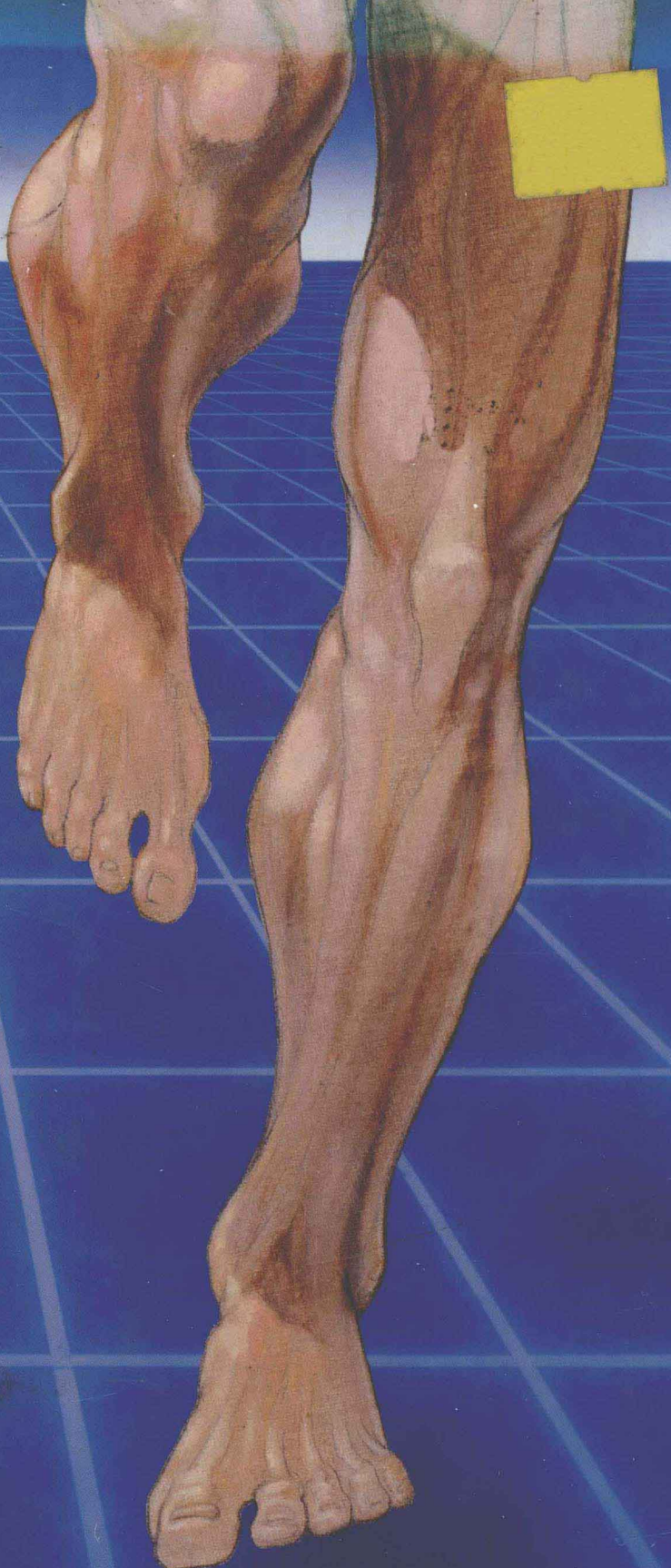
AMERICAN ACADEMY
OF ORTHOPAEDIC SURGEONS

Athletic Training and Sports Medicine



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Preface

In 1974, a workshop composed of representatives from the National Athletic Trainers Association (NATA), led by President Frank George, as well as members of the American Academy of Orthopaedic Surgeons (AAOS), met at Mount Hope Farm in Williamstown, Massachusetts. The purpose of the workshop was to devise educational programs to improve the training and health care of the athlete. Two major accomplishments resulted from this effort.

The first accomplishment, designed to increase the availability of skilled athletic trainers, was a proposed "alternative route" to becoming an athletic trainer that would permit interested faculty members to complete an approved training curriculum. Ultimately, these potential trainers would then be eligible to sit for the comprehensive certification exam. This alternative process was greatly aided by the contributions of Frank George, Lindsay McLean, and the late Sayers "Bud" Miller.

The second accomplishment was the development of a core curriculum. The impetus for this achievement came from Phillip B. Donley and William E. "Pinky" Newell. It was the strong recommendation of Phil Donley that a text be created for this educational program, and thus, the first edition of this text began to take shape. It was developed by editorial subgroups of NATA and members of the Sports Medicine Committee of AAOS.

Arthur Ellison, MD, the editor of the first edition of *Athletic Training and Sports Medicine*, stated in the Preface to that volume, "The reader is encouraged to consider this text to be in less than ultimate form. Sports medicine is dynamic and will continue to evolve. . . . It is the nature of Academy publications to grow and improve through revisions and subsequent editions. We hope this volume will be no exception, and that it will continue to evolve to better serve all of those who are concerned with and care for the athlete." As Dr. Ellison predicted, sports medicine has continued to evolve since the first edition was published, necessitating its revision.

For increased clarity, the second edition has been divided into eight sections:

Section One	Introduction
Section Two	Basic Concepts
Section Three	Diagnosis and Treatment of Specific Sports Injuries
Section Four	Medical Emergencies
Section Five	Preventing Injury
Section Six	Rehabilitation Techniques
Section Seven	Other Medical Issues
Section Eight	Selected Athletic Groups

Significant changes from the first edition include greatly expanded sections on the diagnosis and treatment of common injuries and medical problems seen in sport, updat-

ed chapters on medical emergency concerns, greater emphasis on the principles of conditioning and rehabilitation, and the inclusion of many more tables, charts, and figures to enhance readability.

It is hoped that the second edition of *Athletic Training and Sports Medicine* will continue to be not only a valuable textbook in athletic training and sports physical therapy curriculum programs, but also an important source of information for sports medicine physicians, exercise physiologists, and others involved in the care of athletes.

As this preface is written, the American Academy of Orthopaedic Surgeons is developing an Instructor's Manual to assist those who wish to use this edition as a course text. We feel this will be a significant supplement to the text.

My heartfelt thanks to all on the editorial board for the countless hours of work they contributed to the revision of this text. Their generosity in giving of both their time and expertise is greatly appreciated.

The editorial board wishes to express its appreciation to the members of NATA whose critiques were most helpful in the revision of this text: Dennis Aten, MS, PT, ATC; T. Ross Bailey, ATC; Gary Ball, ATC; Gerald Bell, EdD, PT, ATC; Marty Bradley, MS, ATC, EMT; Rod Compton, ATC; John Cottone, ATC; Michael Ferrara, ATC; Dan Foster, ATC; Suzanne Gewe, RN; Gordon Graham, PT, MS, ATC; Keith Handling, MS, PT, ATC; Peggy Houglum, RPT, ATC; Alexander Kalenak, MD; Kenneth Knight, PhD, ATC; Pete Koehneke, ATC; Roland LaRue, MA, PT, ATC; John Leard, MEd, PT, ATC; David Leigh, ATC; Brent Mangus, ATC; Dan Martin, ATC; Crayton Moss, MD, ATC; Robert Moss, ATC; Bobby Patton, EdD, ATC; John Powell, PhD, ATC; Carol Teitz, MD; Charles Vosler, ATC; and Don Zylks, PhD. Also thanks to The Coca-Cola Company and Southern Bell for contributing examples of their corporate wellness programs.

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Finally, I wish to thank the staff of the American Academy of Orthopaedic Surgeons, particularly Sally King Jessee, publications manager, who served as project manager and oversaw the entire editorial and production process; and Kathy M. Brouillette, production editor, who worked on a daily basis for many months coordinating the production process and attending to the myriad details involved in a text of this magnitude. In addition, Mark W. Wieting, director of communications and publications, Marilyn L. Fox, PhD, assistant director, publications, and Keith Levine, marketing manager, all made valuable contributions to this text.

This second edition is an extension of the first, and its editorial board, Dr. Ellison; Arthur L. Boland, Jr., MD; Kenneth E. DeHaven, MD; Paul Grace, ATC; George Snook, MD; and Heather Calehuff, ATC, PA-C, should be recognized for having built a strong foundation with the first edition.

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Dear Reader:

It is a pleasure to present to you the second edition of *Athletic Training and Sports Medicine*. The enthusiastic reception given the first edition has provided contributors with the impetus and encouragement to produce this text for our students of athletic medicine.

Since the beginning of the National Athletic Trainers Association in 1950, an important goal has been to upgrade educational standards within our profession. The publication of the second edition demonstrates a commitment to this concept and the opportunity for the physician and athletic trainer to work together in this endeavor.

On behalf of the members of the National Athletic Trainers Association, we thank the many contributors to the book and its many readers for their support.

Sincerely,

National Athletic Trainers Association

Mark J. Smaha

Mark J. Smaha
President

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SECTION

ONE

INTRODUCTION

1

Emergence of Sports Medicine as a Discipline

CHAPTER OUTLINE

The Historical Development of Sports Medicine
- The Early Sports Physicians and Trainers
- The Beginning of Physical Education in U.S. Schools

The Development of Athletic Training and Sports Medicine
- Intercollegiate and Interscholastic Athletics
- The Growing Need for Medical Care of Athletes

International Sports Medicine Organizations
Sports Safety Organizations
Sports Organizations for the Physically and Mentally Impaired

OBJECTIVES FOR CHAPTER 1

After reading this chapter, the student should be able to:

1. Discuss how the discipline of sports medicine evolved.
2. Identify various sports organizations whose development was closely linked to the development of sports medicine as a discipline and the sports medicine team.

INTRODUCTION

Throughout history, man's ability to survive has depended on physical capabilities. The speed, skill, and strength early man needed for survival were transformed into games of skill during times of peace. As civilization progressed and athletic contests became more organized, more highly trained and skilled athletes competed in teams. Maintaining fitness and recovering from injuries became increasingly important as the sophistication and popularity of athletic events grew. The need for physicians, trainers, and therapists knowledgeable in the care and rehabilitation of athletes grew simultaneously. Injury prevention through regulation of equipment and playing rules also became important.

Chapter 1 traces the evolution of the sports medicine team. The chapter begins with a brief history of early sports physicians and trainers. Next, the beginnings of physical education in the United States are described. The chapter goes on to describe the development of athletic training and sports medicine. Both disciplines were influenced by the emergence of intercollegiate and interscholastic organizations and the growing need for medical care as athletic participation increased. The last sections of Chapter 1 briefly mention international sports medicine organizations, sports safety organizations, and sports organizations for the physically and mentally impaired. ■

THE HISTORICAL DEVELOPMENT OF SPORTS MEDICINE

The historical development of any field is of interest, not only because it gives students familiarity with the people, places, and organizations that helped shape their area of interest, but also because it provides students with a sense of perspective—why did the field develop and how has it changed to meet the new demands of society?

The Early Sports Physicians and Trainers

The use of therapeutic exercises (medical gymnastics) was recorded as early as 800 to 1000 B.C. in the Atharva-Veda, a medical manuscript from India. Historians claim that the first sports physician was Herodicus. During the fifth century B.C., he treated athletes and other injured people in Athens with therapeutic exercises and diet. Herodicus's colleagues criticized his approach as being harsh and radical. Yet, his fame spread, and other physicians came to observe and evaluate his techniques. His most famous pupil was Hippocrates, who later wrote of the value of exercise in treating many illnesses.

In the second century A.D., Galen was appointed physician to the gladiators and thus became the first physician known to occupy a position analogous to the team physician of today. Although he recognized the brutality and danger of some of the sporting events of his day, he taught and did an enormous amount of research in anatomy, physiology, and sports injuries. While he did not believe in excessive exercise, he did recommend exercise in moderation to maintain health and to treat many diseases.

In the fourth century A.D., Oribasius of

Pergamum claimed that the body's organs functioned better when they were physically stressed. He therefore endorsed an intensified form of exercise. In the fifth century A.D., the physician Aurelianus first recommended exercise during convalescence from surgery; he prescribed hydrotherapy and the use of weights and pulleys.

During the first five centuries of the Christian era, the invasions by the Barbarians, in combination with the medieval church's zealous destruction of Greek and, to some extent, Roman knowledge, led to the loss of many of the early medical texts. Fortunately, the Muslims, under the caliphate of al-Mansur and Harun al-Rashid, encouraged science and education. They ordered the earlier Greek, Roman, and Hebrew medical documents copied into Arabic. Thus, these works were preserved for later return to the Western world.

Hakim Avicenna (ibn-e-Sina), who lived from 980 to 1037 A.D., was probably the most famous Muslim writer. His standing in Islam was certainly equal to that of Galen in Rome. The Canon (Al-Qanun), his most famous medical book, describes prophylactic medical gymnastics and proposes rest, heat, massage, and exercise to aid recovery from illness and injury.

The Beginning of Physical Education in U.S. Schools

In the 15th century, Vittorino de Feltre and Maffeus Veginus reintroduced the Greek tradition of obligatory exercise and sports into the educational curriculum. This concept has influenced Western education ever since.

Physical education in the United States received its start at Amherst College in Amherst, Massachusetts, with the appointment in 1854 of Edward Hitchcock, Jr., as professor of physical education and hygiene. He developed a system of coordinated physical education for the college, incorporating the Swedish and German systems of gymnastics and running, as well as the American-style games of football, basketball, and track. Dr. Hitchcock also served as the school physician for Amherst College. In this capacity, he instituted the study of anthropomorphic measurements of Amherst College students. He also kept systematic records of the incidence of disease and injury at Amherst College. His writings covered a broad range of subjects, such as "Athletics in American Colleges," "Basketball for Women," and "The Gymnastic Era and Athletic Era of Our Country." He is correctly identified as the founder of physical education in the United States; he was also the first team physician in America.

The American Alliance of Health, Physical Education, and Recreation (AAHPER) was founded in 1885 to promote the exchange of ideas and to stimulate research in exercise. It added Dance to its name in 1979 (AAHPERD), and has remained an active influence in health education, sports, and physical exercise. Its members include physical educators at all curriculum levels from elementary schools through colleges, as well as exercise physiologists, trainers, and physicians. This organization serves as the principal force for all physical education related activities in the United States.

AAHPERD developed the first standard fitness test for youth in 1958. This test, comprised of seven test items with results given in percentile scores, was adopted by the President's Council on Youth Fitness, the cabinet-level council formed by President Eisenhower. Physical education teachers gave the test in the fall and spring to grade school and high school students. Its intent was to measure and hence encourage the improvement of fitness during the school year.

The President's Council on Youth Fitness, whose name was changed to the President's Council on Physical Fitness under President Kennedy, continued to encourage the youth fitness program through national testing. In 1966, President Johnson began the President's Physical Fitness Awards Program, which gave awards to children who scored in the 85th percentile or higher on the fitness tests. Table 1.1 shows the

TABLE 1.1. Development of Government-Sponsored Fitness Programs for Youth

President	Organization	Comments
Eisenhower	President's Council on Youth Fitness	Developed as a cabinet-level position under the Secretary of the Interior
Kennedy	President's Council on Physical Fitness	Cabinet-level council under the Secretary of HEW
Johnson		Began physical fitness awards program
Nixon	President's Council on Physical Fitness in Sports	Abolition of the cabinet-level council; creation of a 15-member committee

development of government-sponsored fitness programs for youth.

Under President Nixon, the cabinet-level council was replaced by a 15-member committee renamed the President's Council on Physical Fitness in Sports. Advised by an appointed group of prominent sports persons, the council produced many publications emphasizing the development of lifetime sports activity.

In the 1980s, the President's Physical Fitness Awards Program was challenged by some physical educators who believed it focused too much on sports performance and athletic ability and too little on health-related fitness. In response, the AAHPERD developed the Lifetime Health-Related Fitness Test. Over the last decade, several other testing systems have been developed, not only to evaluate and record each child's fitness level, but also to use the scores to help each child establish an exercise program to improve his or her own fitness level. Table 1.2 compares these tests.

The American Medical Association's (AMA) Committee on Exercise and Physical Fitness was created in 1964 and continues to work closely with the President's Council on Physical Fitness in Sports, as well as with AAHPERD, for public education in this area and promotion of physical fitness for all ages. These organizations stress the need for the school system to be involved not only in providing classes for the development and measuring of youth fitness, but also in educating young people about the advantages of regular physical exercise.

THE DEVELOPMENT OF ATHLETIC TRAINING AND SPORTS MEDICINE

As competitive sports grew in the United States throughout the 20th century, individuals concerned with the safety of the athlete organized for mutual cooperation. Books were published on the prevention,

TABLE 1.2. Comparison of Youth Fitness Tests

AAHPERD Youth Fitness Test *(modification from original 1958 test)*	AAHPERD Health-Related Physical Fitness Test (1980)	President's Council on Physical Fitness in Sports Test (1986)
Sit-ups	Sit-ups	Curl-ups (bent-knee sit-ups)
Pull-ups (boys) or flexed-arm hang (girls)	Mile run or 9-minute run	Pull-ups (boys) or flexed-arm hang (girls)
Shuttle run	Sit-and-reach flexibility test	Shuttle run
600-yard run walk	Sum of triceps and subscapular skinfolds	Mile run/walk
50-yard dash		V-fit reach flexibility test
Standing broad jump		

Source: The Melpomene Journal, vol. 7, no. 2 (Spring 1988).

recognition, and treatment of sports injuries. Perhaps some of the most outstanding of these early works were Sigren Weissbein's *Hygiene des Sports* in 1910, Byles and Osborne's *The Encyclopedia of Sports* in 1898, and Dr. S. E. Bilik's *Trainer's Bible* in 1916. In 1931, Walter Meanwell collaborated with Knute Rockne to produce the first American sports medicine work, which discussed the role of the athletic trainer and team physician in caring for the athlete.

In 1888, sports leaders interested in creating standards and guidelines for amateur athletics in the United States established the Amateur Athletic Union (AAU). Its original 15 member clubs have grown to several thousand clubs, which conduct local, state, regional, and national competitions in the United States and its territories. The AAU remains the largest U.S. nonprofit volunteer organization dedicated solely to the promotion and development of amateur sports and physical fitness programs. It sponsors the AAU/Junior Olympics and the AAU Senior Sports Program. It also provides awards to recognize fitness and sports achievements.

Intercollegiate and Interscholastic Athletics

In general, the development of athletic training and sports medicine in the United States is most closely tied to the development of intercollegiate and, to a lesser extent, interscholastic athletics. Hence, any discussion of the history of athletic training and sports medicine must include an understanding of the growth of organized competitive sports between and within our schools.

The National Collegiate Athletic Association (NCAA) was founded in 1906. Known initially as the Collegiate Athletic Association of the United States, it was formed by 62 representatives of 13 institutions. These individuals met at the urging of President Theodore Roosevelt, who was concerned over the number of injuries occurring in the poorly regulated sport of college football.

The NCAA initially functioned only as a discussion group and rule-making body, but it soon began to foster sports development in colleges and universities by sponsoring national championships, not only in football, but in many other sports as well. With its headquarters in Mission, Kansas, the NCAA remains a voluntary association devoted to the sound administration of intercollegiate athletics. Member colleges consider all athletic problems that cross regional or conference lines. Today the NCAA engages in the following activities:

- Develops, interprets, and enforces rules for sports safety.
- Conducts research on sports issues.
- Compiles sports statistics.
- Provides financial assistance to groups interested in promoting intercollegiate athletics.
- Answers questions on policies and other matters in intercollegiate athletics.
- Promotes participation in international sports programs.
- Administers insurance programs for member institutions and student athletes.
- Promotes community youth programs and administers national marketing programs.
- Promotes championship events and all other intercollegiate athletics through planned activities.

Any college or university may be elected to active membership in the NCAA if it is accredited by the recognized academic accrediting agency in its region, maintains at least four intercollegiate sports for men and four for women (one in each of the three traditional seasons), and complies with all NCAA legislation.

In 1920, the National Federation of State High School Associations (NFSHSA) was founded to promote the safe development of interscholastic activities. The National Federation believes such activities are a necessary part of the growth and development of young people.

Many college team physicians belong to