Concepts of Athletic Training

SEVENTH EDITION

Ronald P. Pfeiffer
Brent C. Mangus
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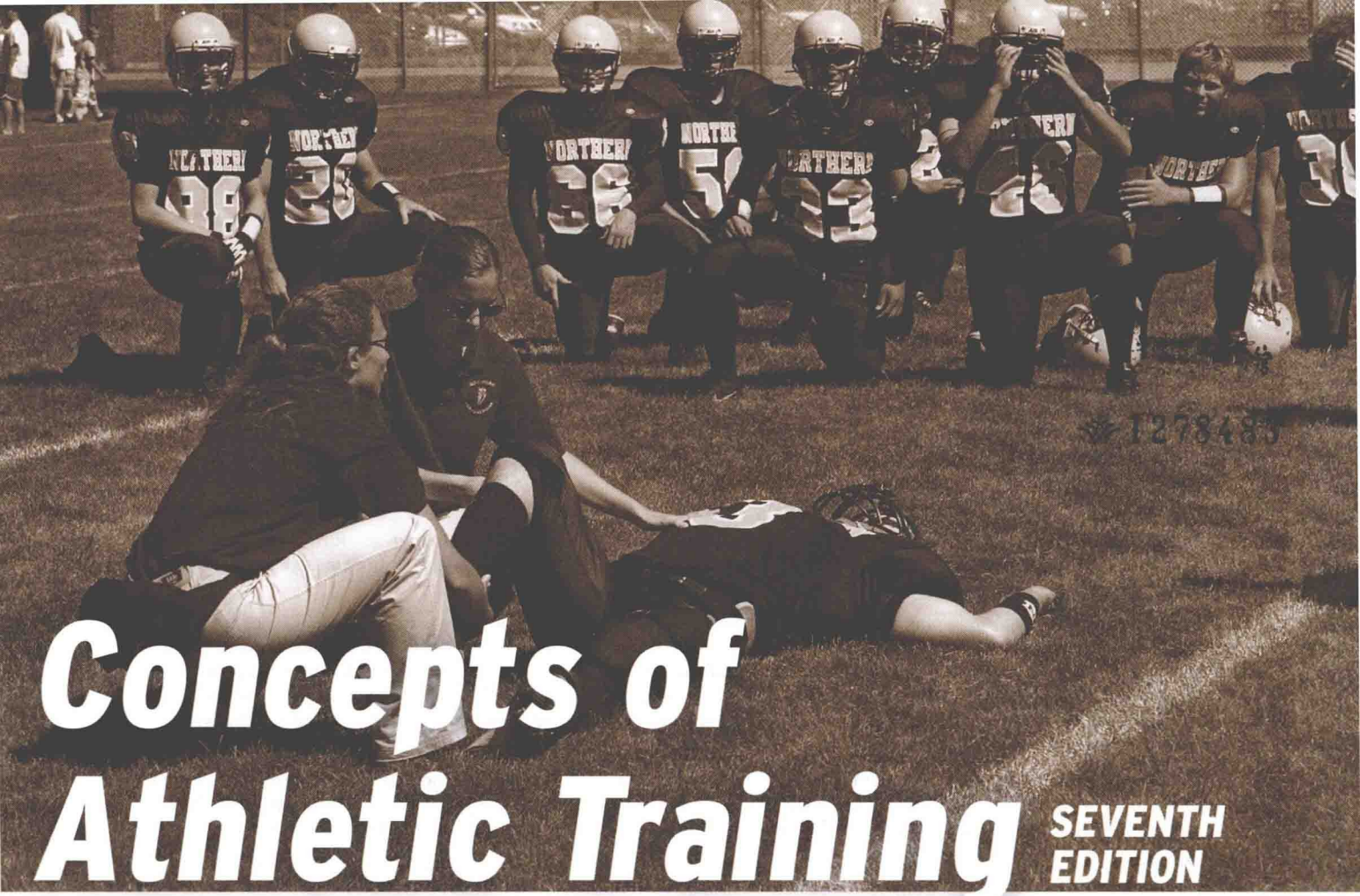

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SEVENTH EDITION

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Production Credits
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Composition: Aptara®, Inc.
Cover Design: Kristin E. Parker
Photo Research and Permissions Coordinator: Lauren Miller
Cover Image: © Dennis MacDonald/Alamy Images
Printing and Binding: Edwards Brothers Malloy
Cover Printing: Edwards Brothers Malloy

To order this product in paperback, use ISBN: 978-1-284-03412-7

To order this product in hardcover, use ISBN: 978-1-284-06246-5

Library of Congress Cataloging-in-Publication Data
Pfeiffer, Ronald P., author.
Concepts of athletic training.—Seventh edition / Ronald Pfeiffer, Brent Mangus, Cindy Trowbridge.
pages cm
Includes bibliographical references and index.
ISBN 978-1-284-02214-8 (pbk.)—ISBN 978-1-284-12075-2 (hardcover)
1. Athletic trainers. 2. Sports injuries. 3. Sports medicine. I. Mangus, Brent C., author.
II. Trowbridge, Cynthia A., author. III. Title.
RC1210.P45 2015
617.1′027—dc23

2013045773

6048

Printed in the United States of America
18 17 16 15 14 10 9 8 7 6 5 4 3 2 1

Concepts of Athletic Training

Preface

More than 3 million children under the age of 14 are injured while participating in organized school sports or playing recreationally and around 750,000 of these injuries require treatment at an emergency care facility. The good news is there are more BOC-Certified Athletic Trainers (ATs) employed in the nation's high schools than at any other time in history. However, the reality is that the majority of schools, especially middle schools, still do not employ ATs and, as a result, the coaching personnel or physical educators are likely to serve as "first responders" in the majority of sports-injury situations. Because coaches and physical educators interact with children of all ages and have teams or classes that include both pre-adolescents and post-pubescent youth, this puts considerable pressure on them to become knowledgeable on the "best practices" for prevention and management of injuries to both populations. In order to make correct decisions, these personnel must be properly trained, not only in basic first aid, but in more advanced knowledge in order to properly manage injuries that are complicated by sports equipment and personal protective equipment such as helmets, face masks, mouth guards, and other equipment.

The primary goal of this book is the prevention, care, and management of sport and physical activity related injuries. Because coaches or non-high level sports medicine professionals are most likely the first responders, the target audience for the *Concepts of Athletic Training* includes anyone planning a career as a coach, physical educator, or personal trainer. This seventh edition is also excellent for high school students or college students majoring in athletic training. The general field of sports medicine continues to be a rapidly evolving field of study. The content will form a solid foundation for more advanced studies in this exciting and constantly evolving allied health field.

New to This Edition

The authors have made every effort to update critical material throughout the text in order to make the content as current as possible. This latest edition includes considerable updates in regards to sports injury epidemiology (Chapter 1, *The Concept of Sports Injury, The Athletic Health Care Team* [Chapter 2]), proper prevention strategies including emergency planning (Chapter 7, *Emergency Plan and Initial Injury Evaluation*), legal issues (Chapter 3, *The Law of Sports Injury*), preparticipation physical exams and strength training and periodization techniques (Chapter 4, *Sports-Injury Prevention*), in addition to updated information on the importance of nutrition in injury prevention (Chapter 6, *Nutritional Considerations*). Response to injury, including the coach's or physical educator's initial decisions and subsequent actions, are critical in determining the outcome of an injury; therefore, significant updates have been added to chapters that focus on injuries to the head, neck, face, mouth (Chapter 9, *Injuries to the Head, Neck, and Face*), upper and lower extremities, skin (Chapter 17, *Skin Conditions in Sports*), and the low back, thorax, and abdomen (Chapter 10, *Injuries to the Thoracic Through Coccygeal Spine* and Chapter 13, *Injuries to the Thorax and Abdomen*). Because the majority of sport- and activity-related injuries involve the musculoskeletal system, much of this text's content is devoted to the recognition, immediate care, and management of injuries such as sprains, strains, dislocations, and fractures in the extremities. In an effort to help coaches and physical educators provide proper advice for the home management of musculoskeletal injuries, Chapter 8, *The Injury Process* includes the latest information regarding the treatment of inflammation. Fortunately, only a small percentage of sports- and activity-related injuries are life threatening or result in permanent disability. However, deaths and permanent disability tragically continue to be an outcome in a small percentage of cases. Most of these injuries are related to trauma to the head and/or neck or are heat related. Detailed information on head and neck injuries, as well as prevention of heat disorders, is provided in Chapter 9, *Injuries to the Head, Neck, and Face* and Chapter 18, *Thermal Injuries*. These chapters have been updated in relation to recent publications on the recognition, treatment, and disposition of concussions, neck injuries, and heat illness. New information on cardiac concerns, diabetes, exercise-induced asthma, sickle cell crisis, and MRSA are also included in Chapter 19, *Other Medicinal Concerns* as coaches and physical educators may be the first to respond to these incidents and proper recognition and activation of an emergency action plan is essential. This newest edition also includes vital information related the psychology of sports participation and injury (Chapter 5, *The Psychology of Athletes and Sport Injury*) and includes advice on recognizing symptoms and directions for referral of

youth who may be experiencing psychological issues related to sports participation, sports injury, or undue pressure from caregivers.

Because coaches and physical educators are often responsible for adolescent athletes, this latest edition continues to feature a chapter devoted to the adolescent athlete (Chapter 20, *The Adolescent Athlete: Special Medical Concerns*). The rationale for this is simple: The vast majority of school-aged athletes (grades 7–12) are, in fact, adolescents or even pre-adolescents. As such, they represent an anatomically distinct population when compared to adult athletes. These differences must be recognized and considered by coaching personnel when making decisions regarding not only injury management, but also when designing and implementing injury prevention programs.

What Is Not Included and Why

Periodically the authors are asked why our text does not include detailed information on more advanced techniques including taping/wrapping, as well as joint assessments. The answer is easy; those procedures clearly fall outside the scope of practice for a coach or physical education teacher. As we have targeted this text to those populations, we feel it would be irresponsible to introduce students to clinical skills they should not attempt to execute in the field. We also market the text to pre-athletic training majors, however, students who complete a CAATE accredited athletic training program will receive extensive training in many advanced skills by way of other, more advanced texts, as well as by way of mentoring from clinical instructors.

Conclusion

This book is an outstanding resource for students studying to become physical education teachers, coaches, and athletic trainers. Personnel charged with the responsibility of providing emergency care for athletes must be trained in the first aid procedures appropriate for sports injuries. The content of this text will provide instructors and students with a wealth of information on topics related to the care and prevention of sports injuries. The goal, of course, is to give coaching and teaching personnel the necessary knowledge and critical-thinking skills to recognize and differentiate minor from more serious sports injuries. Once decisions are made regarding the nature of the injury, appropriate first aid care and/or medical referral can be instituted.

How to Use This Book!

Major Concepts sections provide an introduction that sets the stage for each chapter and provides an overview of what is to come.

MAJOR CONCEPTS

The cornerstone of optimal management of sports- and activity-related injuries is the athletic healthcare team (AHCT), which is made up of a variety of highly trained medical and allied medical personnel as well as other professionals, and coordinates on site with nonmedical personnel including coaches, administrators, parents, and the athletes. This chapter provides an overview of the principal members of the team and reviews the evolution of the field of **sports medicine**. In addition, it describes specific services provided by the athletic healthcare team, giving special attention to the team physician and the athletic trainer who is certified by the Board of Certification, Inc. (BOC). It also outlines educational requirements for BOC certification and employment options for certified athletic trainers.

For a full suite of assignments and additional learning activities (indicated by the icons throughout the text), use the access code found in the front of your text. If you do not have an access code, you can obtain one at go.jblearning.com/PfeifferCWS.

This icon urges students to visit the Navigate Companion Website for additional assignments and practice actitivies.

What if? features are real-world scenarios that encourage students to work on critical decision-making skills. These sections provide information typically available to coaching personnel when confronted with an injury-related problem. Applications range from simple decision-making practice sessions to role-playing exercises in the classroom.

WHAT IF?

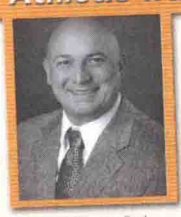
A group of parents asks you, the soccer coach at the local high school, your recommendation for the best way to provide preseason physical evaluations that are required by the state high school association. What would you recommend?

WHAT IF?

A high school senior asks you for information on the academic requirements and certification process to become an athletic trainer.

Athletic Trainers Speak Out boxes feature a different athletic trainer in every chapter who discuss an element of athlete care and injury prevention.

Athletic Trainers SPEAK Out



Courtesy of Forrest Pecha, MS, ATC, LAT, OTC, CSCS, St. Luke's Sports Medicine.

Athletic trainers have been instrumental in the prevention, diagnosis, care, and treatment of musculoskeletal injuries for athletes and active populations for decades. Athletic training forefathers logged many hours and have worked tirelessly managing the athletic sidelines to bring recognition to our profession as healthcare professionals. Today, as athletic training evolves, athletic trainers (ATs) are reaching out into a number of emerging settings and continue to provide the same level of care to patients as we have from the inception of our profession.

ATs have a background in musculoskeletal care, unique to our profession, that sets us apart from many other healthcare providers. Working as a "physician extender" is not unique to our profession; we have been working side by side with physicians through the grassroots of our profession and continue to manage athletes together in the athletic training rooms. The physician extender career setting has evolved and taken the AT from the sidelines to the physician offices. ATs have become instrumental in patient care models in the clinical setting and play an ever-growing role in today's healthcare. ATs fill many responsibilities within the physician clinic, from taking patient histories, completing physical exams and inspection, scribing for their physicians, casting, bracing, and teaching home exercises, to providing patient education, pre- and postoperative patient care, surgical assistance, and the list goes on. ATs working in this role have shown positive financial impacts to their clinics, increased clinic efficiency, and improved patient satisfaction. ATs are being sought out at an increasing pace to work in the physician clinics and be members of the healthcare team.

—Forrest Q. Pecha, MS, ATC, LAT, OTC, CSCS

Forrest Q. Pecha is the Director of Clinical Residency and Outreach at St. Luke's Sports Medicine.

Courtesy of Forrest Pecha, MS, ATC, LAT, OTC, CSCS, St. Luke's Sports Medicine.

Time Out boxes provide additional information related to the text, such as NATA Athletic Helmet Removal Guidelines, guidelines for working with an injured athlete, how to recognize the signs of concussion, and much more.

TIME OUT 2.1

Major support for the placement of BOC-certified athletic trainers in secondary schools was provided by the AMA's House of Delegates in June 1998. The AMA House of Delegates adopted the following statements as policy:

1. The AMA believes that (a) the Board of Education and the Department of Health of the individual states should encourage that an adequate Athletic Medicine Unit be established in every school that mounts a sports program; (b) the Athletic Medicine Unit should be composed of an allopathic or osteopathic physician director with unlimited license to practice medicine, an athletic health coordinator (preferably a BOC-certified athletic trainer), and other necessary personnel; (c) the duties of the Athletic Medicine Unit should be prevention of injury, the provision of medical care with the cooperation of the family's physician and others of the healthcare team of the community, and the rehabilitation of the injured; (d) except in extreme emergencies, the selection of the treating physician is the choice of the parent or guardian and any directed referral therefore requires their consent; (e) Athletic Medicine Units should be required to submit complete reports of all injuries to a designated authority; and (f) medical schools, colleges, and universities should be urged to cooperate in establishing education programs for athletic health coordinators (BOC-certified athletic trainers) as well as continuing medical education and graduate programs in Sports Medicine.
2. The AMA urges high school administrators, athletic directors, and coaches to work with local physicians, medical societies, and medical specialty societies, as well as government officials and community groups, to undertake appropriate measures to ensure funding to provide the services of a certified athletic trainer to all high school athletes.
3. Recognizing that not all high schools have the resources to procure the services of a certified athletic trainer and further recognizing that athletic trainers cannot be present at all practices and competitions, the AMA encourages high school administrators and athletic directors to ensure that all coaches are appropriately trained in emergency first aid and basic life support.

Source: Reproduced from Lyznicki JM, Riggs JA, Champion HC. (1999). Certified athletic trainers in secondary schools: Report of the Council on Scientific Affairs, American Medical Association. *J Athl Train.* 34(3):272–276. Reprinted with permission.

All relevant chapters begin with an **Anatomy Review** to introduce body parts to students unfamiliar with human anatomy and provide a refresher for others who may have taken past anatomy courses.

ANATOMY REVIEW

The shoulder allows for a great deal of movement while at the same time providing a point of attachment for the arm to the thorax. The skeleton of the shoulder (**Figure 11.1**) consists of the bones of the shoulder girdle and the upper arm bone (humerus). The clavicle and the scapula make up the shoulder girdle, so named because these two bones surround (girdle) the upper thorax. The head of the humerus combines with the shallow glenoid fossa of the scapula to form the highly mobile **glenohumeral (GH) joint**, commonly known as the shoulder joint (**Figure 11.2**). The GH joint is provided with additional stability by a fibrocartilaginous cuplike structure known as the glenoid labrum, which is directly attached to the glenoid fossa (Gray, 1985). The labrum extends out into the GH joint, making the glenoid fossa a deeper receptacle for the head of the humerus (Snyder, Rames, & Wolber, 1991). In addition, the long-head tendon of the biceps brachii muscle is attached to the superior labrum and to the supraglenoid tubercle at the top of the GH joint. The shoulder region also includes the **acromioclavicular (AC) joint**, located between the distal end of the clavicle and the acromion of the scapula (Figure 11.2), and the **sternoclavicular (SC) joint**, located between the proximal end of the clavicle and the manubrium of the sternum (**Figure 11.3**). Each of these joints is held together with ligaments and joint capsules that provide stability while also allowing for necessary movement, which is quite limited.

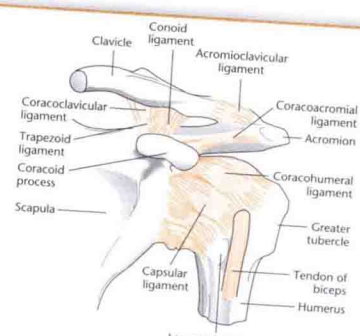


FIGURE 11.2 Ligaments of the acromioclavicular and glenohumeral joints.

shoulder girdle and the GH joint work together to move the arm. Consequently, any limitation from injury to the shoulder girdle will indirectly affect the GH joint. The muscles in the region of the shoulder can be divided into two groups—those that act on the shoulder girdle and those that act on the GH joint (**Figures 11.4** and **11.5**). The muscles of the shoulder girdle are the levator scapulae, trapezius, rhomboids, subclavius, pectoralis minor, and serratus anterior

Key terms are bolded within the text and defined in boxes to help students quickly identify and understand new terms.

sports medicine Branch of medicine concerned with the medical aspects of sports participation.
orthopedic surgeon Physician who corrects deformities of the musculoskeletal system.
team physician A medical doctor who agrees to provide at least limited medical coverage to a particular sports program or institution.

Each chapter closes with **Review Questions** that continue to engage students in a thoughtful review of important chapter material.

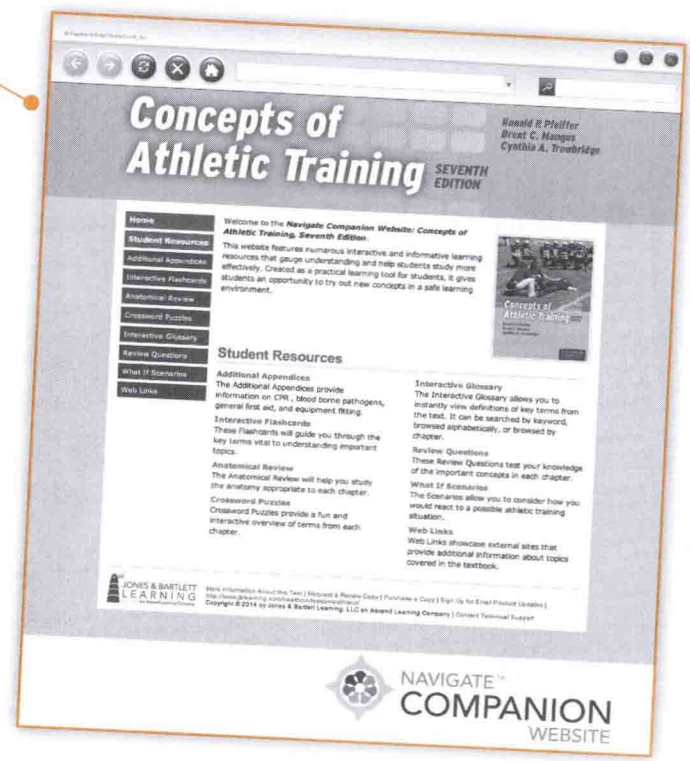
REVIEW QUESTIONS

1. Define the term *sports medicine*.
2. What is the CAQ and how does it relate to the team physician?
3. List the specific services that should be provided to the athlete by the team physician.
4. What are the six practice domains of the BOC-certified athletic trainer?
5. List several professional medical organizations that promote the study of sports medicine.
6. What has been the largest employment market for athletic trainers in recent years?
7. Briefly describe six different employment options for a BOC-certified athletic trainer in the school setting. Elaborate on the advantages and disadvantages of each option.
8. True or false: It is generally acknowledged that sports medicine services in the future will be provided by medical specialists rather than primary care physicians.
9. List the eight professional content areas that are required by CAATE for accredited curricula in athletic training.

Integrated Teaching and Learning Package:

For Instructors: Instructor resources include Instructor's Manuals, Test Banks, Lecture Outlines in PowerPoint format, and Image Banks

For Students: The Navigate Companion Website, included free with every new copy of the text, includes an interactive anatomy review, animated flashcards, crossword puzzles, scenarios, review questions, and more.



Acknowledgments

Those familiar with the previous editions of this text will note we have a new co-author, Dr. Cynthia Trowbridge, Associate Professor of Kinesiology and Clinical Education Coordinator in the Athletic Training Education Program at University of Texas, Arlington. Dr. Trowbridge has over 20 years of experience as a clinician, educator, and scholar. Along with being an exceptional writer, she brings a wealth of knowledge and experience in the profession to our team! We are indeed fortunate to have Dr. Trowbridge on-board as a co-author for the seventh edition. I'd also like to thank my other co-author, Dr. Brent Mangus, for all that he has done for nearly 20 years to ensure this book is contemporary and represents "best practices" across the seven editions. Brent's knowledge, impressive intellect, and wisdom have made the evolution of this text possible. I also want to recognize all those in the profession who have influenced me over the years. Space does not allow me to mention you all by name, but my years as a student at Central Michigan University, University of Oregon, and Brigham Young University provided me with a wealth of opportunities to be mentored by a number of outstanding and dedicated professionals. Thank you all!

—Ron Pfeiffer
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