



8th EDITION

MEDICAL TERMINOLOGY for HEALTH PROFESSIONS

Ann Ehrlich
Carol L. Schroeder
Laura Ehrlich
Katrina A. Schroeder

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for **HEALTH
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Australia • Brazil • Mexico • Singapore • United Kingdom • United States

***Medical Terminology for Health Professions,
Eighth Edition***

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Laura Ehrlich, Katrina A. Schroeder**

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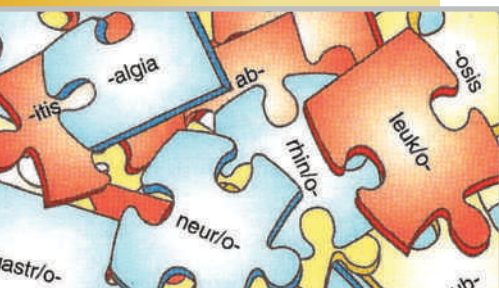
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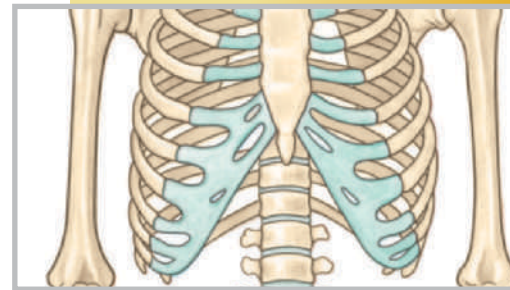
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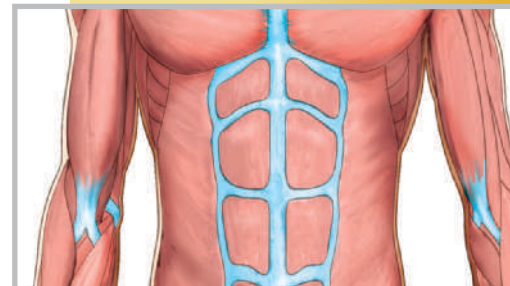
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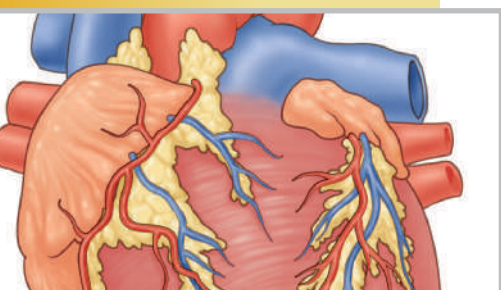


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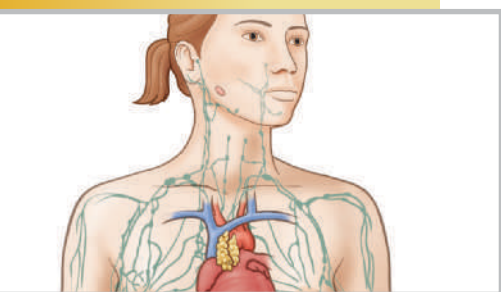
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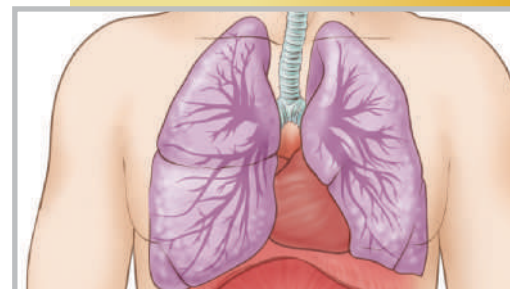
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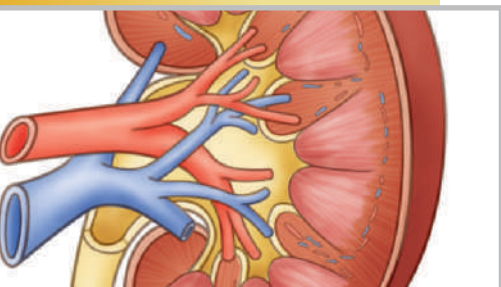
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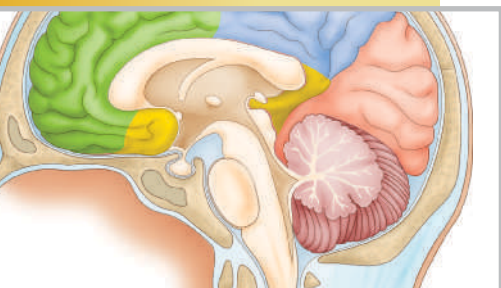




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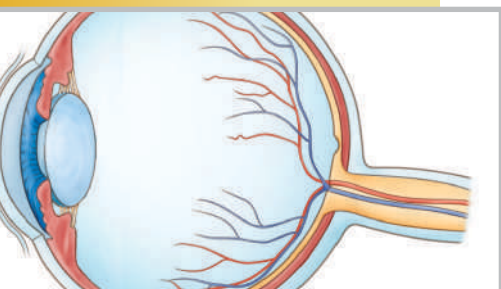
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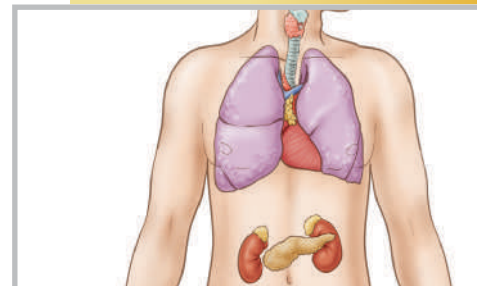
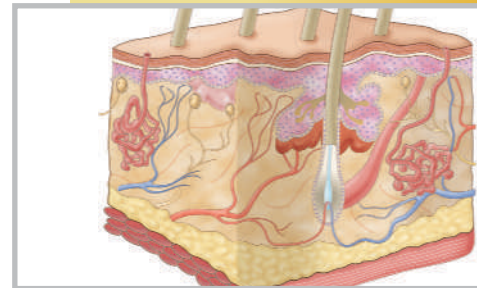
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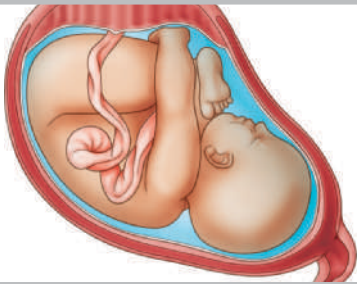


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A

a-	no, not, without, away fr
-a	noun ending
ab-	away from, negative, ab
abdomin/o	abdomen
-able	capable of, able to
abort/o	premature expulsion of

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, three appendices, and an index. To gain the most benefit from your use of this text, take advantage of the many features, including 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 *cyan* 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

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.

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.

Appendices

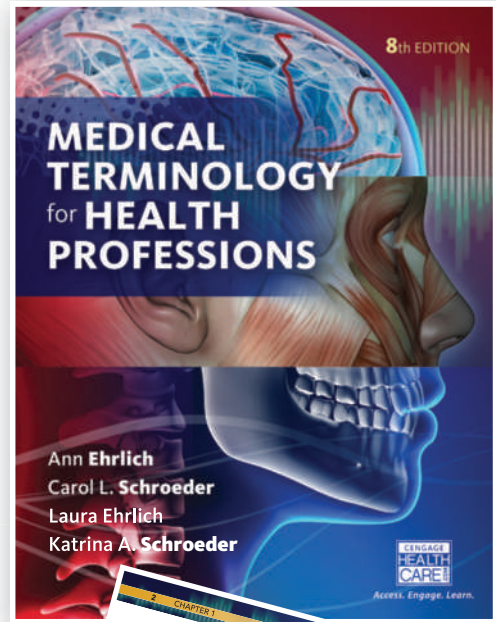
Appendix A: Prefixes, Combining Forms, and Suffixes is a convenient alphabetic reference for the medical word parts. When you don't recognize a word part, you can look it up here.

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: Glossary of Pathology and Procedures gives the definitions of all the primary terms in the text relating to diagnosis, pathology, and medical procedures.

Workbook

The *Medical Terminology for Health Professions*, Eighth Edition workbook contains a chapter to accompany each textbook chapter, with exercises to help you master the terms and word parts on the vocabulary list at the beginning of each chapter. In addition to the review exercises, there is a crossword puzzle to provide you with a change of pace as you study.



Online Resources

Online resources are available to accompany this new textbook, including slide presentations created in PowerPoint® and 3-D animations.

To access the online resources:

1. Go To: <http://www.CengageBrain.com>.
2. Register as a new user or log in as an existing user if you already have an account with Cengage Learning or CengageBrain.com

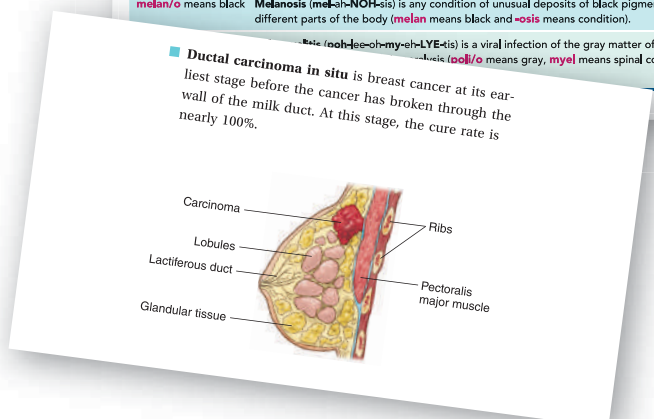


CHANGES TO THE EIGHTH EDITION

A detailed conversion guide that helps you make the change from the seventh to the eighth edition is included in the Instructor Resource Center at <http://www.cengage.com>. A brief summary of some of the changes follows:

- Added eleven new, full-color photos
- Chapter 1: Further clarified combining forms
- Chapter 1: Updated use of medical dictionary to include online resources
- Chapter 1: Updated “Do Not Use” abbreviations
- Chapter 2: Expanded section on health care professions
- Chapter 5: Added nutritional changes under treatments
- Chapter 6: Updated definitions of lymphomas
- Chapter 6: Expanded material on breast cancer
- Chapter 8: Expanded dental section and virtual colonoscopy
- Chapter 9: Added nutrition to treatment procedures
- Chapter 10: Expanded coverage of mental health
- Chapter 15: Updated section on nuclear medicine

TABLE 1.2 Word/Roots/Combining Forms Indicating Color	
cyan/o means blue	Cyanosis (sigh-ah-NOH-sis) is a blue discoloration of the skin caused by a lack of adequate oxygen (cyan means blue and -osis means condition).
erythr/o means red	Erythrocytes (eh-RITH-roh-sights) are mature red blood cells (erythr/o means red and cytes means cells). Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Lorem ipsum dolor sit amet.
leuk/o means white	Leukocytes (LOO-koh-sights) are white blood cells (leuk/o means white and -cytes means cells).
melan/o means black	Melanosis (mel-eh-NOH-sis) is any condition of unusual deposits of black pigment in different parts of the body (melan means black and -osis means condition).
	Encephalomyelitis (en-see-oh-my-eh-LYE-tis) is a viral infection of the gray matter of the brain and spinal cord. (encephal/o means gray, myel means spinal cord, and -itis means inflammation).



ACKNOWLEDGMENTS

It is a pleasure to introduce Katrina A. Schroeder, RD, and Laura Ehrlich, RN, as our new co-authors of *Medical Terminology for Health Professions*. They bring a fresh and professional perspective to this textbook as it enters its third decade. As always, we are very grateful for the input of the many reviewers, and instructors who volunteer feedback, who 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.

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. Deb Myette-Flis deserves special recognition for her steadfast support for this project throughout the past five 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.

*Ann Ehrlich and
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HOW TO USE THIS BOOK

Medical Terminology for Health Professions, Eighth 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

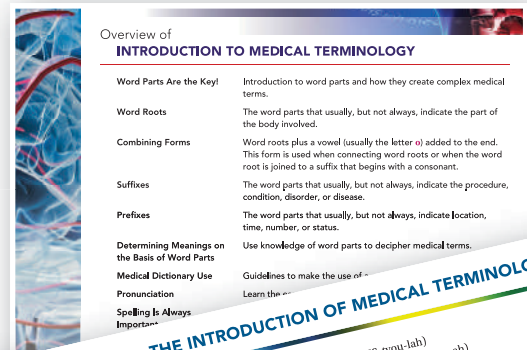
The second page of each chapter is a 75-item vocabulary list. This list includes 15 key word parts with their meanings and 60 important terms for the chapter with their pronunciations. This immediately alerts you to the key terms in the chapter and acts as a review guide. Next to each term is a box so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

LEARNING OBJECTIVES

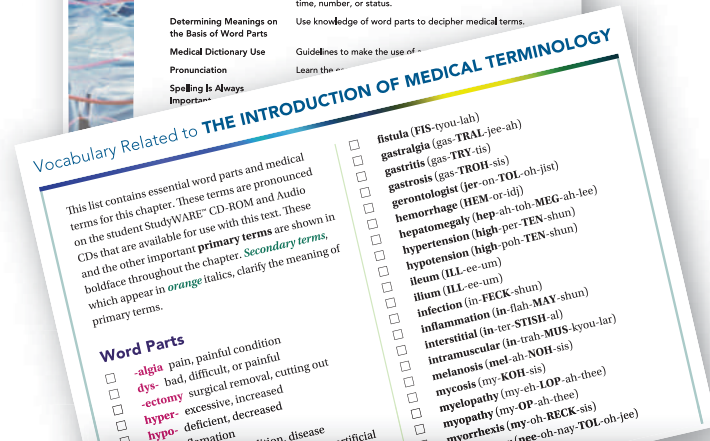
The beginning of each chapter lists learning objectives to help you understand what is expected of you as you read the text and complete the exercises. These objectives are set off with a colored bar for easy identification.

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.



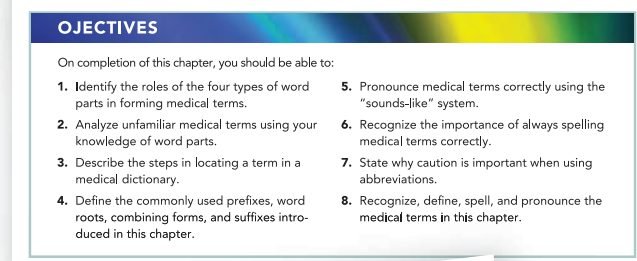
Overview of INTRODUCTION TO MEDICAL TERMINOLOGY	
Word Parts Are the Key!	Introduction to word parts and how they create complex medical terms.
Word Roots	The word parts that usually, but not always, indicate the part of the body involved.
Combining Forms	Word roots plus a vowel (usually the letter <i>i</i>) added to the end. This form is used when connecting word roots or when the word root is joined to a suffix that begins with a consonant.
Suffixes	The word parts that usually, but not always, indicate the procedure, condition, disorder, or disease.
Prefixes	The word parts that usually, but not always, indicate location, time, number, or status.
Determining Meanings on the Basis of Word Parts	Use knowledge of word parts to decipher medical terms.
Medical Dictionary Use	Guidelines to make the use of a medical dictionary easier.
Pronunciation	Learn the correct pronunciation of medical terms.
Spelling Is Always Important	Learn the correct spelling of medical terms.



This list contains essential word parts and medical terms for this chapter. These terms are pronounced on the student StudyWARE™ CD-ROM and Audio CDs that are available for use with this text. These CDs 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	Meaning
<input type="checkbox"/> -algia	pain, painful condition
<input type="checkbox"/> -dys-	bad, difficult, or painful
<input type="checkbox"/> -ectomy	surgical removal, cutting out
<input type="checkbox"/> -hyper-	excessive, increased
<input type="checkbox"/> -hypo-	deficient, decreased
<input type="checkbox"/> -itis	inflammation
<input type="checkbox"/> -oma	tumor, disease
<input type="checkbox"/> -osis	condition, disease
<input type="checkbox"/> -pathy	disease
<input type="checkbox"/> -plasty	surgical repair
<input type="checkbox"/> -rrhagia	excessive flow
<input type="checkbox"/> -rrhea	excessive flow
<input type="checkbox"/> -stasis	stoppage, arrest
<input type="checkbox"/> -tomy	cutting, incision
<input type="checkbox"/> -tripsy	cutting, incision
<input type="checkbox"/> -ulcer	raw, sore
<input type="checkbox"/> -uria	urine
<input type="checkbox"/> -y	condition, disease

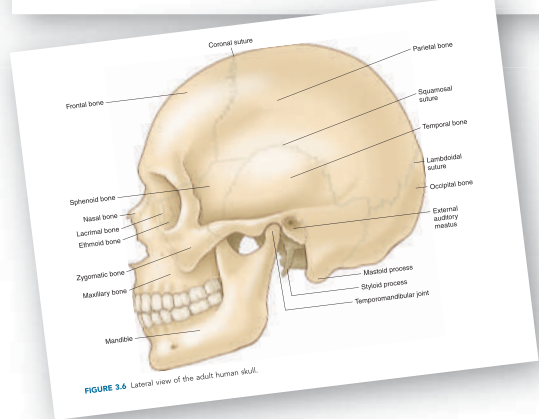
<input type="checkbox"/> fistula (FIS-you-lah)	<input type="checkbox"/> gastralgia (gas-TRAL-jee-ah)
<input type="checkbox"/> gastralgia (gas-TRAL-jee-ah)	<input type="checkbox"/> gastritis (gas-TRY-tis)
<input type="checkbox"/> gastritis (gas-TRY-tis)	<input type="checkbox"/> gastrologist (gas-TROH-sis)
<input type="checkbox"/> gastrologist (gas-TROH-sis)	<input type="checkbox"/> gerontologist (jer-on-TOL-oh-jist)
<input type="checkbox"/> gerontologist (jer-on-TOL-oh-jist)	<input type="checkbox"/> hemorrhage (HEM-or-idj)
<input type="checkbox"/> hemorrhage (HEM-or-idj)	<input type="checkbox"/> hepatomegaly (hep-ah-toh-MEG-ah-lee)
<input type="checkbox"/> hepatomegaly (hep-ah-toh-MEG-ah-lee)	<input type="checkbox"/> hypertension (high-per-TEN-shun)
<input type="checkbox"/> hypertension (high-per-TEN-shun)	<input type="checkbox"/> hypotension (high-poh-TEN-shun)
<input type="checkbox"/> hypotension (high-poh-TEN-shun)	<input type="checkbox"/> ileum (ILL-ee-um)
<input type="checkbox"/> ileum (ILL-ee-um)	<input type="checkbox"/> inflammation (in-flah-MAY-shun)
<input type="checkbox"/> inflammation (in-flah-MAY-shun)	<input type="checkbox"/> interstitial (in-ter-STISH-ial)
<input type="checkbox"/> interstitial (in-ter-STISH-ial)	<input type="checkbox"/> intramuscular (in-trah-MUS-kyou-lar)
<input type="checkbox"/> intramuscular (in-trah-MUS-kyou-lar)	<input type="checkbox"/> melanoma (mel-ah-NOH-sis)
<input type="checkbox"/> melanoma (mel-ah-NOH-sis)	<input type="checkbox"/> mycosis (my-KOH-sis)
<input type="checkbox"/> mycosis (my-KOH-sis)	<input type="checkbox"/> myelopathy (my-eh-LOP-ah-thee)
<input type="checkbox"/> myelopathy (my-eh-LOP-ah-thee)	<input type="checkbox"/> myopathy (my-OP-ah-thee)
<input type="checkbox"/> myopathy (my-OP-ah-thee)	<input type="checkbox"/> myorrhexis (my-oh-RECK-sis)
<input type="checkbox"/> myorrhexis (my-oh-RECK-sis)	<input type="checkbox"/> myorrhexis (my-oh-nay-TOL-oh-jee)



OBJECTIVES

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

1. Identify the roles of the four types of word parts in forming medical terms.
2. Analyze unfamiliar medical terms using your knowledge of word parts.
3. Describe the steps in locating a term in a medical dictionary.
4. Define the commonly used prefixes, word roots, combining forms, and suffixes introduced in this chapter.
5. Pronounce medical terms correctly using the "sounds-like" system.
6. Recognize the importance of always spelling medical terms correctly.
7. State why caution is important when using abbreviations.
8. Recognize, define, spell, and pronounce the medical terms in this chapter.



“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

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 *cyan* 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.

CAREER OPPORTUNITIES

As you learn medical terminology, you will want to give some thought as to what career you might want to pursue after graduation. This section, near the end of each chapter, will give you some ideas to consider.

HEALTH PROFESSION PROFILE

Read the real-life experiences of health care professionals to find out how they selected their career, what they do, and how they like it. Their words may inspire your own career choice!

Cartilaginous Joints

Cartilaginous joints (**kar-tih-LADJ-ih-nus**) allow only slight movement and consist of bones connected entirely by cartilage. For example:

- Where the ribs connect to the sternum (breast bone), shown in Figure 3.8, these joints allow movement during breathing.
- The **pubic symphysis** (**PEW-bick SIM-fih-sis**) allows some movement to facilitate childbirth. This joint is located between the pubic bones in the anterior (front) of the pelvis as shown in Figure 3.12.

The Spinal Column

- A **herniated disk** (**HER-nee-ayt-ed**), also known as a *slipped or ruptured disk*, is the breaking apart of an intervertebral disk that results in pressure on spinal nerve roots (Figure 3.18B).
- **Lumbago** (**lum-BAY-goh**), also known as *low back pain*, is pain of the lumbar region of the spine (**lumb** means lumbar, and **-ago** means diseased condition).
- **Spondylolisthesis** (**spoh-dih-loh-liss-THEE-sis**) is the forward slipping movement of the body of one of the lower lumbar vertebrae on the vertebra or sacrum below it (**spondyl/o** means vertebrae, and **-listhesis** means slipping).

CAREER OPPORTUNITIES

In addition to the medical specialties already discussed, some of the health occupations involving the treatment of the digestive system include:

- **Dental hygienist**: works under the supervision of a dentist, is licensed to remove stains and deposits from the teeth, exposes and develops x-rays, and assists the patient in learning about and maintaining good dental health.
- **Dental assistants** work under the supervision of a dentist, preparing patients for examinations, passing instruments during procedures, exposing and developing x-rays, sterilizing instruments, and performing receptionist and practice management duties.
- **Dental laboratory technician**: following a written prescription from a dentist, fabricates and repairs dental appliances such as crowns, bridges, and orthodontic appliances.
- **Registered dietitian (RD)** or **registered dietitian nutritionist (RDN)**: a specialist in food and nutrition licensed to assess patients' dietary needs, provide medical nutritional therapy, manage food service systems, and supervise and train personnel. Some specialties include:

HEALTH PROFESSION PROFILE REGISTERED DIETITIAN

Nicole Cormier is a registered dietitian and local foods enthusiast. I didn't know where my career as a dietitian would take me, but I knew I had a passion for food and health. I've worked at several hospitals and medical centers acquiring skills, ranging from weight management programs to medical nutrition therapy. However, I found my niche as a dietitian when I began connecting organic farming to nutrition counseling.

I've owned my private practice for over 5 years, and I work one-on-one with each patient to manage his or her energy and life in a way that creates positive relationships with food. I specialize in weight loss, family nutrition, food allergies and intolerance, diabetes, high cholesterol, IBS and gastrointestinal issues, and sports nutrition. I also am the Student Ambassador Advisor for Green Schools, a non-profit whose mission is to create greener and healthier learning environments through education and awareness.



STUDY BREAK

Put down your pencil—there is no quiz on this one. The Study Break is a brief and amusing pause in your studies before you go on to review the important information in the chapter.

REVIEW TIME

At the end of each chapter, there is a review exercise section with five questions. Each requires a written response and a discussion response. These review exercises give you opportunities to practice communicating with patients (using lay terms) and communicating with other health care professionals (using correct medical terminology). As you progress through the text these exercises become increasingly challenging.

OPTIONAL INTERNET ACTIVITY

There are also two Internet exercises at the end of each chapter. One requires you to go to a specific website. The other requires you to search a particular topic relating to the chapter.

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.

CHAPTER 8 STUDY BREAK

An **eponym** is a term derived from someone's name. Many people believe that a common slang word associated with **defecation**, or the elimination of solid waste products, comes from the name of the inventor of the toilet, Thomas Crapper.

This is only partially true. There was indeed a Thomas Crapper, an English inventor and plumber of the nineteenth century who set about to improve the bathroom, or as it was known back then, water closet (WC), which was already in common use at the time. Ironically, although he did hold nine patents of his own, he bought the patent for a device allowing a toilet to flush more effectively from its actual inventor, Albert Giblin. But the name of Crapper's company, T. Crapper—Chelsea, was emblazoned on new, improved toilets throughout England.

When American soldiers passed through England during World War I, they picked up the habit of using "crapper" as a slang term for the WC. Thomas Crapper thus achieved a dubious place in our language through an **eponym** that is frowned upon, but still in use, today.

REVIEW TIME

Write the answers to the following questions on a separate piece of paper or in your notebook. In addition, be prepared to take part in the classroom discussion.

- Written Assignment:** What is done during a dental prophylaxis?
Discussion Assignment: Why is it important to have this done regularly?
- Written Assignment:** Using terms a patient would understand, describe how hepatitis A virus (HAV) and hepatitis B virus (HBV) are transmitted.
Discussion Assignment: Why is being immunized against hepatitis B of particular importance for health care professionals?
- Written Assignment:** Using terms a physician would understand, describe the differences between a colonoscopy and a colostomy.
Discussion Assignment: Mr. Hernandez has a colostomy. Describe how fecal matter is removed from his body.
- Written Assignment:** Using terms a patient could understand, describe celiac disease.
Discussion Assignment: Think about how a patient might feel about having to change his or her entire diet. Describe the types of foods that a patient with celiac disease can still enjoy.

OPTIONAL INTERNET ACTIVITY

The goal of this activity is to help you learn more about medical terminology as it applies to the "real world." Select one of the two options below and follow the instructions.

- To learn more about **dysphagia**, do a search to find out why a person might have trouble swallowing. Write a brief (one- or two-paragraph) report on something new you learned about what someone with dysphagia can eat and include the address of the website where you found this information.
- To learn more about the many types of **hepatitis**, go to the website of the World Health Organization (WHO). Write a brief (one- or two-paragraph) report on something new you learned about any one type of hepatitis.

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 with her medical terminology book opened to the first chapter, highlighter in hand. Her two-year-old son, Mathias, plays with a box of Animal Crackers in his highchair, 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's the membrane and the short one's 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 red words **-rrhagia**, **-rrhaphy**, **-rrhea**, and **-rrhexis**. Stumbling over the pronunciation, 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.

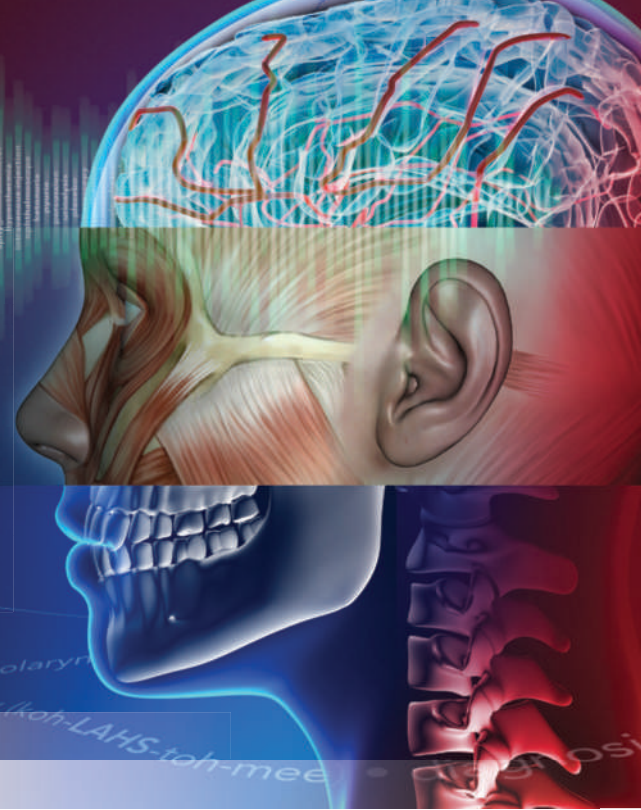
Baylie keeps at it. "Rhini/o means nose," highlighting those three words, "and a rhinoceros has a big horn on his nose."

"Rhini!" Mathias 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:

- Baylie needs to learn medical terminology if she wants a career in the medical field. What study habits would help Baylie accomplish this task?
- A support group could help empower Baylie to accomplish her goals. What people would you suggest for this group and why?
- How can this textbook and other resource materials help her (and you) learn terminology?
- Discuss strategies the instructor could use, and has already used, to help Baylie improve her terminology skills.
- Discuss how previous educational or learning experiences influence a student's approach to learning a new skill or subject.

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 a suffix.
Suffixes	The word part attached at the end of a word that usually, but not always, indicates the procedure, condition, disorder, or disease.
Prefixes	The word part attached at the beginning of a 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.
Medical Dictionary Use	Guidelines to make looking up a term 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 a 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 *cyan* italics, clarify the meaning of primary terms.

Word Parts

- algia** pain, suffering
- dys-** bad, difficult, or painful
- ectomy** surgical removal, cutting out
- hyper-** excessive, increased
- hypo-** deficient, decreased
- itis** inflammation
- osis** abnormal condition, disease
- ostomy** the surgical creation of an artificial opening to the body surface
- otomy** cutting, surgical incision
- plasty** surgical repair
- rrhage** bleeding, abnormal excessive fluid discharge
- rrhaphy** surgical suturing
- rrhea** flow or discharge
- rrhexis** rupture
- 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)
- myorrhexis** (my-oh-RECK-sis)
- 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-droh-m)
- 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 book, you will be introduced to many medical terms; however, mastering them will be easier than you anticipate because this book 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 *cyan* 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 book includes many aids to help you reinforce your word-building skills.

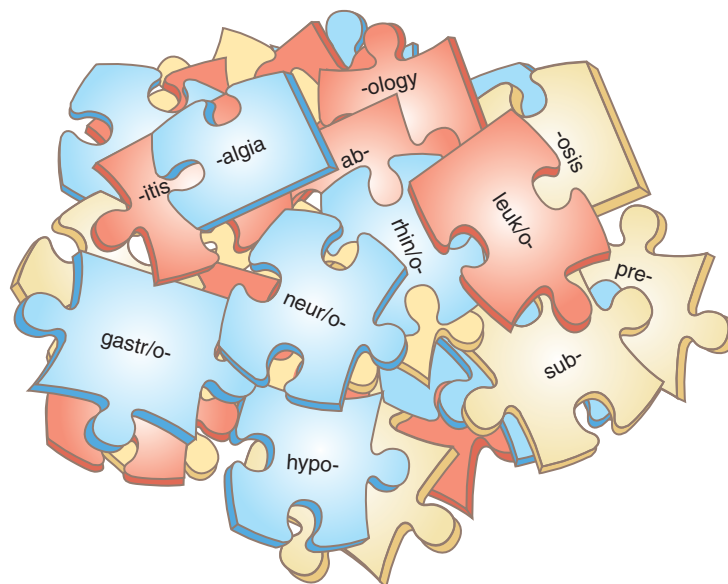


FIGURE 1.1 Word parts (word roots, combining forms, suffixes, and prefixes) make up most medical terms.

- 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 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, 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 (-) preceding 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 followed by a hyphen (-). 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.

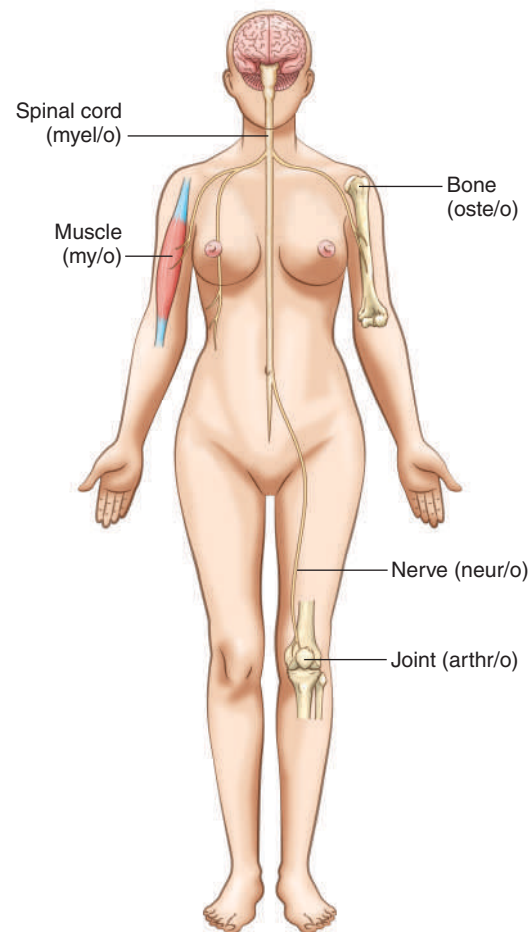


FIGURE 1.2 Word roots, shown here as combining forms, usually indicate the involved body part.

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 a 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 a mature red blood cell (erythr/o means red, and -cyte means cell).
leuk/o means white	A leukocyte (LOO-koh-sight) is a white blood cell (leuk/o means white, and -cyte means cell).
melan/o means black	Melanosis (mel-ah-NOH-sis) is any condition of unusual deposits of black pigment in body tissues or organs (melan means black, and -osis means abnormal condition or disease).
poli/o means gray	Poliomyelitis (poh-lee-oh-my-eh-LYE-tis) is a 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

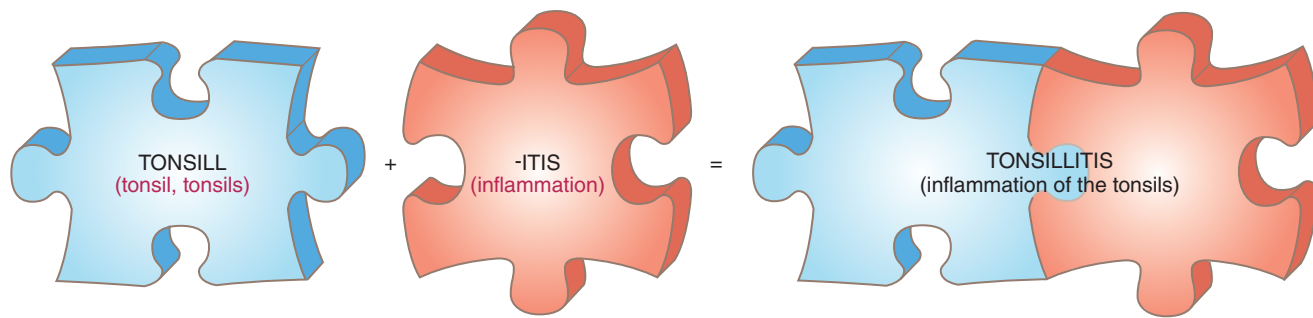


FIGURE 1.3 The term *tonsillitis* is created by adding the suffix **-itis** to the word root **tonsill**.

(**crani** means skull, and **-um** is a noun ending). Suffixes that are commonly used as noun endings are shown in Table 1.3.

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.

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	

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 **-dynia** has the same meaning as **-algia**, 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).

TABLE 1.5

Suffixes Meaning “Abnormal Condition”

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



iStockphoto/Catalin Perolea

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

- **-megaly** means enlargement. **Hepatomegaly** (hep-ah-toh-**MEG**-ah-lee) is abnormal enlargement of the liver (**hepat/o** means liver, and **-megaly** means enlargement).
- **-malacia** means abnormal softening. **Arteriomalacia** (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. **Arteriosclerosis** (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 a radiographic (x-ray) 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 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 abnormal excessive fluid discharge).
- **-rrhaphy** means surgical suturing to close a wound and includes the use of sutures, staples, or surgical glue. **Myorrhaphy** (my-**OR**-ah-fee) is the surgical suturing of a muscle wound (**my/o** means muscle, 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).

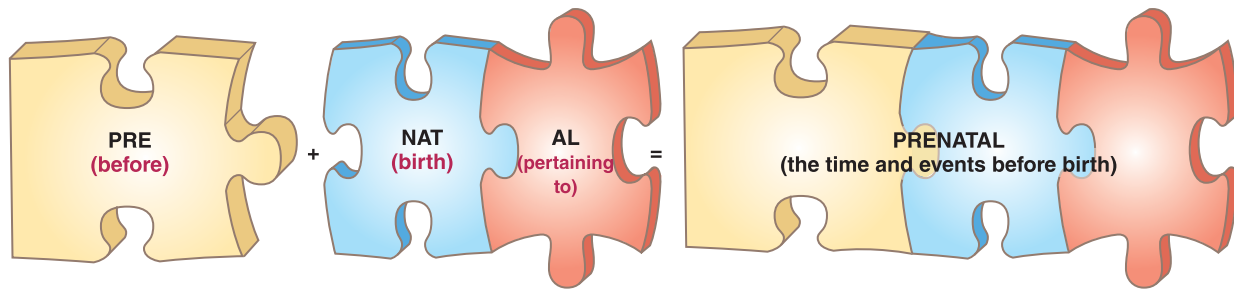


FIGURE 1.5 The term *prenatal* is created by joining the suffix *-al* to the word root *nat* and then adding the prefix *pre-*.

- **-rrhexis** means rupture. **Myorrhesis** (**my**-oh-**RECK**-sis) is the rupture of a muscle (**my/o** means muscle, and **-rrhexis** means rupture).

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,



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



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

TABLE 1.6

Prefixes Describing Direction, Quantity, Size, and Amount

ab- away from, negative, absent	ad- toward, to, in the direction of
dextr/o right side	sinistr/o left side
ex- out of, outside, away from	in- in, into, not, without
macro- large, abnormal size, or long	micr/o, micro- small
mega-, megal/o large, great	olig/o scanty, few
pre- before	post- after, behind



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