organelles act as sites of chemical reactions.***
pathology pă-THŎL-ō-jē *path/o:* disease *-logy:* study of	Study of the nature of diseases, their causes, development, and consequences. ***Pathology as a branch of medicine includes the use of laboratory methods rather than clinical examination of signs and symptoms to study the causes, nature, and development of diseases.***

Body Structure Key Terms—cont'd	
Term	**Definition**
peristalsis pĕr-ĭ-STĂL-sĭs	Rhythmic contraction and relaxation of the walls of a tubular organ to propel its contents onward

Pronunciation Help

Long Sound	ā—rate	ē—rebirth	ī—isle	ō—over	ū—unite
Short Sound	ă—alone	ĕ—ever	ĭ—it	ŏ—not	ŭ—cut

Levels of Organization

The body is made up of several levels of structure and function. Each of these levels builds on the previous level, and contributes to the structure and function of the entire organism. (See Figure 4–1.) The levels of organization from least to most complex are:

- cell
- tissue
- organ
- system
- organism.

Cell

The study of the body at the cellular level is called ***cytology.*** The cell is the structural and functional unit of life. Body cells perform all activities associated with life, including utilizing food, eliminating waste, and reproducing. Cells consist of a cell membrane that encloses cytoplasm and a nucleus.

Cell Membrane and Cytoplasm

The cell membrane acts as a barrier that encloses the entire cell. It controls the transport of many substances to and from the cell. Within the cell membrane is a jellylike matrix of proteins, salts, water, dissolved gases, and nutrients called **cytoplasm.** Inside the cytoplasm are various structures called **organelles** that provide specialized functions for the cell. The largest cell organelle is the nucleus.

Nucleus

The nucleus is responsible for **metabolism,** growth, and reproduction. It also carries the genetic blueprint of the organism. This blueprint is found in a complex molecule called **deoxyribonucleic acid (DNA)** that is organized into threadlike structures called **chromatin.** When the cell is ready to divide, chromatin forms **chromosomes,** which carry thousands of genes that make up our genetic blueprint. In the human, there are about 31,000 genes that determine unique human characteristics. Genes pass biological information from one generation to the next. This biological information includes such traits as hair color, body structure, and metabolic activity. In the human, all cells except sperm cells and egg cells contain 23 pairs, or 46 chromosomes.

Tissue

Groups of cells that perform a specialized activity are called ***tissues.*** The study of tissues is called ***histology.*** Between the cells that make up tissues are varying amounts and types of nonliving, intercellular substances that provide pathways for cellular interaction. More than 200 cell types compose four major tissues of the body:

- **Epithelial tissue** covers surfaces of organs, lines cavities and canals, forms tubes and ducts, provides the secreting portions of glands, and makes up the epidermis of the skin. It is composed of cells arranged in a continuous sheet consisting of one or more layers.
- **Connective tissue** supports and connects other tissues and organs. It is made up of diverse cell types, including fibroblasts, fat cells, and blood.
- **Muscle tissue** provides the contractile tissue of the body, which is responsible for movement.
- **Nervous tissue** transmits electrical impulses as it relays information throughout the entire body.

Organ

Organs are body structures that perform specialized functions. They are composed of at least two or more tissue types. For example, the stomach is made up of connective tissue, muscle tissue, epithelial tissue, and nervous tissue. Muscle and connective tissue form the wall of the stomach. Epithelial and connective tissue cover the inner and outer surfaces of the stomach. Nervous tissue

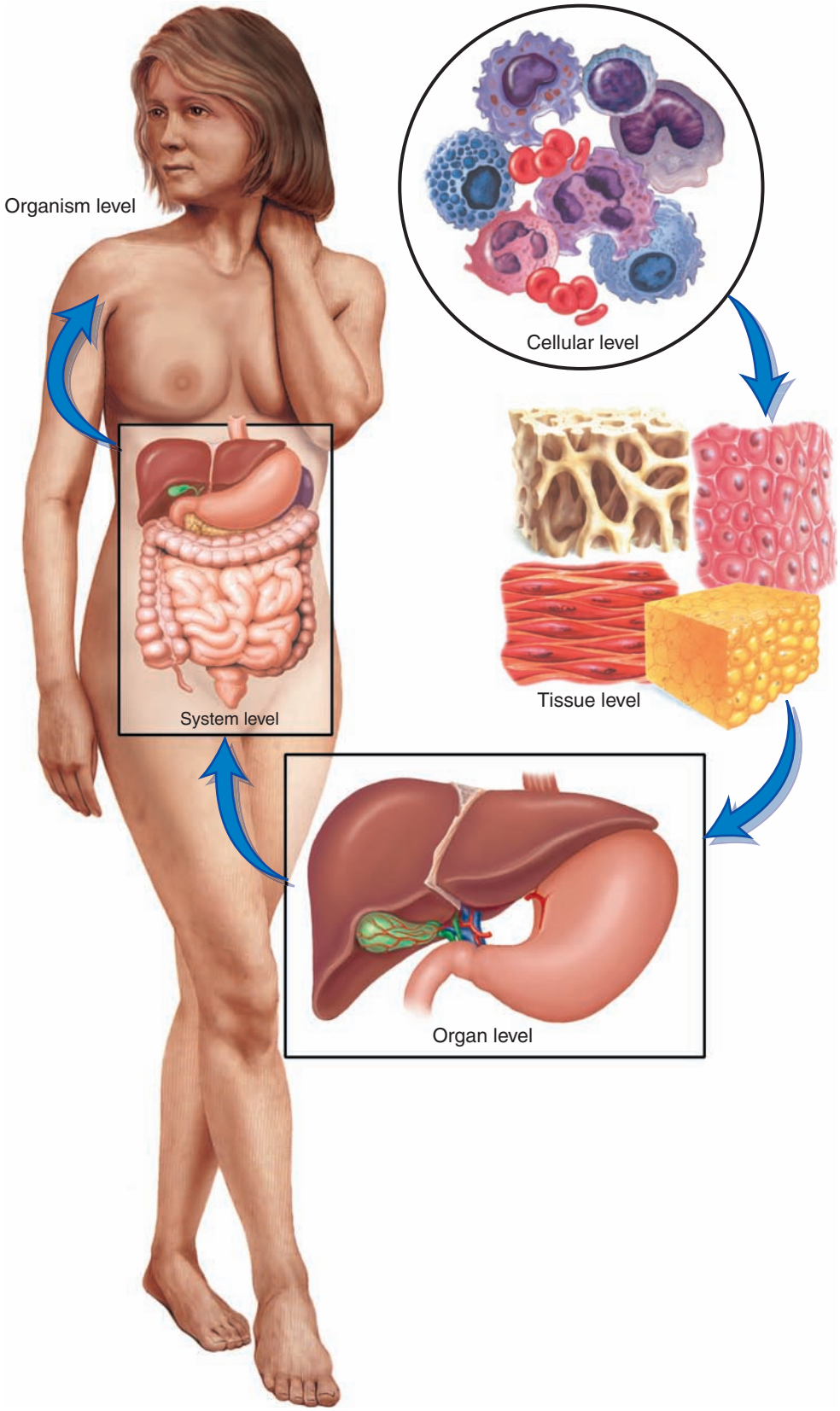

Figure 4-1. Levels of organization of the human body.

penetrates the epithelial lining of the stomach and its muscular wall to stimulate the release chemicals for digestion and contraction for **peristalsis.**

System

A body system is composed of varying numbers of organs and accessory structures that have similar or related functions. For example, organs of the gastrointestinal system include the esophagus, stomach, small intestine, and bowel. Some of its accessory structures include the liver, gallbladder, and pancreas. The purpose of this system is to digest food, remove and use its nutrients, and expel waste products. Other body systems include the reproductive, respiratory, urinary, and cardiovascular systems.

Organism

The highest level of organization is the organism. An organism is a complete living entity capable of independent existence. All complex organisms, including humans, are made up of several body systems that work together to sustain life.

Anatomical Position

The **anatomical position** is a body posture used to locate anatomical parts in relation to each other. In this position, the body is erect and the eyes are looking forward. The upper limbs hang to the sides, with the palms facing forward. The lower limbs are parallel, with toes pointing straight ahead. No matter how the body is actually positioned—standing or lying down, facing forward or backward—or how the limbs are actually placed, the positions and relationships of a structure are always described as if the body were in the anatomical position.

Planes of the Body

To identify the different sections of the body, anatomists use an imaginary flat surface called a ***plane.*** The most commonly used planes are **midsagittal** (median), **coronal** (frontal), and **transverse** (horizontal). (See Table 4–1.) The section is named for the plane along which it is cut. Thus, a cut along a transverse plane produces a transverse, or horizontal, section. (See Figure 4–2.)

Prior to the development of modern imaging techniques, standard x-ray images showed only a single plane, and many body abnormalities were difficult, if not impossible, to see. Current imaging procedures, such as magnetic resonance imaging (MRI) and computed tomography (CT), produce three-dimensional images on more than one plane. Thus, structural abnormalities and body masses that were previously not found using a standard single plane x-ray are now detected with scanning devices that show images taken in several body planes.

Table 4-1 Planes of the Body

This table lists planes of the body and their anatomical divisions.

Plane	Anatomical Division
Midsagittal (median)	Right and left halves
Coronal (frontal)	Anterior (ventral) and posterior (dorsal) aspects
Transverse (horizontal)	Superior (upper) and inferior (lower) aspects

Body Cavities

Medical professionals locate structures or abnormalities by referring to the body cavity in which they are found. (See Figure 4–3.) The body has two major cavities:

- dorsal (posterior), including the cranial and spinal cavities
- ventral (anterior), including the thoracic and abdominopelvic cavities. (See Table 4–2.)

Abdominopelvic Divisions

The abdominopelvic area of the body lies beneath the **diaphragm.** It holds the organs of digestion (abdominal area) and the organs of reproduction and excretion (pelvic area). Two anatomical methods are used to divide this area of the body for medical purposes:

- quadrants
- regions.

Quadrants

Quadrants are four divisions of the lower torso used to show topographical location. They provide a means of locating specific sites for descriptive and diagnostic purposes. (See Table 4–3.) The

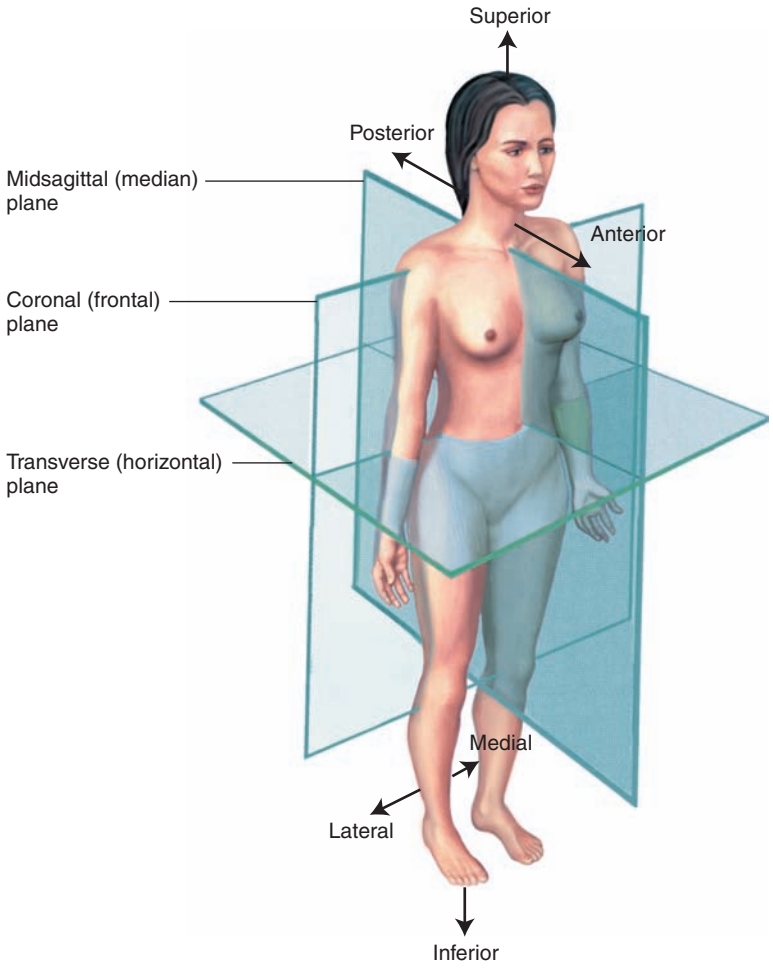

Figure 4-2. Body planes. Note that the body is in the anatomical position.

divisions of quadrants are used in clinical examinations and medical reports. Pain, lesions, abrasions, punctures, and burns are commonly described as located in a specific quadrant. Incision sites are also identified by using body quadrants as the method of location. An imaginary cross passing through the navel identifies the four quadrants. (See Figure 4–4A.)

Regions

Whereas the quadrants of the body are used primarily to identify topographical sites, the **abdominopelvic regions** are used mainly to identify the location of underlying body structures and visceral organs. (See Table 4–4.) For example, the stomach is located in the left hypochondriac and epigastric region; the appendix is located in the hypogastric region. (See Figure 4–4B.)

Spine

The spine is divided into sections corresponding to the vertebrae located in the spinal column. These divisions are:

- cervical (neck)
- thoracic (chest)
- lumbar (loin)
- sacral (lower back)
- coccyx (tailbone)

Directional Terms

Directional terms are used to show the position of a structure in relation to another structure. For example, the kidneys are superior to the urinary bladder. The directional phrase *superior to* denotes *above*. This example indicates that the kidneys are located above the urinary bladder. (See Table 4–5.)

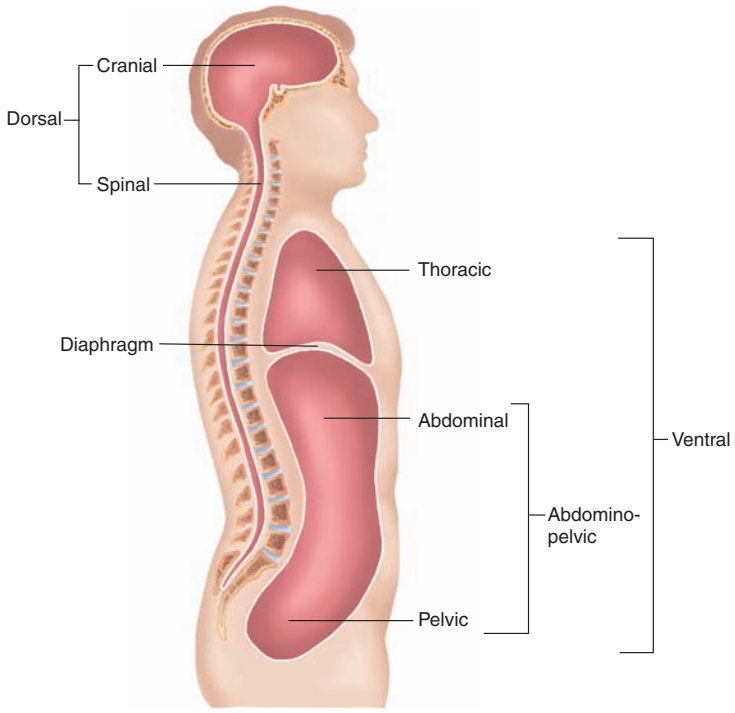

Figure 4-3. Body cavities.

Table 4-2 Body Cavities

This table lists the body cavities and some of the major organs found within them. The thoracic cavity is separated from the abdominopelvic cavity by a muscular wall called the diaphragm.

Cavity	Major Organ(s) in the Cavity
Dorsal	
Cranial	Brain
Spinal	Spinal cord
Ventral	
Thoracic	Heart, lungs, and associated structures
Abdominopelvic	Digestive, excretory, and reproductive organs and structures

Table 4-3 Body Quadrants

This table lists the quadrants of the body, their corresponding abbreviations, and their major structures.

Quadrant	Abbreviation	Major Structures
Right upper	RUQ	Right lobe of liver, gallbladder, part of pancreas, part of small and large intestines
Left upper	LUQ	Left lobe of liver, stomach, spleen, part of pancreas, part of small and large intestines
Right lower	RLQ	Part of small and large intestines, appendix, right ovary, right fallopian tube, right ureter
Left lower	LLQ	Part of small and large intestines, left ovary, left fallopian tube, left ureter

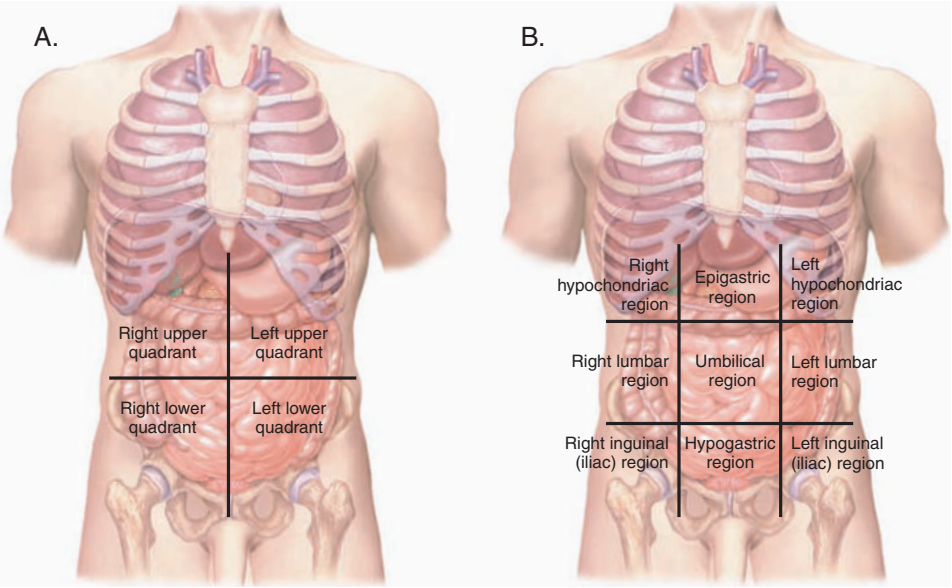

Figure 4-4. Quadrants and regions. (A) Four quadrants of the abdomen. (B) Nine regions of the abdomen.

Table 4-4 Abdominopelvic Regions

This table lists the names of the abdominopelvic regions and their location.

Region	Location
Left hypochondriac	Upper left region beneath the ribs
Epigastric	Region above the stomach
Right hypochondriac	Upper right region beneath the ribs
Left lumbar	Left middle lateral region
Umbilical	Region of the navel
Right lumbar	Right middle lateral region
Left inguinal (iliac)	Left lower lateral region
Hypogastric	Lower middle region beneath the navel
Right inguinal (iliac)	Right lower lateral region

It is time to review the planes of the body and quadrants and regions of the abdominopelvic area by completing Learning Activities 4–1 and 4–2.

Table 4-5 Directional Terms

This table lists directional terms along with their definitions. In this list, opposing terms are presented consecutively to aid memorization.

Term	Definition
Abduction	Movement away from the midsagittal (median) plane of the body or one of its parts
Adduction	Movement toward the midsagittal (median) plane of the body

Table 4-5 Directional Terms—cont'd

Term	Definition
Medial	Pertaining to the midline of the body or structure
Lateral	Pertaining to a side
Superior (cephalad)	Toward the head or upper portion of a structure
Inferior (caudal)	Away from the head, or toward the tail or lower part of a structure
Proximal	Nearer to the center (trunk of the body) or to the point of attachment to the body
Distal	Further from the center (trunk of the body) or from the point of attachment to the body
Anterior (ventral)	Front of the body
Posterior (dorsal)	Back of the body
Parietal	Pertaining to the outer wall of the body cavity
Visceral	Pertaining to the viscera, or internal organs, especially the abdominal organs
Prone	Lying on the abdomen, face down
Supine	Lying horizontally on the back, face up
Inversion	Turning inward or inside out
Eversion	Turning outward
Palmar	Pertaining to the palm of the hand
Plantar	Pertaining to the sole of the foot
Superficial	Toward the surface of the body (external)
Deep	Away from the surface of the body (internal)

It is time to review body cavity, spine, and directional terms by completing Learning Activity 4–3.

Medical Word Elements

This section introduces combining forms, suffixes, and prefixes related to body structure. Word analyses are also provided.

Element	Meaning	Word Analysis
Combining Forms		
Cellular Structure		
cyt/o	cell	**cyt/o**/logist (sī-TŎL-ō-jĭst): specialist in study of cells *-logist:* specialist in the study of ***Cytologists study the formation, structure, and function of cells.***
hist/o	tissue	**hist/o**/logy (hĭs-TŎL-ō-jē): study of tissues *-logy:* study of ***Histology is the branch of science that investigates the microscopic structures and functions of tissues.***
kary/o	nucleus	**kary/o**/lysis (kăr-ē-ŎL-ĭ-sĭs): destruction of the nucleus *-lysis:* separation; destruction; loosening ***Karyolysis results in death of the cell.***
nucle/o		**nucle/ar** (NŪ-klē-ăr): pertaining to the nucleus *-ar:* pertaining to

(continued)

Medical Word Elements—cont'd

Element	Meaning	Word Analysis
Position and Direction		
anter/o	anterior, front	**anter**/ior (ăn-TĒR-ē-or): pertaining to the front *-ior:* pertaining to
caud/o	tail	**caud**/ad (KAW-dăd): toward the tail *-ad:* toward ***Caudad is opposite of craniad.***
crani/o	cranium (skull)	**crani**/al (KRĀ-nē-ăl): pertaining to the cranium *-al:* pertaining to
dist/o	far, farthest	**dist**/al (DĬS-tăl): pertaining to the farthest (point of attachment) *-al:* pertaining to ***Distal refers to the point furthest from the center (trunk) of the body or from the point of attachment to the body. Thus, the fingers are distal to the wrist.***
dors/o	back (of body)	**dors**/al (DOR-săl): pertaining to the back (of the body) *-al:* pertaining to
infer/o	lower, below	**infer**/ior (ĭn-FĒR-rē-or): pertaining to a lower (structure or surface) *-ior:* pertaining to ***The inferior surface is the undersurface of a structure or organ, or a place below a structure or organ.***
later/o	side, to one side	**later**/al (LĂT-ĕr-ăl): pertaining to a side *-al:* pertaining to
medi/o	middle	**medi**/ad (MĒ-dē-ăd): toward the middle *-ad:* toward
poster/o	back (of body), behind, posterior	**poster**/ior (pōs-TĒR-ē-or): pertaining to the back (of the body) *-ior:* pertaining to
proxim/o	near, nearest	**proxim**/al (PRŎK-sĭm-ăl): pertaining to the nearest (point of attachment) *-al: pertaining to* ***Proximal refers to the point closest to the center (trunk) of the body or to the point of attachment to the body. Thus, the elbow is proximal to the wrist.***
ventr/o	belly, belly side	**ventr/al** (VĔN-trăl): pertaining to the belly side (front of the body) *-al: pertaining to*
Regions of the Body		
abdomin/o	abdomen	**abdomin**/al (ăb-DŎM-ĭ-năl): pertaining to the abdomen *-al: pertaining to*
cervic/o	neck; cervix uteri (neck of uterus)	**cervic**/al (SĔR-vĭ-kăl): pertaining to the neck *-al: pertaining to*

Medical Word Elements—cont'd

Element	Meaning	Word Analysis
crani/o	cranium (skull)	**crani**/al (KRĀ-nē-ăl): pertaining to the cranium *-al: pertaining to*
gastr/o	stomach	hypo/**gastr**/ic (hī-pō-GĂS-trĭk): pertaining to (the area) below the stomach *hypo-:* under, below *-ic:* pertaining to
ili/o	ilium (lateral, flaring portion of hip bone)	**ili**/al (ĬL-ē-ăl): pertaining to the ilium *-al:* pertaining to
inguin/o	groin	**inguin**/al (ĬNG-gwĭ-năl): pertaining to the groin *-al:* pertaining to ***The groin is the depression located between the thigh and trunk.***
lumb/o	loins (lower back)	**lumb**/ar (LŬM-băr): pertaining to the loins (lower back) *-ar:* pertaining to
pelv/i	pelvis	**pelv/i/**meter* (pĕl-VĬM-ĕ-tĕr): instrument for measuring the pelvis *-meter:* instrument for measuring
pelv/o		**pelv**/ic (PĔL-vĭk): pertaining to the pelvis *-ic:* pertaining to
spin/o	spine	**spin**/al (SPĪ-năl): pertaining to the spine *-al:* pertaining to
thorac/o	chest	**thorac**/ic (thō-RĂS-ĭk): pertaining to the chest *-ic:* pertaining to
umbilic/o	umbilicus, navel	**umbilic**/al (ŭm-BĬL-ĭ-kăl): pertaining to the navel *-al:* pertaining to
Color		
albin/o	white	**albin**/ism (ĂL-bĭn-ĭzm): condition of whiteness *-ism:* condition ***Albinism is characterized by a partial or total lack of pigment in the skin, hair, and eyes.***
leuk/o		**leuk**/o/cyte (LOO-kō-sīt): white cell *-cyte:* cell ***A leukocyte is a white blood cell.***
chlor/o	green	**chlor**/opia (klō-RŌ-pē-ă): green vision *-opia:* vision ***Chloropia is a disorder in which viewed objects appear green. It is associated with a toxic reaction to digitalis.***
chrom/o	color	hetero/**chrom**/ic (hĕt-ĕr-ō-KRŌ-mĭk): pertaining to different colors *hetero-:* different *-ic:* pertaining to ***Heterochromia is associated with the iris or sections of the iris of the eyes. Thus, the individual with heterochromia may have one brown iris and one blue iris.***

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Medical Word Elements—cont'd

Element	Meaning	Word Analysis
cirrh/o	yellow	**cirrh**/osis (sĭr-RŌ-sĭs): abnormal yellowing *-osis:* abnormal condition; increase (used primarily with blood cells) ***In cirrhosis, the skin, sclera of the eyes, and mucous membranes take on a yellow color. Cirrhosis of the liver is usually associated with alcoholism or chronic hepatitis.***
jaund/o		**jaund**/ice (JAWN-dĭs): yellowing *-ice:* noun ending ***Jaundice is caused by an abnormal increase of bilirubin (a yellow compound formed when red blood cells are destroyed) in the blood.***
xanth/o		**xanth/o**/cyte (ZĂN-thō-sīt): yellow cell *-cyte:* cell
cyan/o	blue	**cyan/o**/tic (sī-ăn-ŎT-ĭk): pertaining to blueness *-tic:* pertaining to ***Cyanosis is associated with lack of oxygen in the blood.***
erythr/o	red	**erythr/o**/cyte (ĕ-RĬTH-rō-sīt): red cell *-cyte:* cell ***An erythrocyte is a red blood cell.***
melan/o	black	**melan**/oma (mĕl-ă-NŌ-mă): black tumor *-oma:* tumor ***Melanoma is a malignancy that arises from melanocytes.***
poli/o	gray; gray matter (of brain or spinal cord)	**poli/o**/myel/itis (pōl-ē-ō-mī-ĕl-Ī-tĭs): inflammation of the gray matter of the spinal cord *myel:* bone marrow; spinal cord *-itis:* inflammation
Other		
acr/o	extremity	**acr/o**/cyan/osis (ăk-rō-sī-ă-NŌ-sĭs): abnormal condition in which the extremities are blue *cyan:* blue *-osis:* abnormal condition; increase (used primarily with blood cells)
eti/o	cause	**eti/o**/logy (ē-tē-ŎL-ō-jē): study of the causes of disease *-logy:* study of
idi/o	unknown, peculiar	**idi/o**/path/ic (ĭd-ē-ō-PĂTH-ĭk): pertaining to an unknown (cause of) disease *path: disease* *-ic:* pertaining to
morph/o	form, shape, structure	**morph/o**/logy (mor-FŎL-ō-jē): study of form, shape, or structure *-logy:* study of
path/o	disease	**path/o**/logist (pă-THŎL-ō-jĭst): specialist in the study of disease *-logist:* specialist in the study of ***Pathologists examine tissues, cells, and body fluids for evidence of disease.***

Medical Word Elements—cont'd

Element	Meaning	Word Analysis
radi/o	radiation, x-ray; radius (lower arm bone on thumb side)	**radi/o**/logist (rā-dē-ŎL-ŏ-jĭst): specialist in the study of radiation *-logist:* specialist in the study of ***Radiologists are physicians who employ imaging techniques for diagnosing and treating disease.***
somat/o	body	**somat**/ic (sō-MĂT-ĭk): pertaining to the body *-ic:* pertaining to
son/o	sound	**son/o**/graphy (sō-NŎG-ră-fē): process of recording sound; also called *ultrasonography* *-graphy:* process of recording ***Sonography employs ultrasound (inaudible sound) to produce images. It is a painless, noninvasive imaging technique that does not use x-rays.***
viscer/o	internal organs	**viscer**/al (VĬS-ĕr-ăl): pertaining to internal organs *-al:* pertaining to
xer/o	dry	**xer**/osis (zē-RŌ-sĭs): abnormal condition of dryness *-osis:* abnormal condition; increase (used primarily with blood cells) ***Xerosis refers to abnormal dryness of the skin, mucous membranes, or conjunctiva.***
Suffixes		
-genesis	forming, producing, origin	path/o/**genesis** (păth-ō-JĔN-ĕ-sĭs): origin of disease *path/o:* disease ***Pathogenesis refers to the origin or cause of an illness or abnormal condition.***
-gnosis	knowing	pro/**gnosis** (prŏg-NŌ-sĭs): knowing before *pro-:* before, in front of ***Prognosis is the prediction of the course and end of a disease and the estimated chance of recovery.***
-gram	record, writing	arteri/o/**gram** (ăr-TĒ-rē-ō-grăm): record of an artery ***An arteriogram is an x-ray film of an artery taken after injection of a radiopaque contrast medium.***
-graph	instrument for recording	radi/o/**graph** (RĀ-dē-ō-grăf): instrument for recording x-rays *radi/o:* radiation, x-rays; radius (lower arm bone on thumb side)
-graphy	process of recording	arthr/o/**graphy** (ăr-THRŎG-ră-fē): process of recording a joint *arthr/o:* joint ***Arthrography is an x-ray examination of a joint, such as the knee, shoulder, or elbow, usually with the use of a contrast medium.***
-logist	specialist in the study of	dermat/o/**logist** (dĕr-mă-TŎL-ō-jĭst): specialist in the study of the skin *dermat/o:* skin
-logy	study of	hemat/o/**logy** (hē-mă-TŎL-ō-jē): study of blood *hemat/o:* blood
-meter	instrument for measuring	therm/o/**meter** (thĕr-MŎM-ĕ-tĕr): instrument for measuring heat *therm/o:* heat

(continued)

Medical Word Elements—cont'd

Element	Meaning	Word Analysis
-metry	act of measuring	ventricul/o/**metry** (vĕn-trĭk-ū-LŎM-ĕ-trē): act of measuring the ventricles *ventricul/o:* ventricle (of heart or brain)
-pathy	disease	gastr/o/**pathy** (găs-TRŎP-ă-thē): disease of the stomach *gastr/o:* stomach
Prefixes		
ab-	from, away from	**ab**/duction (ăb-DŬK-shŭn): act of bringing away from (midline of the body) *-duction:* act of leading, bringing, conducting ***Abduction is the movement of a limb or body part away from the midline of the body.***
ad-	toward	**ad**/duction (ă-DŬK-shŭn): act of bringing toward (midline of the body) *-duction:* act of leading, bringing, conducting ***Adduction is the movement of a limb toward the midline of the body.***
hetero-	different	**hetero**/morph/ous (hĕt-ĕr-ō-MOR-fŭs): different form or shape *morph:* form, shape, structure *-ous:* pertaining to ***Heteromorphous refers to any deviation from a normal type or shape.***
homeo-	same, alike	**homeo**/plasia (hō-mē-ō-PLĀ-zē-ă): formation of same (tissue) *-plasia:* formation, growth ***Homeoplasia is the formation of new tissue similar to that already existing in a part.***
infra-	below, under	**infra**/cost/al (ĭn-fră-KŎS-tăl): pertaining to (the area) below the ribs *cost:* ribs *-al:* pertaining to
peri-	around	**peri**/cardi/al (pĕr-ĭ-KĂR-dē-ăl): pertaining to (the area) around the heart *cardi:* heart *-al:* pertaining to
super-	upper, above	**super**/ior (soo-PĒ-rē-or): pertaining to the upper (area) *-ior:* pertaining to
trans-	across, through	**trans**/abdomin/al (trănz-ăb-DŎM-ĭ-năl): pertaining to (a direction) across or through the abdomen *abdomin:* abdomen *-al:* pertaining to
ultra-	excess, beyond	**ultra**/son/ic (ŭl-tră-SŎN-ĭk): pertaining to beyond (audible) sound *son:* sound *-ic:* pertaining to ***Ultrasound includes sound frequencies too high to be perceived by the human ear.***

*The *i* in *pelvi/i/meter* is an exception to the rule of using the connecting vowel *o*.

It is time to review medical word elements by completing Learning Activity 4–4.

Pathology

All body cells require oxygen and nutrients for survival. They also need a stable internal environment that provides a narrow range of temperature, water, acidity, and salt concentration. This stable internal environment is called ***homeostasis.*** When homeostasis is disrupted and cells, tissues, organs, or systems are unable to function effectively, the condition is called ***disease.*** From a clinical point of view, disease is a **pathological** or **morbid** condition that presents a group of signs, symptoms, and clinical findings. **Signs** are objective indicators that are observable. A palpable mass and tissue redness are examples of signs. A **symptom** is subjective and is experienced only by the patient. Dizziness, pain, and malaise are examples of symptoms. Clinical findings are the results of radiologic, laboratory, and other medical procedures performed on the patient or his specimens.

Etiology is the study of the cause or origin of a disease or disorder. Some possible causes of diseases include:

- metabolic (such as diabetes)
- infectious (such as measles and mumps)
- congenital (such as cleft lip)
- hereditary (such as hemophilia)
- environmental (such as burns and trauma)
- neoplastic (such as cancer)

Establishing the cause and nature of a disease is called ***diagnosis (Dx).*** Determining a diagnosis helps in the selection of a treatment. A ***prognosis*** is the prediction of the course of a disease and its probable outcome. Any disease whose cause is unknown is said to be ***idiopathic.***

A variety of diagnostic procedures are used to identify diseases and determine their extent or involvement. Diagnostic tests can be simple, such as listening to chest sounds with a stethoscope, or complex, such as a biopsy. Many of the diagnostic tests listed in this text can be categorized as surgical, clinical, endoscopic, laboratory, and radiological. Some tests include more than one testing modality.

Diagnostic, Symptomatic, and Related Terms

This section introduces diagnostic, symptomatic, and related terms and their meanings. Word analyses for selected terms are also provided.

Term	Definition
adhesion ăd-HĒ-zhŭn	Abnormal fibrous band that holds or binds together tissues that are normally separated ***Adhesions may occur within body cavities as a result of surgery.***
analyte ĂN-ă-līt	Substance analyzed or tested, generally by means of laboratory methods ***In a glucose tolerance test, glucose is the analyte.***
contrast medium KŎN-trăst MĒD-ē-ŭm	Substance injected into the body, introduced via catheter, or swallowed to facilitate radiographic images of internal structures that otherwise are difficult to visualize on x-ray films
dehiscence dĕ-HĬS-ĕns	Bursting open of a wound, especially a surgical abdominal wound
febrile FĒ-brĭl	Feverish; pertaining to a fever
homeostasis hō-mē-ō-STĀ-sĭs *homeo-:* same, alike *-stasis:* standing still	Relative constancy or balance in the internal environment of the body, maintained by processes of feedback and adjustment in response to external or internal changes ***In homeostasis, such properties as temperature, acidity, and the concentrations of nutrients and wastes remain relatively constant.***

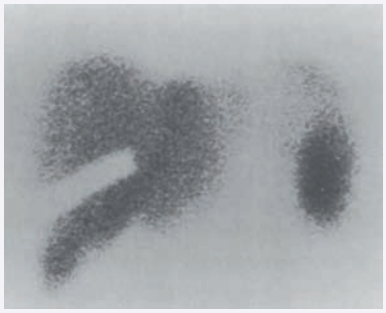
(continued)

Diagnostic, Symptomatic, and Related Terms—cont'd

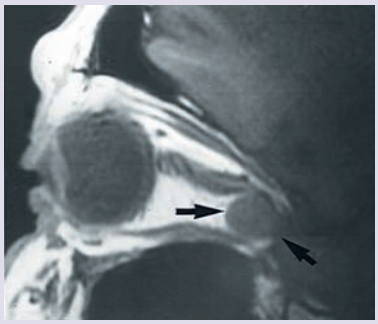
Term	Definition
inflammation ĭn-flă-MĀ-shŭn	Body defense against injury, infection, or allergy that is marked by redness, swelling, heat, pain and, sometimes, loss of function ***Inflammation is one mechanism used by the body to protect against invasion by foreign organisms and to repair injured tissue.***
morbid MOR-bĭd	Diseased; pertaining to a disease
nuclear medicine NŪ-klē-ăr	Branch of medicine concerned with the use of radioactive substances for diagnosis, treatment, and research
radiology rā-dē-OL-ō-jē *radi/o:* radiation, x-ray; radius (lower arm bone on thumb side) *-logy:* study of	Medical specialty concerned with the use of electromagnetic radiation, ultrasound, and imaging techniques for diagnosis and treatment of disease and injury (See Figure 4-5.)
interventional ĭn-tĕr-VĔN-shŭn-ăl	Radiological practice that employs fluoroscopy, CT, and ultrasound in nonsurgical treatment of various disorders ***Examples of interventional radiology include balloon angioplasty and cardiac catheterization.***
therapeutic thĕr-ă-PŪ-tĭk *therapeut:* treatment *-ic:* pertaining to	Use of ionizing radiation in the treatment of cancer; also called *radiation oncology*

(A) Radiographic film.

(B) Ultrasonography.

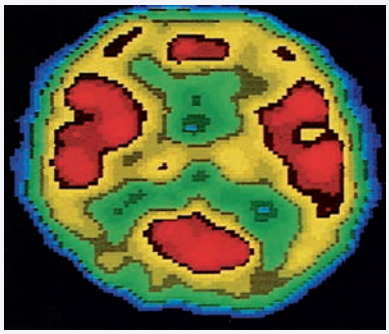


(C) Nuclear scan.



(D) CT scan.

(E) MRI scan.



(F) PET scan of brain.

Figure 4-5. Medical imaging.

Diagnostic, Symptomatic, and Related Terms—cont'd

Term	Definition
radionuclides rā-dē-ō-NŪ-klīdz	Substances that emit radiation spontaneously; also called *tracers* ***The quantity and duration of radioactive material used in these tests are safe for humans and should not have harmful effects.***
radiopharmaceutical rā-dē-ō-fărm-ă-SŪ-tĭ-kăl	Radionuclide attached to a protein, sugar, or other substance used to visualize an organ or area of the body that will be scanned
scan SKĂN	Term used to describe a computerized image by modality (such as CT, MRI, and nuclear imaging) or by structure (such as thyroid and bone)
sepsis SĔP-sĭs	Pathological state, usually febrile, resulting from the presence of microorganisms or their products in the bloodstream
suppurative SŬP-ū-ră-tĭv	Producing or associated with generation of pus

Diagnostic and Therapeutic Procedures

This section introduces procedures used to diagnose and treat a variety of disorders. Specific examples of these procedures are found in the body systems chapters. Descriptions are provided as well as pronunciations and word analyses for selected terms.

Procedure	Description
Diagnostic Procedures	
Endoscopic	
endoscopy ĕn-DŎS-kō-pē *endo-:* in, within *-scopy:* visual examination	Visual examination of a body cavity or canal using a specialized lighted instrument called an *endoscope* ***Endoscopy is used for biopsy, surgery, aspirating fluids, and coagulating bleeding areas. The endoscope is usually named for the organ, cavity, or canal being examined, such as gastroscope and sigmoidoscope. (See Figure 4-6.) A camera and video recorder are commonly used during the procedure to provide a permanent record.***

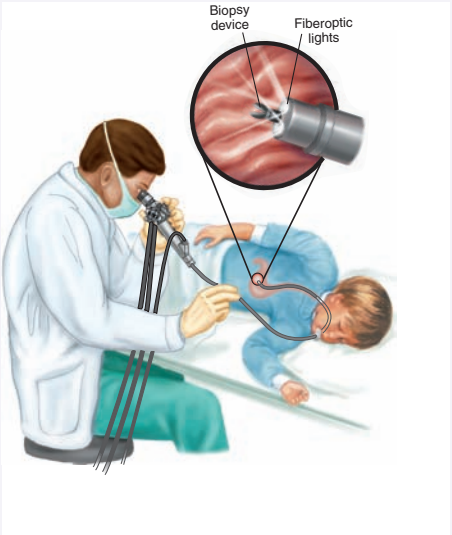


Figure 4-6. Endoscopy (gastroscopy).

(continued)

Diagnostic and Therapeutic Procedures—cont'd

Procedure	Description
laparoscopy lăp-ăr-ŎS-kō-pē *lapar/o:* abdomen *-scopy:* visual examination	Visual examination of the organs of the pelvis and abdomen through very small incisions in the abdominal wall
thoracoscopy thor-ă-KŎS-kā-pē *thorac/o:* chest *-scopy:* visual examination	Examination of the lungs, pleura, and pleural space with a scope inserted through a small incision between the ribs ***Thoracoscopy is an endoscopic procedure usually performed for lung biopsy, repairing perforations in the lungs, and diagnosing pleural disease.***
Laboratory	
complete blood count (CBC)	Common blood test that enumerates red blood cells, white blood cells, and platelets; measures hemoglobin (the oxygen-carrying molecule in red blood cells); estimates red cell volume; and sorts white blood cells into five subtypes with their percentages ***CBC can be performed using a manual or automated method.***
urinalysis (UA) ū-rĭ-NĂL-ĭ-sĭs	Common urine screening test that evaluates the physical, chemical, and microscopic properties of urine ***Immediate UA can be performed with a dipstick test or the urine specimen can be sent to the laboratory for a full analysis.***
Radiographic	
computed tomography (CT) kŏm-PŪ-tĕd tō-MŎG-ră-fē *tom/o:* to cut *-graphy:* process of recording	Imaging technique achieved by rotating an x-ray emitter around the area to be scanned and measuring the intensity of transmitted rays from different angles; formerly called *computerized axial tomography* ***In a CT scan, the computer generates a detailed cross-sectional image that appears as a slice. (See Figure 4-5D.) Tumor masses, bone displacement, and accumulations of fluid may be detected. This technique may be used with or without a contrast medium.***
Doppler DŎP-lĕr	Ultrasound technique used to detect and measure blood-flow velocity and direction through the cardiac chambers, valves, and peripheral vessels by reflecting sound waves off moving blood cells ***Doppler ultrasound is used to identify irregularities in blood flow cause by blood clots, venous insuffiiciency, and arterial blockage.***
fluoroscopy floo-or-ŎS-kō-pē *fluor/o:* luminous, fluorescent *-scopy:* visual examination	Radiographic technique in which x-rays are directed through the body to a fluorescent screen that displays continuous motion images of internal structures ***Fluoroscopy is used to view the motion of organs, such as the digestive tract, heart, and joints, or to aid in the placement of catheters or other devices.***

Diagnostic and Therapeutic Procedures—cont'd

Procedure	Description
magnetic resonance imaging (MRI) măg-NĚT-ĭk RĚZ-ĕn-ăns ĬM-ăj-ĭng	Noninvasive imaging technique that uses radiowaves and a strong magnetic field rather than an x-ray beam to produce multiplanar cross-sectional images (See Figure 4-5E.) ***MRI is used to diagnose a growing number of diseases because it provides superior soft tissue contrast, allows multiple plane views, and avoids the hazards of ionizing radiation. MRI commonly proves superior to CT scan for most central nervous system images, particularly those of the brainstem and spinal cord as well as the musculoskeletal and pelvic areas. The procedure usually does not require a contrast medium.***
nuclear scan NŪ-klē-ăr	Diagnostic technique that uses a radioactive material (radiopharmaceutical) called a *tracer* that is introduced into the body (inhaled, ingested, or injected) and a specialized camera to produce images of organs and structures (See Figure 4-5C.) ***A nuclear scan is the reverse of a conventional radiograph. Rather than being directed into the body, radiation comes from inside the body and is then detected by a specialized camera to produce an image.***
positron emission tomography (PET) PŎZ-ĭ-trŏn ē-MĬSH-ŭn tō-MŎG-ră-fē	Scanning technique using computed tomography to record the positrons (positive charged particles) emitted from a radiopharmaceutical, that produces a cross-sectional image of metabolic activity in body tissues to determine the presence of disease (See Figure 4-5F.) ***PET is particularly useful in scanning the brain and nervous system to diagnose disorders that involve abnormal tissue metabolism, such as schizophrenia, brain tumors, epilepsy, stroke, and Alzheimer disease as well as cardiac and pulmonary disorders.***
radiography rā-dē-ŎG-ră-fē *radi/o:* radiation, x-ray, radius (lower arm bone on thumb side) *-graphy:* process of recording	Imaging technique that uses x-rays passed through the body or area and captured on a film; also called *x-ray* (See Figure 4-5A.) ***On the radiograph, dense material, such as bone, appears white, and softer material, such as the stomach and liver, appears in shades of gray.***
single photon emission computed tomography (SPECT) FŌ-tŏn ē-MĬ-shŭn tō-MŎG-ră-fē *tom/o:* to cut *-graphy:* process of recording	Radiological technique that integrates computed tomography (CT) and a radioactive material (tracer) injected into the bloodstream to visualize blood flow to tissues and organs ***SPECT differs from a PET scan in that the tracer remains in the blood stream rather than being absorbed by surrounding tissue. It is especially useful to visualize blood flow through arteries and veins in the brain.***
tomography tō-MŎG-ră-fē *tom/o:* to cut *-graphy:* process of recording	Radiographic technique that produces an image representing a detailed cross-section, or *slice,* of an area, tissue, or organ at a predetermined depth ***Types of tomography include computed tomography (CT), positron emission tomography (PET), and single photon emission computed tomography (SPECT).***

(continued)

Diagnostic and Therapeutic Procedures—cont'd

Procedure	Description
ultrasonography (US) ŭl-tră-sōn-ŎG-ră-fē *ultra-:* excess, beyond *son/o:* sound *-graphy:* process of recording	Imaging procedure using high-frequency sound waves (ultrasound) that display the reflected "echoes" on a monitor; also called *ultrasound, sonography, echo,* and *echography* (See Figure 4-5B.) ***US, unlike most other imaging methods, creates real-time moving images to view organs and functions of organs in motion. A computer analyzes the reflected echoes and converts them into an image on a video monitor. Because this procedure does not use ionizing radiation (x-ray), it is used for visualizing fetuses as well as the neck, abdomen, pelvis, brain, and heart.***
Surgical	
biopsy (bx) BĪ-ŏp-sē	Representative tissue sample removed from a body site for microscopic examination, usually to establish a diagnosis
frozen section (FS)	Ultra-thin slice of tissue cut from a frozen specimen for immediate pathological examination ***FS is used primarily in oncological cases while the patient is still in the operating room. The evaluation by the pathologist helps determine if and how aggressively the surgeon will treat the patient.***
needle	Removal of a small tissue sample for examination using a hollow needle, usually attached to a syringe
punch	Removal of a small core of tissue using a hollow instrument (punch) ***An anesthetic and suturing are usually required for a punch bx, and minimal scarring is expected.***
shave	Removal of tissue using a surgical blade to shave elevated lesions
Therapeutic Procedures	
Surgical	
ablation ăb-LĀ-shŭn	Removal of a part, pathway, or function by surgery, chemical destruction, electrocautery, freezing, or radio frequency (RF)
anastomosis ă-năs-tō-MŌ-sĭs	Surgical joining of two ducts, vessels, or bowel segments to allow flow from one to another (See Figure 4-7.)

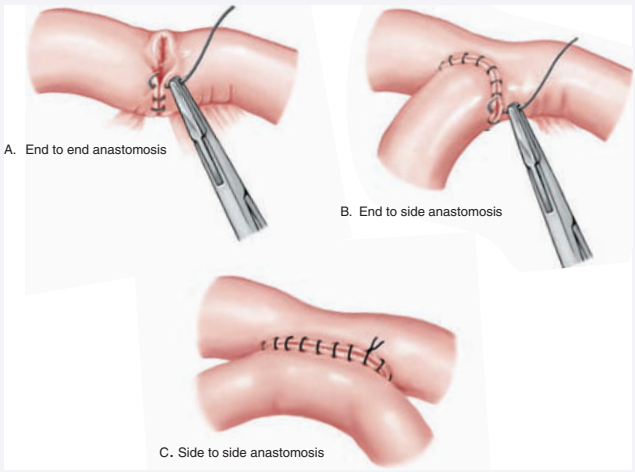


Figure 4-7. Anastomoses.

Diagnostic and Therapeutic Procedures—cont'd

Procedure	Description
cauterize KAW-tĕr-īz	Destroy tissue by electricity, freezing, heat, or corrosive chemicals
curettage kū-rĕ-TĂZH	Scraping of a body cavity with a spoon-shaped instrument called a *curette* (curet)
incision and drainage (I&D) ĭn-SĬZH-ŭn, DRĀN-ĭj	Incision made to allow the free flow or withdrawal of fluids from a wound or cavity
laser surgery LĀ-zĕr SŬR-jĕr-ē	Surgical technique employing a device that emits intense heat and power at close range to cut, burn, vaporize, or destroy tissues
radical dissection RĂD-ĭ-kăl dī-SĔK-shŭn	Surgical removal of tissue in an extensive area surrounding the surgical site in an attempt to excise all tissue that may be malignant and decrease the chance of recurrence ***An example of a radical dissection procedure is radical mastectomy, in which the entire breast, surrounding lymph nodes, and sometimes adjacent muscles are removed.***
resection rē-SĔK-shŭn	Partial excision of a bone, organ, or other structure

It is time to review diagnostic and therapeutic terms and procedures by completing Learning Activity 4–5.

Abbreviations

This section introduces body structure abbreviations and their meanings.

Abbreviation	Meaning	Abbreviation	Meaning
ant	anterior	**MRI**	magnetic resonance imaging
AP	anteroposterior	**PET**	positron emission tomography
Bx, bx	biopsy	**post**	posterior
CBC	complete blood count	**RF**	rheumatoid factor; radio frequency
CT	computed tomography	**RLQ**	right lower quadrant
DNA	deoxyribonucleic acid	**RUQ**	right upper quadrant
DSA	digital subtraction angiography	**sono**	sonogram
Dx	diagnosis	**SPECT**	single photon emission computed tomography
FS	frozen section	**Sx**	symptom
I&D	incision and drainage	**Tx**	treatment
LAT, lat	lateral	**UA**	urinalysis
LLQ	left lower quadrant	**U&L, U/L**	upper and lower
LUQ	left upper quadrant	**US**	ultrasound ultrasonography

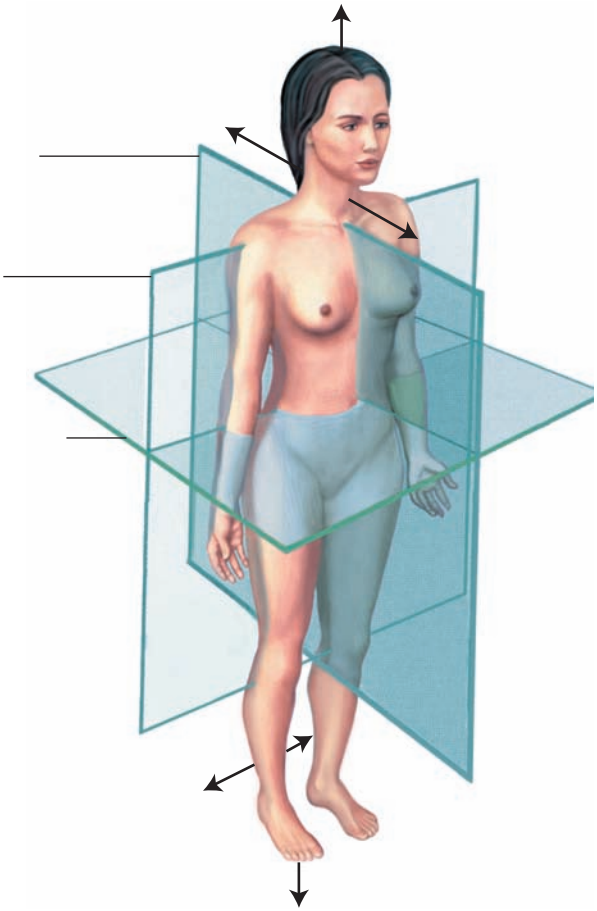
LEARNING ACTIVITIES

The following activities provide a review of the body structure terms introduced in this chapter. Complete each activity and review your answers to evaluate your understanding of the chapter.

Learning Activity 4-1

Identifying Body Planes

Label the following illustration using the terms below.



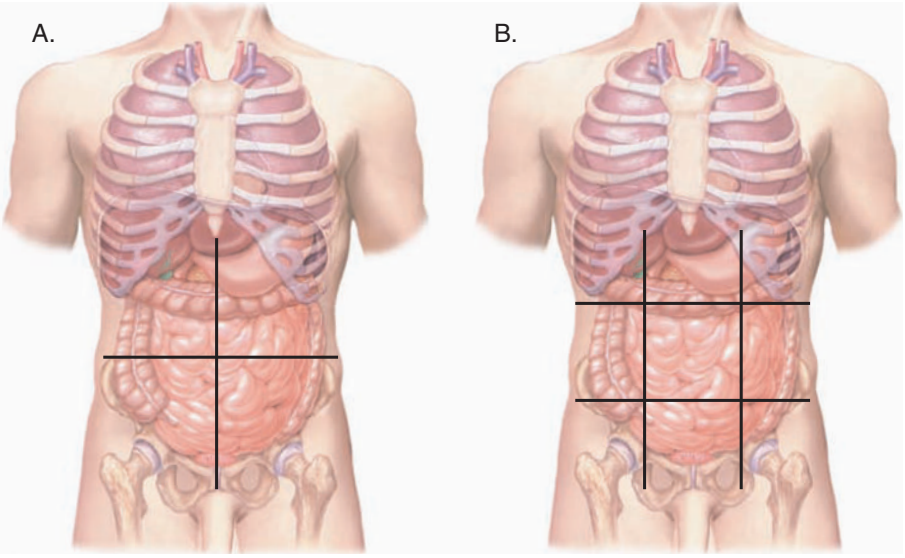
anterior	*lateral*	*posterior*
coronal (frontal) plane	*medial*	*superior*
inferior	*midsagittal (median) plane*	*transverse (horizontal) plane*

Check your answers by referring to Figure 4–2 on page 44. Review material that you did not answer correctly.

Learning Activity 4-2

Identifying Abdominopelvic Divisions

Label the quadrants on Figure A and regions on Figure B using the terms below.



epigastric region
hypogastric region
left hypochondriac region
left iliac region
left lower quadrant
left lumbar region
left upper quadrant
right hypochondriac region
right iliac region
right lower quadrant
right lumbar region
right upper quadrant
umbilical region

Check your answers by referring to Figure 4–4A and 4–4B on page 46. Review material that you did not answer correctly.

Learning Activity 4-3

Matching Body Cavity, Spine, and Directional Terms

Match each term on the left with its meaning on the right.

1. _____ abdominopelvic
2. _____ adduction
3. _____ cervical
4. _____ coccyx
5. _____ deep
6. _____ eversion
7. _____ inferior (caudal)
8. _____ inversion
9. _____ lumbar
10. _____ plantar
11. _____ posterior (dorsal)
12. _____ prone
13. _____ proximal
14. _____ superficial
15. _____ thoracic

a. pertaining to the sole of the foot
b. tail bone
c. ventral cavity that contains heart, lungs, and associated structures
d. toward the surface of the body (external)
e. lying horizontal with face downward
f. turning outward
g. nearer to the center (trunk of the body)
h. ventral cavity that contains digestive, reproductive, and excretory structures
i. turning inward or inside out
j. part of the spine known as the neck
k. movement toward the median plane
l. away from the head; toward the tail or lower part of a structure
m. away from the surface of the body (internal)
n. part of the spine known as the *loin*
o. near the back of the body

Check your answers in Appendix A. Review any material that you did not answer correctly.

Correct Answers _____ × 6.67 = _____ % Score

DavisPlus.fadavis.com

Enhance your study and reinforcement of word elements with the power of DavisPlus. Visit www.davisplus.fadavis.com/gylys/systems *for this chapter's flash-card activity. We recommend you complete the flash-card activity before completing Activities 4–4 and 4–5 below.*

Learning Activity 4-4

Matching Word Elements

Match the following word elements with the definitions in the numbered list.

Combining	Forms	Suffixes	Prefixes
caud/o	*kary/o*	*-genesis*	*ad-*
dist/o	*leuk/o*	*-gnosis*	*infra-*
dors/o	*morph/o*	*-graphy*	*ultra-*
eti/o	*poli/o*		
hist/o	*somat/o*		
idi/o	*viscer/o*		
jaund/o	*xer/o*		

1. _____ nucleus
2. _____ far, farthest
3. _____ process of recording
4. _____ knowing
5. _____ white
6. _____ internal organs
7. _____ yellow
8. _____ tissue
9. _____ forming, producing, origin
10. _____ below, under
11. _____ excess, beyond
12. _____ tail
13. _____ back (of body)
14. _____ gray
15. _____ cause
16. _____ form, shape, structure
17. _____ dry
18. _____ unknown, peculiar
19. _____ toward
20. _____ body

Check your answers in Appendix A. Review any material that you did not answer correctly.

Correct Answers _____ × 5 = _____ % Score

Learning Activity 4-5

Matching Diagnostic and Therapeutic Terms and Procedures

Match the following terms with the definitions in the numbered list.

ablation	*fluoroscopy*	*radionuclide*
cauterize	*morbid*	*resection*
Doppler	*nuclear scan*	*suppurative*
endoscopy	*punch biopsy*	*thoracoscopy*
febrile	*radiology*	*ultrasonography*

1. _____ specialty concerned with the use of electromagnetic radiation, ultrasound, and imaging techniques
2. _____ measurement of blood flow in a vessel by reflecting sound waves off moving blood cells
3. _____ imaging technique that employs high-frequency sound waves
4. _____ visual examination of the lungs, pleura, and pleural space with a scope inserted through a small incision between the ribs
5. _____ excision of a core sample of tissue for examination
6. _____ visual examination of a cavity or canal using a special lighted instrument
7. _____ use of a radioactive material and scanning device to determine, size, shape, location, and function of various organs and structures
8. _____ radiographic technique that directs x-rays to a fluorescent screen and displays "live" images on a monitor
9. _____ disease, or pertaining to disease
10. _____ substance that emits radiation spontaneously; also called *tracer*
11. _____ feverish; pertaining to a fever
12. _____ partial excision of a bone, organ, or other structure
13. _____ producing or associated with generation of pus
14. _____ destruction of tissue by electricity, freezing, heat, or corrosive chemicals
15. _____ removal of a part, pathway, or function by surgery, chemical destruction, electrocautery, freezing, or radiofrequency (RF)

Check your answers in Appendix A. Review any material that you did not answer correctly.

Correct Answers _____ × 6.67 = _____ % Score

MEDICAL RECORD ACTIVITIES

The two medical records included in the following activities use common clinical scenarios to show how medical terminology is used to document patient care. Complete the terminology and analysis sections for each activity to help you recognize and understand terms related to body structure.

Medical Record Activity 4-1

Radiological Consultation Letter: Cervical and Lumbar Spine

Terminology

Terms listed below come from the *Radiological Consultation Letter: Cervical and Lumbar Spine* that follows. Use a medical dictionary such as *Taber's Cyclopedic Medical Dictionary*, the appendices of this book, or other resources to define each term. Then review the pronunciations for each term and practice by reading the medical record aloud.

Term	Definition
AP	
atlantoaxial ăt-lăn-tō-ĂK-sē-ăl	
cervical SĔR-vĭ-kăl	
lateral LĂT-ĕr-ăl	
lumbar LŬM-băr	
lumbosacral junction lŭm-bō-SĀ-krăl	
odontoid ō-DŎN-toyd	
sacral SĀ-krăl	
scoliosis skō-lĕ-Ō-sĭs	
spasm SPĂZM	
spina bifida occulta SPĪ-nă BĬF-ĭ-dă ŏ-KŬL-tă	
vertebral bodies VĔR-tĕ-brăl	

Listen and Learn Online! *will help you master the pronunciation of selected medical words from this medical record activity. Visit* www.davisplus.com/gylys/systems *to find instructions on completing the* Listen and Learn Online! *exercise for this section and to practice pronunciations.*

PATHOLOGY REPORT: RADIOLOGICAL CONSULTATION LETTER: CERVICAL AND LUMBAR SPINE

Physician Center

2422 Rodeo Drive ■■ Sun City, USA 12345 ■■ (555) 333-2427

May 3, 20xx

John Roberts, MD
1115 Forest Ave
Sun City, USA 12345

Dear Doctor Roberts:

Thank you for referring Chester Bowen to our office. Mr. Bowen presents with neck and lower back pain of more than 2 years' duration. Radiographic examination of June 14, 20xx reveals the following: AP, lateral, and odontoid views of the cervical spine demonstrate some reversal of normal cervical curvature, as seen on lateral projection. There is some right lateral scoliosis of the cervical spine. The vertebral bodies, however, appear to be well maintained in height; the intervertebral spaces are well maintained. The odontoid is visualized and appears to be intact. The atlantoaxial joint appears symmetrical.

Impression: Films of the cervical spine demonstrate some reversal of normal cervical curvature and a minimal scoliosis, possibly secondary to muscle spasm, without evidence of recent bony disease or injury. AP and lateral films of the lumbar spine, with spots of the lumbosacral junction, demonstrate an apparent minimal spina bifida occulta of the first sacral segment. The vertebral bodies, however, are well maintained in height; the intervertebral spaces appear well maintained.

Pathological Diagnosis: Right lateral scoliosis with some reversal of normal cervical curvature.

If you have any further questions, please feel free to contact me.

Sincerely yours,

Adrian Jones, MD
Adrian Jones, MD

aj:bg

Analysis

Review the medical record *Radiological Consultation Letter: Cervical and lumbar spine* to answer the following questions.

1. What was the presenting problem?

2. What were the three views of the radiological examination of June 14, 20xx?

3. Was there evidence of recent bony disease or injury?

4. Which cervical vertebrae form the atlantoaxial joint?

5. Was the odontoid fractured?

6. What did the AP and lateral films of the lumbar spine demonstrate?

Medical Record Activity 4-2

Radiology Report: Injury of Left Wrist, Elbow, and Humerus

Terminology

Terms listed below come from the *Radiology Report: Injury of Left Wrist, Elbow, and Humerus* that follows. Use a medical dictionary such as *Taber's Cyclopedic Medical Dictionary*, the appendices of this book, or other resources to define each term. Then review the pronunciations for each term and practice by reading the medical record aloud.

Term	Definition
anterior	
AP	
distal DĬS-tăl	
dorsal DOR-săl	
epicondyle ĕp-ĭ-KŎN-dīl	
humerus HŪ-mĕr-ŭs	
lucency LOO-sĕnt-sē	
medial MĒ-dē-ăl	

Term	Definition
mm	
posterior	
radius RĀ-dē-ŭs	
ulna ŬL-nă	
ventral-lateral VĚN-trăl-LĂT-ĕr-ăl	

Listen and Learn Online! *will help you master the pronunciation of selected medical words from this medical record activity. Visit* www.davisplus.com/gylys/systems *to find instructions on completing the* Listen and Learn Online! *exercise for this section and to practice pronunciations.*

RADIOLOGY REPORT : INJURY OF LEFT WRIST, ELBOW, AND HUMERUS

General Hospital

1511 Ninth Avenue ■■ Sun City, USA 12345 ■■ (555) 802-1887

RADIOLOGY REPORT

Date:	June 5, 20xx	Patient: Hill, Joan
Physician:	Adrian Jones, MD	DOB: 5/25/19xx
Examination:	Left wrist, left elbow, and left humerus	X-ray No: 43201

LEFT WRIST: Images obtained with the patient's arm taped to an arm board. There are fractures through the distal shafts of the radius and ulna. The radial fracture fragments show approximately 8-mm overlap with dorsal displacement of the distal radial fracture fragment. The distal ulnar shaft fracture shows ventral-lateral angulation at the fracture apex. There is no overriding at this fracture. No additional fracture is seen. Soft-tissue deformity is present, correlating with the fracture sites.

LEFT ELBOW AND LEFT HUMERUS: Single view of the left elbow was obtained in the lateral projection. AP view of the humerus was obtained to include a portion of the elbow. A third radiograph was obtained but is not currently available for review. There is lucency through the distal humerus on the AP view along its medial aspect. It would be difficult to exclude fracture just above the medial epicondyle. On the lateral view, there is elevation of the anterior and posterior fat pad. These findings are of some concern. Repeat elbow study is recommended.

Jason Skinner, MD
Jason Skinner, MD

JS: bg

D: 6-05-20xx
T: 6-05-20xx

Analysis

Review the medical record *Radiology Report: Injury of Left Wrist, Elbow, and Humerus* to answer the following questions.

1. Where are the fractures located?

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2. What caused the soft-tissue deformity?

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3. Did the radiologist take any side views of the left elbow?

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4. In the AP view of the humerus, what structure was also visualized?

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5. What findings are cause for concern to the radiologist?

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