

# MEDICAL PRACTICES IN SPORTS

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Sports medicine may be defined today as including four main subdivisions: medical supervision of athletes, medical supervision of adapted physical education, prescription and supervision of therapeutic exercise, and use of exercise as a means of disease prevention. The traditions of medical practice along these lines are ancient, extending back at least to 600 B.C., but the formalization of sports medicine as a specialty is modern, originating in Europe in the second quarter of the present century. Prior to the advent of specific medicinal therapy and the introduction of safe and effective general anesthesia in the nineteenth century, physicians relied heavily on prescriptions of exercise as well as other non-specific measures. Modern control of infectious disease and advances in surgery have now made chronic degenerative diseases the chief threat to human life. This, and the tremendous world-wide increase in a multiplicity of sports activities, have prompted both the renewed interest of physicians in physical exercise as a preventive and therapeutic tool and concern for the treatment of sports-related illness and injury.

In practicing sports medicine, the work of the physician is inseparable from that of the coach, the athletic trainer, the physical therapist, the physical educator, the exercise physiologist, the sports psychologist, and other persons with related interests such as engineers, sociologists, and some even more highly specialized persons. An important key to the successful practice of this specialty, therefore, is the ability to work as a member of a team whose size will vary according to the exigencies of the situation.

## I

### CURRENT EDUCATIONAL PROGRAMS IN SPORTS MEDICINE

Sports medicine has been recognized in Europe for many years as a specialty of medical practice. The German designation is *Sportarzt*, and other countries have similar terms for these specialists. Formal training programs in medical schools and in post-graduate courses and diplomas, certificates, or special licenses are offered in countries such as Germany, Czechoslovakia and Yugoslavia. The Fédération Internationale Medico-Sportive has offered special short courses in recent years in Europe and elsewhere and promotes a World Congress of Sports Medicine every two years. Scientific journals specifically related to this field have multiplied rapidly and articles from the field are published regularly in many other journals. Monographs, textbooks, and encyclopedias are appearing every year in increasing numbers.

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International, national, regional, and local meetings dealing with sports medicine are equally numerous.

In the United States, interest in sports medicine did not begin to grow until about 1950, although the first medical work had been published in 1931. It is not a recognized specialty of medical practice here as yet because so few physicians are engaged full time in the field, and training programs have been limited, with one exception, to meetings or courses lasting only from one to five days. Probably about 30,000 physicians are engaged in one or more aspects of sports medicine, but only on a limited basis. Most of these are related to the supervision of high school, college, and professional athletes.

A full time eight-month comprehensive training program in sports medicine for physicians was offered at the University of Wisconsin-Madison from 1967 to 1972. It consisted of didactic and practical work on such topics as the historical development of sports medicine, the medical evaluation of athletes for competition, introductory exercise physiology, training and conditioning of athletes, the use of protective equipment, prevention and treatment of sports-related injury and illness, psychology of sport, and sociology of sport. A certificate was awarded by the University on completion of the course. Only ten physicians completed this course in the five years of its existence, and the majority of them came from outside the United States. It was therefore discontinued as not being properly responsive to the present needs for training of physicians in this field. A two-week intensive course will be substituted in 1973 with the hope that it will draw a greater response, although it will fall short of providing the details of the more extensive course and will not offer the practical experience in working directly with sports teams.

The first formal course in sports medicine for undergraduate medical students has been offered as an elective for eight weeks in the fourth year at the University of Wisconsin Medical School since 1970. It deals very briefly with the major topics in the field and is designed as an introduction for those who may wish to follow up this interest in medical practice later on by additional study. In some other medical schools isolated lectures in sports medicine have been given as parts of different courses.

Meetings and short courses which involve coaches, trainers, and others as well as physicians are now so numerous that there is hardly a week in the year that at least one is not being held somewhere in the United States. The development of these events has been greatly stimulated by the American Medical Association's Committee on the Medical Aspects of Sports and the American College of Sports Medicine, both of which were started in 1951. Since 1967 the American Academy of Orthopedic Surgeons has organized and presented a series of three-day courses which now take place in different states three or four times a year. The American Medical Association has held a National Conference on the Medical Aspects of Sports every year since 1958.

Journals, pamphlets, monographs, textbooks, and other publications in sports medicine continue to multiply annually in the United States as they have in Europe. The very extensive literature on physical education, sport, exercise physiology, and medicine generally provides an ever-expanding and constantly changing theoretical and practical basis for the study and practice of sports medicine.

## II

### ORGANIZATION OF MEDICAL SERVICES FOR ATHLETES

#### A. Physician and Hospital Care

The organization of medical services for the care of athletes in the United States is generally extremely informal and inefficient. The lack of specialty training in sports medicine is one reason for this, since it is difficult to identify physicians who have the qualifications for providing high quality medical supervision for athletes. An equally important reason is the tremendous scope of sports, which involves persons of all ages in formal and informal programs extending through every season of the year. If, for example, it was conceded that it would be desirable for everyone who is involved in a vigorous or hazardous sport activity to have a physical examination once yearly, there simply is not enough medical manpower to do the job, even if all practicing physicians devoted full time efforts to this task.

What organization there is tends to focus around high school, college, and university team sports, professional sports, and special interest sports groups such as Little League Baseball, the American Association for Automotive Medicine, and the United States Olympic team. Organizations such as the American College of Sports Medicine, and its Canadian counterparts, the Canadian Association of Sports Sciences and the Canadian Academy of Sports Medicine, the Committee on the Medical Aspects of Sports of the American Medical Association, and the Sports Medicine Committee of the American Academy of Orthopedic Surgeons have nothing to do directly with the organization of these services. They have offered in the past, and continue to offer, guidelines, suggestions, and encouragement for such organization, but have no control over the actual provision of services.

At the high school level, arrangements for the medical examination and supervision of athletes are ordinarily made by the school's athletic director, or sometimes by an individual coach. In some states, county and local medical associations play a part in securing physicians to serve high school sports teams or in arranging the allocation and rotation of physicians for this purpose. Formal contracts for the provision of such medical services are rarely written, each party depending instead on an oral understanding of their responsibilities. In relatively few instances is a salary or retainer fee paid. For the most part, the physician providing the service attends games or practices without a fee, but is paid for medical services rendered to sick or injured athletes.

Most state high school athletic associations have a formal requirement for an annual physical examination for each participant in interscholastic sports. There is no requirement for examination of those who participate only in intramural sports. This responsibility falls generally on the family physician. Although millions of cards or papers certifying to such an examination are filled out and signed by physicians annually, there is good reason to believe that many of these examinations are not actually performed. In some cases, especially football, all members of the team are examined by one or a team of physicians on a particular day just prior to the beginning of a regular season of play.

If a college or university has an organized health service for its students, it often becomes the responsibility of this service to provide medical supervision for the intercollegiate athletes. However, sometimes a physician or group of physicians not connected with the health service may be invited to care for the school's athletes, either as a group or on a team basis. Different physicians may take the responsibility for different teams, depending on their interests and previous experience. Contractual arrangements between the college or university are usually more formal, with either a salary or retainer fee paid. In the case of many small colleges, however, the physician donates the time he spends coming to practice and games and receives income only for actually providing medical care.

The physicians in college health services who take care of the athletes ordinarily have other duties there as well which involve other students. There are very few physicians in the United States who are employed full time for sports medicine alone. Rather there is a tendency to spread the work among several physicians, even though there might well be enough to occupy all the time of one of them. When the team physician is not a member of the college health service, he is usually hired by the athletic department or its equivalent, which in some cases is the physical education department. In such a case he is invariably only part time and conducts a private practice off-campus.

Hospitalization for ill and injured athletes may be provided in the college infirmary, if there is one, or in the affiliated university hospital. In the latter case, specialists on the staff of the university hospital may become involved in the athlete's care. There are instances, however, where a university hospital exists but the hospitalization of athletes is in another community hospital. This is ordinarily the case when the physician is not a college or university employee.

Outpatient care may be rendered in the college health service, infirmary, or hospital. In many instances, the team physician will have a small office in the athletic department facilities, in or near the training room, where he may examine athletes and perform simple treatments. These offices are ordinarily open only during games or regular practice times.

The organization of medical services for professional athletes depends on the level of play. At the very highest levels—NFL-AFL football, NHL ice hockey,

and NBA and ABA basketball—services are generally well-organized. At the lowest levels, such as in class A baseball, junior A ice hockey, and semi-professional football, they may be non-existent. In the former case, some teams have full time physicians and highly paid consultant specialists. In the latter case, the player is forced to look after his own needs, depending on the service of a family physician, even though his team may provide some insurance coverage for his expenses.

Although there is an increasing number of sports clubs in the United States, relatively few of them make regular arrangements for medical supervision of their members. Golf clubs, which often provide facilities for tennis, squash, swimming, and other sports, may make an arrangement with a physician who will be called in the event of an emergency, but a more substantial relationship is unlikely. One golf club has organized its physician members and club employees as an emergency medical team and endeavors to provide emergency service for stricken members or their guests on a moment's notice, but this is an exception. Clubs of other special interests such as hunting, fishing, fencing, boating, and horseback riding, frequently have physicians on their rosters but seldom have any organized medical program.

Organized out-of-school sports activities for young persons such as Little League Baseball, Bidy Basketball, Pop Warner Football, Silver Stick Hockey, and so on, usually have a requirement of an annual physical examination, supposedly provided by the family physician. Judging from the numbers of young persons involved, there are many more cards signed than examinations given. Ordinarily only the football leagues require physician attendance at games. Much of the medical services for all these sports, including the AAU age-group programs, are provided casually by physician-fathers of participants.

The United States Olympic Committee has a subcommittee on Medical and Training Services. This subcommittee has selected the physicians, nurses, trainers, and other therapists who have accompanied our teams to the Pan-American and Olympic Games. These persons all volunteer their services, but all their traveling and living expenses are paid while they are with the teams. A limit to the number of physicians who may be a part of the official party is set by the International Olympic Committee and is based on the number of athletes participating on each national team.

### B. The Athletic Trainer

The athletic trainer plays a very important role as an ancillary to the medical profession in the United States in the supervision and care of athletes. The professional organization which sets standards for the qualification and practice of athletic trainers is the National Athletic Trainers Association, which was founded in 1950. It enrolls the great majority of those persons who consider athletic training to be their profession, whether they practice it full time or part time. In 1970 it established standards for certification which are based on training and experience. As a means

of qualifying trainers for this certification, the Association approved educational programs for the preparation of trainers at eight collegiate institutions by 1972, with additional applications for approval under consideration.

The basic requirements for certification can be met by four categories of persons, each with slightly different backgrounds. A common requirement is a baccalaureate degree. Also, two to five years experience as an active trainer or apprentice under an NATA approved trainer is also required. Advanced degrees beyond the baccalaureate are not required, but all classes of trainers are encouraged to qualify for degrees in allied health and education fields. A certifying examination on the basic principles of athletic training, composed and scored by a recognized national testing organization, is given several times a year in different parts of the United States.

Membership classes in the NATA are now described as certified, active, inactive, student, associate, advisory, allied, honorary, and retired. A member must spend two years in the active status before he is eligible for certification. Associate memberships are open to persons working in the field of sports medicine who are not trainers or team physicians. Advisory memberships are open to team physicians. Allied memberships are open to persons whose business interests are related to athletic training and sports in general. Only active and certified members have a vote in NATA affairs.

In May, 1971, the state of Texas became the first governmental unit to license athletic trainers.<sup>1</sup> The statute creates a Texas Board of Athletic Trainers consisting of three members, two of whom are to be licensed athletic trainers, except for the initial appointees, and one to be a physician licensed in Texas. Members are to be appointed by the governor with the advice and consent of the senate for a term of six years, except for the initial appointees, one of whom is appointed for two, and one for four years. The Board is empowered to "establish guidelines for athletic trainers in the state and prepare and conduct an examination for applicants for a license."<sup>2</sup>

To qualify for a license the candidate must possess one of the following qualifications:

- (1) have met the athletic training curriculum requirements of a college or university approved by the board and give proof of graduation; or
- (2) hold a degree in physical therapy or corrective therapy with at least a minor in physical education or health which included a basic athletic training course, hold a valid teaching certificate for the State of Texas, and have spent at least two academic years working under the direct supervision of a licensed athletic trainer; or
- (3) have completed at least four years beyond the secondary school level, as an undergraduate or graduate student, as an apprentice athletic trainer under the

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<sup>1</sup> TEX. REV. CIV. STAT. ANN. art. 4512d (1972).

<sup>2</sup> *Id.* § 5(c).

direct supervision of a licensed athletic trainer. These must be consecutive years of supervision, military duty excepted.<sup>3</sup>

A "grandfather" clause specifies that "Any person actively engaged as an athletic trainer on the effective date of this Act [September 1, 1971] shall be issued a license if he submits proof of five years' experience as an athletic trainer within the preceding 10-year period, and pays the license fee required by this Act."<sup>4</sup> Section 8 (effective date January 1, 1972) states that "No person may hold himself out as an athletic trainer or perform, for compensation, any of the activities of an athletic trainer as defined in this Act without first obtaining a license under this Act."<sup>5</sup>

Since the membership of NATA as of June, 1971, was only a little over 4,000, it is obvious that not every high school with an active sports program, of which there are over 40,000, has the services of a professionally qualified trainer. In conjunction with the Cramer Chemical Company, the NATA has developed a program (largely a correspondence course) for the education and qualification of high school students as trainers. They work under the direction and supervision of high school coaches and team physicians. Many of these young men, and today even some women, go on to become student trainers working under professional trainers in colleges and universities. One must certainly question the qualifications of students trained in this fashion, but the record overall for a number of years does not show that there have been any serious problems.

In many high schools the coach, or one of his assistants, also serves as trainer for the team. Some are well qualified for this role since they have good educational backgrounds and improve their knowledge by attending clinics, seminars, and courses in athletic training. Others are poorly qualified educationally and make no effort to correct their deficiencies. In the state of Nebraska, there is a program, initiated by a subcommittee on athletic injuries of the Nebraska State Medical Society, to train other high school faculty members as athletic trainers. School nurses have been involved in the emergency care of athletes in high schools only to a very limited extent, and the potential of these persons for better medical supervision in sports has not been adequately explored.

The relationship between the team physician, or other private physician, and the athletic trainer is a difficult one, for several reasons. As an initial matter, the four-sided relationship between coach, athlete, trainer, and physician is an awkward one to maintain since all are operating on different levels of knowledge and are united chiefly by a common interest in sports. Where problems of disability and competition are concerned, all, in theory, are motivated by a desire to do what is best for the athlete. The interpretation of what is best may differ with each of the four, and yet there are matters which cannot be decided by a majority vote. Dis-

<sup>3</sup> *Id.* §§ 9(1)-(3).

<sup>4</sup> *Id.* § 16(a).

<sup>5</sup> *Id.* § 8.

cussion should take place, but in the end the opinion of the physician must prevail. Where it does not agree with one or all of the others, antagonisms may arise. Coaches have a tendency to think in terms of what is best for the team, the school, or even for the security of their own jobs. Trainers, many of whom have been coaches themselves, tend to side with the coach. Athletes themselves frequently take the short rather than the long view of their problems.

The trainer carries out preventive and rehabilitative treatment for athletes under direct or standing orders from the team physician. Since the standing orders are generally a matter of unwritten past communications, it is inevitable that misunderstandings arise from what the physician may see as an abuse of authority by the trainer and what the trainer sees as inadequate guidance from the physician. Some trainers do exceed their authority as far as treatment and the administration of medications is concerned, but they are fortunately in the minority. Probably the greatest potential hazard in the treatment situation is the use by unqualified trainers of physical therapy equipment, the operation and effects of which they do not completely understand. Ostensibly they are using it merely as an agent of the physician, but sometimes he knows as little about its operation as the trainer. It is surprising that more serious incidents do not occur.

### III

#### SPORTS SAFETY: COMMON INJURIES AND PREVENTIVE MEASURES

Every type of human movement creates some potential for injury from an intrinsic or extrinsic source; the more rapid and vigorous the movement, the greater the potential for injury. Since sport is characterized by movement that is frequently forceful and rapid, and since that movement may be at the same time opposed by similar movements of others to bring about physical contact between the participants, either deliberately or accidentally, the potential for injury is proportionately high. When one further considers that sport takes place not only on the ground, but in the air and underground, and on and below the surface of the water, and that the excursions involved may also include the use of motorized vehicles reaching speeds up to 600 m.p.h. it is quite apparent that sport participation can be very dangerous.

The National Safety Council has estimated that one accidental death occurs for every 100 disabling injuries, one disabling injury for each 29 accidental injuries, and one accidental injury for each 300 unsafe acts. Since the practice of sport is replete with unsafe acts, the approximately 900,000 unsafe acts statistically necessary to produce one accidental death is frequently attained. To attempt to remove all danger from sports would be to make them joyless, since the feeling of exhilaration they produce is inextricably connected with the danger involved. The task of the persons who attempt to modify these unsafe acts so as to minimize the danger of

accidents, injuries, disabilities, and deaths is a difficult one, not only from the conceptual standpoint, but also because these actions may curtail some of the thrills sought by participants and spectators alike. They therefore tend to resist these intrusions, while at the same time avowing their interest in safety.

Many types of accidental injuries are common to many sports, such as the fractured forearm due to a fall on the ground, the concussion sustained from a blow on the head, or the ankle sprain due to the sudden and unexpected inversion of the foot. Each sport, however, has its characteristic injuries, and the popular description of the injury may take its name from the sport in which it is common, such as tennis elbow, surfer's knees, or rider's strain. One of the important tasks of the sports physician is to study the occurrence of injuries in each sport so that he may make recommendations for minimizing their recurrence and their effects. Repetitive actions are typical of sports, and, indeed, the development of sports skills depends on the ability to reproduce effective patterns of motion consistently. From this standpoint the occurrence of certain types of injuries is predictable, which is one advantage those interested in injury prevention have.

By a study of the actions in a particular sport, the sports physician can develop conceptually a likely table of injuries for that sport. This list must be tested against the actual experience accumulated in a great number of participations in order to determine the relative incidence of each injury. It is in this area that we are most lacking accurate information. The sport of American football has been more closely studied than any other with regard to the actual occurrence of injury. Yet our knowledge of the factors involved and the means of interpreting the particular studies to the universe of the game is still fragmentary. A current study of high school football being conducted by scientists at the University of North Carolina, and one of the best designed and conducted from an epidemiological standpoint, already indicates that ideas which physicians had derived from previous studies, relating especially to the occurrence of concussions, may have been quite erroneous.

The occurrence of injury and the nature of injuries sustained at the different levels of sports competition, as for example in ice hockey, appear to differ according to the age groups involved, from the youngest Pee-Wee leagues to the professional leagues. We know some of the factors involved, but there are very few studies of ice hockey injuries which have been published to verify and support the conceptual approach to injury control. There are many factors which militate against good record-keeping of injuries in each sport, especially in those individual sports practiced chiefly in a recreational setting. Other factors which have some influence on injuries and illness in sports are the nature of the coaching which the athletes receive and the officiating at competitions.

Many coaches have no hesitation in teaching techniques which may endanger the safety of the athletes if they have reason to believe that such tactics may help to

win games. A striking example is the use of the helmeted and face-masked head as an offensive and defensive weapon in American football. Although the protection offered the head by the better protective equipment available today is superior, it is designed to protect only against the incidental and necessary contact which will arise in the game. It is not, nor can it be with present technology, designed to withstand with impunity the forces generated by driving it directly into an advancing opponent. Even more vulnerable is the neck, which must absorb, without any protection, the major portion of the impact which is not absorbed by the helmet.

Rules have been adopted against the deliberate practice of "spearing" an opponent with the headgear, but their enforcement depends on the judgment of officials that the intent was deliberate. As a consequence, the offense is seldom penalized. In fact, as the study of game movies by the North Carolina investigators has demonstrated, eighty per cent of the observable infractions of all types are not penalized in American high school football. The three officials at the high school game and the five officials in the college game cannot see all aspects of every contact made between the twenty-two players, since they have other simultaneous responsibilities which relate to the movement of the ball. With the hard shell plastic helmet we have improved head protection, but we have at the same time increased the number and type of soft tissue injuries caused by the contact of this hard object with other parts of the body.

The rules of a sport are originally designed to make play consistent and reproducible as well as to set reasonable limits for competition in time and space. As each sport develops, rules are written to ensure, in so far as possible, safer playing conditions for the contestants. Some of these relate to mandatory use of protective equipment, such as helmets and mouth guards. Changes in style of play (trap blocking in American football), sports technology (synthetic turfs), age groups involved in organized competition (Little League Baseball), and other factors require rules changes in the interests of safety. There is an inevitable gap between the beginning of these changes and the change in rules to accommodate them. Rules committees are chiefly composed of active coaches and therefore tend to react to what coaches want rather than to what knowledgeable and experienced promoters of safety may recommend.

The development of protective equipment for all sports has not kept pace with engineering technology generally. Although manufacturers conduct their own laboratory tests of this equipment, and there is usually some period of field testing preceding the general introduction of new protective items, there has been relatively little unbiased testing done by independent investigators. Only in the case of the football helmet can one find any extensive literature describing research on its protective qualities. One problem is to secure funds for such testing and evaluation at the present time.

## IV

## THE ECONOMICS OF MEDICAL SUPERVISION OF SPORTS

The proper medical supervision of sports, as it is understood today, is an expensive business. The major professional teams are probably the only ones who can afford to pay the true costs, and even they have been staggered by what it costs them. The costs of the preventive aspects of this care cannot be separated from the costs of treatment, including hospitalization, since the latter is dependent in several ways on the former. The preventive or general supervisory services of the physician may in some instances be provided gratis with the understanding that he will collect fees for his services in treating the ill and injured. The presence of a physician in a supervisory capacity means inevitably that costs for medical treatment will be higher, since many conditions which might otherwise go untreated are recognized and brought to therapy. This may in the long run mean a dollar saving to a professional team that depends on the day-to-day availability of its stars, but it is an immediate out-of-pocket expense. Finally, even though the costs of medical care may be insured, the insurance is experience-rated in one way or another, even though non-profit carriers may be involved, and increased costs are reflected in increased premiums.

At the level of competition of the youngest performers, the six to twelve-year olds, the required physical and dental examinations are provided by some physicians without charge as a public service, but others make a nominal charge, which is the responsibility of the parents. The ever-increasing number of such examinations has led to a revolt of physicians in some areas against the annual performance of physical examinations. Although the major factor is certainly the requirement of time to do these examinations, the question of remuneration is involved to some extent. Physicians are not employed to supervise the practices or competitions, although many of them come as volunteers, and the fee-for-service concept prevails. If present trends in these programs continue, much more comprehensive medical control would be highly desirable. This would involve considerable direct expense, and it is uncertain whether there is sufficient medical manpower available to do such a job.

At the junior high school level, the cost of physical examinations must be borne by the parents if any charge is made by the physician. The usual nominal charge made by physicians who do request a fee may be an unwelcome burden for the low-income family, especially if more than one child is involved. The school may have a regular arrangement with some physician, or perhaps several, but a retainer is not usually involved. The physician accepts fees for the services he provides. The physician is present ordinarily only for competitions, and for the most part only for football. Where interscholastic competition takes place at an elementary school level, the arrangements are similar to those for junior high school.

In the senior high schools, physical examinations are provided by the family physician, with the exception of football, where in some communities, the examinations are conducted en masse at the school, or perhaps in a clinic, by a physician or group of physicians. The practice of having a regular team physician is more firmly rooted, and a retainer is sometimes paid. Fee-for-service-rendered is the rule with a portion or all of the cost ordinarily covered by some insurance. In some high schools a facility is maintained as a physician's office, usually in or near the coaches' offices, training room, or locker room. The school furnishes equipment and supplies for the physician's use. It may also furnish physical therapy equipment which is used by the coach or trainer under the physician's general supervision. In private high schools or college preparatory schools, the school may employ a physician part time for general health supervision if it is a day school, or full time if a boarding school. In such circumstances he may also serve as team physician.

The provisions made for the medical supervision of sports in colleges and universities depend largely on the size of the institution. The smallest institutions have arrangements with local physicians which are comparable to those made by high schools. Any institution large enough to have a college health service usually involves one or more of its physicians in the medical supervision of sports. Their salaries may be supplemented for this service, or they may receive compensatory time when their services are required out of regular hours, as they often are for sports competitions. Many institutions with health services still farm out the medical supervision of sports to local physicians on a retainer or fee-for-service arrangement or both.

In the largest colleges and universities the physician or physicians who supervise the athletic teams may have this as a full time assignment, or as a part time assignment for a stated percentage of their time. They are paid a salary. However, consultation and treatment fees have to be paid to specialists, since team physicians are usually generalists. The costs of maintaining physicians' offices in the athletic department facilities may be borne by the college, by the athletic department, by the health service, or by some combination of all three. In some cases a nurse may be provided to staff the office. The presence of recruited scholarship athletes in any program always increases the medical costs to the athletic department, since such athletes expect all medications be provided for them without charge throughout the year, whether they would be provided to the non-scholarship student or not.

The cost of establishing and maintaining training rooms and the personnel who staff them is indirectly a medical cost. They function, at least in theory, under the direction of the physician, and they do provide therapy for the ill and injured. Some large institutions may employ as many as six full time trainers, and almost all employ student trainers who are paid as part time help. Supplies for a large training room may cost as much as \$25,000 a year, while the initial and replacement cost of equipment may run into many thousands more. These costs are ordinarily met

out of the budget of the athletic department. They are only one of many costs which make the maintenance of intercollegiate sports programs an intolerable burden to some collegiate institutions. Even those who are favored with huge attendances at football and basketball events (virtually the only sports which produce a profit at most institutions) find that they are faced with an annual deficit which must be made by private donations or from the general fund of the institution.

The sponsors of professional sports have improved their medical coverage tremendously in the past fifteen years, but at the lower levels of competition it still leaves a great deal to be desired. Where physicians are involved as full time salaried personnel and where they are allowed to participate in overall planning of operations from the standpoint of preventive medicine, direct costs have increased, but other savings have resulted. The professional trainer ordinarily carries a heavier work load than the college trainer because he doesn't have as much assistance even in proportion to the number of players for whom he is responsible; in fact he may not have any assistant. This is seen as an economy by professional clubs, but it is probably a poor way to try to save money.

#### CONCLUSION

It can be said that the true costs of medical supervision are not being met today because so much service is provided by physicians without remuneration. How long this situation will continue in the face of the many other demands made on the time of physicians is uncertain. The system has been showing signs of severe strain for some time. At the same time, our knowledge of what can and should be done in the way of proper medical supervision of athletes has increased. If this knowledge is to be put to work in a practical way, a much greater increase in costs may be foreseen.