

# Medical Terminology Fourth Edition

## COMPLETE!

Bruce Wingerd



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Bruce Wingerd

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## DEDICATION

For Mala, who has shown so many thousands  
of students how learning can be made  
fun . . . including me.

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# Welcome!

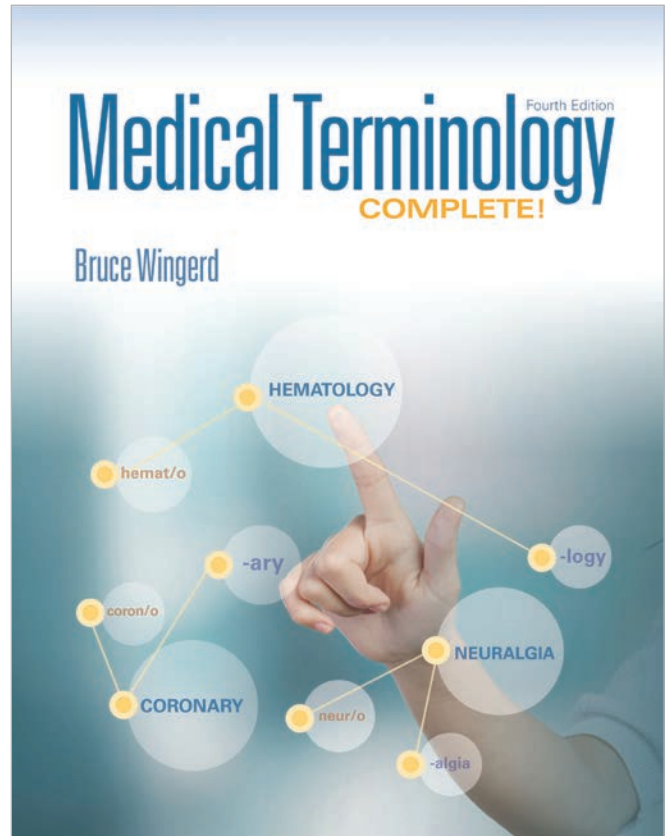
Welcome to *Medical Terminology Complete!* You have chosen an exciting time to begin a career as a healthcare professional. The healthcare industry is a dynamic field that is filled with opportunities for those who care about helping other people. Although many aspects of health care remain relatively constant, research breakthroughs occur each year to keep us moving forward in the war against human suffering. And you can be a part of this exciting process!

This book is designed to help you through the process of building a medical vocabulary. It teaches you the language by using a method known as *programmed learning*. With this approach, you read through the information at your own pace, one small box (or frame) at a time. Within most frames are blanks, which you fill in as you read. The answers to the blanks are provided in the left column, making it easy and quick to check your answer to make sure you are on the right track. To maximize your learning experience, it is best to cover the answers in the left column until you have filled in the blanks on your own. Challenge yourself! By filling in the blanks as you read, you become an active learner, which improves your chance of successfully mastering medical terminology. You'll have the opportunity to learn thousands of medical terms, and our simple goal is to provide you with the tools and confidence to help you master this brand new vocabulary.

You may be wondering about the title of this book: *Medical Terminology Complete!* Let us explain the two goals we had in mind as we developed this text.

1. To place a **complete** resource at your fingertips. With its interactive format and its wealth of clear definitions, vivid images, practical examples, and challenging exercises, it's all that you need to become proficient in speaking and understanding the language of medicine.
2. To allow you to **complete** the exercises on every page. This book features a programmed method that prompts you, the reader, to fill in the content as you read. This approach keeps your pen or pencil on every page, so you stay engaged and retain more.

Now please turn the page to get a glimpse of what makes this book an ideal guide to your exploration of medical terminology.





# Discover What Makes This Book Unique

This section provides you with a snapshot of what makes this book special. Consider this your user’s manual to the book and all the accompanying resources that are available to you.

## Diseases and Disorders of the Male Reproductive System

Here are the word parts that specifically apply to the diseases and disorders of the male reproductive system and are covered in the following section. Note that the word parts are color-coded to help you identify them: prefixes are yellow, combining forms are red, and suffixes are blue.

Prefix	Definition	Combining Form	Definition	Suffix	Definition
an-	without, absence of	andr/o	male	-cele	hernia, swelling, or protrusion
hyper-	excessive, abnormally high, above	balan/o	glans penis	-ism	condition or disease
para-	alongside, abnormal	crypt/o	hidden	-itis	inflammation
		epididym/o	epididymis	-pathy	disease
		hydr/o	water	-plasia	formation, growth
		orchi/o, orchid/o	testis		
		prostat/o	prostate gland		
		varic/o	dilated vein		

## Color-Coded Word Parts

Prefixes, combining forms, and suffixes are each designated by a unique color—making it easier for you to visually recognize the distinctions between each word part, thereby aiding in your mastery of word building.

### KEY TERMS A–Z

#### andropathy

an DROPP ah thee

**12.17** A combining form that means “male” and the suffix meaning “disease” may be combined to form a general term for a disease afflicting only males, \_\_\_\_\_. This constructed term includes three word parts, which can be represented as **andr/o/pathy**.

#### anorchism

an OR kizm

an/orch/ism

**12.18** A word root that means “testis” is **orchi** or **orchid**. When the prefix meaning “without, absence of” is added along with the suffix **-ism**, the constructed term \_\_\_\_\_ is created. It means “condition of without testis” and refers to the absence of one or both testes. The constructed form of the term is written \_\_\_\_/\_\_\_\_/\_\_\_\_. The term **anorchidism** may also be used with the same meaning.

#### balanitis

bal ah NYE tiss

**12.19** Inflammation of the glans penis is a disorder called \_\_\_\_\_. It is a constructed term with two word parts, as you can see in **balan/itis**.

#### benign prostatic hyperplasia

bee NINE \* pross TAT ik \*  
HIGH per PLAY zee ah

**12.20** Among many men older than age 50, the prostate gland enlarges to constrict the urethra passing through it. Known as **benign prostatic hyperplasia**, symptoms include nocturia (nighttime urination) and a frequent need to void (■ Figure 12.4). It is not a form of cancer and does not spread to other tissues, but its symptoms are uncomfortable. \_\_\_\_\_ is also called **benign prostatic hypertrophy**; both are abbreviated **BPH**.

## Key Terms A–Z

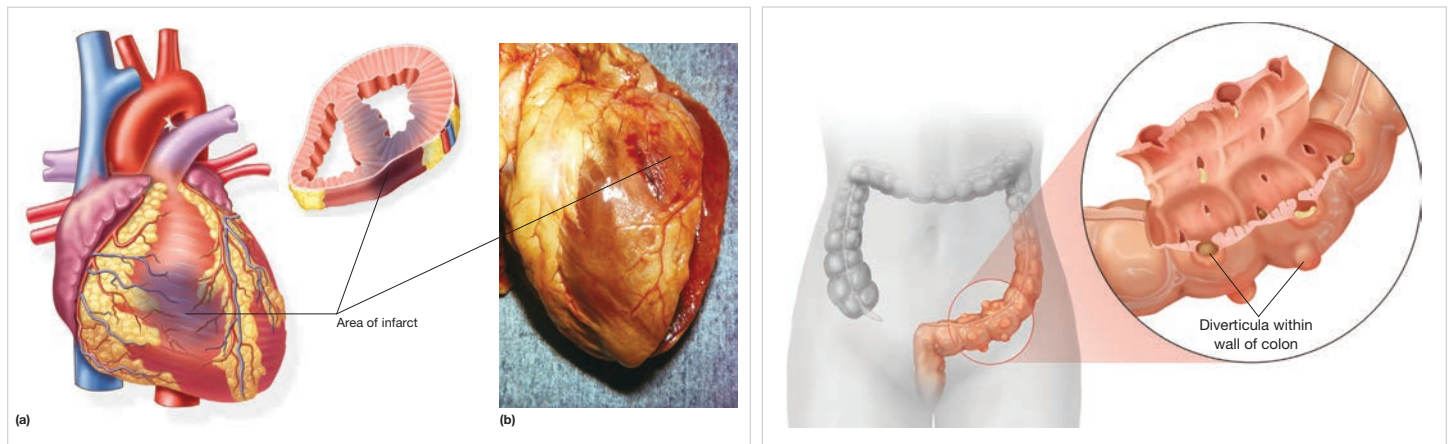
The most important terms are listed in alphabetical order, helping you to easily review those important terms before an exam.

## Programmed Instruction

This format allows you to learn actively but at your own pace, filling in blanks as you read. Answers appear in the left column, making it easy and quick to check your answer to make sure you are on the right track. Programmed instruction works best when you cover the answers in the left column until you fill in the blanks. If you remember to do this, it will keep your studies challenging, and your learning experience will benefit.

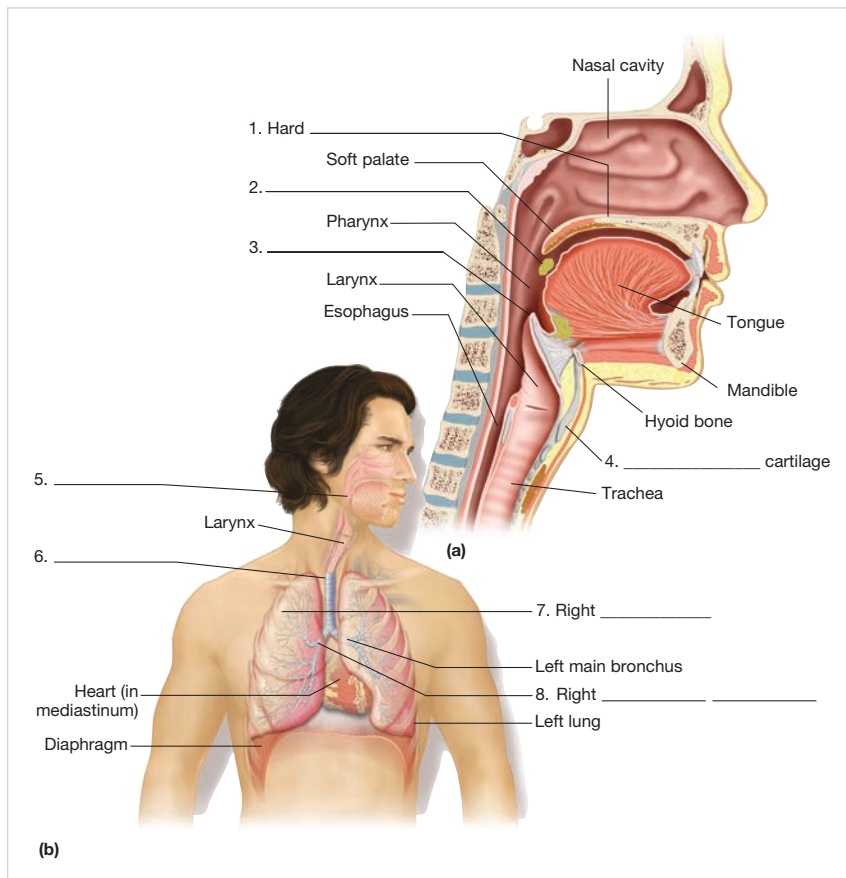
## Medically Accurate Illustrations

Concepts come to life with vibrant, clear, consistent, and scientifically precise images.



## Image Labeling Frames

These frames provide you with opportunities to actively engage with the illustrations, helping to reinforce your knowledge of anatomy. They are included in the Chapter Review section at the ends of Chapters 5–15 and are new to this edition.



## Word Building, Step by Step

At-a-glance tables provide a preview of the word parts and definitions you'll learn in each framed section that follows. Then, in the frame for each constructed term, word part reminders show how the individual word part meanings combine to form the constructed term. Word part breakdowns show, by using slash marks, how the constructed term is broken down. Word parts are colored here, too, for further word building reinforcement.

### hypoparathyroidism

HIGH poh pair ah THIGH royd izm  
hypo/para/thyroid/ism

**15.25** The excessive production of PTH by the parathyroid glands is a disorder known as **hyperparathyroidism**. This lengthy term contains four word parts: **hyper/para/thyroid/ism**. Usually caused by a tumor, it results in excessive calcium levels in the blood, or hypercalcemia (Frame 15.23). In the opposite condition called \_\_\_\_\_, PTH levels are reduced and the condition of hypocalcemia (Frame 15.23) occurs. The constructed form of this term is \_\_\_\_/\_\_\_\_/\_\_\_\_/\_\_\_\_.

## Did You Know?

These special frames reveal fascinating facts about the Latin or Greek origins of a medical term and provide interesting, relevant facts and figures.



### Did You Know

#### IN SITU

The term *in situ* (pronounced in \*SIGH tyoo) is a Latin phrase that literally means "in site." Its use in modern medicine refers to confinement to a site of origin. *Carcinoma in situ* describes a tumor that is confined to its organ of origin, rather than a metastatic tumor in a secondary site. For example, a tumor that originates and remains in the cervix is *in situ*, while a tumor that originates from the cervix but sheds cells to other organs such as the lungs or stomach is metastatic (or malignant).



### WORDS TO Watch Out For

#### -pexy or -plasty?

The meanings of these two suffixes both relate to surgery—but they are very different forms of surgery. Remember that **-pexy** means "surgical *fixation, suspension*," and **-plasty** means "surgical *repair*." One way to remember the meaning of **-pexy** is that it uses an *x*, as does the word *fixation* in its definition. Similarly, a way to remember the meaning of **-plasty** is that it uses a *p*, as does the word *repair* in its definition.

## Words to Watch Out For!

These special frames provide tips about commonly misspelled or error-prone terms and word parts.

## Practice Exercises

These are exercises that follow each chapter subsection and provide opportunities to pause and review with practices such as *The Right Match*, *Linkup*, and *Break the Chain*.

### PRACTICE: Signs and Symptoms of the Digestive System

#### The Right Match

Match the term on the left with the correct definition on the right.

- |                       |   |
|-----------------------|---|
| _____ 1. dysphagia    | a. backward flow of material in the GI tract      |
| _____ 2. reflux       | b. gas trapped in the GI tract                    |
| _____ 3. flatus       | c. difficulty in swallowing                       |
| _____ 4. halitosis    | d. infrequent or incomplete bowel movements       |
| _____ 5. ascites      | e. frequent discharge of watery fecal material    |
| _____ 6. diarrhea     | f. bad breath                                     |
| _____ 7. nausea       | g. from the French word for yellow                |
| _____ 8. constipation | h. a symptomatic urge to vomit                    |
| _____ 9. jaundice     | i. accumulation of fluid in the peritoneal cavity |



## Reinforcement Activities Conclude Each Chapter

### CHAPTER REVIEW

#### Word Building

Construct medical terms from the following meanings. (Some are built from word parts, some are not.) The first question has been completed as an example.

- |   |                                  |
|---|----------------------------------|
| 1. inflammation of the larynx   | _____ <i>laryngitis</i>          |
| 2. absence of oxygen  | _____oxia                        |
| 3. inflammation of the bronchi  | bronch_____                      |
| 4. respiratory failure characterized by atelectasis                   | respiratory _____                |
| 5. physical exam that includes listening to body sounds               | _____ (do this one on your own!) |
| 6. deficient oxygen levels in the blood                               | hyp_____                         |
| 7. difficulty breathing   | _____pnea                        |
| 8. excessive carbon dioxide levels in the blood                       | hyper_____                       |
| 9. abnormal dilation of the bronchi                                   | bronchi _____                    |
| 10. lung inflammation due to dust inhalation                          | _____coniosis                    |
| 11. cancer arising from cells within the bronchi                      | bronchogenic _____               |
| 12. an inherited disease of excessive mucus production                | cystic _____                     |
| 13. inflammation of the trachea                                       | trache_____                      |
| 14. the absence of respiratory ventilation                            | _____sphyxia                     |
| 15. x-ray image of the bronchi  | broncho_____                     |
| 16. surgical puncture and aspiration of fluid from the pleural cavity | thora_____                       |
| 17. measurement of oxygen levels in the blood                         | oxi_____                         |

#### Word Building Exercises

These review opportunities provide practice in assembling word parts to form many of the medical terms you have just learned about in the chapter.

#### Define the Combining Form Exercises

This review gives you the opportunity to practice your new knowledge in the definitions of combining forms found in the chapter and provide an example of how a combining form may create a term (new to this edition).

#### Define the Combining Form

In the space provided, write the definition of the combining form, followed by one example of the combining form used to build a medical term in Chapter 10.

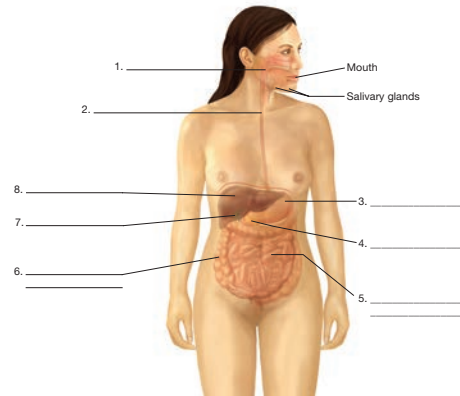
	Definition	Use in a Term
1. gastr/o	_____	_____
2. cholecyst/o	_____	_____
3. choledoch/o	_____	_____
4. enter/o	_____	_____
5. duoden/o	_____	_____
6. gingiv/o	_____	_____
7. col/o	_____	_____
8. pept/o	_____	_____

### Complete the Labels

This review of basic anatomy asks you to complete the labeling of illustrations. The fully labeled illustrations are provided at the beginning of the chapter in the Anatomy and Physiology Terms section (new to this edition).

### Complete the Labels

Complete the blank labels in ■ Figures 10.24 and 10.25 by writing the labels in the spaces provided.



### Medical Report Exercises

These scenarios combine the use of medical case studies and comprehension questions to help you develop a firmer understanding of the terminology in a real-world clinical context.

## MEDICAL REPORT EXERCISES

### Anita Del Rio

Read the following medical report, then answer the questions that follow.

PGH

### PEARSON GENERAL HOSPITAL

5500 University Avenue, Metropolis, New York  
Phone: (211) 594-4000 • Fax (211) 594-4001



**Medical Consultation:** Pediatrics

**Date:** 09/07/2017

**Patient:** Anita Del Rio

**Patient ID:** 123456

**Dob:** 1/15/2004

**Age:** 13

**Sex:** Female

**Allergies:** NKDA

**Provider:** Jonathon McClary, MD

#### Subjective:

"I'm really tired most of the day, mostly between meals, and getting behind in school. I get real thirsty a lot, and it seems like I need to use the bathroom 20 times a day! Lately, I've also been getting headaches a lot and have trouble falling asleep at night."

13 y/o female complains of malaise, polydipsia, polyuria, cephalalgia, and insomnia. Although full of pep in the clinic during her visit, her mother supports her complaints and is very concerned with her lack of energy. No medical history available.

#### Objective:

**Vital Signs:** T: 98.6°F; P: 80; R: 22; BP: 120/75

**Ht:** 5'1"

**Wt:** 90 lb

**General Appearance:** Skin appears healthy, with no apparent masses or discolorations.

**Heart:** Rate at 80 bpm. Heart sounds with auscultation appear normal.

**Lungs:** Clear without signs of disease.

**AbD:** Bowel sounds normal all four quadrants.

**HEENT:** No abnormalities present.

**Lab:** Ketone bodies elevated, mild acidosis pH 7.3; FBS 220 confirmed with GTT

#### Assessment:

Diabetes mellitus type 1

#### Plan:

Treat as type 1 DM with regular insulin injection regimen and enroll with parent in diabetes management class.

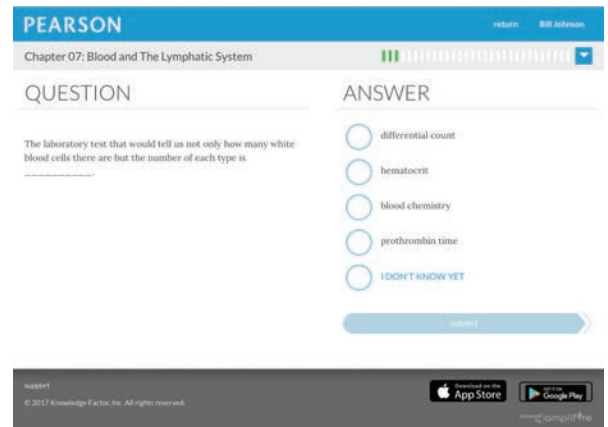
Photo Source: Scott Griessel/Fotolia.

# MyLab Medical Terminology™

## What is MyLab Medical Terminology?

MyLab Medical Terminology is a comprehensive online program that gives you, the student, the opportunity to test your understanding of information, concepts, and medical language to see how well you know the material from the test results. MyLab Medical Terminology builds a self-paced, personalized study plan unique to your needs. Remediation in the form of etext pages, illustrations, exercises, audio segments, and video clips is provided for those areas in which you may need additional instruction, review or reinforcement. You can then work through the program until your study plan is complete and you have mastered the content. MyLab Medical Terminology is available as a standalone program or with an embedded etext.

MyLab Medical Terminology is organized to follow the chapters and learning outcomes in *Medical Terminology Complete!*, fourth edition. With MyLab Medical Terminology, you can track your own progress through your entire med term course.



## How do Students Benefit?

Here's how MyLab Medical Terminology helps you.

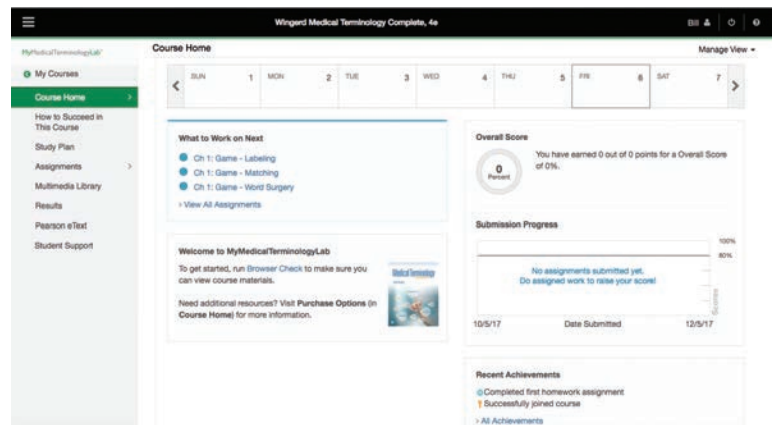
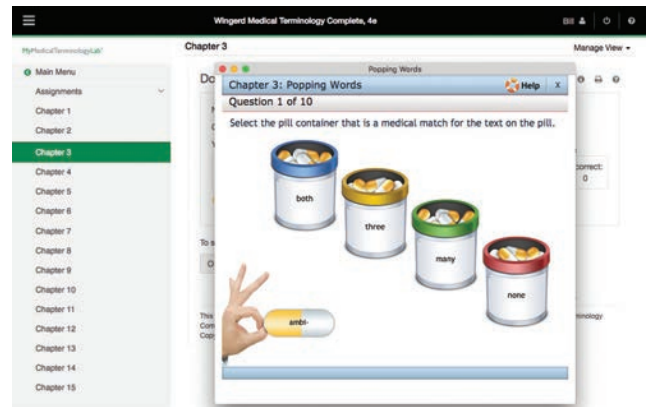
- Keep up with information presented in the text and lectures.
- Save time by focusing study and review on just the content you need.
- Increase understanding of difficult concepts with study material for different learning styles.
- Remediate in areas in which you need additional review.

## Key Features of MyLab Medical Terminology

Pre-Tests and Post-Tests. Using questions aligned to the learning outcomes in *Medical Terminology Complete!*, multiple tests measure your understanding of topics.

Personalized Study Material. Based on the topic pre-test results, you receive a personalized study plan, highlighting areas where you may need improvement. It includes these study tools:

- Links to specific pages in the etext
- Images for review
- Interactive exercises
- Animations and video clips
- Audio glossary
- Access to full Personalized Study Material.





## How do Instructors Benefit?

- Save time by providing students with a comprehensive, media-rich study program.
- Track student understanding of course content in the program guidebook.
- Monitor student activity with viewable student assignments.

## Comprehensive Instructional Package

Perhaps the most gratifying part of an educator's work is the "aha" learning moment when the light bulb goes on and a student truly understands a concept—when a connection is made. Along these lines, Pearson is pleased to help instructors foster more of these educational connections by providing a complete battery of resources to support teaching and learning. Qualified adopters are eligible to receive a wealth of materials designed to help instructors prepare, present, and assess. For more information, please contact your Pearson sales representative or visit [www.pearsonhighered.com/educator](http://www.pearsonhighered.com/educator).

## Preface

*Medical Terminology Complete!* presents the most current and accepted language of health care in a programmed learning approach. It has helped prepare thousands of students for careers in health professions by providing a self-guided tool for learning medical terminology. The book may be used as a text to support lectures and online courses or as an independent student workbook. The flexibility of its application is made possible by the book's text-like format combined with its self-guided learning program, self-assessment questions, and reinforcement exercises. To provide an optimum learning format, the text discussions are basic, clear, and concise. The programmed learning modules are simple and easy to follow, and the self-assessment questions and exercises provide reviews and clinical applications of the information at frequent intervals.

### New to This Edition

Based on extensive feedback from students and instructors, we have revised *Medical Terminology Complete!* so that it provides an even more valuable teaching and learning experience than previous editions. Here are the enhancements we have made:

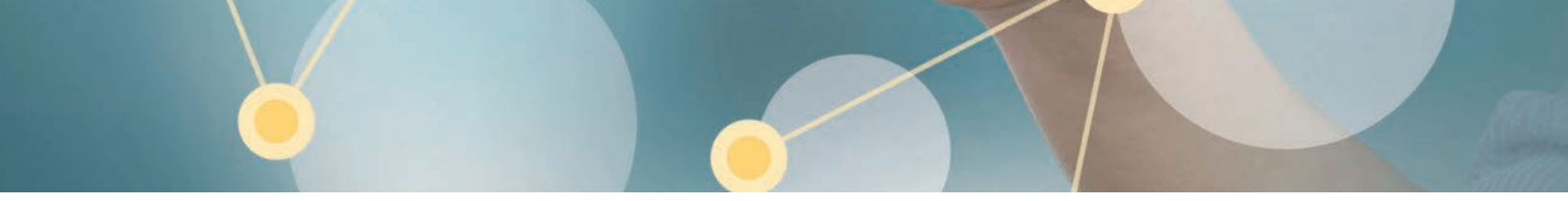
- All chapters have been carefully reviewed and edited to complete a shift from a biological perspective to a more clinical perspective, thereby providing improved clinical training for students poised to enter healthcare careers.
- All selected terms have been carefully screened for current accuracy, with outdated terms removed and new terms added to bring the text up-to-date.
- Many new photographs and several new illustrations have been added to help learners more easily visualize the concepts and meanings of selected terms.
- Additional Chapter Review exercises at the end of chapters 5-15 have been added to give students more practice with reviewing chapter terms, including **Define the Combining Form** and **Complete the Labels**.
- The online support has been improved to provide easier access and enhancements to interactive learning, making this edition a valuable learning tool for online courses in medical terminology.

### The Programmed Approach

Each learning frame contains a clear and concise statement, usually describing a single medical term. This allows learners to focus on one term at a time. Each frame includes at least one blank space, which can be completed based on clues within the frame. The answer to the blank is provided in the left column. Students can either cover the answer column or leave it uncovered. Either way, the kinesthetic component of filling in the blank provides another level of learning that ensures retention.

Each body systems chapter presents the most important terms (or "Key Terms") in the answer column with color-coded word parts, where applicable, as well as a phonetic pronunciation. Prefixes appear in **yellow**; combining forms are **red**; and suffixes are **blue**.





An added benefit of this Key Terms answer column is that the terms are presented in alphabetical order, which provides a way for students to quickly review the priority terms. Other terms that are related to the Key Terms in the answer column, but not as vital for the student to understand, are presented in the main frame section in boldface type.

The self-study features enable students to learn with a minimum of instructor guidance. In addition to the programmed learning frames, other self-study features include blocks of review questions (**Practice**) that are placed at frequent intervals throughout each chapter. In these sections, students have the opportunity to test their understanding by answering questions in **The Right Match**, **Linkup**, and **Break the Chain** activities. Answers to these activities, along with those for the end-of-chapter review questions, appear in Appendix E located at [www.pearsonhighered.com/healthprofessionsresources](http://www.pearsonhighered.com/healthprofessionsresources).

The book also includes boxes intended to promote additional interest in medical terminology. They include **Did You Know?** boxes, which reveal fascinating facts about the Latin or Greek origins of a medical term and provide interesting and relevant facts and figures that draw a connection between a particular term and its clinical point of interest, and **Words to Watch Out For!** boxes, which provide tips about commonly misspelled or error-prone terms and word parts.

## Chapter Format

Each chapter begins with a brief list of **Learning Objectives**. In each chapter beginning with Chapter 5, a brief review of the structure and function of the particular body system discussed in the chapter follows the objectives. The section is titled **Anatomy and Physiology Terms**, and it begins with an at-a-glance table with the major combining forms and definitions for that body system. The Anatomy and Physiology section then presents a limited number of learning frames—enough to give students an opportunity to review essential anatomy and physiology, without overwhelming them or providing redundancy to students who have already taken an anatomy course as a prerequisite. The illustrations accompanying this section provide a visual review of anatomy.

The primary text of each chapter consists of a brief narrative introduction discussing the pathophysiology of the body system, followed by numerous programmed learning frames and **Practice** exercises that are divided into three sections:

- **Signs and Symptoms**
- **Diseases and Disorders**
- **Treatments, Procedures, and Devices**

An **Abbreviations** listing and a **Practice** exercise follow to conclude the teaching portion of the chapter.

Finally, a **Chapter Review** section provides several review exercises, including **Word Building** and **Medical Report Exercises** with two medical reports and case studies. New to this edition are additional chapter review exercises, including **Define the Combining Form** and **Complete the Labels**.



## Organization of the Book

The organization of this text is unique in that it provides a slow, building approach to teaching medical terminology. Students can often be overwhelmed by this new language, so here's what we've done to address this and make the learning experience more comfortable for students:

- The text begins with three chapters devoted exclusively to word building and word parts. Chapter 1 provides an introduction to medical terminology and to the programmed learning approach. Basic definitions of terminology and word construction are first described here. Also, the importance of learning the most common Latin and Greek word parts is emphasized as a starting point. Chapter 2 provides an opportunity for students to learn the common suffixes that are in frequent use in building medical terms. Chapter 3 covers prefixes and their common uses in medical terms. We then present Chapter 4, which introduces anatomy and physiology word roots and combining forms, both of which create the foundation for the majority of medical terms. This chapter also introduces other foundational terms, such as anatomical and directional terms. This allows the student to take a slow, logical approach to learning word parts and word building.
- Then, the student can put that knowledge to work and learn about medical terms as they apply to each body system. The body system chapters progress from the least complex body system (integumentary) to the most complex body system (endocrine), with a sequence that parallels most courses in anatomy and physiology. This approach enhances learning by allowing students to build confidence as they work their way through the chapters.

Appendix A provides a complete glossary of all word parts that are presented in the text, along with their definitions. Appendix B lists abbreviations commonly used in the healthcare professions. Appendix C provides word parts for describing color, number, and plurals. In Appendix D (online), common terms used in pharmacology are included for your reference. Appendix E (online) provides the answers to the Practice exercises and to the end-of-chapter Chapter Review questions. All online materials can be found at [www.pearsonhighered.com/healthprofessionsresources](http://www.pearsonhighered.com/healthprofessionsresources).

A glossary/index concludes the book, providing a quick and handy reference.

I invite and welcome your reactions, comments, and suggestions to be sent to me directly so that subsequent editions may reflect your educational needs even better.

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## About the Author



Bruce Wingerd is a member of the Biology Department at National University in San Diego, California. Previously, he has held teaching/administrative positions at Edison State College (now called Florida Southwestern State College), Broward College, and San Diego State University. Professor Wingerd's degrees are in the fields of zoology and physiology, and he has taught courses in medical terminology, human anatomy, advanced human anatomy, and anatomy and physiology for more than 30 years. He has written numerous textbooks, lab manuals, and multimedia learning resources in medical terminol-

ogy, human anatomy, anatomy and physiology, histology, and comparative mammalian anatomy. Professor Wingerd's goal in teaching and writing is to provide students with learning tools that will help them reach their potential through education. He enjoys counseling students in the health sciences, developing novel approaches to teaching and learning, and leading faculty in the drive for excellence in education.

## About the Illustrators

Marcelo Oliver is president and founder of Body Scientific International, LLC. He holds an MFA degree in Medical and Biological Illustration from the University of Michigan. For more than 15 years, his passion has been to condense complex anatomical information into visual education tools for students, patients, and medical professionals.

Body Scientific's lead artists in this publication were medical illustrators Carol Hrejsa, Liana Bauman, and Katie Burgess. They each hold Master of Science degrees in Biomedical Visualization from the University of Illinois at Chicago. Their contribution was the creation and editing of clear, effective, vibrant, and medically accurate artwork throughout.





## Acknowledgments

This book is the product of collective hard work from a talented team focused on creating a unique learning tool.

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## Our Development Team

The fresh, unique vision, format, and content contained within the pages of *Medical Terminology Complete!* comes as a result of an incredible collaboration of expert educators from around the United States. This book represents the collective insights, experience, and thousands of hours of work performed by members of this development team. Their influence will continue to have an impact for decades to come. Let us introduce the members of our team.

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## A Commitment to Accuracy

As a student embarking on a career in health care you probably already know how critically important it is to be precise in your work. Patients and coworkers will be counting on you to avoid errors on a daily basis. Likewise, we owe it to you—the reader—to ensure accuracy in this book. We have gone to great lengths to verify that the information provided in *Medical Terminology Complete!* is complete and correct. To this end, here are the steps we have taken:

1. **Editorial Review**—We have assembled a large team of developmental consultants (listed on the preceding pages) to critique every word and every image in this book. No fewer than 12 content experts have read each chapter for accuracy. In addition, some members of our developmental team were specifically assigned to focus on the precision of each illustration that appears in the book.
2. **Medical Illustrations**—A team of medically trained illustrators was hired to prepare each piece of art that graces the pages of this book. These illustrators have a higher level of scientific education than the artists for most textbooks, and they worked directly with the author and members of our development team to make sure that their work was clear, correct, and consistent with what is described in the text.
3. **Accurate Ancillaries**—The teaching and learning ancillaries are often as important to instruction as the textbook itself. Therefore, we took steps to ensure accuracy and consistency of these by reviewing every ancillary component. The author and editorial team studied every PowerPoint slide and online course frame to ensure the context was correct and relevant to each lesson.

Although our intent and actions have been directed at creating an error-free text, we have established a process for correcting any mistakes that may have slipped past our editors. Pearson takes this issue seriously and therefore welcomes any and all feedback that you can provide along the lines of helping us enhance the accuracy of this text. If you identify any errors that need to be corrected in a subsequent printing, please send them to:

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Thank you for helping Pearson reach its goal of providing the most accurate medical terminology textbooks available.

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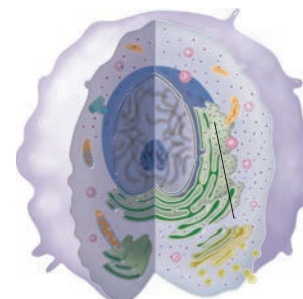
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# Introduction to Word Parts and Word Construction

## ✓ Learning Objectives

*After completing this chapter, you will be able to:*

- 1.1 Use the technique of programmed learning and frames.
- 1.2 Apply the phonetic pronunciation guides that are used in frames.
- 1.3 Recognize that medical terminology has both constructed and nonconstructed terms.
- 1.4 Identify each of the three word parts (word roots, prefixes, and suffixes) used to construct medical terms.
- 1.5 Identify the function of a combining vowel that is added to a word root to form a combining form.
- 1.6 Recognize that many medical terms are constructed from word parts and can be deconstructed into their word parts.



# The Programmed Learning Approach

## frame

**1.1** This textbook teaches you medical terminology by using the friendly technique of **programmed learning**. This technique has been used for many years to teach many subjects, such as math, world languages, and of course, medical terminology. It consists of blocks of information, known as frames, which contain one or more blanks. The blanks are provided for you to write in the missing word. In some cases, the missing word is easy to determine, and in other cases it becomes more of a challenge. In either case, the missing word is provided in the left margin of the \_\_\_\_\_, so you don't have to feel frustrated if you have trouble identifying or spelling the missing word correctly.

## number

**1.2** As you can see, each frame consists of a block of information with the blank in the box on the right side of the page. Note the frame \_\_\_\_\_. This number enables you to locate and flip back to a previous frame with ease if needed.

## blank

**1.3** The far left margin in each frame contains the missing word(s). As you proceed from frame to frame, you should write the missing word in the \_\_\_\_\_. To challenge yourself and make the best use of your time, try to work by first filling in the blank *without* looking at the answer. It works best to use a 3 × 5 card or something similar to block the answers in the margin; then after committing to an answer, check to see if your choice is correct. By doing so, the activity will engage your mind and help you to learn the meanings of the words.

## spelling

**1.4** Spelling is very important when learning medical terminology. By writing the missing word in the blank without looking at it in the far left margin and then comparing your answer with the one provided in the far left margin, you will be practicing the \_\_\_\_\_ of the word. Always check your answer before moving to the next frame. Pay special attention to the "Did You Know?" and "Words to Watch Out For" boxes in this text. These alert you to helpful information that aids your learning and identifies tricky spelling issues or terms that might easily be confused.



**phonetic**  
foh-NET-ik

**1.5** In addition to spelling, correct pronunciation of medical terms is also important. To help you with pronunciation, the phonetic (“sounds like”) form of the word is provided in parentheses whenever a new term is introduced; for example, \_\_\_\_\_ (\_\_\_\_\_) and pronunciation (proh NUN see AYE shun). You should say the new word aloud whenever possible, using the phonetic guide to assist you.

**guides**

**1.6** In the phonetic \_\_\_\_\_ that appear in this text, note that the syllables with the most spoken emphasis are shown in all capital letters. Here are some examples:

- The term *cardiology* is pronounced (kar dee AHL oh jee). Note that the middle syllable *AHL* carries the most emphasis.
- The term *gastrohepatic* is pronounced (GAS troh heh PAT ik). Note that the long *o* sound in the second syllable is demonstrated when spelled phonetically as *oh*, and the short *e* sound is demonstrated when spelled *eh*.
- The term *osteopathic* is pronounced (oss tee oh PATH ik). Note that the long *e* sound in the second syllable is shown as *ee*.

**pronunciation**

You can also refer to the student website for audio samples of the pronunciation of each medical term presented in this text. Spend time listening to the \_\_\_\_\_ of each term presented in each chapter. Doing so will help you complete the pronunciation exercise in this chapter’s “Talking Shop.”

## PRACTICE: The Programmed Learning Approach

### The Right Match

Match the term on the left with the correct definition on the right.

- |                                       |  |
|---------------------------------------|--|
| _____ 1. pronunciations               | a. alert you to terms that might easily be confused  |
| _____ 2. spelling                     | b. learning technique that consists of blocks of information, known as frames, which contain one or more blanks for the student to fill in |
| _____ 3. blank                        | c. by comparing your filled-in answer with the one provided in the far left margin, you will be practicing this                            |
| _____ 4. programmed learning          | d. as you proceed from frame to frame, you should write the missing word into this   |
| _____ 5. Words to Watch Out For boxes | e. you can also refer to the student website for audio samples of these  |

## Talking Shop

In the blank, write the letter of the pronunciation that matches the term. The first one is completed for you as an example. Visit the student website to hear the correct pronunciation of these terms.

Term	Pronunciation
<u>  f  </u> 1. cardiologist	a. pee dee ah TRISH an
<u>      </u> 2. lymphoma	b. men IN goh seel
<u>      </u> 3. pneumonia	c. limm FOH mah
<u>      </u> 4. fracture	d. ep ih KAR dee um
<u>      </u> 5. meningitis	e. FRAK sher
<u>      </u> 6. meningocele	f. kar dee AHL oh jist
<u>      </u> 7. epicardium	g. NEFF roh lith EYE ah siss
<u>      </u> 8. nephrolithiasis	h. HEPP ah toh MEG ah lee
<u>      </u> 9. psychologist	i. bak teer ee YOO ree ah
<u>      </u> 10. hepatomegaly	j. noo MOH nee ah
<u>      </u> 11. pediatrician	k. sigh KAHL oh jist
<u>      </u> 12. bacteriuria	l. MEN in JYE tis

## Constructed and Nonconstructed Terms

### language

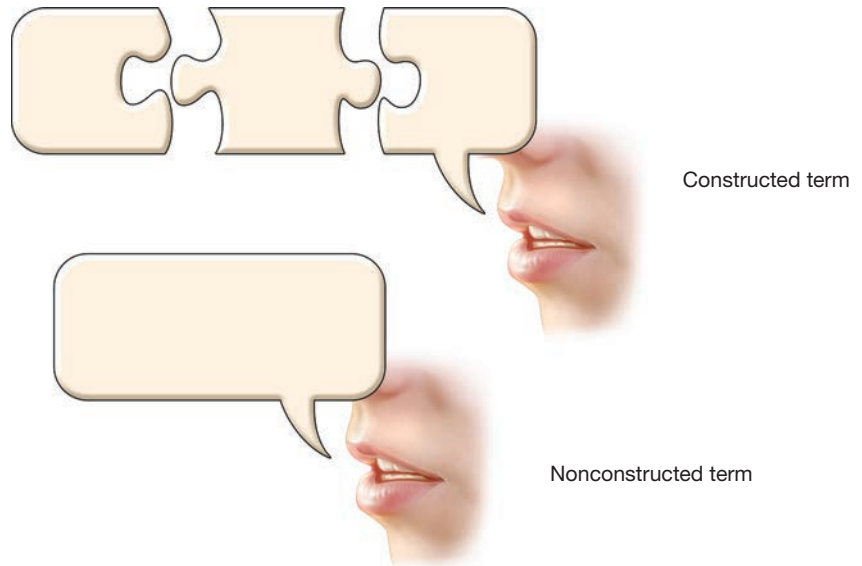
### medical terminology

**1.7** Medical terminology is a language for medical health professionals. This \_\_\_\_\_ has rules of grammar, spelling, and pronunciation, just like any other language. Because medical terminology is the universal language of medicine, its terms must be understood by speakers of many languages in many parts of the world, especially in our age of globalization. For the purpose of learning the language of \_\_\_\_\_, terms in this specialized language can be separated into two main categories: constructed terms and nonconstructed terms.

### constructed terms

### word

**1.8** Many medical terms are **constructed terms**, which are made up of multiple word parts that are combined to form a new word. In most cases, the word parts are derived from Latin and Greek. The key to learning \_\_\_\_\_ is to first learn the meaning of the various word parts. It may be helpful to think of constructed terms as if they were written in code. Once you have the key to a code, it becomes a fairly simple process to decode the messages or to use the code to form messages yourself. Similarly, once you learn the meanings of the individual \_\_\_\_\_ parts, you have the key to the medical terminology code. See ■ Figure 1.1.



■ **Figure 1.1**

Medical terms are either constructed words, which are composed of more than one word part, or nonconstructed words you must memorize, which include terms that are a single Latin or Greek word part, eponyms, acronyms, and so on.

## eponym

## nonconstructed terms

**1.9** The second group of medical terms is **nonconstructed terms**, terms that are not formed from individual word parts. Nonconstructed terms include **eponyms**, which are terms derived from the names of people. For example, *eustachian tube* is an \_\_\_\_\_ because it is derived from the name of Bartolommeo Eustachio, who first discovered this small tube between the throat and the middle ear. Other forms of nonconstructed terms include **acronyms**, which are words derived from the first letters of words in a compound term, such as *LASIK* for **l**aser-**a**ssisted **i**n situ **k**eratomileusis; and words derived from languages other than Greek or Latin, such as *jaundice*, which is derived from the French word for yellow, *jaune*. To learn \_\_\_\_\_, you must commit them to memory.

## PRACTICE: Constructed and Nonconstructed Terms

### The Right Match

Match the term on the left with the correct definition on the right.

- |                               |                                       |
|-------------------------------|---------------------------------------|
| _____ 1. nonconstructed terms | a. term derived from a person's name  |
| _____ 2. constructed terms    | b. must be committed to memory        |
| _____ 3. medical terminology  | c. made up of word parts              |
| _____ 4. eponym               | d. the universal language of medicine |

# The Word Parts

## word parts

**1.10** When a constructed term is formed, individual \_\_\_\_\_ are assembled to create a term with a new meaning. This is very useful in medicine because new discoveries are made frequently, and the need to provide them with relevant names is important. The three primary types of word parts are prefixes, word roots, and suffixes.

## prefix

**1.11** A **prefix** is a word part that is affixed to the beginning of a word. Its purpose is to expand or enhance the meaning of the word. Let's look at an example of a prefix in action, using the word *construction*. In our sample word, **con-** is the prefix. It means "with, together, jointly." Notice the hyphen following the prefix. You will know that a word part is a \_\_\_\_\_ by the hyphen that immediately follows it (e.g., **con-**).

## word root

**1.12** A **word root** is a word part that provides the primary meaning of the term. The \_\_\_\_\_ provides the basis for the term and is the part to which other word parts are attached. Nearly all terms have a word root, and some have more than one. In our sample word *construction*, **struct** is the word root. It means "make, build."

## suffix

**1.13** A **suffix** is a word part that is affixed to the end of a word. The \_\_\_\_\_ often indicates the word's part of speech (noun, verb, adjective, adverb, etc.) or modifies the word's meaning. In our sample word *construction*, the suffix is **-ion**. It indicates that the word is a noun and it means "process." You will know that a word part is a suffix by the hyphen that immediately precedes it (for example, **-ion**).

## three

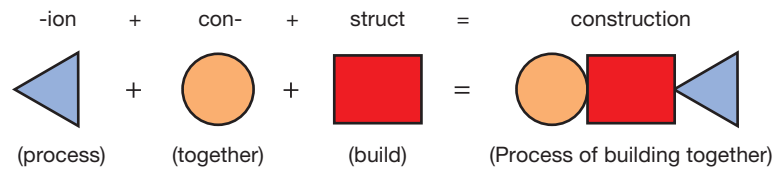
**1.14** To summarize using our example, the word *construction* is composed of \_\_\_\_\_ word parts (■ Figure 1.2):

**con-** + **struct** + **-ion**  
(prefix + word root + suffix)

We decipher the meaning of medical words by defining each of the word parts. First, we look at the meaning of the suffix, and then we look at the meaning of the prefix. Finally, we define the word root. Then we combine the meanings of all the word parts in the way that makes the most sense. Thus, **con-** + **struct** + **-ion** means "process of building together."

■ **Figure 1.2**

Most medical terms are formed by assembling word parts.



## Did You KNOW

This text has a special color-coding system to help you recognize the individual word parts. Each time a word part is presented, it appears in a specific color:

- Prefixes are **yellow**
- Word roots and combining forms are **red**
- Suffixes are **blue**

## word parts

**1.15** The word *construction*, then, as we use it in medical terminology, refers to “building words out of word parts.” This is what we do every time we write and speak. This is also what we do when we use medical terminology by speaking and writing medical terms. Understanding how to build words out of \_\_\_\_\_ is essential to understanding the meaning of medical terms. Equally important is understanding how to deconstruct or break down a medical term into its component word parts. That is exactly what we did when we deciphered the meaning of our sample word *construction*. We broke the word down into its prefix, word root, and suffix parts and then combined the definitions of the word parts to derive the meaning of the term. Now let’s break down a medical term into its word parts:

### hypodermic

hypo- + **derm** + -ic

(prefix + word root + suffix)

**hypo-** is a prefix that means “deficient, abnormally low, below”

**derm** is a word root that means “skin”

**-ic** is a suffix that means “pertaining to”

Thus, the term *hypodermic* means “pertaining to below the skin.” Notice that the meaning of the suffix comes first when describing the meaning of the term from its word parts.

**1.16** Not every medical term has all three word parts. Some medical terms lack a prefix, word root, or suffix, and some have more than one word root. For example, the term *gastroenteritis* (GAS troh en ter EYE tis) breaks down like so:

**gastroenteritis**

gastr + enter + -itis

(word root + word root + suffix)

**word root**

*gastr* is a word root that means “stomach”

*enter* is a \_\_\_\_\_ that means “small intestine”

*-itis* is a suffix that means “inflammation”

Thus, the term *gastroenteritis* means “inflammation of the stomach and small intestine.” Notice the letter *o* between the two word roots. You will learn about the importance of its use very soon (Frame 1.18).

**1.17** Some medical terms are made simply of a prefix and a suffix. The term *aphasia* is an example.

**aphasia**

a- + -phasia

(prefix + suffix)

**suffix**

*a-* is a prefix that means “without or absence of”

*-phasia* is a \_\_\_\_\_ that means “speaking”

Thus, the term *aphasia* means “absence of speaking.”

**combining vowel**

**1.18** A fourth word part is the **combining vowel**. It is used when a word root requires a connecting vowel in order to add a suffix that begins with a consonant, or to add another word root, when forming a term. The \_\_\_\_\_ does not add to or alter the meaning of the word root; it simply assists us in pronouncing a term. In most cases, the combining vowel is the letter *o*, and in some cases it is the letter *i* or *e*.

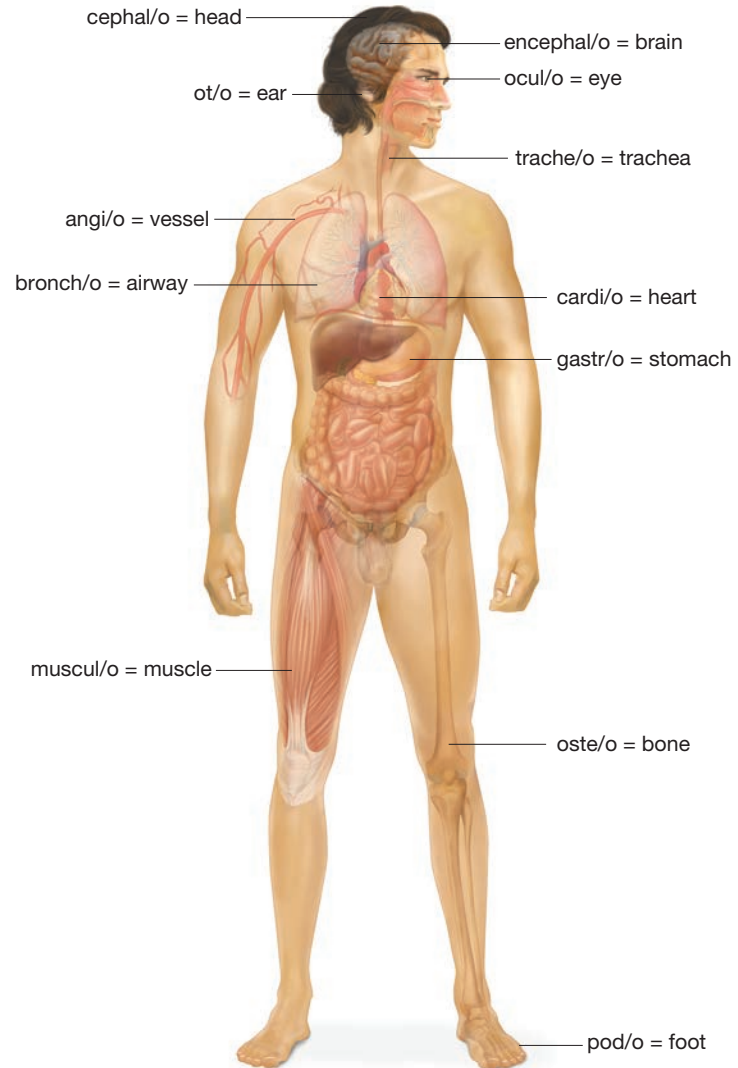


## combining form

**1.19** Generally, it is best to learn a word root with its combining vowel. This word root plus combining vowel form is called a **combining form**. Whenever possible, the combining forms are presented in this text to ease your building and deconstructing of medical terms, some of which are shown in ■ Figure 1.3. The method for writing a \_\_\_\_\_ is to use a slash between the word root and the combining vowel, such as

**cardi/o**  
(word root/combining vowel)

The combining vowel in **cardi/o** is *o*.



■ **Figure 1.3**

The human body, with many of the common combining forms.