

An anatomical illustration of a woman in a yoga pose, standing on one leg with the other leg raised and held by her hands. Her body is overlaid with a semi-transparent anatomical map showing muscles and bones in shades of red and pink. The background is a gradient from light orange to yellow.

Lynn S. Lippert

FIFTH EDITION

Clinical Kinesiology and Anatomy





Clinical Kinesiology and Anatomy

常州大学图书馆
藏书章

Fifth Edition

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To Sal, who has supported this project from the very beginning. A simple but heartfelt “thank you” seems inadequate. Perhaps dipping it in chocolate first would be more meaningful.

To Hunt, whose creativity has amazed and inspired me throughout my life.

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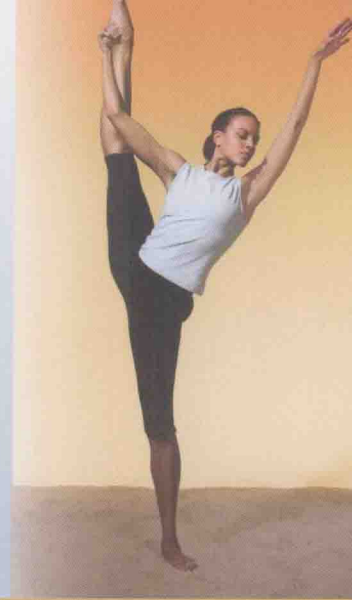


I have some appreciation of what an actor receiving an Academy Award goes through, wanting not to forget anyone who figured importantly in reaching this culminating moment. I feel the same way—I don't want to forget to thank anyone who helped me in creating this Fifth Edition. Like the previous four editions, I need to acknowledge numerous people. Sal Jepson continued to remind me that describing concepts simply is always better than rambling dissertations. Don Davis continued to remind me that physics isn't always as simple as I would like to make it. Authors always dream of an error-proof edition, so Shelby Clayson, MS, PT, applied her eagle-eyes to proofreading. Debbie Van Dover, MEd, PT, and Kristin Kjensrud, MSPT, assisted with proofing the numerous figures. Linda Besant and Damara Bennett of Oregon Ballet Theatre helped me understand human movement through dancers' eyes. I am

convinced that we all would have better posture if we took ballet lessons as children. Gwen White, PT, CLT, offered her expertise and knowledge of the lymphatic system and lymphedema, and John Medeiros, PT, PhD, did the same regarding arthrokinematics.

My gratitude goes out to Rob Craven, President, and the many people at F. A. Davis for their commitment to making this textbook one that will continue to make us all proud. Melissa Duffield, Acquisitions Editor, brought new energy and vision. Karen Williams, Developmental Editor, often had a better (i.e., more clearly stated) way of wording a sentence. I have appreciated her calm and honest communication. Margaret Biblis, Publisher, continued to support this project. Carolyn O'Brien, Design Manager, used her expertise in the creation of the book cover and inside art.

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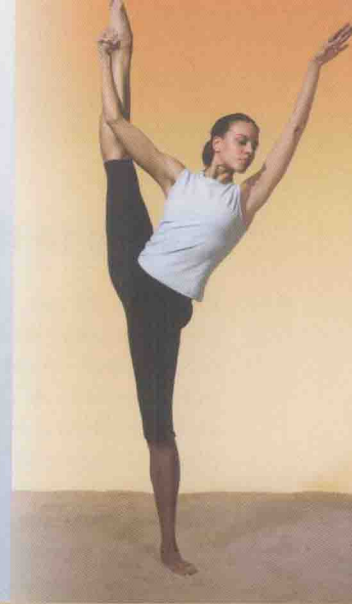
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Preface to Fifth Edition



The major addition to the Fifth Edition is the chapter on the circulatory system. The cardiovascular and lymphatic systems are becoming more clinically relevant in the fields of physical and occupational therapy, athletic training, and massage therapy, just as they have in other medical fields. New treatment techniques require basic understanding of these systems.

Individuals wanting a fundamental understanding of kinesiology and anatomy from a clinical perspective will find this text of great value. The anatomical basis of common pathological conditions is briefly described in most chapters to give greater clinical relevance. The functional activities and clinical exercises in the “Review Questions” section of many chapters have been expanded.

The depth and scope of the text remains the same. Emphasis is on basic kinesiology and anatomy. Simple, easy-to-follow descriptions and explanations remain the core of this book. Not all disciplines may need all of the information within this text. For example, some disciplines may not have a need to study arthrokinematics, or the temporomandibular joint, or gait. The book is written so that instructors can omit these and other concepts without putting the student at a disadvantage in terms of understanding other subject matter. The chapters dedicated to the various joints are essentially self-standing, so the order in which they are read can be easily changed. Instead of beginning with joints of the upper extremity, one could begin with the lower extremity or the axial skeleton, and not lose understanding.

Lynn S. Lippert

Preface to the Fourth Edition

Fifteen years ago, this project began as an attempt to provide a basic kinesiology and anatomy text to physical therapist assistant students. Jean-Francois Vilain, publisher at F. A. Davis Company, recognized the need and published this as the first textbook written for the physical therapist assistant. The narrow title *Clinical Kinesiology for Physical Therapist Assistants* was chosen to encourage others to write much-needed books and to encourage publishers to publish them. While many books have been written, there remain content areas that lack appropriate texts that could benefit students if they existed. Our work here is clearly not done.

However, the publisher felt that the time had come to change the title of this text to *Clinical Kinesiology and Anatomy*, opening the market to other disciplines. However, this text remains a basic textbook. Students who want a fundamental understanding of kinesiology and anatomy with a clinical perspective will find this text of great value. Examples, activities, and exercises are not focused solely on physical therapy but have been broadened to be of use to those in occupational therapy, athletic training, massage therapy, and other fields needing this basic level of understanding.

As with previous editions, the emphasis is on basic kinesiology and anatomy. Simple, easy-to-follow descriptions and explanations remain the core of this book. Clinical relevance has been increased by adding the following: (1) brief definitions and descriptions of common pathologies in terms of anatomical location, and (2) questions involving the analysis of functional activities and clinical exercises, in addition to general anatomy review.

Not all disciplines may need all of the information within this text. For example, some disciplines may not place emphasis on the arthrokinematic features. The book is written so that the arthrokinematic chapter can be omitted from study. Examples and questions regarding this subject matter can also be omitted without the student being at a disadvantage in terms of understanding other subject matter. The chapters dedicated to the various joints begin with the upper extremity and proceed to the axial skeleton, and then to the lower extremity. However, because these chapters are essentially self-standing, the order in which they are read can easily be changed. One could begin with the lower extremity or with the axial skeleton and not lose comprehension.

There are several textbooks that give a more in-depth analysis of the subject matter; however, *Clinical Kinesiology and Anatomy* is intended to provide an easy-to-understand basic introduction.

Lynn S. Lippert

Preface to the Third Edition

There are some changes and several new faces in this revision; however, the depth and scope of the text remains the same. It has been satisfying and rewarding to continually hear that one of the main strengths of the book is the simple, easy-to-follow descriptions and explanations.

The muscular system has been expanded to include an explanation of open and closed kinetic chain principles. The gait chapter now includes an explanation of many common pathological gait patterns. Several illustrations have been redrawn for greater clarity.

Five new chapters have been added. A chapter on basic biomechanics provides explanations and examples of the various biomechanical principles commonly used in physical therapy. Chapters describing the temporomandibular joint and the pelvic girdle have been added for those who want a basic description of those joints' structure and function. Normal posture and arthrokinematics, which were included in the *Kinesiology Laboratory Manual for Physical Therapist Assistants*, have been described and expanded upon in this revision.

There is no universal agreement within the physical therapy community regarding the scope of practice of the physical therapist assistant. It is generally felt that joint mobilization is not an entry-level skill. I do not disagree with this. However, physical therapist assistants are exposed to and involved in patient treatments where these skills are utilized. For this reason, they need basic understanding of the terminology and principles, and this text provides them with this information.

This revision of *Clinical Kinesiology for Physical Therapist Assistants* is the result of many suggestions from educators, students, and clinicians. The profession needs good textbooks that cover many additional areas of physical therapist assistant education. I hope that by its fourth edition, this text will have its place on the bookshelf along with those yet-to-be-written texts.

Lynn S. Lippert

Preface to the Second Edition

Most of the people who write and lecture on anatomy agree on what is there and where it is, although they do not always agree on what to call it. Kinesiologists tend to agree that motion occurs, but they certainly do not agree on what muscles cause a motion or on the relative importance of each muscle's action in that motion.

In *Clinical Kinesiology for Physical Therapist Assistants*, the emphasis is on basic kinesiology. In describing joint motion and muscle action, I have focused on describing

the commonly agreed-on prime movers, using the terminology most widely accepted within the discipline of physical therapy. Many textbooks exist that describe in greater detail various motions and muscles, in both normal and pathological conditions. For more in-depth analysis, the student should consult these books.

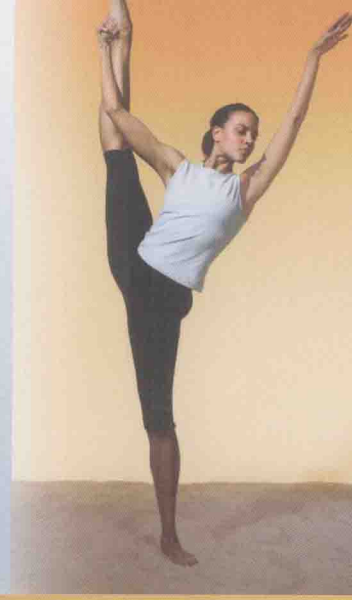
The idea of writing a kinesiology textbook for physical therapist assistant students has been around for several years. Somehow, time constraints and the pressures of other projects always got in the way. When educators

gathered to discuss issues regarding physical therapist assistant education, lack of appropriate textbooks was always high on the list of problems. It became evident that if such textbooks were to exist, the physical therapist assistant educators were the ones who needed to write them.

Clinical Kinesiology for Physical Therapist Assistants is the result of those discussions. I hope that it is only the first of many textbooks that emphasize physical therapist assistant education.

Lynn S. Lippert

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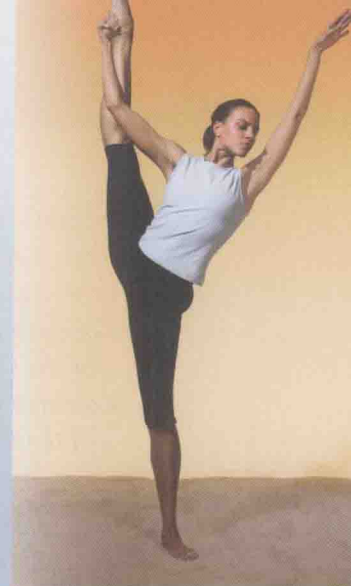
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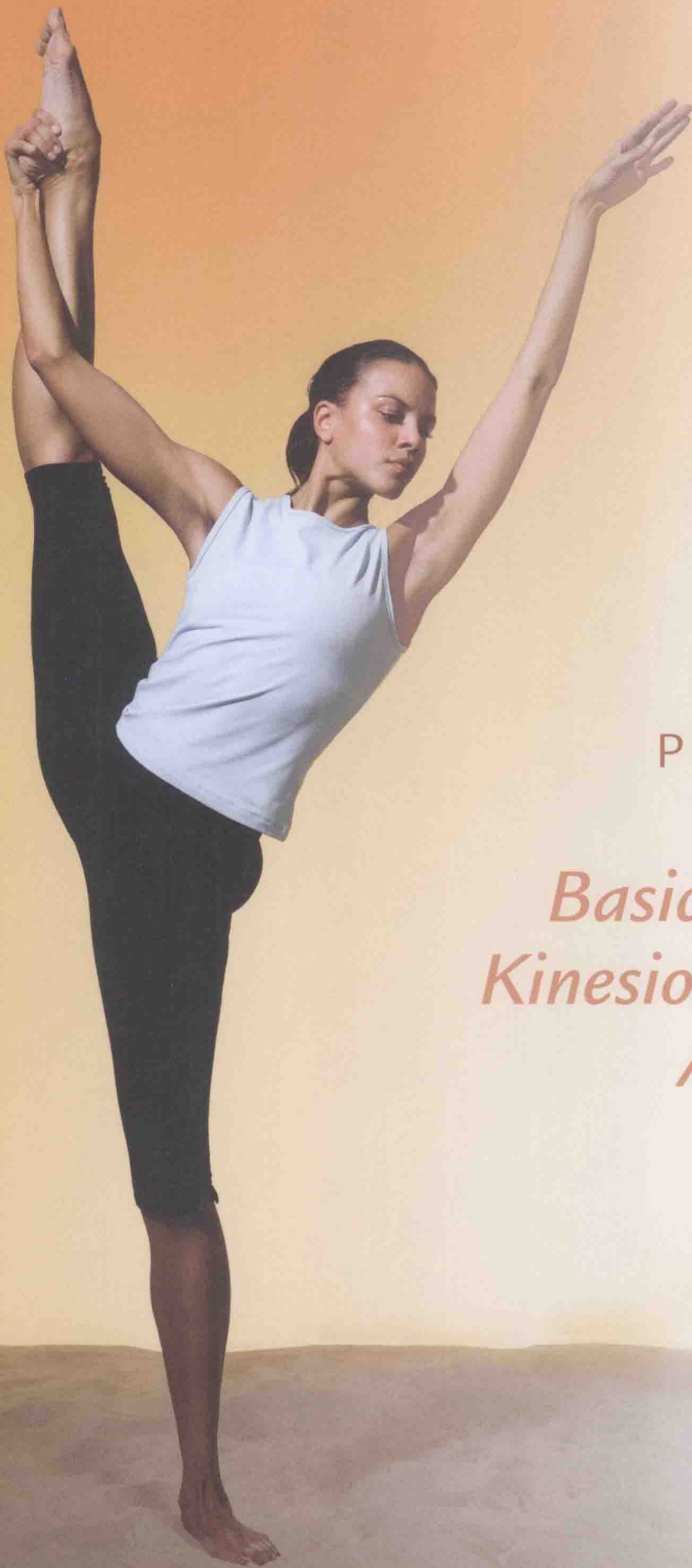
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PART I

*Basic Clinical
Kinesiology and
Anatomy*

