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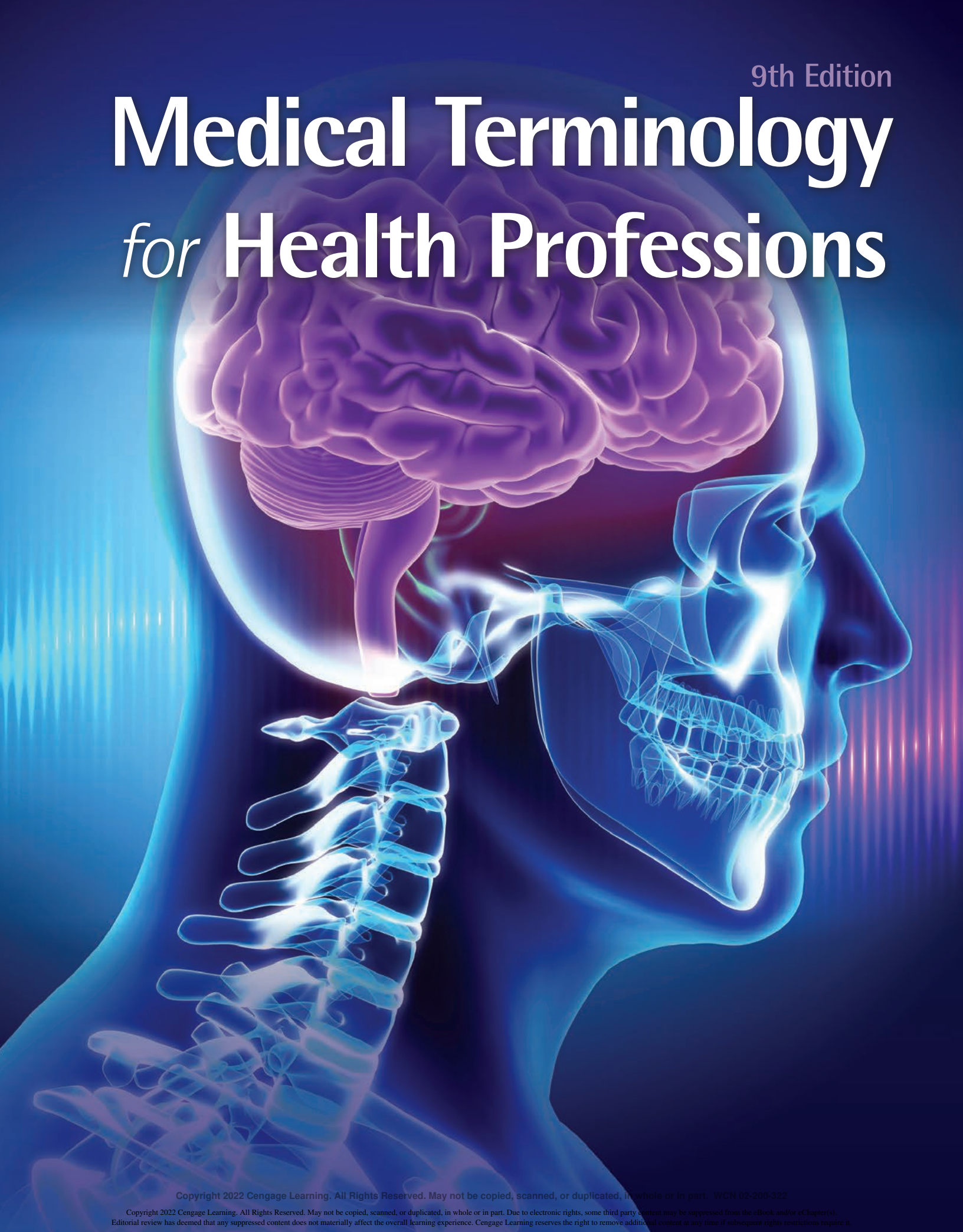
9th Edition

Medical Terminology *for* Health Professions

Carol L. Schroeder
Laura Ehrlich
Katrina Schroeder Smith
Ann Ehrlich

9th Edition

Medical Terminology *for* Health Professions



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Ninth Edition**

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Katrina Schroeder Smith, Ann Ehrlich**

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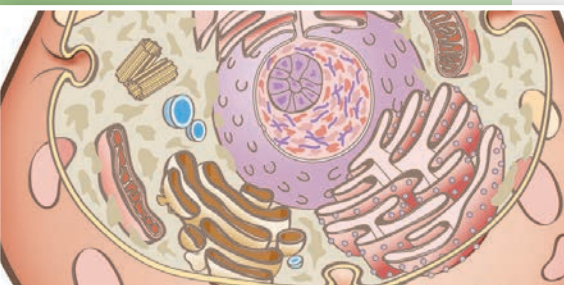
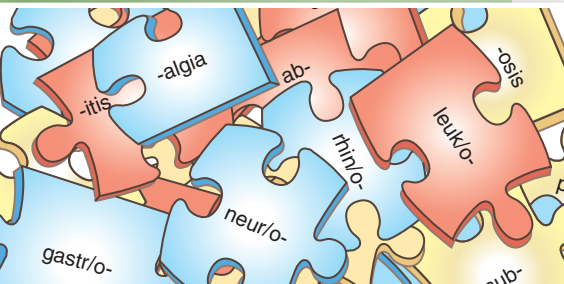
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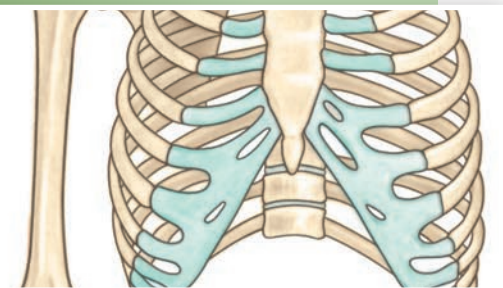
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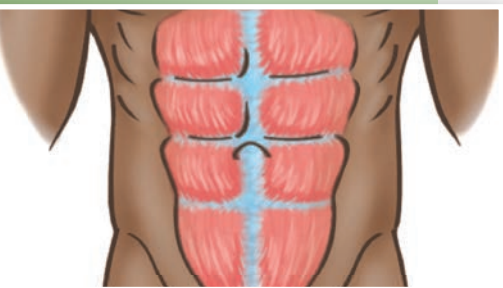
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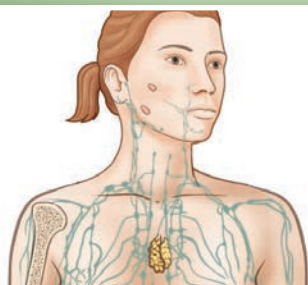
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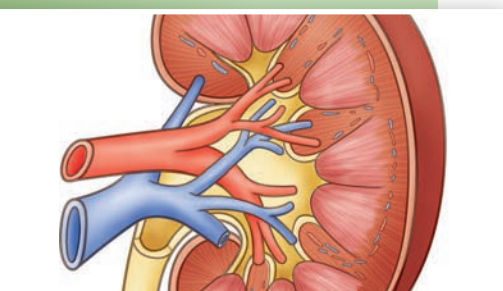
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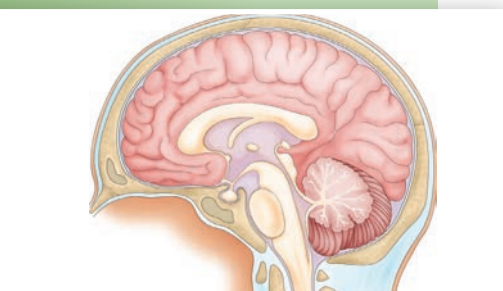
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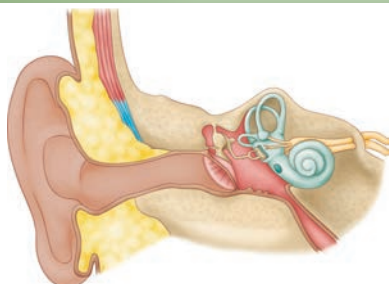
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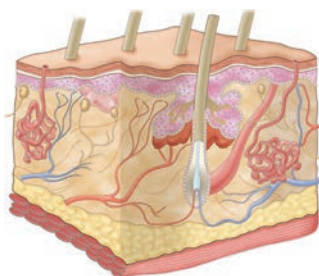
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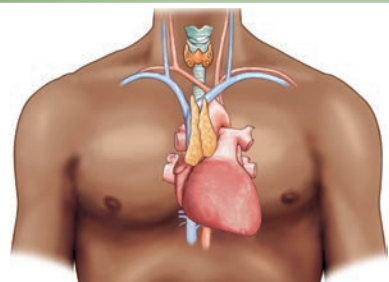
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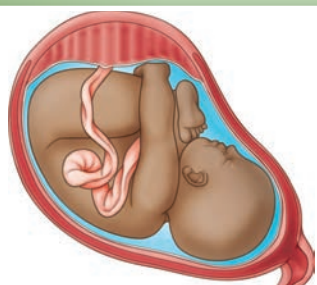
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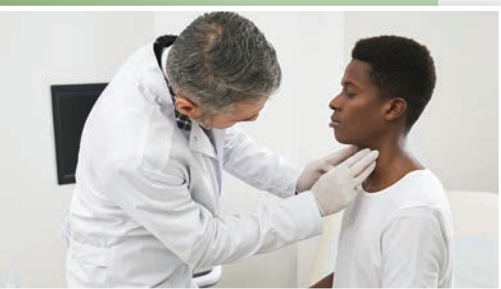
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RS.3. The suffix _____ means surgical fixation.

- a. **-desis**
- b. **-lysis**
- c. **-pexy**
- d. **-ptosis**

A

a-	no, not, without, away from, negative
-a	noun ending
ab-	away from, negative, absent
abdomin/o	abdomen
-able	capable of, able to
abrad/o, abras/o	rub or scrape off
abrupt/o	broken away from

PREFACE



TO THE LEARNER

Welcome to the world of medical terminology! Learning this special language is an important step in preparing for your career as a health care professional. Here's good news: learning medical terms is much easier than learning a foreign language because you are already familiar with quite a few of the words, such as *appendicitis* and *tonsillectomy*. Understanding new words becomes easier with the discovery that many of these terms are made up of interchangeable word parts that are used in different combinations. Once you understand this, you'll be well on your way to translating even the most difficult medical terms, including words you have never seen before. You'll be amazed to see how quickly your vocabulary will grow!

This book and the accompanying learning materials are designed to make the process as simple as possible. Review the “*How to Use This Book*” section so you can find your way around easily. Once you become comfortable with the format, you'll discover you are learning faster than you ever imagined possible.

CHAPTER ORGANIZATION

The text is designed to help you master medical terminology. It is organized into 15 chapters, the Word Part Review, the Comprehensive Medical Terminology Review, three appendices, an index, and removable flashcards. To gain the most benefit from your use of this text, take advantage of the many features, including the *Learning Exercises* plus the *Human Touch* stories and discussion questions that are included at the end of each chapter.

Primary terms are the most important terms in a chapter. When first introduced, the term appears in boldface and, if appropriate, is followed by the “sounds-like” pronunciation. Only primary terms are used as correct answers in the exercises and tests.

Secondary terms appear in *orange* italics. These terms, which are included to clarify the meaning of a primary term, are sometimes used as distracters, but not as correct answers, in exercises or tests.

Each chapter begins with a **vocabulary list** consisting of 15 word parts and 60 medical terms selected from among the primary terms in the chapter. *Note:* If your instructor is using the **Simplified Syllabus** version of this course, these are the terms that you will be expected to learn for all quizzes, tests, and exams.

Introductory Chapters and Word Part Review

Chapters 1 and 2 create the foundation that enables you to master the rest of the book. Chapter 1 introduces key word parts—the building blocks of most medical terms.

Chapter 2 introduces more word parts and provides an overview of basic terms used throughout the medical field, as well as some of the many career options open to you in health care.

After studying these chapters, complete the **Word Part Review** that follows Chapter 2. These practice activities and the accompanying test will help you determine whether you’ve mastered the concept of these all-important building blocks. If you are having trouble here, it is important to put more effort into learning these basics.

Body System Chapters

Chapters 3 through 14 are organized by body system. Because each body system stands alone, you can study these chapters in any sequence. Each chapter begins with an overview of the structures and functions of that system so you can relate these to the medical specialists, pathology, diagnostics, and treatment procedures that follow.

Chapter 15 introduces basic diagnostic procedures, examination positions, imaging techniques, laboratory tests, nuclear medicine, and pharmacology. It also includes a section on alternative and complementary medicines. This chapter can be studied at any point in the course.

Comprehensive Medical Terminology Review

This section, which follows Chapter 15, is designed to help you prepare for your final examination. It includes study tips, practice exercises, and a simulated final test; however, be aware that none of these questions are from the actual final test.

Appendices

Appendix A: Prefixes, Combining Forms, and Suffixes is a convenient alphabetic reference for the medical word parts. When you don’t recognize a word part, you can look it up here.

Appendix B: Abbreviations and Their Meanings is an extensive list of commonly used abbreviations and their meanings. Abbreviations are important in medicine, and using them *accurately* is essential!

Appendix C: Terms Related to Diagnosis, Pathology and Procedures gives the definitions of all the primary terms in the text relating to diagnosis, pathology, and medical procedures.

Instructor & Student Resources

The following resources are included with your textbook to provide even more help as you study.

- **Flashcards.** Improve your knowledge and test your mastery by using the flashcards provided in the last section of the book. Remove these perforated pages carefully and then separate the cards. Flashcards are an effective study aid for use even when you have only a small amount of time.
- **Additional Online Resources.** Additional instructor and student resources for this product are available online. Instructor assets include an Instructor’s Manual, Educator’s Guide, PowerPoint® slides with art and answer keys, and a test bank powered by Cognero®, as well as a transition guide, correlations to two exams, and spreadsheets detailing media assets, time on task, and MindTap customization. Student assets include PowerPoint® slides with art. Sign up or sign in at www.cengage.com to search for and access this product and its online resources.

CHANGES TO THE NINTH EDITION

New techniques and terminology were carefully and thoroughly researched to make this latest edition as up-to-date as possible. Terms that are no longer in common use have been eliminated, and countless new terms and definitions have been added.

A detailed conversion guide that helps instructors make the change from the eighth to the ninth edition is available on the at <http://www.cengage.com>. A brief summary of some of the changes follows:

- Chapter 2: New section on advance directives
- Chapter 3: Expanded section on medications
- Chapter 6: Added COVID-19; new Human Touch story
- Chapter 8: Expanded dental procedures; added new section on nutrition support
- Chapter 12: New section on viral skin infections
- Chapter 13: Expanded coverage of diabetic pathology and treatment
- Chapter 14: New section on gender identity
- Chapter 15: Chapter title changed to **Diagnostic Procedures, Pharmacology, and Complementary Medicine**; new sections on stool analysis and durable medical equipment

ABOUT THE AUTHORS



CAROL L. SCHROEDER, UNIVERSITY OF WISCONSIN

Carol L. Schroeder has over 20 years of experience in finding innovative ways to present medical terminology at a level appropriate for this text's readers. Her background in technical writing, translating, and research is invaluable in continuously updating the content and in creating innovative activities and approaches—such as the Simplified Syllabus and Human Touch stories—that enable instructors to present engaging courses that help all students succeed.

LAURA EHRLICH, UNIVERSITY OF ROCHESTER SCHOOL OF NURSING

Laura Ehrlich, a registered nurse, enjoys the fast-paced, challenging environment of the emergency department as well as the knowledge that her skills save lives. She excels at explaining medical terminology to patients and training other nurses on new procedures, equipment, and technology. She is also a board-certified emergency nurse (CEN).

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ANN EHRLICH, GODDARD COLLEGE

Ann Ehrlich, who founded this series in 1988, was an experienced teacher, professional author and lifelong student. Considered one of the leading experts in the field of medical terminology, she wrote numerous books on such health topics as dental assisting, practice management, speech therapy and lymphedema.

ACKNOWLEDGEMENTS



Medical Terminology for Health Professions recently celebrated its 30th anniversary as one of the leading texts in the healthcare field. We are honored to carry on the work that Ann Ehrlich started in the 1980s, following her high standards for continuously updating every aspect of the book's content and the accompanying instructional materials.

We are very grateful for the input of the many reviewers and instructors who volunteer feedback, all of whom are an invaluable resource in guiding this book as it evolves. Their insights, comments, suggestions, and attention to detail are very important in making the text, and its many resources, up-to-date and accurate. Special thanks to Adam Lindsey, Ben Ehrlich, and Elise Anderson for their input on this edition. We would each especially like to thank our families for their support throughout the research, writing, and editing process.

Thanks also to the editorial and production staff of Cengage Learning for their very professional and extremely helpful assistance in making this revision possible, especially our editors, Deb Myette-Flis and Laura Stewart. We are very fortunate to have had Deb Myette-Flis providing her expertise to this project for the past six editions.

Please note that a portion of the royalties for this textbook provide scholarships for lymphedema therapists, helping to address a nation-wide shortage in this field.

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Laura Ehrlich, and
Katrina Schroeder Smith*

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HOW TO USE THIS BOOK

Medical Terminology for Health Professions, Ninth Edition, is designed to help you learn and remember medical terms with surprising ease. The key lies in the following features.

BODY SYSTEM OVERVIEW

The first page of each body system chapter is a chart giving an overview of the structures, related combining forms, and functions most important to that system.

VOCABULARY LIST

The second page of each chapter is a 75-item vocabulary list. This list includes 15 key word parts with their meanings and 60 important terms for the chapter with their pronunciations. This immediately alerts you to the key terms in the chapter and acts as a review guide. Next to each term is a box so you can check off each term when you've learned it.

LEARNING OBJECTIVES

The beginning of each chapter lists learning objectives to help you understand what is expected of you as you read the text and complete the exercises. These objectives are set off with a colored bar for easy identification.

ART PROGRAM

Our art program includes hundreds of photos and full-color illustrations that help clarify the text and contain important additional information. Review each illustration and read its caption carefully for easy and effective learning.

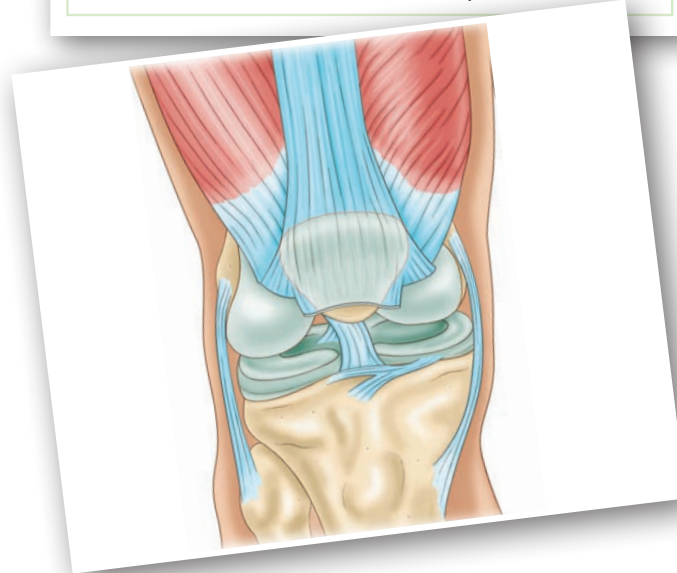
Overview of
**STRUCTURES, COMBINING FORMS, AND FUNCTIONS
OF THE SKELETAL SYSTEM**

Major Structures	Related Combining Forms	Primary Functions
Bones	<i>oss/e, oss/i, oste/o, ost/o</i>	Act as the framework for the body, protect the internal organs, and store calcium.
Bone Marrow	<i>myel/o</i> (also means spinal cord)	Red bone marrow helps form red blood cells. Yellow bone marrow stores fat.
Cartilage	<i>chondr/o</i>	Creates a smooth surface for motion within the joints.
Joints	<i>arthr/o</i>	
Ligaments		
Synovial		

Vocabulary Related to THE SKELETAL SYSTEM

This list contains essential word parts and medical terms for this chapter. These and the other important terms are shown in **boldface** throughout the chapter. **Secondary terms**, which appear in orange italics, clarify the meaning of primary terms.

Word Parts	Terms
<input type="checkbox"/> <i>anky/o</i> crooked, bent, stiff	<input type="checkbox"/> hemarthrosis (hem-ar-THROH-sis)
<input type="checkbox"/> <i>arthr/o</i> joint	<input type="checkbox"/> hematopoietic (hee-MAH-toh-poy-et-ick)
<input type="checkbox"/> <i>burs/o</i> bursa	<input type="checkbox"/> internal fixation
<input type="checkbox"/> <i>chondr/i, chondr/o</i> cartilage	<input type="checkbox"/> juvenile idiopathic arthritis (id-ee-oh-PATH-ick ar-THRIGH-tis)
<input type="checkbox"/> <i>cost/o</i> rib	<input type="checkbox"/> kyphosis (kye-FOH-sis)
<input type="checkbox"/> <i>cran/i</i> skull	<input type="checkbox"/> laminectomy (lam-ih-NECK-toh-mee)
<input type="checkbox"/> <i>-desis</i> to bind, tie together	<input type="checkbox"/> lordosis (lor-DOH-sis)
<input type="checkbox"/> <i>kyph/o</i> bent, hump	<input type="checkbox"/> lumbago (lum-BAY-goh)
<input type="checkbox"/> <i>lord/o</i> curve, swayback, bent	<input type="checkbox"/> malleolus (mah-LEE-oh-lus)
<input type="checkbox"/> Lumb/o lumbar, lower back	<input type="checkbox"/> manubrium (mah-NEW-pree-um)
<input type="checkbox"/> <i>myel/o</i> spinal cord, bone marrow	<input type="checkbox"/> metacarpals (met-ah-KAR-palz)
<input type="checkbox"/> <i>oste/o, oste/o</i> bone	<input type="checkbox"/> metatarsals (met-ah-TAHR-salz)
	<input type="checkbox"/> multiple myeloma (my-eh-LOH-mah)
	<input type="checkbox"/> open fracture
	<input type="checkbox"/> orthopedic surgeon (or-thoh-PEE-dick)
	<input type="checkbox"/> orthotic (or-THOT-ick)
	<input type="checkbox"/> osteitis (oss-tee-EYE-tis)
	<input type="checkbox"/> osteoarthritis (oss-tee-oh-ar-THRIGH-tis)
	<input type="checkbox"/> osteochondroma (oss-tee-oh-kon-DROH-mah)
	<input type="checkbox"/> osteochondritis (oss-tee-oh-mah-LAY-she-ah)
	<input type="checkbox"/> osteomalacia (oss-tee-oh-my-eh-LAY-tye)
	<input type="checkbox"/> osteomyelitis (oss-tee-oh-my-eh-LAY-tye)



- The **ilium** (ILL-ee-um) is the broad, blade-shaped bone that forms the back and sides of the pubic bone.
- The **sacroiliac** (say-kroh-ILL-ee-ack) is the slightly movable articulation between the sacrum and posterior portion of the ilium (**sacr/o** means sacrum, **ili** means ilium, and **-ac** means pertaining to).
- The **ischium** (ISS-kee-um), which forms the lower posterior portion of the pubic bone, bears the weight of the body when sitting.

PATHOLOGY OF THE MUSCULAR SYSTEM

Fibers, Fascia, and Tendons

- **Fasciitis** (fash-ee-EYE-tis) is inflammation of a fascia (**fasci** means fascia, and **-itis** means inflammation). Note the double “i” that results from the suffix **-itis** being added to the word root **fasci**.
- **Fibromyalgia** (figh-broh-my-AL-jee-ah) is a debilitating chronic condition characterized by fatigue; diffuse or specific muscle, joint, or bone pain; and a wide range of other symptoms (**fibr/o** means fibrous tissue, **my** means muscle, and **-algia** means pain). **Debilitating** means a condition causing weakness.
- **Tenosynovitis** (ten-oh-sin-oh-VYE-tis) is an inflammation of the sheath surrounding a tendon
- **Singultus** (sing-GUL-tus), also known as **hiccups**, is myoclonus of the diaphragm that causes the characteristic hiccup sound with each spasm.
- A **cramp** is a painful localized muscle spasm often named for its cause, such as menstrual cramps or writer’s cramp. A **charley horse** is a slang term for a cramp, usually in the leg, that came into use in the 1880s among baseball players.
- **Torticollis** (tor-tih-KOL-is), also known as **wryneck**, is a stiff neck due to spasmodic contraction of the neck muscles that pull the head toward the affected side.

LEARNING EXERCISES

MATCHING WORD PARTS 1

Write the correct answer in the middle column.

Definition	Correct Answer	Possible Answers
4.1. abnormal condition	_____	-cele
4.2. fascia	_____	fasci/o
4.3. fibrous tissue	_____	fibr/o
4.4. hernia, swelling	_____	-ia
4.5. movement	_____	kines/o, kinesi/o

MATCHING WORD PARTS 2

Write the correct answer in the middle column.

Definition	Correct Answer	Possible Answers
4.6. coordination	_____	my/o
4.7. muscle	_____	-rhexis
4.8. set free	_____	tax/o
4.9. tendon	_____	tend/o
4.10. tone	_____	ton/o

MATCHING MUSCLE DIRECTIONS AND POSITIONS

Write the correct answer in the middle column.

Definition	Correct Answer	Possible Answers
4.11. crosswise	_____	lateralis
4.12. ring like	_____	oblique

“SOUNDS-LIKE” PRONUNCIATION SYSTEM

The sounds-like pronunciation system makes pronunciation easy by respelling the word with syllables you can understand—and say—at a glance. Simply pronounce the term just as it appears in parentheses, accenting the syllables as follows:

- **Primary** (strongest) **accent**: capital letters and bold type
- **Secondary accent**: lowercase letters and bold type

WORD PARTS

Because word parts are so important to learning medical terminology, whenever a term made up of word parts is introduced, the definition is followed (in parentheses) by the word parts highlighted in **magenta** and defined.

PRIMARY AND SECONDARY TERMS

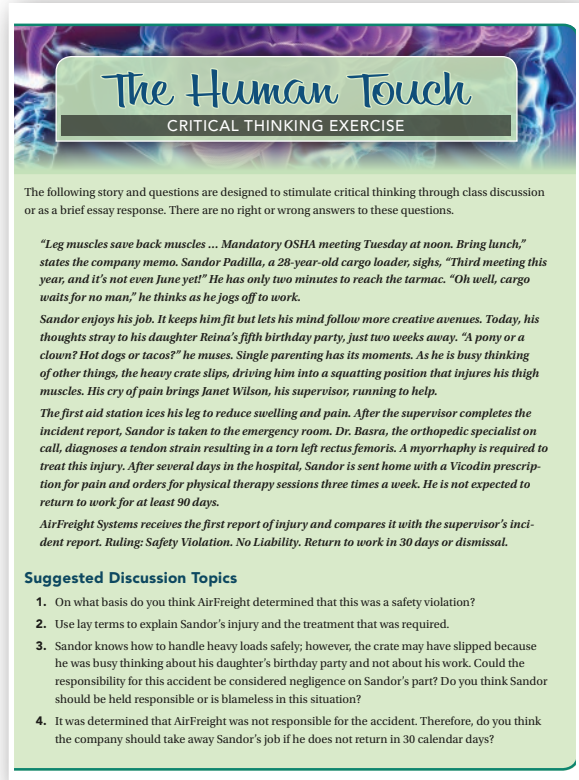
- **Primary terms** are the most important medical words in a chapter. When first introduced, the term appears in **boldface** and, if appropriate, is followed by the sounds-like pronunciation. These are the words students need to concentrate on learning. Only primary terms are used as correct answers in the exercises and tests.
- **Secondary terms** appear in **orange** italics. These terms are included to clarify the meaning of a primary term. Although used as distracters in exercises, the secondary terms are not used as correct answers in exercises or tests.

LEARNING EXERCISES

Each chapter includes 100 Learning Exercises in a variety of formats that require a one- or two-word written answer. Writing terms, rather than just circling a multiple-choice option, reinforces learning and provides practice in writing and spelling the terms.

THE HUMAN TOUCH: CRITICAL THINKING EXERCISE

A real-life short story that involves patients and pathology, along with related critical thinking questions, at the end of each chapter helps you apply what you are learning to the real world. There are no right or wrong answers, just questions to get you started thinking about and using the new terms you have learned.



The following story and questions are designed to stimulate critical thinking through class discussion or as a brief essay response. There are no right or wrong answers to these questions.

"Leg muscles save back muscles ... Mandatory OSHA meeting Tuesday at noon. Bring lunch," states the company memo. Sandor Padilla, a 28-year-old cargo loader, sighs, "Third meeting this year, and it's not even June yet!" He has only two minutes to reach the tarmac. "Oh well, cargo waits for no man," he thinks as he jogs off to work.

Sandor enjoys his job. It keeps him fit but lets his mind follow more creative avenues. Today, his thoughts stray to his daughter Reina's fifth birthday party, just two weeks away. "A pony or a clown? Hot dogs or tacos?" he muses. Single parenting has its moments. As he is busy thinking of other things, the heavy crate slips, driving him into a squatting position that injures his thigh muscles. His cry of pain brings Janet Wilson, his supervisor, running to help.

The first aid station ices his leg to reduce swelling and pain. After the supervisor completes the incident report, Sandor is taken to the emergency room. Dr. Basra, the orthopedic specialist on call, diagnoses a tendon strain resulting in a torn left rectus femoris. A myorrhaphy is required to treat this injury. After several days in the hospital, Sandor is sent home with a Vicodin prescription for pain and orders for physical therapy sessions three times a week. He is not expected to return to work for at least 90 days.

AirFreight Systems receives the first report of injury and compares it with the supervisor's incident report. Ruling: Safety Violation. No Liability. Return to work in 30 days or dismissal.

Suggested Discussion Topics

1. On what basis do you think AirFreight determined that this was a safety violation?
2. Use lay terms to explain Sandor's injury and the treatment that was required.
3. Sandor knows how to handle heavy loads safely; however, the crate may have slipped because he was busy thinking about his daughter's birthday party and not about his work. Could the responsibility for this accident be considered negligence on Sandor's part? Do you think Sandor should be held responsible or is blameless in this situation?
4. It was determined that AirFreight was not responsible for the accident. Therefore, do you think the company should take away Sandor's job if he does not return in 30 calendar days?

INTRODUCTION TO MEDICAL TERMINOLOGY



Overview of INTRODUCTION TO MEDICAL TERMINOLOGY

Primary Medical Terms

Primary terms enable you to give priority to the most important words in your study of medical terminology. These terms are shown in **black boldface**.

Word Parts Are the Key

An introduction to word parts and how they are used to create complex medical terms.

Word Roots

The word parts that usually, but not always, indicate the part of the body involved.

Combining Form

A word root that has a vowel, usually the letter “o,” put on the end before the addition of another word root or suffix.

Suffixes

The word part attached at the end of word that usually, but not always, indicates the procedure, condition, disorder, or disease.

Prefixes

The word part attached at the beginning of word that usually, but not always, indicates location, time, number, or status.

Determining Meanings on the Basis of Word Parts

Knowledge of word parts helps decipher medical terms.

Using a Medical Dictionary or Online Resource

Guidelines to help make looking up terms online or in a medical dictionary easier.

Pronunciation

Learn how to pronounce words correctly using the “sounds-like” pronunciation system and audio files.

Spelling Is Always Important

A single spelling error can change the entire meaning of term.

Singular and Plural Endings

Unusual singular and plural endings used in medical terms.

Basic Medical Terms

Terms used to describe disease conditions.

Look-Alike, Sound-Alike Terms and Word Parts

Clarification of confusing terms and word parts that look or sound similar.

Using Abbreviations

Caution is always important when using abbreviations.

Vocabulary Related to THE INTRODUCTION TO MEDICAL TERMINOLOGY

This list contains essential word parts and medical terms for this chapter. These and the other important **primary terms** are shown in **boldface** throughout the chapter. *Secondary terms*, which appear in *orange* italics, clarify the meaning of primary terms.

Word Parts

- ☐ **-algia** pain, suffering
- ☐ **-dynia** pain
- ☐ **-ectomy** surgical removal, cutting out
- ☐ **-gram** picture or record
- ☐ **hyper-** excessive, increased
- ☐ **hypo-** deficient, decreased
- ☐ **-itis** inflammation
- ☐ **-osis** abnormal condition, disease
- ☐ **-ostomy** the surgical creation of an artificial opening to the body surface
- ☐ **pre-** before, in front of
- ☐ **-plasty** surgical repair
- ☐ **-rrhage** bleeding, abnormal excessive fluid discharge
- ☐ **-rrhaphy** surgical suturing
- ☐ **-rrhea** flow or discharge
- ☐ **-sclerosis** abnormal hardening

Medical Terms

- ☐ **abdominocentesis** (ab-dom-ih-noh-sen-TEE-sis)
- ☐ **acronym** (ACK-roh-nim)
- ☐ **acute**
- ☐ **angiography** (an-jee-OG-rah-fee)
- ☐ **appendectomy** (ap-en-DECK-toh-mee)
- ☐ **arteriosclerosis** (ar-tee-ree-oh-skleh-ROH-sis)
- ☐ **arthralgia** (ar-THRAL-jee-ah)
- ☐ **colostomy** (koh-LAHS-toh-mee)
- ☐ **cyanosis** (sigh-ah-NOH-sis)
- ☐ **dermatologist** (der-mah-TOL-oh-jist)
- ☐ **diagnosis** (dye-ag-NOH-sis)
- ☐ **diarrhea** (dye-ah-REE-ah)
- ☐ **edema** (eh-DEE-mah)
- ☐ **endarterial** (end-ar-TEE-ree-al)
- ☐ **eponym** (EP-oh-nim)
- ☐ **erythrocyte** (eh-RITH-roh-sight)
- ☐ **fissure** (FISH-ur)

- ☐ **fistula** (FIS-chuh-lah)
- ☐ **gastralgia** (gas-TRAL-jee-ah)
- ☐ **gastritis** (gas-TRY-tis)
- ☐ **gastroenteritis** (gas-troh-en-ter-EYE-tis)
- ☐ **gastrosis** (gas-TROH-sis)
- ☐ **hemorrhage** (HEM-or-idj)
- ☐ **hepatomegaly** (hep-ah-toh-MEG-ah-lee)
- ☐ **hypertension** (high-per-TEN-shun)
- ☐ **hypotension** (high-poh-TEN-shun)
- ☐ **infection** (in-FECK-shun)
- ☐ **inflammation** (in-flah-MAY-shun)
- ☐ **interstitial** (in-ter-STISH-al)
- ☐ **intramuscular** (in-trah-MUS-kyou-lar)
- ☐ **laceration** (lass-er-AY-shun)
- ☐ **lesion** (LEE-zhun)
- ☐ **malaise** (mah-LAYZ)
- ☐ **mycosis** (my-KOH-sis)
- ☐ **myelopathy** (my-eh-LOP-ah-thee)
- ☐ **myopathy** (my-OP-ah-thee)
- ☐ **natal** (NAY-tal)
- ☐ **neonatology** (nee-oh-nay-TOL-oh-jee)
- ☐ **neurorrhaphy** (new-ROR-ah-fee)
- ☐ **otorhinolaryngology** (oh-toh-rye-noh-lar-in-GOL-oh-jee)
- ☐ **palpation** (pal-PAY-shun)
- ☐ **palpitation** (pal-pih-TAY-shun)
- ☐ **pathology** (pah-THOL-oh-jee)
- ☐ **phalanges** (fah-LAN-jeez)
- ☐ **poliomyelitis** (poh-lee-oh-my-eh-LYE-tis)
- ☐ **prognosis** (prog-NOH-sis)
- ☐ **pyoderma** (pye-oh-DER-mah)
- ☐ **pyrosis** (pye-ROH-sis)
- ☐ **remission**
- ☐ **sign**
- ☐ **supination** (soo-pih-NAY-shun)
- ☐ **suppuration** (sup-you-RAY-shun)
- ☐ **supracostal** (sue-prah-KOS-tal)
- ☐ **symptom** (SIMP-tum)
- ☐ **syndrome** (SIN-drohm)
- ☐ **tenorrhaphy** (ten-OR-ah-fee)
- ☐ **tonsillitis** (ton-sih-LYE-tis)
- ☐ **trauma** (TRAW-mah)
- ☐ **triage** (tree-AHZH)
- ☐ **viral** (VYE-ral)

LEARNING OBJECTIVES

On completion of this chapter, you should be able to:

1. Identify the roles of the four types of word parts used in forming medical terms.
2. Use your knowledge of word parts to analyze unfamiliar medical terms.
3. Describe the steps in locating a term in a medical dictionary or online resource.
4. Define the commonly used word roots, combining forms, suffixes, and prefixes introduced in this chapter.
5. Use the “sounds-like” pronunciation system and audio files to correctly pronounce the primary terms introduced in this chapter.
6. Recognize the importance of spelling medical terms correctly.
7. State why caution is important when using abbreviations.
8. Recognize, define, spell, and correctly pronounce the primary terms introduced in this chapter.

PRIMARY MEDICAL TERMS

In this textbook, you will be introduced to many medical terms; however, mastering them may be easier than you anticipate because **Medical Terminology for Health Professions** has many features to help you learn.

- **Primary terms** appear in **boldface**. Learning these terms should be your highest priority as only primary terms are used as correct answers in the Learning Exercises and tests.
- A **vocabulary list** with 15 essential word parts and 60 key primary terms (and their pronunciations) is at the beginning of each chapter.

- **Secondary terms** appear in **orange italics**. Some of these terms are the “also known as” names for conditions or procedures. Other secondary terms clarify words used in the definitions of primary terms.

WORD PARTS ARE THE KEY

Learning medical terminology is much easier once you understand how word parts work together to form medical terms (Figure 1.1). This textbook includes many aids to help you reinforce your word-building skills.

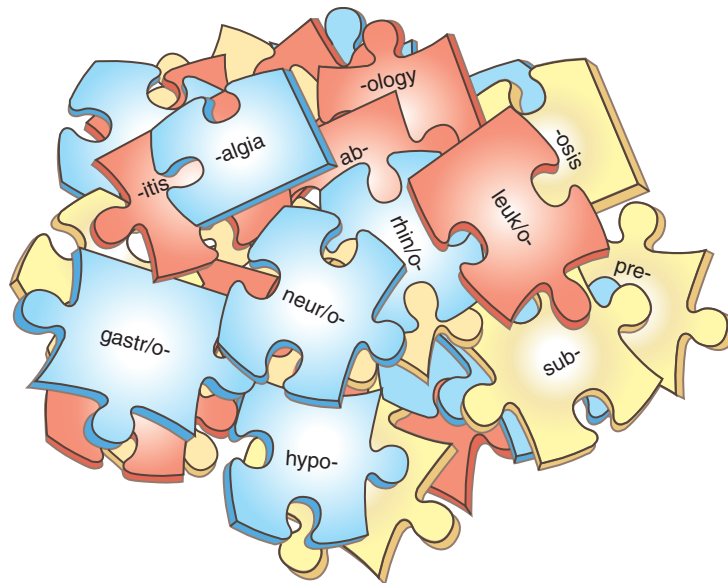


FIGURE 1.1 Word parts (word roots, combining forms, suffixes, and prefixes) make up most medical terms.

- The types of word parts and the rules for their use are explained in this chapter. Learn these rules and follow them.
- When a term is made up of recognizable word parts, these word parts and their meanings are included with the definition of that term. These word parts appear in **magenta**.
- The majority of the word parts used in medical terminology are of Latin origin, some are derived from Greek, and a few are from other languages.
- The Learning Exercises for each chapter include a “Challenge Word Building” section to help develop your skills in working with word parts.
- A **Word Part Review** follows Chapter 2. This section provides additional word part practice and enables you to evaluate your progress toward mastering the meaning of these word parts.

The Four Types of Word Parts

The four types of word parts used to create many medical terms are word roots, combining forms, suffixes, and prefixes. Guidelines for their use are shown in Table 1.1.

1. A **word root** contains the basic meaning of the term. In medical terminology, this word part usually, *but not always*, indicates the involved body part. For example, the word root meaning stomach is **gastr**.
2. A **combining form** is a word root with a combining vowel added at the end. It is used when two word roots are combined or when a suffix beginning with a consonant is added. When a combining form appears alone, it is shown with a back slash (/) between the word root and the combining vowel. For example, the combining form of the word root **gastr** is **gastr/o**. Note: *a, e, i, o, u*, and sometimes *y* are vowels. All the other letters in the alphabet are consonants.

TABLE 1.1

Word Part Guidelines

1. A word root cannot stand alone. A suffix must always be added at the end of the word to complete the term.
2. The rules for creating a combining form by adding a vowel apply when a suffix beginning with a consonant is added to a word root.
3. If a prefix is added, it is *always* placed at the beginning of the word.

3. A suffix usually, *but not always*, indicates the procedure, condition, disorder, or disease.
 - A suffix always comes at the end of the word.
 - You'll know a word part is a suffix when it is shown with a hyphen (-) in front of it. For example, the suffix **-itis** means inflammation.
4. A prefix usually, *but not always*, indicates location, time, number, or status.
 - A prefix always comes at the beginning of a word.
 - You'll know a word part is a prefix when it is shown with a hyphen (-) after it. For example, **hyper-** means excessive or increased.

WORD ROOTS

Word roots act as the foundation for most medical terms. They usually, *but not always*, describe the part of the body that is involved (Figure 1.2). As shown in Table 1.2, some word roots indicate color.

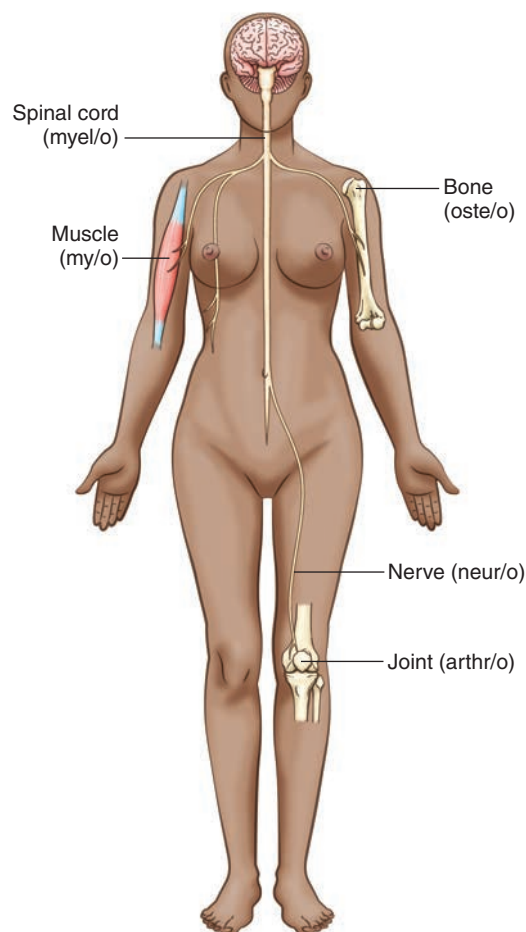


FIGURE 1.2 Word roots, shown here as combining forms, usually indicate the involved body part.

TABLE 1.2

Word Roots and Combining Forms Indicating Color

cyan/o means blue	Cyanosis (sigh-ah-NOH-sis) is blue discoloration of the skin caused by lack of adequate oxygen in the blood (cyan means blue, and -osis means abnormal condition or disease).
erythr/o means red	An erythrocyte (eh-RITH-roh-sight) is mature red blood cell (erythr/o means red, and -cyte means cell).
leuk/o means white	A leukocyte (LOO-koh-sight) is white blood cell (leuk/o means white, and -cyte means cell).
melan/o means black	Melanoma (mel-ah-NOH-mah) is a type of skin cancer (melan means black, and -oma means a tumor).
poli/o means gray	Poliomyelitis (poh-lee-oh-my-eh-LYE-tis) is viral infection of the gray nerve tissue of the spinal cord (poli/o means gray, myel means spinal cord, and -itis means inflammation).

Combining Forms Vowels

A combining form includes a vowel, usually the letter **o**, added to the end of a word root. It is usually added to make the resulting medical term easier to pronounce. The rules for the use of a combining vowel are as follows:

- When two word roots are joined, a combining vowel is always added to the first word root. A combining vowel is used at the end of the second word root *only if the suffix begins with a consonant*.
- For example, the term **gastroenteritis** combines two word roots with a suffix: when **gastr** (stomach) is joined with the word root **enter** (small intestine), a vowel is used to make the combining form **gastr/o**.
- The word root **enter** is joined to **-itis** *without a combining vowel* because this suffix begins with a vowel. **Gastroenteritis** (gas-troh-en-ter-EYE-tis) is an inflammation of the stomach and small intestine.

SUFFIXES

A suffix is *always* added at the end of a word to complete that term. In medical terminology, suffixes usually, *but not always*, indicate a procedure, condition, disorder, or disease.

A combining vowel is used when the suffix begins with a consonant. For example, when **neur/o** (nerve) is

joined with the suffix **-plasty** (surgical repair) or **-rrhaphy** (surgical suturing), the combining vowel **o** is used because **-plasty** and **-rrhaphy** both begin with a consonant.

- **Neuroplasty** (NEW-roh-plas-tee) is the surgical repair of a nerve.
- **Neurorrhaphy** (new-ROR-ah-fee) is suturing together the ends of a severed nerve.

A combining vowel is *not* used when the suffix begins with a vowel. For example, the word root **tonsill** means tonsils. No combining vowel is needed when adding either **-itis** (inflammation) or **-ectomy** (surgical removal) to **tonsill**, because they both start with a vowel (Figure 1.3). These suffixes complete the term and tell us what is happening to the tonsils.

- **Tonsillitis** (ton-sih-LYE-tis) is an inflammation of the tonsils.
- A **tonsillectomy** (ton-sih-LECK-toh-mee) is the surgical removal of the tonsils.

Suffixes as Noun Endings

A **noun** is a word that is the name of a person, place, or thing. In medical terminology, some suffixes change the word root into a noun. For example, the **cranium** (KRAY-nee-um) is the portion of the skull that encloses the brain (**crani** means skull, and **-um** is a noun ending). Suffixes that are commonly used as noun endings are shown in Table 1.3.

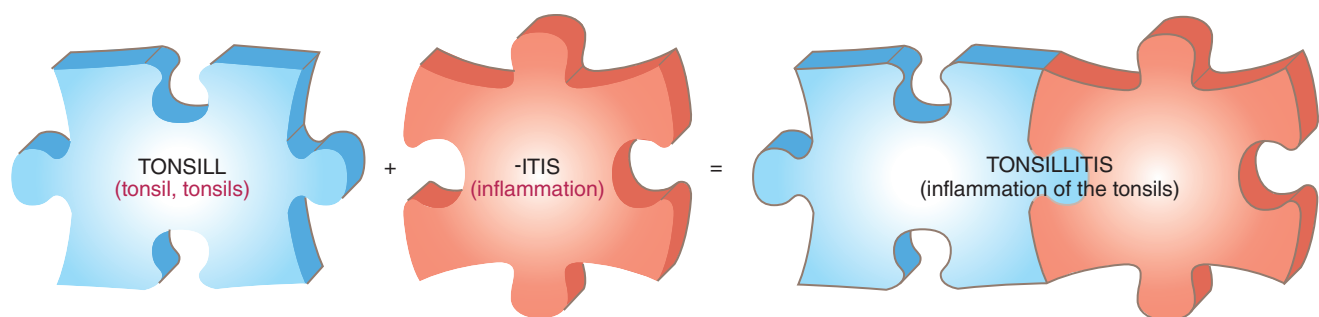


FIGURE 1.3 The term *tonsillitis* is created by adding the suffix **-itis** to the word root **tonsill**.

Suffixes Meaning “Pertaining To”

An **adjective** is a word that defines or describes. In medical terminology, many suffixes meaning “pertaining to” are used to change the meaning of a word root into an adjective. For example, the word root **cardi** means heart, and the suffix **-ac** means pertaining to. Once combined, they form the term **cardiac** (KAR-dee-ack), an adjective that means pertaining to the heart. Commonly used suffixes meaning pertaining to are shown in Table 1.4.

Suffixes Meaning “Abnormal Condition or Disease”

In medical terminology, many suffixes, such as **-osis**, mean “abnormal condition or disease.” For example,

gastrosis (gas-TROH-sis) means any disease of the stomach (**gastr** means stomach, and **-osis** means abnormal condition or disease). Commonly used suffixes meaning abnormal condition or disease are shown in Table 1.5.

Suffixes Related to Pathology

Pathology (pah-THOL-oh-jee) is the study of all aspects of diseases (**path** means disease, and **-ology** means study of). Suffixes related to pathology describe specific disease conditions.

- **-algia** means pain and suffering. **Gastralgia** (gas-TRAL-jee-ah), also known as a **stomachache**, means pain in the stomach (**gastr** means stomach, and **-algia** means pain).
- **-dynia** is another suffix meaning pain. **Gastrodynia** (gas-troh-DIN-ee-ah) also means pain in the stomach (**gastr/o** means stomach, and **-dynia** means pain). Although **gastrodynia** has the same meaning as **gastralgia**, it is not used as commonly (Figure 1.4).
- **-itis** means inflammation. **Gastritis** (gas-TRY-tis) is an inflammation of the stomach (**gastr** means stomach, and **-itis** means inflammation).
- **-megaly** means enlargement. **Hepatomegaly** (hep-ah-toh-MEG-ah-lee) is abnormal enlargement of

TABLE 1.3

Suffixes as Noun Endings

-a	-um	-y
-e	-us	

TABLE 1.4

Suffixes Meaning “Pertaining To”

-ac	-eal	-ior
-al	-ical	-ory
-an	-ial	-ous
-ar	-ic	-tic
-ary	-ine	

TABLE 1.5

Suffixes Meaning “Abnormal Condition or Disease”

-ago	-iasis	-osis
-esis	-ion	-pathy
-ia	-ism	



krakenimages.com/Shutterstock.com

FIGURE 1.4 *Gastralgia and gastrodynia are both terms meaning stomach pain.*

the liver (**hepat/o** means liver, and **-megaly** means enlargement).

- **-malacia** means abnormal softening. **Arterio-malacia** (ar-tee-ree-oh-mah-LAY-shee-ah) is the abnormal softening of the walls of an artery or arteries (**arteri/o** means artery, and **-malacia** means abnormal softening). Notice that **-malacia** is the opposite of **-sclerosis**.
- **-necrosis** means tissue death. **Arterionecrosis** (ar-tee-ree-oh-neh-KROH-sis) is the tissue death of an artery or arteries (**arteri/o** means artery, and **-necrosis** means tissue death).
- **-sclerosis** means abnormal hardening. **Arterio-sclerosis** (ar-tee-ree-oh-skleh-ROH-sis) is the abnormal hardening of the walls of an artery or arteries (**arteri/o** means artery, and **-sclerosis** means abnormal hardening). Notice that **-sclerosis** is the opposite of **-malacia**.
- **-stenosis** means abnormal narrowing. **Arteriostenosis** (ar-tee-ree-oh-steh-NOH-sis) is the abnormal narrowing of an artery or arteries (**arteri/o** means artery, and **-stenosis** means abnormal narrowing).

Suffixes Related to Procedures

Some suffixes identify the procedure that is performed on the body part indicated by the word root.

- **-centesis** is a surgical puncture to remove fluid for diagnostic purposes or to remove excess fluid.

Abdominocentesis (ab-dom-ih-noh-sen-TEE-sis) is the surgical puncture of the abdominal cavity to remove fluid (**abdomin/o** means abdomen, and **-centesis** means a surgical puncture to remove fluid).

- **-graphy** means the process of producing a picture or record. **Angiography** (an-jee-OG-rah-fee) is the process of producing an x-ray, or radiographic study, of blood vessels after the injection of a contrast medium to make these blood vessels visible (**angi/o** means blood vessel, and **-graphy** means the process of recording).
- **-gram** means a picture or record. An **angiogram** (AN-jee-oh-gram) is the resulting film that is produced by angiography (**angi/o** means blood vessel, and **-gram** means a picture or record).
- **-plasty** means surgical repair. **Myoplasty** (MY-oh-plas-tee) is the surgical repair of a muscle (**my/o** means muscle, and **-plasty** means surgical repair).
- **-scopy** means visual examination. **Arthroscopy** (ar-THROS-koh-pee) is the visual examination of the internal structure of a joint (**arthr/o** means joint, and **-scopy** means visual examination).

The “Double R” Suffixes

Medical terminology suffixes beginning with two of the letter *r*, often referred to as the *double Rs*, can be particularly confusing. These word parts are of Greek rather than Latin origin. They are grouped together here to help you understand them and to remember the differences.

- **-rrhage** and **-rrhagia** mean bleeding; however, they are most often used to describe sudden, severe bleeding. A **hemorrhage** (HEM-or-idj) is the loss of a large amount of blood in a short time (**hem/o** means blood, and **-rrhage** means bleeding or abnormal excessive fluid discharge).
- **-rrhaphy** means surgical suturing to close a wound and includes the use of sutures, staples, or surgical glue. **Tenorrhaphy** (ten-OR-ah-fee) is the surgical suturing of a tendon (**ten/o** means tendon, and **-rrhaphy** means surgical suturing).
- **-rrhea** means flow or discharge and refers to the flow of most body fluids. **Diarrhea** (dye-ah-REE-ah) is the frequent flow of loose or watery stools (**dia-** means through, and **-rrhea** means flow or discharge).

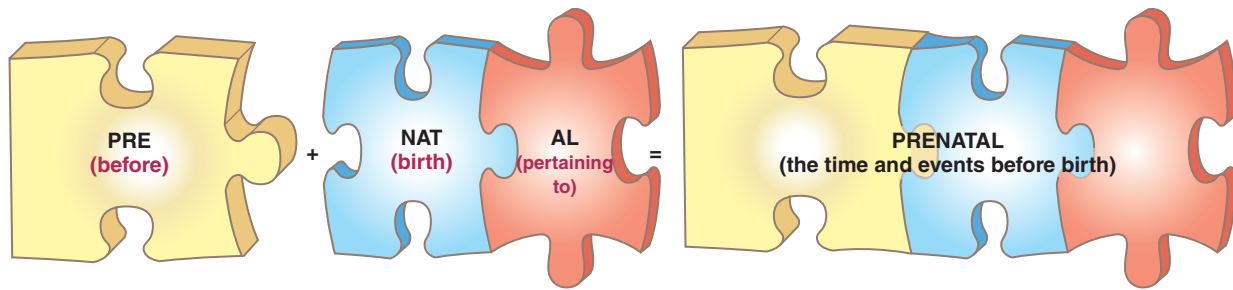


FIGURE 1.5 The term *prenatal* is created by joining the suffix **-al** to the word root **nat** and then adding the prefix **pre-**.

PREFIXES

A prefix is sometimes added to the beginning of a word to influence the meaning of that term. Prefixes usually, *but not always*, indicate location, time, or number. See Table 1.6 for a list of prefixes describing direction, quantity, size, and amount. The term **natal** (**NAY**-tal) means pertaining to birth (**nat** means birth, and **-al** means pertaining to). The following examples show how prefixes change the meaning of this term (Figures 1.5–1.8).

- **Prenatal** (pre-**NAY**-tal) means the time and events before birth (**pre-** means before, **nat** means birth, and **-al** means pertaining to).
- **Perinatal** (pehr-ih-**NAY**-tal) refers to the time and events surrounding birth (**peri-** means surrounding, **nat** means birth, and **-al** means pertaining to). This is the time just before, during, and just after birth.

TABLE 1.6

Prefixes Describing Direction, Quantity, Size, and Amount

ab- away from, negative, absent	ad- toward, to, in the direction of
dextro- right side	sinistro- left side
ex- out of, outside, away from	in- in, into, not, without
macro- large, abnormal size, long	micro- small
mega- , megalo- large, great	oligo- scanty, few
pre- before	post- after, behind



FIGURE 1.6 The *prenatal* development of a fetus (baby).



FIGURE 1.7 A *perinatal* event of the umbilical cord being cut immediately after the baby is born.



FIGURE 1.8 A happy *postnatal* moment as the parents bond with their new baby.

- **Postnatal** (pohst-NAY-tal) refers to the time and events after birth (**post-** means after, **nat** means birth, and **-al** means pertaining to).

Memory aid: you may know some prefixes already by using your prior knowledge and experiences. For example, a postgame press conference happens *after* a game, and a preshow reception happens *before* a performance.

Contrasting and Confusing Prefixes

Some prefixes are confusing because they are similar in spelling but opposite in meaning. The more common prefixes of this type are summarized in Table 1.7.

DETERMINING MEANINGS ON THE BASIS OF WORD PARTS

Knowing the meaning of the word parts often makes it possible to figure out the definition of an unfamiliar medical term.

Taking Terms Apart

To determine a word's meaning by looking at the component pieces, you must first separate it into word parts.

- Always start at the end of the word, with the suffix, and work toward the beginning.

- As you separate the word parts, identify the meaning of each. Identifying the meaning of each part should give you a definition of the term.
- Because some word parts have more than one meaning, it also is necessary to determine the context in which the term is being used. As used here, **context** means to determine which body system this term is referring to.
- If you have any doubt, use your medical dictionary or a trusted online resource to double-check your definition.
- Be aware that not all medical terms are made up of word parts.

An Example to Take Apart

Look at the term **otorhinolaryngology** (oh-toh-rye-noh-lar-in-GOL-oh-jee) as shown in Figure 1.9. It is made up of two combining forms, a word root, and a suffix. This is how it looks when the word parts have been separated by working from the end to the beginning.

- The suffix **-ology** means the study of.
- The word root **laryng** means larynx or throat. The combining vowel *is not used* here because the word root is joining a suffix that begins with a vowel.
- The combining form **rhin/o** means nose. The combining vowel *is used* here because the word root **rhin** is joining another word root beginning with a consonant.

TABLE 1.7

Contrasting Prefixes: Opposites

ab- means away from. Abnormal means not normal or away from normal.	ad- means toward or in the direction of. Addiction means being drawn toward or having a strong dependence on a drug or substance.
dys- means bad, difficult, or painful. Dysfunctional means an organ or body part that is not working properly.	eu- means good, normal, well, or easy. Eupnea means easy or normal breathing.
hyper- means excessive or increased. Hypertension is higher-than-normal blood pressure.	hypo- means deficient or decreased. Hypotension is lower-than-normal blood pressure.
inter- means between or among. Interstitial means between, but not within, the parts of a tissue.	intra- means within or inside. Intramuscular means within the muscle.
sub- means under, less, or below. Subcostal means below a rib or ribs.	super-, supra- mean above or excessive. Supracostal means above or outside the ribs.

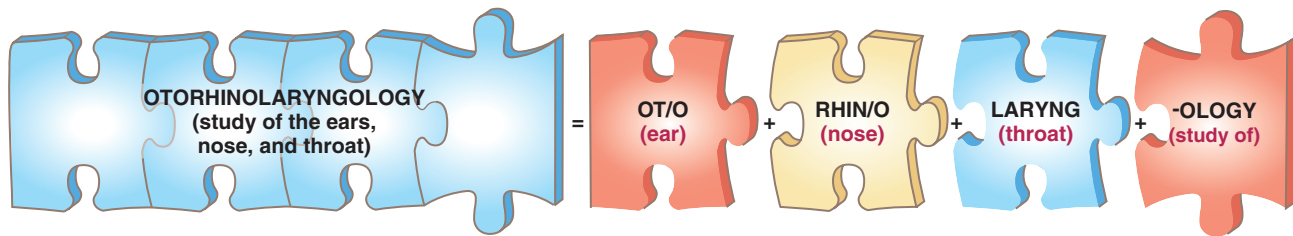


FIGURE 1.9 To determine the meaning of a medical term, the word parts are separated working from the end of the word toward the beginning.

- The combining form **ot/o** means ear. The combining vowel *is used* here because the word root **ot** is joining another word root beginning with a consonant.
- Together they form *otorhinolaryngology*, which is the study of the ears, nose, and throat (**ot/o** means ear, **rhin/o** means nose, **laryng** means throat, and **-ology** means study of). *Note: laryng/o* also means larynx and is discussed in Chapter 7.
- Because this is such a long term, this specialty is frequently referred to as **ENT** (ears, nose, and throat).
- A shortened version of this term is **otolaryngology** (**oh**-toh-lar-in-GOL-oh-jee), which is the study of the ears and larynx or throat (**ot/o** means ears, **laryng** means larynx, and **-ology** means study of).

Guessing at Meanings

When you are able to guess at the meaning of a term on the basis of its word parts, you must always double-check for accuracy because some terms have more than one meaning. For example, look at the term **lithotomy** (lih-THOT-oh-mee):

- On the basis of word parts, a **lithotomy** is a surgical incision for the removal of a stone (**lith** means stone, and **-otomy** means a surgical incision). This meaning is discussed further in Chapter 9.
- However, **lithotomy** is also the name of an examination position in which a female patient is lying on her back with her feet and legs raised and supported in stirrups. The term is used to describe this position because in the early days, this was the preferred position for lithotomy surgery. This term is discussed further in Chapter 15.
- This type of possible confusion is one of the many reasons why a medical dictionary or trusted online resource is an important medical terminology tool.

MEDICAL DICTIONARY USE

Learning to use a medical dictionary and other resources to find the definition of a term is an important part of mastering the correct use of medical terms. The following tips for dictionary use apply whether you are working with a traditional book-form dictionary or with electronic dictionary software, websites, or applications on your computer or handheld device.

If You Know How to Spell the Word

When starting to work with a printed dictionary, spend a few minutes reviewing its user guide, table of contents, and appendices. The time you spend reviewing now will be saved later when you are looking up unfamiliar terms.

- On the basis of the first letter of the word, start in the appropriate section of the dictionary. Look at the top of the page for clues. The top left word is the first term on the page. The top right word is the last term on that page.
- Next, look alphabetically for words that start with the first and second letters of the word you are researching. Continue looking through each letter until you find the term you are looking for.
- When you think you have found it, check the spelling very carefully, letter by letter, working from left to right. Terms with similar spellings have very different meanings.
- When you find the term, carefully check *all* of the definitions.

If You Do Not Know How to Spell the Word

Listen carefully to the term, and write it down. If you cannot find the word on the basis of your spelling, start looking for alternative spellings based on the beginning sound as shown in Table 1.8. *Note: All of these examples are in*

TABLE 1.8**Guidelines to Looking Up the Spelling of Unfamiliar Terms**

If it sounds like	It may begin with	Example
F	F PH	flatus (FLAY-tus), see Chapter 8 phlegm (FLEM), see Chapter 7
J	G J	gingivitis (jin-jih-VYE-tis), see Chapter 8 jaundice (JAWN-dis), see Chapter 8
K	C CH K QU	crepitus (KREP-ih-tus), see Chapter 3 cheilitis (kye-LITE-is), see Chapter 8 kyphosis (kye-FOH-sis), see Chapter 3 quadriplegia (kwad-rih-PLÉE-jee-ah), see Chapter 4
S	C PS S	cytology (sigh-TOL-oh-jee), see Chapter 2 psychologist (sigh-KOL-oh-jist), see Chapter 10 serum (SEER-um), see Chapter 5
Z	X Z	xeroderma (zee-roh-DER-mah), see Chapter 12 zygote (ZYE-goht), see Chapter 14

this textbook. However, you could practice looking them up in the dictionary!

Look Under Categories

Most printed dictionaries use categories such as *Diseases* and *Syndromes* to group disorders with these terms in their titles. For example:

- *Sexually transmitted disease* would be found under *Disease, sexually transmitted*.
- *Fetal alcohol syndrome* would be found under *Syndrome, fetal alcohol*.
- When you come across such a term and cannot find it listed by the first word, the next step is to look under the appropriate category.

Multiple-Word Terms

When you are looking for a term that includes more than one word, begin your search with the last term. If you do not find it there, move forward to the next word.

- For example, *congestive heart failure* is sometimes listed under *Heart failure, congestive*.

Searching for Definitions on the Internet

Online search engines such as Google are valuable resources in finding definitions and details about medical

conditions and terms; however, it is important that you rely on websites, such as the National Institutes of Health (NIH) website (<http://www.nih.gov>), which are known to be reputable information sources.

- For better results, an Internet search should include visits to at least two reputable sites. If there is a major difference in the definitions, go on to a third site. Sometimes search engine results will include a site that is not necessarily trustworthy but has paid for good placement.
- Beware of suggested search terms. If you do not spell a term correctly, a website may guess what you were searching for. Make sure to double-check that the term you are defining is the intended term.

The same caution applies to medical dictionary applications on handheld devices. Make sure that the application comes from a reputable source, and always double-check that this definition is for the term that you intended to look up.

PRONUNCIATION

A medical term is easier to understand and remember when you know how to pronounce it properly. To help you master the pronunciation of new terms, a commonly accepted pronunciation of that word appears in parentheses next to the term.

The sounds-like pronunciation system is used in this textbook. Here the word is respelled using normal English letters to create sounds that are familiar. To pronounce a new word, just say it as it is spelled in the parentheses.

- The part of the word that receives the primary (most) emphasis when you say it is shown in uppercase bold-face letters. For example, **edema** (eh-DEE-mah) is swelling caused by an abnormal accumulation of fluid in cells, tissues, or cavities of the body.
- A part of the word that receives secondary (less) emphasis when you say it is shown in boldface lowercase letters. For example, **appendicitis** (ah-pen-dih-SIGH-tis) means an inflammation of the appendix (**appendic** means appendix, and **-itis** means inflammation).

A Word of Caution

Frequently, there is more than one correct way to pronounce a medical term.

- The pronunciation of many medical terms is based on their Greek, Latin, or other foreign origin. However, there is a trend toward pronouncing terms as they would sound in English.
- The result is more than one “correct” pronunciation for a term. The text shows the most commonly accepted pronunciation.
- If your instructor prefers an alternative pronunciation, follow the instructions you are given.

SPELLING IS ALWAYS IMPORTANT

Accuracy in spelling medical terms is extremely important!

- Changing just one or two letters can completely change the meaning of a word—and this difference literally could be a matter of life or death for the patient.
- The section “Look-Alike, Sound-Alike Terms and Word Parts” later in this chapter will help you become aware of some terms and word parts that are frequently confused.
- The spelling shown in this text is commonly accepted in the United States. You may encounter

alternative spellings used in other English-speaking countries such as England, Australia, and Canada.

SINGULAR AND PLURAL ENDINGS

Many medical terms have Greek or Latin origins. As a result of these different origins, there are unusual rules for changing a singular word into a plural form. In addition, English endings have been adopted for some commonly used terms.

- Table 1.9 provides guidelines to help you better understand how these plurals are formed.
- Also, throughout the text, when a term with an unusual singular or plural form is introduced, both forms are included. For example, the **phalanges** (fah-LAN-jeez) are the bones of the fingers and toes (singular, *phalanx*) (Figure 1.10).

BASIC MEDICAL TERMS TO DESCRIBE DISEASES

Some of the medical terms that are used to describe diseases and disease conditions can be confusing. Some of the most commonly confused terms are described in Table 1.10. You will find that studying the groups of three as they are shown in the table makes it easier to master these terms.

LOOK-ALIKE, SOUND-ALIKE TERMS AND WORD PARTS

This section highlights some frequently used terms and word parts that are confusing because they look and sound alike. However, their meanings are very different. It is important that you pay close attention to these terms and word parts as you encounter them in the text.

arteri/o, ather/o, and arthr/o

- **arteri/o** means artery. **Endarterial** (end-ar-TEE-ree-al) means pertaining to the interior or lining of an artery (**end-** means within, **arteri** means artery, and **-al** means pertaining to).
- **ather/o** means plaque or fatty substance. An **atheroma** (ath-er-OH-mah) is a fatty deposit within the wall of an

TABLE 1.9

Guidelines to Unusual Plural Forms

Guideline	Singular	Plural
If the singular term ends in the suffix -a , the plural is usually formed by changing the ending to -ae .	bursa vertebra	bursae vertebrae
If the singular term ends in the suffix -ex or -ix , the plural is usually formed by changing these endings to -ices .	appendix index	appendices indices
If the singular term ends in the suffix -is , the plural is usually formed by changing the ending to -es .	diagnosis metastasis	diagnoses metastases
If the singular term ends in the suffix -itis , the plural is usually formed by changing the -is ending to -ides .	arthritis meningitis	arthritides meningitides
If the singular term ends in the suffix -nx , the plural is usually formed by changing the -x ending to -ges .	phalanx meninx	phalanges meninges
If the singular term ends in the suffix -on , the plural is usually formed by changing the ending to -a .	criterion ganglion	criteria ganglia
If the singular term ends in the suffix -um , the plural usually is formed by changing the ending to -a .	diverticulum ovum	diverticula ova
If the singular term ends in the suffix -us , the plural is usually formed by changing the ending to -i .	alveolus malleolus	alveoli malleoli

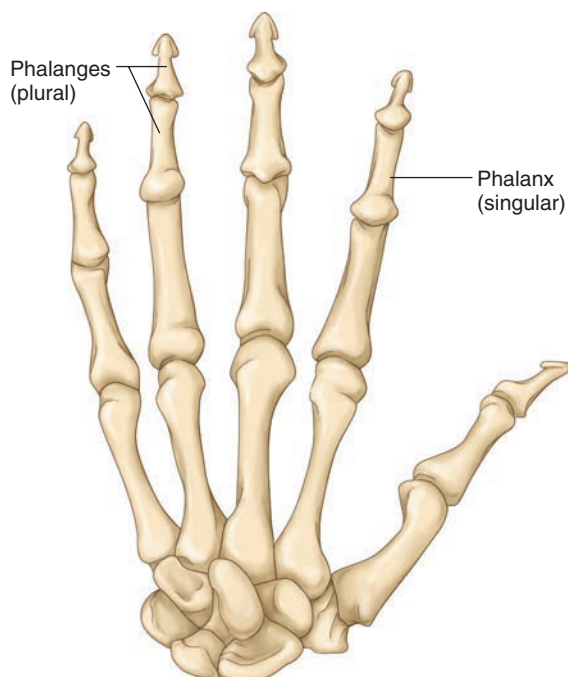


FIGURE 1.10 Singular and plural endings. A phalanx is one finger or toe bone. Phalanges are more than one finger or toe bones.

artery (**ather** means fatty substance, and **-oma** means tumor).

- **arthr/o** means joint. **Arthralgia** (ar-**THRAL**-jee-ah) means pain in a joint or joints (**arthr** means joint, and **-algia** means pain).

-ectomy, -ostomy, and -otomy

- **-ectomy** means surgical removal. An **appendectomy** (ap-en-**DECK**-toh-mee) is the surgical removal of the appendix (**append** means appendix, and **-ectomy** means surgical removal).
- **-ostomy** means the surgical creation of an artificial opening to the body surface. A **colostomy** (koh-**LAHS**-toh-mee) is the surgical creation of an artificial excretory opening between the colon and the body surface (**col** means colon, and **-ostomy** means the surgical creation of an artificial opening).
- **-otomy** means cutting or a surgical incision. **Pyelotomy** (pye-eh-**LOT**-oh-mee) is a surgical incision into the renal pelvis to remove obstructions such as a kidney stone (**pyel** means the renal pelvis, and **-otomy** means surgical incision).

TABLE 1.10

Basic Medical Terms to Describe Disease Conditions

A **sign** is objective evidence of disease, such as a fever. **Objective** means the sign can be evaluated or measured by the patient or others.

A **symptom** (**SIMP**-tum) is subjective evidence of a disease, such as pain or a headache. **Subjective** means that it can be evaluated or measured only by the patient.

A **syndrome** (**SIN**-drohm) is a set of signs and symptoms that occur together as part of a specific disease process.

A **diagnosis** (**dye**-ag-**NOH**-sis) (DX) is the identification of a disease (plural, *diagnoses*). To **diagnose** is the process of reaching a diagnosis.

A **differential diagnosis** (D/DX), also known as a **rule out** (R/O), is an attempt to determine which one of several possible diseases is causing the signs and symptoms that are present.

A **prognosis** (prog-**NOH**-sis) is a prediction of the probable course and outcome of a disease (plural, *prognoses*).

An **acute** condition has a rapid onset, a severe course, and a relatively short duration.

A **chronic** condition is of long duration. Although such diseases can be controlled, they are rarely cured.

A **remission** is the temporary, partial, or complete disappearance of the symptoms of a disease without having achieved a cure.

A **disease** is a condition in which one or more body parts are not functioning normally. Some diseases are named for their signs and symptoms. For example, **chronic fatigue syndrome** is a persistent, overwhelming fatigue of unknown origin (see Chapter 4).

An **eponym** (**EP**-oh-nim) is a disease, structure, operation, or procedure named for the person who discovered or described it first. For example, **Alzheimer's disease** is named for German neurologist Alois Alzheimer (see Chapter 10).

An **acronym** (**ACK**-roh-nim) is a word formed from the initial letter of the major parts of a compound term. For example, the acronym **laser** stands for *light amplification by stimulated emission of radiation* (see Chapter 12).

Fissure and Fistula

- A **fissure** (**FISH**-ur) is a groove or crack-like sore of the skin (see Chapter 12). This term also describes normal folds in the contours of the brain.
- A **fistula** (**FIS**-chuh-lah) is an abnormal passage, usually between two internal organs or leading from an organ to the surface of the body. A fistula may be due to surgery, injury, or the draining of an abscess.

Ileum and Ilium

- The **ileum** (**ILL**-ee-um) is the last and longest portion of the small intestine. *Memory aid:* *ileum* is spelled with an *e* as in *intestine*.
- The **ilium** (**ILL**-ee-um) is part of the hip bone. *Memory aid:* *ilium* is spelled with an *i* as in *hip* (Figure 1.11).

Infection and Inflammation

- Although the suffix **-itis** means inflammation, it also is commonly used to indicate infection. An

example is **meningitis** (**mening** means the meninges and **-itis** means inflammation), in which the cause of the inflammation is an infection. Another example is **tendinitis** (**tendin** means tendon and **-itis** means inflammation). The inflammation of tendinitis is usually caused by overuse rather than infection.

- An **infection** (in-**FECK**-shun) is the invasion of the body by a pathogenic (disease-producing) organism. The infection can remain localized (near the point of entry) or can be systemic (affecting the entire body). Signs and symptoms of infection include malaise, chills and fever, redness, heat and swelling, or exudate from a wound.
- **Malaise** (mah-**LAYZ**) is a word of French origin referring to a feeling of general discomfort or uneasiness that is often the first indication of an infection or other disease.
- **Exudate** (**ECKS**-you-dayt) is any fluid, such as pus, that leaks out of an infected wound.

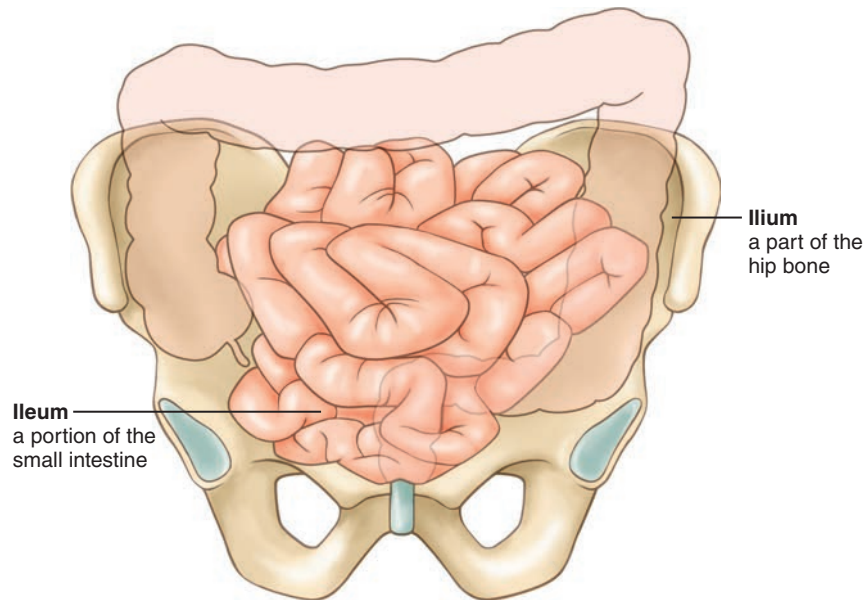


FIGURE 1.11 There is only one letter difference between *ileum* and *ilium*, but they are very different parts of the body.

- **Inflammation** (in-flah-MAY-shun) is a localized response to an injury or to the destruction of tissues. The key indicators of inflammation are (1) **erythema** (redness), (2) **hyperthermia** (heat), (3) **edema** (swelling), and (4) **pain**. These are caused by extra blood flowing into the area as part of the healing process.

Laceration and Lesion

- A **laceration** (lass-er-AY-shun) is a torn or jagged wound or an accidental cut.
- A **lesion** (LEE-zhun) is a pathologic change of the tissues due to disease or injury.

Mucous and Mucus

- The adjective **mucous** (MYOU-kus) describes the specialized membranes that line the body cavities.
- The noun **mucus** (MYOU-kus), which is pronounced the same way, refers to the fluid secreted by these mucous membranes.

myc/o, myel/o, and my/o

- **myc/o** means fungus. **Mycosis** (my-KOH-sis) describes any abnormal condition or disease caused by a fungus (**myc** means fungus, and **-osis** means abnormal condition or disease).
- **myel/o** means bone marrow or spinal cord. The term **myelopathy** (my-eh-LOP-ah-thee) describes any injury, degeneration or disease in the spinal cord

(**myel/o** means spinal cord or bone marrow, and **-pathy** means disease).

- **my/o** means muscle. The term **myopathy** (my-OP-ah-thee) describes any pathologic change or disease of muscle tissue (**my/o** means muscle, and **-pathy** means disease).

-ologist and -ology

- **-ologist** means specialist. A **dermatologist** (der-mah-TOL-oh-jist) is a physician who specializes in diagnosing and treating disorders of the skin (**dermat** means skin, and **-ologist** means specialist).
- **-ology** means the study of. **Neonatology** (nee-oh-nay-TOL-oh-jee) is the study of disorders of the newborn (**neo-** means new, **nat** means birth, and **-ology** means study of).

Palpation and Palpitation

- **Palpation** (pal-PAY-shun) is an examination technique in which the examiner's hands are used to feel the texture, size, consistency, and location of certain body parts.
- **Palpitation** (pal-pih-TAY-shun) is a pounding or racing heart.

pyel/o, py/o, and pyr/o

- **pyel/o** means renal pelvis, which is part of the kidney. **Pyelitis** (pye-eh-LYE-tis) is an inflammation of the

renal pelvis (**pyel** means renal pelvis, and **-itis** means inflammation).

- **py/o** means pus. **Pyoderma** (pye-oh-**DER**-mah) is any acute, inflammatory, pus-forming bacterial skin infection such as impetigo (**py/o** means pus, and **-derma** means skin).
- **pyr/o** means fever or fire. **Pyrosis** (pye-**ROH**-sis), also known as **heartburn**, is discomfort due to the regurgitation of stomach acid upward into the esophagus (**pyr** means fever or fire, and **-osis** means abnormal condition or disease).

Supination and Suppuration

- **Supination** (soo-pih-NAY-shun) is the act of rotating the arm so that the palm of the hand is forward or upward.
- **Suppuration** (sup-you-RAY-shun) is the formation of pus.

Triage and Trauma

- **Triage** (tree-AHZH) is the medical screening of patients to determine their relative priority of need and the proper place of treatment (Figure 1.12).
- **Trauma** (TRAW-mah) means wound or injury. These are the types of injuries that might occur in an accident, shooting, natural disaster, or fire.

Viral and Virile

- **Viral** (VYE-ral) means pertaining to a virus (**vir** means virus or poison, and **-al** means pertaining to).



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FIGURE 1.12 Triage describes the process through which emergency personnel arriving on an accident scene identify which of the injured require care first and where they can be treated most effectively.

- **Virile** (**VIR**-ill) means having the nature, properties, or qualities of an adult male.

USING ABBREVIATIONS

Abbreviations are frequently used as a shorthand way to record long and complex medical terms; Appendix B contains an alphabetized list of many of the more commonly used medical abbreviations.

- Abbreviations can also lead to confusion and errors!
- Therefore, it is important that you use caution when using or interpreting an abbreviation.
- For example, the abbreviation *BE* means both “below the elbow” (when describing an amputation) and “barium enema,” which is an x-ray examination of the large intestine using a contrast medium injected into the rectum. Just imagine what a difference a mix-up would make for the patient!
- Most clinical agencies have policies for accepted abbreviations. It is important to follow this list for the facility where you are working.
- If there is any question in your mind about which abbreviation to use, always follow this rule: *When in doubt, spell it out.*

The Joint Commission, an organization founded in 1910 to standardize medical practices, publishes an official list of commonly confused “Do Not Use” abbreviations to prevent potentially fatal medical errors. The full list is available at www.jointcommission.org (see Table 1.11 for examples). Many medical facilities have their own suggested “Do Not Use” abbreviation list.

TABLE 1.11

Examples of “Do Not Use” Abbreviations

Abbreviation	Potential Problem
MS	can mean either morphine sulfate or magnesium sulfate
QD and QOD	mean daily and every other day, respectively; sometimes mistaken for each other
U	means unit, sometimes mistaken for 0 or 4

LEARNING EXERCISES

MATCHING WORD PARTS 1

Write the correct answer in the middle column.

Definition	Correct Answer	Possible Answers
1.1. bad, difficult, painful	_____	-algia
1.2. excessive, increased	_____	dys-
1.3. enlargement	_____	-ectomy
1.4. pain, suffering	_____	-megaly
1.5. surgical removal	_____	hyper-

MATCHING WORD PARTS 2

Write the correct answer in the middle column.

Definition	Correct Answer	Possible Answers
1.6. abnormal condition or disease	_____	hypo-
1.7. abnormal softening	_____	-itis
1.8. deficient, decreased	_____	-malacia
1.9. inflammation	_____	-necrosis
1.10. tissue death	_____	-osis

MATCHING WORD PARTS 3

Write the correct answer in the middle column.

Definition	Correct Answer	Possible Answers
1.11. bleeding, abnormal excessive fluid discharge	_____	-ostomy
1.12. surgical creation of an artificial opening to the body surface	_____	-otomy
1.13. surgical incision	_____	-plasty
1.14. surgical repair	_____	-rrhage
1.15. surgical suturing	_____	-rrhaphy

MATCHING WORD PARTS 4

Write the correct answer in the middle column.

Definition	Correct Answer	Possible Answers
1.16. visual examination	_____	-ac
1.17. pertaining to	_____	-rrhea
1.18. abnormal narrowing	_____	-sclerosis
1.19. abnormal hardening	_____	-scopy
1.20. flow or discharge	_____	-stenosis

DEFINITIONS

Select the correct answer, and write it on the line provided.

- 1.21. The term _____ describes any pathologic change or disease in the spinal cord.
- myelopathy myopathy pyelitis pyrosis
- 1.22. The medical term for higher-than-normal blood pressure is _____.
- hepatomegaly hypertension hypotension supination
- 1.23. The term _____ means pertaining to birth.
- natal perinatal postnatal prenatal

- 1.24. Pain is classified as a _____.
- diagnosis sign symptom syndrome
- 1.25. In the term *myopathy*, the suffix **-pathy** means _____.
- abnormal condition disease inflammation swelling

MATCHING TERMS AND DEFINITIONS 1

Write the correct answer in the middle column.

	Definition	Correct Answer	Possible Answers
1.26.	white blood cell	_____	acute
1.27.	prediction of the probable course and outcome of a disorder	_____	edema
1.28.	swelling caused by an abnormal accumulation of fluid in cells, tissues, or cavities of the body	_____	leukocyte
1.29.	rapid onset	_____	prognosis
1.30.	turning the palm of the hand upward	_____	supination

MATCHING TERMS AND DEFINITIONS 2

Write the correct answer in the middle column.

	Definition	Correct Answer	Possible Answers
1.31.	examination procedure	_____	laceration
1.32.	fluid, such as pus, that leaks out of an infected wound	_____	lesion
1.33.	pathologic tissue change	_____	palpitation
1.34.	pounding heart	_____	palpation
1.35.	torn or jagged wound, or an accidental cut wound	_____	exudate

WHICH WORD?

Select the correct answer, and write it on the line provided.

- 1.36. The medical term _____ describes an inflammation of the stomach.

gastritis

gastrosis

- 1.37. The formation of pus is called _____.

supination

suppuration

- 1.38. The term meaning wound or injury is _____.

trauma

triage

- 1.39. The term _____ means pertaining to a virus.

viral

virile

- 1.40. An _____ is the surgical removal of the appendix.

appendectomy

appendicitis

SPELLING COUNTS

Find the misspelled word in each sentence. Then write that word, spelled correctly, on the line provided.

- 1.41. A disease named for the person who discovered it is known as an enaponym.

- 1.42. A localized response to injury or tissue destruction is called inflimination.

- 1.43. A fisure of the skin is a groove or crack-like sore of the skin. _____

- 1.44. The medical term meaning suturing together the ends of a severed nerve is neurorraphy.

- 1.45. The medical term meaning inflammation of the tonsils is tonsilitis. _____

MATCHING TERMS

Write the correct answer in the middle column.

	Definition	Correct Answer	Possible Answers
1.46.	inflammation of a tendon	_____	syndrome
1.47.	a set of signs and symptoms	_____	gastralgia
1.48.	the surgical suturing of a tendon	_____	tendinitis
1.49.	stomach pain	_____	pyoderma
1.50.	any acute, inflammatory, pus-forming bacterial skin infection	_____	tenorrhaphy

TERM SELECTION

Select the correct answer, and write it on the line provided.

- 1.51. The abnormal hardening of the walls of an artery or arteries is called _____.
arteriosclerosis arteriostenosis arthrostenosis atherosclerosis
- 1.52. A fever is considered to be a _____.
prognosis sign symptom syndrome
- 1.53. An inflammation of the stomach and small intestine is known as _____.
gastralgia gastroenteritis gastritis gastrosis
- 1.54. The term meaning pain in a joint or joints is _____.
arthralgia arthritis arthrocentesis atherosclerosis
- 1.55. A _____ is a physician who specializes in diagnosing and treating diseases and disorders of the skin.
dermatologist dermatology neurologist neurology

SENTENCE COMPLETION

Write the correct term on the line provided.

- 1.56. Lower-than-normal blood pressure is called _____.
- 1.57. The process of recording an x-ray of the blood vessels after the injection of a contrast medium is known as _____.
- 1.58. The term meaning above or outside the ribs is _____.
- 1.59. A/An _____ diagnosis is also known as a rule out.
- 1.60. A/An _____ is an abnormal passage, usually between two internal organs or leading from an organ to the surface of the body.

TRUE/FALSE

If the statement is true, write **True** on the line. If the statement is false, write **False** on the line.

- 1.61. _____ An erythrocyte is commonly known as a red blood cell.
- 1.62. _____ Arteriomalacia is abnormal hardening of the walls of an artery or arteries.
- 1.63. _____ A colostomy is the surgical creation of an artificial opening between the colon and the body surface.
- 1.64. _____ Malaise is often the first symptom of inflammation.
- 1.65. _____ An infection is the invasion of the body by a disease-producing organism.

WORD SURGERY

Divide each term into its component word parts. Write these word parts, in sequence, on the lines provided. When necessary, use a slash (/) to indicate a combining vowel. (You may not need all of the lines provided.)

- 1.66. **Otorhinolaryngology** is the study of the ears, nose, and throat.

- 1.67. The term **mycosis** means any abnormal condition or disease caused by a fungus.

- 1.68. **Poliomyelitis** is a viral infection of the gray matter of the spinal cord.

1.69. **Neonatology** is the study of disorders of the newborn.

1.70. The term **endarterial** means pertaining to the interior or lining of an artery.

CLINICAL CONDITIONS

Write the correct answer on the line provided.

1.71. Miguel required a/an _____ injection. This term means that the medication was placed directly within the muscle.

1.72. Mrs. Tillson underwent _____ to remove excess fluid from her abdomen.

1.73. The term *laser* is a/an _____. This means that it is a word formed from the initial letters of the major parts of a compound term.

1.74. In an accident, Felipe Valladares broke several bones in his fingers. The medical term for these injuries is fractured _____.

1.75. In case of a major disaster Cheng Lee, who is a trained paramedic, helps perform _____. This is the screening of patients to determine their relative priority of need and the proper place of treatment.

1.76. Gina's physician ordered laboratory tests that would enable him to establish a differential _____ to identify the cause of her signs and symptoms.

1.77. Jennifer plans to go to graduate school so she can specialize in _____. This specialty is concerned with the study of all aspects of diseases.

1.78. John Randolph's cancer went into _____. Although this is not a cure, his symptoms disappeared and he felt much better.

1.79. Mr. Jankowski describes that uncomfortable feeling as heartburn. The medical term for this condition is _____.

1.80. Phyllis was having great fun traveling until she ate some contaminated food and developed _____. She felt miserable and needed to stay in her hotel because of the frequent flow of loose or watery stools.

WHICH IS THE CORRECT MEDICAL TERM?

Select the correct answer, and write it on the line provided.

1.81. The term _____ describes the surgical repair of a nerve.

neuralgia neurorrhaphy neurology neuroplasty

1.82. The term _____ means loss of a large amount of blood in a short time.

diarrhea hemorrhage hepatorrhagia otorrhagia

1.803. The term _____ means the tissue death of an artery or arteries.

arteriomalacia arterionecrosis arteriosclerosis arteriostenosis

1.84. The term _____ means between, but not within, the parts of a tissue.

interstitial intrastitial intermuscular intramuscular

1.85. The term _____ means enlargement of the liver.

hepatitis hepatomegaly nephromegaly nephritis

CHALLENGE WORD BUILDING

These terms are *not* primary terms in the chapter; however, they are made up of the following familiar word parts. If you need help in creating the term, refer to your medical dictionary.

neo- = new

arteri/o = artery

-algia = pain and suffering

arthr/o = joint

-itis = inflammation

cardi/o = heart

-ologist = specialist

nat/o = birth

-otomy = a surgical incision

neur/o = nerve

-rrhea = flow or discharge

rhin/o = nose

-scopy = visual examination

1.86. A medical specialist concerned with the diagnosis and treatment of heart disease is

a/an _____.

1.87. The term meaning a runny nose is _____.

1.88. The term meaning the inflammation of a joint or joints is _____.

1.89. A medical specialist in disorders of the newborn is a/an _____.

- 1.90. The term meaning a surgical incision into a nerve is a/an _____.
- 1.91. The term meaning inflammation of the heart is _____.
- 1.92. The term meaning pain in the nose is _____.
- 1.93. The term meaning pain in a nerve or nerves is _____.
- 1.94. The term meaning a surgical incision into the heart is a/an _____.
- 1.95. The term meaning an inflammation of the nose is _____.

LABELING EXERCISES

- 1.96. The combining form meaning spinal cord is

_____.

- 1.97. The combining form meaning muscle is

_____.

- 1.98. The combining form meaning bone is

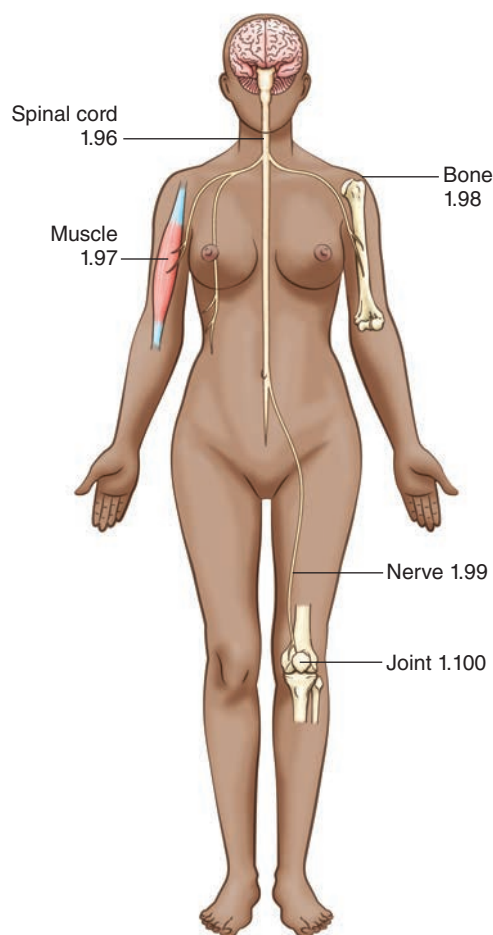
_____.

- 1.99. The combining form meaning nerve is

_____.

- 1.100. The combining form meaning joint is

_____.



The Human Touch

CRITICAL THINKING EXERCISE

The following story and questions are designed to stimulate critical thinking through class discussion or as a brief essay response. There are no right or wrong answers to these questions.

Baylie Hutchins sits at her kitchen table, highlighter in hand, with her medical terminology book opened to the first chapter. Her 2-year-old son, Mathias, plays with a box of animal crackers in his high chair, some even finding his mouth. “Arteri/o, ather/o, and arthr/o,” she mutters, lips moving to shape unfamiliar sounds. “They’re too much alike, and they mean totally different things.” Mathias sneezes loudly, and spots of animal cracker rain on the page, punctuating her frustration.

“Great job, Thias,” she says wiping the text with her finger. “I planned on using the highlighter to mark with, not your lunch.” Mathias giggles and peeks through the tunnel made by one small hand.

“Mucous and mucus,” she reads aloud, each sounding the same. Then she remembers her teacher’s tip for remembering the difference, “The long word is the membrane, and the short one is the secretion.”

Mathias picks up an animal cracker and excitedly shouts, “Tiger, Mommy! Tiger!” “That’s right, Thias. Good job!”

Turning back to the page she stares at the pink word parts -rrhagia, -rrhaphy, and -rrhea. Stumbling over the pronunciations, Baylie closes her eyes and tries to silence the voices in her head. “You can’t do anything right,” her ex-husband says. “Couldn’t finish if your life depended on it,” her mother’s voice snaps.

Baylie keeps at it, “rhin/o means nose,” as she highlights that word part, “and a rhinoceros has a big horn on his nose.”

“Rhino!” Matthias shouts, holding up an animal cracker. Baylie laughs. We both have new things to learn, she realizes. And we can do it!

Suggested Discussion Topics

1. Baylie needs to learn medical terminology because she wants a career in the medical field. What study habits would help Baylie accomplish this task?
2. A support group could help empower Baylie to accomplish her goals. How could she find people to be part of this group?
3. In what ways can this textbook and other resource materials help her, and you, learn medical terminology?
4. Baylie figured out a way to remember the term for nose by using her prior knowledge of the word rhinoceros. Can you think of other examples of ways in which your prior knowledge and experiences help you understand the meaning of medical terms?

THE HUMAN BODY IN HEALTH AND DISEASE



Overview of THE HUMAN BODY IN HEALTH AND DISEASE

Anatomical Reference Systems

Terms used to describe the location of body planes, directions, and cavities.

Structures of the Body

The cells, tissues, and glands that form the body systems that work together to enable the body to function properly.

Genetics

The genetic components that transfer characteristics from parents to their child.

Tissues

A group of similarly specialized cells that work together to perform specific functions.

Glands

A group of specialized cells that is capable of producing secretions.

Body Systems and Related Organs

Organs are somewhat independent parts of the body that perform specific functions. Organs with related functions are organized into body systems.

Pathology

The study of the nature and cause of disease that involve changes in structure and function.

Vocabulary Related to THE HUMAN BODY IN HEALTH AND DISEASE

This list contains essential word parts and medical terms for this chapter. These and the other important **primary terms** are shown in **boldface** throughout the chapter. *Secondary terms*, which appear in *orange* italics, clarify the meaning of primary terms.

Word Parts

- ☐ **aden/o** gland
- ☐ **adip/o** fat
- ☐ **anter/o** before, front
- ☐ **caud/o** lower part of body, tail
- ☐ **cephal/o** head
- ☐ **cyt/o, -cyte** cell
- ☐ **end-, endo-** in, within, inside
- ☐ **exo-** out of, outside, away from
- ☐ **hist/o** tissue
- ☐ **-ologist** specialist
- ☐ **-ology** the science or study of
- ☐ **path/o, -pathy** disease, suffering, feeling, emotion
- ☐ **plas/i, plas/o, -plasia** development, growth, formation
- ☐ **poster/o** behind, toward the back
- ☐ **-stasis, -static** control, maintenance of a constant level

Medical Terms

- ☐ **abdominal cavity** (ab-**DOM**-ih-nal)
- ☐ **adenocarcinoma** (ad-eh-noh-kar-sih-**NOH**-mah)
- ☐ **adenoma** (ad-eh-**NOH**-mah)
- ☐ **anaplasia** (an-ah-**PLAY**-zhee-ah)
- ☐ **anatomy** (ah-NAT-oh-mee)
- ☐ **anomaly** (ah-NOM-ah-lee)
- ☐ **anterior** (an-**TEER**-ee-or)
- ☐ **aplasia** (ah-**PLAY**-zhee-ah)
- ☐ **atresia** (ah-**TREE**-zee-ah)
- ☐ **autopsy** (AW-top-see)
- ☐ **bloodborne transmission**
- ☐ **caudal** (**KAW**-dal)
- ☐ **cephalic** (seh-FAL-ick)
- ☐ **chromosome** (**KROH**-moh-sohme)
- ☐ **communicable disease** (kuh-MEW-nih-kuh-bul)
- ☐ **congenital disorder** (kon-JEN-ih-tahl)

- ☐ **cytoplasm** (**SIGH**-toh-plazm)
- ☐ **distal** (**DIS**-tal)
- ☐ **dorsal** (**DOR**-sal)
- ☐ **dysplasia** (dis-**PLAY**-zhee-ah)
- ☐ **endemic** (en-**DEM**-ick)
- ☐ **endocrine glands** (EN-doh-krin)
- ☐ **epidemic** (ep-ih-**DEM**-ick)
- ☐ **epigastric region** (ep-ih-**GAS**-trick)
- ☐ **etiology** (ee-tee-**OL**-oh-jee)
- ☐ **exocrine glands** (ECK-soh-krin)
- ☐ **functional disorder**
- ☐ **genetic disorder**
- ☐ **geriatrician** (jer-ee-ah-**TRISH**-un)
- ☐ **hemophilia** (hee-moh-**FILL**-ee-ah)
- ☐ **histology** (hiss-**TOL**-oh-jee)
- ☐ **homeostasis** (hoh-mee-oh-**STAY**-sis)
- ☐ **hyperplasia** (high-per-**PLAY**-zhee-ah)
- ☐ **hypertrophy** (high-**PER**-troh-fee)
- ☐ **hypogastric region** (high-poh-**GAS**-trick)
- ☐ **hypoplasia** (high-poh-**PLAY**-zhee-ah)
- ☐ **iatrogenic illness** (eye-at-roh-**JEN**-ick)
- ☐ **idiopathic disease** (id-ee-oh-**PATH**-ick)
- ☐ **infectious disease** (in-**FECK**-shus)
- ☐ **inguinal** (ING-gwih-nal)
- ☐ **medial** (**MEE**-dee-al)
- ☐ **mesentery** (**MESS**-en-terr-ee)
- ☐ **midsagittal plane** (mid-**SADJ**-ih-tal)
- ☐ **nosocomial infection** (nahs-oh-**KOH**-mee-al)
- ☐ **pandemic** (pan-**DEM**-ick)
- ☐ **pathology** (pah-**THOL**-oh-jee)
- ☐ **pelvic cavity** (**PEL**-vick)
- ☐ **peritoneum** (pehr-ih-toh-**NEE**-um)
- ☐ **peritonitis** (pehr-ih-toh-**NIGH**-tis)
- ☐ **physiology** (fiz-ee-**OL**-oh-jee)
- ☐ **posterior** (pos-**TEER**-ee-or)
- ☐ **proximal** (**PROCK**-sih-mal)
- ☐ **retroperitoneal** (ret-roh-pehr-ih-toh-**NEE**-al)
- ☐ **stem cells**
- ☐ **syndrome** (**SIN**-drohm)
- ☐ **thoracic cavity** (thoh-**RAS**-ick)
- ☐ **transverse plane** (trans-**VERSE**)
- ☐ **umbilicus** (um-**BILL**-ih-kus)
- ☐ **vector-borne transmission**
- ☐ **ventral** (**VEN**-tral)

LEARNING OBJECTIVES

On completion of this chapter, you should be able to:

1. Define *anatomy* and *physiology* and the uses of anatomical reference systems to identify the anatomical position plus body planes, directions, and cavities.
2. Recognize, define, spell, and pronounce the primary terms related to cells and genetics.
3. Recognize, define, spell, and pronounce the primary terms related to the structure, function, pathology, and procedures of tissues and glands.
4. Identify the major organs and functions of the body systems.
5. Recognize, define, spell, and pronounce the primary terms used to describe pathology, the modes of transmission, and the types of diseases.

ANATOMICAL REFERENCE SYSTEMS

Anatomical reference systems are used to describe the locations of the structural units of the body. The simplest anatomical reference is the one we learn in childhood: our right hand is on the right, and our left hand on the left.

In medical terminology, there are several additional ways to describe the location of different body parts. These anatomical reference systems include:

- Body planes
- Body directions
- Body cavities
- Structural units

When body parts work together to perform a related function, they are grouped together and are known as a body system. The digestive system, for example, is made up of the organs related to ingesting and processing of food.

Anatomy and Physiology Defined

- **Anatomy** (ah-NAT-oh-mee) is the study of the structures of the body. The adjective **anatomical** (ah-nah-TOM-ih-kal) means referring to anatomy.
- **Physiology** (fiz-ee-OL-oh-jee) is the study of the functions of the structures of the body (**physi** means nature or physical, and **-ology** means study of).

The Anatomical Position

The **anatomical position** describes the body standing in the standard position. This includes:

- Standing up straight so that the body is erect and facing forward.
- Holding the arms at the sides with the hands turned so that the palms face toward the front.

The Body Planes

Body planes are imaginary vertical and horizontal lines used to divide the body into sections for descriptive purposes (Figure 2.1). These planes are aligned to a body standing in the anatomical position.

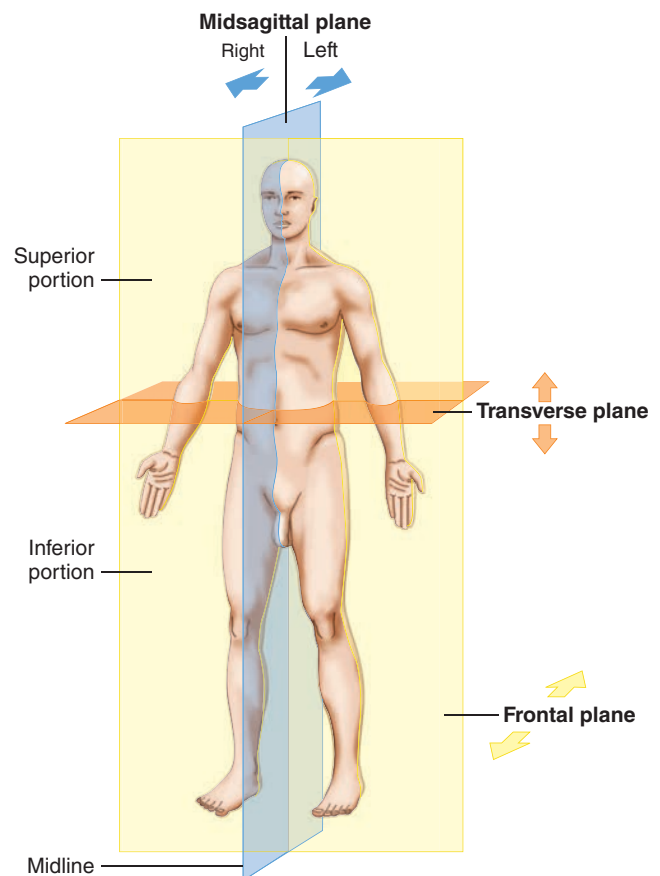


FIGURE 2.1 Body planes: the midsagittal plane divides the body into equal left and right halves. The transverse plane divides the body into superior (upper) and inferior (lower) portions. The frontal plane divides the body into anterior or ventral (front) and posterior or dorsal (back) portions.

The Vertical Planes

A **vertical plane** is an up-and-down plane that is at a right angle to the horizon.

- A **sagittal plane** (SADJ-ih-tal) is a vertical plane that divides the body into *unequal* left and right portions.
- The **midsagittal plane** (mid-SADJ-ih-tal), also known as the **midline**, is the sagittal plane that divides the body into *equal* left and right halves (Figure 2.1).
- A **frontal plane** is a vertical plane that divides the body into anterior (front) and posterior (back) portions. Also known as the **coronal plane**, it is located at right angles to the sagittal plane (Figure 2.1).

The Horizontal Plane

A **horizontal plane** is a flat, crosswise plane, such as the horizon.

- A **transverse plane** (trans-VERSE) is a horizontal plane that divides the body into superior (upper) and inferior

(lower) portions. A transverse plane can be at the waist or at any other level across the body (Figure 2.1).

Body Direction Terms

The relative location of sections of the body or of an organ can be described through the use of pairs of contrasting body direction terms. These terms are illustrated in Figures 2.2 and 2.3.

- **Ventral** (VEN-tral) refers to the front, or belly side, of the organ or body (**ventr** means belly side of the body, and **-al** means pertaining to). *Ventral* is the opposite of *dorsal*.
- **Dorsal** (DOR-sal) refers to the back of the organ or body (**dors** means back of the body, and **-al** means pertaining to). *Dorsal* is the opposite of *ventral*.
- **Anterior** (an-TEER-ee-or) means situated in the front. It also means on the front or forward part of an organ (**anter** means front or before, and **-ior** means

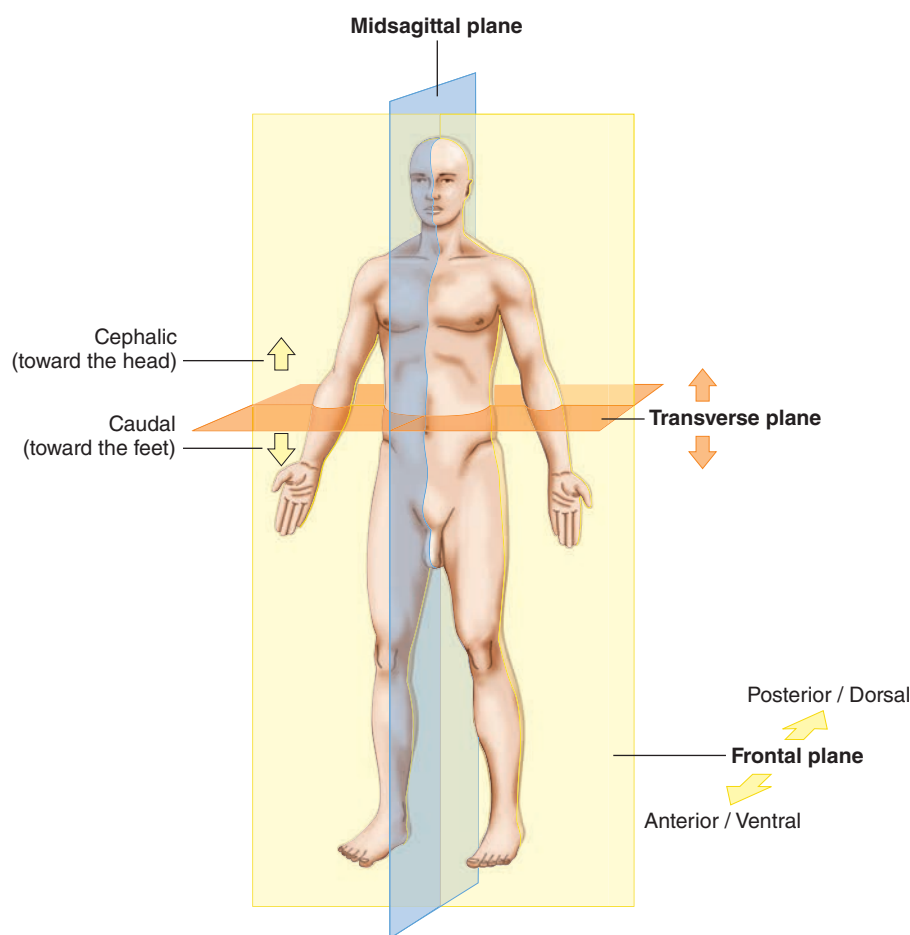


FIGURE 2.2 Body directions: *Cephalic* means toward the head, and *caudal* means toward the feet. *Anterior* means toward the front, and the front of the body is known as the ventral surface. *Posterior* means toward the back, and the back of the body is known as the dorsal surface.

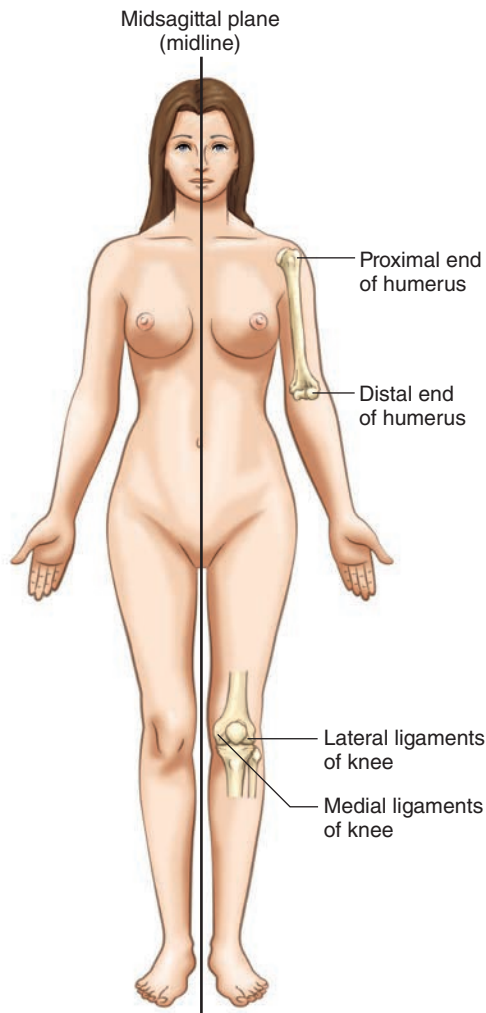


FIGURE 2.3 Body directions: *Proximal* means situated nearest the midline, and *distal* means situated farthest from the midline. *Medial* means toward or nearer the midline, and *lateral* means toward the side and away from the midline.

pertaining to). For example, the stomach is located anterior to (in front of) the pancreas. *Anterior* is also used in reference to the ventral surface of the body. *Anterior* is the opposite of *posterior*.

- **Posterior** (pos-TEER-ee-or) means situated in the back. It also means on the back part of an organ (**poster** means back or toward the back, and **-ior** means pertaining to). For example, the pancreas is located posterior to (behind) the stomach. The term *posterior* is also used in reference to the dorsal surface of the body. *Posterior* is the opposite of *anterior*.
- **Superior** means uppermost, above, or toward the head. For example, the lungs are located superior to (above) the diaphragm. *Superior* is the opposite of *inferior*.

- **Inferior** means lowermost, below, or toward the feet. For example, the stomach is located inferior to (below) the diaphragm. *Inferior* is the opposite of *superior*.
- **Cephalic** (seh-FAL-ick) means toward the head (**cephal** means head, and **-ic** means pertaining to). *Cephalic* is the opposite of *caudal*.
- **Caudal** (KAW-dal) means toward the lower part of the body (**caud** means tail or lower part of the body, and **-al** means pertaining to). *Caudal* is the opposite of *cephalic*.
- **Proximal** (PROCK-sih-mal) means situated nearest the midline or beginning of a body structure. For example, the proximal end of the humerus (bone of the upper arm) forms part of the shoulder. *Proximal* is the opposite of *distal*.
- **Distal** (DIS-tal) means situated farthest from the midline or beginning of a body structure. For example, the distal end of the humerus forms part of the elbow (Figure 2.3). *Distal* is the opposite of *proximal*.
- **Medial** (MEE-dee-al) means the direction toward, or nearer, the midline. For example, the medial ligament of the knee is near the inner surface of the leg (Figure 2.3). *Medial* is the opposite of *lateral*.
- **Lateral** means the direction toward, or nearer, the side of the body, away from the midline. For example, the lateral ligament of the knee is near the side of the leg. *Lateral* is the opposite of *medial*. **Bilateral** means relating to, or having, two sides.

Major Body Cavities

The two major **body cavities**, which are the dorsal (back) and the ventral (front) cavities, are spaces within the body that contain and protect internal organs (Figure 2.4).

The Dorsal Cavity

The **dorsal cavity**, which is located along the back of the body and head, contains organs of the nervous system that coordinate body functions and is divided into two portions:

- The **cranial cavity**, which is located within the skull, surrounds and protects the brain. **Cranial** means pertaining to the skull.
- The **spinal cavity**, which is located within the spinal column, surrounds and protects the spinal cord.