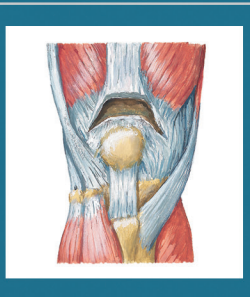
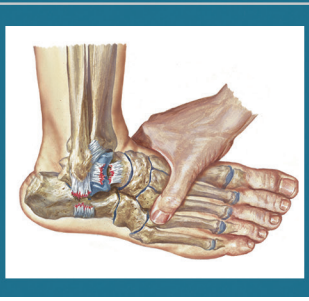
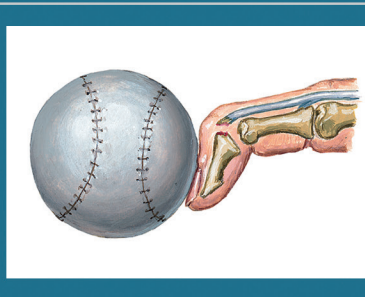
NETTER'S SPORTS MEDICINE

2nd EDITION

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NETTER'S SPORTS MEDICINE, SECOND EDITION ISBN: 978-0-323-39591-5

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Library of Congress Cataloging-in-Publication Data

Names: Madden, Christopher C., author. | Putukian, Margot, author. | Young, Craig C., author. | McCarty, Eric C., author. | Netter, Frank H. (Frank Henry), 1906-1991, illustrator.
Title: Netter's sports medicine / Christopher C. Madden, Margot Putukian, Craig C. Young, Eric C. McCarty; illustrations by Frank H. Netter; contributing illustrators, Carlos A. Machado, John A. Craig, James A. Perkins, Kristen Wienaundt Marzejon.
Other titles: Sports medicine
Description: Second edition. | Philadelphia, PA : Elsevier, Inc., [2017] | Preceded by: Netter's sports medicine / Christopher Madden … [et al.]; illustrations by Frank H. Netter ; contributing illustrators, Carlos A.G. Machado … [et al.]. c2010. | Includes bibliographical references and index.
Identifiers: LCCN 2016030811 | ISBN 9780323395915 (hardcover : alk. paper)
Subjects: | MESH: Athletic Injuries | Sports Medicine—methods
Classification: LCC RC1211 | NLM QT 261 | DDC 617.1/027—dc23 LC record available at https://lccn.loc.gov/2016030811

Executive Content Strategist: Elyse O'Grady
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Project Manager: Stephanie Turza
Design Direction: Patrick Ferguson

Printed in China

Last digit is the print number: 9 8 7 6 5 4 3 2 1

DEDICATION

Netter's Sports Medicine is dedicated to the *Team Physician's Handbook* and to the many thousands of sports medicine physicians and health professionals who have loyally followed and evolved with its content over three spectacular editions. *Netter's Sports Medicine* evolved from the original efforts embodying the *Team Physician's Handbook* and all that it represented for sports professionals through the years.

The Netter editions bring with them a broader and deeper approach to the comprehensive field of sports medicine. Many new topics, chapters, and authors are combined with cutting-edge Netter and other graphics, displayed in a colorful, user-friendly, easy-access format. *Netter's Sports Medicine* invites a much broader audience of sports medicine professionals and promises to be a premier ready reference and a detailed resource for all sports medicine professionals.

This book is also dedicated with respect and honor to the original creators of the *Team Physician's Handbook*, who we failed to acknowledge in the previous edition: W. Michael Walsh, MD, Morris B. Mellion, MD, and Guy L Shelton, PT, whose vision and wisdom made this work possible. May their love of sports medicine, conduct in the field, and integrity as human beings set an example for us all to follow.

And, to the most wonderful, loving family I can imagine: Jessica, my beautiful wife, and Sage, my energetic and inquisitive daughter. They are both my best teachers, and they bring me infinite happiness. Also, to my mother, Susan Madden, and my passed father, Spencer Madden, whose love, patience, belief, and guidance presented me with limitless opportunity.

—Christopher C. Madden, MD, FACSM

This book is dedicated to my parents, John and Elissa, who taught me to work hard, enjoy life, and respect other people; to my brother, Peter, and sister, Lisa, as well as their families; and to my husband and best friend, Joe Hindelang, as well as my stepson Joel. I treasure the time and memories we're able to spend together. I have learned so much in my career through my mentors, including my fellowship directors Dave Hough and Doug McKeag, as well as so many colleagues (many of whom are contributors to this book). I feel fortunate that I've had an opportunity to participate in this book with such great contributors and editors.

—Margot Putukian, MD, FACSM

This is dedicated to my parents, Margaret and Jimmie, who instilled in me the thirst for knowledge, and to my teachers who had the patience to give me that knowledge, especially to Drs. Jim Puffer, Bob Dimeff, and John Bergfeld. And finally, and most important, to my beautiful and wonderful wife, Sharon Busey, who has given me the love, support, and time to complete this project—I couldn't have done this without you.

—Craig C. Young, MD

My dedication of this book goes to my best friend and loving wife, Miriam, who is ever supportive, patient, and enduring in her love, especially in an effort such as this book, with the hours it takes and late nights to make it happen. To my dear children, Madeleine, Cleveland, Shannon, and Torrance, who are the light and diversion to the busy life as an academician, surgeon, and team physician. To my parents, Cleve and Jackie, who gave me great inspiration in pursuing excellence. To my many teachers, mentors, coaches, and orthopaedic partners who along the way have taught me so much and continue to live within me. Finally, to my ultimate mentor and the one who gave so much, my savior, Jesus Christ.

—Eric C. McCarty, MD

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Christopher C. Madden, MD, FACSM, is in private practice on the Front Range of the Rocky Mountains in Colorado. His sports medicine practice is broad, and he has special interests in head injuries, biomechanics, environmental and altitude medicine, backcountry sports, endurance and ultra-endurance medicine, snowboarding injuries, and cycling and mountain biking injuries. Chris edits and writes on a variety of topics in sports publications, ranging from previsit patient education to professional textbooks. He also teaches sports medicine to primary care residents from Rose and the University of Colorado Family Medicine Residency Programs. He is active in the American Medical Society for Sports Medicine, where he is a Past President and member of the Board of Directors, is past Annual Meeting Program Chair, and has served on the Quality Initiatives and Healthcare Transformation Subcommittee, Program Planning Committee, and Public Relations Committees. In 2011, Chris received the AMSSM's highest award, the Founders Award, which is given to "the individual, group or organization who exemplifies the best we can be or do in Sports Medicine." Chris is also a Fellow with the American College of Sports Medicine, where he has served on the Education Committee and has served on and chaired panels at various annual meetings. An avid backcountry enthusiast, Chris loves to mountain bike, trail run, snowboard, ski, hike, mountaineer, rock climb, practice yoga, travel, and spend time with his family.

Margot Putukian, MD, FACSM, received her BS degree in Biology from Yale University, where she participated in soccer and lacrosse. She received her MD from Boston University and then did both her internship and residency at the Primary Care Internal Medicine Program at Strong Memorial Hospital in Rochester, New York. She completed her fellowship in sports medicine at Michigan State University. Margot worked as the Director of Primary Care Sports Medicine at Penn State University before starting her current position in January 2004 as the Director of Athletic Medicine and Head Team Physician for Princeton University. Margot also serves as a team physician for U.S. Soccer and the Men's U.S. National Lacrosse Team. Margot is a charter member of the American Medical Society for Sports Medicine (AMSSM), where she served as President from 2004 to 2005, and is currently the President of the AMSSM Foundation. Margot is a medical consultant for Major League Soccer. She currently serves as the Chair for the Clinical Sports Medicine Leadership committee for the American College of Sports Medicine (ACSM) and served previously on the Board of Trustees for ACSM. She served previously on the NCAA Competitive Safeguards and Medical Aspects of Sport Committee and is currently serving as the chair of the Sports Science and Safety Committee for U.S. Lacrosse. She currently serves on the NFL Head, Neck & Spine Committee. Margot has participated in several Team Physician Consensus Statements, NATA Statements, and the Third and Fourth International Consensus Conference on Concussion in Sport in Zurich, Switzerland, as well as the Fifth International Consensus Conference on Concussion in Sport in Berlin, Germany. She has served on the editorial board for *Medicine and Science in Sports and Exercise*, the *Journal of Athletic Training*, *The Physician and SportsMedicine*, and *Athletic Training and Sports Health Care*. She is the proud recipient of the 2007 Dr. David Moyer Team Physician's award presented by the Eastern Athletic Trainer's Association, the 2015 AMSSM Founders Award, and the 2016 ACSM Citation Award.

Craig C. Young, MD, is a professor and the Medical Director of Sports Medicine at the Medical College of Wisconsin. He received a BS degree (cum laude) in Biological Sciences from the University of California, Irvine. He is a graduate of the University of California, San Diego School of Medicine. He completed a residency in family medicine at UCLA and a sports medicine fellowship at the Cleveland Clinic Foundation. Dr. Young has served as a team physician for the Milwaukee Brewers since 1994 and for the Milwaukee Bucks since 2016. He has served as a company physician for the Milwaukee Ballet since 1992. He has also served as a physician at the U.S. Olympic Training Center (Chula Vista) and is a physician for the U.S. National Ski and Snowboard Teams. In 2007, he was appointed by the U.S. Olympic Committee as a team physician for the 23rd World Winter University Games in Torino, Italy. Dr. Young is board certified in both family practice and sports medicine. He was the President of the American Society for Sports Medicine (AMSSM) from 2007 to 2008. In 2012, he was the recipient of AMSSM's highest award, the Founders Award, which is given to "the individual, group or organization who exemplifies the best we can be or do in Sports Medicine." His clinical interests include dance medicine, wilderness medicine, female athletes, adolescent athletes, and endurance athletes. His research interests include dance medicine and injury prevention.

Eric C. McCarty, MD, is a board–certified and fellowship-trained orthopaedic surgeon with a longtime interest in sports medicine and athletics. He attended college at the University of Colorado, where he excelled and received numerous honors for his exploits in the classroom, as well as on the football field, where he was an All Big-Eight linebacker and also was an Academic All-American. After medical school at the University of Colorado, he completed his training in orthopaedic surgery at Vanderbilt University in Nashville, Tennessee. From there he completed an intensive year of fellowship training in sports medicine and shoulder surgery at the internationally renowned Hospital for Special Surgery in New York City. He subsequently returned to Vanderbilt as a faculty member in the department of orthopaedics. In 2003, Dr. McCarty was recruited from Vanderbilt University to take over the sports medicine and shoulder program and to serve as the head team physician for the University of Colorado and University of Denver athletic programs. His specialized practice involves the care of these collegiate athletes, as well as recreational and highly competitive athletes from the community. In addition to his busy clinical practice, Dr. McCarty is very active in research, teaching, and writing articles in the field of sports medicine and knee and shoulder surgery. He has received grants for his research and frequently gives talks at both the national and international level. Since his playing days, Dr. McCarty continues to maintain a very active lifestyle with his family. He enjoys the activities he grew up with in Colorado, including hiking, cycling, climbing, and skiing. This carries over into his unbridled dedication to returning his patients to their desired activity/sport.

ABOUT THE ARTISTS

FRANK H. NETTER, MD

Frank H. Netter was born in 1906 in New York City. He studied art at the Art Student's League and the National Academy of Design before entering medical school at New York University, where he received his MD degree in 1931. During his student years, Dr. Netter's notebook sketches attracted the attention of the medical faculty and other physicians, allowing him to augment his income by illustrating articles and textbooks. He continued illustrating as a sideline after establishing a surgical practice in 1933, but he ultimately opted to give up his practice in favor of a full-time commitment to art. After service in the United States Army during World War II, Dr. Netter began his long collaboration with the CIBA Pharmaceutical Company (now Novartis Pharmaceuticals). This 45-year partnership resulted in the production of the extraordinary collection of medical art so familiar to physicians and other medical professionals worldwide.

In 2005, Elsevier, Inc. purchased the Netter Collection and all publications from Icon Learning Systems. There are now over 50 publications featuring the art of Dr. Netter available through Elsevier, Inc. (in the US: www.us.elsevierhealth.com/Netter and outside the US: www.elsevierhealth.com).

Dr. Netter's works are among the finest examples of the use of illustration in the teaching of medical concepts. The 13-book *Netter Collection of Medical Illustrations*, which includes the greater part of the more than 20,000 paintings created by Dr. Netter, became and remains one of the most famous medical works ever published. The Netter *Atlas of Human Anatomy*, first published in 1989, presents the anatomical paintings from the Netter Collection. Now translated into 16 languages, it is the anatomy atlas of choice among medical and health professions students the world over.

The Netter illustrations are appreciated not only for their aesthetic qualities, but, more important, for their intellectual content. As Dr. Netter wrote in 1949, ". . . clarification of a subject is the aim and goal of illustration. No matter how beautifully painted, how delicately and subtly rendered a subject may be, it is of little value as a *medical illustration* if it does not serve to make clear some medical point." Dr. Netter's planning, conception, point of view, and approach are what inform his paintings and what makes them so intellectually valuable.

Frank H. Netter, MD, physician and artist, died in 1991.

Learn more about the physician-artist whose work has inspired the Netter Reference collection:
http://www.netterimages.com/artist/netter.htm.

CARLOS MACHADO, MD

Carlos Machado was chosen by Novartis to be Dr. Netter's successor. He continues to be the main artist who contributes to the Netter collection of medical illustrations.

Self-taught in medical illustration, cardiologist Carlos Machado has contributed meticulous updates to some of Dr. Netter's original plates and has created many paintings of his own in the style of Netter as an extension of the Netter collection. Dr. Machado's photorealistic expertise and his keen insight into the physician/patient relationship inform his vivid and unforgettable visual style. His dedication to researching each topic and subject he paints places him among the premier medical illustrators at work today.

Learn more about his background and see more of his art at:
http://www.netterimages.com/artist/machado.htm

PREFACE

We are grateful for the opportunity to carry on the widespread popularity of the first edition of *Netter's Sports Medicine*, the history of *Team Physician's Handbook*, and the revered anatomical graphic works of Frank Netter, MD. The second edition continues to embrace a well-organized, colorful, bulleted outline format combined with helpful Netter graphics, tables, figures, pictures, diagnostic imaging, and other medical artwork. The text hosts a national and international author base that represents the best in sports medicine today.

Serving as a team physician is a unique privilege and an awesome challenge. *Netter's Sports Medicine* is written for the multitude of physicians and other health care professionals who are fortunate enough to provide care to a variety of athletes and active individuals in almost any athletic setting imaginable, from pediatric to senior athletics, Little League to professional sports, weekend warrior to Olympic champion, and backcountry mountainside to Super Bowl field.

The book is designed to serve as a comprehensive sports medicine resource and a ready reference in the busy outpatient office, in the training room, on the sideline, and in the long, quiet hours of preparation for sports medicine board certification. Insightful, expert, anecdotal experience fills the void where the most current evidence in sports medicine falls short, and careful considerations of controversies are mindfully presented. The sports medicine literature has grown exponentially since the first edition of *Netter's Sports Medicine* and its predecessor three editions of the *Team Physician's Handbook*, and many new chapters and chapter sections were added and revised to reflect the evolving depth and breadth of our exciting field. The text is divided into user-friendly sections for quick reference, and each chapter includes a Recommended Readings section limited to the best sources. We have added videos to support learning, and additional information supplementing certain chapters is available online. We welcome many new, respected authors who joined us to produce this book, and we are fortunate to continue our lasting relationship with numerous previous authors, who are leaders in their respective areas of emphasis. We thank all the authors who contributed chapters to previous texts, and whose chapter templates continue to provide a strong foundation to build upon.

Whether you are a primary care physician attempting to manage a common or unique musculoskeletal injury in an efficient ambulatory setting, an orthopaedic surgeon trying to gain insight about a medical or psychological problem foreign to the cast or operating room, an athletic trainer trying to figure out a diagnosis in the training room, or a physical therapist pursuing further in-depth sports medicine knowledge, we sincerely hope you find this reference all it is meant to be and more, and we thank you for opening the cover and sharing with us what we feel is one of the highest quality sports medicine works produced to date. Please enjoy.

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- **Chapter 61, Taping and Bracing,** *Rebecca Ann Myers*
  - Video 61-1 Ankle Taping
  - Video 61-2 Thumb Spica Taping
  - Video 61-3 Patellofemoral Taping
  - Video 61-4 Arch Taping
  - Video 61-5 Turf Toe Taping
- **Chapter 79, Snowboarding,** *Thomas R. Sachtleben and Rebecca Ann Myers*
  - Video 79-1 Anatomical Relationships of LPT Fracture
  - Video 79-2 LPT Stress Test Demonstration
- **Chapter 82, Swimming and Diving,** *Jennifer D. Stromberg and Nathaniel S. Jones*
  - Video 82-1 Front Crawl (Freestyle)
  - Video 82-2 Back Stroke
  - Video 82-3 Breaststroke
  - Video 82-4 Butterfly Stroke
  - Video 82-5 Eggbeater Kick
  - Video 82-6 Flip Turn

PRINTABLE FORMS

- eForm 16-1 Example of a PPE Health History Form for a Wilderness Sports/Adventure PPE
- eForm 27-1, 2014 Female Athlete Triad Coalition Consensus Statement on Treatment and Return to Play of the Female Athlete Triad
- eForm 97-1 Medical Record Form
- eForm 97-2 Medical Discharge/ER Transfer Form

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- MANAGING YOUR ANKLE SPRAIN
- MANAGING YOUR BLISTERS
- MANAGING YOUR FINGER SPRAIN
- MANAGING YOUR GROIN STRAIN
- MANAGING YOUR GOLFER'S ELBOW
- MANAGING YOUR HAMSTRING STRAIN
- MANAGING YOUR PLANTAR FASCIITIS
- MANAGING YOUR CONCUSSION
- MANAGING YOUR KNEE SWELLING
- MANAGING YOUR LOW BACK STRAIN
- MANAGING YOUR NECK STRAIN
- CARING FOR YOUR CHILD WITH OSGOOD-SCHLATTER CONDITION
- MANAGING YOUR PATELLOFEMORAL PAIN SYNDROME
- MANAGING YOUR PATELLA TENDINITIS
- MANAGING YOUR ROTATOR CUFF TENDINOSIS
- MANAGING YOUR SHIN SPLINTS
- MANAGING YOUR TENNIS ELBOW

THE TEAM PHYSICIAN

1

Margot Putukian • Christopher C. Madden • Craig C. Young • Eric C. McCarty

BEING A TEAM PHYSICIAN: A SPECIAL PRIVILEGE, AN AWESOME CHALLENGE

Special Role

- Team physicians have a unique responsibility of leadership while taking care of athletes.
- Athletes, their parents, and their team administrators expect team physicians to make decisions in terms of clearance to participate in the sport as well as to assess and manage healthcare issues in order to ensure safe participation of athletes.
- In addition, such decisions may be required in a setting of intense time pressure, such as when required on the sidelines.
- Team physicians may play a leadership role within an organization and may provide care for individuals and teams at mass participation sporting events. In addition, team physicians have responsibilities and duties that are both medical and administrative, and these frequently include ethical and medicolegal issues.
- This chapter discusses the requirements of a team physician in terms of medical qualifications, education, and roles and responsibilities.

THE SPORTS MEDICINE TEAM

- Care of an athlete is a team effort, wherein members of a sports medicine team support each other for the benefit of the athlete and the athletic team.
- An athletic trainer occupies a unique position at the center of the athletic healthcare triangle.
- A team physician cares for the team and also serves as a key player on the sports medicine team comprising the athlete, the team physician, the coach, the athletic trainer, and other supporting health professionals. Similar to the athletic team, sports medicine services are best provided following a team approach (Fig. 1.1).

Availability

- Availability is a cornerstone for success of a team physician.
  - On the sidelines, at events, and during travel
  - In the training room
  - In the office: Team physicians may have to include special accommodations in their office schedules for athletes who require urgent medical attention.
  - After office hours and weekends: Most athletic activity happens outside a normal work day; thus, team physicians must accommodate this in their coverage considerations.

DEFINITION OF THE TEAM PHYSICIAN

- Six major professional associations focusing on clinical sports medicine issues collaborated to develop guidance documents for team physicians.
- These "Team Physician Consensus Statements (TPCS)" cover various topics for team physicians, including the definition of team physicians: **TPCS** (see Appendix A, online) and **Sideline Preparedness for the Team Physician: Consensus Statement** (see Appendix B, online).
- All other TPCS are referenced in "Recommended Readings," which are useful resources that cover specific topics and populations.
- The TPCS that defines the qualifications, roles, and responsibilities of team physicians along with guidelines for individuals and organizations seeking to select a team physician were updated in 2013.
- The team physician must be a medical doctor (MD) or doctor of osteopathy (DO) with an unrestricted license in good standing and knowledge of on-field emergency care and basic cardiopulmonary resuscitation techniques as well as musculoskeletal injuries and medical and psychological issues that affect athletes.

RESPONSIBILITIES OF THE TEAM PHYSICIAN

Medical Care

- The most important role of the team physician is to address the physical and psychological needs of an athlete.
- In addition to the essential requirements described in the TPCS, it is also desirable that the team physician has additional training and education in sports medicine, with medical specialty and fellowship training and additional American Council of Graduate Medical Education (ACGME)/American Osteopathic Association (AOA) certification in sports medicine, and additional experience, including:
  - Ongoing continued medical education in sports medicine
  - Experience in sports medicine
  - Membership and participation in a sports medicine professional association or society
  - Training in advanced cardiac and trauma life support
  - Ongoing involvement in education and research in sports medicine
- Understanding the complexities of medicolegal, disability, and compensation issues that can occur in sports medicine is helpful.
- To perform effectively, the team physician must maintain a broad and up-to-date knowledge base that addresses athletics as well as medicine.
  - All team physicians should feel comfortable in providing emergency care at sporting events.
  - Training in cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) use is essential, and additional knowledge of advanced cardiac life support (ACLS) and advanced trauma life support (ATLS) is useful.
  - In addition, the team physician should have knowledge in the following areas:
    - **Medicine:** full-spectrum primary care, including musculoskeletal system, growth and development, cardiovascular and pulmonary medicine, infectious disease, gastroenterology, nephrology, neurology, and other medical areas pertaining to exercise and sports
    - **Psychology and behavior:** mental health issues such as depression, anxiety, eating disorders, alcohol and other drug use/abuse, and psychological response to injury
    - **Pharmacology:** therapeutics, supplements, performance enhancers, recreational drugs, interactions among these agents, and effects on performance
    - **Nutrition and exercise science:** nutrition, exercise physiology, biomechanics, sport-specific issues (e.g., altitude and other environmental issues)
    - **Sport- and population-specific issues:** sport- and population-specific issues, including gender, age, disability, or other unique population factors

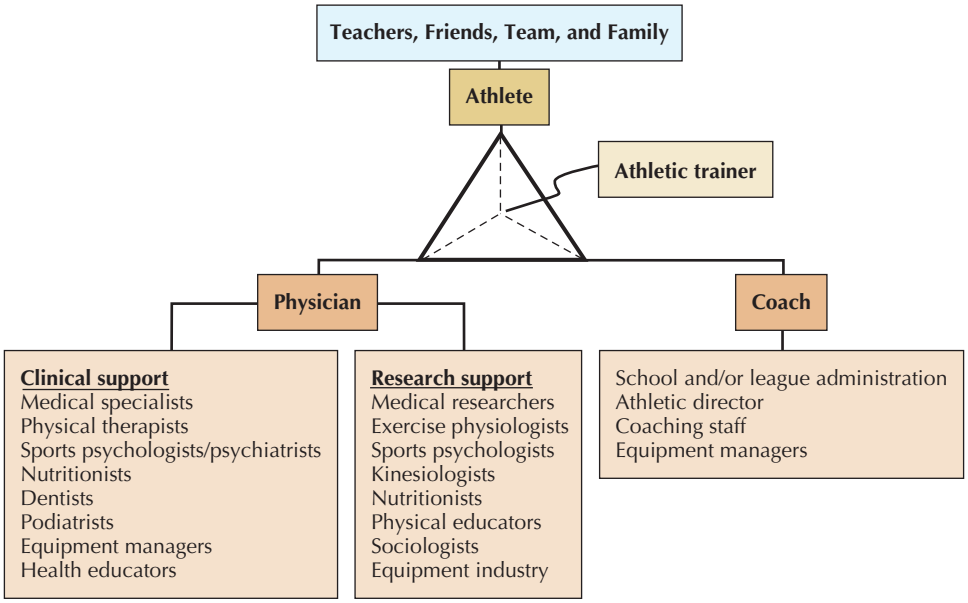

Figure 1.1. The sports medicine team. (Modified from Mellion MB. *Office sports medicine.* Philadelphia: Hanley & Belfus; 1996.)

Additional Medical Responsibilities

- Coordinating assessment and management of injuries and illness on game day, including making decisions about clearance and same-day return to play
- Understanding the importance of pre-participation physical evaluation (PPE), emergency planning, and issues of sudden death and heat illness as well as recovery and rest

Administrative Responsibilities

The team physician has a range of important administrative responsibilities:

- Establish a chain of command for injury and illness management, including:
  - Involvement in planning and implementation of emergency action plans
  - Involvement in and awareness of protocols and equipment required for sideline preparedness
  - Coordinating assessment and management of game-day injuries and illnesses, including return-to-play decision-making
- Clearance for non-game day participation and return-to-play decision-making
- Understand the importance of injury and illness prevention
- Understand the importance of collaboration with other healthcare providers, including athletic trainers, physical therapists, nutritionists, strength and conditioning specialists, psychologists, and other specialists, in the care of an athlete
- Understand the role of nutrition, supplements, and performance-enhancing agents
- Important decisions regarding PPE and what it may include (e.g., screening for mental health issues, concussion baseline testing, and cardiac screening)
  - Such decisions are often complex and may involve several other stakeholders.
- Additional considerations include preventive measures:
  - Immunizations
  - Educational efforts (e.g., concussion, heat-related illnesses, nutrition, and cardiac illnesses)
  - Injury and illness prevention (e.g., anterior cruciate ligament [ACL] injury prevention or prophylaxis for communicable skin diseases)
- An important administrative responsibility of the team physician is to work with the organizing body (e.g., school, university, or club) to develop an agreement that clearly defines the roles and responsibilities of the team physician as well as the reporting structure for other healthcare providers (e.g., the team physician makes clearance decisions and the athletic trainer reports to the team physician and not the coach)

Ethical and Medicolegal Responsibilities

The team physician has a range of responsibilities that reflect the many relationships involved in the care of an athlete:

- Responsibilities toward the athlete, the team, and the institution and its representatives must be considered.
- All physicians have ethical responsibilities, but those of team physicians may be somewhat unique given the complex and often public nature of sports participation.
- As stated in the TPCS, "the overriding principle for all physicians, including team physicians, in managing ethical issues, is to provide care focused on what is best for the patient and only for the patient." Several examples of ethical challenges are provided below.

Informed Consent

- Information provided by team physicians to an athlete and/or his or her parent/guardian must be complete and inclusive of all options so that the athlete can make an informed decision.
- Information should include a discussion of short- and long-term risks and benefits and balance the athlete's autonomy, desires, and optimal medical treatment.
  - For example, an athlete with a meniscus tear amenable to repair should be provided with all information so that he/she can make an informed decision (e.g., short-term benefits of meniscectomy and return-to-play versus potential long-term benefits of repair).

  - Team physicians should provide information with a goal of protecting athletes from injury, re-injury, permanent disability, and themselves.
- Athletes must be counseled and thoroughly informed when there is a valid medical contraindication to participation or resumption of participation.

Confidentiality

- Team physicians must respect the rights of patients and safeguard their confidentiality within the constraints of the law, respecting both the Health Insurance Portability and Accountability Act of 1996 (HIPAA) as well as the Family Educational Rights and Privacy Act (FERPA).
- Relationship with athletes may have to be clarified in advance. Challenging examples may include:
  - Medical conditions that limit or affect participation
  - Psychological issues that may limit or affect participation
  - Medical issues that may affect other participants
  - Drug testing results

Conflict of Interest

- There are some situations where team physicians may experience a conflict of interest or a perceived conflict of interest.
- These include situations where a team physician is hired by a professional organization to care for team members, wherein there is a financial relationship with particular organizations, which may lead to a conflict with the care provided to the athlete.

Influence of Others

- Influence of others, such as teammates, parents, coaches, and administrators, may conflict with the medical care provided to the athlete.
- Team physicians should remain aware of potential implicit and explicit influences, including those provided by the community and media.

Marketing, Publicity, and Advertising

- A potential ethical issue for team physicians may occur when a company or individual offers compensation for services and medical care provided by them.
- Team physicians may be sponsored by a company or industry with the biased expectation that they will use one product over another.
- Ethical issues can arise when team physicians are expected to endorse or use a new technology (e.g., equipment, treatment modality, or medications) without substantial evidence of efficacy or safety.

Drug Use

- Team physicians may be asked to prescribe or administer pain medications in order to allow an athlete to participate.
- Athletes using illegal, illicit, or performance-enhancing drugs may pressure team physicians to supply, administer, or help cover-up the use of such drugs.

Medicolegal Issues

- Certain medicolegal issues may be unique for team physicians. Specific concerns may include:
  - Team physicians should clearly define professional autonomy over medical decisions.
  - Issues regarding HIPAA and FERPA compliance
  - Guidelines, standards, policies, and regulations set by school and governing bodies
  - Rules, regulations, and/or laws of local, state, or federal government
  - Issues regarding the management of on-field (e.g., cardiac, concussion, cervical spine, or heat) injuries or illnesses
  - Issues regarding clearance to play and/or restriction from play, waivers, and return-to-play decision-making
  - Issues regarding medical documentation

RECOMMENDED READINGS

Available at www.ExpertConsult.com.

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2 THE CERTIFIED ATHLETIC TRAINER AND THE ATHLETIC TRAINING ROOM

Jodi Schneider

DEFINITION OF AN ATHLETIC TRAINER

- Athletic trainers (ATs) are healthcare professionals who collaborate with physicians to direct injury prevention, evaluation, management, and treatment of patients under their care (see Chapter 1: The Team Physician).
- ATs work under the direction of physicians, as prescribed by state licensure statutes.
- They are uniquely qualified, allied healthcare providers who are optimally suited as front-line gate keepers and first responders for all athletic-related healthcare issues.
- ATs provide services including injury and illness prevention, emergency care, on-field and clinical diagnosis, patient education, and rehabilitation and therapeutic intervention of acute and chronic injuries and illnesses.
- Apart from responsibilities of injury prevention, evaluation, management, and treatment of patients under their care, communication is one of the most important responsibilities of ATs.
- They also have a responsibility as a liaison between the physician, patient, coaching staff, and support staff to coordinate effective patient-centered care.
- Settings
  - Traditional
    - High school, college, and professional sports
  - Nontraditional
    - Hospital/orthopedic practice
    - Military/special forces
    - Occupational
    - Performing arts
    - For additional information on nontraditional settings for ATs, please visit http://www.nata.org/athletic-training/job-settings (accessed March 2016).

EDUCATION

- Graduation from a Commission on Accreditation of Athletic Training Education (CAATE) with an accredited, 4-year undergraduate or a 2-year, entry-level masters program to be eligible to sit for the certification exam
- Curriculum CAATE 2015
  - Risk Management and Injury Prevention
  - Pathology of Injuries and Illnesses
  - Orthopedic Clinical Examination and Assessment
  - Medical Conditions and Disabilities
  - Acute Care of Injuries and Illnesses
  - Therapeutic Modalities
  - Conditioning and Rehabilitative Exercises
  - Psychosocial Intervention and Referral
  - Nutritional Aspects of Injuries and Illnesses
  - Healthcare Administration
  - Professional Development and Responsibility
  - Healthcare Professional Development and Responsibility
- 70% of candidates possess a master's or doctorate degree
- After professional education
  - Residency/fellowship: An emerging aspect of an AT's education is optional post-professional residencies or fellowships. These programs are designed to provide an advanced level of clinical and didactic education in specialized areas.

Licensure

- As of January 2016, all states, with the exception of California, require licensure or registration to practice as an AT.

ROLES AND RESPONSIBILITIES OF AN ATHLETIC TRAINER

Domains of Practice, National Athletic Trainers' Association (NATA), 2015

Injury/Illness Prevention and Wellness Protection

- Education of patients, coaches, and administrators
- Implement and assist in the administration of preparticipation physical examination with physicians
  - Preseason musculoskeletal screening
- Playing surface, environmental, and weather safety monitoring
- Screening and referral for mental health and psychological concerns
  - Effective recognition and referral to appropriate care providers
- Supplement monitoring and education and oversight of weight management protocols and safety in weight-class sports
  - Coordination with administration, coaches (including strength and conditioning), sports dietitians, and physicians in developing and implementing monitoring and education

Clinical Evaluation and Diagnosis

- Acute and chronic injury evaluation on and off the field and effective referral to physician when necessary
- Concussion evaluation, protocol management, and referral to physician

Immediate and Emergency Care

- Development and implementation of emergency action plans based on the most up-to-date consensus/position statements and best practices. For a detailed list of up-to-date NATA position statements, please visit http://www.nata.org/position-statements.
- Coordination and pre-event communication with local emergency services departments
- Prompt and proficient emergency care based on current standards of care

Treatment and Rehabilitation

- Management and treatment of injuries and illnesses by using evidence-based practices
- Returning patients to full preinjury function as soon as safely possible
- Determining the ability to safely return with functional testing
- Communication and coordination of rehabilitation and transition to full function with strength and conditioning and coaching staff
- Communication and coordination with external rehabilitation providers when appropriate

Organization and Administration

- Development and implementation of policies and procedures of the athletic training facility, emergency action plans, and medical coverage of events
- Maintain professional relationships to coordinate patient care with:
  - Coaching staff, including strength and conditioning staff
  - Administrators
  - Dietitians
  - Psychologists/counselors
  - External providers
- Timely and accurate medical record keeping
- Maintenance of supplies and budget of the athletic training facility

HOW AN ATHLETIC TRAINER AND A PHYSICIAN FUNCTION AS A TEAM

- ATs work under the direction of the team physician based on state practice acts
  - AT license requires a written Plan of Care, which varies from state to state depending upon the legislation, to guide the day-to-day practice of an AT and can include:
    - Timeframe for referral to physician
    - Emergency care procedures
    - Nonprescription medication administration
    - Treatment protocols and modality usage
  - Communicate effectively to provide collaborative patient-centered care
    - AT coordinates effective referrals to physician.
    - Physician and AT work together to make return-to-play decisions.
    - AT communicates frequently on day-to-day progress and status to physician to facilitate modifications to care plan as necessary.
- The team physician and AT work together and develop policies and procedures specific to the institution/facility.
  - Developing, communicating, and enforcing physician-led chain of commands and establishing subsequent AT supervisory positions within the sports medicine department.
  - Development of facility-specific emergency action plans and clearly communicating them to all members of the athletic department
  - Development and implementation of appropriate medical coverage policies
  - Standard operating procedures for sports medicine facilities and the staff
- Members of interdisciplinary treatment and performance teams
  - No greater demonstration of commitment to patient-centered care than development and participation in interdisciplinary treatment and performance teams. Aligning medical, coaching/performance, and academics to provide complete personal care and support to athletes. ATs and physicians are crucial and invaluable members of these teams not only because they provide medicalcare/healthcare but also because of the level of relationship they develop with the athletes. This also provides ATs and physicians varied perspectives to help direct patient care and support.
  - Examples include:
    - Mental health
    - Eating disorders
    - Sport performance
    - Academic performance
    - Life skills/transition to post-athletic life

ATHLETIC MEDICINE/SPORTS MEDICINE DEPARTMENT MODEL

- Responsibility to provide an effective sports medicine structure/model free of conflict of interest. Determination of the best model varies from setting to setting.
- Several different models have been utilized across the United States, the most common one being Sports Medicine housed within the Athletic Department. Recently, there have been more changes to Sports Medicine housed within University Health Services in an effort to decrease conflict of interest and provide better athlete-centered care. For a comprehensive description of other models along with their advantages and disadvantages, please see "Inter-Association Consensus Statement on Best Practices for Sports Medicine Management for Secondary Schools and Colleges."

RECOMMENDED READINGS

Available at www.ExpertConsult.com.