

Study Guide

Medical Terminology

By

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About the Author

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INSTRUCTIONS

INTRODUCTION

Welcome to your course on medical terminology. You're taking this course because you're most likely interested in pursuing a health and science career, which entails proficiency in communicating with healthcare professionals such as physicians, nurses, or dentists.

As an aspiring member of a healthcare team, accurate understanding, pronunciation, spelling, and definition of frequently used medical terms is imperative. The textbook entitled *Quick & Easy Medical Terminology*, 8th Edition, by Peggy C. Leonard will provide basic knowledge and understanding of medical terminologies. Competence in using medical language doesn't happen instantaneously. A strong medical vocabulary is a product of excellent time management skills and fervent commitment by the student.

COURSE OBJECTIVES

When you complete this section, you'll be able to do the following:

- Identify word parts and write medical terms accurately
- Utilize suffixes to build medical terminologies related to surgical procedures, medical conditions, specialists, and specialties
- Recognize and use prefixes in writing medical terms
- Distinguish and analyze medical terms associated with the digestive system
- Identify and be familiar with medical terminologies pertaining to the integumentary system

COURSE MATERIALS

This course includes the following materials:

1. This study guide, which contains an introduction to your course, plus
 - A lesson assignments page with a schedule of study assignments, as well as exams for the lessons you'll complete during this course
 - Individual sections that cover each of the main points of each lesson
 - Self-checks and answers to help you assess your understanding of the material
2. Your course textbook, *Quick and Easy Medical Terminology*, 8th Edition, which contains the assignment reading material

YOUR TEXTBOOK

Your textbook, *Quick and Easy Medical Terminology*, 8th Edition, by Peggy C. Leonard contains the material on which you'll be tested. You need to become familiar with this textbook before beginning your studies.

You'll want to begin by skimming the table of contents. This will give you an overview of the entire textbook. Read the preface as a brief introduction to the textbook. Appendices, found at the end of the text, provide medical abbreviations, word parts and their meanings, and answers to self-check questions. Following the appendices are a bibliography and photo credits, as well as an index.

STUDY PLAN

Think of this study guide as a blueprint for your course. You should read it carefully. Using the following procedures should help you receive the maximum benefit from your studies:

- Read the lessons in the study guide to introduce you to concepts that are discussed in the textbook. The lessons emphasize the important material discussed in the text and provide additional tips or examples to help you grasp the material.
- Note the chapters for each assignment in the textbook and read the assignment in the textbook to get a general idea of its content. Study the assignment, paying attention to all details, especially the main concepts.
- Answer the questions and problems provided in the self-checks in the study guide. This will serve as a review of the material covered.
- After answering the suggested questions, check your answers with those given in the back of the study guide. If you miss any questions, review the pages of the textbook covering those questions. The self-checks are designed to reveal weak points that you need to review. Do not send the self-check answers to the school. They're for you to evaluate your understanding of the material. Complete each assignment in this way.
- After you've completed and checked the self-checks for Lesson 1, go to your student portal and complete your first exam.
- Follow this procedure for all lessons. At any time, you can contact your instructor for information regarding the materials.



Remember to check your student portal regularly. Additional resources to enhance your learning experience may be posted.

READING ASSIGNMENTS

Lesson 1: The Fundamentals of Medical Terminology

Read in the study guide:

Section 1.1

Section 1.2

Section 1.3

Examination 427782RR

Read in the textbook:

Chapter 1

Chapter 2

Chapter 3

Lesson 2: Diagnosis, Intervention, and Human Body Terms

Read in the study guide:

Section 2.1

Section 2.2

Examination 427783RR

Read in the textbook:

Chapter 4

Chapter 5

Lesson 3: Musculoskeletal, Circulatory, and Respiratory System Terms

Read in the study guide:

Section 3.1

Section 3.2

Section 3.3

Examination 427784RR

Read in the textbook:

Chapter 6

Chapter 7

Chapter 8

Lesson 4: Digestive, Urinary, and Reproductive System Terms

Read in the study guide:

Section 4.1

Section 4.2

Section 4.3

Examination 427785RR

Read in the textbook:

Chapter 9

Chapter 10

Chapter 11

Lesson 5: Integumentary, Nervous, and Endocrine System Terms

Read in the study guide:

Section 5.1

Section 5.2

Section 5.3

Section 5.4

Read in the textbook:

Chapter 12

Chapter 13

Chapter 14

Chapter 15

Examination 427786RR

Note: To access and complete any of the examinations for this study guide, click the appropriate **Take Exam** icon on your student portal. You shouldn't have to enter the examination numbers. These numbers are for reference only if you have reason to contact Student Services.

LESSON 1: THE FUNDAMENTALS OF MEDICAL TERMINOLOGY

INTRODUCTION

For a layperson, learning medical language may seem difficult, but it becomes easier as one gets to know the origin and meaning of medical terms. For healthcare professionals, it's already second nature. The majority of the medical terms are borrowed from Latin and Greek, but it's unnecessary for you to learn these languages to become experts in the use of and understanding of medical terms. All you need to do is to study and learn word parts.

SECTION 1.1: SIMPLIFIED MEDICAL LANGUAGE

Read the following section, then read Chapter 1 in your textbook.

Objectives

When you complete this section, you'll be able to identify word parts and write medical terms properly.

SIMPLIFIED MEDICAL LANGUAGE

The building block for most medical terms is the *word root*, or the primary body of a word. At times, a medical term can be made up of compound words. A compound word may consist of two word roots, such as in the case of collarbone (*collar* + *bone*).

To facilitate the pronunciation of words, a combining vowel is placed in between word roots. A significant number of medical terms use the vowel "o". However, it's good to note that "o" isn't the only vowel.

The following table demonstrates examples of roots and combining forms.

Word Root	Combining Vowel		Combining Form	Meaning	Use in a Word
acr	+	o	acr/o	extremity	acrocyanosis
psych	+	o	psych/o	mind	psychology
chol	+	e	chol/e	bile	cholesterase

PREFIXES AND SUFFIXES

Prefixes and suffixes may accompany a word root to alter its meaning. A *prefix* is attached before the word, while a *suffix* is placed at the end of a word root. Sometimes, a word may consist of a prefix and a suffix only.

<p><i>Prefix + Combining form + Suffix</i> <i>electro + cardi/o + gram</i> (electrocardiogram)</p> <p><i>Prefix + Suffix</i> <i>hyper + emia</i> (hyperemia)</p>
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By now, you've already learned word parts. Word roots, combining forms, prefixes, and suffixes are all word parts.

WRITING MEDICAL TERMS

Building words follows certain guidelines. Table 2 presents some common rules in word building.

Guidelines		Examples	
Linking combining forms	In most instances, the combining vowel is retained amid combining forms.	leuk/o + cyte cardi/o + logy	leukocyte cardiology
Linking combining forms and suffixes	Use a combining vowel if the suffix begins with a consonant.	crani/o + tomy derm/a + tology	craniotomy dermatology
Linking combining forms and suffixes with initial vowels	Omit the combining vowel if the suffix begins with a vowel.	appendic/o + itis enter/o + ic	appendicitis enteric
Linking other word parts and prefixes	Usually, prefixes need not be changed when linked with other word parts.	dys + pepsia intra + dermal	dyspepsia intradermal

To better recognize the parts that make up a medical term, word division is commonly used throughout this course. For instance, appendectomy may be written as *append + ectomy* to highlight its component parts.

EPONYMS

Eponyms are names derived from a proper noun. They may originate from the name of a person, place, or thing. In the medical field, diseases, organs, procedures, or body functions can be eponyms; hence, they are frequently capitalized. Examples of eponyms include Alzheimer's disease, after Alois Alzheimer, and Babinski sign, after Joseph Babinski.

ABBREVIATIONS AND PHARMACOLOGY

An *abbreviation* is a shortened form of a word or phrase. Abbreviations can be in the form of:

- Letters: The abbreviation for chest x-ray is CXR.
- Shortened words: The abbreviation "tab" is short for "tablet."
- Acronyms: The acronym CPR stands for cardiopulmonary resuscitation.

Note: Abbreviations and symbols should be used cautiously, especially when medications are involved. The Institute for Safe Medication Practices (ISMP) and The Joint Commission (TJC) provide a list of unsafe abbreviations and symbols.

The branch of science that deals with the preparation, properties, uses, and actions of drugs is known as *pharmacology*. Drugs, most commonly referred to as medicines, are used in the prevention and treatment of diseases. Concepts related to drugs include the following:

- Route of administration: ways in which drugs can be given (usually via the mouth or via an injection)
- Generic name: nonproprietary name of the drug (for example, ibuprofen)
- Trade name: company name, otherwise known as the brand name (for example, Motrin)

PLURALS

The plural form of many medical terms follows the rules used in common language.

Word endings	Singular form	Plural Form
Consonants other than s, h, or y	contusion	contusions
s, ch, sh	virus	viruses
y	allergy	allergies

General Guidelines in Forming Plurals of Nouns with Special Endings			
Singular Ending	Plural Ending	Examples (Singular)	Examples (Plural)
is	es	diagnosis, anastomosis	diagnoses, anastomoses
*Some words ending in <i>is</i> take on their plural form by omitting the <i>is</i> and adding <i>ides</i> , as in arthritis and arthritides			
um	a	atrium, ostium	atria, ostia
us	i	bronchus, alveolus	bronchi, alveoli
*Some words ending in <i>us</i> take on their plural form by omitting the <i>us</i> and adding <i>era</i> or <i>ora</i> , as in viscus to viscera and corpus to corpora.			
a	ae	cava, vertebra	cavae, vertebrae
ix	ices	appendix, cervix	appendices, cervices
ex	ices	apex	apices
ax	aces	thorax	thoraces
ma	s or mata	condyloma	condylomas or condylomata
on	a	spermatozoon	spermatozoa
*Some words ending in <i>on</i> take on their plural form by adding <i>s</i> , as in chorion to chorions			
nx	nges	phalanx	phalanges

After you've carefully read Chapter 1 in your textbook, complete Self-Check 1.1. When you completely understand the material from Section 1.1, move on to Section 1.2.



Self-Check 1.1

At the end of each section of *Quick and Easy Medical Terminology*, 8th Edition, you'll be asked to pause and check your understanding of what you've just read by completing a self-check. Writing the answers to these questions will help you review what you have learned so far. Please complete *Self-Check 1.1* now.

Complete Practice Exercises A–H at the end of Chapter 1 of your textbook.

Check your answers with those in Appendix III of your textbook.

SECTION 1.2: SUFFIXES AND COMBINING FORMS MADE EASY

Read the following section, then read Chapter 2 in your textbook.

Objective

When you complete this section, you'll be able to utilize suffixes to build medical terminologies related to surgical procedures, medical conditions, specialists, and specialties.

MEDICAL SPECIALISTS AND THEIR SPECIALTIES

Identifying medical specialists and their specialties is made easy by recognizing the meanings of the suffixes attached to the word root. For example, the suffix *-logy* refers to the “study or science of.” *Anesthesiology* is the branch of medical science that specifically

deals with the study of anesthesia or anesthetics. On the other hand, the suffix *-logist* means “one who studies” or “specialist.” An *anesthesiologist* is a physician who specializes in anesthesia. It’s important not to confuse anesthesiologist with anesthetist. The suffix *-ist* means “one who”; hence, an *anesthetist* is one who administers anesthesia. An anesthetist can be a physician or a nurse, while an anesthesiologist is a medical doctor or physician. Study the following suffixes and their meanings.

SUFFIXES: MEDICAL SPECIALISTS AND THEIR SPECIALTIES					
Medical Specialists			Medical Specialties		
Suffix	Meaning	Example	Suffix	Meaning	Example
-er, -ist	one who	internist	-ac, -al, -ic, ical	pertaining to	obstetrical
-iatrician	practitioner	pediatrician	-logic, -logical	pertaining to the study of	psychological
-logist	one who studies, specialist	pulmonologist	-iatrics, -iatry	medical profession or treatment	pediatrics
			-logy	study or science of	gynecology

The following table lists some of the most common combining forms associated with medical specialties and specialists.

Combining Form	Meaning	Medical Specialty	Medical Specialist
cardi/o	heart	cardiology	cardiologist
dermat/o	skin	dermatology	dermatologist
esthesi/o	feeling or sensation	anesthesiology	anesthesiologist
gynec/o	female	gynecology	gynecologist
immune/o	immune	immunology	immunologist
ne/o, nat/o	new, birth	neonatology	neonatologist
ophthalm/o	eye	ophthalmology	ophthalmologist
path/o	disease	pathology	pathologist
radi/o	radiation or radius	radiology	radiologist
ur/o	urinary tract or urine	urology	urologist

SURGICAL PROCEDURES

A significant number of medical terms refer to surgical procedures. Generally, the suffixes used will give you an idea about the type of surgery or procedure performed. For instance, the suffix *-ectomy* means surgical removal. *Polypectomy* and *adrenalectomy* refer to the excision or removal of polyps and adrenal glands, respectively. Knowing a familiar word related to the suffix makes it easier to analyze a medical term. This process is known as word *association*. Take a look at the following table.

SUFFIXES: SURGICAL PROCEDURES		
Suffix	Meaning	Word Association
-centesis	surgical puncture to aspirate or remove fluid	<i>Paracentesis</i> is a puncture of the peritoneal cavity to remove fluid for diagnostic or therapeutic purposes.
-ectomy	excision (surgical removal or cutting out)	Excision of the appendix is referred to as an <i>appendectomy</i> .
-lysis	process of loosening, freeing, or destroying	This suffix can also mean dissolving or destruction, as in <i>hydrolysis</i> .
-pexy	surgical fixation (securing in a fixed position)	<i>Nephropexy</i> is a surgical fixation of a kidney that descends when the patient stands up.
-plasty	surgical repair	<i>Rhinoplasty</i> is a plastic surgery of the nose and is done for several reasons.
-rrhaphy	suture (fusing a wound by stitches)	<i>Herniorrhaphy</i> is surgical repair of the hernia with suture of the abdominal wall.
-scopy	visual examination with the use of a lighted instrument	<i>Colonoscopy</i> is a means of visualizing the colon with the use of a fiber-optic instrument.
-stomy	creation of an opening	<i>Colostomy</i> is a surgical procedure that creates an opening for the colon or large intestine through the abdomen.
-tome	an instrument used for cutting	A <i>microtome</i> is used to cut thin sections of tissue.
-tomy	incision (cutting into tissue)	<i>Sternotomy</i> is an incision of the sternum usually performed during heart surgery.
-tripsy	surgical crushing, breaking, or pulverizing	<i>Lithotripsy</i> is the surgical crushing of a renal calculus or stone.

BODY STRUCTURES

Some of the combining forms for body structures have already been introduced when naming medical specialists. In this section, you'll be presented with additional combining forms and the most frequent word associations used. *Hepat/o* is one of the most common combining forms used in the medical field. Note that *hepat/o* means liver; hence, *hepatitis* refers to an inflammatory condition of the liver. More examples are presented in the following table.

COMBINING FORMS FOR A NUMBER OF BODY STRUCTURES

Combining Form	Meaning	Word Association
aden/o	gland	<i>Adenopathy</i> refers to the enlargement of the glands.
angi/o	vessel	<i>Angioplasty</i> is a procedure used to reestablish blood flow through partially or fully blocked blood vessels.
bi/o	life or living	<i>Biopsy</i> is a procedure used to extract cells or tissues for examination.
blephar/o	eyelid	<i>Blepharitis</i> is an infection of the eyelids.
cerebr/o, encephal/o	brain	<i>Cerebrospinal</i> fluid is a clear, colorless fluid found in the brain and the spinal cord. <i>Encephalopathy</i> is a general term that refers to a disorder or disease of the brain.
col/o	colon or large intestine	<i>Colitis</i> is an inflammation of the colon's inner lining.
faci/o	face	<i>Facial</i> relates to the face.
hepat/o	liver	<i>Hepatomegaly</i> is enlargement of the liver.
mamm/o, mast/o	breast	<i>Mammogram</i> is an x-ray of the breast. <i>Mastitis</i> is an infection of the breast tissue.
muscul/o, my/o	muscle	The <i>musculoskeletal</i> system is an organ system responsible for movement and activity. <i>Myosin</i> is one of the muscle proteins.
myel/o	bone marrow or spinal cord	<i>Myelogram</i> is a means of examining the spinal canal using a combination of dye and x-ray.
oste/o	bone	<i>Osteoporosis</i> is a disease that weakens the bones, thereby increasing the risk for fractures.
pulm/o, pulmon/o, pneum/o, pneumon/o	lungs	<i>Pulmonary</i> refers to the lungs. <i>Pneumatic</i> refers to gas or air. <i>Pneumothorax</i> is the accumulation of air or gas in the chest.
tonsil/o	tonsil	<i>Tonsillectomy</i> is the surgical removal of the tonsils.
trache/o	trachea (windpipe)	<i>Tracheitis</i> is an inflammation of the trachea.
vas/o	vessel	Widening of the blood vessels is known as <i>vasodilation</i> .

SYMPTOMS OR DIAGNOSIS

Symptom and diagnosis are common terms used in the medical field. A *symptom* indicates a disorder or disease in which changes in health status are perceived by the client. For instance, a client says: “My stomach hurts.” *Diagnosis*, on the other hand, is the scientific determination of a disease process or condition after evaluation. “Peptic ulcer disease” is an example of a medical diagnosis.

SUFFIXES: SYMPTOMS OR DIAGNOSIS		
Suffix	Meaning	Word Association
-algia, -dynia	pain	<i>Arthralgia</i> is joint pain. <i>Vulvodynia</i> is a chronic pain condition affecting a woman's external genitalia.
-cele	hernia (results when organ pushes through the organ or muscle that contains it)	<i>Omphalocele</i> is an abdominal wall defect in which the abdominal organs protrude through an opening at the base of the umbilical cord.
-ectasia, -ectasis	dilatation	<i>Telangiectasia</i> is the dilation of the superficial blood vessels. <i>Lymphangiectasis</i> is the dilation of the lymphatic vessels.
-edema	swelling	<i>Edema</i> denotes the presence of excess fluid in the tissues, causing swelling. <i>Angioedema</i> involves the precipitous swelling of the tissues under the skin, usually due to an allergic reaction.
-emesis	vomiting	<i>Emesis</i> denotes vomiting. <i>Hyperemesis</i> means excessive vomiting.
-emia	condition of the blood	<i>Anemia</i> refers to a decrease in red blood cells or hemoglobin in the blood.
-ia, -iasis	condition	<i>Hysteria</i> is a mental disorder attributed to women in the nineteenth century. <i>Filariasis</i> is a parasitic disease caused by microscopic worms.
-itis	inflammation	Inflammation of the voice box or larynx is known as <i>laryngitis</i> .
-ith	stone or calculus	<i>Fecalith</i> is a hard mass consisting of feces.
-malacia	soft, softening	<i>Chondromalacia patella</i> is the softening of the cartilage underneath the knee.
-mania	excessive preoccupation	<i>Pyromania</i> is a compulsion to set things on fire.
-megaly	enlargement	<i>Cardiomegaly</i> is the enlargement of the heart.

(Continued)

SUFFIXES: SYMPTOMS OR DIAGNOSIS (continued)		
Suffix	Meaning	Word Association
-oid	resembling	<i>Mucoid</i> means similar to mucus.
-oma	tumor	<i>Lymphoma</i> refers to a group of blood cancers originating from the lymphatic system.
-osis	condition (usually an abnormal condition, occasionally refers to an increase)	<i>Psychosis</i> is a group of disorders affecting the mind.
-pathy	disease	<i>Cardiomyopathy</i> is a group of diseases affecting the cardiac muscle.
-penia	deficiency	<i>Neutropenia</i> refers to abnormally low levels of neutrophils, a type of white blood cell.
-phobia	abnormal fear	<i>Phobia</i> refers to extremely strong fear or dislike of something. Fear of being in an enclosed space or area is known as <i>claustrophobia</i> .
-ptosis	prolapse (sagging)	Drooping eyelids is <i>ptosis</i> .
-rrhage, -rrhagia	excessive bleeding	<i>Hemorrhage</i> means bleeding, which can be external or internal.
-rrhea	flow or discharge	<i>Amenorrhea</i> is the absence of menstrual flow.
-rrhexis	rupture	Rupture of the bowels is referred to as <i>enterorrhexis</i> .
-spasm	cramp, twitching	<i>Vasospasm</i> is the spasm of the blood vessels.
-stasis	stopping, controlling	<i>Hemostasis</i> is the normal bodily response to stop bleeding or hemorrhaging.

MISCELLANEOUS SUFFIXES

Aside from the suffixes categorized earlier, there are other various suffixes that are widely utilized by healthcare professionals. As you go further into the course, you should become more familiar with these suffixes. The following is a list of select miscellaneous suffixes.

MISCELLANEOUS SUFFIXES		
Suffix	Meaning	Examples
-able, -ible	capable of, able to	injectable, edible
-ac, -al, -an, -ar, -ary, -eal, -ic, -ive, -tic	pertaining to	iliac, dermal, median, ulnar, capillary, meningeal, hepatic, invasive, cyanotic
-ase	enzyme	lipase, amylase
-eum, -ium	membrane	peritoneum, myocardium
-ia, -ism	condition or theory	paranoia, dwarfism
-iac	one who suffers	hemophiliac
-opia	vision	hyperopia
-ose	sugar	fructose
-ous	pertaining to or characterized by	cancerous
-y	state or condition	atrophy

MISCELLANEOUS WORD PARTS

These word parts aren't categorized under a specific group, but note that they're frequently used in medical terminologies. The word *microscope* (word part= *micro*), for example, is used not only by healthcare professionals but in customary language as well.

MISCELLANEOUS WORD PARTS		
Word Part	Meaning	Word Association
adip/o, lip/o	fat	adipose, hyperlipidemia
amyl/o	starch	amylase
glyc/o	sugar	hyperglycemia
hemat/o	blood	hematology
lact/o	milk	lactation
litho/o	stone	lithotripsy
micro-	small	microscopy
muc/o	mucus	mucous
prote/o, protein/o	protein	proteolysis, proteinuria
pyr/o	fire	pyromania



Self-Check 1.2

Complete Practice Exercises A–H in Chapter 2 of your textbook, then answer questions below.

Choose the correct answer.

1. The presence of abnormally large amounts of fluid in the tissues that results in swelling is called
 - a. dilatation.
 - b. edema.
 - c. emesis.
 - d. ptosis.
2. Surgical repair of the eye is
 - a. ophthalmalgia.
 - b. ophthalmological.
 - c. ophthalmoplasty.
 - d. ophthalmorrhagia.
3. Herniation of the brain through an opening in the skull is called
 - a. craniectomy.
 - b. craniotomy.
 - c. encephalocele.
 - d. encephalopathy.
4. Which of the following terms means dilation of a blood or lymph vessel?
 - a. Angioplasty
 - b. Vasotomy
 - c. Vascular
 - d. Angiectasis
5. The medical specialty that studies the nature and cause of disease is
 - a. cardiology.
 - b. dermatology.
 - c. pathology.
 - d. urology.
6. A term that means excessive vomiting is
 - a. edema.
 - b. hyperemesis.
 - c. hypoglycemia.
 - d. hysteria.

(Continued)



Self-Check 1.2

7. A term that means pertaining to the eye is
- a. adenic.
 - b. ophthalmic.
 - c. otic.
 - d. vascular.
8. Excision of a gland is called
- a. adenectomy.
 - b. appendectomy.
 - c. neurectomy.
 - d. tonsillectomy.
9. *Dermatoplasty* is
- a. any disease of the skin.
 - b. pertaining to the skin.
 - c. skin grafting.
 - d. the science that studies the skin.
10. An instrument for incising brain tissue is a/an
- a. cerebrotomy.
 - b. cerebrectomy.
 - c. encephalotome.
 - d. encephalocele.
11. A 78-year-old man who had a blood vessel removed during surgery is likely to have which term documented in his chart?
- a. Angiectomy
 - b. Angiogram
 - c. Angiotomy
 - d. Angioscopy
12. During a physical examination, a physician can visualize the eardrum using a tool called an
- a. ophthalmoplasty.
 - b. ophthalmoscope.
 - c. otoplasty.
 - d. otoscope.

Check your answers to the Practice Exercises with those on Appendix III of your textbook. Check your answers to questions 1–12 with those at the end of this study guide.

SECTION 1.3: ESSENTIAL PREFIXES AND MORE

Read the following section, then read Chapter 3 in your textbook.

Objectives

When you complete this section, you'll be able to identify and use prefixes in writing medical terms.

NUMBERS AND QUANTITIES

The medical field, like any other group of professions, makes use of terms related to numbers and quantities. The prefixes used in these medical terms are the same ones we use in everyday language. For example, the prefix *bi-* is a prefix which means two. Examples of words associated with this prefix include *bicycle* (a vehicle with two wheels) and *biannual* (an event occurring twice a year). The prefix *bi-* has the same meaning when used in medical language. *Bicuspid* means two cusps or valves, as in the case of heart valves. Study the following table for more examples.

PREFIXES: NUMBERS AND QUANTITIES			
NUMBERS			
Prefix	Meaning	Example	Word Association
mono-, uni-	one	mononuclear, unilateral	<i>Mononuclear</i> refers to a cell made up of one nucleus. <i>Unilateral</i> means one side.
bi-, di-	two	bicuspid, disaccharide	<i>Bicuspid</i> means having two cusps, as in the bicuspid valves of the heart. <i>A disaccharide</i> is a type of carbohydrate that is made up of two simple sugars.
tri-	three	tricuspid	<i>Tricuspid</i> means having three cusps, as in the tricuspid valve of the heart.
quad-, quadri-, tetra-	four	quadriplegia	The paralysis of all four extremities is known as <i>quadriplegia</i> .
centi-	one hundred, one-hundredth	centigrade	The <i>centigrade</i> or Celsius scale is a unit of measurement for temperature, which is divided into 100 degrees.

(Continued)

PREFIXES: NUMBERS AND QUANTITIES (continued)

NUMBERS

Prefix	Meaning	Example	Word Association
milli-	one-thousandth	milliunit	<i>A milliunit is 1/1000 of a unit.</i>

QUANTITIES

diplo-	double	diplopia	<i>Diplopia</i> means double vision or the perception of two images of a single object.
hemi-, semi-	half, partly	hemiparesis, semi-fowler's	<i>Hemiparesis</i> refers to weakness of one entire side of the body. <i>Semi-fowler's</i> position is a position assumed when a client is supine on a bed with the head of the bed elevated at about 30–45 degrees.
hyper-	excessive, more than normal	hyperglycemia	<i>Hyperglycemia</i> is excessive blood sugar.
hypo-	under, less than normal	hypoglycemia	Decreased blood sugar in the blood is known as <i>hypoglycemia</i> .
multi-, poly-	many	multigravid, polyuria	<i>Multigravid</i> means multiple pregnancies. <i>Polyuria</i> means excessive production or passage of urine.
nulli-	none	nulliparous	A woman who hasn't given birth is referred to as <i>nulliparous</i> .
pan-	all	pancytopenia	<i>Pancytopenia</i> occurs when all blood cell types are decreased.
primi-	first	primigravida	<i>Primigravida</i> refers to a woman being pregnant for the first time.
super-, ultra-	excessive, above or superior	superior, supraspinatus, ultraviolet	<i>Superior</i> vena cava is a large-diameter blood vessel that drains blood from the upper parts of the body. <i>Ultraviolet</i> light is a form of radiation.

POSITION OR DIRECTION

Knowledge of the prefixes used in identifying positions or directions is essential in understanding medical terminologies. You might have heard the word *postoperative*. This term refers to the period following surgery. Note that the prefix *post-* means after. Inversely, *pre-* denotes before. Thus, the term *preoperative* refers to the period prior to surgery. More positional or directional suffixes are outlined in the following table.

PREFIXES: POSITION OR DIRECTION		
Prefix	Meaning	Word Association
ab-	away from	<i>Abduction</i> is movement of a body part away from the midline.
ad-	toward	<i>Adduction</i> is movement of a body part toward the midline.
ante-, pre-	before in time or in place	<i>Antepartum</i> refers to the period before childbirth. <i>Preoperative</i> refers to the period before surgery.
circum-, peri-	around	The circular movement of a body part is known as <i>circumduction</i> . <i>Periorbital</i> edema is swelling around the eyes.
contra-	contralateral	<i>Contralateral</i> pertains to the opposite side.
dia-	through	<i>Diaphoresis</i> is the passage of moisture through the pores of the skin.
ecto-, ex-, exo-, extra-	outside, without, away from	<i>Ectoderm</i> is the outermost primary germ layer of the embryo. <i>Exocrine</i> glands secrete substances externally through a duct.
en-, end-, endo-	inside	<i>Endolymph</i> is the fluid found within the membranous labyrinth of the ear.
epi-	above, on	The outermost layer of the sclera is known as <i>episclera</i> .
hypo-, infr-, sub-	beneath, under	<i>Hypodermis</i> refers to the area below the skin. <i>Infraclavicular</i> pertains to the area below the clavicle. <i>Subdural</i> hematoma results from the collection of blood beneath the skull.
inter-	between	<i>Interphalangeal</i> joints are formed between the phalanges.
intra-	within	<i>Intraosseous</i> means within the bone.

(Continued)

PREFIXES: POSITION OR DIRECTION (continued)		
Prefix	Meaning	Word Association
ipsi-	same	<i>Ipsilateral</i> pertains to the same side
meso-, mid-	middle	The middle tissue layer during embryonic development is the <i>mesoderm</i> .
para-	near, beside, or abnormal	<i>Paralysis</i> is the loss of motor function in a body part.
per-	through or by	<i>Percutaneous</i> means through or via the skin.
post-	after, behind	<i>Postoperative</i> means after surgery.
retro-	behind, backward	<i>Retrograde</i> means going back in position or time.
super-, supra-	above, beyond	<i>Superficial</i> indicates being near or on the surface, as in superficial veins. <i>Supraclavicular</i> means above the clavicle.
sym-, syn-	joined, together	The relationship between two dissimilar organisms pertains to <i>symbiosis</i> . <i>Syndactyly</i> is a condition where two or more digits of the hands are fused.
trans-	across	<i>Transference</i> occurs when one's feelings are unconsciously redirected to another.

MISCELLANEOUS PREFIXES

Miscellaneous prefixes are easy to remember since most of them are being used frequently, even in lay conversations. To promote organization of content, these miscellaneous prefixes are categorized into the following: (1) related to description, (2) related to time, (3) related to size, and (4) related to negation.

MISCELLANEOUS PREFIXES		
Prefix	Meaning	Word Association
<i>Description</i>		
anti-, contra-	against	<i>Antidiuretics</i> are medications that decrease or inhibit urination. <i>Contraception</i> refers to methods or devices that prevent pregnancy.
brady-	slow	<i>Bradypnea</i> means decreased respiratory rate.
dys-	bad, difficult	Difficulty swallowing is referred to as <i>dysphagia</i> .

(Continued)

MISCELLANEOUS PREFIXES (continued)		
Prefix	Meaning	Word Association
eu-	good, normal	<i>Eupnea</i> pertains to normal respirations.
mal-	bad	<i>Malabsorption</i> results from the inability of the gastrointestinal tract to properly absorb food nutrients.
pro-	favoring, supporting	<i>Probiotics</i> are live microorganisms that are believed to be beneficial to one's health.
tachy-	fast	<i>Tachypnea</i> refers to abnormally fast respirations.
Time		
ante-, pre-, pro-	before	<i>Antemortem</i> means before death. <i>Premature</i> births refer to neonates being born before 37 weeks of gestation.
post-	after or behind	<i>Postpartum</i> pertains to the period immediately after birth.
Size		
macro-, mega-, megal-	large or great	<i>Macrocephaly</i> refers to a condition where the head is abnormally large. <i>Megaloblasts</i> are abnormally large red blood cells. Large blood cells in the bone marrow are referred to as <i>megakaryocytes</i> .
micro-	small	<i>Microcephaly</i> is a condition where the head is abnormally small.
Negation		
a-, an-	no, not, without	<i>Apathy</i> pertains to lack of or absence of emotion. <i>Analgesia</i> refers to absence of sensitivity to pain.
in-	not or inside (in)	<i>Indifferent</i> pertains to having no interest. <i>Intubate</i> means putting a tube inside an airway.

COMBINING FORMS FOR COLORS

Medical terms also utilize combining forms for colors. Unlike the combining forms discussed in the earlier chapters, these forms are not generally used in everyday conversations. Most of these forms are used in the health sciences. The following table lists the most common combining forms for colors and their meanings.

COMBINING FORMS FOR COLORS			
Combining Form	Meaning	Examples	Word Association
alb/o, albin/o, leuk/o (leuc/o)	white	albinism, leukocytosis	<i>Albinism</i> is a genetic disorder resulting in minimal or absence of skin, hair, or eye pigmentation. An increase in the white blood cell count is known as <i>leukocytosis</i> .
chlor/o	green	chlorophyll	<i>Chlorophyll</i> is the green coloring matter found in leaves and plants.
cyano/o	blue	cyanosis	Lack of oxygen in the blood can cause a bluish discoloration of the skin and mucous membranes known as <i>cyanosis</i> .
erythr/o	red	erythema	<i>Erythema</i> refers to the redness of the skin or mucous membrane.
melan/o	black	melanin	<i>Melanin</i> is a dark brown or black substance that forms a natural part of a person's hair, skin, and eyes.
xanth/o	yellow	xanthophyll	The yellow pigment in plants is <i>xanthophyll</i> . <i>Xanthophobia</i> is the fear of the color yellow.

COMBINING FORMS AND RELATED SUFFIXES

Some combining forms are closely associated with suffixes that are commonly used to write medical terms. These suffixes can be used to form nouns and adjectives. Note that all the suffixes in the following list form nouns except for those ending in *-ic* and *-tic*, which are used to form adjectives. For example, *phagocytes* (with the suffix *-cyte*) refer to cells that ingest foreign matter. *Phagocytic* (with the suffix *-tic*), on the other hand, refers to a cell capable of functioning as a phagocyte. More examples follow.

COMBINING FORMS AND RELATED SUFFIXES			
Combining Form	Suffixes	Meaning	Examples
cyt/o	-cyte	cell	karyocyte
gen/o		beginning, origin	genetic
	-genic	produced by or in	carcinogenic
	-genesis	producing or forming	spermatogenesis

(Continued)

COMBINING FORMS AND RELATED SUFFIXES (continued)			
Combining Form	Suffixes	Meaning	Examples
gram/o	-gram -graph -graphy	to record a record instrument for recording process of recording	echocardiogram electrocardiograph echocardiography
kinesi/o	-kinesia -kinesis	movement, motion	bradykinesia
leps/o	-lepsy	seizure	epilepsy
lys/o	-lysin -lysis -lytic	destruction, dissolving that which destroys process of destroying capable of or producing destruction	lysozyme cytolysin hemolysis hemolytic
malac/o	-malacia	soft, softening abnormal softening	osteomalacia
megalo/o	-megalo	large, enlarged, enlargement	megaloblasts
metr/o	-meter -metry	measure, uterine, tissue instrument used to measure process of measuring	endometrium goniometer densitometry
path/o	-pathy	disease	coagulopathy
phag/o	-phagia, -phagic, -phagy	eat, ingest eating, swallowing	phagocytosis dysphagia
phas/o	-phasia	speech	aphasia
pleg/o	-plegia	paralysis	hemiplegia
schis/o, schiz/o, schist/o	-schisis	split, cleft	schizophrenia
scler/o	-sclerosis	hard hardening	scleroderma atherosclerosis
scop/o	-scope -scopy	to examine, to view instrument used for viewing process of examining visually	microscope bronchoscopy
troph/o	-trophic, -trophy	nutrition	hypertrophy

MISCELLANEOUS COMBINING FORMS

Miscellaneous combining forms are named as such because they can't be classified under a specific category, but are frequently used. Combining forms such as *therm/o* (in thermometer) and *carcin/o* (in carcinogenic) are usual examples. Study the following combining forms and their word associations.

MISCELLANEOUS COMBINING FORMS		
Combining Form	Meaning	Word Association
aer/o	air	<i>Aerobic</i> microorganisms are those that need oxygen in order to survive.
blast/o	embryonic form	<i>Erythroblasts</i> are immature red blood cells.
cancer/o, carcin/o	cancer	<i>Carcinogenic</i> means any substance or agent that can cause cancer.
cephal/o	head	<i>Cephalohematoma</i> is the collection of blood under the skull.
cry/o	cold	<i>Cryosurgery</i> utilizes extreme cold temperature to destroy or remove diseased tissue.
crypto/o	hidden	Undescended or "hidden" testis is referred to as <i>cryptorchidism</i> .
dips/o	thirst	Excessive thirst is <i>polydipsia</i> .
electr/o	electricity	<i>Electrocardiography</i> is a test that detects problems with the electrical activity of the heart.
fibr/o	fiber	<i>Fibrous</i> pertains to anything that contains, resembles, or consists of fiber.
hist/o	tissue	<i>Histology</i> is the study of the microanatomy of cells and tissues of plants and animals.
myc/o	fungus	The branch of botany that focuses on the study of fungi is <i>mycology</i> .
narc/o	stupor	<i>Narcotics</i> may cause stupor or insensibility.
necr/o	dead	<i>Necropsy</i> or autopsy is the examination of a person who has died.
optic/o, opt/o	vision	The <i>optic</i> nerve carries electrical impulses from the eye to the brain. <i>Optometry</i> is concerned with the diagnosis, treatment, and prevention of eye and vision problems.
phon/o	voice	<i>Bronchophony</i> refers to the normal voice sounds heard over the bronchus.
phot/o	light	<i>Phototherapy</i> or light therapy pertains to treatment using a special kind of light.
py/o	pus	<i>Pyogenesis</i> refers to pus formation.
therm/o	heat	<i>Thermometer</i> is an instrument used to measure temperature.
top/o	position, place	A <i>topical</i> medication is applied to the skin.
trache/o	trachea	A <i>tracheostomy</i> is a surgical procedure that creates an opening in the trachea (windpipe) to facilitate breathing.



Self-Check 1.3

Complete Practice Exercises A–G found in Chapter 3 of your textbook, then answer questions below.

Choose the correct answer.

- Which of the following terms contains a word part that means yellow?
 - Chloropia
 - Cyanotic
 - Melancholy
 - Xanthosis
- Painful or difficult movement is
 - bradykinesia.
 - dyskinesia.
 - kinesiotherapy.
 - yachykinesia.
- Cephalometry* is
 - a headache.
 - an instrument used to measure the head.
 - measurement of the head.
 - study of the head.
- A *lipoma* is
 - the breakdown of lipids in digestion.
 - a benign tumor composed of fatty tissue.
 - surgical crushing of a stone.
 - an ectopic pregnancy.
- Aphonia* is
 - absence of speech.
 - difficult speech.
 - rapid speech.
 - absence or loss of voice.
- A term that means pertaining to the skin is
 - cryotherapy.
 - cyanosis.
 - dermal.
 - dysphagia.

(Continued)



Self-Check 1.3

7. *Cryptorchidism* means
- a. tissue compatibility.
 - b. undescended testicle.
 - c. within a vein.
 - d. without water.
8. A record or tracing of the electrical impulses of the heart is called an
- a. electrocardiograph.
 - b. electrocardiogram.
 - c. electrocardiography.
 - d. electrocardiopathy.
9. A term for a large cell, usually restricted to mean an extremely large red blood cell, is
- a. erythrocyte.
 - b. megalocyte.
 - c. microcyte.
 - d. phagocyte.
10. A patient who has a stroke usually displays deficits on the other side of the body. For instance, a patient with a right-side stroke has left hemiparesis. Which term best describes the location of the weakness in relation to the area of the stroke?
- a. Bilateral
 - b. Contralateral
 - c. Ipsilateral
 - d. Unilateral
11. A woman who has just given birth is considered to be
- a. antepartum.
 - b. postpartum.
 - c. primigravida.
 - d. multigravida.
12. A 54-year-old woman had _____ to check for seizure activity in her brain.
- a. electrocardiography
 - b. electroencephalography
 - c. echoencephalography
 - d. computed tomography

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–12 with those at the end of this study guide.

LESSON 2: DIAGNOSIS, INTERVENTION, AND HUMAN BODY TERMS

INTRODUCTION

By this time, you're already accustomed to the basic components of medical word-building as presented in Chapters 1–3 of your textbook. Now, you'll begin to learn about diagnoses, interventions, and body structures. In Chapters 4 and 5 of your textbook, you'll study diagnostic procedures, therapeutic interventions, and anatomy and physiology of the human body.

SECTION 2.1: DIAGNOSES AND INTERVENTIONS

Read the following section, then read Chapter 4 in your textbook.

Objectives

When you complete this section, you'll be able to match diagnostic terms and therapeutic interventions with their meanings.

To better understand medical terms related to diagnoses and interventions, you need to familiarize yourself with the definitions of the following terms:

- *Normal range*: acceptable limit
- *Pathologic*: pertains to a condition involving a disease process
- *Diagnosis*: naming a disease or condition based on scientific evaluation
- *Prognosis*: anticipated outcome of a disease

Before studying concepts related to pathology, you need to recognize the functions that occur when the body is in a healthy state. To evaluate if bodily functions are normal, several tests are usually performed. These tests may include clinical studies, laboratory tests, and radiologic (*radio + logic*) studies. Apart from these tests, the healthcare practitioner also needs to check for *signs* and *symptoms* of a disease. Signs are observable characteristics that have been gathered through the use of the senses. For instance,

when the examiner *auscultates* (listens) for breath sounds, and hears that the lung fields are clear, it is documented as “clear breath sounds.” On the other hand, symptoms are subjective data. These are statements made by the client or significant others based on their perception. A “severe throbbing headache” is an example of a symptom. The results of these studies help establish a *diagnosis*. When a client is diagnosed with a disease, it’s often classified as either *acute* (occurs over a short duration) or *chronic* (exists over an extended period of time).

BASIC EXAMINATION PROCEDURES

When a healthcare practitioner checks for signs of a disease, they usually perform two basic functions: (1) measuring vital signs and (2) performing a physical examination.

Vital Signs

Vital signs are clinical measurements that indicate the state of a client’s life-sustaining functions. There are three to six signs being measured, depending on the institution’s protocol. The basic ones are pulse, respiration, and temperature. Some facilities include blood pressure, oxygen saturation, and pain.

Vital Sign	Points To Remember
Pulse	<ul style="list-style-type: none"> ■ may be abbreviated as P ■ refers to recurrent expansion of an artery referred to as heart beats ■ pulse rate (PR) is the number of heart beats per minute
Respiration	<ul style="list-style-type: none"> ■ may be abbreviated as R ■ denotes the exchange of oxygen and carbon dioxide in the body ■ otherwise known as ventilation or breathing ■ measured by counting the rise and fall of the chest during breathing
Temperature	<ul style="list-style-type: none"> ■ defined as the balance between heat lost and heat produced by the body ■ thermometer <ul style="list-style-type: none"> ■ therm/o = heat ■ -meter = instrument used to measure ■ different routes of measurement: oral, axilla, rectal, tympanic ■ measured in Centigrade and Fahrenheit

(Continued)

Vital Sign	Points To Remember
Blood pressure	<ul style="list-style-type: none"> ■ refers to the pressure of the circulating blood on the blood vessel walls ■ millimeters of mm Hg (mercury) is the standard unit of measure ■ expressed as fraction: ■ systolic: maximum arterial pressure (contraction) ■ diastolic: pressure during relaxation
Oxygen saturation	<ul style="list-style-type: none"> ■ refers to the measure of the concentration of oxygen ■ measured using a pulse oximeter
Pain	<ul style="list-style-type: none"> ■ an unpleasant feeling caused by intense or damaging stimuli

Four Techniques in Physical Examination

Physical examination is a means of gathering clinical data from the client using the examiner's senses, namely the senses of sight, hearing, and touch.

Technique	Sense Involved	Skill	Example
Inspection	sight	Eyes are used to observe.	Checking for skin color
Palpation	touch	Hands are used to feel for the texture, size, consistency, and location of body parts.	Feeling for lumps
Percussion	hearing	The fist or fingertips are used to tap the body part to determine the size, borders, and consistency of body organs.	Performing "kidney punch"
Auscultation	hearing	A stethoscope is used to listen for sounds within the body.	Listening for breath sounds

COMMON DIAGNOSTIC TESTS AND PROCEDURES

In Lesson 1, you've been introduced to the word parts commonly used in diagnostic tests and procedures. Review the following word parts and their meanings:

Word Part	Meaning	Example
-gram	a record	echocardiogram
-graph	instrument for recording	radiograph
-graphy	process of recording	radiography

(Continued)

Word Part	Meaning	Example
-meter	instrument used to measure	thermometer
-metry	process of measuring	optometry
-scope	instrument used in visual examination	endoscope
-scopy	visual examination with a lighted instrument	endoscopy

Endoscopy (*endo* = inside + *scopy* = visual examination using a lighted instrument) is one of the most common visualization procedures used in healthcare. It makes use of an *endoscope* (*endo* + *scope*) to view the internal body cavities or organs.

Catheters and *cannulas* are instruments inserted into a body cavity. Both instruments are hollow and flexible and have several purposes, such as withdrawal and instillation of fluids, or visualization of vessels or cavities.

Diagnostic Radiology

The domain of medicine related to the diagnosis of diseases with the use of x-rays, radioactive substances, and radiant energy is known as *radiology*. The following table lists word parts related to radiology.

Combining Form	Meaning	Example
ech/o, son/o	sound	echocardiogram, sonography
electr/o	electricity	electroconvulsive
fluor/o	emitting or reflecting light	fluoroscopy
radi/o	radiant energy	radiography
tom/o	to cut	tomography
ultra- (<i>prefix</i>)	excessive	ultrasonography

Diagnostic imaging modalities include:

a. *Radiography*

- uses film images of internal structures (commonly referred to as x-ray)
- radiopaque: substances that don't allow x-rays to pass through
- radiolucent: substances that allow the passage of x-rays

b. *Computed tomography*

- ionizing radiation is used to produce a cross-section of a tissue
- painless and noninvasive

c. *Magnetic resonance imaging*

- radio wave pulses and magnetic field are used to produce a notable soft tissue resolution, which differentiates adjoining structures

d. *Ultrasonography*

- otherwise known as *ultrasound imaging* or *sonography*
- makes use of high-frequency sound waves to produce images of deep body structures

e. *Fluoroscopy*

- uses a *fluoroscope* to visually examine an internal organ
- can produce continuous images of internal structures, even with movement

f. *Contrast imaging*

- radiopaque materials are used to visualize internal structures on x-ray images
- a contrast medium may be used to enhance visualization

g. *Nuclear imaging*

- uses *radiopharmaceuticals* to form an image of an organ or system
- radi/o = radiant energy + *pharmaceut/i* = drugs or medicine + *al* = pertaining to

Radiation and Other Therapeutic Interventions

As presented in the earlier part of this section, the use of radioactive materials and x-rays is advantageous in disease identification. Apart from this purpose, radiation is also useful in treating tumors or cancer cells. This method is known as *radiotherapy* or *radiation oncology*. However, radiotherapy not only destroys cancer cells, but it also leads to destruction of normal cells; hence, the client may present with side effects such as hair loss, nausea and vomiting, bone marrow suppression, and drying of the mucous membranes.

The word *therapeutic* pertains to therapy. The following table lists word parts related to treatment.

Combining Form	Meaning	Example
algesi/o	sensitivity to pain	analgesic
chem/o	chemical	chemotherapy
pharmac/o, pharmaceuti/i	drugs or medicine	pharmacokinetics
plast/o	repair	neoplastic
therapeut/o	treatment	thermotherapy
tox/o	poison	toxicology
-therapy (<i>suffix</i>)	treatment	cryotherapy



Self-Check 2.1

Complete Practice Exercises 1–10 and A–G found in Chapter 4 of your textbook, then answer questions 1–13 below.

Choose the correct answer.

- The term that means the introduction of a catheter is
 - catheter.
 - catheterization.
 - catheterize.
 - fluoroscopy.
- The procedure in which the image is digitized and immediately displayed on a monitor or recorded on film is
 - auscultation.
 - computed radiography.
 - endoscopy.
 - thermometry.
- The term for tapping the body with the fingertips or fist to evaluate internal organs or to evaluate fluid in a body cavity is
 - auscultation.
 - inspection.
 - palpation.
 - percussion.
- The number of breaths per minute is the
 - blood pressure.
 - heart rate.
 - pulse.
 - respiration rate.
- On day 5, Dr. Norris removed the sutures that had resulted from a small cut on Sean's leg. The surgeon tells his mother that excellent healing had resulted, the small scar will fade significantly with time, and this should cause no additional problems for Sean. What's the name of the report that the surgeon is giving to Sean's mother?
 - Prognosis
 - Sign
 - Specimen
 - Symptom

(Continued)



Self-Check 2.1

6. Lisa visits her obstetrician, who uses a stethoscope to listen to the heart rate of her 38-week developing fetus. The obstetrician's action describes which of the following techniques?
- a. Auscultation
 - b. Inspection
 - c. Palpation
 - d. Percussion
7. An instrument consisting of two earpieces connected by flexible tubing that's used to hear sounds within the body is a
- a. fluoroscope.
 - b. sonograph.
 - c. stethoscope.
 - d. tomogram.
8. A commonly used term that means an x-ray image is
- a. radiolucent.
 - b. radiograph.
 - c. radiography.
 - d. radiopaque.
9. Substances that readily permit the passage of x-rays are described as
- a. radiolucent.
 - b. radiograph.
 - c. radiography.
 - d. radiopaque.
10. An instrument that projects an x-ray image on a screen during fluoroscopy is called a
- a. fluoroscope.
 - b. microscope.
 - c. radiograph.
 - d. stethoscope.
11. A term that means pertaining to a procedure that uses an illuminated instrument for the visualization of the interior of a body cavity or organ is
- a. endoscopic.
 - b. endoscope.
 - c. fluoroscopic.
 - d. fluoroscope.

(Continued)



Self-Check 2.1

12. While reviewing a chart, you note that the patient has had an ultrasound. Which of the following terms best describes this type of testing?
- a. echography.
 - b. endoscopy.
 - c. fluoroscopy.
 - d. radiography.
13. A patient with hypertension has his blood pressure checked at the doctor's office. The reading was 210/90. The number 210 is referred to as the
- a. diastolic pressure.
 - b. pulse.
 - c. respiratory rate.
 - d. systolic pressure.

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–13 with those at the end of this study guide.

SECTION 2.2: THE BODY AS A WHOLE

Read the following section, then read Chapter 5 in your textbook.

Objectives

When you complete this section, you'll be able to build and identify medical terms related to body structures.

ORGANIZATION OF THE BODY

The human body is made up of structures that come together to make up a whole. These structures start from the smallest unit, which is an atom, to the largest, most complex unit, the human organism. The body is made up of many levels of structural organization: cells make up tissues, tissues form organs, organs form body systems, and the body systems make up an organism. *Organism* refers to an individual being with life.

The basic unit of life is the *cell*. Cells divide until they mature. Some cells can divide without limit. These are referred to as *stem cells*. These specialized cells are ample in a fetus and in newborn cord blood. *Cytology* refers to the study of the formation, structure, and function of cells.

A group of similar cells that work together and perform a specific function forms the next level of organization, *tissues*. *Histology* is the study of the microscopic structure of tissues. There are four types of tissues according to function: *connective*, *epithelial*, *muscular*, and *nervous*.

Organs are formed when two or more tissue types work together to accomplish a particular function. The heart, lungs, and skin are examples of organs.

A set of organs that have a collective function make up a *body system*. Body systems will be discussed in detail in the later sections. The major body systems are listed as follows:

- Muscular system
- Skeletal system
- Cardiovascular system
- Lymphatic system
- Respiratory system
- Digestive system
- Urinary system
- Reproductive system
- Integumentary system
- Nervous system
- Endocrine system

The organism or the *human body* is the largest and the most complex level in the organizational structure. It's composed of different body systems.

There are instances when tissues or organs are abnormally formed. The prefix *ana-* and suffix *-plasia* are commonly used to describe these abnormalities. *Ana-* means upward, excessive, or again, while *-plasia* refers to development or formation of tissue. The following word parts are frequently used to describe abnormal tissue development.

Word Part	Meaning	Example
a-	without	<i>Aplasia</i> denotes underdeveloped organ or tissue.
-plasia	formation	<i>Dysplasia</i> refers to abnormal development of tissues.
dys-	bad	
hypo-	below normal	The underdevelopment of organ or tissue is known as <i>hypoplasia</i> (a less severe form of aplasia).
hyper-	above normal	An increase in the number of cells is known as <i>hyperplasia</i> .
-trophy	nutrition	An increase in the size of cells is referred to as <i>hypertrophy</i> .

REFERENCE PLANES

Directional terms and planes are used to depict the position and direction of different body structures relative to the *anatomic position*. The anatomical position is defined as the body standing erect, eyes directed forward, hands at the side, palms turned outward, and lower limbs parallel with the toes pointing forward.

Directional Terms

Directional terms denote the position of a structure in relation to another structure. In Chapter 5 of your textbook, you'll find a list of directional terms. Here are additional terms relating to direction:

- *Abduction*: movement of body parts away from the midline
- *Adduction*: movement of body parts toward the midline
- *Inversion*: turning inward
- *Eversion*: turning outward
- *Palmar*: pertains to the palm of the hand
- *Plantar*: pertains to the sole of the foot
- *Supination*: turning upward
- *Pronation*: turning downward

Planes

The orientation of the body can be described using terms such as *plane* and *aspect*. Reference planes are imaginary flat surfaces that divide the body into portions or sides. The three reference planes are:

- *Frontal/coronal plane*: splits the body into front and back portions
- *Transverse plane*: splits the body into upper and lower portions
- *Sagittal plane*: splits the body into right and left sides

These planes form aspects used to identify locations:

- *Anterior* (front)
- *Posterior* (behind)
- *Lateral* (side)
- *Medial* (middle)
- *Superior* (uppermost)
- *Inferior* (lowermost)

BODY CAVITIES

The hollow place or space within the body that houses internal organs is known as a *cavity*. The two major body cavities are the *dorsal* (located near the posterior part of the body) and *ventral* (located near the anterior part of the body) cavities. The dorsal cavity is subdivided into the *cranial* and *spinal* cavities, while the ventral cavity is subdivided into the *thoracic* and *abdominopelvic* cavities.

See the following figure:

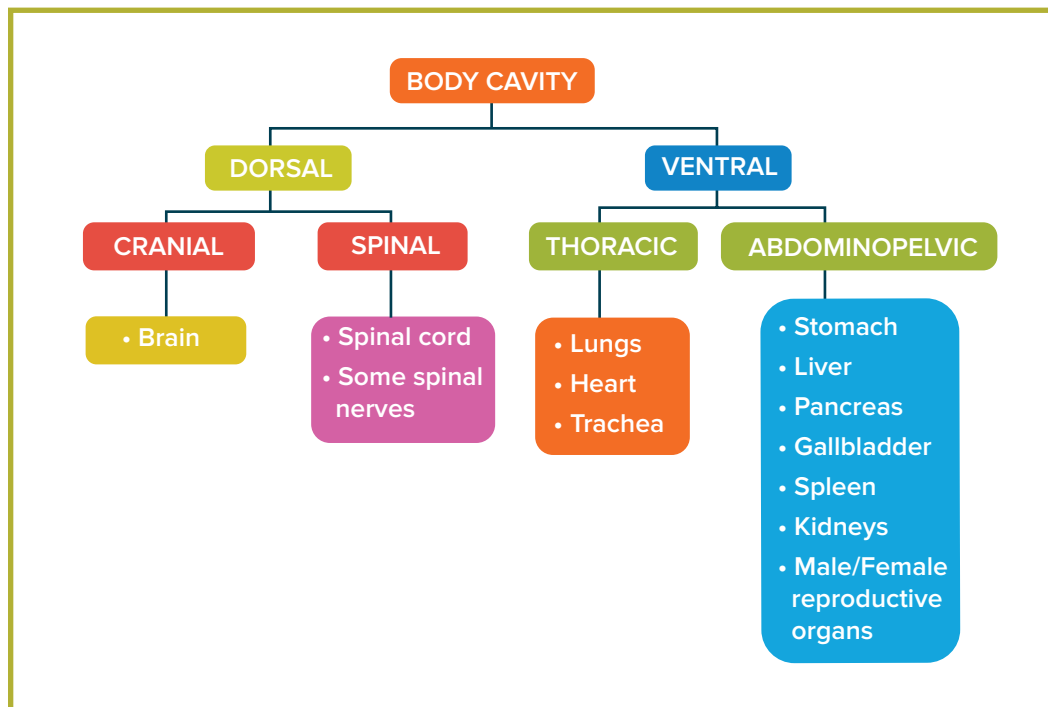


FIGURE 1—Body Cavities

BODY REGIONS

The body is divided into four major regions: head, neck, torso, and extremities. The list below identifies the regions and the organs contained in each part.

- Head: brain and the special sense organs
- Neck
- Torso: chest, abdomen, pelvis
- Extremities
 - upper: arms, wrists, hands, fingers
 - lower: thighs, knees, legs, ankles, feet, toes

BODY FLUIDS

Approximately 60% of an average adult's weight is fluids. Fluids are needed by the body for transport of nutrients and removal of wastes. The two primary body fluids are blood and lymph. Most body fluid is *intracellular* (found within the cell), but some is *extracellular* (outside the cell). The two types of extracellular fluid are *interstitial* fluid (fluid found between the cells of the body) and *plasma* (fluid part of the blood). The following table provides a list of frequently used word parts pertaining to body fluids.

Combining Form/ Word Part	Meaning	Word Association
-crine	secrete	endocrine
lacrim/o	tear, tearing, crying	lacrimation
-emia	condition of the blood	anemia
hem/o	blood	hemoglobin
lymph/o	lymph	lymphatic
muc/o	mucus	mucolytic
-poiesis	production	erythropoiesis
-poietin	substance that causes production	erythropoietin
py/o	pus	pyorrhea
sial/o	saliva	sialography
ur/o	urine	urinary

BLOOD

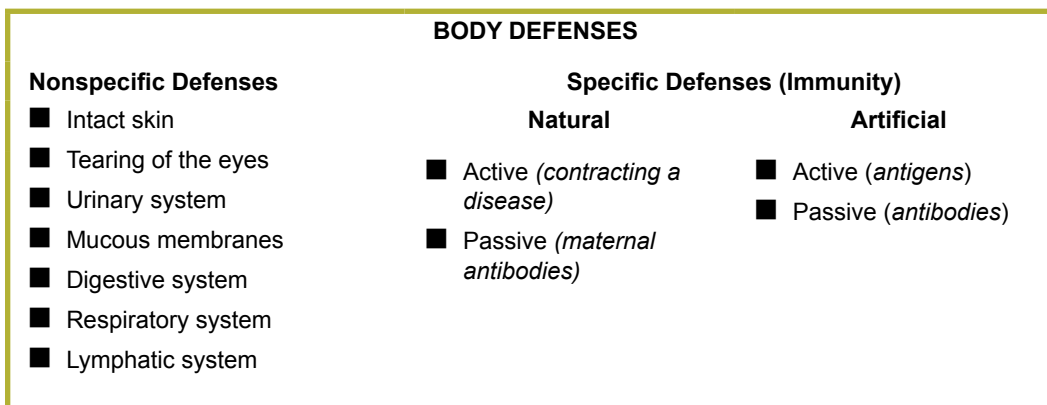
Blood carries oxygen, nutrients, vitamins, antibodies, and other substances to different parts of the body. It also helps carry carbon dioxide and other wastes away. Select word parts pertaining to blood are found in the following table:

Combining Form	Meaning	Word Association
coagul/o	coagulation	coagulopathy
cyt/o	cell	cytology
erythr/o	red	erythrocyte
hem/a, hemat/o	blood	hematology
immun/o	immune	immunization
leuk/o	white	leukocyte
thromb/o	clot (thrombus)	thrombocyte
Suffix		
-cyte	cell	cytology
-osis	increased or abnormal	leukocytosis
-penia	deficiency	leukopenia
-poiesis	production	hematopoiesis

BODY DEFENSES AND IMMUNITY

Susceptibility and *resistance* are two essential terms related to body defenses. Vulnerability to a disease or disorder is known as susceptibility, while resistance refers to the body's natural ability to fight microorganisms or toxins. The body has two defense mechanisms, *nonspecific resistance* and *specific (selective) resistance*, otherwise known as *immunity*.

Nonspecific resistance is the body's first line of defense and is directed against all pathogens. Several body systems are involved in protecting the body. Immunity, on the other hand, works against infectious microorganisms and can be classified into four categories. See the following diagram:



PATHOGENS

Any microorganism capable of producing a disease is known as a *pathogen*. Generally, there are four types of *pathogenic* (the ability to produce disease) microorganisms:

- Virus
- Bacteria
- Fungi
- Protozoa

Acts of terrorism have been a growing concern worldwide. Terrorists make use of various forms of weapons of mass destruction (WMD). The following categories have been identified by several government agencies:

- B Biological
- N Nuclear
- I Incendiary
- C Chemical
- E Explosive

Using pathogenic biological agents to cause panic, fear, and terror in a population is *bio-terrorism*. Microorganisms are used as weapons of mass destruction because they can easily be transmitted, have high chances of causing death, may lead to panic, and lastly, would require extraordinary attention.



Self-Check 2.2

Complete Practice Exercises 1–25 and A–H found in Chapter 5 of your textbook, then answer questions 1–11.

Choose the correct answer.

1. Which term means inflammation of the tear sac?
 - a. Dacryolithiasis
 - b. Dacryocyst
 - c. Dacryocystitis
 - d. Lacrimitis

(Continued)



Self-Check 2.2

2. Which of the following statements is true of endocrine glands?
- a. They carry their secretions to an external surface.
 - b. They're classified by the presence of ducts.
 - c. They're ductless.
 - d. They secrete hormones onto an epithelial surface.
3. What's the name of the membrane that lines the abdominal cavity and invests the internal organs?
- a. Adhesion
 - b. Diaphragm
 - c. Peritoneum
 - d. Viscera
4. Surgical puncture of the chest wall for aspiration of fluids is called
- a. open thoracic surgery.
 - b. thoracentesis.
 - c. thoracodynia.
 - d. thoracoplasty.
5. Immunoglobulins that are formed to act against foreign cells or substances are called
- a. antibodies.
 - b. neoplasms.
 - c. phagocytes.
 - d. thrombocytes.
6. A term for excessive sweating is
- a. hematopoiesis.
 - b. hyperhidrosis.
 - c. hyperemia.
 - d. polyuria.
7. A term that means tumor of a sweat gland is
- a. hematoma.
 - b. hidradenoma.
 - c. hydrophobia.
 - d. omphaloma.
8. Organs that are located inside the body are termed
- a. dorsal.
 - b. external.
 - c. internal.
 - d. plantar.

(Continued)



Self-Check 2.2

9. You're treating a patient who has a swollen eyelid caused by an infected eyelash. What's the proper term for the eyelid condition?
- a. Blepheral
 - b. Blepharitis
 - c. Blepharoplegia
 - d. Blepharospasm
10. A patient has a disease of the fingernails of unknown cause. What's the term that best describes this condition?
- a. Onychectomy
 - b. Onychomalacia
 - c. Onychomycosis
 - d. Onychopathy
11. A patient complains of frequently having "writer's cramp" while taking notes in class. This is referred to as
- a. chiroplasty.
 - b. chiropodist.
 - c. chiropody.
 - d. chirospasm.

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–11 with those at the end of this study guide.

LESSON 3: MUSCULOSKELETAL, CIRCULATORY, AND RESPIRATORY SYSTEM TERMS

INTRODUCTION

In lesson 2, you were introduced to the different body systems. Now, you'll begin to learn more about body systems in detail. This section will discuss medical terminologies related to the musculoskeletal, circulatory, and respiratory systems. Chapters 6, 7, and 8 of your textbook will provide comprehensive discussion on these systems.

SECTION 3.1: THE MUSCULOSKELETAL SYSTEM

Read the following section, then read Chapter 6 in your textbook.

Objectives

When you complete this section, you'll be able to build and identify medical terms related to the musculoskeletal system.

Musculoskeletal refers to the muscles and the skeleton. The musculoskeletal system protects, supports, and aids in the movement of body parts. Apart from these functions, the musculoskeletal system, particularly the bones, are essential in *hematopoiesis* or blood production (*hemat/o* = blood, *-poiesis* = production). The bones also function to store fat in the bone marrow and to store and release minerals.

STRUCTURES OF THE MUSCULOSKELETAL SYSTEM

The musculoskeletal system involves all the muscles, bones, joints, and other related structures. The branch of medicine that aims to prevent and correct problems concerning the bones and the muscles is known as *orthopedics* (*orth/o* = straight, *ped/o* = child, *-ic* = pertaining to).

MAJOR BONES OF THE BODY

The human body is made up of 206 bones. There are two main divisions of the human skeleton: axial and appendicular.

- *Axial skeleton*

- consists of 80 bones, including the bones of the skull, hyoid bone, auditory ossicles (bones of the ears), vertebral column, sternum, and ribs
- functions include central weight-bearing, and protection and maintenance of posture

- *Appendicular skeleton*

- consists of 126 bones, including the shoulder girdle (scapula and clavicle), upper and lower extremities, and the pelvic bones
- functions include balance, stability, movement, and manipulation

The following table lists the major bones of the body, the meanings of their names, and word associations.

Bone	Combining Form	Common Name	Word Association
<i>Bones of the Axial Skeleton</i>			
cranium	crani/o	skull	craniotomy
costa	cost/o	rib	intercostal
sternum	stern/o	breastbone	sternotomy
spine (vertebrae)	rachi/o, spin/o spondyl/o, vertebr/o	backbone	spondylosis
■ cervical	cervic/o	spinal bones	cervicalgia
■ thoracic	thorac/o	spinal bones	thoracolumbar
■ lumbar	lumb/o	spinal bones	lumbosacral
■ sacrum	sacr/o	spinal bones	sacroiliac
■ coccyx	coccyg/o	tailbone	coccygeal
<i>Bones of the Appendicular Skeleton</i>			
clavicle	claviculo/o	collarbone	clavicular
scapula	scapul/o	shoulder blade	subscapular
<i>Bones of the Upper Extremities</i>			
humerus	humer/o	upper arm bone	humeral
radius	radi/o		radial
ulna	uln/o		ulnar
carpals	carp/o	wrist bones	carpophalangeal
metacarpals	metacarp/o	bones of the hand	
phalanges	phalang/o	bones of the fingers	phalangitis

(Continued)

Bone	Combining Form	Common Name	Word Association
Bones of the Pelvis			
ilium	ili/o	pelvic bones	iliac
ischium	ischi/o	pelvic bones	ischial
pubis	pub/o	pelvic bones	pubic
Bones of the Lower Extremities			
femur	femor/o	thigh bone	femoral
patella	patella/o	kneecap	patellar
fibula	fibul/o	bones of the lower leg	fibulator
tibia	tibi/o	bones of the lower leg	tibialis
tarsals	tars/o	ankle bones	tarsus
calcaneus	calcane/o	heel bone	calcaneal
metatarsals	metatars/o	bones of the feet	metatarsalgia
phalanges	phalang/o	bones of the toes	interphalanges

CARTILAGE

Cartilage is a dense, elastic connective tissue that covers and protects the ends of long bones. The skeleton of the embryo is made up largely of cartilage. As one matures, the cartilage is replaced with bones, except for some structures such as the external ear and the nasal septum. The medical term *chondral* refers to cartilage.

MUSCLES, ARTICULATIONS, AND ASSOCIATED STRUCTURES

Muscles consist of cells and fibers that contract and produce body movement. The three types of muscles are:

- *Cardiac muscle*
 - heart muscle
- *Smooth muscle*
 - otherwise known as visceral or involuntary muscle
 - found in the internal organs such as the stomach
- *Skeletal muscle*
 - the only muscle that can be controlled voluntarily
 - attached to the bones

Fascia is a fibrous tissue that's responsible for covering, supporting, separating, and allowing muscles to slide easily. *Tendons*, on the other hand, are tissue fibers that connect the muscles to the bone.

Articulation, commonly known as *joint*, is the connection made between bones. Articulations that have cavities between adjoining bones are known as *synovial joints*. *Ligaments* are bands of connective tissues responsible for connecting bones and cartilages and, at the same time, are essential in supporting and strengthening joints.

DISEASES, DISORDERS, AND DIAGNOSTIC TERMS

Although the most common cause of musculoskeletal problems is injury, other pathologies—such as infections, malignancies, and connective tissue disorders, to name a few—can also affect the muscles and the bones.

Fractures and *dislocations* are the most common traumatic injuries sustained by the bones. For the muscles, *sprain* and *strain* are usual occurrences. An injury to the spinal cord is life-threatening. Cord injury may cause *paralysis* or *paresis* below the injured part.

para = beside *quadri-, tetra-* = four *plegia* = paralysis *paresis* = weakness

- *Paraplegia*: paralysis of both legs
- *Quadriplegia/tetraplegia*: paralysis of upper and lower extremities
- *Paraparesis*: weakness of the both legs
- *Quadriparesis/tetraparesis*: weakness of all four extremities

In the previous sections, you learned that the suffix *-itis* means inflammation. Study the following list of infections affecting the musculoskeletal system:

- *cellul/o* (little cell) + *itis* = *cellulitis*
- *my/o* (muscle) + *itis* = *myocellulitis*
- *oste/o* (bone) + *itis* = *osteitis*
- *chondro/o* (cartilage) + *itis* = *osteochondritis*

Several types of malignancies or tumors affect the muscles and the bones. They may be classified as *primary* (starts from the bones) or *secondary* (starts from another tissue, but metastasizes to the bone).

Sarcomas = tumors that originate from the connective tissues, such as muscles and bones

- *Chondrosarcoma* = *chondro* + *sarcoma* (masses of cartilage)
- *Fibrosarcoma* = *fibro* + *sarcoma* (tumor with fibrous tissue)

Alterations with metabolism can lead to bone destruction and problems with bone formation. The following combining words are associated with bone disorders arising from metabolic problems:

- *deformans* (deformity/ disfiguring) : *osteitis deformans*
- *malacia* (softening) : *osteomalacia*
- *-porosis* (thinning) : *osteoporosis*

In some instances, clients are born with developmental defects that cause skeletal malformation. Here are some examples:

- *Spina bifida* *bifida*: divided into two parts
- *Scoliosis* *scoliosis*: curvature
- *Kyphosis* *kyphos*: hunchback
- *Muscular dystrophy* *dys* (bad) + *trophy* (nutrition)
- *Craniocoele* *crani/o* (skull) + *-cele* (herniation)
- *Tarsoptosis* *tars/o* (ankle) + *-ptosis* (prolapsed)

Any disease of the joint is known as *arthropathy*. Describe the following medical terms based on the meanings you learned in the previous chapters. Remember that *arthr/o* refers to the joint.

- Arthroscopy
- Arthroscope
- Arthrotomy
- Arthritis

Arthritis denotes any joint inflammation. There are several types of arthritis:

- Osteoarthritis
- Rheumatoid arthritis
- Spondylarthritis
- Polyarthritis

Other connective tissue disorders include the following:

- *Bursitis*: inflammation of the bursa
- *Lupus erythematosus*: autoimmune disease involving the connective tissues
- *Gout*: acute form of arthritis caused by a metabolic disease
- *Ankylosis*: stiffening of the joints

SURGICAL AND THERAPEUTIC INTERVENTIONS

Orthopedic surgeons perform surgical procedures to restore bones to their normal function. Recall the following suffixes introduced in the previous sections:

- plasty*: repair
- ectomy*: removal or excision
- otomy*: creation of opening
- centesis*: extraction of fluid from a body cavity

The following are common surgical procedures associated with the musculoskeletal system:

vertebroplasty	vertebro + plasty	repair of the vertebrae
arthroplasty	arthro + plasty	repair or reconstruction of a joint
tendoplasty	tendo + plasty	repair of tendons
myoplasty	myo + plasty	repair of muscle
tendomyoplasty	tendo + myo + plasty	repair of the tendons and the muscles
cranioplasty	cranio + plasty	repair of the skull
bunionectomy	bunion + ectomy	excision of a bunion
ostectomy	osteo + ectomy	excision of a bone
costectomy	cost + ectomy	excision of a rib
craniectomy	crani + ectomy	excision of a skull segment
laminectomy	lamina + ectomy	removal of a lamina (portion of the vertebra)
diskectomy	disk + ectomy	total excision of an intervertebral disk
chondrectomy	chondro + ectomy	excision of a cartilage
arthrocentesis	arthro + centesis	extraction of accumulated fluid in the synovial joint

Anti-inflammatories and *anti-arthritis* are various forms of medications that treat arthritis and other connective tissue disorders. Note that *anti-* is a prefix meaning against, thus:

- *Anti-inflammatories*: drugs that reduce inflammation and pain
- *Anti-arthritis*: drugs that provide relief from arthritic symptoms



Self-Check 3.1

Complete Practice Exercises 1–15 and A–J found in Chapter 6 of your textbook, then answer questions 1–15.

Choose the correct answer.

- Displacement of a bone from a joint is called
 - dislocation.
 - fracture.
 - sprain.
 - strain.
- Surgical repair of the skull is called
 - cephaloplasty.
 - cephalotomy.
 - cranioplasty.
 - craniotomy.
- Visualization of the interior of a joint is called
 - arthroscope.
 - arthroscopy.
 - chondroscopy.
 - endoscope.
- Inflammation of a joint is
 - arthritis.
 - chondritis.
 - osteoarthritis.
 - osteocondritis.
- Osteoid* means _____ bone.
 - growth of
 - inflammation of
 - resembling
 - softening of
- Replacement of bone marrow by fibrous tissue is called
 - fibrosclerosis.
 - myelofibrosis.
 - osteoarthritis.
 - osteofibrosis.
- Inflammation of more than one joint is called
 - arthrocentesis.
 - arthrodynia.
 - polyarthritis.
 - quadriplegia.
- The term that means pertaining to a rib and a vertebra is
 - costal.
 - costovertebral.
 - spondylocostal.
 - sternocostal.

(Continued)



Self-Check 3.1

9. A condition in which the whole spine is stiffened is called
- a. ankylosed spine.
 - b. kyphosis.
 - c. scoliosis.
 - d. spina bifida.
10. A term that means pertaining to the wrist and the fingers is
- a. carpophalangeal.
 - b. metacarpal.
 - c. metatarsal.
 - d. tarsophalangeal.
11. Which adjective does *not* pertain to a bone of the arm?
- a. Costal
 - b. Humeral
 - c. Radial
 - d. Ulnar
12. A skeletal disorder in adults characterized by a disturbance in bone metabolism and commonly caused by a deficiency of vitamin D is
- a. kyphosis.
 - b. osteomalacia.
 - c. osteomyelitis.
 - d. rickets.
13. Bones that are located between the toes and the bones of the ankle are
- a. carpals.
 - b. metacarpals.
 - c. metatarsals.
 - d. tarsals.
14. Which of the following muscle types are under the voluntary control of a person?
- a. Cardiac
 - b. Skeletal
 - c. Smooth
 - d. Visceral
15. A 74-year-old post-menopausal woman who has reduced bone mass likely has which of the following?
- a. Osteitis deformans
 - b. Osteomalacia
 - c. Osteoporosis
 - d. Spondylomalacia

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–15 with those at the end of this study guide.

SECTION 3.2: THE CIRCULATORY SYSTEM

Read the following section, then read Chapter 7 in your textbook.

Objective

When you complete this section, you'll be able to build, identify, and analyze medical terms referring to the circulatory system.

The *circulatory system* is made up of the *cardiovascular system* and the *lymphatic system*. This body system functions to maintain *homeostasis* by:

- Transporting oxygen, nutrients, vitamins, antibodies, and other substances
- Taking away waste and carbon dioxide

CARDIOVASCULAR SYSTEM

Structures of the Cardiovascular System

The *cardiovascular* (*cardio* + *vascul* + *ar*) system consists of the heart and the blood vessels.

Heart

The heart is an organ in the chest that pumps blood through the veins and arteries. It has four chambers:

- Right and left *atria* (plural for *atrium*)
- Right and left *ventricles*

Atrial and ventricular refer to the atrium and ventricle, respectively. *Atrio* + *ventricular* (AV) valves are found between the atria and the ventricles. These valves are made up of *cus-pids* (small flaps that make up the AV valves).

<i>tricuspid</i>	tri (three) + cuspid	valve on the right side of the heart
<i>bicuspid</i>	bi (two) + cuspid	valve on the left side of the heart, otherwise known as <i>mitral</i> valve

Semilunar valves regulate the flow of blood to and from the lungs:

- *Pulmonic valve*: controls the flow of blood to the lungs
- *Aortic valve*: controls the flow of blood into the *aorta*

The *pericardium* (*peri* + *card* + *ium*) is a double membrane that surrounds the heart and the great vessels. The heart wall is made up of several layers:

- *Epicardium*: outer layer
- *Myocardium*: muscular middle layer
- *Endocardium*: inner layer

Blood Vessels

The circulatory system is made up of five types of blood vessels that transport blood throughout the entire body:

- *Arteries*: carry oxygenated blood from the heart to the different body parts
- *Arterioles*: small blood vessels that connect the arteries to the capillaries
- *Capillaries*: smallest blood vessels where oxygenation and nutrients occur
- *Venules*: small blood vessels that connect the capillaries to the veins
- *Veins*: carry deoxygenated blood from the different parts of the body to the heart

Note that the *pulmonary artery* is the only artery that carries deoxygenated blood and the *pulmonary vein* is the only vein that carries oxygenated blood.

The *coronary arteries* carry oxygenated and nutrient-filled blood to the *myocardium* (heart muscle).

The following table lists the combining forms associated with the blood vessels.

Combining Form	Meaning	Word Association
angi/o, vas/o, vascul/o	vessel	An <i>angiogram</i> is a radiologic test that views blood flow within the veins or arteries.
aort/o	aorta	An <i>aortogram</i> is an invasive procedure in which a catheter is placed in the aorta and a contrast material is injected.
arter/o, arteri/o	artery	<i>Arteriosclerosis</i> refers to the thickening, hardening, and loss of elasticity of the arterial walls.
arteriol/o	arteriole	<i>Arteriopathy</i> refers to any disease of the arterioles.
ather/o	yellow, fatty plaque	The build-up of plaque in the arterial walls is known as <i>atherosclerosis</i> .
phleb/o, ven/o	vein	<i>Phlebitis</i> or <i>venitis</i> is the inflammation of the veins.
venul/o	venule	<i>Venulitis</i> is inflammation of the venules.

Diseases, Disorders, and Diagnostic Terms

Cardiomyopathy is the general diagnostic term used to identify a disease of the heart muscle. The following are examples of cardiomyopathy. Note the meaning of the suffix *-itis*.

- *Myocarditis*: inflammation of the myocardium (heart muscle)
- *Endocarditis*: inflammation of the endocardium
- *Pericarditis*: inflammation of the pericardium

There are several tests used to diagnose cardiac problems. Some of the most common tests include:

- *Electrocardiogram* *electr/o + cardi/o + -gram*
 - measures the electrical activity of the heart
 - electrocardiography: a noninvasive procedure used to record electrical activity of the heart
 - electrocardiograph: record of the heart's electrical activity
- *Echocardiogram* *echo + cardi/o + -gram*
 - record of the heart's sonogram
 - echocardiography: the use of sound waves to produce live images of the heart
- *Positron emission tomography*
 - is useful in examining the flow of blood in the heart and blood vessels
 - a radioactive element is used
- *Cardiac catheterization*
 - a procedure in which a *catheter* is moved through a blood vessel to the heart to diagnose heart disorders

Study the following list of diseases and disorders affecting the heart:

- Angina pectoris
- Arrhythmia
- Cardiomegaly
- Congenital heart defects
- Congestive heart failure
- Coronary artery disease
- Coronary heart disease
- Fibrillation

- Heart murmur
- Hyperlipidemia
- Hypertension
- Infarction
- Myocardial ischemia
- Septal defect
- Shock

The distribution of blood to the various parts of the body is influenced by the diameter of the blood vessels:

- **Vasoconstriction:** decrease in the diameter of a blood vessel
 - *vaso + constriction*
- **Vasodilation:** increase in the diameter of a blood vessel
 - *vaso + dilation*

Angiomas are benign tumors made up of blood vessels (*hemangioma*) or lymph vessels (*lymphangioma*).

There are several radiologic studies involving the blood vessels. These include:

aortography	aorto + graphy	x-ray of the aorta with the use of a contrast dye	aortogram	record produced
arteriography	arterio + graphy	x-ray of the arteries using a radiopaque material	arteriogram	image produced
angiocardiography	angio + cardio + graphy	x-ray of the heart and great vessels using a dye		

Surgical and Therapeutic Interventions

Healthcare technology has greatly improved in the past few decades, leading to major advances in the treatment of cardiovascular diseases. *Cardiopulmonary* pertains to the heart and lungs.

- **Cardiopulmonary bypass:** a technique that temporarily takes over the function of the heart and the lungs during surgery
- **Cardioversion:** a procedure in which an electric current is used to reset the heart's rhythm back to its normal pattern
- **Cardiopulmonary resuscitation:** a series of lifesaving actions that improve a client's chances of survival after a cardiac arrest

Heart problems are corrected using several medications, including the following:

- *Digoxin*: a cardiac glycoside used in the treatment of clients with congestive heart failure and/or dysrhythmia
- *Nitroglycerin*: a vasodilator often given to clients with *angina pectoris*

For blood vessel problems, these medications are frequently used:

- *Thrombolytics* (*thromb/o + lytic*): medications that dissolve clots
- *Vasodilators*: medications that dilate the blood vessels
- *Antihypertensives*: medications that decrease blood pressure
- *Diuretics*: medications that facilitate excretion of water by the kidneys
- *Antilipidemics*: medications that decrease cholesterol levels

Vascular problems that cannot be corrected with medications may need to be treated using some of these procedures:

<i>angioplasty</i>	angio + plasty	repair of the blood vessels
<i>atherectomy</i>	ather/o + ectomy	insertion of a specialized catheter to remove plaque from the arterial lining
<i>aortoplasty</i>	aort/o + plasty	repair of the aorta
<i>phlebectomy</i>	phleb + ectomy	excision of a vein or a vein segment
<i>hemorrhoidectomy</i>	hemorrhoid + ectomy	excision of a hemorrhoid

LYMPHATIC SYSTEM

Otherwise known as “the lymphatics,” the lymphatic system performs the following functions:

- Return the fluid that escaped from the blood vessels back to circulation
- Defend the body against disease

STRUCTURES OF THE LYMPHATIC SYSTEM

- *Lymph*: fluid that circulates in the lymphatic system
- *Lymph vessels*: thin tubes that carry lymph and white blood cells
- *Lymph nodes*: small round glands that filter lymph throughout the body

- **Tonsils:** collections of *lymphoid* tissue found in the pharynx
 - palatine tonsils: located at the back of the throat
 - pharyngeal tonsils: commonly referred to as “adenoids”
- **Thymus:** gland in the upper chest cavity that processes *lymphocytes*
- **Spleen:** produces *antibodies* and *lymphocytes*

The following table lists some word parts related to the lymphatic system:

Word Part	Meaning	Word Association
adenoid/o	adenoids	<i>Adenoidectomy</i> is the surgical removal of the adenoids.
cervic/o	neck or the uterus	<i>Cervicalgia</i> means neck pain. Inflammation of the cervix is known as <i>cervicitis</i> .
home/o	sameness	<i>Homeostasis</i> refers to the ability of the physiological system to maintain internal stability.
lymphat/o	lymphatics	A disease or enlargement of the lymph nodes is <i>lymphadenopathy</i> .
splen/o	spleen	<i>Splenomegaly</i> is the enlargement of the spleen.
thromb/o	thrombus, blood clot	<i>Thrombolysis</i> is the breakdown of blood clots.

Diseases, Disorders, and Diagnostic Terms

Any disease involving the lymph nodes is referred to as *lymphadenopathy*. Study the following table for additional terms referring to pathological terms and diagnoses related to the lymphatics.

<i>lymphoma</i>	lymph + oma	cancer that originates from the lymphatic system
<i>lymphadenoma</i>	lymph + aden + oma	tumor of the lymph node
<i>lymphangitis</i>	lymph + ang + itis	acute or chronic inflammation of the lymphatic vessels
<i>lymphadenitis</i>	lymph + aden + itis	inflammation of the lymph nodes
<i>lymphedema</i>	lymph + edema	Accumulation of lymph in the tissue that results in swelling. <i>Elephantiasis</i> is a form of edema caused by parasites.
<i>lymphangiography</i>	lymph + angio + graphy	radiologic study of the lymphatic vessels and nodes using a contrast dye
<i>lymphangiogram</i>	lymph + angio + gram	x-ray of the lymphatic vessels and nodes

Surgical and Therapeutic Interventions

Antibiotics or *anti-infective medications* are the usual lines of treatment for infections of the lymph nodes and lymph vessels.

In more severe problems of the lymphatic system such as cancer, excision of the affected lymphatic structure may be necessary. Recall the meaning of the following terms:

- Lymphadenectomy
 - Splenectomy
 - Tonsillectomy
 - Adenoidectomy
-



Self-Check 3.2

Complete Practice Exercises 1–13 and A–H found in Chapter 7 of your textbook, then answer questions 1–11.

Choose the correct answer.

1. The fluid transported by lymphatic vessels is
 - a. lymph.
 - b. lymphoma.
 - c. plasma.
 - d. serum.

2. *Polyarteritis* is
 - a. arthritis in many joints.
 - b. inflammation of many arteries.
 - c. many heart abnormalities.
 - d. plastic surgery of the arteries.

(Continued)



Self-Check 3.2

3. The name of the record produced by recording the electrical currents of the heart muscle is
- a. echocardiogram.
 - b. echocardiography.
 - c. electrocardiogram.
 - d. electrocardiography.
4. Arterioles are small
- a. arteries that carry blood to arteries.
 - b. arteries that receive blood from arteries.
 - c. blood vessels that carry blood to the inferior vena cava.
 - d. blood vessels that receive blood from veins.
5. Inflammation of the lining of the heart is
- a. endocarditis.
 - b. myocarditis.
 - c. pericarditis.
 - d. polyarteritis.
6. An excessive quantity of fat in the blood is called
- a. hyperkalemia.
 - b. hyperlipidemia.
 - c. hypernatremia.
 - d. hypertension.
7. *Vasodilation* is a/an
- a. decrease in the diameter of a blood vessel.
 - b. drug that dilates the blood vessels.
 - c. synonym for vasoconstriction.
 - d. increase in the diameter of a blood vessel.
8. A 55-year-old man had which device implanted in his chest to detect sustained ventricular tachycardia or fibrillation and deliver a low-energy shock to the heart, restoring the normal rhythm?
- a. Automated external defibrillator
 - b. Cardioverter-defibrillator
 - c. Electrocardiogram
 - d. Pacemaker

(Continued)



Self-Check 3.2

9. A 74-year-old man underwent which operation when the blockages in his coronary arteries were too severe for a percutaneous procedure to be effective?
- a. Aortography
 - b. Atherectomy
 - c. Cardiopulmonary resuscitation
 - d. Coronary artery bypass graft
10. A 3-month-old boy has a “hole” in his heart. This is better described as
- a. a septal defect.
 - b. congestive heart failure.
 - c. myocardial infarction.
 - d. myocardial ischemia.
11. The mitral valve is also referred to as the _____ valve.
- a. bicuspid
 - b. sinoatrial
 - c. semilunar
 - d. tricuspid

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–11 with those at the end of this study guide.

SECTION 3.3: THE RESPIRATORY SYSTEM

Read the following section, then read Chapter 8 in your textbook.

Objective

When you complete this section, you'll be able to write, recognize, and analyze medical terms pertaining to the respiratory system.

Otherwise known as the *pulmonary system*, the *respiratory system* (*spir/o* = to breathe) functions primarily to deliver *oxygen* to the body tissues and get rid of *carbon dioxide*. This function is achieved through *breathing* or *ventilation*. There are two processes involved in *ventilation*:

- *Inspiration/inhalation*: movement of air into the lungs
- *Expiration/exhalation*: movement of air out of the lungs

A *pulmonologist* (*pulmon/o* + *-logist*) is a specialist in the anatomy, physiology, and pathology of the lungs, while a *respiratory therapist* evaluates and treats respiratory disorders at the direction of a physician.

STRUCTURES OF THE RESPIRATORY SYSTEM

The respiratory system consists of the upper and lower respiratory tracts. The following diagram illustrates the movement of air into the respiratory tract with the associated structures.

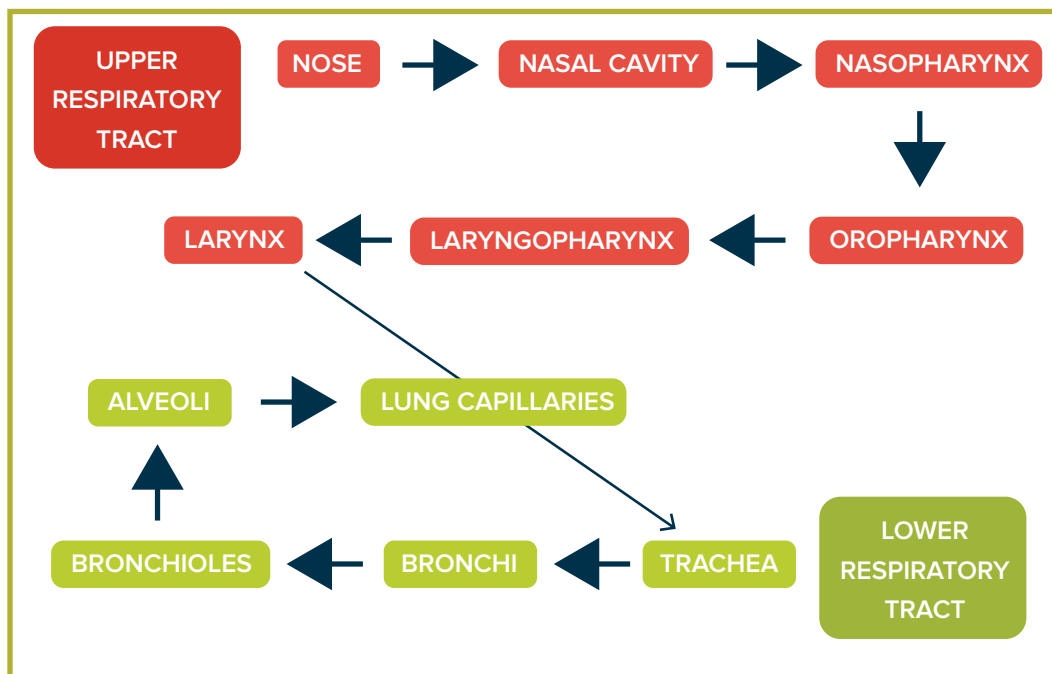


FIGURE 2—Upper and Lower Respiratory Systems

The following respiratory structures are important to note:

■ **Diaphragm**

- serves as the main muscle of respiration
- separates the abdominal cavity from the *thoracic* (*thora/o* = chest) cavity

■ **Pleura:** membrane that surrounds the lungs

■ **Lungs**

- a pair of large, spongy organs used for gas exchange
- the right lung has three lobes while the left lung has two lobes

■ **Sinuses**

- lighten the weight of the skull
- Four sinuses: frontal, ethmoid, maxillary, sphenoid
 - *para + nasal sinuses*
 - (*para* = beside, *nas/o* = nose, *-al* = pertaining to)
 - the frontal and maxillary sinuses are air-filled paired cavities located around the nose

■ **Pharynx:** throat

■ **Larynx:** voice box

Study the combining forms of the following respiratory structures along with the word associations and their meanings.

Combining Form	Meaning	Word Association
<i>alveol/o</i>	alveolus/alveoli	<i>Alveolar</i> ventilation refers to the volume of gas expired from the alveoli.
<i>bronch/o,</i> <i>bronchi/o</i>	bronchus/bronchi	A <i>bronchodilator</i> is a medication that opens up the bronchioles. <i>Bronchitis</i> is the inflammation of the bronchial tubes.
<i>bronchiol/o</i>	bronchiole	Inflammation of the bronchioles is known as <i>bronchiolitis</i> .
<i>epiglott/o</i>	epiglottis	<i>Epiglottitis</i> is a life-threatening condition in which the epiglottis swells.
<i>laryng/o</i>	larynx (voice box)	<i>Laryngospasm</i> is the uncontrolled and involuntary muscular contraction of the vocal folds.
<i>lob/o</i>	lobe	The surgical removal of a lobe of an organ is referred to as <i>lobectomy</i> .
<i>nas/o, rhin/o</i>	nose	The <i>nasopharynx</i> refers to the upper part of the throat behind the nose.

(Continued)

Combining Form	Meaning	Word Association
<i>phren/o</i>	diaphragm	The <i>phrenic</i> nerve supports the movement of the diaphragm.
<i>pleur/o</i>	pleura	<i>Pleuritis</i> or <i>pleurisy</i> is the inflammation of the pleura or the lining of the lungs.
<i>pharyng/o</i>	pharynx (throat)	<i>Pharyngitis</i> is the inflammation of the pharynx, otherwise known as “ <i>sore throat</i> .”
<i>pneu/o, pneumon/o, pulm/o, pulmon/o</i>	lung	<i>Pneumonia</i> is the infection of one or both lungs. The medical specialty that deals with diseases involving the respiratory tract is known as <i>pulmonology</i> .
<i>trache/o</i>	trachea	<i>Tracheostomy</i> is a surgical procedure that creates an opening in the trachea.

DISEASES, DISORDERS, AND DIAGNOSTIC TERMS

Two of the most common noninvasive measurements used to collect data about a client’s respiratory status are oximetry and spirometry.

■ Oximetry

- measurement of the blood oxygen saturation in the arteries
- *oximeter*: a device used to measure oxygen saturation of the blood

■ Spirometry (*spiro* + *metry*)

- measurement of airflow taken in and exhaled from the lungs
- *spirometer*: instrument used for measuring air inhaled to and exhaled out of the lungs

The suffix *-pnea* denotes breathing. Study the following list for medical terms pertaining to respirations.

<i>eupnea</i>	<i>eu-</i> (normal)	eu + <i>pnea</i>	normal respirations
<i>dyspnea</i>	<i>dys-</i> (bad)	dys + <i>pnea</i>	labored and difficult breathing
<i>apnea</i>	<i>a-</i> (absence)	a + <i>pnea</i>	temporary absence of breathing
<i>orthopnea</i>	<i>orth/o-</i> (straight)	ortho + <i>pnea</i>	difficulty breathing in any position other than upright or sitting position
<i>bradypnea</i>	<i>brady-</i> (slow)	brady + <i>pnea</i>	abnormal breathing, less than 12 breaths per minute

(Continued)

<i>tachypnea</i>	<i>tachy-</i> (fast)	tachy + pnea	respirations more than 20 breaths per minute
<i>hyperpnea</i>	<i>hyper-</i> (more than normal)	hyper + pnea	abnormally deep or rapid respiration

Aside from the previous list, the following terms are frequently used in relation to the respiratory system:

- *hyperventilation* (*hyper* + *ventilation*): excessive ventilation of the lungs
- *hypoventilation* (*hypo* + *ventilation*): insufficient exchange of oxygen and carbon dioxide in the lungs
- *hypoxia* (*hyp* + *ox* + *ia*): diminished oxygenation to the tissues
- *anoxia* (*an* + *ox* + *ia*): extreme form of hypoxia, severe lack of oxygen in the tissues

Similar to the circulatory system, the respiratory system can be afflicted with a number of disorders. Review the definitions of the following respiratory disorders:

- Adult respiratory distress syndrome
- Asthma
- Atelectasis
- Bronchiectasis
- Bronchography
- Lung carcinoma
- Chronic obstructive pulmonary disease
- Emphysema
- Influenza
- Nasal polyp
- Pleuritis
- Pneumoconiosis
- Pulmonary embolism
- Severe acute respiratory syndrome
- Silicosis
- Sudden infant death syndrome
- Tuberculosis

SURGICAL AND THERAPEUTIC INTERVENTIONS

Asphyxia denotes a severe decrease in the supply of oxygen in the body secondary to abnormal breathing. Methods used to address this problem may include the use of the *Heimlich maneuver* or, in severe cases, *endotracheal intubation*.

- *Heimlich maneuver*
 - otherwise known as *abdominal thrust*
 - first-aid procedure used to remove airway foreign body obstruction, such as in the case of *choking*
- *Endotracheal intubation* (*endo* = *inside* + *trache/o* + *al*): insertion of artificial airway into the trachea
 - *nasotracheal* intubation (*nas/o* = nose)
 - insertion of an airway tube through the nose
 - *orotracheal* intubation (*or/o* = mouth)
 - insertion of an airway tube through the mouth
- *Ventilator*
 - an apparatus used to administer artificial respiration in cases of respiratory failure

In severe cases, respiratory disorders may need to be treated surgically. The following table lists some of the most common surgical procedures related to the respiratory system.

Surgical Procedure	Word Parts	Definition
<i>tracheotomy</i>	trach/o + tomy	creation of an opening in the trachea
<i>tracheostomy</i>	trach/o + ostomy	creation of artificial airway in the trachea
<i>biopsy</i>	bi + o + o/psy	removal of small tissue for examination
<i>percutaneous</i>	per + cutane/o	puncturing the skin to obtain a sample of the tissue
<i>pneumonectomy</i>	pneumon/o + ectomy	removal of all or part of the lungs
<i>lobectomy</i>	lob/o + ectomy	removal of a lobe of the lung
<i>rhinoplasty</i>	rhin/o + plasty	surgical repair of the nose
<i>pneumocentesis</i>	pneum/o + centesis	puncture of the lungs to remove fluid
<i>thoracentesis</i>	thorac/o + centesis	puncture of the chest cavity to drain fluid

Respiratory disorders may also be treated with medications. Review the purpose of the following drug classifications:

- *Decongestants* *de + congest + ant*
- *Antitussives* *anti + tussive*
- *Antihistamines* *anti + histamine*
- *Bronchodilators* *broncho + dilat/o + or*
- *Mucolytics* *muco + lys/o + tics*



Self-Check 3.3

Complete Practice Exercises 1–10 and A–G found in Chapter 8 of your textbook, then answer questions 1–14.

Choose the correct answer.

1. A term that means pertaining to the windpipe and the bronchi is
 - a. bronchiectasis.
 - b. laryngobronchial.
 - c. pharyngobronchial.
 - d. tracheobronchial.
2. *Atelectasis* is
 - a. a collapsed or airless condition of the lungs.
 - b. an acute, contagious respiratory infection.
 - c. chronic dilation of the lungs.
 - d. paroxysmal dyspnea.
3. Removal of lung tissue is called
 - a. pneumatic.
 - b. pneumohemothorax.
 - c. pneumonectomy.
 - d. pneumothorax.

(Continued)



Self-Check 3.3

4. The term *pneumocardial* pertains to the
- a. chest and lungs.
 - b. heart and kidneys.
 - c. heart and lungs.
 - d. kidneys and lungs.
5. Absence of breathing is termed
- a. apnea.
 - b. dyspnea.
 - c. hypopnea.
 - d. hyperpnea.
6. *Rhinitis* is inflammation of the
- a. chest.
 - b. nose.
 - c. throat.
 - d. voice box.
7. The term *pulmonary* refers to the
- a. chest.
 - b. diaphragm.
 - c. heart.
 - d. lungs.
8. A respiratory condition in which there's discomfort in breathing in any position except sitting erect or standing is
- a. apnea.
 - b. bradypnea.
 - c. orthopnea.
 - d. tachypnea.
9. Tiny air sacs through which the exchange of oxygen and carbon dioxide takes place are called
- a. alveoli.
 - b. bronchi.
 - c. bronchioles.
 - d. emboli.
10. The term for a whistling sound made during respiration is
- a. nares.
 - b. pleura.
 - c. thrombus.
 - d. wheeze.
11. A 72-year-old man has orders to have his oxygen levels checked. This can be done using
- a. endotracheal intubation.
 - b. a bronchogram.
 - c. an oximeter.
 - d. a spirometer.

(Continued)



Self-Check 3.3

12. A 75-year-old woman with a left cerebrovascular accident (stroke) is now unable to speak. You document which term to indicate this deficit?
- a. Anoxia
 - b. Aphasia
 - c. Dysphasia
 - d. Dysphonia
13. An instructor says that this disease has been nearly eradicated in developed countries. Which disease is probably being discussed?
- a. Influenza
 - b. Pharyngitis
 - c. Thoracentesis
 - d. Tuberculosis
14. A 29-year-old woman is trying to break up sputum by using which type of over-the-counter medication?
- a. Antihistamine
 - b. Bronchoconstrictor
 - c. Bronchodilator
 - d. Mucolytic

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–14 with those at the end of this study guide.

LESSON 4: DIGESTIVE, URINARY, AND REPRODUCTIVE SYSTEM TERMS

INTRODUCTION

In the previous section, you became familiar with medical terminologies related to the musculoskeletal, circulatory, and respiratory systems. This section will focus on medical vocabularies and jargons related to digestion, micturition or urination, and reproduction. Detailed discussion on these systems can be found in Chapters 9, 10, and 11 of your textbook.

SECTION 4.1: DIGESTIVE SYSTEM

Read the following section, then read Chapter 9 in your textbook.

Objectives

When you complete this section, you'll be able to distinguish and analyze medical terms associated with the digestive system.

THE DIGESTIVE SYSTEM

The *digestive system* is responsible for the provision of water, nutrients, and minerals to the body. *Alimentation* (*alimentum* = to nourish) is the term used for the process of giving or receiving nutrition, while *metabolism* is used to describe all the body processes involved in maintaining life.

There are four processes involved in digestion:

- *Ingestion*: taking foods or fluids orally
- *Digestion*: physical and chemical breakdown of food into smaller components that can be absorbed in the bloodstream
- *Absorption*: passage of food molecules from the small intestine into the blood and lymph capillaries
- *Elimination*: removal of food particles that were not digested through *defecation*

Nutrients are classified into three major categories. They're further broken down into simpler substances known as *enzymes*. The following table summarizes nutrient classifications and their specific enzymes (-ase = enzyme).

Nutrient Classification	Associated Enzyme/s	Word Parts
<i>carbohydrates</i>	lactase (breaks down lactose)	<i>lact + ase</i>
	amylase (breaks down starch)	<i>amyl + ase</i>
<i>proteins</i>	protease	<i>prote + ase</i>
	proteinase	<i>protein + ase</i>
<i>fats</i>	lipase	<i>lip + ase</i>

Study the following word parts related to digestion and nutrition:

Word Part	Meaning	Word Association
<i>-ation</i>	action or process	<i>Defecation</i> is the process of passing out stool or feces via the anus.
<i>bil/i, chol/e</i>	bile	The <i>biliary</i> system consists of the liver, gall-bladder, and the bile duct.
<i>cirrh/o</i>	orange-yellow	<i>Liver cirrhosis</i> refers to the chronic scarring and damage to the liver.
<i>de-</i>	down, from, reversing, or removing	The removal of an amino group from a molecule is known as <i>deamination</i> .
<i>glycos/o</i>	sugar	<i>Glycolysis</i> is the breakdown of glucose for cellular metabolism.
<i>-orexia</i>	appetite	<i>Anorexia</i> is the loss of appetite.
<i>-pepsia</i>	digestion	<i>Dyspepsia</i> is the term used to describe indigestion or painful and upset stomach.
<i>vag/o</i>	vagus nerve	The <i>vasovagal</i> syncope is the sudden loss of consciousness caused by affectation of the vagus nerve.
<i>viscer/o</i>	viscera	<i>Visceral</i> pain is a pain that originates from body organs.

Structures of the Digestive System

The structures of the digestive system can be divided into two categories: alimentary tract and the accessory organs of digestion.

Alimentary Tract

The *alimentary tract*, otherwise known as the *digestive tract*, starts from the mouth and continues down to the anus.

■ *Intestinal* *intestin/o* = intestines + *-al*

■ *Gastrointestinal* *gastr/o* = stomach + *-al*

The alimentary canal consists of two parts, the *upper* and *lower gastrointestinal tract*.

Upper Gastrointestinal Tract	Digestive Organs	Word Part	Word Association
	lips	cheil/o	cheilosis
	teeth	dent/i, dent/o, odont/o	dentistry
	gums	gingiv/o	gingivitis
	tongue	gloss/o, lingu/o	glossitis
	mouth	or/o, stomat/o	oropharynx
	esophagus	esophag/o	esophagitis
	stomach	gastr/o	gastroenterologist
Lower Gastrointestinal Tract	intestines	intestin/o, enter/o	intestinal, enteritis
	duodenum	duoden/o	duodenal
	jejunum	jejun/o	jejunostomy
	ileum	ile/o	ileostomy
	colon or large intestine	col/o, colon/o	colonoscopy
	appendix	append/o, appendic/o	appendectomy
	cecum	cec/o	ileocecal
	sigmoid colon	sigmoid/o	sigmoidectomy
	anus or rectum	proct/o	proctologist
	rectum	rect/o	rectal
	anus	an/o	anal

Accessory Organs of Digestion

Proper digestion and absorption of nutrients is aided by the secretion of substances by the accessory organs of digestion. These organs include the liver, gallbladder, pancreas, and salivary glands. The following table lists the word parts related to the accessory organs of digestion.

Word Part	Meaning	Word Association
<i>cholecyst/o</i>	gallbladder	<i>Cholecystectomy</i> is the surgical removal of the gallbladder.
<i>cholecho/o</i>	common bile duct	The presence of gallstones in the common bile duct is referred to as <i>choledocholithiasis</i> .
<i>hepat/o</i>	liver	<i>Hepatitis</i> refers to the inflammatory condition of the liver.
<i>pancreat/o</i>	pancreas	<i>Pancreatography</i> is the radiographic examination of the pancreas.
<i>sial/o</i>	salivary gland	<i>Sialorrhea</i> refers to excessive salivation.

Diseases, Disorders, and Diagnostic Terms

Diseases and disorders of the digestive system are usually diagnosed through *radiology* or *endoscopy*.

Radiologic studies of the digestive system (*-graphy* = process of recording):

- *Esophagography*: *esophagi/o + graphy*
- *Sialography*: *sial/o + graphy*

Endoscopic examinations (*-scopy* = visual examination):

- *Esophagoscopy*: *esophag/o + scopy*
- *Gastroscope*: *gastr/o + scopy*
- *Colonoscopy*: *colon/o + scopy*
- *Sigmoidoscopy*: *sigmoid/o + scopy*
- *Proctoscopy*: *proct/o + scopy*

The presence of stones in the digestive organs is a common occurrence (*lith/o* = stone).

The following are examples:

- *Cholelithiasis*: *chole + lith + iasis*
- *Choledocholithiasis*: *cholecho + lith + iasis*
- *Pancreatolithiasis*: *pancreato + lith + iasis*

Diabetes mellitus is a group of diseases that pertain to the body's utilization of glucose. Lack of insulin or insulin resistance results in *hyper + glycemia* (*hyper* = increased, *glyc/o* = sugar, *emia* = blood). *Hyperglycemia* may lead to the following signs and symptoms (*poly* = excessive):

- *Poly + phagia* (eating)
- *Poly + uria* (urination)
- *Poly + dipsia* (thirst)

The prefix *hyper* is also used in the following disorders (*hyper* = excessive or increased):

- *Hyperlipidemia*: *hyper + lipid + emia*
 - increased level of lipids in the blood, including cholesterol and triglycerides
- *Hyperemesis*: *hyper + emesis*
 - excessive vomiting

Other health concerns related to the digestive system include:

- Obesity
- Emaciation

- Anorexia nervosa
- Bulimia
- Malabsorption
- Malnutrition
- Dehydration

Surgical and Therapeutic Interventions

Some clients may need to be fed via an *enteral* (*enter/o* = intestine) feeding tube. The three most common types of feeding tubes are:

- *Nasogastric*: *naso* + *gastr/o* + *ic*
- *Nasoduodenal*: *naso* + *duoden/o* + *al*
- *Nasojejunal*: *naso* + *jejun/o* + *al*

Selected surgical procedures include:

<i>esophagostomy</i>	esophag/o + stomy	<i>stomy</i> = formation of an opening
<i>gastrostomy</i>	gastr/o + stomy	
<i>jejunostomy</i>	jejun/o + stomy	
<i>colostomy</i>	col/o + stomy	
<i>ileostomy</i>	ile/o + stomy	
<i>vagotomy</i>	vag/o + tomy	<i>tomy</i> = creation of incision
<i>gastroplasty</i>	gastr/o + plasty	<i>plasty</i> = repair
<i>lithotripsy</i>	lith/o + tripsy	<i>tripsy</i> = surgical crushing
<i>appendectomy</i>	append/o + ectomy	<i>ectomy</i> = excision
<i>cholecystectomy</i>	cholecyst/o + ectomy	
<i>gastrectomy</i>	gastr/o + ectomy	
<i>hemorrhoidectomy</i>	hemorrhoid/o + ectomy	
<i>pancreatolithectomy</i>	pancreat/o + lith + ectomy	
<i>laparoscopy</i>	lapar/o + scopy	<i>scopy</i> = visual examination

Some gastrointestinal problems may be treated with medications. These medications include:

- *Antidiarrheal* (*anti* + *diarrheal*)
 - relieves diarrhea
- *Antiemetic* (*anti* + *emetic*)
 - relieves or prevents vomiting

- *Emetic*
 - induces vomiting
 - *Laxative*
 - promotes bowel movement
 - *Purgative/cathartic*
 - promotes complete bowel emptying
-



Self-Check 4.1

Complete Practice Exercises 1–11 and A–I found in Chapter 9 of your textbook, then answer questions 1–15.

Choose the correct answer.

1. The term *ileostomy* means
 - a. creation of a surgical passage through the abdominal wall into the ileum.
 - b. endoscopic examination of the ileum.
 - c. herniation of the ileum.
 - d. prolapse of the ileum.
2. A condition that results when output of body fluid exceeds fluid intake is termed
 - a. achlorhydria.
 - b. dehydration.
 - c. enterostasis.
 - d. peristalsis.
3. Which of the following is *not* part of the small intestine?
 - a. Cecum
 - b. Duodenum
 - c. Jejunum
 - d. Ileum
4. A disorder that's characterized by episodes of binge eating and often terminates in self-induced vomiting is called
 - a. anorexia nervosa.
 - b. bulimia.
 - c. emaciation.
 - d. flatulence.

(Continued)



Self-Check 4.1

5. Which of the following is a branch of dentistry that specializes in tooth alignment and associated facial problems?
- a. Endodontics
 - b. Orthodontics
 - c. Pedodontics
 - d. Periodontics
6. Washing out of the stomach is called
- a. gastralgia.
 - b. gastric lavage.
 - c. gastrodynia.
 - d. stomal irrigation.
7. In which type of liver biopsy is liver tissue removed by puncturing the skin overlying the liver with a needle?
- a. Open
 - b. Resection
 - c. Percutaneous
 - d. Wedge
8. *Gastrocele* means herniation of the
- a. gallbladder.
 - b. large intestine.
 - c. liver.
 - d. stomach.
9. *Eupepsia* means
- a. deficient appetite.
 - b. excessive appetite.
 - c. normal digestion.
 - d. sluggish intestinal action.
10. A condition noted by yellowness of the skin, whites of the eyes, mucous membranes, and body fluids caused by deposition of bile pigment is known as
- a. cholelithiasis.
 - b. dehydration.
 - c. diarrhea.
 - d. jaundice.
11. The branch of dentistry that specializes in the tissue that invests and supports the teeth is called
- a. orthodontics.
 - b. pedodontics.
 - c. periodontics.
 - d. periodontium.

(Continued)



Self-Check 4.1

12. The branch of medicine that specializes in the stomach, intestines, and associated structures is called
- a. gastroenterology.
 - b. internal medicine.
 - c. intestinology.
 - d. proctology.
13. Bile is produced by the liver and allows what to occur in the small intestine?
- a. Breakdown and absorption of fats
 - b. Defecation of excess nutrients
 - c. Emesis of excess calories
 - d. Flatulence of excess gas
14. The American Cancer Society recommends which test at least once every 10 years beginning at age 50 for early detection of cancer in the intestines?
- a. Appendectomy
 - b. Colonoscopy
 - c. Cholangiography
 - d. Gastroscopy
15. A patient visits a dentist's office for a routine examination. She is told she has inflammation of her gums. The term for this condition is
- a. cheilitis.
 - b. gingivitis.
 - c. glossitis.
 - d. stomatitis.

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–15 with those at the end of this study guide.

SECTION 4.2: URINARY SYSTEM

Read the following section, then read Chapter 10 in your textbook.

Objective

When you complete this section, you'll be able to build, identify, and analyze medical terms pertaining to the urinary system.

The *urinary system*, otherwise known as the *renal system*, serves many purposes. One of these purposes is the elimination of waste products through *urin + ation*. Other functions include:

- Regulation of blood pressure, blood volume, and blood pH
- Production of red blood cells (*erythropoiesis* = erythro + poiesis)
- Synthesis of vitamin D

Urea: end product of waste excretion by the kidneys

Urology: branch of medicine that deals with the diagnosis and treatment of diseases of the urinary tract and the urogenital system

Urologist: a physician who specializes in diseases of the urinary tract and the male reproductive system

Study the following word parts pertaining to the urinary system.

Word Part	Meaning	Word Association
<i>albumin/o</i>	albumin	<i>Albuminuria</i> is a pathologic condition wherein an abnormal amount of albumin is present in the urine.
<i>-ation</i>	process	<i>Urination</i> is the act of voiding.
<i>-esis</i>	action, process, or result of	Increased excretion of urine is known as <i>diuresis</i> .
<i>glycos/o</i>	sugar	The presence of glucose in the urine is <i>glycosuria</i> .
<i>olig/o</i>	few, scanty	<i>Oliguria</i> is the reduction of urine volume.
<i>ur/o</i>	urine or urinary tract	The formation of urinary stones is known as <i>urolithiasis</i> .
<i>urin/o</i>	urine	<i>Urinal</i> is a fixture used for urination, especially by males.
<i>-uria</i>	urine or urination	The presence of blood in the urine is referred to as <i>hematuria</i> .

STRUCTURES OF THE URINARY TRACT

The major structures of the urinary system include:

- *Right and left kidneys*: produce hormones, absorb minerals, filter blood, and produce urine
- *Right and left ureters*: passageways of urine
- *Bladder*: urine storage
- *Urethra*: the tubular passage through which urine is expelled from the body

The *nephron* is the functional unit of the kidney. It has three functions, namely:

1. Glomerular filtration
2. Tubular reabsorption
3. Tubular secretion

The following table lists the word parts associated with the urinary system.

Combining Form	Name of Structure	Word Association
<i>cyst/o</i>	bladder	<i>Cystogram</i> is an x-ray examination of the urinary bladder.
<i>glomerul/o</i>	glomerulus	Inflammation of the glomeruli is known as <i>glomerulonephritis</i> .
<i>nephr/o, ren/o</i>	kidney	A <i>nephrologist</i> is a physician who specializes in treating diseases of the kidneys. Kidney failure is otherwise known as <i>renal</i> failure.
<i>pyel/o</i>	renal pelvis	<i>Pyelitis</i> is the inflammation of the renal pelvis.
<i>ureter/o</i>	ureter	<i>Ureterectomy</i> is the excision of the ureter.
<i>urethr/o</i>	urethra	Irritation and inflammation of the urethra is known as <i>urethritis</i> .

DISEASES, DISORDERS, AND DIAGNOSTIC TERMS

There are several tests used to diagnose diseases of the urinary system. One of the most common tests is *urinalysis* (*urin/o* + *analysis*). This test needs a urine specimen, which can either be a *voided specimen* or *catheterized specimen*.

The presence of abnormal substances in the urine provides significant information about the client's health status. Several examples are listed as follows:

<i>Glycosuria</i>	glyc/o + uria	sugar in the urine
<i>Proteinuria</i>	protein/o + uria	protein in the urine
<i>Hematuria</i>	hem/o + uria	blood in the urine
<i>Albuminuria</i>	albumin/o + uria	albumin in the urine
<i>Pyuria</i>	py/o + uria	pus in the urine
<i>Ketonuria</i>	keton/o + uria	ketones in the urine

Radiography and ultrasonography are also used to aid in the diagnosis of disorders of the urinary system. Some of these tests include:

- Renal angiography
- Nephrotomography
- Intravenous urography
- Nephrosonography

Visualization procedures may also be used, namely:

- Cystoscopy
- Urethroscopy

Since the urinary system is responsible for filtration of the blood and excretion of waste products, stone (*lith*) formation isn't uncommon.

- *Urolithiasis*: presence of urinary stones
- *Cystolithiasis*: presence of stones in the urinary bladder
- *Nephrolithiasis*: presence of stones in the kidneys

Other pathological conditions related to the urinary system include the following:

<i>Nephromalacia</i>	nephro + malacia	softening of the kidneys
<i>Nephromegaly</i>	nephron + megaly	enlargement of the kidneys
<i>Nephritis</i>	nephron/o + itis	inflammation of the kidney
<i>Dysuria</i>	dys + uria	painful urination
<i>Polyuria</i>	poly + uria	excessive urination
<i>Anuria</i>	an + uria	absence of urination
<i>Oliguria</i>	oligi + uria	diminished urine formation
<i>Uremia</i>	ur/o + emia	uric acid in the blood

SURGICAL AND THERAPEUTIC INTERVENTIONS

Surgical procedures and medications have been used to treat disorders of the urinary system.

Insertion of tubes or urinary diversion is a common procedure. Some examples include:

- Urethral catheterization
- Ureteral catheterization
- Suprapubic catheterization
- Percutaneous nephrostomy

In extreme cases, when the kidneys are unable to excrete waste products from the blood, dialysis may be necessary.

dia = through *lysis* = freeing or destroying

<i>Hemodialysis</i>	hemo + dia + lysis	the use of a machine to filter blood
<i>Peritoneal dialysis</i>	periton/o + eal	the use of the peritoneum as a filter

A number of surgeries have been utilized to treat problems involving the urinary system. Some of these include:

Word Parts	Word Association	
<i>cyst/o</i> = bladder <i>nephr/o</i> = renal pelvis <i>pyel/o</i> = renal pelvis <i>lith/o</i> = stone	-stomy new opening	<i>Cystostomy</i> is the surgical creation of an opening into the bladder.
		The creation of a new opening into the renal pelvis of the kidney is referred to as <i>nephrostomy</i> or <i>pyelostomy</i> .
	-tripsy surgical crushing	<i>Lithotripsy</i> is the surgical crushing of a stone.
	-tomy incision	<i>Nephrotomy</i> is an incision of the kidney.
	-pexy surgical fixation	<i>Nephropexy</i> is the term used to describe surgical attachment of a prolapsed kidney.
	-plasty surgical repair	Surgical reconstruction of the ureters is known as <i>ureteroplasty</i> .

Some substances affect the formation and excretion of urine. *Diuretics* promote urination, while *antidiuretics* inhibit urination. Examples of diuretics include coffee, tea, alcohol, and water.



Self-Check 4.2

Complete Practice Exercises 1–10 and A–H found in Chapter 10 of your textbook, then answer questions 1–15 below.

Choose the correct answer.

- The term for painful, burning urination is
 - diuresis.
 - dysuria.
 - nephrolithiasis.
 - voiding.
- A condition in which there are degenerative but not inflammatory changes in the kidneys is called
 - catheterization.
 - nephritis.
 - nephrosis.
 - percutaneous nephrostomy.
- An increased concentration of a particular type of protein in the urine is
 - albuminuria.
 - glycosuria.
 - hematuria.
 - pyuria.
- Urinary retention is
 - complete failure of the kidney.
 - inability to empty the bladder.
 - inability to hold urine in the bladder.
 - partial functioning of the kidney.
- Pus in the urine is called
 - albuminuria.
 - hematuria.
 - pyuria.
 - uremia.

(Continued)



Self-Check 4.2

6. A type of nephritis in which the glomeruli of the kidney are inflamed is called
- a. glomerulonephritis.
 - b. nephrolithiasis.
 - c. nephrosis.
 - d. polycystic kidney disease.
7. The part of the nephron that filters the blood is the
- a. collecting duct.
 - b. glomerulus.
 - c. loop of Henle.
 - d. tubule.
8. The instrument used in cystoscopy is a
- a. cystogram.
 - b. cystography.
 - c. cystoscope.
 - d. cystotome.
9. Incision of the kidney to remove a calculus is called a
- a. nephrectomy.
 - b. nephrolithotomy.
 - c. nephrotomy.
 - d. nephrotripsy.
10. An x-ray film of the kidneys and ureters produced after injection of radiopaque material into a vein is called an intravenous
- a. urogram.
 - b. venogram.
 - c. urethrogram.
 - d. urethrograph.
11. A 24-year-old man has urinary stones in the renal pelvis. The term that refers to these stones is
- a. cholelithiasis.
 - b. cystolithiasis.
 - c. ureterolithiasis.
 - d. urolithiasis.
12. A patient who is undergoing renal lithotripsy using shock waves may be undergoing which procedure?
- a. Extracorporeal shock wave lithotripsy (ESWL)
 - b. Glomerulonephral shock wave lithotripsy (GSWL)
 - c. Nephral shock wave lithotripsy (NSWL)
 - d. Transurethral shock wave lithotripsy (TSWL)

(Continued)



Self-Check 4.2

13. An x-ray series using contrast medium injected into a vein provides information about the structure and function of the kidney, ureters, and bladder. This test is referred to as
- a. intravenous urography.
 - b. nephrotomography.
 - c. retrograde urography.
 - d. voiding cystourethrography.
14. A surgical incision of the kidney is called
- a. cystotomy.
 - b. nephrotomy.
 - c. pyelotomy.
 - d. renotomy.
15. Removal of impurities from the blood is referred to as
- a. diuresis.
 - b. hemodialysis.
 - c. peritoneal dialysis.
 - d. renal insufficiency.

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–15 with those at the end of this study guide.

SECTION 4.3: REPRODUCTIVE SYSTEM

Read the following section, then read Chapter 11 in your textbook.

Objectives

When you complete this section, you'll be able to build, recognize, and analyze medical terminologies involving the male and female reproductive system.

The reproductive system's main function is production of offspring. Specific organs, known as *gonads* and *genitalia*, serve to fulfill this function.

- **Gonads:** internal reproductive organs
 - *testes* produce *spermatozoa* (sperm cells)
 - *ovaries* produce *ova* (egg cells)
- **Genitalia:** external reproductive organs

FEMALE REPRODUCTIVE SYSTEM

The female reproductive system functions to enable procreation and to support the development and nourishment of the fetus during pregnancy and following childbirth.

STRUCTURES

Gynecology (*gynec/o* = female; *-logy* = study of) is the branch of medicine that deals with the diseases and routine physical care of women's reproductive systems, and the specialist responsible is referred to as a *gynecologist*.

Study the following word parts pertaining to the structures of the female reproductive system.

WORD PARTS SPECIFIC TO THE FEMALE GENITALIA		
Female Genitalia	Meaning	Word Association
<i>cervic/o</i>	cervix	<i>Cervicitis</i> is the inflammation and irritation of the cervix.
<i>colp/o</i> <i>vagin/o</i>	vagina	Repair of the vaginal wall is <i>colporrhaphy</i> . <i>Vaginitis</i> is the inflammation of the vagina.
<i>gynec/o</i>	female	The medical practice concerned with the female reproductive system is <i>gynecology</i> .
<i>hyster/o</i> , <i>uter/o</i>	uterus	<i>Hysterectomy</i> is the removal of the uterus.
<i>metro/o</i>	uterine tissue	Irregular uterine bleeding in between regular menstrual periods is known as <i>metrorrhagia</i> .
<i>oophor/o</i> , <i>ovar/o</i>	ovary	<i>Oophoritis</i> or <i>ovaritis</i> is the inflammation of the ovaries.
<i>salping/o</i>	uterine/fallopian tube	<i>Salpingectomy</i> is the surgical removal of the Fallopian tubes.
<i>vulv/o</i>	vulva/external genitalia	Removal of the female external genitalia is known as <i>vulvectomy</i> .

(Continued)

WORD PARTS SPECIFIC TO THE FEMALE GENITALIA (continued)		
Female Genitalia	Meaning	Word Association
Other Word Parts		
<i>-cidal</i>	killing	<i>Bactericidal</i> agents kill bacteria.
<i>cyst/o, vesic/o</i>	bladder, cyst, or sac	A <i>vesicovaginal</i> fistula is an abnormal opening between the vagina and the bladder.
<i>genit/o</i>	genitals	The term <i>genitourinary</i> refers to the genital and urinary organs.
<i>gonad/o</i>	genitals or reproduction	<i>Gonadotropins</i> are hormones that stimulate the gonads to perform their reproductive and endocrine functions.
<i>men/o</i>	month	<i>Menstruation</i> refers to the monthly shedding of the uterine lining.
<i>-plasia</i>	development or formation	<i>Endometrial hyperplasia</i> is the thickening of the inner lining of the uterus.
<i>rect/o</i>	rectum	<i>Rectovaginal</i> fistulas are abnormal tracts that connect the lower gastrointestinal tract with the vagina.
<i>urethr/o</i>	urethra	<i>Urethrocele</i> refers to the prolapse of the female urethra into the vagina.
<i>urin/o</i>	urine	The <i>urogenital</i> system refers to the organ system consisting of the reproductive and the urinary organs.

The female reproductive system consists of external and internal structures. The *external genitalia*, otherwise known as the *vulva*, structures include:

- Mons pubis
- Labia (*labium* = lip)
 - majora
 - minora
- Clitoris
- Gland openings (Bartholin's, Skene's gland)

Internal structures include:

- Right and left ovaries
 - Functions
 - ovulation
 - production of hormones
 - estrogen
 - progesterone
- Right and left fallopian tubes

- Uterus

- Three layers

- endometrium *endo + metr + ium* (*endo* = inside)
 - myometrium *myo + metr + ium* (*my/o* = muscle)
 - perimetrium *peri + metr + ium* (*per* = around)

- Vagina

- Special glands

The capability to reproduce begins at *puberty*. For females, this stage is characterized by the start of *menstruation* or *menses* (*men/o* = month). The term *menopause*, on the other hand, is the time that marks the end of the menstrual cycle.

Diseases, Disorders, and Diagnostic Terms

Examination of the female reproductive system may include physical assessment and pelvic examination that can be done unaided or with the use of instruments.

Examination of the cervix and the walls of the vagina may be done with a *vaginal speculum*. Collection of uterine and/or vaginal wall tissue for *cytologic* examination is known as a *Papanicolaou smear/test* (abbreviated form = Pap smear).

Visual (*-scopy*) and *radiologic* examinations of the structures of the female reproductive tract include:

Procedure	Meaning	Instrument Used
<i>colposcopy</i>	Examination of the cervix using a special magnifying device (microscope)	colposcope
<i>laparoscopy</i>	Surgical diagnostic procedure used to examine the abdominal structures	laparoscope
<i>hysteroscopy</i>	Direct visualization of the cervical canal and the uterine cavity	hysteroscope
<i>hysterosalpingography</i>	X-ray examination of the uterus and fallopian tubes with the use of a radiopaque dye	

Pain, bleeding, and abnormal vaginal discharge are usual gynecologic concerns that warrant a visit to a *gynecologist*. Aside from the *gynecologic* problems previously mentioned, *menstrual* irregularities are also common. Examples of these irregularities include:

<i>men/o</i> = month	amenorrhea	Absence of menstruation
<i>-rrhea</i> = discharge	dysmenorrhea	Difficult or painful menstruation
<i>-rrhagia</i> = hemorrhage	menorrhagia	Abnormally heavy menstruation
<i>metr/o</i> = uterine tissue	metrorrhagia	Abnormal uterine bleeding

Study the following list of diseases and disorders affecting the female reproductive system.

- Cervical polyp
- Cervicocolpitis
- Colpitis
- Cystocele
- Endometriosis
- Endometritis
- Fistula
 - vesicovaginal
 - rectovaginal
 - urethrovaginal
- Hysteroptosis
- Myoma
- Oophoritis
- Oophorosalingitis
- Ovarian carcinoma
- Ovarian cyst
- Pelvic inflammatory disease
- Premenstrual syndrome
- Salpingitis
- Salpingocele
- Uterine cancer
- Uterine fibroid
- Vulva

Surgical and Therapeutic Interventions

Gynecological concerns may be treated using several methods.

Common Gynecological Concerns	Interventions
<i>infertility</i>	in vitro fertilization
<i>amenorrhea and menopause</i>	hormone replacement therapy
<i>prevention of pregnancy and sexually transmitted illness</i>	Contraception <ul style="list-style-type: none"> ■ natural ■ artificial

Some gynecological problems may need to be treated with surgery. The following list outlines several surgeries related to the female reproductive system.

Word Part	Surgical Procedure	Meaning
- <i>plasty</i> = surgical repair	colpoplasty	surgical repair of the vagina
- <i>rrhaphy</i> = suture	colporrhaphy	suture of the vagina
	salpingorrhaphy	suture of the uterine tube
- <i>ectomy</i> = excision	hysterectomy	excision of the uterus
	oophorectomy	excision of one or both ovaries
	salpingectomy	excision of the fallopian tube
	salpingo-oophorectomy	excision of the ovary and its fallopian tube
	vulvectomy	excision of the vulva

Pregnancy and Childbirth

The branch of medicine that deals with the care of women during pregnancy and childbirth is *obstetrics*, and the specialist is an *obstetrician*.

Pregnancy, otherwise referred to as *gestation*, begins at conception and ends at childbirth. Prior to conception, *fertilization* occurs in the fallopian tube and is followed by *implantation* of the *zygote* in the endometrium. The implanted embryo is called a *fetus* after eight weeks. The presence of *human chorionic gonadotropin* (HCG) in the urine or blood may be a presumptive sign of pregnancy. The average duration of gestation from the fertilization date is 266 days, or about *three trimesters*. *Ultrasonography* is a useful diagnostic tool in monitoring the fetus' development throughout the pregnancy.

The suffix *-natal* refers to birth. Examples of relevant terms include:

<i>Prenatal</i>	(pre + natal)	period occurring before birth
Postnatal	(post + natal)	period occurring after birth
Perinatal	(peri + natal)	period occurring immediately before and after birth
Neonatal	(neo + natal)	period occurring from the birth of the child to one month

Parturition pertains to childbirth:

Antepartum	(ante + partum)	before childbirth
Postpartum	(post + partum)	after childbirth

Gravidity pertains to the number of times a woman has been pregnant. *Gravida* may be used to refer to a pregnant woman.

<i>Primigravida</i>	(primi + gravida)	a woman who is pregnant for the first time
<i>Multigravida</i>	(multi + gravida)	a woman who has been pregnant more than once

Parity denotes the number of births a woman has had after 20 weeks of gestation. The combining form *-para* is used to describe a woman who has given birth:

Unipara	(uni + para)	a woman who has given birth to one child
Multipara	(multi + para)	a woman who has had multiple births
Nullipara	(null/o + para)	a woman who has never given birth

Prior to giving birth, the pregnant woman goes through the labor process. The stages of labor include:

1. Cervical dilation
2. Expulsion of the fetus
3. Expulsion of the placenta

Fetal presentation refers to the part of the fetus' body that's closest to the birth canal:

- Cephalic presentation
- Breech presentation
- Shoulder presentation

The two types of delivery are:

- Vaginal
- Cesarean section (C-section)

The list below presents the most common obstetric terms:

- Abruptio placentae
- Amnion
- Amniocentesis
- Amniotomy
- Cesarean section
- Chorionic villus sampling
- Down syndrome
- Episiotomy
- Erythroblastosis fetalis
- Fetal monitoring
- Placenta previa

Female Breasts

The female breasts are paired *mammary* (*mamm/o* = breast) *glands* that are essential in *lactation* (*lact/o* = milk + *ation*).

Common medical terminologies pertaining to the breasts are as follows:

Medical Term	Word Parts	Meaning
mammography	mamm/o + graphy	radiographic examination of the breast
lumpectomy	lump + ectomy	removal of a breast lump or tumor
mastectomy	mast/o + ectomy	removal of the breast
mastalgia	mast/o + algia	pain in the breast
mastodynia	mast/o + dynia	
mammalgia	mamm/o + algia	painful breast
mastitis	mast/o + itis	inflammation of the breast
mastoptosis	mast/o + ptosis	sagging breasts
mastopexy	mast/o + pexy	surgical procedure to lift the breasts
mammoplasty	mamm/o + plasty	surgical repair of the breasts

MALE REPRODUCTIVE SYSTEM

The male reproductive system is essential in the production of male sex hormones and the production, sustenance, and delivery of sperm for reproduction.

Structures

The male reproductive system also consists of internal and external organs.

External organs include:

- Penis
- Scrotum

Internal organs include:

- Testis
- Epididymis
- Vas deferens or ductus deferens

- Accessory glands
 - seminal vesicles
 - prostate gland
 - bulbourethral glands

The following table pertains to the word parts and word associations related to the male reproductive organs.

Word Part	Meaning	Word Association
<i>gon/o</i>	genitals or reproduction	<i>Gonads</i> refer to the reproductive organs, namely the testes or ovaries.
<i>orchi/o, orchid/o, test/o, testicu/o</i>	testes	<i>Orchitis</i> is the inflammation of the testes. <i>Orchidopexy</i> is the surgical fixation of an undescended testis. <i>Testosterone</i> is the primary male hormone. <i>Testicular</i> pertains to the testicles.
<i>pen/o</i>	penis	<i>Penile</i> pertains to the penis.
<i>prostat/o</i>	prostate	<i>Prostatectomy</i> is the surgical removal of the prostate gland.
<i>scrot/o</i>	scrotum, bag	<i>Scrotal</i> pertains to the scrotum.
<i>semin/o</i>	semen	The semen is otherwise referred to as <i>seminal fluid</i> .
<i>ser/o</i>	serum	<i>Serology</i> pertains to the scientific study or diagnostic examination of blood serum.
<i>spermat/o</i>	spermatozoa (sperm)	<i>Spermatogenesis</i> is defined as the formation of mature functional sperm.
<i>urethr/o</i>	urethra	<i>Urethral</i> pertains to the urethra.
<i>vas/o</i>	vessel or duct	The <i>vas deferens</i> carries sperm from the testicle to the urethra.

Diseases, Disorders, and Diagnostic Terms

The following list enumerates the most common disorders of the male reproductive system. Refer to Chapter 11 of your textbook for the definition.

■ Anorchidism	■ an + orchid/o + ism
■ Aspermia	■ a + sperm + ia
■ Benign prostatic hyperplasia	■ prostat/o + ic hyper + plasia
■ Cryptorchidism	■ crypt/o + orchid/o + ism

(Continued)

■ Hydrocele	■ hydr/o + cele
■ Intersexuality	■ inter + sex/o + al + ity
■ Orchitis	■ orchi/o + itis
■ Prostatic carcinoma	■ prostat/o + ic carcin/o + oma
■ Prostatitis	■ prostat/o + itis
■ Testicular cancer	■ testicul/o
■ Testicular torsion	■ testicul/o

Surgical and Therapeutic Interventions

Disorders of the male reproductive system may be treated with surgery. Several surgical interventions are as follows:

Word Part	Surgical Procedure	Meaning
-ectomy = excision	orchidectomy/ orchiectomy	surgical removal of the testicle
	prostatectomy	removal of all or part of the prostate
	vasectomy	removal of all or part of the vas deferens
-plasty = surgical repair	orchidoplasty	plastic surgery of the testis
-pexy = surgical fixation	orchiopexy	surgical fixation of an undescended testis
-ostomy = new opening	vasovasostomy	surgical means of reconnecting the ends of severed ductus deferens
circum = around	circumcision	removal of the foreskin that covers the head of the penis

SEXUALLY TRANSMITTED DISEASES OR INFECTIONS

Sexually transmitted diseases (STDs) or *infections* (STIs) are named as such because these are disorders acquired through sexual contact. These disorders directly affect the *genitourinary* system. Common symptoms of STDs or STIs include *urethr + itis* in males and *vagin + itis* in females. Causative microorganisms include bacteria, viruses, protozoa, fungi, or parasites.

Common STIs and their causative agents:

- *Bacteria*
 - Gonorrhea
 - Syphilis

- Chlamydial infection
 - Chancroid
 - *Virus*
 - Acquired Immunodeficiency Syndrome
 - Genital herpes
 - Genital warts
 - Hepatitis B, C, D
 - *Protozoa*
 - Trichomoniasis (*trich/o* = hair)
 - *Fungi*
 - Candidiasis
 - *Parasites*
 - Pubic lice
-



Self-Check 4.3

Complete Practice Exercises 1–22 and A–H found in Chapter 11 of your textbook, then answer questions 1–14.

Choose the correct answer.

1. A congenital condition of the newborn marked by mental retardation is called
 - a. Down syndrome.
 - b. cesarean section.
 - c. ectopic pregnancy.
 - d. jaundice.
2. Surgical suture of the ductus deferens is called
 - a. ductoplasty.
 - b. ductus venosus.
 - c. vasectomy.
 - d. vasorrhaphy.

(Continued)



Self-Check 4.3

3. Surgical removal of the end of the foreskin of the penis is called
 - a. castration.
 - b. circumcision.
 - c. episiotomy.
 - d. orchiectomy.
4. Menopause is also called
 - a. amenorrhea.
 - b. climacteric.
 - c. dysmenorrheal.
 - d. fistula.
5. The term *vaginal* is a/an
 - a. noun that means the birth canal.
 - b. adjective that refers to the birth canal.
 - c. noun that means the womb.
 - d. adjective that refers to the womb.
6. *Gestation* means
 - a. after birth.
 - b. before birth.
 - c. childbirth.
 - d. pregnancy.
7. Bleeding from the uterus at any time other than during the menstrual period is called
 - a. amenorrhea.
 - b. dysmenorrheal.
 - c. menorrhagia.
 - d. metrorrhagia.
8. A hormone that's necessary for the development and maintenance of female sexual characteristics is
 - a. amnion.
 - b. estrogen.
 - c. testosterone.
 - d. uterine.
9. Abnormal implantation of a fertilized ovum outside the uterus is called
 - a. a pelvic inflammatory disorder.
 - b. an ectopic pregnancy.
 - c. colpocervicitis.
 - d. cryptorchidism.

(Continued)



Self-Check 4.3

10. A woman who is pregnant may consider taking which types of vitamins?
- a. Antenatal
 - b. Perinatal
 - c. Postnatal
 - d. Prenatal
11. A woman who has had two live births is referred to as
- a. nullipara.
 - b. secundipara.
 - c. tripara.
 - d. unipara.
12. A three-day-old boy is noted to have undescended testicles upon physical examination. This is referred to as
- a. cryptorchidism.
 - b. orchidopexy.
 - c. orchiopexy.
 - d. seminal vesicles.
13. A healthcare professional specializes in breastfeeding. Which term refers to the secretion of milk or breastfeeding?
- a. Lactation
 - b. Mammary
 - c. Menses
 - d. Perimetrium
14. Women with gonorrhea are often asymptomatic. The causative agent for this disease is
- a. Chlamydia trachomatis.
 - b. Haemophilus ducreyi.
 - c. Neisseria gonorrhoeae (gonococcus).
 - d. Treponema pallidum.

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–14 with those at the end of this study guide.

LESSON 5: INTEGUMENTARY, NERVOUS, AND ENDOCRINE SYSTEM TERMS

INTRODUCTION

The preceding chapters have acquainted you with medical terms pertaining to the digestive, urinary, and reproductive systems. This section will help you recognize medical terminologies related to the integument, brain, spinal cord, special senses, and the glands. Comprehensive discussion on these structures is presented in Chapters 12–15 of your textbook.

SECTION 5.1: THE INTEGUMENTARY SYSTEM

Read the following section, then read Chapter 12 in your textbook.

Objective

When you complete this section, you'll be able to identify and be familiar with medical terminologies pertaining to the integumentary system.

The skin, otherwise referred to as the *integument*, is the biggest organ of the body. The other structures included under this system include the appendages of the skin, hair, nails, and the sweat and sebaceous glands.

The skin has several functions including the following, which are presented as a mnemonic:

- D vitamin synthesis
- Elimination of wastes
- Regulation of body temperature
- Makes information readily available
- Acts as a barrier

STRUCTURES OF THE INTEGUMENTARY SYSTEM

The skin has two layers:

- Epidermis *epi + dermis* (*epi* = above, *derma* = skin)
 - thin, outer layer of the skin
 - primarily consists of *keratin*, a *sclero + protein*
 - composed of five layers (from the deepest to the most superficial)
- stratum basale
 - stratum spinosum ■ *stratum* = layer
 - stratum granulosum ■ *strata* = plural form
 - stratum lucidum
 - stratum corneum
- Dermis
 - thick layer under the epidermis
 - consists of connective tissue containing lymphatics, nerves, blood vessels, hair follicles, sebaceous and sweat glands
 - Beneath the dermis is the *subcutaneous adipose* tissue.
 - sub* (below) + *cutane* (skin) + *ous* + (pertaining to)
 - *adip/o* (fat)
 - *stratum*= layer
 - *strata*= plural form

The accessory skin structures are:

- *Hair*: filament made up of protein that grows from follicles in the skin
- *Nail*: a keratinized structure found at the end of toes and fingers
- *Sebaceous glands*: glands that produce oil or waxy substance, called sebum
- *Sweat glands/sudoriferous glands*: essential in temperature regulation and waste elimination through perspiration
 - *eccrine glands*: open directly to the skin
 - *apocrine glands*: open into the hair follicles

The following table lists the word parts and word associations pertaining to the structures of the integumentary system.

Combining Forms/ Suffixes	Meaning	Word Association
<i>adip/o, lip/o</i>	fat	<i>Adipocytes</i> are fat cells.
<i>axill/o</i>	axilla (armpit)	<i>Axillary</i> pertains to the armpit or axilla.
<i>cutane/o, dermat/a, derm/o, dermat/o</i>	skin	<i>Cutaneous</i> horns are hard conical projections from the skin. <i>Dermatitis</i> is a group of diseases that results in skin inflammation. <i>Dermatology</i> is the branch of medicine that deals with the skin, nails, hair, and their diseases.
<i>erythemat/o</i>	erythema or redness	Systemic <i>lupus erythematosus</i> or lupus is a chronic inflammatory disease that attacks the immune system.
<i>follicul/o</i>	follicle	Inflammation of the follicles is known as <i>folliculitis</i> .
<i>ichthy/o</i>	fish	<i>Ichthyosis</i> is a group of skin disorders typified by having dry, scaly, or thickened skin.
<i>kerat/o</i>	tissue containing keratin	Seborrheic <i>keratosis</i> is a common non-cancerous skin growth in older adults.
<i>onych/o, ungu/o</i>	nail	<i>Onychia</i> is the inflammation of the nail folds. <i>Unguis incarnates</i> refers to an ingrown fingernail or toenail.
<i>pil/o, trich/o</i>	hair	The <i>pilomotor</i> muscles are responsible for the erection of skin hair. <i>Trichology</i> is the science that deals with the structure, function, and diseases of the skin.
<i>seb/o</i>	sebum	<i>Seborrheic</i> dermatitis is a skin condition that frequently causes scaly patches and red skin, commonly in the scalp.
<i>sept/o</i>	infection/septum	<i>Septicemic</i> or hemorrhagic rash refers to a cluster of tiny blood spots similar to pinpricks in the skin caused by infection in the blood.
<i>xer/o</i>	dry	Simple dry skin is known as <i>xeroderma</i> .
<i>-derm</i>	skin or germ layer	Embryonic germ layers: <ul style="list-style-type: none"> ■ <i>endoderm</i>: innermost layer ■ <i>mesoderm</i>: middle layer ■ <i>ectoderm</i>: outermost layer
<i>-static</i>	keeping stationary	<i>Fungistatic</i> medications, commonly prescribed in fungal skin infections, are antifungal drugs that stop the growth of fungus.

DISEASES, DISORDERS, AND DIAGNOSTIC TERMS

The skin, being the body's physiological defense against the external environment, can be exposed to numerous factors that can lead to disorders and diseases.

Skin Lesions

Visible abnormalities of the skin are collectively known as *skin lesions*. Lesions can be primary or secondary.

- *Primary lesions* are initial reactions to a problem that changes one of the components of the skin.

Examples:

- *Macule*: flat, circumscribed, and discolored area of the skin that is less than 1 cm in diameter
 - *Papule*: elevated, circumscribed, and discolored area of the skin with no visible fluid
 - *Plaque*: elevated and circumscribed patches greater than 1 cm in diameter
 - *Wheal*: irregularly shaped and elevated lesions commonly seen in allergic reactions
 - *Bulla*: a fluid-filled, elevated skin lesion greater than 1 cm in diameter
 - *Vesicle*: a fluid-filled, elevated skin lesion less than 1 cm in diameter
 - *Pustule*: vesicles that are filled with pus or cloudy fluid
- *Secondary lesions* result from modification of the primary lesion caused by trauma or other external factors.

Examples:

- *Atrophy*: thinning of the epidermis
- *Ulcer*: skin erosions that are irregularly shaped and may extend up to the bones, as in the case of *pressure ulcers*
- *Fissures*: splits in the skin
- *Scales*: dry fragments of epidermis that have been sloughed off

Injuries to the Skin

Since the skin is exposed to several external factors, skin injuries such as wounds and burns are common. A *wound* is a break in the integrity of the skin. There are several types of wound, as indicated by the following terms:

- *Laceration*: tearing of body tissue
- *Incision*: a surgical cut or clean-cut wound
- *Puncture*: a small hole caused by a small object
- *Abrasion*: shallow wounds or scrapes that tear or rub off the epidermis
- *Contusion*: rupture or damage to the blood vessels caused by trauma, but the skin remains intact; otherwise known as a bruise
- *Burns*: tissue injuries caused by extreme exposure to heat, chemicals, radiation, electricity, and sunlight.
 - Types of burns include:
 - *Superficial partial-thickness (1st degree)*: confined to the dermis only
 - *Deep partial-thickness (2nd degree)*: involves the dermis
 - *Full-thickness (3rd degree)*: involves the epidermis, dermis, and at times, the subcutaneous tissue
 - *Deep full-thickness (4th degree)*: both the epidermis and dermis have been sloughed off and the damage extends to the muscles and bones

The extent of burns may be estimated using the Rule of Nines. See Figure 12-11 in your textbook.

Note: The *Rule of Nines* is used to estimate the total body surface area affected by a burn in an adult whose height and weight are proportional. Modifications are needed in estimating the extent of burn injuries in children and infants.

Skin Disorders

The following are typical skin disorders. Review the definitions in Chapter 12 of your textbook.

- Abscess
- Albinism
- Cellulitis
- Contact dermatitis
- Cyanosis
- Dermatitis

- Discus lupus erythematosus
- Frostbite
- Furuncle
- Hypopigmentation
- Ichthyosis
- Lipoma
- Lyme disease
- Malignant melanoma
- Mycodermatitis
- Necrosis
- Pediculosis
- Petechiae
- Psoriasis

Disorders of the Accessory Skin Structures

Additional disorders of the integumentary system, particularly the accessory structures, are discussed in Chapter 12 of your textbook. Study the following disorders.

- Acne vulgaris
- Folliculitis
- Hidradenitis
- Onychomycosis
- Onychopathy
- Seborrhea
- Seborrheic dermatitis
- Trichosis

SURGICAL AND THERAPEUTIC INTERVENTIONS

There are numerous types of interventions used to treat skin disorders and diseases. Several forms of surgeries may be employed to treat these problems, including:

- Suturing
 - joining the lips or edges of a wound by stitching

- **Stapling**
 - using surgical staples to close the edges of an open wound
- **Liposuction (*lipo + suction*)**
 - otherwise known as *suction-assisted lipectomy*
 - surgical removal of adipose tissue
- **Biopsy**
 - removal of a small amount of tissue for examination
- **Cryosurgery (*cry/o + surgery*)**
 - otherwise referred to as *cryotherapy*
 - using extreme cold to destroy abnormal or diseased tissue
- **Curettage**
 - surgical cleaning or scraping with the use of a curette
- **Debridement**
 - removal of unhealthy tissue from a wound to enhance healing
- **Dermabrasion**
 - a procedure used to resurface the skin with the use of a rotating device
- **Electrosurgery (*electr/o + surgery*)**
 - refers to several modalities that use electricity to cause destruction of tissue

Aside from surgery, skin disorders may also be managed with medications. These medications may be given using different routes, which may include:

- **Oral:** medications administered via the mouth
- **Topical:** drugs administered directly on the skin
- **Transdermal:** medications that are administered on the intact skin to be absorbed and delivered via the circulatory system

The most common classifications of medications or drugs administered are:

- **Antimicrobials:** prevent infection
 - **Bacteriostatic:** drugs that inhibit the growth of bacteria
 - **Bactericidal:** drugs that kill bacteria
- **Antiperspirants:** substances that counteract perspiration

Additional treatment options may include:

- **Collagen injections:** used to smooth out wrinkles
- **Electrolysis (*electr/o + lysis*)**
 - means of destroying hair follicles through electric current



Self-Check 5.1

Complete Practice Exercises 1–10 and A–I found in Chapter 12 of your textbook, then answer questions 1–15.

Choose the correct answer.

1. Deep, irregular erosions are called
 - a. fissures.
 - b. pustules.
 - c. scales.
 - d. ulcers.
2. Damage to the skin, tissues, and blood vessels as a result of prolonged exposure to cold is
 - a. cryogenesis.
 - b. frostbite.
 - c. sclerosis.
 - d. urticarial.
3. What's the term for a sharply elevated, irregularly shaped, progressively enlarging scar caused by excessive collagen during tissue repair?
 - a. Keloid
 - b. Nevus
 - c. Pediculosis
 - d. Verruca
4. The subcutaneous adipose tissue is located just under the _____.
 - a. dermis
 - b. epidermis
 - c. corium
 - d. cutis vera
5. An abscess is a/an
 - a. localized collection of pus.
 - b. round elevation of the skin seen in urticarial.
 - c. skin elevation resulting from hypertrophy of the epidermis.
 - d. excavation of the skin or mucous membrane.
6. Which term means any dry condition?
 - a. Hidrosis
 - b. Ichthyosis
 - c. Necrosis
 - d. Xerosis

(Continued)



Self-Check 5.1

7. What does *asepsis* mean?
- a. Substance that inhibits microorganisms
 - b. A form of infection
 - c. Sterile
 - d. Presence of microorganisms or their toxins
8. Which of the following is the oily secretion of the sebaceous glands?
- a. Ecchymosis
 - b. Furuncle
 - c. Lunula
 - d. Sebum
9. Which of the following is an inflammatory disease of the sebaceous glands, characterized by pimples and blackheads?
- a. Acne vulgaris
 - b. Basal cell carcinoma
 - c. Decubitus ulcer
 - d. Viral warts
10. The location of the epidermis is
- a. above the dermis.
 - b. dispersed within the connective tissue.
 - c. under the dermis.
 - d. under the subcutaneous layer.
11. Which of the following methods can be used to destroy a hair follicle?
- a. Electrolysis
 - b. Fissure
 - c. Lipectomy
 - d. Transcutaneous nerve stimulation
12. Excessive exposure to sun increases the risk for skin cancer, which is composed of which types of cells?
- a. Contusions
 - b. Keloids
 - c. Melanocytes
 - d. Onychocytes

(Continued)



Self-Check 5.1

13. A 14-year-old girl bought a necklace at a stand at the mall. She is now showing an irritation along her neck where she wore it. The term for this condition is
- a. acne vulgaris.
 - b. contact dermatitis.
 - c. folliculitis.
 - d. mycodermatitis.
14. Dermabrasion or laser treatments can be used for removal of
- a. cellulitis.
 - b. fissures.
 - c. scales.
 - d. tattoos.
15. A 6-year-old girl skinned her knee, and her mother applied medicine to the broken skin to prevent infection. The type of medicine is classified as
- a. antimicrobial.
 - b. antiperspirant.
 - c. aseptic.
 - d. bacteriostatic.

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–15 at the end of this study guide.

SECTION 5.2: THE NERVOUS SYSTEM AND PSYCHOLOGIC DISORDERS

Read the following section, then read Chapter 13 in your textbook.

Objective

When you complete this section, you'll be able to build, identify, and analyze medical terminologies and jargon related to the nervous system.

The nervous system is a complex system that primarily serves as the body's control center, both physiologically and psychologically. More specific functions include:

- Storage and processing of information
- Stimulation of movement
- Maintenance of homeostasis
- Control of behavior, mood and thinking

Control of the nervous system can be categorized into:

- *Somatic nervous system*
 - responsible for voluntary movements such as movement of the musculoskeletal system
- *Autonomic nervous system*
 - controls involuntary movements such as breathing

Two types of nerve fibers that transmit impulses are:

- *Sensory or afferent*
 - receptors that receive information from the sensory organs and transmit this information to the central nervous system
- *Motor or efferent*
 - neurons that transmit information from the central nervous system to the muscles and glands

STRUCTURES OF THE NERVOUS SYSTEM

Two types of cells make up the nervous system, the *neurons* and *neuroglial* cells.

- *Neurons* (*neur/o* = nerve)
 - transmit impulses to and from the brain
 - *structures* of a typical neuron:
 - *dendrites*: responsible for transmitting impulses to the cell body
 - *soma* or *cell body*: contains the nucleus
 - *axon*: conducts electrical impulses away from the cell body
 - *myelin sheath*: aids in the conduction of nerve impulses
 - *neurilemma*: also called the sheath of Schwann, it's the outermost layer of the axon

■ *Glial or neuroglial cells*

- primarily functions to support the neurons

The following table presents the word parts and word associations related to the nervous system and psychological disorders.

Combining Forms	Meaning	Word Associations
aut/o	self	<i>Autoimmune</i> diseases refer to disorders in which the body's immune system destroys healthy cells.
cerebell/o	cerebellum	<i>Cerebellar</i> stroke is a result of interruption of blood supply to the cerebellum.
cerebr/o, encephal/o	brain	<i>Cerebral</i> edema is the accumulation of excessive fluid in the brain.
cervic/o	neck	Pain in the neck is generally referred to as <i>cervicalgia</i> .
coccyg/o	coccyx	Persistent pain in the coccyx or tailbone is <i>coccydynia</i> .
crani/o	cranium	<i>Craniotomy</i> is the surgical removal of a part of the skull.
dendr/o	tree	<i>Dendrites</i> are small projections of a nerve cell that are essential for nerve transmission.
dur/o	dura mater	The outermost layer of the meninges is the <i>dura mater</i> .
gli/o	neuroglia or sticky substance	<i>Glial</i> cells function to support and insulate neurons.
lumb/o	lower back	The <i>lumbosacral</i> region of the spine consists of five lumbar vertebrae and the sacrum.
mening/o	meninges	Inflammation of the protective membranes of the brain and spinal cord is known as <i>meningitis</i> .
ment/o, psych/o	mind	<i>Mentation</i> refers to mental activity or the process of thinking. <i>Psychology</i> is the science that deals with the study of the mind and behavior.
myel/o	bone marrow or spinal cord	A general term referring to inflammation of the spinal cord is referred to as <i>myelitis</i> .
nerv/o, neur/o	nerve	<i>Neuritis</i> is the inflammation of the peripheral nerves.
phren/o	mind or diaphragm	The study of the skull's structure relative to one's character and mental faculties is <i>phrenology</i> .
physi/o	nature	<i>Physiology</i> is the branch of science that deals with the natural and normal functions of living organisms.
sacr/o	sacrum	The sacrum is otherwise referred to as the <i>sacral</i> area.
spin/o	spine	The term <i>spinal</i> pertains to the spine.
thorac/o	thorax	<i>Thoracotomy</i> is a surgical procedure used to open the chest cavity.
ventricul/o	ventricle	A neurosurgical procedure that involves the creation of an opening within the cerebral ventricle is known as <i>ventriculostomy</i> .

The nervous system is divided into the *central* and *peripheral* nervous systems.

Central Nervous System

The central nervous system consists of the *brain* and the *spinal cord*. Both of these structures are protected by:

- **Bones**
 - the *cranium* or *skull* encases the brain
 - the *spinal vertebrae* protect the spinal cord
- **Cerebrospinal fluid**: clear, colorless body fluid produced by the ventricles of the brain
- **Meninges**: membranes that line the skull and spinal cord
 - *dura mater*: outermost layer of the meninges
 - *arachnoid*: middle layer
 - *pia mater*: innermost layer

Brain

Parts and Functions of the Brain

- **Cerebrum**: largest and uppermost part of the brain
 - *frontal lobe*: controls cognitive skills including problem solving, memory, language, and judgment
 - *parietal lobe*: integrates sensory functions and processes language
 - *occipital lobe*: center of the visual perception system
 - *temporal lobe*: responsible for auditory perception
- **Diencephalon**: upper end of the brain stem
 - *thalamus*: transmits sensory impulses from receptors in the different parts of the body to the cerebral cortex
 - *hypothalamus*: produces hormones and regulates body temperature
- **Brainstem**: posterior part of the brain that adjoins with the spinal cord
 - *midbrain*: associated with hearing, vision, alertness, wakefulness, and regulation of temperature
 - *pons*: transmits information from the cortex and cerebellum
 - *medulla oblongata*: regulates breathing and heart and blood vessel function
- **Cerebellum**: coordinates and regulates muscular activity

Spinal Cord

- Transmits information to the brain through the *spinal tracts*
- A cylindrical structure found in the vertebral column

Peripheral Nervous System

The *peripheral nervous system* consists of the *nerves* and *ganglia* outside the brain and the spinal cord.

There are 31 pairs of spinal nerves:

- 8 cervical
- 12 thoracic
- 5 lumbar
- 5 sacral
- 1 coccygeal

DISEASES, DISORDERS, AND DIAGNOSTIC TERMS

This section pertains to the diseases, disorders, and diagnostic terms pertaining to the nervous system, including psychological problems.

Nervous System

Common diagnostic procedures involving the nervous system include:

- Examination of the *cerebrospinal fluid*
 - chemical analysis and microscopic examination may help indicate the *presence of infection*
 - *lumbar puncture* or *spinal tap*
 - procedure used to collect cerebrospinal fluid
- *Electroencephalography* (EEG): *electro* + *encephalo* + *graphy*
 - monitoring method to record electrical activity of the brain
- Scans used to assess the structural changes of the spinal cord and the brain
 - *computed tomography*
 - *magnetic resonance imaging*

Several disorders pertaining to the nervous system include:

- **Hematoma**: collection of blood outside the blood vessels
 - *epidural*: accumulation of blood between the dura mater and the *skull*
 - *subdural*: buildup of blood below the dura mater
 - *intracerebral*: bleeding within the brain
- **Cerebrovascular accident (CVA)**: *cerebro + vascul + ar*
 - *commonly referred to as stroke*
 - *disruption of the normal blood supply to the brain*
 - *transient ischemic attack (TIA)*
 - brief interruption in cerebral blood flow
- **Hydrocephalus**: accumulation of cerebrospinal fluid in the skull
- **Aneurysm**: weakening and bulging of the cerebral artery
- **Spinal cord injuries**
 - potential causes include:
 - excessive hyperflexion
 - hyperextension
 - vertical compression

Study these disorders related to the nervous system. Definitions are outlined in Chapter 13 of your textbook.

- Akinesia
- Anesthesia
- Aphagia
- Aphasia
- Bradykinesia
- Brain tumor
- Cephalalgia
- Cerebral concussion
- Cerebral contusion
- Cerebral hemorrhage
- Cerebral palsy
- Coma
- Diplegia

- Dyslexia
- Dysphagia
- Dysphasia
- Electromyography
- Encephalitis
- Encephalocele
- Encephalomalacia
- Encephal meningitis
- Encephalopathy
- Epilepsy
- Hemiplegia
- Hyperkinesia
- Meningitis
- Meningocele
- Multiple sclerosis
- Myasthenia gravis
- Myelitis
- Myelography
- Narcolepsy
- Neuralgia
- Neuritis
- Neuropathy
- Parkinson's disease
- Peripheral neuropathy
- Shingles

Psychological Disorders

- *psych/o* = mind
- otherwise referred to as mental illness, mental disorders, or psychiatric disorder
- patterns of thought or behavior that are outside the expected norms and impair the individual's ability to function in ordinary life

Psychological disorders can be classified into:

- **Neurodevelopmental disorders:** disabilities associated with the growth and development of the brain or central nervous system
 - dementia
 - autism
 - attention deficit disorder
- **Anxiety disorders:** disabilities characterized by significant feelings of worry, anxiety, or fear
 - post-traumatic stress disorder
 - dissociative disorder
 - obsessive-compulsive disorder
 - phobias
 - agoraphobia
 - zoophobia
 - phobophobia
 - arachnophobia
 - acrophobia
 - claustrophobia
 - pyrophobia
- **Eating disorders:** pertains to abnormal eating habits that negatively impact a person's health
 - anorexia nervosa
 - bulimia
- **Mood disorders:** otherwise known as *affective* disorders, which collectively describes all types of depression and bipolar disorders
 - clinical depression
 - mania
 - pyromania
 - kleptomania
 - bipolar disorder
- **Sexual disorders:** diseases characterized by diminished or disturbance in sexual desire that's unrelated to a general medical condition
 - paraphilia

- **Somatoform disorders** (*somat/o* = body, *form* = shape): disorders that cause unexplained physical symptoms
 - somatic symptom disorder
 - illness anxiety disorder
 - neurasthenia (*neur* + *asthenia*)
 - pseudomania (*pseudo* + *mania*)
- **Personality disorders**: maladaptive patterns of behavior and cognition that affect a person's ability to form normal and healthy relationships
 - paranoia
 - antisocial personality disorder

SURGICAL AND THERAPEUTIC INTERVENTIONS

Surgery may be indicated for some disorders of the nervous system. Some of these surgeries are presented in the following table:

craniotomy	crani/o + tomy	surgical opening into the skull
craniectomy	crani/o + ectomy	removal or excision of a part of the skull
cranioplasty	crani/o + plasty	surgical repair of the skull
neuroplasty	neur/o + plasty	plastic surgery to repair a nerve
neurorrhaphy	neur/o + rrhapy	suturing of a cut nerve
neurolysis	neuro + lysis	breaking down or destruction of nervous tissue

Additional interventions include the following:

- **Shunts**: a small passage that allows movement of fluid from one body part to another
 - **ventriculoperitoneal shunt** (*ventricul/o* = ventricle, *periton/o* = peritoneum, *-eal* = pertaining to)
 - used in the treatment of hydrocephalus
 - shunts cerebrospinal fluid from the ventricles of the brain to the peritoneum
- **transcutaneous electrical nerve stimulation** (*trans* = across + *cutane* = skin + *ous* = pertaining to)
 - using electric current to stimulate the nerves for therapeutic purposes
- **stereotactic radiosurgery**
 - the use of ionizing radiation to treat functional abnormalities and small tumors of the brain

Medications used to treat nervous system disorders include:

- *Analgesics*: pain relievers
 - *Hypnotics*: produce a calming effect
 - *Anticonvulsants*: relieve or prevent convulsions
 - *Antipyretics*: relieve fever
-



Self-Check 5.2

Complete Practice Exercises 1–12 and A–G found in Chapter 13 of your textbook, then answer questions 1–14.

Choose the correct answer.

1. Surgical repair of a nerve or nerves is called
 - a. neurolysis.
 - b. neuropathy.
 - c. neuroplasty.
 - d. neurosclerosis.

2. The part of the nervous system that consists of various nerve processes and receptors is the _____ nervous system.
 - a. central
 - b. integrative
 - c. peripheral
 - d. subdural

3. Paralysis affecting like parts on both sides of the body is
 - a. cerebral palsy.
 - b. diplegia.
 - c. hemiplegia.
 - d. paraplegia.

(Continued)



Self-Check 5.2

4. A large category of psychiatric disorders in which the symptoms are distressing to the person, reality testing is within normal limits, and behavior doesn't violate gross social norms refers to
 - a. dysphagia.
 - b. neurosis.
 - c. psychosis.
 - d. pyromania.

5. What's the term for an increased accumulation of cerebrospinal fluid within the brain?
 - a. Cephalalgia
 - b. Cerebral concussion
 - c. Cerebral hemorrhage
 - d. Hydrocephalus

6. Radiographic inspection of the spinal cord with injection of a radiopaque substance is called
 - a. electromyography.
 - b. electroencephalography.
 - c. myelography.
 - d. myogram.

7. The supportive network of the nervous system is the
 - a. cerebellum.
 - b. neuroglia.
 - c. neurosclera.
 - d. somatic nerve.

8. Which of the following terms means a nervous condition characterized by chronic weakness and fatigue?
 - a. Narcolepsy
 - b. Neurasthenia
 - c. Neurolysis
 - d. Neurosclerosis

(Continued)



Self-Check 5.2

9. A morbid fear of closed places is
- acrophobia.
 - agoraphobia.
 - claustrophobia.
 - pyrophobia.
10. The term for localized dilation of the wall of a cerebral artery is
- cerebral aneurysm.
 - cerebral contusion.
 - epidural hematoma.
 - intracerebral hematoma.
11. The term for a graphic record of the contracting of a muscle as a result of electrical stimulation is
- electroencephalogram.
 - electroencephalography.
 - electromyogram.
 - electromyography.
12. Your client complains of severe headaches. What's the proper term to document in the chart?
- Analgesic
 - Cephalgia
 - Cerebral contusion
 - Neuralgia
13. You're completing an initial examination on a 74-year-old man. His daughter attends the appointment with him and reports that she has noticed progressive confusion, disorientation, and deterioration of intellectual capacity and function. The patient doesn't show a speech disturbance or restlessness. All of these findings indicate
- Alzheimer's disease.
 - bradykinesia.
 - dementia.
 - Parkinson's disease.

(Continued)



Self-Check 5.2

14. A patient plays with a lighter during the subjective interview, occasionally trying to light it. He reports having been diagnosed with an obsession with fire. A person with his condition can be documented as a
- a. kleptomaniac.
 - b. megalomaniac.
 - c. pyromaniac.
 - d. pseudomaniac.

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–14 above with those at the end of this study guide.

SECTION 5.3: SPECIAL SENSE ORGANS OF THE PERIPHERAL NERVOUS SYSTEM

Read the following section, then read Chapter 14 in your textbook.

Objective

When you complete this section, you'll be able to build, recognize, and analyze medical terminologies and jargon pertaining to the special senses.

Special senses refer to senses that have specialized organs dedicated to them. These senses include the senses of sight, taste, hearing, smell, and touch.

EYES

The organs of the visual system are the eyes. Aside from providing vision, they also enable photo-response functions.

Eye Structures

The eyes are made up of these external structures:

- *Pupil*: opening in the middle of the iris
- *Iris*: colored circle that surrounds the pupil
- *Sclera*: tough, white, outer covering of the eye
- *Conjunctiva*: thin, mucous membrane that lines the eyelid
- *Lacrimal glands*: produces *lacrimal* fluid (tears)
- *Lacrimal duct*: a short tube in the inner corner of the eyelid that serves as a passageway of tears
- *Lacrimal sac*: receives tears from the lacrimal duct
- *Nasolacrimal duct*: transports tears from the lacrimal sac of the eye into the nasal cavity

The eyeball is made up of several layers, namely:

- *Sclera*
- *Cornea*: the transparent, anterior part of the eye that refracts light
- *Choroid*: vascular layer of the eye that supplies blood to the retina

Internal structures of the eye include:

- *Lens*: transparent structure posterior to the iris that bends light rays
- *Anterior chamber*: the compartment between the cornea and the iris that's filled with *aqueous humor*
- *Vitreous chamber*: the compartment behind the lens and anterior to the optic nerve that is filled with a gel-like substance known as the *vitreous humor*
- *Retina*: thin layer of tissue that lines the posterior portion of the eye where stimulation by light occurs, leading to the sensation of vision
- *Optic nerve*: known as the second cranial nerve, it carries visual information from the eye to the brain
- *Optic disc*: the part of the eye where the optic nerve crosses the retina

The following table lists the common word parts pertaining to the eyes.

Combining Form	Meaning	Word Association
<i>choroid/o</i>	choroid	<i>Choroidal</i> melanoma is a primary cancer of the eye.
<i>chrom/o</i>	color	<i>Chromotherapy</i> or color therapy is the use of colors to promote healing.
<i>conjunctiv/o</i>	conjunctiva	Inflammation of the conjunctiva is <i>conjunctivitis</i> or pink eye.
<i>corne/o, kerat/o</i>	cornea	The presence of an open sore in the cornea is known as a <i>corneal</i> ulcer. <i>Keratoconus</i> is a condition in which the cornea progressively thins.
<i>dacry/o, lacrim/o</i>	tear	The tear sac is also known as the <i>dacrocyst</i> . <i>Lacrimation</i> is the secretion of tears.
<i>ir/o, irid/o</i>	iris	<i>Iritis</i> is the inflammation of the iris.
<i>ocul/o, ophthalm/o</i>	eye	The <i>oculomotor</i> nerve is responsible for the movement of the eyeballs and the eyelids. <i>Ophthalmology</i> is the science that deals with the anatomy, functions, and disorders of the eyeball and its orbit.
<i>opt/o, optic/o</i>	vision	<i>Optometry</i> is the practice responsible for examining visual defects of the eye and prescribing corrective lenses. An <i>optician</i> is responsible for designing, fitting, and dispensing corrective lenses for correcting a person's vision.
<i>presby/o</i>	old or old age	<i>Presbyopia</i> is the gradual loss of one's ability to focus on objects that are nearby.
<i>pupill/o</i>	pupil	<i>Pupillometry</i> refers to the measurement of pupil size.
<i>retin/o</i>	retina	<i>Retinopathy</i> refers to a disorder of the retina that may result in visual loss.
<i>ton/o</i>	tone or tension	A <i>tonometer</i> is an instrument used to measure the intraocular pressure in the eye.

Diseases, Disorders, and Diagnostic Terms

Eye disorders are frequent occurrences. Common tests to check for the presence of vision problems include:

- Routine *physical examination*
 - *Snellen chart*: an eye chart used to measure visual acuity
 - *visual fields assessment*

- *ophthalmoscopy*: examination of the internal structures of the eyes using an ophthalmoscope
- tonometry: test used to measure intraocular pressure using a tonometer

The most common *refractive* disorders of the eyes are:

- *Myopia*: nearsightedness
- *Hyperopia*: farsightedness
- *Astigmatism*: uneven focusing of the image resulting in blurred vision

Review the additional irregularities or abnormal conditions of the eye.

- Amblyopia
- Presbyopia
- Blepharitis
- Cataract
- Color vision deficiencies
 - *achromatic vision*
 - *achromatopsia*
 - *Daltonism*
- Conjunctivitis
- Glaucoma
- Hordeolum
- Macular degeneration
- Nyctalopia
- Photophobia
- Ptosis
- Retinal detachment
- Retinopathy

Surgical and Therapeutic Interventions

- *Blepharoplasty*: surgical repair of droopy eyelids
- *Keratoplasty*: otherwise known as *corneal transplant*, a surgical procedure to replace part of the cornea with corneal tissue from a donor
- *Ophthalmic cryosurgery*: using extreme cold for the excision of cataract
- *Cryoextraction*: the surgical removal of a cataract with the use of a *cryoprobe*

- *Intraocular lens transplant*: a surgical procedure that involves placing an artificial lens inside the eye
- *Laser retinal photocoagulation*: using a laser to seal or destroy abnormal leaking blood vessels in the retina
- *Laser-assisted in-situ keratomileusis (LASIK)*: a pain-free procedure that reshapes the cornea to allow the light entering the eye to be focused on the retina

Eye medications frequently prescribed for therapy are:

- *Mydriatics*: drugs that cause dilation of the pupils
- *Miotics*: agents that cause constriction of the pupils

THE EARS

Aside from being the organs of hearing, the ears are also essential in maintaining a sense of equilibrium.

Ear Structures

The human ear is made up of three general parts: external, middle, and inner.

- *External ear*: outer, visible part of the ear
 - *pinna/auricle*
 - *tympanic membrane*: otherwise called the eardrum, receives sound waves from the outer air
- *Middle ear*: consists of three *ossicles*, which transmit sounds from the outer to the inner ear
 - *malleus*
 - *incus*
 - *stapes*
- *Inner ear*: contains the organs for hearing and balance
 - *semicircular canals*: organ of balance
 - *cochlea*: receives sounds in the form of vibrations

The following table lists common word parts pertaining to the structures of the ears.

Combining Form/ Suffix	Meaning	Word Association
acoust/o, audi/o	hearing	The <i>acoustic</i> or vestibulocochlear nerve serves the organs of equilibrium and hearing. An <i>audiometer</i> is an instrument used to measure hearing acuity.
adenoid/o	adenoids	<i>Adenoidectomy</i> is the surgical removal of the adenoids.
aur/o, auricul/o, ot/o	ear	<i>Aural</i> pain refers to earache. <i>Auriculotherapy</i> is a healthcare procedure in which the auricle is stimulated to diagnose and treat other health problems. An <i>otoscope</i> is a device used to look into the ears.
cerumin/o	ear wax	<i>Ceruminolytics</i> are substances used to soften the cerumen.
cochle/o	cochlea	<i>Cochlear</i> implants are electronic medical devices that are used to replace the function of the impaired inner ear.
myring/o, tympan/o	eardrum	<i>Myringitis</i> is the inflammation of the tympanic membrane. <i>Tympanoplasty</i> is the surgical repair of the tympanic membrane.

Diseases, Disorders, and Diagnostic Terms

Diagnosing ear disorders may be accomplished using several methods. Some of these methods include:

- *Otoscopic examination* or *otoscopy*: (*oto* + *scop* + *ic*), (*oto* + *scopy*)
 - test that involves looking into the ear with an *otoscope* or *auriscope*
- *Audiometer*: (*audio* + *meter*)
 - electronic device used to measure hearing
 - *audiologist*: a medical professional trained to identify, diagnose, treat, and monitor disorders of the *auditory* system
- *Tuning fork tests*: assess hearing loss
 - *Weber's test*: detects unilateral hearing loss
 - *Rinne's test*: differentiates between conductive and sensorineural hearing loss

Otitis (*oto* + *itis*) is the general term used to describe inflammation of the ear.

- *Otitis externa*: infection of the external ear
- *Otitis media*: inflammation of the middle ear
 - *myringitis* (*myring/o* + *itis*): inflammation of the tympanic membrane
 - *mastoiditis* (*mastoid/o* + *itis*): inflammation or infection of the mastoid bone
- *Otitis interna*: inflammation of the inner ear

Other ear disorders include:

- *Otosclerosis* (*oto* + *sclerosis*)
 - abnormal bone growth in the middle ear, causing disruption of the sound to travel from the middle to the inner ear
- *Tinnitus*: hearing an external sound when there is no external sound present; can be perceived as ringing, buzzing, or clicking sound
- *Vertigo*: sensation of feeling off balance

Surgical and Therapeutic Interventions

Hearing aids are electronic devices commonly used for clients with partial hearing loss. These devices amplify sounds, which help enhance hearing. For clients with complete hearing loss, *cochlear implants* may be indicated.

Surgical procedures involving the ears include:

- *Otoplasty*: (*oto* + *plasty*)
 - otherwise known as ear pinning
 - the ears are surgically moved closer to the head
- *Tympanostomy*: (*tympan/o* + *ostomy*)
 - otherwise referred to as *myringotomy*
 - creation of incision or opening in the tympanic membrane to relieve the pressure caused by buildup of fluid or pus

To treat bacterial infections, *antibiotics* are prescribed. *Ceruminolytics* (*cerumin/o* + *lytics*), on the other hand, are substances that are instilled into the eardrum to soften or loosen the *cerumen* or ear wax.

The Skin

The skin, being the largest organ of the body, contains receptors that respond to specific stimuli:

Types of Receptors	Word Parts		Meaning sensory cells or organs responsive to:
<i>chemoreceptor</i>	chem/o		chemical stimuli
<i>mechanoreceptor</i>	mechan/o		mechanical distortions such as touch or pressure
<i>nociceptor</i>	noc/i	+ receptor	damaging or painful stimuli
<i>thermoreceptor</i>	therm/o		temperature changes
<i>*photoreceptor</i>	phot/o		light (only the eyes have these receptors)

THE MOUTH AND NOSE

The *taste buds*, the organs of taste, have chemoreceptors that are found on the surface of the mouth and the nose. The four basic taste sensations are sweet, sour, bitter, and salty.

The organ for *olfaction*, the sense of smell, is the nose. Disorders pertaining to the sense of smell include:

- *Anosmia*: receptor loss of the sense of smell (an + (-osmia = sense of smell))
- *Hyperosmia*: receptor abnormally increased sensitivity to odors (hyper + osmia)



Self-Check 5.3

Complete Practice Exercises 1–12 and A–H found in Chapter 14 of your textbook, then answer questions 1–15.

Choose the correct answer.

- Which of the following is impairment of vision due to advancing years or old age?
 - Astigmatism
 - Hyperopia
 - Myopia
 - Presbyopia
- Which term means capable of being heard?
 - Accommodation
 - Audible
 - Aural
 - Auricular
- The term for farsightedness is
 - astigmatism.
 - exophthalmos.
 - hyperopia.
 - myopia.
- Which structure is a spiral tunnel that contains the sense of hearing?
 - Choroid
 - Cochlea
 - Conjunctiva
 - Cornea
- Which term means inflammation of the eyelid?
 - Blepharitis
 - Ophthalmitis
 - Photophobia
 - Ptosis
- What does the combining form *ocul/o* refer to?
 - Ear
 - Eye
 - Nerve
 - Nervous sensation

(Continued)



Self-Check 5.3

7. Which of the following are special receptors that initiate the sense of pain?
- a. Chemoreceptors
 - b. Mechanoreceptors
 - c. Nociceptors
 - d. Thermoreceptors
8. Which term means a weakness in perceiving colors distinctly?
- a. Achromatic vision
 - b. Achromatopsia
 - c. Daltonism
 - d. Ménière disease
9. Which of the following are widely distributed in the skin and are sensitive to touch or pressure?
- a. Chemoreceptors
 - b. Mechanoreceptors
 - c. Nociceptors
 - d. Thermoreceptors
10. A young patient requires an eye patch because of reduced vision in one eye that can't be corrected by glasses. This condition is referred to as
- a. achromatopsia.
 - b. blepharitis.
 - c. myopia.
 - d. strabismus.
11. A 46-year-old woman has recently developed farsightedness that appears to be worsening with age. This is referred to as
- a. amblyopia.
 - b. astigmatism.
 - c. myopia.
 - d. presbyopia.
12. A physician uses an otoscope to examine a patient's ear. She notes that the patient has inflammation of the tympanic membrane, also referred to as
- a. blepharitis.
 - b. mastoiditis.
 - c. myringitis.
 - d. otitis.

(Continued)



Self-Check 5.3

13. A 30-year-old man visits his physician and complains of hearing loss. The physician suspects there's hardening of the ear, which results in hearing impairment. This disorder is
- a. otomycosis.
 - b. otoplasty.
 - c. otorrhea.
 - d. otosclerosis.
14. A 17-year-old girl developed a sty following the use of false eyelashes. Resulting from an infected sebaceous gland of an eyelash, a sty is also called a
- a. blepharitis.
 - b. cerumen.
 - c. conjunctivitis.
 - d. hordeolum.
15. A test for visual acuity uses letters and numbers or symbols arranged in decreasing size from top to bottom. Which of the following is used in the test just described?
- a. LASIK
 - b. Ophthalmoscope
 - c. Otoscope
 - d. Snellen chart

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–15 with those at the end of this study guide.

SECTION 5.4: THE ENDOCRINE SYSTEM

Read the following section, then read Chapter 15 in your textbook.

Objectives

When you complete this section, you'll be able to identify, build, and analyze medical terms related to the endocrine system.

The endocrine (*endo + crine*) system, otherwise known as the *hormonal system*, is essential in the regulation of body activities through the production and release of chemical substances known as *hormones*. Unlike *exocrine glands*, endocrine glands are ductless and secrete their hormones directly to the bloodstream. A *dysfunction* (*dys = bad*) of the endocrine glands can lead to:

- *Hyposecretion*: deficiency in hormone production
- *Hypersecretion*: excess in hormone production

STRUCTURES OF THE ENDOCRINE SYSTEM

Hormones secreted by the endocrine glands primarily affect a specific organ or structure, referred to as the *target organ*.

The release of hormones by the endocrine glands can be achieved in two ways:

- The nervous systems initiates the release of hormones.
- The pituitary gland, or the master gland, stimulates the other glands to produce hormones.

Major Glands of the Endocrine System	Hormones Produced
pituitary or hypophysis	antidiuretic hormone, growth hormone
pineal	melatonin
thyroid	thyroxine
parathyroid	parathyroid hormone
islets of Langerhans	insulin
adrenal glands	adrenaline/epinephrine, cortisone
ovaries	estrogen
testes	androgen

The following table lists the word parts pertaining to the endocrine system.

Combining Forms	Meaning	Word Association
aden/o	gland	<i>Adenocarcinoma</i> is a type of cancer that starts in the glands.
<i>adren/o, adrenal/o</i>	adrenal glands	<i>Adrenalectomy</i> is the surgical removal of one or both adrenal glands.
<i>andr/o</i>	male or masculine	Aging-related hormonal changes in men is referred to as <i>andropause</i> .
<i>gigant/o</i>	giant	<i>Gigantism</i> refers to abnormally large growth secondary to excessive production of growth hormone.

(Continued)

Combining Forms	Meaning	Word Association
<i>gonad/o</i>	gonad	<i>Gonadotropins</i> are hormones that act on the gonads.
<i>insulin/o</i>	insulin	An increase in the amount of circulating insulin in the blood is known as <i>hyperinsulinism</i> .
<i>iod/o</i>	iodine	<i>Iodized</i> salt is a form of table salt in which iodine was added.
<i>myx/o</i>	mucus	<i>Myxedema</i> is a condition where mucopolysaccharides are deposited in the dermis, causing swelling of the affected area.
<i>pancreat/o</i>	pancreas	<i>Pancreatitis</i> is inflammation of the pancreas.
<i>parathyroid/o</i>	parathyroid	<i>Parathyroidectomy</i> is the surgical removal of one or more parathyroid glands.
<i>pituitar/o,</i> <i>hypophys/o</i>	pituitary gland	Excessive production of growth hormone is known as <i>hyperpituitarism</i> .
<i>ren/o, nephr/o</i>	kidney	<i>Renal</i> failure is otherwise known as kidney failure. <i>Nephrology</i> is the branch of medicine that is concerned with the diagnosis and treatment of diseases of the kidneys.
<i>thyr/o, thyroid/o</i>	thyroid gland	<i>Thyroiditis</i> is the inflammation of the thyroid gland.
<i>toxic/o</i>	poison	<i>Toxicology</i> is the science concerned with the study of the adverse effects of chemical substances to living organisms.

DISEASES, DISORDERS, AND DIAGNOSTIC TERMS

Examination of the endocrine glands usually involves the use of invasive procedures, such as extraction of blood to measure hormone levels. However, unlike most glands, the *testicles* and the *thyroid glands* are accessible through routine physical examination. A thyroid gland that has a normal function is referred to as *euthyroid*. Abnormal findings include enlargement and the presence of masses. The following terms pertain to the thyroid gland:

- *Hyperthyroidism*: (*hyper* + *thyroid/o* + *ism*)
 - a condition which involves over activity of the thyroid gland
 - *exophthalmos* (*ex* + *ophthalmos*)
 - protrusion of the eyeballs
 - classic finding with hyperthyroidism
 - *goiter*: enlarged thyroid gland

- *Hypothyroidism*: (*hypo* + *thyroid/o* + *ism*)

- insufficient hormone production by the thyroid gland

Aside from health conditions affecting the thyroid gland, *diabetes* is also a common disorder affecting the endocrine system. Note the difference between diabetes insipidus and diabetes mellitus.

- *Diabetes insipidus*: deficiency of antidiuretic hormone leading to frequent urination

- *Diabetes mellitus*: deficiency or improper use of insulin resulting in *hyperglycemia*

Classic Signs and Symptoms of Diabetes Mellitus			
Signs and Symptoms	Word Parts		Meaning
<i>polyuria</i>	poly + (many)	- <i>uria</i> (urination)	frequent urination
<i>polydipsia</i>		- <i>dipsia</i> (thirst)	excessive drinking or thirst
<i>polyphagia</i>		- <i>phagia</i> (eating)	excessive hunger or increased appetite
<i>hyperglycemia</i>	hyper (increased)	<i>glyc/o</i> (sugar) - <i>emia</i> (blood)	abnormally high blood glucose level
<i>glycosuria</i>	glyc/o (sugar)	- <i>uria</i> (urination)	excretion of sugar in the urine

Other disorders of the endocrine system are outlined as follows.

- Acromegaly
- Adenoma
- Cretinism
- Dwarfism
- Gigantism
- Hyperinsulinism
- Hyperparathyroidism
- Hypoglycemia
- Hypoparathyroidism
- Hypopituitarism
- Myxedema
- Thyrotoxicosis

SURGICAL AND THERAPEUTIC INTERVENTIONS

The usual first line of treatment for endocrine disorders is medication therapy:

- *Antithyroid drugs*: indicated for hyperthyroidism
- *Insulin*: may be administered via injection or pump for clients with type 1 diabetes
- *Hypoglycemic medications* or *glucose-lowering agents*: given for clients with type 2 diabetes

For other endocrine system disorders, surgery may be necessary.

Surgery/ Procedure	Word Parts		Meaning
hypophysectomy	<i>hypophys/o</i> (pituitary)	+ <i>ectomy</i> (excision/ removal)	surgical removal of the pituitary gland
thyroidectomy	<i>thyroid/o</i> (thyroid)		excision of the thyroid gland
adrenalectomy	<i>adren/o</i> (adrenal glands)		excision of an adrenal gland
adenectomy	<i>aden/o</i> (gland)		surgical removal of a gland



Self-Check 5.4

Complete Practice Exercises 1–10 and A–H found in Chapter 15 of your textbook, then answer questions 1–14.

Choose the correct answer.

- Excessive secretion of insulin is called
 - cretinism.
 - hyperinsulinism.
 - hypoinsulinism.
 - myxedema.

(Continued)



Self-Check 5.4

2. The four glands that lie beside the thyroid gland and are responsible for regulating calcium and phosphorus levels in the body are called the
 - a. adrenals.
 - b. parathyroids.
 - c. pineals.
 - d. pituitaries.
3. Which of the following is the gland that lies above the kidney?
 - a. Adrenal
 - b. Pancreas
 - c. Pineal body
 - d. Thyroid
4. A general term for chemical substances that are discharged into the bloodstream and used in some other part of the body is
 - a. ducts.
 - b. endocrines.
 - c. exocrines.
 - d. hormones.
5. An endocrine gland that can be palpated and examined in a physical examination is the
 - a. adrenal.
 - b. salivary gland.
 - c. sweat gland.
 - d. thyroid.
6. The clusters of cells within the pancreas that perform an endocrine function are the
 - a. hypophyseal bodies.
 - b. islets of Langerhans.
 - c. pineal bodies.
 - d. thyroxine cells.
7. In the term *hypophysis*, the suffix *-physis* means
 - a. above.
 - b. below.
 - c. growth.
 - d. secretion.
8. In the term *myxedema*, the prefix *myx-* or *myxo-* means
 - a. increased.
 - b. male or masculine.
 - c. mucus.
 - d. secrete.

(Continued)



Self-Check 5.4

9. The pineal gland is
- a. a cluster of cells in the pancreas.
 - b. a cluster of cells in the thyroid.
 - c. attached by a stalk to the pituitary gland.
 - d. attached to the posterior part of the brain.
10. In the term *gonadotropic*, the suffix *-tropic* means
- a. Origin.
 - b. ovaries or testes.
 - c. secrete.
 - d. stimulate.
11. A 24-year-old man has a disorder associated with a deficiency of antidiuretic hormone (ADH) or inability of the kidneys to respond to ADH. This disorder is
- a. diabetes insipidus.
 - b. diabetes mellitus.
 - c. hypopituitarism.
 - d. hyposecretion.
12. A 31-year-old woman with type 1 diabetes mellitus has a portable battery-operated instrument that delivers a measured amount of insulin through the abdominal wall and delivers doses of insulin according to the body's needs. This instrument is called
- a. a hypoglycemia pump.
 - b. a hyperglycemia pump.
 - c. an insulin pump.
 - d. islets of Langerhans.
13. A patient with type 1 diabetes inadvertently administered too much insulin. Which of the following is the biggest concern for this patient?
- a. Glycosuria
 - b. Hyperglycemia
 - c. Hypoglycemia
 - d. Hypoinsulinism
14. Excessive secretion of growth hormone in children can lead to gigantism, whereas it can lead to _____ in adults if secreted after maturity.
- a. acromegaly
 - b. cretinism
 - c. dwarfism
 - d. myxedema

Check your answers to the Practice Exercises with those in Appendix III of your textbook. Check your answers to questions 1–14 with those at the end of this study guide.

SELF-CHECK ANSWERS

Self-Check 1.2

1. b
2. c
3. c
4. d
5. c
6. b
7. b
8. a
9. c
10. c
11. a
12. d

Self-Check 1.3

1. d
2. b
3. c
4. b
5. d
6. c
7. b
8. b
9. b
10. b
11. b
12. b

Self-Check 2.1

1. b
2. b
3. d
4. d
5. a
6. a
7. c
8. b
9. a
10. a
11. a
12. a
13. d

Self-Check 2.2

1. c
2. c
3. c
4. b
5. b
6. b
7. b
8. c
9. b
10. d
11. d

Self-Check 3.1

1. a
2. c
3. b
4. a
5. c
6. b
7. c
8. b
9. a
10. a
11. a
12. b
13. c
14. b
15. c

Self-Check 3.2

1. a
2. b
3. c
4. b
5. a
6. b
7. d
8. b
9. d
10. a
11. a

Self-Check 3.3

1. d
2. a
3. c
4. c
5. a
6. b
7. d
8. c
9. a
10. d
11. c
12. b
13. d
14. d

Self-Check 4.1

1. a
2. b
3. a
4. b
5. b
6. b
7. c
8. d
9. c
10. d
11. c
12. a
13. a
14. b
15. b

Self-Check 4.2

1. b
2. c
3. a
4. b
5. c
6. a
7. b
8. c
9. b
10. a
11. d
12. a
13. a
14. b
15. b

Self-Check 4.3

1. a
2. d
3. b
4. b
5. b
6. d
7. d
8. b
9. b
10. d
11. b
12. a
13. a
14. c

Self-Check 5.1

1. d
2. b
3. a
4. c
5. a
6. d
7. c
8. d
9. a
10. a
11. a
12. c
13. b
14. d
15. a

Self-Check 5.2

1. c
2. c
3. b
4. b
5. d
6. c
7. b
8. b
9. c
10. a
11. c
12. b
13. c
14. c

Self-Check 5.3

1. d
2. b
3. c
4. b
5. a
6. b
7. c
8. c
9. b
10. d
11. d
12. c
13. d
14. d
15. d

Self-Check 5.4

1. b
2. b
3. a
4. d
5. d
6. b
7. c
8. c
9. d
10. d
11. a
12. c
13. c
14. a