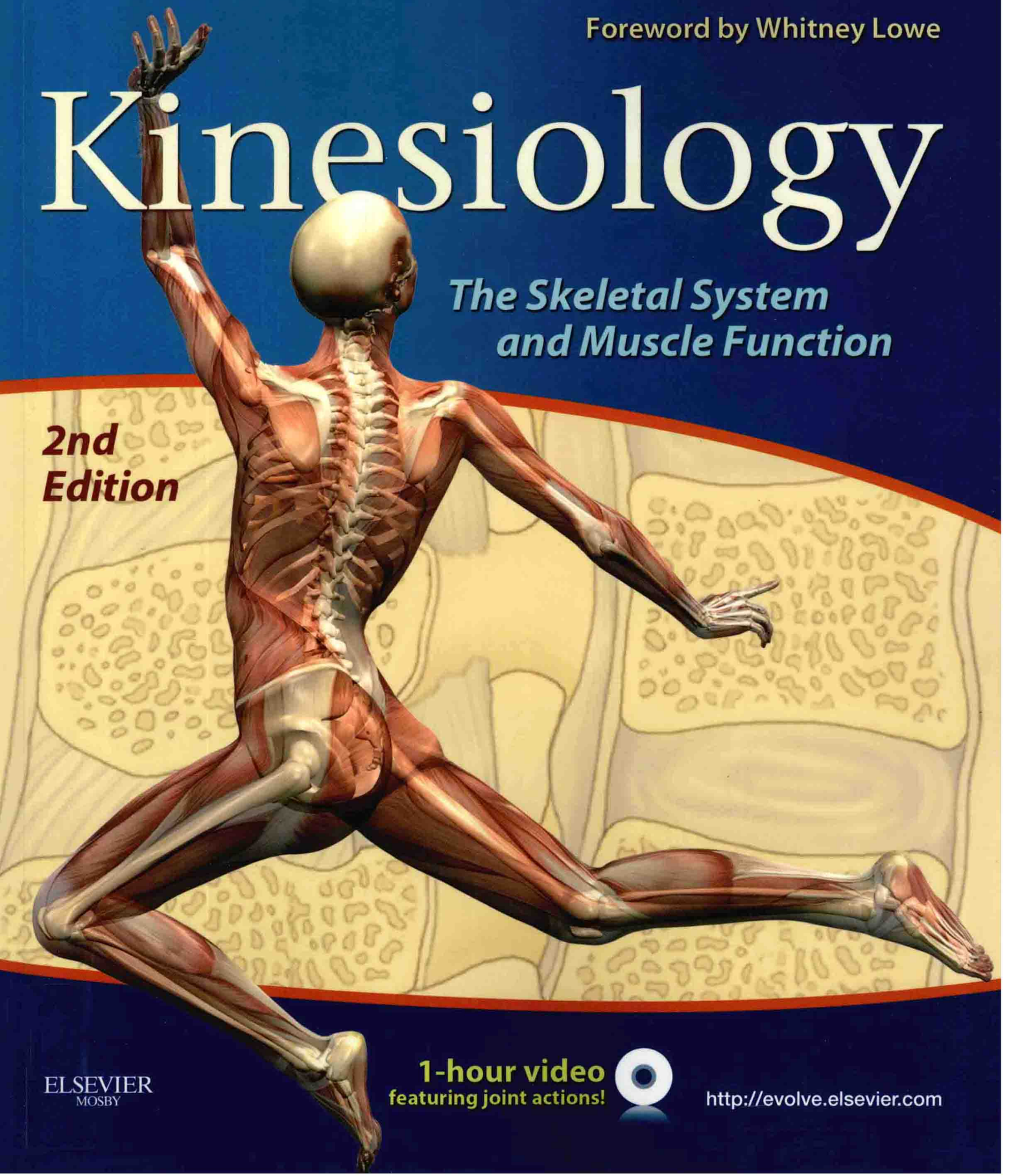
JOSEPH E. MUSCOLINO

Foreword by Whitney Lowe

# Kinesiology

## The Skeletal System and Muscle Function

2nd Edition



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# Kinesiology

## The Skeletal System and Muscle Function

2nd Edition

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## Dedication

This book is dedicated to my entire family, who have given me everything of value, most importantly love and support.

## Special Dedication

A special dedication to Connie and Alfredo Llanes, Columbian angels with tremendous hearts of gold who have entered my mother's life. It is rare, but so gratifying, to meet such kind and generous people. Thank you!

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# Foreword

The many different styles of massage therapy and bodywork have become an integral component of addressing musculoskeletal pain and injury conditions. The public's expectations place a high demand on the knowledge base of these practitioners. Consequently, the professional development of massage and bodywork therapists must accommodate the changing requirements of the profession. In the first edition of this text, author Joe Muscolino made an excellent contribution to the professional literature to aid today's soft-tissue therapist. In this new edition of *Kinesiology: The Skeletal System and Muscle Function,* updates and improvements have taken this text to the next level and significantly improved an already excellent resource.

Kinesiology is a critical component of the knowledge and skills necessary for today's soft-tissue therapist. By definition kinesiology is the study of anatomy (structure), neuromuscular physiology (function), and biomechanics (the mechanics of movement related to living systems). Competence in these principles is required even for those practitioners who work in an environment where massage or movement therapy is used only for relaxation or stress reduction. The need to understand proper movement can arise in the most basic soft-tissue treatment.

The requirements for knowing the principles of kinesiology are even greater for those practitioners who actively choose to address soft-tissue pain and injury conditions. Treatment of any soft-tissue disorder begins with a comprehensive assessment of the problem. Accurate assessment is not possible without an understanding of how the body moves under normal circumstances and what may impair its movement in pathology. Joe Muscolino has continually set high standards for helping prepare practitioners of soft-tissue therapy. The improvements in this new edition build on the established foundation that is crucial for today's clinician.

Over the years of teaching orthopedic assessment and treatment to soft-tissue therapists, I have found many students deficient in their understanding of kinesiology. Similarly, students express frustration about understanding how to apply basic kinesiology principles in their practice. Although they receive some training in their initial coursework, traditional approaches to teaching kinesiology often provide little benefit to students. Overwhelmingly, basic courses in kinesiology prove to be insufficient and fail to connect the student with the skills necessary for professional success.

Learning muscle attachments and concentric actions tends to be the focus of most kinesiology curricula and is often turned into an exercise of rote memorization. Yet, there is significantly more to this important subject than these topics. Eccentric actions, force loads, angle of pull, axis of rotation, synergistic muscles, and other concepts are necessary for understanding human movement. These principles, in turn, are prerequisites for effective therapeutic treatment. An adequate understanding of kinesiology requires more than a curriculum plan that emphasizes memorization. A competent education in kinesiology requires a foundation in the functional application of its principles.

Joe Muscolino's scientific background and years of experience as an educator teaching anatomy, pathology, and kinesiology make him uniquely qualified to tackle a project of this scope. His skill, talent, and demonstrated expertise are evidenced in this work and are of great benefit to the soft-tissue professions. During the years I've known Joe as a professional colleague, we have repeatedly engaged in animated discussions about how to raise the quality of training and improve educational resources available in the profession.

I was thoroughly impressed with the content and presentation of the first edition of this text. In this new edition, the author has responded to the needs of students and educators by including new sections on strength training and stretching. These topics are of great importance to manual therapy practitioners and are often not present in this detail in many other resources. Also included is new and updated information on the role of fascia in movement, stability and posture. Many clinicians are increasingly aware of the importance of fascia, and these new findings help us understand this ubiquitous tissue even better. Finally, a new section on understanding how to read a research paper has been added to this edition. This section introduces the student/practitioner to the importance of research in the manual therapy professions, and then explains how to read and understand a research article. Research literacy is an increasingly important skill in the manual therapy profession, and this section facilitates that process.

The educational landscape is changing at a dramatic pace and one of the most powerful changes driving this transformation is the development and use of enhanced multimedia resources. The Elsevier Evolve site is a wealth of teaching and learning materials for students and users

of this text. Numerous activities have been designed to aid the student in both comprehension of basic concepts as well as developing high order thinking skills that are essential in clinical practice.

When this book first came out it was clear that it excelled as both a comprehensive resource for the practicing professional and an excellent guide for students new to the field. This updated edition has broken new ground and set the bar high as a comprehensive resource and learning tool for professionals in multiple disciplines.

**Whitney Lowe, LMT**
Orthopedic Massage Education & Research Institute
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# Preface

The term *kinesiology* literally means *the study of motion*. Because motion of the body is created by the forces of muscle contractions pulling on bones and moving body parts at joints, kinesiology involves the study of the musculoskeletal system. Because muscle functioning is controlled by the nervous system, kinesiology might be better described as study of the neuromusculosketetal system. And because the importance of fascia is better understood and accepted, perhaps the best description might be study of the neuromyofascialskeletal system!

There are three keys to healthy motion: (1) flexibility of soft tissues to allow motion, (2) strength of musculature to create motion and stability, and (3) neural control from the nervous system. This book provides the reader/student with necessary information to apply this knowledge and to help their clients in the health and fitness fields.

*Kinesiology: The Skeletal System and Muscle Function*, 2nd edition, is unique in that it is written for the allied health fields of manual and movement therapies, rehabilitation and fitness training. These fields include massage therapy, physical therapy, occupational therapy, yoga, Pilates, fitness and athletic training, Feldenkrais technique, Alexander technique, chiropractic, osteopathy, naturopathy, and exercise physiology. Information is presented in a manner that explains the fundamental basis for movement of the human body as it pertains to working with clients in these fields. Clinical applications are located throughout the text's narrative and in special light-bulb and spotlight boxes to explain relevant concepts.

## CONCEPTUAL APPROACH

The purpose of this book is to explain the concepts of kinesiology in a clear, simple, and straightforward manner, without dumbing down the material. The presentation of the subject matter of this book encourages the reader or student to think critically instead of memorize. This is achieved through a clear and orderly layout of the information. My belief is that no subject matter is difficult to learn if the big picture is first presented, and then the smaller pieces are presented in context to the big picture. An analogy is a jigsaw puzzle, wherein each piece of the puzzle represents a piece of information that must be learned. When all the pieces of the puzzle first come cascading out of the box, the idea of learning them and fitting them together can seem overwhelming; and indeed it is a daunting task if we do not first look at the big picture on the front of the box. However, if the big picture is first explained and understood, then our ability to learn and place into context all the small pieces is facilitated. This approach makes the job of being a student of kinesiology much easier!

## ORGANIZATION

Generally, the information within this book is laid out in the order that the musculoskeletal system is usually covered. Terminology is usually needed before bones can be discussed. Bones then need to be studied before the joints can be learned. Finally, once the terminology, bones, and joints have been learned, the muscular system can be explored. However, depending on the curriculum of your particular school, you might need to access the information in a different order and jump around within this book. The compartmentalized layout of the sections of this book easily allows for this freedom.

- Scattered throughout the text of this book are light-bulb  and spotlight  icons. These icons alert the reader to additional information on the subject matter being presented. A  contains an interesting fact or short amount of additional information; a  contains a greater amount of information. In most cases, these illuminating boxes immediately follow the text statements that explain the concept.
- At the beginning of each chapter is a list of learning objectives. Refer to these objectives as you read each chapter of the book.
- After the objectives is an overview of the information of the chapter. I strongly suggest that you read this overview so that you have a big picture idea of what the chapter covers before delving into the details.
- Immediately after the overview is a list of key terms for the chapter, with the proper pronunciation included where necessary. These key terms are also in bold type when they first appear in the text. A complete glossary of all key terms from the book is located on the Evolve web site that accompanies this book.
- After the key terms is a list of word origins. These origins explore word roots (prefixes, suffixes, and so forth) that are commonly used in the field of kinesiology. Learning a word root once can enable you to make sense of tens or hundreds of other terms without having to look them up!

*Kinesiology, The Skeletal System and Muscle Function* is divided into four parts.

- **Part I** covers essential terminology that is used in kinesiology. Terminology that is unambiguous is necessary to allow for clear communication, which is especially important when dealing with clients in the health, athletic training, and rehabilitation fields.
- **Part II** covers the skeletal system. This part explores the makeup of skeletal and fascial tissues and also contains a photographic atlas of all bones and bony landmarks, as well as joints, of the human body.
- **Part III** contains a detailed study of the joints of the body. The first two chapters explain the structure and function of joints in general. The next three chapters provide a thorough regional examination of all joints of the body.
- **Part IV** examines how muscles function. After covering the anatomy and physiology of muscle tissue, the larger kinesiologic concepts of muscle function are addressed. A big picture idea of what defines muscle contraction is first explained. From this point, various topics such as types of muscle contractions, roles of muscles, types of joint motions, musculoskeletal assessment, control by the nervous system, posture, the gait cycle, stretching, and strength fitness training are covered. A thorough illustrated atlas of all the skeletal muscles of the body, along with their attachments and major actions, is also given.

## DISTINCTIVE FEATURES

There are many features that distinguish this book:

- Clear and ordered presentation of the content
- Simple and clear verbiage that makes learning concepts easy
- Full-color illustrations that visually display the concepts that are being explained so that the student can see what is happening
- Light-bulb and spotlight boxes that discuss interesting applications of the content, including pathologic conditions and clinical scenarios
- Open bullets next to each piece of information allow the student to check off what has been or needs to be learned and allows the instructor to assign clearly the material that the students are responsible to learn
- An enclosed DVD is included that shows and explains all joint movements of the body and the major concepts of kinesiology
- Evolve website support for students and instructors

## NEW TO THIS EDITION

Every feature of the first edition has been preserved. In addition, the second edition has many new features:

- A complete chapter containing a thorough illustrated atlas of all the skeletal muscles of the body along with their attachments and major standard and reverse actions
- A comprehensive chapter on fitness and athletic training
- An entire chapter that expands the discussion of stretching
- Greatly expanded sections on fascia, tensegrity, and myofascial meridians
- Incorporation of new research as it pertains to concepts in the field of kinesiology and a section on how to read a research paper

## DVD

The enclosed DVD demonstrates and explains key concepts of kinesiology such as anatomic position, planes, axes, how to name joint actions, and the concept of reverse actions. It then demonstrates and describes all the major joint actions of the human body, beginning with actions of the axial body, followed by actions of the lower extremity and upper extremity.

## EVOLVE RESOURCES

- Video clips
  - All DVD video clips demonstrating all joint actions of the body are located on the Evolve site.
- Bony landmark identification exercises reinforce your knowledge.
- Answers to review questions in the textbook.
- Drag and drop labeling exercises aid in your review of the material as you drag the name of the structure and drop it into the correct position on illustrations.
- Crossword puzzles help reinforce muscle names and terminology through fun, interactive activities!
- Glossary of terms and word origins. All terms from the book are defined and explained, along with word origins, on the Evolve site.
- Additional strengthening exercise photographs demonstrate key strengthening exercises on Evolve.
- Radiographs
  - Study these radiographs for real-world application of material in the book.

## INSTRUCTOR RESOURCES

For instructors, TEACH lesson plans and PowerPoints Cover the book in 50-minute lectures, with learning outcomes, discussion topics, and critical thinking questions. There is also an instructor's manual that provides step-by-step approaches to leading the class through learning the content, as well as kinesthetic in-class activities. Further, a complete image collection that contains every figure in the book, and a test bank in ExamView containing 1,000 questions, are provided.

## RELATED PUBLICATIONS

This book has been written to stand on its own. However, it can also complement and be used in conjunction with *The Muscular System Manual, The Skeletal Muscles of the Human Body*, 3rd edition (Mosby, 2010). *The Muscular System Manual* is a thorough and clearly presented atlas of the skeletal muscles of the human body that covers all aspects of muscle function. These two textbooks, along with *Musculoskeletal Anatomy Coloring Book*, 2nd edition (Mosby, 2010), *Musculoskeletal Anatomy Flashcards*, 2nd Edition (Mosby, 2010), and *Flashcards for Bones, Joints, and Actions of the Human Body*, 2nd edition (Mosby, 2011), give the student a complete set of resources to study and thoroughly learn all aspects of kinesiology.

For more direct clinical assessment and treatment techniques, look also for *The Muscle and Bone Palpation Manual, With Trigger Points, Referral Patterns, and Stretching* (Mosby 2009), *Flashcards for Palpation, Trigger Points, and Referral Patterns* (Mosby 2009), and *Mosby's Trigger Point Flip Chart, with Referral Patterns and Stretching* (Mosby 2009). For additional information about these products, visit http://joeknows.elsevier.com.

Even though kinesiology can be viewed as the science of studying the biomechanics of body movement (and the human body certainly is a marvel of biomechanical engineering), kinesiology can also be seen as the study of an art form. Movement is more than simply lifting a glass or walking across a room; movement is the means by which we live our lives and express ourselves. Therefore science and art are part of the study of kinesiology. Whether you are just beginning your exploration of kinesiology, or you are an experienced student looking to expand your knowledge, I hope that *Kinesiology: The Skeletal System and Muscle Function*, 2nd edition, proves to be a helpful and friendly guide. Even more importantly, I hope that it also facilitates an enjoyment and excitement as you come to better understand and appreciate the wonder and beauty of human movement!

**Joseph E. Muscolino DC**
July 2010

# Acknowledgments

Usually only one name is listed on the front of a book, and that is the author's. This practice can give the reader the misconception that the author is the only person responsible for what lies in his or her hands. However, many people who work behind the scenes and are invisible to the reader have contributed to the effort. The Acknowledgments section of a book is the author's opportunity to both directly thank these people and acknowledge them to the readers.

First, I would like to thank William Courtland. William, now an instructor himself, was the student who 10 years ago first recommended that I should write a kinesiology textbook. William, thanks for giving me the initial spark of inspiration to write.

Because kinesiology is the study of movement, the illustrations in this book are just as important, if not more important, than the written text. I am lucky to have had a brilliant team of illustrators and photographers. Jeannie Robertson illustrated the bulk of the figures in this book. Jeannie is able to portray three-dimensional movements of the body with sharp, accurate, simple, and clear full-color illustrations. Tiziana Cipriani contributed a tremendous number of beautiful drawings to this book, including perhaps my two favorites, Figures 11-13*A* and 11-13*B*. Jean Luciano, my principle illustrator for the first edition of *The Muscular System Manual*, also stepped in to help with a few beautiful illustrations. Yanik Chauvin is the photographer who took the photos that appear in Chapters 7, 8, 9, 15, and 19, as well as a few others. Yanik is extremely talented, as well as being one of the easiest people with whom to work. Frank Forney is an illustrator who came to this project via Electronic Publishing Services (EPS). Frank drew the computer drawings of the bones that were overlaid on Yanik's photos in Chapters 7, 8, and 9. Frank proved to be an extremely able and invaluable asset to the artwork team. For Chapter 15, the new illustrated atlas of muscles chapter, Giovanni Rimasti (of LightBox Visuals, Jodie Bernard, owner), Frank Forney, and Dave Carlson, provided computer-drawn images of the bones and muscles overlaid on Yanik's photos. These illustrations are astoundingly beautiful! Last but not least is Dr. David Eliot of Touro University College of Osteopathic Medicine, who provided the bone photographs that are found in Chapter 4. Dr. Eliot is a PhD anatomist whose knowledge of the musculoskeletal system is as vast as his photographs are beautiful. I was lucky to have him as a contributor to this book.

I would also like to thank the models for Yanik's photographs: Audrey Van Herck, Kiyoko Gotanda, Gamaliel Martinez Fonseca, Patrick Tremblay, and Simona Cipriani. The beauty and poise of their bodies was invaluable toward expressing the kinesiologic concepts of movement in the photographs for this book.

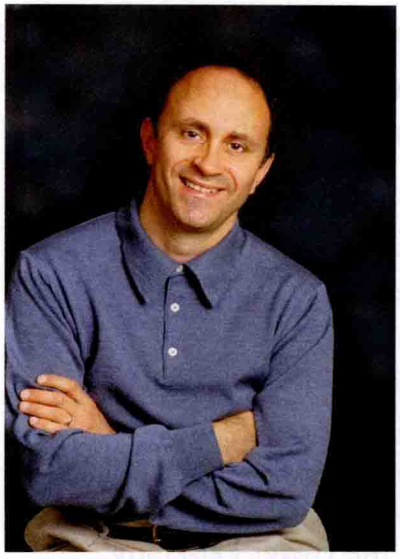
I must thank the authors of the other kinesiology textbooks that are presently in print. I like to think that we all stand on the shoulders of those who have come before us. Each kinesiology textbook is unique and has contributed to the field of kinesiology, as well as my knowledge base. I would particularly like to thank Donald Neumann, PT, PhD of Marquette University. His book, *Kinesiology of the Musculoskeletal System*, in my opinion, is the best book ever written on joint mechanics. I once told Don Neumann that if I could have written just one book, I wish it would have been his.

Writing a book is not only the exercise of stating facts, but also the art of how to present these facts. In other words, a good writer should be a good teacher. Toward that end, I would like to thank all my present and past students for helping me become a better teacher.

For the act of actually turning this project into a book, I must thank the entire Mosby/Elsevier team in St. Louis who spent tremendous hours on this project, particularly Jennifer Watrous, Kellie White, Kate Dobson, Celeste Clingan, Linda McKinley, Julie Eddy, Paula Catalano, Abby Hewitt, and Julie Burchett. Thank you for making the birth of this book as painless as possible.

Finally, to echo my dedication, I would like to thank my entire family, who makes it all worthwhile!

# About the Author

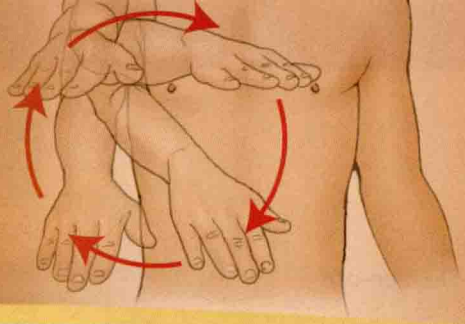


Dr. Joseph E. Muscolino has been teaching musculoskeletal and visceral anatomy and physiology, kinesiology, neurology, and pathology courses for more than 24 years. He has also been instrumental in course manual development and has assisted with curriculum development. He has published *The Muscular System Manual*, 3rd edition, *Musculoskeletal Anatomy Coloring Book*, 2nd edition, and *Musculoskeletal Anatomy Flashcards*, 2nd edition, as well as articles in *Massage Therapy Journal, Journal of Bodywork and Movement Therapies*, *Massage Magazine*, and *Massage Today*. Dr. Muscolino runs continuing education workshops on topics such as body mechanics for deep tissue massage, intermediate and advanced stretching techniques, joint mobilization, kinesiology, and cadaver lab workshops. He is approved by the National Certification Board for Therapeutic Massage and Bodywork (NCBTMB) as a provider of continuing education, and grants continuing education credit (CEUs) for massage therapists toward certification renewal. Dr. Muscolino also was a subject matter expert and member of the NCBTMB's Continuing Education and Exam Committees and is a member of the Educational Review Operational Committee (EROC) of *Massage Therapy Journal*.

Dr. Muscolino holds a Bachelor of Arts degree in biology from the State University of New York at Binghamton, Harpur College. He attained his Doctor of Chiropractic degree from Western States Chiropractic College in Portland, Oregon, and is licensed in Connecticut, New York, and California. Dr. Muscolino has been in private practice in Connecticut for more than 25 years and incorporates soft-tissue work into his chiropractic practice for all his patients.

If you would like further information regarding *Kinesiology: The Skeletal System and Muscle Function*, 2nd edition, or any of Dr. Muscolino's other publications, or if you are an instructor and would like information regarding the many supportive materials such as PowerPoint slides, test banks of questions, or instructor's manuals, please visit http://www.us.elsevierhealth.com. You can contact Dr. Muscolino directly at his web site: http://www.learnmuscles.com.

# Contents





# CHAPTER 1

# Parts of the Human Body

## CHAPTER OUTLINE



## CHAPTER OBJECTIVES

*After completing this chapter, the student should be able to perform the following:*

1. List the major divisions of the body.
2. List and locate the 11 major parts of the body.
3. Describe the concept of and give an example of movement of a body part.
4. List the aspects of and give an example of fully naming a movement of the body.
5. Describe the concept of and give an example of movement of smaller body parts located within larger (major) body parts.
6. Explain the difference between and give an example of *true movement* of a body part compared with "going along for the ride."
7. List and locate the major regions of the body.
8. Define the key terms of this chapter.
9. State the meanings of the word origins of this chapter.

## OVERVIEW

The human body is composed of 11 major parts that are located within the axial and appendicular portions of the body. Some of these major body parts have smaller body parts within them. Separating two adjacent body parts from each other is a joint. True movement of a body part involves movement of that body part relative to another body part at the joint that is located between them.

## KEY TERMS

Abdominal (ab-DOM-i-nal)
Antebrachial (AN-tee-BRAKE-ee-al)
Antecubital (an-tee-KYU-bi-tal)
Anterior view (an-TEER-ee-or)
Appendicular (ap-en-DIK-u-lar)
Arm
Axial (AK-see-al)
Axillary (AK-sil-err-ee)
Body part
Brachial (BRAKE-ee-al)
Carpal (KAR-pal)
Cervical (SER-vi-kal)
Cranial (KRAY-nee-al)
Crural (KROO-ral)
Cubital (KYU-bi-tal)
Digital (DIJ-i-tal)
Facial
Femoral (FEM-o-ral)

Foot
Forearm
Gluteal (GLOO-tee-al)
"Going along for the ride"
Hand
Head
Inguinal (ING-gwi-nal)
Interscapular (IN-ter-skap-u-lar)
Joint
Lateral view (LAT-er-al)
Leg
Lower extremity (eks-TREM-i-tee)
Lumbar (LUM-bar)
Mandibular (man-DIB-u-lar)
Neck
Palmar (PAL-mar)
Patellar (pa-TEL-ar)
Pectoral (PEK-to-ral)
Pelvis
Plantar (PLAN-tar)
Popliteal (pop-LIT-ee-al)
Posterior view (pos-TEER-ee-or)
Pubic (PYU-bik)
Sacral (SAY-kral)
Scapular (SKAP-u-lar)
Shoulder girdle
Supraclavicular (SUE-pra-kla-VIK-u-lar)
Sural (SOO-ral)
Thigh
Thoracic (tho-RAS-ik)
Trunk
Upper extremity (eks-TREM-i-tee)

### WORD ORIGINS

- Ante—From Latin *ante,* meaning *before, in front of*
- Append—From Latin *appendo,* meaning *to hang something onto something*
- Ax—From Latin *axis,* meaning *a straight line*
- Fore—From Old English *fore,* meaning *before, in front of*
- Inter—From Latin *inter,* meaning *between*
- Lat—From Latin *latus,* meaning *side*
- Post—From Latin *post,* meaning *behind, in the rear, after*
- Supra—From Latin *supra,* meaning *on the upper side, above*

## 1.1 MAJOR DIVISIONS OF THE HUMAN BODY

- The human body can be divided into two major sections (Figure 1-1):
  - The **axial** body
  - The **appendicular** body
- When we learn how to name the location of a structure of the body or a point on the body (see Chapter 2), it will be crucial that we understand the difference between the axial body and the appendicular body.

### AXIAL BODY:

- The axial body is the central core axis of the body and contains the following body parts:
  - Head
  - Neck
  - Trunk

## APPENDICULAR BODY:

- The appendicular body is made up of appendages that are "added onto" the axial body.
- The appendicular body can be divided into the right and left upper extremities and the right and left lower extremities.
- An **upper extremity** contains the following body parts:
  - **Shoulder girdle** (scapula and clavicle)
  - Arm
  - Forearm
  - Hand
- A **lower extremity** contains the following body parts:
  - **Pelvis** (pelvic girdle)
  - Thigh
  - Leg
  - Foot
- The pelvis is often considered to be part of the axial body. In actuality, it is a transitional body part of both the axial body and the appendicular body; the sacrum and coccyx are axial body bones and the pelvic bones are appendicular body bones. For symmetry, we will consider the pelvis to be part of the lower extremity (therefore the appendicular body), because the shoulder girdle is part of the upper extremity. Note: The word *girdle* is used because the pelvic and shoulder girdles resemble a girdle in that they encircle the body as a girdle does (actually, the shoulder girdle does not completely encircle the body because the two scapulae do not meet in back).

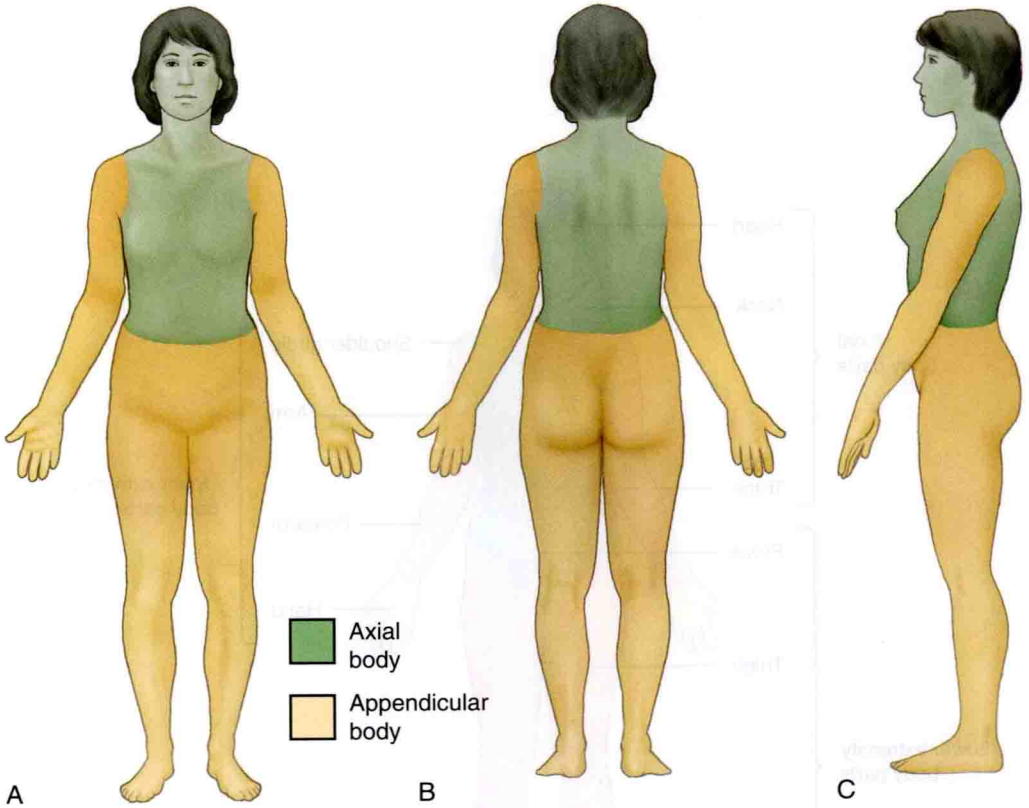



**FIGURE 1-1** The major divisions of the human body: the axial body and the appendicular body. *A*, **Anterior view.** *B*, **Posterior view.** *C*, **Lateral view.**

## 1.2 MAJOR BODY PARTS

- A **body part** is a part of the body that can move independently of another body part that is next to it.
- Generally it is the presence of a bone (sometimes more than one bone) within a body part that defines the body part.
- For example, the humerus defines the arm; the radius and ulna define the forearm.
- The human body has 11 major body parts (Figure 1-2):
  - Head
  - Neck
  - Trunk

  } Axial body
  - Pelvis
  - Thigh
  - Leg
  - Foot

  } Lower extremity
  - Shoulder girdle
  - Arm
  - Forearm
  - Hand

  } Upper extremity

  } Appendicular body
- It is important to distinguish the thigh from the leg. The thigh is between the hip joint and the knee joint, whereas the leg is between the knee joint and the ankle joint. In our terminology, the thigh is not part of the leg.
- It is important to distinguish the arm from the forearm. The arm is between the shoulder joint and the elbow joint, whereas the forearm is between the elbow joint and the wrist joint. In our terminology, the forearm is not part of the arm.
- The shoulder girdle contains the scapulae and the clavicles.
  - Most sources include the sternum as part of the shoulder girdle.
  - The shoulder girdle is also known as the *pectoral girdle*.
- The pelvis as a body part includes the pelvic girdle of bones.
  - The pelvic girdle contains the two pelvic bones, the sacrum, and the coccyx.

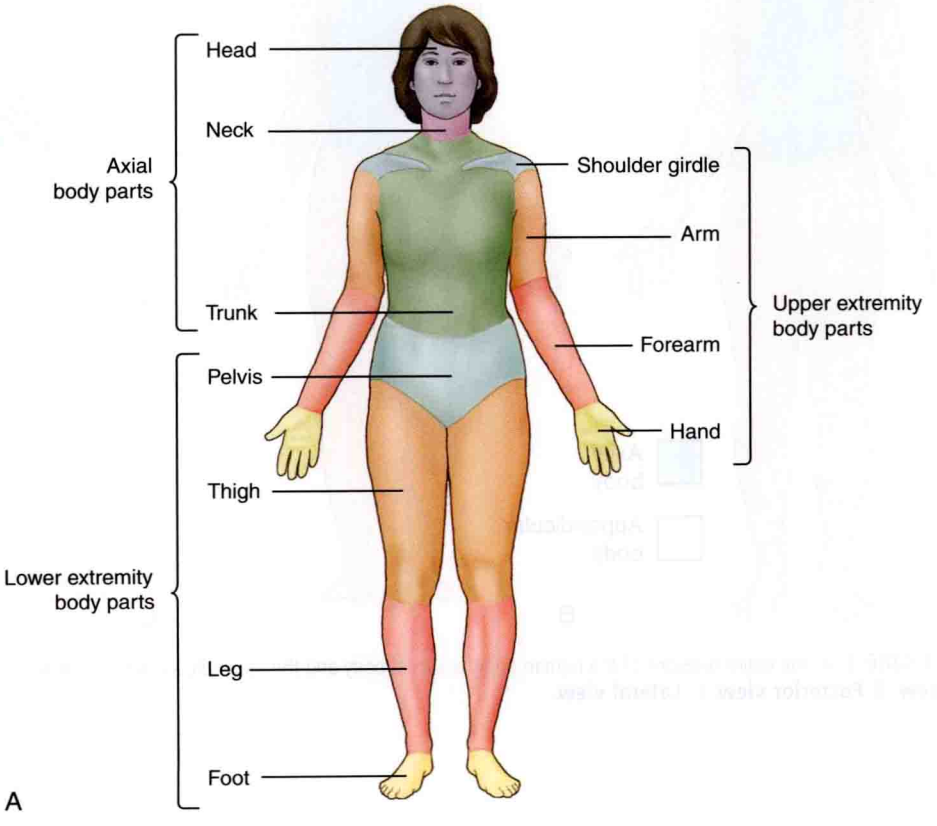



**FIGURE 1-2** The 11 major parts of the human body. *A*, Anterior view.