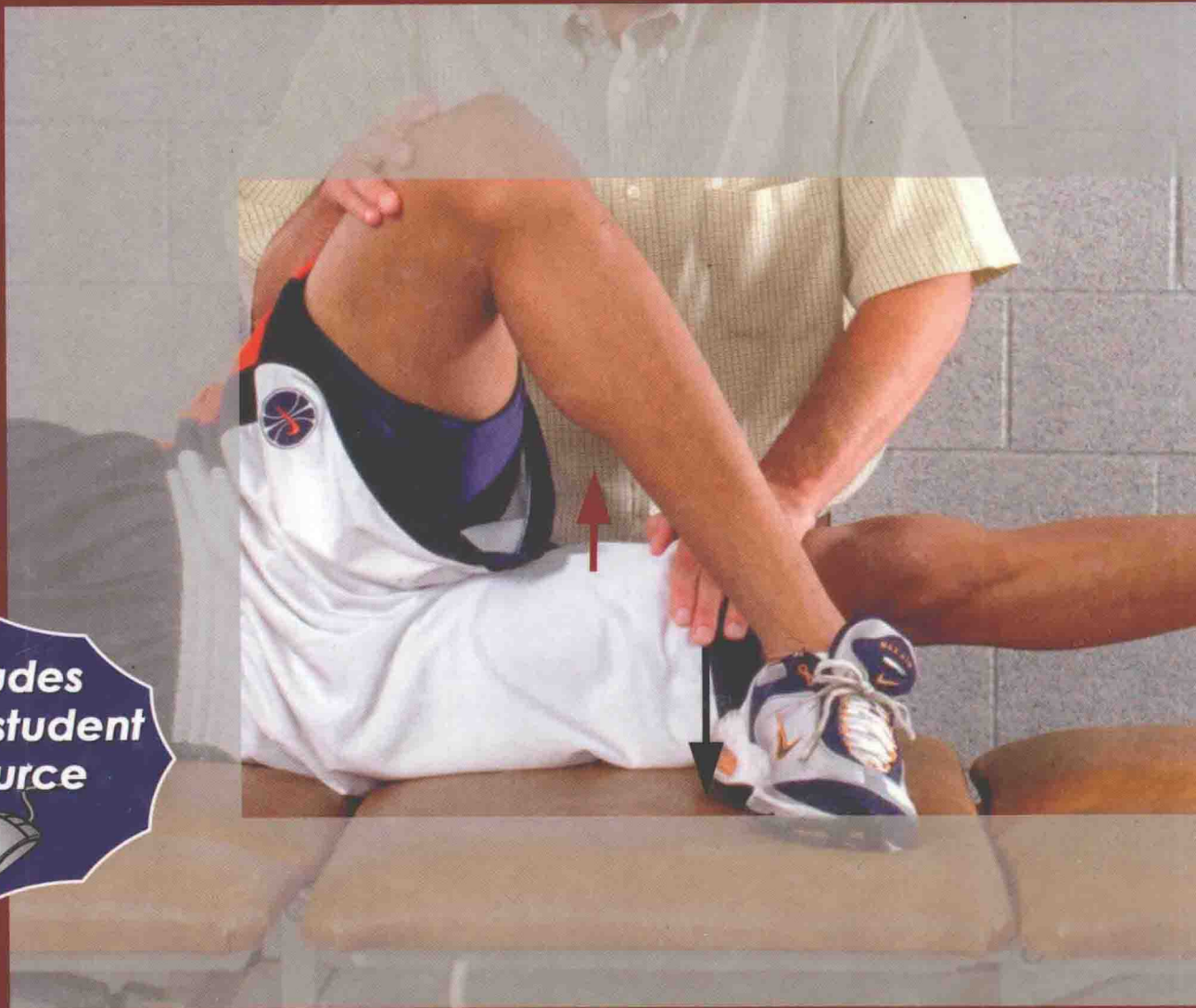


Third Edition

EXAMINATION OF MUSCULOSKELETAL INJURIES



**Includes
online student
resource**



**SANDRA J. SHULTZ
PEGGY A. HOUGLUM
DAVID H. PERRIN**

THIRD EDITION

EXAMINATION *of* MUSCULOSKELETAL INJURIES

ATHLETIC TRAINING EDUCATION SERIES

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INTRODUCTION TO THE ATHLETIC TRAINING EDUCATION SERIES

The six titles of the Athletic Training Education Series—*Core Concepts in Athletic Training*, *Examination of Musculoskeletal Injuries*, *Therapeutic Exercise for Musculoskeletal Injuries*, *Therapeutic Modalities for Musculoskeletal Injuries*, *Management Strategies in Athletic Training*, and *Developing Clinical Proficiency in Athletic Training*—are textbooks for athletic training students and references for practicing certified athletic trainers. Other allied health care professionals, such as physical therapists, physician's assistants, and occupational therapists, will also find these texts to be invaluable resources in the prevention, examination, treatment, and rehabilitation of injuries to physically active people.

The rapidly evolving profession of athletic training necessitates a continual updating of the educational resources available to educators, students, and practitioners. The authors of the six new editions in the series have made key improvements and have added information based on the fourth edition of the NATA Athletic Training Educational Competencies.

- *Core Concepts in Athletic Training*, which replaces *Introduction to Athletic Training*, is suitable for introductory athletic training courses. Part I of the text introduces students to mechanisms of injury, pathophysiology, and injury assessment. It also includes a chapter with some of the injuries and tests that students should be aware of. Part II introduces topics in injury examination, and part III considers the use of modalities and exercise in the therapeutic rehabilitation process. Part IV covers prevention topics such as conditioning, nutrition, protective gear, and taping and bracing. Part V introduces the managerial and legal issues relevant to clinical practice in athletic training.
- In *Examination of Musculoskeletal Injuries*, new information about sensitivity and specific-

ity strengthens the evidence-based selection of special tests, and an increased emphasis on clinical decision making and problem solving and the integration of skill application in the end-of-chapter activities are now included.

- Two new chapters have been added to *Therapeutic Exercise for Musculoskeletal Injuries*. Chapter 16 focuses on arthroplasty, and chapter 17 contains information regarding various age considerations in rehabilitation. This text also provides more support of evidence-based care resulting from a blend of research results and the author's 40 years of experience as a clinician.
- The new edition of *Developing Clinical Proficiency in Athletic Training* contains 27 new modules, and embedded within it are all the 2006 NATA Athletic Training Educational Competencies. The concepts of progressive clinical skill development, clinical supervision and autonomy, and clinical decision making are introduced and explained. The nature of critical thinking and why it is essential to clinical practice are also discussed.
- The third edition of *Therapeutic Modalities for Musculoskeletal Injuries* continues to provide readers with information on evidence-based practice and includes recent developments in the areas of inflammation and laser therapy.
- The fourth edition of *Management Strategies in Athletic Training* continues to help undergraduate and graduate students master entry level concepts related to administration in athletic training. Each of the ten chapters has been thoroughly updated, with new material added on such topics as evidence-based medicine, professionalism in athletic training, health care financial management, cultural competence, injury surveillance systems, legal updates, athletic trainer compensation, and more.

The Athletic Training Education Series offers a coordinated approach to the process of preparing students for the Board of Certification examination. If you are a student of athletic training, you must master the material in each of the content areas delineated in the NATA Athletic Training Educational Competencies. The Athletic Training Education Series addresses each of the competencies sequentially while avoiding unnecessary duplication.

The series covers the educational content areas developed by the Education Council of the National Athletic Trainers' Association for accredited curriculum development. The content areas and the texts that address each content area are as follows:

- Risk management and injury prevention (*Core Concepts and Management Strategies*)
- Pathology of injury and illnesses (*Core Concepts, Examination, Therapeutic Exercise, and Therapeutic Modalities*)
- Orthopedic assessment and diagnosis (*Examination and Therapeutic Exercise*)
- Acute care (*Core Concepts, Examination, and Management Strategies*)
- Pharmacology (*Therapeutic Modalities*)
- Conditioning and rehabilitative exercise (*Therapeutic Exercise*)
- Therapeutic modalities (*Therapeutic Modalities*)
- Medical conditions and disabilities (*Examination*)
- Nutritional aspects of injury and illness (*Core Concepts*)
- Psychosocial intervention and referral (*Therapeutic Modalities and Therapeutic Exercise*)
- Administration (*Management Strategies*)
- Professional development and responsibilities (*Core Concepts and Management Strategies*)

The authors for this series—Craig Denegar, Peggy Houglum, Richard Ray, Jeff Konin, Ethan Saliba, Susan Saliba, Sandra Shultz, Ken Knight, Kirk Brumels, and I—are certified athletic trainers with well over three centuries of collective experience as clinicians, educators, and leaders in the athletic training profession. The clinical experience of the authors spans virtually every setting in which athletic trainers practice: high schools, sports medicine clinics, universities, professional sports, hospitals, and industrial settings. The professional positions of the authors include undergraduate and graduate curriculum director, head athletic trainer, professor, clinic

director, and researcher. The authors have chaired or served on the NATA's most prominent committees, including Professional Education Committee, Education Task Force, Education Council, Research Committee of the Research and Education Foundation, Journal Committee, Appropriate Medical Coverage for Intercollegiate Athletics Task Force, and Continuing Education Committee.

This series is the most progressive collection of texts and instructional materials currently available to athletic training students and educators. Several elements are present in most of the books in the series:

- Chapter objectives and summaries are tied to one another so that students will know and achieve their learning goals.
- Chapter-opening scenarios illustrate the relevance of the chapter content.
- Thorough reference lists allow for further reading and research.

To enhance instruction, various ancillaries are included:

- All of the texts (except for *Developing Clinical Proficiency in Athletic Training*) include instructor guides and test banks.
- *Therapeutic Exercise for Musculoskeletal Injuries* includes a presentation package plus image bank.
- *Core Concepts in Athletic Training, Therapeutic Modalities for Musculoskeletal Injuries, and Examination of Musculoskeletal Injuries* all include image banks.
- *Examination of Musculoskeletal Injuries* includes an online student resource.

Presentation packages include text slides plus select images from the text. Image banks include most of the figures, tables, and content photos from the book. Presentation packages and image banks are delivered via PowerPoint, and instructors can use these to enhance lectures and demonstration sessions. Other features vary from book to book, depending on the subject matter; but all include various aids for assimilation and review of information, extensive illustrations, and material to help students apply the facts in the text to real-world situations.

The order in which the books should be used is determined by the philosophy of each curriculum director. In any case, each book can stand alone so that a curriculum director does not need to revamp an

entire curriculum in order to use one or more parts of the series.

When I entered the profession of athletic training over 30 years ago, one text—*Prevention and Care of Athletic Injuries* by Klafs and Arnheim—covered nearly all the subject matter required for passing the Board of Certification examination and practicing as an entry-level athletic trainer. Since that time we have witnessed an amazing expansion of the information

and skills one must master in order to practice athletic training, along with an equally impressive growth of practice settings in which athletic trainers work. You will find these updated editions of the Athletic Training Education Series textbooks to be invaluable resources as you prepare for a career as a certified athletic trainer, and you will find them to be useful references in your professional practice.

David H. Perrin, PhD, ATC
Series Editor

PREFACE

The third edition of *Examination of Musculoskeletal Injuries* is one of six texts in the Athletic Training Education series. This text addresses several areas of clinical practice that you must master in order to pass the Board of Certification (BOC) examination, including pathology of injury and illnesses, examination and assessment, and general medical conditions and disabilities.

As a certified athletic trainer, your ability to recognize and examine athletic injuries will prove essential to managing the broad spectrum of injuries you will encounter. These injuries will range from acute to chronic, obvious to subtle, and minor to life threatening. The injury examination includes obtaining an accurate injury history, inspecting the injured area and related structures, testing active and passive motion, conducting strength and neurological examinations, palpating bony landmarks and soft tissues, and examining function to determine an athlete's readiness to return to unrestricted physical activity. In addition, you will use special tests to isolate relevant structures and identify specific pathologies, including ligament stress testing and fracture examination. The order and extent to which you address these components of examination will be determined in part by the injury acuity, the injury setting, and your initial history and observation. *Examination of Musculoskeletal Injuries* is unique in its presentation of injury examination strategies, dividing them into on-site, acute, and clinical protocols. These protocols allow you to focus your evaluation skills on emergent, nonemergent, and postacute conditions. Checklists provide the framework for developing a systematic approach to injury examination in each setting.

Examination of Musculoskeletal Injuries, Third Edition, is divided into three parts. Part I is geared to entry-level students and presents the general principles and foundational skills for each component of the injury examination. Chapters 1 and 2 review injury terminology and classifications and present an overview of the general concepts and rationale for each of the components of the examination procedure. Chapters 3 through 9 delve into the specifics of each of these components (history, observation, palpation, range of motion, strength assessment, neurological

examination, cardiovascular examination), presenting the goals, purposes, and general principles and techniques that you will need in order to perform the region-specific tests presented in part II. Because special tests are unique to each joint and typically incorporate the principles of several examination techniques, they are addressed in part II as they apply to specific body regions. Chapter 10 concludes part I by incorporating these individual examination components into systematic examination strategies tailored to injury acuity and environment.

Part II of *Examination of Musculoskeletal Injuries* applies the general principles presented in part I to the recognition and examination of injuries and conditions specific to each body region. Chapters 11 through 20 address each body region and consist of four primary sections. Each chapter opens with functional anatomy, providing an overview of the primary anatomical characteristics of the region. Acute and chronic injuries specific to the region are then presented, which focus on the etiology and signs and symptoms that will help you recognize and differentiate injuries commonly incurred during physical activity. Specific objective tests used in examining each region then follow, including tests for palpation, range of motion, strength, neurovascular status, special tests, and joint mobility. Each chapter in part II concludes by incorporating these tests into specific injury examination strategies for on-site injuries, immediate postinjuries, and injuries seen in the treatment facility. One or two scenarios precede the discussion of each examination strategy to orient you to the types of situations you can expect to encounter.

Completing the text, part III addresses the general medical conditions you are most likely to encounter with patients. The topics are presented here according to body system as presented in the fourth edition of *Athletic Training Educational Competencies* (National Athletic Trainers' Association 2006). Chapter 21 covers conditions of the eyes, ears, nose, and throat (EENT) and respiratory and cardiovascular systems. It also covers other viral conditions. Chapter 22 covers conditions affecting the digestive, endocrine, reproductive, and urinary systems. Disordered eating and sexually transmitted diseases are also discussed. Chapter

23 concludes part III with a discussion of the general medical conditions affecting the musculoskeletal, nervous, integumentary, and other systems.

Each chapter of the third edition of *Examination of Musculoskeletal Injuries* will optimize your understanding and mastery of the material. All chapters open with objectives that highlight key learning points and follow with an open-ended real-life scenario that illustrates the complexity and exciting challenge of athletic injury examination. Each chapter closes with a summary, and key concepts that show how the chapter answered the chapter objectives, and a list of review questions, critical thinking questions, and laboratory activities to ensure mastery and application of the material. Throughout each chapter, you will find several learning aids: Key terms are boldfaced and their definitions are provided in the glossary; warnings marked by exclamation points alert you to procedures you should not omit because they may make the difference between complete recovery and permanent disability or even death; and facts designated by a lightbulb remind you of statements made earlier in the text that are important for you to recall.

NEW FOR THE THIRD EDITION

Updates in content have been made throughout the text based on the fourth edition of *Athletic Training Educational Competencies*. The functional anatomy and injury recognition sections in part II are revised where needed to better link these sections to the musculoskeletal examination process. Chapters 12 and 17 feature tables reporting the sensitivity and specificity of the various special tests used in the examination procedures for the shoulder and knee to differentiate the various conditions at each joint. You will also find an increased emphasis on clinical decision making, problem solving, and integration of skill application in the end-of-chapter activities. Specifically, the opening scenarios have been streamlined and revised to be more open ended to better set the stage for the critical thinking questions at the end of the chapter. Stronger and more thought-provoking review and critical thinking questions allow readers to better develop and demonstrate their clinical decision-making and problem-solving skills. We also added four or five lab activities for nearly every chapter to help students apply and integrate their examination skills with their clinical decision-making and problem-solving skills. The third edition is also enhanced with additional photos and figures to complement the text. We are

pleased to announce that all photos, figures, and tables from the text will now be available to instructors through the ancillary Web site.

eBook
available at
HumanKinetics.com

INSTRUCTOR AND PROFESSIONAL RESOURCES

Additional resources for instructors and professionals continue to be available at www.HumanKinetics.com/ExaminationOfMusculoskeletalInjuries. An updated instructor guide, test package, and image bank are available. The instructor guide includes learning objectives, chapters at a glance, suggested lecture outlines, and suggested classroom and student activities to assist with lecture and exam preparation. It also provides sample answers for the book's critical thinking questions. The test package contains more than 460 questions, including true-or-false, fill-in-the-blank, short-answer, and multiple-choice. The image bank includes most of the art, tables, and content photos in convenient PowerPoint format. A blank PowerPoint template is also provided to help instructors build their own lecture content tailored to their individual styles.

STUDENT RESOURCES

Many of the special element features in the text are provided in an easily reproducible format that students can print to use as study guides during laboratory and review sessions. These resources encompass examination checklists; tables detailing range of motion, strength, and neurological examination for each joint; and color plates of dermatological conditions. Cross references throughout the book like this one,



Go to www.HumanKinetics.com/ExaminationOfMusculoskeletalInjuries for a printable PDF of the on-site examination checklist.

point students to these reproducible elements, which can be accessed at the Student Resources section of www.HumanKinetics.com/ExaminationOfMusculoskeletalInjuries. Course and clinical instructors will find these elements useful as teaching aids or as proficiency checklists for oral or practical examinations to assess students' mastery. Although permission is not granted for reproducing the color slides of skin conditions, students

may view these online to aid in differentiating among conditions.

We trust that you will find this new edition of *Examination of Musculoskeletal Injuries* to be an indispensable resource for developing your confidence in examining and differentiating the various pathologies that you will encounter over your career as a certified

athletic trainer. This book can stand alone, but keep in mind that using the entire Athletic Training Education series will be especially effective in preparing you for the challenging Board of Certification examination and for a gratifying career in athletic training and sports medicine.

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We extend our thanks to Michael D. Leonard for his research on the sensitivity and specificity of special tests for the knee and shoulder that have been added to this third edition. We also wish to again acknowledge Dr. Kenneth E. Greer, professor of dermatology and chairman emeritus (1993-2008); Dr. Theodore E. Keats, alumni professor of radiology; the film library staff in the department of radiology; and Dr. Brian C. Hoard, associate professor of clinical dentistry, all from the University of Virginia Health Sciences, for

their assistance in obtaining photographs of dermatological conditions, radiographs of skeletal pathologies, Salter-Harris illustrations, and dental injuries. This text has been greatly enhanced by the collective contributions of these outstanding individuals.

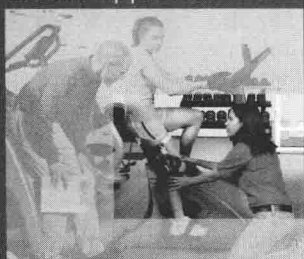
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Athletic Training Education Series

Human Kinetics' Athletic Training Education Series contains six textbooks, each with its own supporting instructional resources. Featuring the work of respected athletic training authorities, the series parallels and expounds on the content areas established by the NATA Education Council. To learn more about the books in this series, visit the Athletic Training Education Series Web site at www.HumanKinetics.com/AthleticTrainingEducationSeries.

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Third Edition

EXAMINATION OF MUSCULOSKELETAL INJURIES



SANDRA J. SHULTZ
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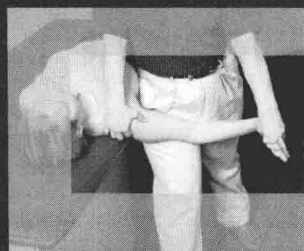
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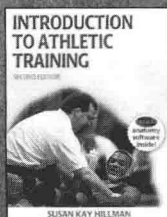
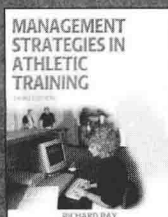
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