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**COMPETENCY-BASED OBJECTIVES
FOR INTRODUCTORY COURSES
IN ATHLETIC TRAINING**

By

Robert M. Barton

**A dissertation presented to the
Graduate Faculty of Middle Tennessee State University
in partial fulfillment of the requirements
for the degree Doctor of Arts**

May, 1975

COMPETENCY-BASED OBJECTIVES
FOR INTRODUCTORY COURSES
IN ATHLETIC TRAINING

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ABSTRACT

COMPETENCY-BASED OBJECTIVES FOR INTRODUCTORY COURSES IN ATHLETIC TRAINING

by Robert M. Barton

This study was designed to assist physical educators who are beginning new courses and programs in athletic training education for colleges and universities. The purpose of this study was: 1. to determine the content of introductory courses in athletic training at colleges and universities offering curriculums leading to National Athletic Trainers Association certification, and 2. to develop competency-based objectives for introductory courses in athletic training.

The content of introductory courses was determined by using a check list, containing the subject areas covered in three textbooks used in introductory college courses. Supervisors of athletic training curriculums at NATA approved colleges and universities completed the check lists. After studying the results of the check list survey, members of the NATA's Professional Preparation Committee made suggestions as to which subject areas should be included in introductory courses in athletic training.

Robert M. Barton

After twenty-four desirable subject areas were selected, the writer prepared competency-based objectives covering these subject areas. The competency-based objectives were reviewed by members of the NATA's Professional Preparation Committee and members of the Sports Medicine Committee of the Florida Medical Association. The objectives were then used in a class of thirty-two students at Florida International University. An item-analysis was done on the competency-based objectives at the end of the quarter. The item analysis was used to determine the percentage of successful completions and the discriminating power of each competency-based objective. A 70/70 criteria was achieved on the thirty-one competency-based objectives, as seventy percent of the students (22 students) successfully completed seventy percent or more of the tasks.

Recommendations for improvement were made concerning using the tasks in introductory athletic training courses. The competency-based objectives are presented as thirty-one separate tasks organized into a booklet consisting of twenty-two modules.

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Chapter 1

THE PROBLEM AND DEFINITIONS OF TERMS USED

INTRODUCTION

Educational programs have been asked to justify their accountability by state legislators as well as the public. The intent of this challenge is to encourage educators to seriously consider the value and worth of the various programs that are now being offered, as well as the worthiness of proposed programs. The theme of accountability became very popular in the early part of this decade. Increasing costs of education may require that education programs become more accountable to the public it serves on a continuous basis.

Departments of Health, Physical Education, Recreation, Safety, and Athletics have not escaped recent evaluations of accountability. Recent moves to reduce the number of required courses in college degree programs have brought about the need for physical educators to justify the worth of their programs. A problem facing physical education, like other disciplines, is to identify the desired outcomes of individual courses as well as programs of study.¹

¹Joe M. Shockley, "Needed: Behavioral Objectives in Physical Education," Journal of Health, Physical Education, and Recreation, XLIV (April, 1973), 44.

Although a considerable amount of material is available concerning competency-based objectives for physical education, there are still relatively few competency-based teacher education programs for physical education.²

Physical education, however, does seem to lend itself to these objectives. It is too early to determine the degree to which physical education programs will become competency oriented. However, the move in this direction has been helpful to many physical educators by causing them to consider the desired outcomes of their courses and programs.

The physical education profession has recently become concerned with a new aspect of physical training. This is the aspect of providing competent persons to assist teachers, coaches, and participants in protecting the health, safety, and welfare of these students or other individuals participating in physical activity.³ On many college campuses, this responsibility now is given to the school's athletic trainer. Most colleges still only provide an athletic trainer for members of varsity athletic teams. However, some schools now employ enough athletic trainers so as to provide those

²G. Wesley Sowards, "One Year in Retrospect," Performance-Based Teacher Education, II (November, 1973), 3.

³Sayers Miller, "The Role of the Athletic Trainer as an Educator in the NATA's Educational Program," Journal of the NATA, VI (Summer, 1971), 68.

services for students participating in intramural sports and other school sponsored activities.⁴

Although athletic training has a long and interesting history, it has been very recently that institutions of higher education have been directly involved in the professional preparation of qualified athletic trainers. Departments of physical education have assumed this responsibility at many colleges and universities. This seems to be an ideal relationship, for athletic training is closely related to many of the same principals encompassing physiology of activity, adapted physical education, corrective exercises, physical measurement and evaluation, aquatics, and first aid, as well as individually oriented conditioning programs. Although there is still some debate, the writer feels that incorporating the professional preparation of trainers with departments of physical education is a logical and highly desirable relationship.

This new relationship gives physical education and athletic training a very unique opportunity. Interest in athletic training programs has reached a peak at approximately the same time as the push for accountability. Therefore, athletic training professional preparation

⁴Mr. Homer Rice, Athletic Director, University of North Carolina, Chapel Hill, North Carolina, Personal Communication, March 6, 1974.

programs should become accountable during the formative years. If these programs meet the criteria of accountability at the onset, it is possible that these programs can be developed to avoid many of the criticisms that other disciplines are now facing.

The athletic training profession appears to have a bright and enviable future.⁵ The next decade should further brighten this future by emphasizing such things as: better health care for all athletes, interscholastic and intercollegiate programs for women, regulations concerning athletic safety standards, increased national and international athletic competition, state and/or federal regulations concerning the employment of athletic trainers, and the use of qualified athletic trainers in recreational programs for people outside the college setting. Bobby Gunn, President of the National Athletic Trainers Association, stated:

The future of athletic training is unlimited. The need for competent, well-educated athletic trainers is great now, but the future needs--not only in schools but in industry--are nearly beyond comprehension.⁶

⁵Otho Davis, "A Certified Curriculum for Athletic Training," Current Sports Medicine Issues, I (February 15, 1973), 39.

⁶Mr. Bobby Gunn, President, National Athletic Trainers Association, Houston, Texas. Personal Communication, December 1, 1973.

The professions of physical education and athletic training can greatly be enhanced by preparing competent athletic trainer-physical educators. Beginning now with accountable programs of education in this area will make the implementation of nationwide standards much easier in the future. There is little doubt that each state will eventually have at least one institution of higher education preparing students for careers as certified athletic trainers and teachers.⁷ These schools will provide integrated curricula that will allow students to meet the requirements for certification as an athletic trainer in addition to acquiring teaching certification in health and/or physical education.

It is the desire of the National Athletic Trainers Association to have standardized curricula in the near future. Hopefully, behavioral objectives will be established for each course in the curriculum prior to the implementation of federal legislation. The standardization of introductory athletic training courses would be a significant step towards curriculum conformity. The use of competency-based objectives could be of great assistance in standardizing all NATA curricula as well as introductory courses.

⁷Congressman Carl D. Perkins, Representative from Kentucky, Washington, D. C., Personal Communications, April 1, 1974.

THE PROBLEM

Statement of the Problem

The purpose of the study was: 1. to determine the content of introductory courses in athletic training at colleges and universities offering curriculums leading to NATA certification, and 2. to develop competency-based objectives for introductory courses in athletic training.

Significance of the Study

Athletic training is a relatively new profession. Although trainers of various caliber have been involved in athletics for hundreds of years, their inconsistent procedures made it impossible to consider these gentlemen professionals. There were no educational standards during this era. It was not until 1950 that athletic trainers met together in Kansas City to form the National Athletic Trainers Association.

Athletic training education did not begin until the 1960's. Before that time, the education of future athletic trainers was a matter of on-the-job training through an apprenticeship as a student athletic trainer. In the early 1960's, Indiana University began offering a graduate specialization in athletic training. Since that time, progress in athletic training education has been constant. In June of 1974, there were 23 colleges and universities

offering undergraduate degrees in athletic training. Two institutions offered programs on the graduate level.

Each of these 25 colleges and universities, as well as many others, offer introductory courses in athletic training. According to the NATA's Professional Education Committee, there has been no official attempt to standardize the subject matter covered in the introductory courses. This study will be the first attempt to determine the content of introductory athletic training courses at the college and university level.

The results of this study can be of significant value to the many colleges and universities presently implementing or planning introductory courses. By examining the content of introductory courses offered at NATA accredited schools, administrators and educators should be more effective in structuring their course to meet the needs of their particular situation.

The number of introductory courses in athletic training should greatly increase within the next five to ten years. A major reason for this increase will be the trend of more and more schools developing programs that meet the standards required for certification by the NATA. The impetus for these programs will most likely stem from the "Athletic Care Act" that is presently being studied by Congress and the NATA board of directors. This proposed

legislation, officially known as Dellums Bill, H. R. 7795, may have a profound effect upon Departments of Health, Physical Education, and Recreation throughout the country.⁸ Significant ramifications of this proposed bill include: substantial government subsidies to schools implementing trainer education programs, national legislation requiring state systems of higher education to offer trainer-education programs, and state legislation requiring secondary school systems to employ Certified Athletic Trainers to coordinate the health care programs for athletic participants at public elementary and secondary schools. It may be many years before this bill is finalized and implemented. However, it will certainly increase public awareness of the athletic training profession and public interest and demand for introductory courses in athletic training.

The trend toward coaching certification will also contribute to the significance of this study. In 1968, Arthur A. Esslinger was appointed chairman of a Task Force to study the importance of state certification for coaches, and to make recommendations for implementing a certification program in Illinois. Included in his recommendations was the requirement of some credit in courses concerned with the medical aspects of athletic coaching. The Task Force

⁸John O'Neil, "Coming: Two Bills for School Sports Safety," Sports Trails, XXVII (May, 1973), 5.

specifically mentioned the areas of first aid, protective equipment, injury and illness prevention, training room techniques, and safety problems as recommended subject matter for prospective coaches.⁹

Many schools now require the introductory course in athletic training for all of their physical education majors. The new emphasis on coaching certification should increase the number of students desiring this course. Coaching majors and minors will not only necessitate additional introductory athletic training courses, the trend will also require many physical education departments to realize they do not have staff members proficient in this area. This study should be of benefit to the many health and physical educators that will be called upon to teach in this area. It should be beneficial for health and physical educators to see what is presently being taught at these 25 schools, who will someday be considered the pioneers of athletic training-education.

Also contributing to the significance of this study is the projected future emphasis on intercollegiate athletics for women. Several universities have been giving athletic scholarships for women since the early 1970's. The University

⁹Thomas Meinhardt, "A Rationale for Certification of High School Coaches in Illinois," Journal of Health, Physical Education and Recreation, XLII (January, 1971), 55.

of Florida and the University of Miami were pacesetters in this area. The University of Florida Athletic Association absorbed the six women's sports clubs in 1972 and was one of the first southern universities to hire a female student trainer for the women's program. The University of Miami began giving athletic scholarships to females in 1973.¹⁰

Pending federal legislation will most likely cause this trend to accelerate. A comprehensive proposal, referred to as "Title IX" by the Department of Health, Education and Welfare could soon become part of the Civil Rights Act. This would force colleges and universities not complying with the legislation to lose federal monies that are presently available.

According to the executive secretary of the NCAA, the new legislation will encourage college and university athletic departments to spend a more equitable portion of athletic funds on the women's programs.¹¹ This legislation is significant to this study, only in its predicted influence upon women's athletic programs in colleges and universities. This emphasis will only exaggerate the greatly neglected area of proper health care for female athletes.

¹⁰Mr. Norm Parsons, Intramural Director, University of Miami, Coral Gables, Florida. Personal Communication, February 28, 1974.

¹¹Robert W. Creamer, "Scorecard-Sports Equity," Sports Illustrated, XL (January 28, 1974), 13.

Women athletic trainers are still few in number. There are a limited number of full-time jobs available for female athletic trainers at this time, but there will certainly be a growing need in this area, as women's programs develop. There are presently at least six athletic trainer-education programs that accept women. These are the University of Indiana, University of Montana, West Chester State University, Ball State University, Western Illinois University and Indiana State University. The future NATA approved trainer-education programs will be co-educational.

Many females have received special training in the field during the last several years. Out of necessity, they have resorted to asking college and university male trainers for help. Some of the means by which women have acquired athletic training information have been: attending NATA workshops, enrolling in correspondence courses, enrolling in men's athletic training courses, serving apprenticeships under NATA-certified athletic trainers, and entering NATA approved trainer education programs.¹²

Additional introductory athletic training courses will be opened to females in the future, and health and physical education departments in predominantly female colleges will be adding the course to their curriculums.

¹²Holly Wilson and Marge Albohm, "Women Athletic Trainers," JOHNER, XLIV (May, 1973), 57.

This study should be of assistance to both the administrators and instructors of these courses.

Delimitations of the Study

1. The survey of course content was restricted to include only those colleges and universities that were fully accredited by the National Athletic Trainers Association as of June, 1974.
2. The survey and proposed competency-based objectives were concerned with introductory athletic training courses only.
3. Personal interviews with the supervisors of NATA accredited trainer-education programs were restricted to those supervisors that attended the 1974 NATA Convention held in Kansas City, Missouri, and those supervisors that were located within a reasonable distance from Middle Tennessee State University.
4. The competency-based objectives established by the writer were tested by one introductory athletic training class of thirty-two students at Florida International University in the fall of 1974.
5. This study was limited only to the previously mentioned items.

DEFINITION OF TERMS USED

For the purpose of this study the following terms and definitions were used.¹³

Actively engaged athletic trainer--An athletic trainer who is employed on a salary basis by an educational institution, professional athletic organization, or other bona fide athletic organization, and performs the duties of athletic trainer as the major responsibility of his employment.

Athletic contest--An athletic game, meet, bout, match, or similar physical competitive meeting between individuals or teams representing at least two institutions of higher education, secondary schools, or elementary schools.

Athletic trainer--A person with specific qualifications, who upon the advice and consent of his team physician carries out the practice of prevention and/or physical rehabilitation of injuries incurred by athletes.

Athletic training education--A new branch of the Health and Physical Education discipline that has as its main purpose the education and professional preparation of competent athletic trainers.

¹³Carl E. Klafs and Daniel D. Arnheim, Modern Principles of Athletic Training, 3rd ed. (Saint Louis: C. V. Mosby Company, 1969), pp. 421-424.

Athletic trainer-physical educator--A professionally prepared specialist that has met the dual requirements needed to be qualified as a physical education teacher as well as an athletic trainer. The person is a Certified Athletic Trainer and holds a valid state teaching certificate in physical education.

Enabler--An objective or set of objectives prerequisite to successful completion of a task. Through the accomplishment of the enablers, the trainee demonstrates that he has the necessary knowledge or skill to complete the task.

Entry behavior--A description of the necessary prerequisite skills of a module.

Goal--A short, concise statement of the overall objective of a module.

Heat prostration--Extreme exhaustion and powerlessness due to exposure to continual heat.

Heat stroke--A condition caused by exposure to excessive heat, natural or artificial, that develops due to the failure of the human body's cooling mechanism.

Introduction--A general description of the content and purpose of the module.

Instructional resources--A list of required and/or suggested instructional materials and learning experiences that would lead to the successful completion of a particular task and its enablers.

Module--A cluster of related tasks. The module title describes the competencies to be learned.

Participant--Any individual who competes in an athletic contest, is a member of a team that competes in an athletic contest, or is a member of a team that engages in activity as practice or preparation for an athletic contest.

Performance based education--Educational programs that are based on the actual accomplishment of observable acts, as distinguished from memorization-feedback techniques or subjective ratings of potential ability.

Performance objectives--The specification of objectives in terms of specific behavior to be attained by the learners or teachers, and the measures and means for assessing the degree of accomplishment of these predetermined standards.

Project or program management systems--The adaptation of the systems approach to education and its management through such techniques as management by objectives.

Role playing--The personal experiencing of emotions and perceptions by assuming a role in a defined situation and acting out its relevant behaviors. Presently being used in first aid and physical therapy instruction, role playing techniques offer many possibilities for athletic training professional preparation programs.

Sports medicine--A relatively new area of medical specialization that deals with scientific athletic research and the medical supervision of athletes before, during, and following training and performance.

Task--An instructional competency to be demonstrated by the trainee in a performance based curriculum.

BASIC ASSUMPTIONS

The following assumptions were made in undertaking this study:

1. Colleges and universities offering athletic training curricula, including introductory courses in athletic training, are superior to other forms of professional preparation for the beginning student of athletic training.
2. The NATA's Professional Preparation Committee has given considerable thought to the desired contents of college courses included in NATA approved curricula.
3. The writer is a college teacher of average ability and is capable of presenting the course in an effective manner.
4. The athletic trainers teaching in NATA accredited programs will be cooperative, objective and honest in furnishing the writer the information needed to complete this study.

HYPOTHESES

For the purposes of this study, the following hypotheses were developed:

1. Although similar in nature, introductory courses in athletic training at different institutions are actually covering somewhat different areas of subject matter.
2. Given the opportunity to study the various subject areas covered in introductory courses at the NATA accredited institutions, the NATA's Professional Preparation Committee will reach agreement as to what subject areas should be covered in all introductory athletic training courses.
3. The subject areas recommended for introductory courses by the NATA's Professional Preparation Committee can be further identified by preparing competency-based objectives.

Chapter II

REVIEW OF RELATED LITERATURE

Very little research has been done concerning the athletic trainer. According to the National Athletic Trainers Association's Professional Preparation Committee, there has not been any research concerning competencies or skills needed by the athletic trainer. However, there is considerable information available that is related to the factors that brought about the need for this study. This information has been categorized into four areas. These areas are: historical perspectives, competency-based education, athletic training education, and legislative influences. Brief summaries of the work done in these areas will be given.

Literature on the History of Health Care and Training of Athletes

The health care of athletes has been mentioned in historical literature for a number of years. Primitive man had to stay in relatively good health in order to survive. His constant fight for food and safety did not allow him time to be incapacitated. The primitive man relied upon the local soothsayer, medicine man, or shaman to help him retain his overall well-being. These early health counselors made use of various combinations of prayer, fasting, and

medication. Herbs were the most useful medication readily available. Herbs were used for anointment as well as ingestion. Anodynes of various types were also used and passed down from generation to generation.¹

Archaeological findings have indicated there was athletic activity in Egypt and Mesopotamia. The Egyptians were believed to have had participants in horsemanship, hunting, and swimming. Swimming accidents were especially feared since such a death would have prohibited the person from having a religiously oriented tomb burial.² The Egyptian nobleman danced at religious ceremonies and was entertained by dancing slaves and professional dancers. The nobleman most likely made sure that his favorite slaves and dancers received proper health care when they were injured performing for the nobleman's pleasure. The Hebrews were one of the first groups of people to make significant contributions to health. They are given credit for the practice of handwashing as well as many dietary laws.

The Chinese were responsible for the first form of medical gymnastics. They practiced a series of medically oriented exercises called "Cong Fu." Disease was believed

¹Carl K. Klafs and Daniel D. Arnheim, Modern Principles of Athletic Training, 3rd ed. (Saint Louis: C. V. Mosby Company, 1969), p. 3.

²Beverly L. Seidel and M. C. Resick, Physical Education: An Overview (Reading: Addison-Wesley Publishing Co., 1972), p. 18.

to be due to a lack of body activity. These exercises included mild gymnastics, stretching, and breathing exercises. The activities were usually performed in a sitting or kneeling position and were believed to maintain organic functioning and to prolong life.

The Greeks, however, are given credit for developing strongly organized athletics.³ They established the Panhellenic Games which lead to coaches and trainers assisting the athletes in achieving peak performances. In addition to the Olympic Games at Elis (776 B.C.-394 A.D.), athletes competed regularly in the Pythian Games at Delphi, the Ithian Games at Corinth, and the Nemean Games held at Argolis.

The oldest trainers were mostly former boxers and wrestlers who began training other athletes after they were too old to compete. About the time the professional athlete appeared in Athens, the "gymnastes" became recognized. The "gymnastes" date back to at least the fifth century B.C. They coached the athletes and made practical use of what knowledge they had of anatomy, physiology, and nutrition.⁴ The "gymnastes" are referred to by many famous writers, including Plato.

³D. B. Van Dalen and B. L. Bennett, A World History of Physical Education (Englewood Cliffs: Prentice-Hall, Inc., 1971), p. 18.

⁴Klafs and Arnheim, op. cit., p. 3.

Hackensmith mentions Plato's views on the "gymnastes" or coach.

According to Plato in his De virtute, the successful coach must have some knowledge of the body and the effect of exercise upon it. He should be able to judge the human animal-- be able to tell an individual in which form of athletics he would do best and what type of training program was necessary for him to achieve success.⁵

Following the "gymnastes", the "gymnastai" appeared. The "gymnastai" was also concerned with keeping the athlete in prime physical condition. He had some knowledge of the effects of exercise, diet, and rest on development and performance. The "gymnastai" also made use of anodynes, hot baths and massage.⁶

The "gymnastai" significantly increased the emphasis placed on baths and massage in athletic training. Some of the diet and exercise prescriptions of the "gymnastai" were based more upon superstition than science.⁷

Athenian history also mentions the "paidotribe" or boy-rubber. The "paidotribe" was the physical education instructor and he gave his students rubdowns with olive oil

⁵C. W. Hackensmith, History of Physical Education (New York: Harper & Row, Publishers, 1966), p. 36.

⁶Klafs and Arnheim, op. cit., p. 3.

⁷Van Dalen and Bennett, op. cit., p. 67.

after each lesson. He also gave the boys instruction in boxing, wrestling, pankration, running, jumping, discus, javelin, and conditioning.

The "aleiptes" were anointers and professional trainers. The "aleiptes" were concerned with general fitness, diet and massage. In the fifth century, the "aleiptes" performed their work in the apodyterion, which was a large hall near the entrance of the Palaestra.⁸

The class of professional trainers arose as competition raised the standards of performance and athletics became more competitive. General athletic ability and ordinary exercise could no longer produce winning performances.⁹

The new breed of trainers took complete control of their pupils' lives and particularly regulated their diets. They did bring about some scientific advances in athletics, but they also encouraged the idea of athletics being an end in themselves.¹⁰

A trainer introduced the meat diet at Olympia in approximately 456 B.C. This trainer is believed to have been Dremeus of Stymphalus.¹¹

⁸E. N. Gardiner, Greek Athletic Sports and Festivals (London: MacMillan and Co., 1910), p. 477.

⁹Ibid., p. 81.

¹⁰E. N. Gardiner, Athletics of the Ancient World (Oxford: Clarendon Press, 1930), p. 101.

¹¹Ibid., p. 102.

The meat diet was intended to produce the bulk and strength needed for boxing and wrestling.

Trainers are thought to have contributed to the artificial distinction that became obvious between the life of an athlete and the life of an ordinary citizen.

Herodious of Megara may have been the most famous Greek trainer. He was considered a physician as well as a trainer. Herodious is believed to be the first to recommend exercise as a form of treatment for disease.¹²

History indicates that Herodious is most remembered as being Hippocrates' teacher.¹³

Hippocrates of Cos became known as "the father of medicine."¹⁴ He criticized the high state of training that many of the athletes reached. Hippocrates believed this state was dangerous and an unstable condition of the body. Hippocrates was quite critical of intensive and extensive periods of training.

Professional trainers were also prevalent in ancient Rome. Galen served as physician to the gladiator school at Pergamum.

¹²Klafs and Arnheim, op. cit., p. 4.

¹³E. N. Gardiner, Greek Athletic Sports and Festivals (London: MacMillan and Co., 1910), p. 128.

¹⁴Van Dalen and Bennett, op. cit., p. 67.

He later served as court physician to Marcus Aurelius.¹⁵

Galen and his colleagues wrote about the values of proper diet, abstinence, and rest. They particularly encouraged the athletes under their care to abstain from strong beverages and sexual activity. Galen is remembered for his treatise on health in which he described exercises suited for teenaged athletes, as well as his system of classifying different types of exercises.

Some Romans became critical of the Greek physicians. However, at the same time, some medical men began to establish lucrative practices in Rome.¹⁶

About the time of Christ, Asclepiades was recommending exercise combined with massage as a method of treatment.

Mercuriale and Pare were very respected in the sixteenth century. Mercuriale was the first physician to recognize a difference in preventive exercise and therapeutic exercise.¹⁷ Pare recommended exercise following the primary treatment of fractures.

Interest in sports activity seemed to greatly diminish following the fall of the Roman Empire. Although

¹⁵Klafs and Arnheim, op. cit., p. 3.

¹⁶Van Dalen and Bennett, op. cit., p. 83.

¹⁷Klafs and Arnheim, op. cit., p. 4.

there were surely trainers and/or physicians caring for the athletes that did exist, their names and activities are not included in the literature.

During the Middle Ages, contests between armed horsemen became a peacetime amusement. Tournaments provided entertainment as well as providing training for novices and the practice of knights. The knights participated in vigorous physical training programs.

"It was held that a youth must have seen his blood flow and felt his teeth crack under the blow of his adversary and have been thrown to the ground twenty times. . . . thus will he be able to face real war with hope of victory."¹⁸

The Renaissance brought about a revival of interest in physical activity. During the transitional period between the Middle Ages and modern time, the values of exercise and hygiene were again emphasized. The invention of the printing press and sports information sheets intended to encourage wider acceptance of gymnastics, sport, and other physical activity. Activity and its connection to health received new emphasis from medically oriented gymnastics. Johann Freidrich Guts Muth (1759-1839) believed that gymnastics should be based on a knowledge of physiology and medicine. Friedrich Ludwig Jahn (1778-1852) was influential in the development of the turnverein which encouraged gymnastics

¹⁸Van Dalen and Bennett, op. cit., p. 106.

for the Germans. Although Jahn's ideas were not based on the science of the human body, he presented many ideas which later had implications for athletic training. According to Rice:

Jahn held that the turners should eat only simple food and refrain from overindulgence and intemperance. Tobacco and sweetmeats were forbidden near the turn platz. He was aware of individual differences and did not expect all participants to do all exercises equally well.¹⁹

Franz Nachteggall (1777-1847) of Denmark and Per Henrik Ling (1776-1839) of Sweden both developed systems of gymnastics which were related to medical well-being. The Swedish system of Ling's was introduced to the United States by Dr. Hartvig Nissen (1856-1924). Dr. Nissen came to Washington in 1883 as Vice-Consul for Norway and Sweden. He soon acquainted the American physicians with the value of medical gymnastics and massage.²⁰

It was not until the nineteenth century that the trainer became known in the United States. Their beginning coincided with the establishment of intercollegiate and interscholastic athletics. These first American trainers were more often than not former participants who wanted to

¹⁹E. A. Rice, J. L. Hutchinson and M. Lee, A Brief History of Physican Education (New York: The Ronald Press, 1958), p. 96.

²⁰Ibid., p. 237.

continue their athletic association in some capacity. Their main function was rubbing down athletes. They possessed very little technical knowledge at best. Their treatment procedures included rub downs, counter-irritant applications, and prescribing home remedies. Unfortunately, many of these early trainers were of questionable character. Therefore, it took several years for the athletic trainer to achieve a position of respectability and integrity.

It was not until the National Athletic Trainers Association was formed in 1951 that athletic trainers received any recognition as professionals. The next twenty years saw the athletic training profession experience tremendous growth. During the 1960's, professional preparation was begun at a few colleges and universities, and a movement toward certification began. The certification procedure was complete by 1970, and the image of the training profession continued to improve. Possibly the most significant milestone in the history of health care for athletes occurred in the early 1970's. At this time federal legislators became interested in the health care extended to athletes in this country. This interest will soon be culminated by federal legislation that will attempt to guarantee proper health care to all athletes in elementary and secondary schools as

well as institutions of higher education.²¹ This should be a historic milestone in the evolutionary progress of athletic health care.

Literature on Competency-Based Education

Competency-based education is a relatively new term being used in teacher education programs. Although many of the components have been used for many years, the latest competency-based education "movement" in the United States, actually began in the 1960's. During this period, various attempts were made to describe and analyze the act of teaching. By this analysis, efforts could be directed toward making teacher preparation a more role-relevant and effective experience.²²

Teacher-education programs were being asked to justify their existence, as were all disciplines in higher education. The emphasis on accountability accelerated the competency-based education movement. The press for accountability often centered around inadequate teacher-education programs. There was growing dissatisfaction with present teacher education programs. There was greater community involvement by citizens who felt their schools were not

²¹Congressman Ronald V. Dellums, Representative from California, Washington, D. C. Personal Communication, March 30, 1974.

²²G. Wesley Sowards, "One Year in Retrospect," Performance-Based Teacher Education, II (November, 1973), 2.

meeting the needs of their children. Students began demanding more relevant education. The rising costs of education received the taxpayers attention, and the general public became interested in studying higher education's accountability.

In 1968, the United States Office of Education made considerable allocations to teacher-education planning.²³ Nine contracts were approved and appropriated for "the elementary models" projects. Eight universities and one regional educational laboratory were supported to consider exemplary programs for elementary education teacher preparation. The majority of these projects were extended in order to determine the feasibility of operating various training models. Although elementary education received the major emphasis, these contracts did indirectly influence teacher education programs at various levels. Some of the innovations practiced at the elementary level were also applicable to secondary education programs.

In 1972, the physical education profession was criticized because its curricula lacked resultant learnings that were relevant to student needs. At that time the curriculum commission of the AAHPER agreed that the current curricula was lacking consistency and meaning.²⁴

²³Ibid., p. 3.

²⁴Seidel, op. cit., p. 32.

Therefore, a major problem facing the profession is defining the student outcomes that should be developed by courses of instruction. Shockley mentioned several ways of classifying specific objectives that could be useful to physical educators.²⁵ Robert Mager suggested that objectives should be made very specific in order to insure clear interpretation of meanings.²⁶ He indicated that objectives must define precisely what is expected under certain conditions, and the criteria to be used in evaluation. Shockley demonstrated an objective that meets Mager's criteria for behavioral objectives.

An example of this type of objective in a course in scuba diving might be: the student will doff and don equipment, including fins, mask, snorkel, weight belt, and scuba, in 12 or more feet of water, in an indoor pool, in a time period of three minutes or less.²⁷

The physical education objectives of organic development, neuromuscular development, personal social traits, and interpretive development are sometimes considered as too general or vague. Physical educators will have to become more specific in order to justify existing programs.

²⁵Joe M. Shockley, "Needed: Behavioral Objectives for Physical Education," JOHPER XLIV (April, 1973), 44-46.

²⁶Robert F. Mager, Preparing Instructional Objectives (Belmont: Fearson Press, 1962), p. 11.

²⁷Shockley, op. cit., p. 44.

Robert Davis has made several suggestions for writing behavioral objectives. He describes the two essential elements of behavioral objectives as observable behavior and acceptable performance criteria. The evaluating procedure must be considered in writing objectives. Hopefully, each behavioral objective can be measured in an objective manner. Davis suggests that properly written behavioral objectives could be evaluated by various individuals.

In other words, the supervisor or coworker having viewed the lesson should be able to determine the degree to which the objective was met without further classification from the teacher.²⁸

Vincent Melograno has further emphasized the significance of behavioral objectives by suggesting they be used as methods of supervision and teacher evaluation. He indicated these procedures would have to increase the accountability level of physical education teachers. This would force the teacher to abandon inadequate or vague methods of evaluation.

Supervision by objectives simply means that a supervisor and teacher agree in advance on what evidence will be acceptable to determine the degree of the teacher's success

²⁸Robert Davis, "Writing Behavioral Objectives," JOHPER, XLIV (April, 1973), 49.

in improving the skills, competencies, or attitudes of his students. The contract or agreement is negotiated before teaching to prevent ex post facto evaluation of results. The contract is tentative whereby either party can initiate renegotiation. The time period is also variable. A contract can be drawn up for a single lesson, teaching unit, or a year's course of instruction. As a result, the teacher and supervisor become partners in the process.²⁹

This process would obviously change many systems of organization and procedures. Melograno suggested a four-phase framework to facilitate organization. The framework includes: 1. a pre-observational conference, 2. observation of teaching, 3. analysis of facts collected during observation, and 4. post observational conference.³⁰ The results of the teaching unit would be evaluated by both the teacher and the supervisor. This would permit them to reevaluate present objectives as well as formulate new ones. The main advantage of this approach would be the built-in improvement procedures which would aid the teacher in attaining the desired outcomes.

Literature on Athletic Training Education

Athletic Trainer Education is a relatively new area of specialization. Since 1960, professional

²⁹Vincent J. Melograno, "Supervision by Objectives," JOHPER, XLIV (March, 1973), 27.

³⁰Ibid.

preparation for athletic trainers has experienced tremendous growth.

There are now approximately 25 universities offering majors or areas of specialization in athletic training. These programs have caused educators as well as the public to become more aware of the great need for institutions of higher education to produce qualified athletic trainers. This awareness has brought about a demand for highly educated athletic trainers who are well qualified in the various phases of the profession. The modern-day trainer is expected to be a college graduate, usually with a major in physical education, health education or physical therapy.

In 1972, Phillip Donley, athletic trainer at West Chester State University, surveyed the membership of the NATA. A significant area investigated was the educational preparation of the currently practicing athletic trainers. Among the active trainers in the United States, 41.3 percent held either masters of science or masters of arts degrees. This indicated significant advances in the educational preparation of trainers since the NATA was organized in 1951. In addition to the masters degree holders, 35.3 percent of the active trainers held bachelor of arts or bachelor of science degrees, while 8.0 percent had received physical therapy certification as their highest level of preparation. This left only 10.7 percent of the active

trainers with no formal degree from an institution of higher education. The majority of the latter group were the older members of the profession that had received extensive training in the military service during World War II. They became certified under the grandfather clause.³¹

It should be pointed out that many of these gentlemen are among the most respected in the country today. Another significant result of this survey showed that there are presently at least three active trainers that hold either a Doctor of Philosophy or a Doctor of Education Degree.

These trainers are Bobby Patton of Southwest Texas State University, Daniel Arnheim of California State at Long Beach, and Marty Broussard of Louisiana State University.

These gentlemen all direct a NATA approved curriculum at their respective universities. With more and more universities adding training curricula, a possible trend could be more athletic trainers working towards doctoral degrees.

A new dimension was added to athletic trainer education in 1972. The University of Arizona and Indiana State University became the first universities in the United States to have graduate programs officially approved by the NATA. The University of Arizona began offering an area of

³¹Phillip Donley, "1972 NATA Membership Survey," JNATA, VIII (December, 1973), 150.

academic specialization in athletic training as part of both the master of education and the master of science programs in physical education. The program includes those courses recommended by the NATA for the professional preparation of athletic trainers. Mr. Delforge also feels the graduate program is an excellent preparation for the NATA Certification examination.

By following the required graduate curriculum, athletic training students at the University of Arizona are given an opportunity to take courses that will prepare them for the national certification examination in athletic training and subsequent National Athletic Trainers Association approval as Certified Athletic Trainers.³²

Indiana State University is presently the only university in the United States that offers a graduate specialization in athletic training as well as a NATA approved undergraduate curriculum. This program offers an opportunity to combine 21 semester hours of graduate work in Athletic Training and allied fields with a Masters Degree in Physical Education.

The graduate specialization includes courses in science and correctives as well as in athletic training.

³²Gary Delforge and Richard Klein, "High School Athletic Training Internships," JOHPER, XLIV (March, 1973), 42-43.

There are, however, undergraduate prerequisites for these graduate courses. For example, a course in physiology of exercise is required in the masters degree program. To qualify for such courses, a student must have had undergraduate courses in anatomy, physiology, kinesiology, nutrition, and chemistry or physics. Other required graduate courses include adapted physical education, advanced training techniques, training practicum, and seminar in current trends.³³

The University of Arizona graduate program offers a unique internship in athletic training. The masters degree candidates are assigned to local high schools for practical experience as that school's head trainer. The wide acceptance the Arizona intern program has received indicates a possible trend for the future. The intern program has helped remove many of the barriers to the employment of high school athletic trainers. The program has allowed all 14 high schools of Tucson to employ qualified athletic trainers. Four of the schools now employ full-time teacher-athletic trainers. The other ten high schools are participating in the internship program with the university.

³³Mel Blickenstaff, Athletic Trainer, Indiana State University, Terre Haute, Indiana. Personal Communication, March 1, 1974.

The Arizona program is an example of excellent cooperation between a public university and its surrounding community. The athletic trainer-interns are recruited by the University of Arizona Physical Education Department for one-year appointments. During the year, the intern pursues a masters degree in physical education or health education while serving as a high school's head trainer. The intern is paid approximately \$3,000 by the high school for approximately 25 hours of weekly work. Flexible scheduling permits the intern to attend classes in the mornings and evenings. The intern is generally responsible for the prevention, emergency treatment, and rehabilitation of injuries incurred by freshman, junior varsity, and varsity athletes. He is also responsible for the development of a student athletic training staff.³⁴

The intern possibly gains more from this program than anyone else. He has the opportunity to earn his masters degree while receiving a substantial stipend. He also gains the experience of serving in the responsible position of head trainer. This experience gives him the opportunity to use the ideas he has learned during his undergraduate student training experience. The intern should also improve his organizational and decision-making

³⁴Delforge and Klein, op. cit., p. 42.

skills, while learning to better communicate with various athletic personnel.

The University of Arizona is very proud of their internship program. The more positive aspects of the program are summarized by Delforge and Klein.

This valuable on-the-job training plus the opportunity to learn through specialized courses in athletic training prepares the intern for athletic training at all levels of organized athletics. Graduates of the internship program have found full-time assistant and head athletic training positions with high school, college, and professional teams throughout the United States. Each year, the athletic training field is rewarded with an experienced group of graduating interns eager to embark on their careers as professional athletic trainers.³⁵

The Arizona and Indiana State programs will serve as models for future programs in graduate professional preparation.

Literature on Legislation Influencing Athletic Training Education

In June of 1974, Texas was the only state that had laws affecting the athletic training profession.³⁶ However,

³⁵Ibid., p. 43.

³⁶T. McKissack, "State of Texas Premier's Licensure of Athletic Trainers," Journal of the NATA, VI (Fall, 1971), 122.

federal legislation has been proposed that could eventually revolutionize the athletic training profession.

Representatives Ronald V. Dellums of California, Edwin Forsythe of New Jersey, and Carl Perkins of Kentucky are working together to promote two bills that will significantly influence athletic training education programs.

The impetus for federal legislation concerning athletic safety was the death of a college football player in September of 1971. Bill Arnold, a University of North Carolina lineman, collapsed on the practice field and died of heat stroke. Controversial publicity over this death eventually lead to several North Carolina athletes giving testimony before a House subcommittee.³⁷

Former North Carolina football players as well as some of Arnold's teammates were critical of some practices used in the operation of the football program. A small group of these athletes attempted to have the situation investigated. They first requested University of North Carolina officials to undertake an internal investigation. They were not satisfied with the response they received from the university and, therefore, presented their case to various state officials. They were again dissatisfied with the response they received. From there, the students began

³⁷John O'Neil, "Coming: Two Bills for School Sports Safety," Sports Trail, XXVII (May, 1973), 5.

contacting various United States congressmen in an attempt to receive political support for an investigation.

According to testimony before a House subcommittee, Bill Arnold had died during a football practice session conducted in a questionable manner.³⁸ Testimony revealed that it had been humid and warm--approximately 86 degrees--in Chapel Hill on the day of his collapse. According to Arnold's teammates, the football squad had been practicing for one hour and fifty minutes without any type of rest or opportunity to replenish the liquid lost through perspiration at the time of his collapse. Various squad members also testified that the practice session was conducted under conditions which violated regulations set forth by the National Collegiate Athletic Association.

Congressman Ronald V. Dellums of California eventually became interested in the North Carolina situation. The North Carolina group met with Congressman Dellums' staff on Thanksgiving Day, 1971. The meeting caused Mr. Dellums to begin considering federal legislation to prevent such situations in the future.³⁹

³⁸Ronald V. Dellums, Congressman, Representative from California. Personal Communication, March 7, 1974.

³⁹Ibid.

Since 1971, Congressman Dellums has prepared two bills which if passed will have profound effects upon competitive athletics.

The first bill is referred to as "The Athletic Safety Act." This act would protect the safety of athletes in a manner similar to the protection afforded workers under the Occupational Safety and Health Act of 1970.

As previously mentioned, the Occupational Safety and Health Act of 1970 protects the safety of all workers. The Act is enforced through fines and possible criminal actions against the employer. The OSHA prevents employers from arbitrarily dismissing persons who bring actions under the Act.

"The Athletic Safety Act of 1973" is officially known as Bill H. R. 2575. The objective of Bill H. R. 2575 is described by Congressman Dellums:

. . . to provide the protection of the safety and health standards under the Occupational Safety and Health Act of 1970 for individuals participating in athletic contests between secondary schools or between institutions of higher education.⁴⁰

The Athletic Safety Act proposes to amend the Occupational Safety and Health Act of 1970 in the following manner:

⁴⁰Ronald V. Dellums, Congressman, Representative from California. Personal Communication, March 7, 1974.

1. By expanding OSHA coverage to every participant in an athletic contest between secondary schools or between institutions of higher education;
2. by regarding each secondary school and institution of higher education as an employer of an individual representing that school or institution as a participant in an athletic contest;
3. by expanding the definition of national consensus standards to include any athletic contest approved by the code of the NCAA or the code of any other recognized athletic organization.⁴¹

The "Athletic Care Act" deals much more directly with the athletic training profession. This bill, officially known as H. R. Bill Number 7795, may eventually revolutionize the athletic training profession at many levels. Institutions of higher education will be the first to feel the impact of this legislation. Some schools will have to make significant changes in their professional preparation programs for health and physical education, as well as increase their emphasis on athletic training personnel and financial allocations.

⁴¹United States House of Representatives (May 15, 1973, Washington, D. C.).

The objective of H. R. Bill 7795 is clear and direct. It will require educational institutions participating in interscholastic and intercollegiate competition to employ certified athletic trainers. The bill has the strength to force schools and colleges to hire certified athletic trainers regardless of the school's other priorities. This strength comes from the bill being attached to the Elementary and Secondary Education Act of 1965 and the Higher Education Act of 1965.

Failure to comply with this particular part of either of the Acts could cause schools to be ineligible for any financial grants from the other sections of the Acts. The majority of schools simply cannot risk having those federal grants discontinued.

Although there is a great deal of interrelation within the bill, there are distinctions made as to what is expected of elementary and/or secondary schools, as opposed to what is expected of institutions of higher education.

Elementary and secondary schools will be most concerned with the amendment to be attached to The Elementary and Secondary Education Act of 1965. Basically, the amendment includes the following four points:

1. public schools that have interscholastic sports must hire a certified trainer,

2. public schools that do not employ certified trainers will not be permitted to have interscholastic sports programs,
3. if a public school continues its interscholastic sports program without hiring a certified trainer, the school will lose its federal grants from the Act,
4. the school must hire a certified trainer to meet the requirements of this Act.

This is obviously a very strong piece of legislation. The 1973 report of the National Federation of State High Schools indicates that only 1 percent of the 14,314 schools playing tackle football employed a certified athletic trainer.⁴² The vast majority of these high school trainers were employed in Texas. Therefore, if the bill had been in effect prior to the 1973 school year, either a great number of certified athletic trainers would have moved to high schools, or Texas would have been the only state playing high school football the following year.

The amendment gets very specific concerning each of the four points mentioned. The bill does call for each school to employ a certified trainer, thus prohibiting area

⁴²N.A.T.A. Board of Directors Meeting (June 8, 1973, Atlanta, Georgia).

schools from sharing a trainer on a system-wide or county-wide basis. The federal funds are not cut off during the year in which a violation occurs. However, if any violation occurs during one year, all funds allocated under the 1965 Act will be cancelled for the following year. The only credentials that are accepted by this bill are those recognized by the National Athletic Trainers Association. Therefore, the person hired must have met one of the following prerequisites:

1. graduated from an NATA approved curriculum program,
2. have been a certified trainer in good standing at the time this bill becomes law.

No other form of professional preparation will be acceptable under the guidelines of this bill.

All institutions of higher education should be considering the amendment to the Higher Education Act of 1965. The amendment briefly mentions plans to partially subsidize colleges and universities that will offer programs leading to a B.S. degree, in addition to meeting the standards of the NATA. It is obvious that many more schools must offer NATA curriculums in order to supply the trainers required by this bill. The bill is also specific as to what it expects from institutions of higher education. Briefly, it mentions the following points:

1. Institutions of higher education that have intercollegiate athletic programs must hire at least one certified trainer.
2. Institutions of higher education that do not hire a certified trainer will not engage in intercollegiate competition.
3. If the institution violates this Act, it will lose all its funds, from the Act of 1965, for the next school year.
4. The bill will provide grants to institutions of higher education for the purpose of establishing athletic trainer-education programs.
5. Funds will be sufficient to meet the demands of this bill.

This is also a very strong piece of legislation. There are still more institutions of higher education without certified trainers than expected. Most football-playing four-year institutions that are members of the NCAA do now employ certified athletic trainers. However, this does not include schools that don't have football, N.A.I.A. schools, and most significantly junior-community colleges. A large percentage of these schools do not employ certified athletic trainers.⁴³ The number of junior-community colleges has

⁴³Donley, op. cit., 150-151.

greatly increased in number throughout the country. However, only Texas and California have employed a significant number of certified athletic trainers for their state-supported junior-community colleges. Although many community colleges do not have football, they often do have to have well-rounded athletic programs. These colleges cannot be overlooked when considering the supply and the demand of certified athletic trainers.

It is the four-year institutions of higher learning that have shown the most concern over H. R. Bill 7795. Many do not see how the number of certified athletic trainers required by the bill could possibly be produced within eight years.

After related oppositions were voiced, the NATA Board of Directors and Congressman Dellums decided to further evaluate H. R. Bill 7795. Congressman Dellums and Congressman Edwin Forsythe of New Jersey have now introduced an interim piece of legislation entitled H. R. Bill 69. This bill calls for a government-funded one-year study on the need for athletic trainers. This year will provide everyone an opportunity to re-evaluate the legislation and hopefully come up with workable solutions for the problem areas.⁴⁴

⁴⁴Edwin Forsythe, Congressman, Representative from New Jersey. Personal Communication, March 1, 1974.

Chapter III

METHODS AND PROCEDURES

The basic methods and procedures which were used in this investigation are discussed in this chapter. Due to the pragmatic nature of this study, there was no instrument available at this time to evaluate courses offered in athletic training curriculums. A check list was developed by the writer in order to determine the subject areas presently being covered in introductory athletic training courses. However, the major efforts of the study involved developing competency-based objectives for introductory athletic training courses. Since this was one of the first attempts in this area, the writer had to rely a great deal on the NATA's Professional Preparation Committee's recommendations.

DETERMINATION OF THE CONTENT OF INTRODUCTORY ATHLETIC TRAINING COURSES OFFERED AT N.A.T.A. ACCREDITED COLLEGES AND UNIVERSITIES

The initial part of this study determined what subject areas were being covered in introductory athletic training courses as of the summer of 1974. The writer secured this information in the following manner:

1. The writer developed a check list of subject areas covered in the text Fundamentals of Athletic Training, including a place to respond yes or no to the question: Do you cover the following subject areas in your introductory athletic training courses?
2. A place was provided to list subject areas covered in introductory athletic training courses that are not included in the previously mentioned text book.
3. Mr. Bobby Gunn, President of the National Athletic Trainers Association, provided the writer with the name and address of the supervisor of each N.A.T.A. accredited curriculum.
4. The writer sent this check list with an explanatory letter to each curriculum supervisor.
5. Each curriculum supervisor was asked to have the check list answered by a person familiar with the introductory athletic training course at his university.
6. Each curriculum supervisor was asked to use his discretion in choosing the person to complete the check list; returning it to the writer in early August of 1974.
7. Schools not responding by August 15, 1974, were sent one follow-up letter.

8. Schools not responding by August 30, 1974, were not included in this study.

RECORDING THE RESULTS OF THE SURVEY

The writer tallied the results of the survey, without making any conclusions or recommendations. The information was collected for referral in the following manner:

1. The results of the survey were tallied according to subject area.
2. Any subject covered at any NATA accredited university was tallied.
3. Only the percentage of curricula including each subject area was calculated.
4. After reviewing all returned check lists, a master list of subject areas covered in NATA accredited introductory courses was compiled by the writer.

EVALUATION OF THE SUBJECT AREAS

The writer did not attempt to evaluate the subject areas. Members of the Professional Preparation Committee of the National Athletic Trainers Association performed this function. The members of the committee were:

Chairman Bud Miller of the University of Washington,

Gary Delforge from district 7 of the University of Arizona,

Tom Diehm from district 7 of the University of New Mexico,

Paul Zeek from district 6 of Lamar Technological University,

Mel Blickenstaff from district 4 of Indiana State University,

Ron Sendre from district 4 of Ball State University,

Al Proctor from district 3 of the North Carolina Sports Medicine Division,

Phil Donley from district 2 of West Chester State College,

Kerkor Kassabian from district 1 of Northeastern University,

Leroy Mullins from district 9 of the University of Tennessee.¹

This committee was given a copy of the master list of subject areas covered in NATA accredited introductory courses. The committee reached a consensus as to which subject areas should be included in introductory athletic training courses. If for any reason a consensus had not been reached, Mr. Bud Miller, the committee chairman, would have been asked to make the final decision. Mr. Miller supplied the writer with a list of the subject areas his

¹Sayers Miller, Athletic Trainer, University of Washington, Seattle, Washington. Personal Communication, April 1, 1974.

committee deemed appropriate for introductory courses in athletic training.

PREPARING COMPETENCY-BASED OBJECTIVES

After the recommended subject areas were determined, competency-based objectives were suggested by the writer for each subject area.

The competency-based objectives were presented in the "Module Format" developed by P. D. Gallagher. Under this format, each subject area was presented as a "module". The competencies suggested for each subject area were broken down into "tasks" and "enablers". The required tasks were the competencies to be demonstrated by the student, whereas the enablers were exercises which prepared the student to successfully perform the task.²

The objectives for the introductory athletic training course were stated in competency-based terms that met the criteria recommended by Gallagher. Competency objectives were developed by the writer for each module that was to be included in the introductory athletic training course.

The writer made an intensive review of three texts which were concerned with many of the skills covered in

²Paul D. Gallagher, "Module Format and the Instructional Process," Performance-Based Teacher Education, II (November, 1973), 3.

introductory athletic training courses on the collegiate level. These texts were: Complete Guide to the Prevention and Treatment of Athletic Injuries by B. J. Brown, Modern Principles of Athletic Training by Carl E. Klafs and Daniel D. Arnheim, and Fundamentals of Athletic Training which was prepared by a joint committee.

These texts were chosen because they have been recommended by the NATA's Professional Education Committee for introductory athletic training courses. These texts lend themselves to developing the practical skills required by athletic trainers. The backgrounds of the authors included both athletic training experience as well as teaching experience.

Dr. Brown is a former athletic trainer at Southern Illinois University and the University of Kentucky. He was Head Basketball Trainer at the University of Kentucky from 1962-1965. While at Kentucky, Dr. Brown also taught Kinesiology and Medical Aspects of Sports in the Department of Health, Physical Education and Recreation. Dr. Brown is presently graduate research coordinator at Virginia Polytechnic Institute.

Dr. Klafs and Dr. Arnheim are both at California State University at Long Beach. Dr. Klafs is a professor in the physical education department and teaches courses related to the general field of sports medicine. Dr.

Arnheim is the former head trainer at Long Beach in addition to being a professor of physical education. He was one of the first athletic trainer-educators to receive a doctorate in physical education. Dr. Arnheim is now director of the NATA approved curriculum at California State at Long Beach.

The book entitled Fundamentals of Athletic Training is the first textbook to have an equal amount of input from the three professions of medicine, athletic training, and physical education. The book is a joint project of the National Athletic Trainers Association, the Athletic Institute, and the Medical Aspects of Sports Committee of the American Medical Association. Physicians that contributed to the book include: Dr. C. M. Pierce of Harvard University, Dr. F. L. Behling of Stanford University, Dr. J. E. Hain of Clemson University, and Dr. J. A. Nicholas of the New York Jets.

Educators that contributed to this book include: Dr. F. B. Jones of Sacramento State College, Dr. K. S. Clarke of Mankato State College, Dr. B. C. Ogilvie of San Jose State College, and Mr. Robert Oswald of the American National Red Cross.

Many Certified Athletic Trainers made significant contributions to this book, including: James Conboy of the Air Force Academy, George Sullivan of the University of Nebraska, David Wike of the University of Miami, Charles

Medlar of Pennsylvania State University, and Larry Gardner of the Miami Dolphins.

The interrelated concepts of this book dealing with education, training, and medicine, make this book worthy of consideration for introductory athletic training education courses.

The skills that are emphasized in these texts were incorporated into the competency-based objectives for the modules covering the subject areas recommended for introductory athletic training courses by the NATA's Professional Education Committee. The competency-based objectives were developed by the writer, with the advise and consent of members of the NATA's Professional Education Committee and members of the Dade County Medical Association's Committee on the Medical Aspects of Sports. This study was one of the first attempts at establishing competency-based objectives for introductory athletic training courses.³ Therefore, the writer relied to a great extent upon personal communications with others involved in teaching introductory athletic training courses.

After competency-based objectives had been established for the recommended subject areas, they were

³Gary Delforge, Curriculum Coordinator, University of Arizona, Tucson, Arizona. Personal Communication, January 25, 1974.

used for a one quarter introductory course in athletic training. The writer received permission to use these objectives on thirty-two students at Florida International University.

STATISTICAL ANALYSIS

An item analysis was done on the competency-based objectives following the completion of the quarter. The percentage of students successfully completing each task and the ability of the task to differentiate between the pupils that did well on the total number of tasks and those pupils that did poorly on the total number of tasks was determined. This was accomplished in the following manner. Student performance was observed and recorded throughout the semester. The performance of each student was recorded as pass or fail on each objective used. Florida International University policy required that students be allowed to re-take all evaluation procedures as many times as needed in a one-year period. However, for the purposes of this study, only three attempts were allowed for each task. If a student did not successfully complete the task in three attempts, his performance was recorded as a failure for that particular task.

Critically evaluating course requirements is a challenging task for most teachers. Competency-based

objectives should be evaluated just as conscientiously as course requirements in traditional classes. Espich and Williams recommend using 90/90 criteria for evaluating competency-based tasks.⁴ However, there is not a nationally accepted method for evaluating competency-based objectives at this time.⁵ Because this was the first attempt at establishing competencies for students of athletic training, a 75/75 criteria was considered desirable for this study. This meant that it was desirable that 75 percent of the students taking the course met 75 percent of the competency-based objectives. The writer attempted to construct the competency-based objectives in a manner that would facilitate meeting this criteria. However, it had been suggested that caution should be used in predicting such outcomes in previously untested subject areas.⁶

At the conclusion of the quarter, each competency-based objective was examined by an item analysis. Due to the pragmatic nature of this study, only practical

⁴James E. Espich and Bill Williams, Developing Programmed Instructional Materials (Belmont: Fearon Publishers, 1967), pp. 119-125.

⁵Opinion expressed by Dr. Marshall Gunselman, Director of Learning Resources, Middle Tennessee State University, in a personal interview, Murfreesboro, Tennessee, June 10, 1974.

⁶Opinion expressed by Dr. William Holmes, Assistant Professor of Psychology, Middle Tennessee State University, in a personal interview, Murfreesboro, Tennessee, June 20, 1974.

statistical techniques were used. As Ahmann and Glock have stated:

Since teachers do not have the time, facilities or number of cases often demanded by the more elaborate methods, such methods are of little practical value although widely used in the construction of standardized achievement tests.⁷

The item analysis was used to determine the percentage of pupils successfully completing each task, and the ability of the task to differentiate between the pupils who had done well and those who had done poorly. This was completed by using the formula suggested by Ahmann and Glock.⁸ In this procedure, the number of pupils in the lower third of the group that successfully completed the item was subtracted from the number of pupils in the upper third of the group that successfully completed the item. This remainder was then divided by the number of pupils in each of the two groups. The quotient from this formula then became the index of discriminating power of that particular item.

⁷J. Stanley Ahmann and Marvin D. Glock, Evaluating Pupil Growth, Principles of Tests and Measurements, 3rd ed. (Boston: Allyn and Bacon, 1967), pp. 184-185.

⁸Ibid.

ORGANIZATION OF REMAINDER OF STUDY

The results of this study are reported in the fourth chapter. The fifth chapter contains a summary of the study, in addition to the conclusions and implications drawn from the study by the writer. The appendix is a very significant part of this study. Included in Appendix B is the material prepared by the writer that could be used for future publication. This material included the competency-based objectives, presented as modules, covering the subject area recommended for introductory athletic training courses by the NATA Professional Preparation Committee. Each module began with an explanation of the subject area that serves as an introduction for the student. The competency-based objectives were presented as tasks to be performed by the student. Each task was accompanied by one or more enabler which should assist the student in preparing to successfully complete the task. Instructional resources are included at the end of each module.

Chapter IV

DATA ANALYSES

The initial information needed for this study was the subject areas presently being covered in introductory athletic training courses at colleges and universities approved by the National Athletic Trainers Association. A check list was developed by the writer for the purpose of obtaining this information (see Appendix A). The check list included the subject areas covered in the text, Fundamentals of Athletic Training. The check list was mailed to the supervisor of each N.A.T.A. accredited curriculum.

Twenty of the twenty-three supervisors of accredited programs returned the check list. At least sixty percent of the accredited programs included the subject areas covered in the text (see Table 1). The supervisors were also asked to list the subject areas covered in their introductory courses that were not included on the check list. The areas covered in the courses that were not on the check list were: professional health associations, record keeping, and travel problems. These three areas are included in Table 1.

The master list of subject areas was evaluated by the Professional Preparation Committee of the National Athletic Trainers Association. The following subject areas

Table 1
Subject Areas Covered in Accredited Introductory
Courses in Athletic Training

Subject Area	Number of Schools Including Subject Area	Number of Schools Not Including Subject Area	Percentage of Schools Including Subject Area
Ankle	20	0	1.00
Back and Spine	18	2	.90
Cardiopulmonary Resuscitation	17	3	.85
Contrast	18	2	.90
Cryotherapy	20	0	1.00
Drug Education	12	8	.60
Equipment and Supplies	19	1	.96
Equipment (Protective)	15	5	.75
Elbow	20	0	1.00
Foot	20	0	1.00
Hand and Wrist	20	0	1.00
Head and Face	20	0	1.00
Heat Problems	14	6	.70
Internal Injuries	20	0	1.00
Knee	20	0	1.00
Muscular Problems	20	0	1.00
Neck	19	1	.95

Table 1 (continued)

Subject Area	Number of Schools Including Subject Area	Number of Schools Not Including Subject Area	Percentage of Schools Including Subject Area
Nutrition	14	6	.70
Personnel Relations and Duties	17	3	.85
Physical Conditioning	12	8	.60
Physical Examination	20	0	1.00
Professional Health Associations	4	16	.20
Record Keeping	11	9	.55
Rehabilitation	19	1	.95
Shoulder	20	0	1.00
Skin	20	0	1.00
Therapy and Healing	18	2	.90
Travel Problems	3	17	.15

were deleted from the list by the committee: physical conditioning, professional health associations, record keeping, and travel problems. This left twenty-four subject areas for introductory athletic training courses. Competency-based objectives were developed by the writer for these subject areas (see Appendix B). The writer received permission to use these objectives in an introductory athletic training course from the Dean of Education at Florida International University. Thirty-three competency-based objectives were prepared by the writer. However, Florida International University was closed during six hours of scheduled class time as a result of demonstrations protesting the proposed renewal of diplomatic relations between the United States and Cuba. This prevented the class from completing the final two modules. Therefore, the class of thirty-two students attempted to complete thirty-one competency-based objectives. The performance of each class member is shown in Table 2. Every student's performance on each of the thirty-one competency-based objectives is shown in Appendix D.

Following the quarter, an item analysis was completed on the thirty-one competency-based objectives. This analysis determined the percentage of students successfully completing each task, in addition to the discriminating power of each task (see Table 3).

Table 2
Student Performance

Computer Number	Social Security Number	Number of Tasks Passed	Number of Tasks Failed	Percentage of Tasks Passed
1	106-42-1996	17.0	14.0	0.5483
2	265-11-0166	27.0	4.0	0.8709
3	265-15-3295	25.0	6.0	0.8064
4	346-38-9930	21.0	10.0	0.6774
5	123-40-2606	29.0	2.0	0.9354
6	261-88-7542	31.0	0.0	1.0000
7	266-94-5252	29.0	2.0	0.9354
8	261-15-4973	19.0	12.0	0.6129
9	262-06-9544	19.0	12.0	0.6129
10	267-78-4682	16.0	15.0	0.5161
11	266-98-0740	24.0	7.0	0.7741
12	267-17-2873	28.0	3.0	0.9032
13	147-42-1022	28.0	3.0	0.9032
14	267-58-2965	20.0	11.0	0.6451
15	263-08-2598	17.0	14.0	0.5483
16	266-04-7465	24.0	7.0	0.7741
17	262-11-1965	22.0	9.0	0.7096
18	485-58-0212	31.0	0.0	1.0000
19	263-23-3388	23.0	8.0	0.7419
20	254-82-9924	27.0	4.0	0.8709

Table 2 (continued)

Computer Number	Social Security Number	Number of Tasks Passed	Number of Tasks Failed	Percentage of Tasks Passed
21	263-68-6863	21.0	10.0	0.6774
22	327-52-8036	27.0	4.0	0.8709
23	263-08-4958	16.0	15.0	0.5161
24	263-08-5071	23.0	8.0	0.7419
25	000-00-0326	22.0	9.0	0.7096
26	262-06-8807	26.0	5.0	0.8387
27	265-06-9263	24.0	7.0	0.7741
28	063-44-2195	28.0	3.0	0.9092
29	031-14-1314	30.0	1.0	0.9677
30	080-40-8373	22.0	9.0	0.7096
31	218-48-9859	21.0	10.0	0.6774
32	264-08-4792	25.0	6.0	0.8064

Table 3
Summary of Item Analysis Results

Module Number	Task Number	Discriminating Power	Number of Students Passed	Number of Students Failed	Percentage of Students Passed
1	1	+0.1818	30	2	.9375
1	2	+0.1818	27	5	.8438
2	1	+0.0909	31	1	.9688
2	2	+0.1818	28	4	.8750
3	1	+0.3636	22	10	.6875
4	1	+0.1818	13	19	.4063
5	1	+0.6363	22	10	.6875
6	1	+0.3636	27	5	.8438
7	1	+0.0909	28	4	.8750
8	1	+0.2727	18	14	.5625
9	1	+0.3636	25	7	.7813
9	2	+0.2727	27	5	.8438
10	1	+0.1818	26	6	.8125
10	2	+0.1818	28	4	.8750
11	1	+0.2727	28	4	.8750

Table 3 (continued)

Module Number	Task Number	Discriminating Power	Number of Students Passed	Number of Students Failed	Percentage of Students Passed
11	2	+0.0909	26	6	.8125
11	3	+0.2727	28	4	.8750
12	1	+0.1818	23	9	.7188
12	2	+0.1818	27	5	.8438
13	1	+0.8181	19	13	.5938
14	1	+0.4545	19	13	.5938
15	1	+0.8181	17	15	.5313
15	2	+0.0000	21	11	.6562
16	1	+0.4545	17	15	.5313
17	1	+0.2727	28	4	.8750
18	1	+0.6363	19	13	.5938
19	1	+0.1818	29	3	.9063
20	1	+0.2727	25	7	.7813
21	1	+0.0909	31	1	.9688
22	1	+0.5454	30	2	.9375
22	2	+0.3636	23	9	.7188

The discriminating power of each task was calculated by using the methods suggested by Ahmann and Glock.¹ They refer to the discriminating power of an item as the difference between the number of correct and incorrect discriminations expressed as a percentage of the maximum possible correct discriminations. As they describe in their text:

The rationale behind the scheme for computing an index of item discriminating power is quite simple. A test item with maximum discriminating power would be one which every pupil in the upper group would answer correctly and every pupil in the lower group would answer incorrectly; in short, it can discriminate between every pupil in the upper group and every pupil in the lower group.²

The maximum size of a discriminating power would be +1.0000, while the minimum size would be -1.0000. A negative discriminating power would indicate that the item discriminates in an undesired direction. Positive discriminating powers indicate that the item discriminates in the desired direction.

Thirty of the thirty-one competency-based tasks were found to have positive discriminating powers. The

¹J. Stanley Ahmann and Marvin D. Glock, Evaluating Pupil Growth: Principles of Tests and Measurements, 3rd ed. (Boston: Allyn & Bacon, 1967), p. 189.

²Ibid., p. 188.

other item's discriminating power was computed to be +0.0000. The item did not discriminate between the upper third of the group and the lower third of the group in either direction.

The 75/75 criteria was not achieved. Only seventeen students, or fifty-five percent of the class, successfully completed seventy-five percent of the tasks. Seventy-five percent of the class (twenty-four students) did successfully complete twenty-one or more tasks.

However, a 70/70 criteria was achieved by seventy percent of the students (twenty-two students) who successfully completed at least seventy percent of the tasks.

Chapter V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

This study was designed to assist physical educators in the organization of new courses and programs in athletic training education at the university level. The purpose of this study was:

1. To determine the content of introductory courses in athletic training at colleges and universities offering curriculums leading to National Athletic Trainers Association certification.
2. To develop competency-based objectives for introductory courses in athletic training.

SUMMARY

Twenty of the twenty-three colleges and universities with athletic training programs, approved by the National Athletic Trainers Association, voluntarily participated in this study. The supervisors of the athletic training education programs completed check lists concerning the subject areas covered in the introductory athletic training course at their schools. The results were tallied by the writer and referred to the Professional Preparation Committee

of the National Athletic Trainers Association. This committee reviewed the subject areas and suggested twenty-four subject areas that should be included in introductory athletic training courses. The writer prepared competency-based objectives covering these twenty-four subject areas. The writer then used these competency-based objectives for a one-quarter course at Florida International University. Thirty-one competency-based objectives were used during the course. Following the quarter, an item analysis was done on each of the objectives. The percentage of students successfully completing each objective was calculated, as was the discriminating power of each competency-based objective. The discriminating power of an item refers to the difference between the number of correct and incorrect discriminations expressed as a percentage of the possible correct discriminations. Discriminating powers can conceivably range from the extremes of a minimum of -1.0000 to a maximum of $+1.0000$. Positive discriminating powers indicate that the item discriminates in the desired directions. In this study, all but one of the items had a positive discriminating power, and that particular item's discriminating power was computed to be $+0.0000$. A 70/70 criteria was achieved as seventy percent of the students successfully completed at least seventy percent of the competency-based objectives, referred to in this study as

"tasks". Certain tasks proved to be both more expensive and time consuming than expected. These occurrences made it necessary to increase the financial allocations for the course, and to schedule additional laboratory sessions for the students to review and practice their newly acquired skills. These two adjustments were most helpful in allowing a large number of students to successfully complete the objectives of the course.

CONCLUSIONS

Based upon the findings of this study, the following conclusions appear warranted:

1. The hypothesis that introductory courses in athletic training are covering different areas of subject matter was proven to be true. No two colleges or universities covered exactly the same subject areas.
2. The hypothesis that the NATA's Professional Preparation Committee would reach an agreement concerning the desired subject matter was proven to be true.
3. The text Fundamentals of Athletic Training includes the subject areas presently being taught in the introductory athletic training courses at the participating schools.

4. Subject areas not covered in the introductory course are sometimes covered in other courses within the school curriculum (Nutrition, Drug Education, Corrective Therapy, etc.).
5. Certain tasks (M1-T2, M2-T2, M9-T1, M11-T1, M15-T2, M22-T2) require supplies that may be too expensive for some colleges.
6. Calculating discriminating powers of competency-based objectives is very helpful in determining the strengths and the weaknesses of the items a teacher desires as exit-competencies for a particular class.
7. Discriminating powers calculated to be 0.00 indicate the item has no power to distinguish between the students who performed well and the students who performed poorly.
8. Positive discriminating powers indicate the item discriminates in the desired direction to some degree.
9. Negative discriminating powers indicate the item discriminates in the wrong direction to some degree.
10. The amount of practice the students receive with non-reusable supplies is determined by the amount of money appropriated for the course.

11. Certain tasks (M2-T1, M20-T1) require more than one class period to complete. Pre-planning and conscientious budgeting of time are essential in order to meet the objectives of the course.
12. An adequate Sports Medicine Library is needed to complete certain tasks.
13. Various pieces of large equipment (stretchers, body splints, crutches, etc.) are needed for certain tasks (M2-T1, M13-T1, M15-T1, M17-T1, M22-T1). Course planning is essential in order to have the needed equipment available.

IMPLICATIONS

Several factors were identified in this study that may have overtones for the new specialization of athletic training education. As a result of this study, the following implications are submitted:

1. The athletic trainer should be aware of a wide variety of information which spans many disciplines. In order to cover the recommended material, the introductory course in athletic training should meet at least three hours a week.
2. Athletic training educators are eager to improve their programs and make greater contributions to their colleges and universities. Better

communication between Departments of Athletics, Student Health Services, Departments of Health, Physical Education, and Recreation, and Allied Health Professions would be advantageous to everyone concerned.

3. Lack of communication among athletic trainers has been a problem in the past. The Education Committee of the NATA can be of great help in overcoming this problem.
4. Athletic training skills lend themselves to competency-based objectives. Competency-based course guides could be beneficial to the students and teachers in each of the required courses.
5. Athletic training education is still in its infancy. Additional research and projects similar to this study should be encouraged.
6. Due to the increasing costs of some of the supplies needed for certain tasks, financial responsibilities should be agreed upon before a course begins.
7. Due to the amount of time required to complete certain tasks, laboratory sessions for smaller numbers of students would be beneficial.

8. Proper planning with local health agencies, such as the American Red Cross, could help secure additional pieces of heavy equipment which are needed for certain tasks.
9. Colleges offering the introductory course in athletic training should subscribe to one or more journals from the following areas: (a) Adapted Physical Education, (b) Athletic Training, (c) Corrective Therapy, (d) Drug Education, (e) Exercise Physiology, (f) Physical Therapy, (g) Medical Emergencies, and (h) Sports Medicine.

APPENDICES

APPENDIX A

CHECK LIST FOR INTRODUCTORY COURSES

IN ATHLETIC TRAINING

**Check List for Introductory Courses
in Athletic Training**

Name of College of University _____

Number of sections offered per year _____

How many students are allowed in the course? _____

What are the prerequisites? _____

Do you cover the following subject areas in your
introductory athletic training courses?

	Yes	No
1. Ankle	_____	_____
2. Back and Spine	_____	_____
3. Resuscitation	_____	_____
4. Contrast	_____	_____
5. Cryotherapy	_____	_____
6. Drug Education	_____	_____
7. Equipment and Supplies	_____	_____
8. Protective Equipment	_____	_____
9. Elbow	_____	_____
10. Foot	_____	_____
11. Hand and Wrist	_____	_____
12. Head and Face	_____	_____
13. Heat Problems	_____	_____
14. Internal Injuries	_____	_____
15. Knee	_____	_____

	Yes	No
16. Muscular Problems	_____	_____
17. Neck	_____	_____
18. Nutrition	_____	_____
19. Duties and Personnel Relations	_____	_____
20. Physical Conditioning	_____	_____
21. Physical Examination	_____	_____
22. Rehabilitation	_____	_____
23. Shoulder	_____	_____
24. Skin	_____	_____
25. Therapy and Healing	_____	_____
26. What other subject areas are covered in your introductory courses?		
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

APPENDIX B

**COMPETENCY-BASED OBJECTIVES FOR INTRODUCTORY
COURSES IN ATHLETIC TRAINING**

Competency-Based Objectives for Introductory
Courses in Athletic Training

Module 1

Ankle

Introduction

A troublesome body part for most athletic participants is the ankle. The ankle is a hinge joint (ginglymus) consisting of the articulating surfaces of the tibia, fibula, and talus. The area commonly referred to as the "ankle bone" is actually the lower ends of the tibia and/or fibula. The lower end of the tibia is called the medial malleolus, while the lower end of the fibula is called the lateral malleolus. On the average individual, the lateral malleolus is located posterior to, and approximately $\frac{1}{2}$ inch lower than the medial malleolus. The talus is the weight-bearing bone of the ankle joint. It is a large bone that restricts the ankle's movements to dorsal flexion and plantar flexion.

Fortunately, the ankle is structurally strong due to the bone arrangement and the support of the joining ligaments. The medial aspects of the ankle is stronger structurally because of the bone arrangement and a strong

single deltoid ligament.¹ The deltoid ligament has three sections and is attached to the medial malleolus and the talus and calcaneus. The major lateral ligaments are the anterior tibiofibular, anterior talofibular, lateral talocalcaneal, and calcaneofibular ligaments.

The weakest aspect of the ankle joint is its musculature. This is because the muscle tendons that cross on all sides of the ankle afford a maximum of muscle leverage but a minimum of stabilization. The major muscles of the ankle joint are the extensor hallucis longus and extensor digitorum longus on the anterior aspect; the posterior tibialis, flexor hallucis longus, anterior tibialis, and flexor digitorum longus on the medial aspect; the peroneus longus and peroneus brevis on the lateral aspect; and the gastrocnemius and soleus on the posterior aspect. It is important to remember that the muscles of the medial aspect of the ankle also support the medial longitudinal arch.²

The major arteries supplying the ankle are the anterior tibial and peroneal arteries. The major nerves are the deep peroneal and tibial nerves.

¹B. J. Brown, Complete Guide to Prevention and Treatment of Athletic Injuries (West Nyack: Parker Publishing Company, 1972), pp. 56-58.

²C. E. Klafs and D. D. Arnheim, Modern Principles of Athletic Training (St. Louis: C. V. Mosby, 1969), pp. 268-78.

Goal

The goal of this module is to introduce the athletic training student to the skills required for properly managing ankle injuries.

Task 1

Demonstrate a proper technique of (1) controlling hemorrhaging and (2) splinting and transporting an athlete with a severe ankle sprain or possible Pott's fracture. This process must be completed in four minutes.

Enabler 1

Prepare a drawing of the ankle labeling the four significant bones, five significant ligaments, and the major nerve supply.

Enabler 2

Practice using Brown's manual palpation tests for identifying the location of ankle injury damage.

Enabler 3

List in writing five techniques of controlling swelling while transporting the athlete to the training room or physician.

Task 2

Tape a classmate's ankle, utilizing the closed basket-weave strapping technique, in the manner recommended

for a mild sprain of the lateral aspect of the ankle joint, within a period of three minutes and fifteen seconds.

Enabler 1

Briefly explain in writing the significant points concerning the following pre-strapping preparations:

1. ligament identification
2. skin preparation
3. friction padding
4. underwrapping
5. anchoring
6. positioning the athlete.

Enabler 2

Practice applying a 1½ or 2 inch cloth ankle wrap to a classmate's ankle, utilizing the Louisiana heel lock technique.

Enabler 3

After familiarizing yourself with the various ankle strapping techniques, make an appointment with the athletic trainer to observe an afternoon taping period in the athletic training room.

Entry level

Successful completion of the previous module.

Instructional Resources

B. J. Brown, Complete Guide to the Prevention and Treatment of Athletic Injuries (West Nyack: Parker Publishing Co., 1972), pp. 55-60.

J. P. Juvenal, "The Effects of Ankle Taping on Vertical Jumping Ability," The Journal of the NATA, VII (October, 1972), 146-147.

C. E. Klafs and D. D. Arnheim, Modern Principles of Athletic Training (St. Louis: C. V. Mosby, 1969), pp. 243-254.

NATA, Athletic Institute, AMA's Medical Aspects of Sports Committee, Fundamentals of Athletic Training (Chicago: American Medical Association, 1971), pp. 79-82.

Chris Patrick, "Treatment of Sprained Ankles," Journal of the NATA, IV (Winter, 1969), 14-15.

Ken Rawlinson, "General Treatment Rules: Contusions, Strains, Sprains," Scholastic Coach, XXXVIII (September, 1968), 88.

Clyde Stretch, "The Gibney Ankle Strapping--A Brief History," Journal of the NATA, II (Fall, 1967), 16-17.

Module 2

Back and Spine

Introduction

The spine or vertebral column is made up of individual bones called vertebrae. The vertebrae are separated into three divisions. The first division consists of seven cervical vertebrae; the second, twelve thoracic vertebrae; and the third, five lumbar vertebrae. Each vertebrae contains a neural arch, through which the spinal cord passes and several projecting processes that serve as attachments for muscles and ligaments.

The major ligaments that join the vertebral parts consist of the anterior longitudinal, the posterior longitudinal, and the supraspinous. Athletic back problems usually develop from congenital, mechanical, or traumatic causes. Congenital back conditions may go unnoticed until a related injury occurs under the stress of athletic competition. Some rather common congenital conditions are: excessive length of the transverse process of the fifth lumbar vertebrae, incomplete closure of the neural arch, and a typical lumbosacral angles or articular facets. The abnormalities may produce mechanical weaknesses that make the back prone to injury when it is subjected to excessive postural strains. The tall, lanky, ectomorphic athlete is

more susceptible to back injury than is the short and stocky individual.

Lower back problems are often identified by muscle spasm, point tenderness, radiating pain, and restricted movement.³ The more common problems are sciatica and lumbosacral or sacroiliac sprains. Sciatica is an inflammatory condition of the sciatic nerve which produces a pain that follows the nerve pathway posterior to the thigh and to the inside of the leg. The lumbosacral junction is usually considered to have the greatest number of lower back injuries in athletics. Lumbosacral sprains are caused by an irritation of the fifth lumbar nerve. They occur most often to athletes with lordosis, or an anterior curvature of the lumbar spine. The sacroiliac is the junction formed by the ilium and the sacrum. There are many less sacroiliac sprains in athletics because the area is well fortified by ligamentous tissue that allows little motion to take place.

Soft tissue injuries of the back result from acute twists, direct blows, and chronic strains. Athletes may experience considerable pain due to stretching or tearing of the supporting ligamentous tissue and secondary

³Buddy Taylor and M. M. Novich, Training and Conditioning of Athletes (Philadelphia: Lea and Febiger, 1970), pp. 225-226.

involvement of the musculature.⁴ Back contusions rank second to strains and sprains in incidence of athletic back injuries.

Goal

The goal of this module is to acquaint the student with the elementary anatomy of the back so that he may administer first aid for a serious back injury and assist in the rehabilitation of minor back strains.

Task 1

After being informed of the simulated symptoms, move a classmate from a contorted face down position on the ground to a stretcher and prepare the victim to be moved. Lift the stretcher and transport the injured person in a manner approved by the American Red Cross.

Enabler 1

Practice locating and identifying each of the upper twenty-five vertebrae of a classmate.

Enabler 2

Prepare a chart naming each of the 33 vertebrae, listing the major nerves generating from the appropriate

⁴Don H. O'Donoghue, Treatment of Athletic Injuries (Philadelphia: W. B. Saunders Company, 1964), pp. 362-364.

vertebrae and listing symptoms that could develop from damage to each of the four vertebrae areas.

Task 2

Given the needed supplies, strap a classmate's back utilizing the Arnheim lumbosacral strapping technique in a period of three minutes or less.

Enabler 1

Name the strapping technique that would provide the greatest amount of support to each of the following muscles:

- a. external oblique
- b. iliocostalis lumborum
- c. longissimus thoracis
- d. spinalis thoracis
- e. erector spinae

Enabler 2

List and briefly describe three systems of exercise that have been recommended by various persons for rehabilitation of a mild back strain. Make a reference for each of these systems that will enable you to quickly locate the exercise information.

Entry level

Successful completion of previous module.

Instructional Resources

Brown, op. cit., pp. 161-175.

Klafs and Arnheim, op. cit., pp. 310-319.

Buddy Taylor, "Low Back Pain," Journal of the NATA, II (Winter, 1967), 2-3.

F. J. Welk, "Low Back Problems in Athletics," Journal of the NATA, VIII (Marcy, 1973), 16-17.

K. F. Wells, Kinesiology (Philadelphia: W. B. Saunders Co., 1966), p. 191.

Module 3

Resuscitation

Introduction

A respiratory emergency is one in which normal breathing stops or is so reduced that oxygen intake is insufficient to support life. Artificial respiration is a procedure which causes air to flow into and out of a person's lungs when his natural breathing is inadequate or ceases. Artificial respiration may be needed due to anatomical obstructions, mechanical obstructions, or air depletion of oxygen. It should be attempted even though there may be some doubt as to whether or not the heart is beating. Artificial respiration does not help if heart action has stopped because the blood is no longer carrying oxygen from the lungs to the body cells. In an emergency in which the heart has stopped beating, cardiopulmonary resuscitation must also be employed. Cardiopulmonary resuscitation is the combination of artificial respiration and manual artificial circulation. It is obviously recommended for use in cases of cardiac arrest.

The importance of artificial respiration and cardiopulmonary resuscitation cannot be over-emphasized. If breathing has stopped and the heart has not been beating for four minutes, the brain probably has been permanently

damaged.⁵ The victim is rapidly approaching imminent death. The mouth-to-mouth or mouth-to-nose technique is the most practical method for emergency ventilation. Extensive studies have indicated that mouth-to-mouth and mouth-to-nose resuscitation are unequivocally superior to manual techniques.

Students of athletic training must be prepared to administer artificial respiration as rapidly as possible. The average person can die in six minutes or less if his oxygen supply is cut off. Though it is very difficult to determine exactly when a person stops breathing, you must assume there is a chance for revival. You, as an athletic trainer, should not attempt to determine a point of no return. That responsibility lies with an attending physician.

Cardiopulmonary resuscitation is concerned with four phases: (a) airway opening, (b) breathing restoration, (c) circulation restoration, and (d) definitive therapy. Airway opening and breathing restoration is accomplished by mouth-to-mouth or mouth-to-nose resuscitation. The rescuer breathes directly into the victim's mouth once every five seconds for an adult, and once every three seconds for a child. Therefore, the breathing ratio is twelve breaths per minute for an adult victim and twenty breaths per minute for a child victim. Circulation is restored by external

⁵John P. Curran, Primer of Sports Injuries (Springfield: Charles C. Thomas, 1968), pp. 60-66.

compression. External cardiac compression consists of the application of rhythmic pressure over the lower half of the sternum. This pressure is to be applied approximately once per second and must always be accompanied by artificial ventilation.⁶

Goal

The goal of this module is to cause the student to develop basic cardiopulmonary resuscitation skills.

Task 1

Administer cardiopulmonary resuscitation to a manikin for a period of two minutes utilizing both the ventilation and circulation technique recommended for one rescuer.

Enabler 1

Briefly explain and document one theory that explains the practice of substituting expired carbon dioxide for oxygen.

Enabler 2

List five adaptations that must be made in administering cardiopulmonary resuscitation to a fully clothed football player.

⁶NATA, Athletic Institute, AMA, Fundamentals of Athletic Training (Chicago: American Medical Association, 1971), pp. 113-114.

Enabler 3

List the advantages and disadvantages of using an oral screw in cardiopulmonary resuscitation.

Entry level

Successful completion of the previous module.

Instructional Resources

American Heart Association, Cardiopulmonary Resuscitation (New York: American Heart Association, 1969).

Louis Abelson, "Respiratory Aids for Respiratory Injuries During Sports Contests," Journal of the NATA, III (Winter, 1968), 12-13.

American National Red Cross, Standard First Aid and Personal Safety (Garden City: Doubleday and Co., 1973), 66-90.

Brown, op. cit., pp. 101-104.

Klafs and Arnheim, op. cit., pp. 217-219.

Module 4

Contrast Application

Introduction

Contrast treatment is the alternate application of heat and cold modalities. The effects of alternate contraction and relaxation of blood vessels help relieve pain and muscle stiffness due to trauma. They increase one's tolerance to cold, and vessels in the treated area tend to respond more efficiently to environmental temperature changes.

The usual method of treatment involves filling two containers with water. The temperature in one container should be 100 to 110° F. The other container is filled with cold tap water which is usually 50 to 65° F. The athlete submerges the injured body part in the two containers alternately, spending three to four minutes in the warm water and one to two minutes in the cold water. A three to one ratio is used for most athletic injuries. The alternations may include three to five immersions in the hot and should finish in the cold water. A timer should be used to keep track of the intervals.

Contrast therapy is a simple yet effective treatment technique and has the added advantage of being an inexpensive

procedure.⁷ Galvanized steel or plastic garbage cans are very good containers for the cold water, while a whirlpool offers an easy method of regulating the warm water. A floating thermometer should be used to monitor the water so that it can be corrected as necessary.

Goal

The goal of this module is to cause the student to understand the rationale of contrast therapy in treating athletic injuries.

Task 1

Prepare a one-page hand out concerning the advantages of contrast therapy to be given to your local high school coaching association.

Enabler 1

List the five most significant effects of cold application and the five most significant effects of heat application.

Enabler 2

List the contraindications of heat and cold applications.

⁷NATA, Athletic Institute, AMA., op. cit., pp. 59-60.

Entry level

Successful completion of the previous module.

Instructional Resources

American Red Cross, op. cit., pp. 160-169.

T. J. Barboza, "The Contrast Bath for Problem Injuries," Scholastic Coach, XLI (February, 1972), 58.

NATA, Athletic Institute, AMA., op. cit., p. 59.

Module 5

Cryotherapy

Introduction

Cryotherapy refers to the various therapeutic techniques involving the use of ice or other cold modalities. It has been mentioned in medical reports for many centuries.

There has been greater emphasis placed on cryotherapy in recent years as a possible adjunct to the treatment of neuromuscular injuries. Cryotherapy is now used for many reasons other than simply minimizing swelling following traumatic injury. Several trainers now use cryotherapy exclusively in treating muscle strains and ankle sprains.

An important effect of ice is to break up the pain reflex cycle. This is accomplished by reducing the spasticity of a muscle when it is injured. Ice breaks the spastic contraction through a reduction of the nervous reflex activity and its other effects on living tissues.

According to Bing and Clark, ice naturally increases muscle temperature during the first three or four minutes of cooling. At five minutes, there is a gradual return to pre-cooling temperatures. After ten minutes of ice application, there is a marked drop off in muscle temperature. This results in a vasoconstriction.

Another advantage of ice is that it has a numbing sensation. Through ice application, sensory nerve endings are made to respond or transmit less. When this occurs, the athlete is temporarily relieved of injury related pain.⁸

Techniques of cryotherapy include immersion, ice massage, and ice packs. Immersion is particularly advantageous for treating extremity injuries. Ankle sprains are frequently treated in this manner. Ankles are immersed in ice water to at least mid-calf depth for a period of 10-20 minutes. This may be accomplished by using a cold tank, a whirlpool, or smaller container. Ice massage is a popular form of treatment for flatter areas of the body. This technique is recommended for treatment of the low back, shoulder, quadriceps, and hamstring areas. Ice massage is usually more localized and not as uniform in its cooling so that the treatment time recommended is 30 minutes. Ice packs may be made by putting small pieces of ice in a towel, an English ice bag, or a small plastic bag. A hydrocollator unit provides a consistent supply of cold packs which serve similar purposes to ice packs. The ice pack and/or cold pack should be continually shifted in order to prevent any possibility of frostbite. Ice packs and cold packs are usually used for 30-minute periods with consistent checks of the injured area being treated.

⁸Klafs and Arnheim, op. cit., pp. 176-177.

The advantages of cryotherapy are particularly advantageous in athletic therapy. Cryotherapy is often the quickest method of preparing an athlete to return to activity. Initial application prevents swelling, which otherwise may complicate the rehabilitation process. After capillary bleeding has stopped, cryotherapy can break the pain reflex cycle in addition to relieving the level of pain. These factors allow the athlete to exercise the injured body part as soon as possible.⁹ This general exercise in turn speeds circulation and removes waste products more efficiently than any other available modality. Exercise is still the best treatment modality for athletic injuries. Cryotherapy appears to be the best treatment technique for rehabilitating athletic injuries to the point that active exercise can be employed.

Goal

The goal of this module is to allow the student to develop an appreciation and understanding of cryotherapy as a practical treatment procedure for athletic injuries.

Task 1

Given simulated symptoms for an injury in the post-capillary bleeding stage, apply the most effective

⁹Taylor and Novich, op. cit., p. 140.

technique of cryotherapy to a classmate for the purpose of beginning active exercise progressions. Administer a fifteen-minute cryotherapy treatment.

Enabler 1

Briefly describe a form of cryotherapy that accomplishes similar purposes to the following:

- a. elastic ankle wrap
- b. hamstring massage
- c. analgesic balm
- d. whirlpool

Enabler 2

Briefly outline the cryotherapy techniques to be used for the first ten days in the treatment of the most common injury in your favorite sport.

Entry level

Successful completion of the previous module.

Instructional Resources

Robert Behnke, "Cryotherapy and Vasodilation," Journal of the NATA, VIII (September, 1973), 106-107.

Joe Brown and B. Johnson, "The Use of Instant Ice for Prevention of Blisters on the Hands," Journal of the Association for Physical and Mental Rehabilitation, XX (July-August, 1966), p. 132-133.

Donald Chu and C. J. Lutt, "The Rationale of Ice Therapy," Journal of the NATA, IV (Winter, 1969), 8.

Klafs and Arnheim, op. cit., p. 173.

Jane E. Olson and V. D. Stravino, "A Review of Cryotherapy," Physical Therapy: Journal of the APTA, LII (August, 1972), 2.

Module 6

Drug Education

Introduction

One of the most difficult problems that can face an athletic trainer is knowing how to respond effectively to an athlete who is curious about drugs. The trainer should be prepared to handle this situation effectively, for in all probability, he will be asked many questions. Student-athletes are experimenting more and more with drugs, as are non-athletes. We are presently living in a drug-oriented society and it must be realized that drug abuse has invaded the athletic world.

There are several ways of classifying drugs. The broad headings of depressants, hallucinogens, stimulants, and vapors include the majority of commonly abused drugs.¹⁰ The athletic trainer should have a basic understanding of these categories.

Depressants are drugs which sedate the individual by acting on the central nervous system. Medically, they are used to treat anxiety, high blood pressure, and tension. When abused, depressants may cause drowsiness and decrease imagination, judgment, and self-control. They may also

¹⁰Brown, op. cit., pp. 224-228.

cause a loss of a sense of time and space, a confused state of mind, a feeling of well-being, depression, and irritability. Common depressants include barbiturates and narcotics. Barbiturates are chemical compounds which induce sleep, sedate, or induce a hypnotic state. Narcotics are derived from opium, and their function is to induce sleep or a stupor for the purpose of relieving pain. Both barbiturates and narcotics are habit forming.

Hallucinogens are drugs which produce sensations of a distortion of time, space, sound, and color by affecting the central nervous system. They may be in tablet, capsule, or leaf form; but they are most commonly found in liquid form. Commonly abused hallucinogens include lysergic acid diethylamide tartrate (LSD), marijuana, and STP.

Stimulants act on the central system to produce excitation, alertness, and wakefulness. Medically, they are used to treat mild depressive states, overweight, and narcolepsy (excessive desire to sleep). Stimulants are obtainable in capsule, tablet, or liquid form. General signs of stimulant abuse are excessive activity, irritability, and nervousness. Some of the more often abused stimulants are the amphetamines: benzedrine, dexedrine, and methedrine.

Vapor abuse is the deliberate inhalation of a solvent for the express purpose of getting high. Common vapors which are abused include glue, ether, chloroform,

gasoline, lighter fluid, refrigerants, carbon tetrachloride, paint thinner, shellac, and kerosene. Vapor abuse among athletes may be identified early by continuous inflammation of the membranes around the mouth and nose and excessive nasal secretions.¹¹

Goal

The goal of this module is to cause the student to realize there is a drug abuse problem in athletics and that the athletic trainer can play a significant role in minimizing such problems.

Task 1

Properly identify a pill by using the Physicians Desk Reference in a period of three minutes or less.

Enabler 1

List five drugs commonly used by physicians in treating athletic injuries. Explain the purpose of each of these drugs and their contraindications and side effects.

Enabler 2

List five drugs that trainers and/or coaches have been accused of misusing in recent periodicals and newspapers. Document these accusations.

¹¹NATA, Athletic Institute, AMA., op. cit., pp. 50-52.

Enabler 3

Bring three sample drugs from your home medicine chest and practice identifying them properly in recommended reference materials.

Entry level

Successful completion of the previous module.

Instructional Resources

Dennis R. Burke, "Ergogenic Aids and Athletes," Journal of the NATA, V (Summer, 1970), 12.

Gary Carlton, "Heat and Antihistamines," Journal of the NATA, IV (Fall, 1969), 19.

Medical Economics Company, Physician's Desk Reference (Oradell: Medical Economics Company, 1974).

NATA, Athletic Institute, AMA. Fundamentals of Athletic Training (Chicago: American Medical Association, 1971), pp. 50-55.

K. D. Rose, S. Mathana and G. F. Sullivan, "Vitamin B12 in Athletics: A Negative Report," Journal of the NATA, I (Winter, 1966), 3-4.

Module 7

Equipment and Supplies

Introduction

An initial responsibility of the athletic trainer is to set aside a place for the immediate and continued care of athletic injuries. It is generally agreed that the ideal training room is a place specifically set aside for injury care. This area should have good lighting and ventilation, a constant temperature range of 72 to 78 degrees, adequate electrical outlets, and adequate space. There are several different ways of designing athletic training rooms, but they all include a wet room area, a therapy area, and a treatment area. The design of any training room should take into consideration all of the programs that it is intended to serve.

Athletic training equipment acquisition is also the responsibility of the trainer.¹² Ideally, the trainer should determine the equipment he intends to use in the future before arranging his facility. Many pieces of training equipment require special electrical and water supplies that are difficult to add at a later date. The athletic

¹²Charles O. Olson, Prevention of Football Injuries (Philadelphia: Lea and Febiger, 1971), p. 74.

program and financial resources will greatly influence the type of equipment that is practical for a training room. However, each training room needs the following essential pieces of equipment: (1) refrigerator, (2) cold tank, (3) supply cabinet, (4) training table, (5) treatment cabinet, (6) whirlpool, and (7) hydrocollator unit. It would be most difficult to operate without this equipment.

Athletic training supplies are usually distinguished from equipment. Supplies refer to those items that cannot be used continually. This obviously makes up a great percentage of the athletic training budget. Many of the more expensive trainer's supplies, such as adhesive tape, can only be used once.¹³ There are now many companies making athletic training supplies. It is generally recommended to receive bids from at least three companies before ordering supplies. Many items made by different companies are actually very similar. A considerable amount of money can be saved by ordering in large volumes through district or state contracts. However, it is very important to order athletic training supplies that are carried by a dealer in the general vicinity.

¹³Klafs and Arnheim, op. cit., pp. 32-42.

Goal

The goal of this module is to cause the student to compare and contrast the different brands of equipment and supplies available to athletic trainers.

Task 1

Prepare an athletic training budget for a high school of 3,000 students with a well-rounded athletic program.

Enabler 1

Secure a catalogue from at least three companies that specialize in athletic training equipment and supplies.

Enabler 2

Prepare an inventory check list for an athletic training department.

Entry level

Successful completion of the previous module.

Instructional Resources

Bike Sports Division, Athletic Training Equipment and Supplies (Chicago: The Kendall Company, 1974) (309 West Jackson Boulevard).

Cramer Chemical Company, Athletic Training Equipment and Supplies (Gardner: The Cramer Chemical Company, 1974) (Cramer Co., Gardner, Kansas).

J. A. Preston Corporation, Remedial Exercise and Trainers Equipment (New York: J. A. Preston Corporation, 1974) (71 Fifth Avenue, New York, N. Y. 10003).

School Health Supply, Training Equipment (Addison: School Health Supply, 1974) (300 Lombard Road, Addison, Illinois 60101).

Mueller Chemical Company, Supplies for the Sports Therapist (Prairie Sac: Mueller Chemical Company, 1974) (Box 99, Prairie Sac, Wisconsin 53578).

Spenco Corporation, Product Catalog (Waco: Spenco Corporation, 1974) (Box 8113, Waco, Texas 76710).

Module 8

Equipment (Protective)

Introduction

The athletic trainer should be consulted when protective equipment is being selected. The proper selection and fitting of protective equipment is a basic method of injury prevention. This selection cannot be made on the basis of price alone. Protection of the athlete is too essential to gamble with inferior protective equipment. The best available equipment should be purchased. Selection should be limited to a top line of a reputable manufacturer. No student athlete should be subjected to the false sense of security and the jeopardy of serious injury which may result from wearing inferior equipment.

Protective equipment must be fitted carefully to the individual participant. Equipment that cannot be fitted properly by following the manufacturers directions should not be utilized.

Eye protection is of great significance in all sports. If eye glasses are worn, they should be made of shatter resistant material and held in place with an elastic headband. Contact lens must also be made of shatter resistant material. Soft contact lens appear to have great potential for athletic participants.

The types of helmet worn for head protection vary considerably with different sports. Football helmets require construction to absorb high mass and relatively low speed impacts. Sports such as hockey, baseball, and lacrosse require material to withstand low mass and high speed impacts. Injuries in these sports are generally due to impacts from sticks, pucks, or hard balls.

The best head protection in football is offered by shock-absorbing material encased in a rigid hard shell. The helmet must fit properly to be effective. The three basic tests for proper fit are: (1) side to side check, (2) proper crown adjustment, and (3) back press test for continued forehead pressure. Face masks with rigid internal construction and external covering appear to be preferred. To adequately protect from elbow contact with the eyes and jaw, double-bar face masks are recommended.

Shoulder pads are now available that are light, allow maximum range of motion, and still afford protection for the wearer. Linemen, linebackers and fullbacks should use the shoulder pads with low breast and back plates for maximum coverage of chest and back. Offensive backs can use smaller epaulets and cups to ensure maximum range of motion for pass catching and throwing. Defensive backs should use the large epaulets and cups to give protection during tackling.

Mouth protectors are now required in football and recommended for various other sports. There are three basic types of mouth protectors: (1) custom made, (2) mouth formed, and (3) stock type. In nearly all cases the mouth protector is worn over the upper teeth. A dentist's assistance in the fabrication and fitting of mouth protectors is most helpful regardless of the protector being used.

Special pads are also used for the hip, leg, knee, and neck. They, too, must fit properly in order to be effective. The athletic trainer should become aware of all types of protective equipment.

Goal

The goal of this module is to cause the student to realize the importance of protective equipment in injury prevention.

Task 1

Properly fit a classmate with a football helmet and pair of shoulder pads in five minutes.

Enabler 1

List the four most important pieces of protective equipment for football, baseball, lacrosse, and wrestling.

Enabler 2

List the trade name and supplier of three different types of helmets presently being used in intercollegiate football.

Entry level

Successful completion of the previous module.

Instructional Resources

John Baumann, "Football Face Guards: Caution Advised," Journal of the NATA, III (Spring, 1968), 20.

Tom Healion, "Survey on the Use of Mouthguards," Journal of the NATA, V (Summer, 1970), 15.

NATA, Athletic Institute, AMA, op. cit., pp. 62-68.

C. Roy Rylander, "Custom-Made Protective Pads and Heel Cup," Journal of the NATA, VIII (December, 1973), pp. 169, 183.

Module 9

Elbow

Introduction

The elbow consists of the humerus, radius, and ulna bones. The bottom of the humerus forms two articulating condyles. The lateral condyle is called the capitulum while the medial condyle is the trochlea. The rounded capitulum articulates with the radius. The spool-shaped trochlea fits into an articulating groove called the semi-lunar notch. The semi-lunar notch is provided by the ulna, between the olecranon and coronoid processes. Above each condyle is a projection called the epicondyle. Flexion and extension of the joint are permitted by the articulation of the trochlea with the semi-lunar notch of the ulna, and forearm pronation and supination are made possible because the head of the radius rests against the capitulum without any bone limitations.

The major ligament of the elbow joint is the annular ligament, which forms a cuplike structure. The ligament permits the radius to move on its long axis but is restricted from anterior and posterior movement. The joint's other ligaments are the radial and ulna collateral ligaments. The important bursae are the bicipital and olecranon

bursae.¹⁴ The bicipital bursae lie in the anterior aspect of the bicipital tuberosity and cushions the tendon when the forearm is pronated. The olecranon bursae lies between the olecranon process and the skin, forming a liquid cushion.

The muscles of the elbow consist of the flexor and extensor groups. The main flexors are the biceps, brachialis, and coracobrachialis. The major extensor muscles are the triceps and the anconeus muscles. The biceps muscle is actually a two-headed muscle. It is primarily a muscle of the elbow joint and of the proximal radioulnar articulation, but it also acts as the shoulder joint.

The major nerves of the elbow joint are the radial, median, and ulnar nerves. They are relatively close to the skin and can be stimulated easily by a direct fall. The major artery supplying the elbow is the brachial artery.

The elbow is subject to injury in athletic because of its broad range of motion, its weak lateral bone arrangement, and its relative exposure to soft tissue damage in the vicinity of the joint.¹⁵ The more common injuries to the

¹⁴Isoa Hirata, The Doctor and the Athlete (Philadelphia: J. B. Lippincott Company, 1968), pp. 160-162.

¹⁵O'Donoghue, op. cit., pp. 193-195.

elbow are fractures, dislocations, contusions, strains, sprains, and bursitis.

Goal

The goal of this module is to cause the student to develop skill in managing elbow injuries.

Task 1

In four minutes, tape a classmate's elbow for a hyperextension sprain using 1½ or 2 inch adhesive tape and 3 inch elastic tape.

Enabler 1

Practice wrapping the elbow joint with an elastic bandage using the "figure of eight" technique.

Enabler 2

Apply a doughnut protective pad to protect an olecranon contusion from further irritation.

Task 2

Administer the recommended first aid for Volkman's paralysis in five minutes or less. The joint must be completely immobilized.

Enabler 1

Recommend a strengthening exercise for the following muscles:

- a. brachialis
- b. coracobrachialis
- c. triceps
- d. anconeus

Enabler 2

Practice applying a cravat bandage to a classmate's elbow.

Entry level

Successful completion of previous module.

Instructional Resources

Brown, op. cit., pp. 75-88.

Klafs and Arnheim, op. cit., pp. 359-366.

NATA, Athletic Institute, AMA, op. cit., pp. 74-75.

Module 10

Foot

Introduction

The foot is designed for strength, flexibility, and coordinated movement. It consists of 36 bones: 14 phalangeal, 5 metatarsal, and 17 tarsal. The tarsal bones form the instep and consist of the talus, calcaneus, navicular, and three cuneiform bones. The navicular, cuboid, and cuneiform bones glide upon each other in a combined movement that permits rotation, inversion, and eversion of the foot.

The metatarsals consist of five long bones that lie between the tarsal bones and the phalanges. There is little movement of the metatarsals. The ligamentous arrangement of the metatarsals gives the foot elasticity for weight bearing. The first metatarsal is the largest and strongest of all the metatarsals and functions as the main body support during walking and running.

The phalanges are somewhat similar to the fingers but are much shorter. The phalanges are designed to give a wider base both for balance and for gripping the ground when propelling the body forward.

There are also two sesamoid bones located beneath the first metatarsophalangeal joint. They are very valuable

to the functioning of the foot. The sesamoid bones assist in reducing pressure in weight bearing, alleviate friction, and act as sliding pulleys for tendons.

The foot is structured to form four arches: the inner longitudinal arch, the anterior metatarsal arch, the outer longitudinal arch, and the transverse arch.¹⁶ The inner longitudinal arch consists of the calcaneus, talus, navicular, first cuneiform, and first metatarsal. The plantar calcaneonavicular ligament supports this arch. The anterior metatarsal arch is formed by the distal heads of the metatarsals. It stretches from the first to the fifth metatarsal and maintains a semiovoid or cone-shaped appearance. The outer longitudinal arch is formed by the calcaneus, cuboid, and fifth metatarsal bones. It is much lower and less flexible than the inner longitudinal arch. The transverse arch extends across the transverse tarsal bones and forms a half dome. The transverse arch gives protection to soft tissue and increases the foot's mobility.

The movements of the foot are performed by four muscle groups: flexors, abductors, extensors, and adductors. Several of the foot muscles, such as the tibialis posterior, are involved in more than one athletic

¹⁶Hirata, op. cit., pp. 246-258.

injury. Responsible for foot inversion and plantar flexion, the tibialis posterior may be a major factor in shin splints. The muscle originates at the fibula and attaches at the navicular, calcaneus, cuneiforms, and second, third, and fourth metatarsal bones. The tibialis anterior may also be involved. The attachments of these muscles encourage taping the transverse and metatarsal arches in treating skin splints.

Branches of the sciatic nerve supply the foot's nervous system. The tibial nerve supplies the plantar aspect of the foot in addition to the back of the leg. The common peroneal nerve supplies the foot as well as the front of the leg. The sural branch of popliteal nerve, which supplies the lateral margin of the foot, must be considered in all strapping procedures.

The major portion of the blood is supplied to the foot by the anterior and posterior tibial arteries.

The majority of the population experience foot problems at some time in their lives.¹⁷ Athletes obviously place exceptional demands on the feet of participants--far beyond the normal daily requirements. The foot is of major importance in all athletic endeavors.

¹⁷Brown, op. cit., pp. 192-200.

Goal

The goal of this module is to cause the student to develop basic skills in treating foot injuries.

Task 1

Tape a classmate for a longitudinal arch strain, utilizing the figure of eight technique, in four minutes or less.

Enabler 1

Practice locating and padding the metatarsal heads of classmates with varying foot sizes.

Enabler 2

Identify the following arches on a model of a foot:

- a. inner longitudinal arch
- b. anterior metatarsal arch
- c. outer longitudinal arch
- d. transverse arch.

Task 2

Apply a doughnut pad to a classmate's foot, in the manner recommended for a blister of the skin under the first metatarsal head.

Enabler 1

List the basic steps in both the conservative and radical method of blister treatment.

Enabler 2

Briefly describe in writing the three day tape application method of blister treatment.

Entry level

Successful completion of previous module.

Instructional Resources

Brown, op. cit., pp. 192-203.

J. V. Basmajian, Primary Anatomy (Baltimore: Waverly Press, Inc., 1963), p. 340.

Klafs and Arnheim, op. cit., pp. 225-242.

A. G. Edwards, "Blisters: No Problem," Athletic Journal, XLVIII (June, 1968), 16.

M. M. Novich, "Ligamentous Peroneal Nerve Syndrome," Journal of the NATA, I (Winter, 1960), 10.

Module 11

Hand and Wrist

Introduction

The hand is sometimes defined as the area between the wrist and knuckles. However, due to the similarity of injuries, the hand is often thought of as including the fingers and thumb. Therefore, the hand will be used in this module to refer mainly to the metacarpal areas, but will also include the phalanges.

The metacarpal bones consist of five bones that are located between the carpals and the phalanges. They form metacarpophalangeal articulations of a condyloid (oval surface fitting into a reciprocally shaped concave surface) type, that permit flexion, extension, abduction, adduction, and circumduction.¹⁸ Each joint has an articular capsule that is reinforced by collateral and accessory ligaments.

The interphalangeal articulations are hinge joints, permitting only flexion and extension. Their ligamentous support is similar to that of the metacarpophalangeal joints. The carpometacarpal joint of the thumb is classified as a saddle joint because it allows rotation on its long axis.

¹⁸Klafs and Arnheim, op. cit., p. 221.

Hand injuries include abrasions, contusions, cuts, punctures, ruptured blood vessels, and fractures. The fingers and thumb are prone to dislocations and nail problems. Fractures are obviously the most disabling. Fractures of the metacarpals are common in contact sports. They are usually accompanied by pain, deformity, swelling, and abnormal mobility. Fractures of the phalanges are disabling to many athletes. More concern should be given to fractures of the middle and proximal phalanges because of possible involvement with the extensor and flexor tendons.

Fractures, as well as dislocations, usually require an extended time for splinting.¹⁹ For this reason, reconditioning should begin as soon as possible.

The wrist is formed by the union of the radius, ulna, and the four proximal carpal bones. From the radial side, the proximal carpal row consists of the navicular, lunate, triquetrum, and pisiform; while the distal row consists of the greater multangular, lesser multangular, capitate, and hamate bones. The carpal bones articulate with one another as gliding joints. They are stabilized mainly by the anterior, posterior, and connecting interosseous ligaments.

¹⁹O'Donoghue, op. cit., pp. 278-295.

Some of the most common wrist injuries are Colle's fractures. These fractures involve the lower end of the radius and/or ulna. In many cases there is a forward displacement of the radius that causes a visible deformity. Tendons may be torn and the median nerve may be damaged. Of the carpal bones, the navicular bone is by far the most frequently fractured. This fracture is often diagnosed mistakenly as a severe sprain. Without splinting, the navicular may never heal due to a poor blood supply. The lunate bone becomes dislocated more than the other carpal bones. Difficulty in flexing the wrist is a main symptom of a dislocation.

The sprain is the most common injury of the wrist. The posterior and anterior ligaments are usually involved. All athletes having severe sprains should be X-rayed.²⁰ Ice compression and elevation are essential in treating wrist sprains. Hand strengthening exercises should be begun as soon as the pain tolerance permits.

Task 1

Apply, on a classmate's right hand, a demigauntlet bandage that holds a gauze pad in place (on the back of the hand) in a period of three minutes or less.

²⁰Klafs and Arnheim, op. cit., pp. 388-394.

Enabler 1

Practice splinting fingers number 2, 3, 4, and 5 by using a tongue depressor and roller gauze.

Enabler 2

Make a protective pad of foam rubber to fit the metacarpal area of a classmate's hand and secure it with an elastic wrap.

Task 2

Strap a classmate's thumb for a sprain, utilizing the spica technique, in a period of four minutes or less.

Enabler 1

List in writing three ways in which the thumb differs from fingers number 2, 3, 4, and 5 that are significant in evaluating and treating athletic injuries.

Enabler 2

Practice applying (with a two-inch elastic wrap) a protective pad that protects the area from the "snuffbox" to the metacarpal-trapezium juncture.

Task 3

Given simulated symptoms of a wrist sprain, strap a classmate's wrist, using the X technique, in a period of five minutes.

Enabler 1

Prepare a page-sized drawing of the eight carpal bones emphasizing their relationship to each other.

Enabler 2

Practice taping a classmate's wrist for a mild sprain, using a technique that does not restrict the metacarpal bones.

Entry level

Successful completion of the previous module.

Instructional Resources

Brown, op. cit., pp. 209-218.

A. E. Flatt, "Athletic Injuries of the Hand," Journal of the NATA, III (Spring, 1968), pp. 8-9.

Klafs and Arnheim, op. cit., pp. 206-208.

Module 12

Head and Face

Introduction

The head is of tremendous importance in the treatment of athletic injuries, primarily due to the location of the human brain. Although there is considerable protection, the brain is subject to traumatic injury, and a great many of the head injuries incurred in athletics have serious consequences. The need of the brain is vital and critical, and a constant flow of blood must be maintained for its survival.

Most head injuries are actually cerebral concussions. A cerebral concussion is an agitation of the brain by either a direct or an indirect blow. Indirect concussion can come from a fall that jars the vertebral column. In most cases of cerebral concussion there is a short period of unconsciousness. Some feel this brief unconsciousness is due to a brain anoxia that is caused by constriction of the blood vessels.²¹ This is a controversial theory. Cerebral concussions can be classified as first, second, and third degree cerebral concussions. Initially, each concussion

²¹Curran, op. cit., p. 36.

must be considered a potential third degree concussion, which is a serious traumatic injury.

Cerebral hemorrhage may result from any concussion. Venous bleeding may be slow and insidious. However, arterial bleeding may quickly become a life and death situation requiring immediate neurosurgical care.

Facial injuries involve injuries to the jaw, nose, eye, ear, as well as facial skin. Facial injuries are probably exceeded in number only by major joint injuries. The jaw and nose are prone to fractures, though the jaw may be dislocated at the temporomandibular joint. Eye and ear injuries must be treated with the greatest of care, since their well-being is essential for normal daily functions.

Special attention must be given to all skin wounds of the face and scalp. The high vascularity and closeness of the brain of these areas make skin wounds serious problems. Infections in these areas can cause extremely significant problems.

Athletic injuries also occur to the mouth. Relatively common mouth injuries include contusions, lacerations, and abrasions, as well as chips and fractures of teeth.²² Contact injuries due to collisions with other

²²Brown, op. cit., pp. 147-155.

athletes can be very infectious to the other person as well as costly and expensive to the injured athlete.

Goal

The goal of this module is to cause the student to realize the significance and possible seriousness of all head and facial injuries.

Task 1

Check and record the results of the six checks for a contrecoup head injury, in a period of five minutes or less.

Enabler 1

Give the Romberg test to a classmate and record his ability to retain the accepted position.

Enabler 2

List ten possibilities for cerebrally damaging injuries that occur in any two non-contact sports.

Task 2

Close a simulated forehead laceration in a sanitary manner in a period of five minutes.

Enabler 1

List the sanitary measures that should be taken in all breaks of the epidermis covering the head and face.

Enabler 2

Practice applying a bandage to the head, utilizing the Barton technique.

Entry level

Successful completion of the previous module.

Instructional Resources

Brown, op. cit., pp. 147-160.

Klafs and Arnheim, op. cit., pp. 220-230.

A. L. Dickinson, "The Incidence of Graded Cerebral Concussions Sustained by Athletes Participating in Inter-Collegiate Football," Journal of the NATA, II (Summer, 1967), 14-15.

O'Donoghue, op. cit., p. 109.

Michael C. Willie, "Making a Fiberglass Hockey Mask," Journal of the NATA, VIII (March, 1973), 19-26.

Module 13

Heat Problems

Introduction

Problems related to heat and humidity have received a great deal of attention in recent years. Heat stroke has been the cause of thirteen deaths in high school and college football since 1964. Heat stroke is the most serious of all heat problems. Other relatively common problems are heat cramps and heat exhaustion. Heat problems often affect the athlete who has been inactive, or who has worked in an air conditioned environment during the summer months. An athlete who is overweight is especially susceptible to heat problems.

Heat cramps are involuntary contractions of muscles that often affect the abdominal and leg muscles. These cramps are related to an inadequate salt balance brought about as a result of profuse sweating. The cramps are accompanied by severe muscle spasms, pain, and loss of muscular function.²³ Athletes should be encouraged to take additional salt and water during hot weather. It has been estimated that the average athlete needs approximately one-half ounce of additional salt during hot days in order to

²³Klafs and Arnheim, op. cit., p. 409.

off-set heat cramps. This salt requirement can be met by the athlete's liberally salting his food. This is an advisable method of supplementing salt intake because many athletes develop indigestion from taking salt pills shortly before activity. Heat cramps are treated with firm pressure and stretching of the affected muscle. As soon as the spasm has stopped, the athlete should drink water mixed with a small amount of salt or take two or three salt tablets.²⁴ An athlete who has experienced heat cramps should have limited activity for approximately twenty-four hours.

Heat exhaustion or heat prostration is when an excessive depletion of electrolytes and water occurs due to continuous, profuse sweating. Severe dehydration accompanies heat exhaustion along with fatigue, muscle spasms, nausea, pale, moist skin and abdominal pain. It is important to remember that a normal pulse is maintained during heat exhaustion. Heat exhaustion should be treated by placing the athlete in a backlying position in a shaded or cool area. If the athlete is not nauseous, he should be given cold water and salt. The athlete should be closely watched for signs of circulatory failure.

Heat stroke is severe dehydration and overheating, resulting from a breakdown in the sweating mechanism. Heat

²⁴Brown, op. cit., p. 219.

stroke is a critically serious emergency. The high body temperature can quickly result in unconsciousness, hot, dry, flushed skin, high fever, muscle spasms, dizziness, weakness, convulsions, and rapid pulse. Heat stroke usually develops when the athlete does hard physical work in periods of high temperature and high humidity. For this reason, athletes should be gradually acclimated to the environment in which they must participate.²⁵ The fastest way to differentiate heat stroke from heat exhaustion is by observing the skin and checking the pulse. In heat stroke, the athlete's skin will be hot and flushed and his pulse will be rapid. Call for an ambulance immediately and submerge the athlete in cold water or ice.

The best way to prevent heat illness is to check the humidity and temperature regularly with a sling psychrometer. The psychrometer is relatively inexpensive and uncomplicated to use. When the temperature is in the high eighty's and the relative humidity is over seventy percent, athletes should be given a ten minute rest every hour and allowed to drink water and get off their feet. When the temperature is above ninety and the humidity is over seventy percent, a shortened program should be conducted.²⁶

²⁵Taylor and Novich, op. cit., pp. 64-68.

²⁶Robert J. Murphy and William E. Ashe, "Prevention of Heat Illness in Football Players," Journal of the American Medical Association, CXCIV (November 8, 1965), 650-654.

Goal

The goal of this module is to cause the student to develop skill in using the sling psychrometer as a means of preventing heat illness.

Task 1

Given a sling psychrometer, the student will determine the relative humidity and make the appropriate practice recommendations in writing, within a period of five minutes.

Enabler 1

Practice finding the temperature, wet bulb reading, and dry bulb reading, by using the sling psychrometer.

Enabler 2

Prepare a one page handout, to be given to a group of little league coaches, that differentiates between the symptoms and first aid for heat stress, heat cramps, and heat stroke.

Entry level

Successful completion of the previous module.

Instructional Resources

Bobby Barton and Chris Patrick, "Astroturf or Grass as Related to Temperature and Relative Humidity," Journal of the NATA, VII (April, 1972), 7.

Gary D. Penny, "Prevention of Heat Injuries: West Bulb Globe Temperature Psychrometer," Athletic Journal, II (September, 1970), 62-64.

Gary W. Carlton, "Heat and Antihistamines," Journal of the NATA, IV (Fall, 1969), 19-26.

"News Release from the AMA," Journal of the NATA, I (Fall, 1961), 6.

Anderson Spickard, "How to Prevent Heat Stroke in Football Players," Journal of the NATA, III (Fall, 1968), 6-7.

"Sling Psychrometer Instructions," Sling Psychrometer and Hygrorule (Summer, 1970), I. (Mason Supply Company, 2628 Keruper Lane. Cincinnati, Ohio \$16.00).

Module 14

Internal Injuries

Introduction

The possibility of internal injury must always be considered when evaluating an injured athlete. Obvious external symptoms may be accompanied by other symptoms that indicate internal difficulties. Unfortunately, symptoms of internal injuries are often slower to develop and more difficult to evaluate.

The kidneys occasionally are bruised or ruptured, even though they are well protected in the abdominal cavity. They are located in the lower back region near the bottom of the ribs. In a moderate contusion, there may be some blood in the urine as well as pain for several days. The ruptured kidney is a much more serious injury. There will be sharp intense pain in the back, swelling, blood in the urine, muscle spasms, shock, nausea, and/or vomiting. Kidney injury treatment must be under the direct supervision of the physician.

The bladder or urethra may also be ruptured. Indications of a rupture would be pain in lower abdomen, inability to urinate, nausea, shock, blood dripping from the urethra, or bloody urine. Ruptures take place more often when the bladder is full and distended. Therefore,

athletes should be encouraged to empty their bladder before practice or game time.

Spleen injuries frequently do not appear serious at first. However,²⁷ they are complicated and may cause death in a matter of hours. Following blows to the abdominal area, athletes should be checked for tenderness in the upper left corner of the abdomen toward the back. When the spleen is damaged, the athlete may eventually have pain in the left shoulder and upper left arm. The athlete should be transported to a hospital if a spleen injury is suspected.

Athletes participating in contact sports often receive blows to the solar plexus. This produces a temporary paralysis of the diaphragm. When the athlete is unable to breathe, he may become hysterical. The trainer can help relieve this apprehension by simply (confidently) talking to him. The athlete's belt and clothing around his abdomen should be loosened. Relaxation can be encouraged by having the athlete use short inspirations and long expirations. Failure of the athlete to respond to this procedure necessitates mouth-to-mouth resuscitation.

A rather common athletic injury with an indefinite etiology is a "stitch in the side". This is the cramplike pain that affects either side during strenuous activity.

²⁷Brown, op. cit., pp. 175-178.

Some of the related factors are: constipation, poor conditioning, weak abdominal muscles, lack of oxygen in the diaphragm, and ischemia (lack of blood) of either the diaphragm or intercostal muscles. The stitch is initially treated by having the athlete lift his arm above his head in order to stretch the affected side. Flexing the trunk forward on the thighs may also be beneficial. If abdominal pain continues, a physician should be consulted.

Due to their exposed position, the testes are also susceptible to injury. Testes injury can easily occur when an athlete is sharply hit by a helmet or other hard obstacle.²⁸ Initially, the athlete will experience severe pain, faintness, and sometimes loss of breath. The athlete should be encouraged to lay on his back. Then, the trainer should bend his knees towards his chest in a gentle manner. If scrotum swelling or testicular displacement occurs, the athlete should see a physician.

Goal

The goal of this module is to cause the student to realize the significance of symptoms associated with internal injuries.

²⁸Klafs and Arnheim, op. cit., pp. 327-328.

Task 1

Given simulated symptoms of an internal injury, administer the proper first aid immediately to the simulated victim, and plan (in writing) a list of follow-up procedures.

Enabler 1

Briefly explain in writing why it is no longer recommended that an athlete, having difficulty breathing, should be lifted by his belt, in order to facilitate normal breathing.

Enabler 2

Practice fitting a classmate with protective pads that would offer protection to the spleen, kidney, and urethra areas.

Entry level

Successful completion of the previous module.

Instructional Resources

Brown, op. cit., pp. 175-181.

M. P. Cawett, "Proctological Problems in Sports," Journal of the NATA, I (Fall, 1961), 9-10.

R. E. Morgan, "Shock," Journal of the NATA, I (Fall, 1961), 13.

Module 15

Knee

Introduction

The knee has remained a problem in athletics for many years. It has received as much study and intense scrutiny as any body part in sports medicine programs. It is probably the most vulnerable joint in the body in regard to athletic injury.²⁹

The bones of the knee joint are the femur, tibia, patella, and fibula. The knee is actually enclosed in a capsule that is very closely aligned with the ligaments. The major ligaments of the knee are the anterior cruciate, posterior cruciate, medial collateral, and lateral collateral. The cruciate ligaments are the internal ligaments that run in oblique directions. When the anterior cruciate is torn, the tibia can be drawn forward to an abnormal distance from the patella. When the posterior cruciate is torn, rearward displacement is possible. These two ligaments are sometimes difficult to diagnose.³⁰ The medial

²⁹Don H. O'Donoghue, Treatment of Injuries to Athletes (Philadelphia: W. B. Saunders, 1964), p. 431.

³⁰Joseph P. Dolan and L. J. Holladay, Treatment and Prevention of Athletic Injuries, 3rd ed. (Danville: The Interstate Printers, 1967), pp. 150-152.

collateral ligament has many divisions that function as two essential layers. The short fibers run from the femoral condyle to the upper tibial margin. The superficial portion attaches two or three inches below the upper tibial margin. The lateral collateral (fibular collateral) ligament is a strong band going from the fibula to the femoral condyle. This ligament is supported by the illiotibial tract.

The medial and lateral cartilages are sometimes called the knee joint's spacefillers. The medial cartilage is more often injured in athletics than the lateral. The medial cartilage tear is usually a longitudinal tear along the inner surface of the knee. The lateral cartilage is a semilunar cartilage and it is not secure in its rear attachment on the lateral collateral ligament. This probably enhances its safety. The lateral cartilage is mobile.³¹ Generally, when a cartilage is torn, the weight is on that leg, the leg is flexed, and there is some rotation of the femur upon the tibia.

Although there are other problems that occur frequently with the knee, ligament and cartilage damage present the most frequent problems.

³¹Taylor and Novich, op. cit., pp. 152-155.

Goal

The goal of this module is to cause the student to develop the basic skills of managing knee injuries.

Task 1

Given simulated symptoms, make an initial evaluation of a knee joint, utilizing various recommended tests, and apply the indicated first aid in a period of four minutes.

Enabler 1

Briefly describe in writing the basic procedures and positive signs of the collateral ligament tests, drawer sign test, tibial rotation test, Mac Murry's sign, and the patella click.

Enabler 2

Practice performing these tests on a classmate.

Enabler 3

Become familiar with the parts of the knee as indicated on a skeleton and plastic knee model.

Task 2

The student will tape a classmate's right knee, utilizing the basketweave technique, in a period of four minutes.

Enabler 1

Practice the "X" pattern method of wrapping a knee with an elastic wrap.

Enabler 2

Briefly describe in writing the alterations made in knee strapping when cartilage damage is suspected.

Entry level

Successful completion of the previous module.

Instructional Resources

Klafs and Arnheim, op. cit., pp. 260-278.

Karl K. Klein, "Developmental Asymmetry of the Weightbearing Skeleton and Its Implication on Knee Injury," Journal of the NATA, VIII (June, 1973), pp. 68-69.

Karl K. Klein, "A Series of Case Study Reviews of the Non-Effectiveness of Progressive Resistance Exercise for Re-Establishment of Ligament Stability," Journal of the NATA, I (Winter, 1960), 12-13.

O'Donoghue, op. cit., pp. 431-531.

Module 16

Muscular Problems

Introduction

A muscle fibre consists of a tubular sarcolemma within which is a contractile substance that presents a striated appearance. Each fibre is up to 40 mm in length. The diameter varies from .01 to 0.1 mm. The fibre's spindle-shaped ends join with other fibres on the tissues of the muscle origin or insertion. Force is developed when a muscle contracts in the long axis of its fibres. Muscles require both an origin and insertion in order to facilitate movement. A muscle must cross a joint in order to affect the range of motion of a joint or an extremity. Some muscles, such as the gastrocnemius, cross two joints. If a muscle does not cross a particular joint, the muscle has no action at that joint. Two basic types of contractions are isotonic and isometric. In an isotonic contraction, the tension in the muscle remains relatively constant throughout the movement. There is no movement in isometric contractions, therefore, the muscle tension increases without any fibre shortening. The power of a muscle is directly proportional to the number of constituent fibres and to its cross-sectional area.

Injury to a muscle will result in tearing and disruption of the muscle fibres, connective tissue, and vessels.³² The tearing may occur in the belly of the muscle as well as at its origin or insertion. Fortunately, complete rupture of a muscle is uncommon. Usually, athletic injuries are restricted to only a few muscle fibres and their connective tissue. In a herniated muscle, there is a longitudinal split in the muscle sheath which allows the muscle to bulge up through the split. In a mild tear or strain of a muscle, the major damage is done to the blood vessels and other connective tissues. This results in the blood escaping and forming a hematoma. The degree of hemorrhage and hematoma formation is proportional to the vascularity of the muscle.

Muscle tears occur most often in the lower limbs. Muscle damage usually occurs suddenly and the athlete is able to know the exact location of the damage. There is considerable pain at first that turns into a dull ache. The affected muscle is tense and tender and there may be local spasm.

Muscle stiffness is due mainly to increased intramuscular pressure. The athlete complains of gradually

³²J. G. P. Williams, ed., Sports Medicine
(Baltimore: The Williams and Wilkins Company, 1962),
p. 89.

increasing pain and swelling. In moderate cases, he may experience difficulty in moving the affected muscle group.

The goal in treating muscle injuries is to prevent hematoma formation and to promote rapid resolution of any hematoma that does form. This helps get rid of the pain and prevents the formation of excess scar tissue and adhesions.

The key word for the treatment of muscle injuries is "ICE". The I stands for ice, the C stands for compression, and the E stands for elevation.³³ A cold "wet wrap" is an effective device for this procedure.

The muscle cramp is a problem in early season workouts and in excessive heat. The cramp is directly related to the degree of dehydration and salt depletion. First aid treatment involves stretching the muscle and replenishing the fluids and salt lost through perspiration. Salt pills are the most effective when taken at the meal prior to activity. Salt given after the cramp has occurred has a limited effect.

Goal

The goal of this module is to cause the student to become familiar with the basic procedures for muscle injury care.

³³Klafs and Arnheim, op. cit., p. 282.

Task 1

Given simulated symptoms, administer the proper first aid for a suspected muscle injury, in a period of three minutes.

Enabler 1

Practice locating the major muscle groups on the body model.

Enabler 2

Outline the treatment, for a three-day period, following a severe cramp of the gastrocnemius.

Entry level

Successful completion of the previous module.

Instructional Resources

Brown, op. cit., pp. 41-49.

Klafs and Arnheim, op. cit., pp. 243-245.

NATA, Athletic Institute, op. cit., pp. 113-114.

Wesley Knight, "An Ole Miss Aid for Muscle Strain," Journal of the NATA, V (Winter, 1970), 11-12.

Allan Peppard, "Mytonic Muscle Distress: A Rationale for Therapy," Journal of the NATA, VIII (December, 1973), 166-169.

Richard Patton, "Management of Muscle Injury," Journal of the NATA, II (Winter, 1967), 6-7.

Module 17

Neck

Introduction

The neck and cervical area is one of the greatest concerns of team physicians and trainers. This is because injuries to this area are often serious and are sometimes fatal. Through the small cervical area passes an essential part of every functioning body unit. The possibility of skeletal injury and subsequent spinal cord damage is always present. A minor rotary subluxation of an upper cervical vertebrae can lead to quadriplegia or death. Unfortunately, it is sometimes quite difficult to differentiate between a serious injury and a relatively minor muscle strain.

The first step in treating a neck injury is to try to determine the mechanism of the injury. It is helpful to know if the injury was due to hyperflexion, hyperextension, lateral flexion, or hyper-rotation. It must then be determined whether there is sensory or motor damage to either arm or leg. This should be checked before any neck examination is begun. If there is any sign of serious damage, the injury should be treated initially as a broken neck.

Palpation may indicate tenderness or spasm of particular muscle groups. Trapezius and longissimus capitis strains are usually very noticeable. Contusions of various

degrees can usually be identified as localized tender swellings.

The "pinched nerve" or "hot shot" is a rather common football injury.³⁴ The injury is characterized by a sharp, burning pain radiating from a cervical branch to the occipital area or the area behind the ear. The burning sensation may extend into the clavicle and shoulder areas. If the neck was bent laterally away from the affected side, this is the classical pinched nerve. If the symptoms occur on lateral flexion toward the affected side, serious skeletal injury must be anticipated. The athlete should receive some type of neck support immediately, then be transported to a hospital for detailed cervical-spine studies.³⁵ If there is no problem with the four limbs and lateral flexion toward the affected side does not cause pain, place a very small amount of pressure on the top of the head. If this slight axial compression causes radiating pain, serious deep injury must again be suspected. Again, the athlete should receive a neck support and be taken to a hospital immediately.

Various strains and contusions may also occur to the neck region. However, these are of little consequence

³⁴Isao Hirata, The Doctor and the Athlete (Philadelphia: J. B. Lippincott Company, 1968), pp. 123-124.

³⁵Ralph W. Berlin, "Cervical Spine Injuries: Immediate First Aid," Journal of the NATA, IV (Fall, 1969), 13-19.

compared to the ever-present possibility of a skeletal injury. If there is any doubt, a neck injury must be treated as a serious emergency.

Goal

The goal of this module is to cause the student to become capable of moving an injured athlete with a possible broken neck, in a relatively safe manner.

Task 1

Given symptoms of a possible broken neck, move a classmate from a face down position on to a stretcher and move him ten feet in a recommended manner, within a period of six minutes.

Enabler 1

Practice applying a neck brace to a classmate while he is lying on the ground, without moving his neck.

Enabler 2

List in writing the advantages and disadvantages of three different types of stretchers for use in transporting cervical spine victims.

Entry level

Successful completion of the previous module.

Instructional Resources

Berlin, op. cit., pp. 13-19.

Hirata, op. cit., pp. 122-129.

E. D. O'Donnell, "Neck Injuries in Sports," Journal of the NAIA, I (January, 1957), pp. 1-2.

Module 18

Nutrition

Introduction

Nutrition can be defined as the science of food, the nutrients and other substances therein, their action, interaction and balance in relation to health and disease and the process by which the organism ingests, digests, absorbs, transports, utilizes, and excretes food substances. This obviously involves many complex chemical processes. Fortunately, a great deal of diet principles are based upon an input and output plan that, at the same time, provides the body with its needed nutrients. Principles of athletic nutrition include: (1) that adequate protein is needed to permit growth of muscle tissue, (2) that sufficient carbohydrates are needed to provide rapidly available supplies of energy from muscle and liver stores, (3) that fats are needed to help meet caloric needs during sustained activity, (4) that caloric intake must be sufficient to maintain a desirable body weight, and (5) that some allowance can be made for a minimal amount of vitamins and minerals sufficient to promote growth and maintain health. Only a well-balanced diet can provide adequate amounts of protein, carbohydrates, fats, vitamins, and minerals.

Most athletes have a daily caloric intake requirement of 3,000 to 5,000 calories.³⁶ As much as one-third of an athlete's caloric intake can usually come from foods chosen only for caloric purposes. This food is considered an extra as opposed to a first choice food. First choice foods are selected from the four basic categories of milk, meats, fruits and vegetables, as well as breads and cereals. A well-balanced selection should be made within these categories.

The balance between caloric intake and caloric expenditure accounts for true body weight. This is not influenced by daily fluctuations in water content. Weight extremes usually result from a disproportion in the total diet's caloric value related to expenditure of energy over a period of time. More calories are used per day in maintaining basal metabolism than any other one thing. Exercise is the next most significant factor. This is why athletes will always gain weight in their off season if their caloric consumption remains stable. If calories are to be reduced, the athlete still needs to eat a nutritious diet lower in calories.

Special supplements are often used by athletes when they are not needed. It is doubtful that any supplement is needed unless it is recommended by a physician.

³⁶NATA, Athletic Institute, *AMA, op. cit.*, pp. 20-23.

Pre-game meals remain a debatable item. They range anywhere from large steak dinners to small amounts of high caloric liquid. Fortunately, the content of the meal is not nearly as important as many believe. Energy for a particular event comes from the body's energy stores, not from an immediately preceding meal. However, the meal should be eaten four hours before the event. The digestion of food requires a large amount of blood to be in the abdominal area during the three hours following eating. There is simply not enough blood left for strenuous physical activity.

Goal

The goal of this module is to cause the student to realize that in addition to a normally balanced diet, the normally healthy athlete's only needed supplements are calories, salt and water.

Task 1

Given the menu of a contemporary pre-game meal, list (in a five-minute period with one mistake permitted) the advantage and disadvantage of each item included.

Enabler 1

List four commercial pre-game meals with the name and address of their supplier, in addition to the price.

Enabler 2

Classify yourself as to body build and briefly relate it to the quantity and quality of your caloric intake.

Entry level

Successful completion of the previous module.

Instructional Resources

Carl Blyth, "Weight Loss in Wrestling," Journal of the NATA, III (Summer, 1968), 8-9.

Klafs and Arnheim, op. cit., pp. 93-109.

W. D. Paul, "Crash Diets in Wrestling," Journal of the NATA, I (Winter, 1966), 6-7.

W. D. Paul, "Crash Diets in Wrestling," Journal of the NATA, I (Winter, 1966), 6-7.

Module 19

Personnel Relations and Duties

Introduction

The athletic trainer can be a very important part of a complete athletic program. His duties consist of various procedures involved in the prevention, treatment, and rehabilitation of athletic injuries. His skills vary from taking care of cuts and scratches, taping and wrapping, applying cryotherapy, making special injury pads, and rehabilitation of injuries. Although the trainer cannot supervise every team at his school, he should be able to advise coaches and athletes concerning conditioning and diet.

The athletic trainer performs his duties from a very unique position in relation to other athletic personnel. The trainer is in daily contact with athletes from different sports, the team physician, and coaches from various sports. The nature of his job requires that he be able to get along with a wide variety of people. The trainer will also come into regular contact with the athletic director, the physical education staff, the equipment man, the school

nurse, the news media, as well as the administrators of the school or university.³⁷

There is no standard chain-of-command that the athletic trainer must follow. It varies from school to school and is influenced by the level of competition. However, the trainer should always be responsible to the team physician and the athletic director. There are very few schools or universities where this procedure is not followed. There are many variations from this basic plan. Many athletic directors are also coaches of one major sport. In this situation, the athletic trainer is responsible to that individual. At other schools, the coaches of revenue producing sports are allowed to hire a trainer just for their sport. In this situation, the trainer answers directly to the coach who in turn answers to the athletic director. Theoretically, this is a questionable practice. However, the advisability of such an organizational framework depends upon the relationship between the trainer and that particular coach. The downfall of any organizational framework is when the trainer and the team physician lose their authority to make health related decisions. Since they are held responsible for the health care of the

³⁷Buddy Taylor and M. M. Novich, Training and Conditioning of Athletes (Philadelphia: Lea and Febiger, 1970), pp. 16-17.

athletes, they must have the permission to exercise their authority in making important health related decisions. The University of North Carolina is the only university that presently has the trainer answering only to the team physician. The team physician is a full-time employee of the university and he serves as the liason with the athletic department through the athletic director.

More and more athletic trainers are being hired as faculty members teaching a reduced load. In this situation, the athletic trainer is also responsible to the chairman of his department as well as the dean of his school.

Regardless of the organizational framework, the athletic trainer's duties and responsibilities should be well defined in writing. These duties should be explained to other department personnel in order to prevent future conflicts. The organizational framework will influence the detailed duties of the trainer, but they will not allow him to be tactless or antagonistic. The athletic trainer must be able to work congenially with a wide variety of people.³⁸

Goal

The goal of this module is to cause the student to realize the significance of practicing high personal standards

³⁸Fred L. Allman, "What a Trainer Ought to Be," Journal of the NATA, V (Fall, 1970), 3.

in striving to fit into a department's organizational framework in a congenial manner.

Task 1

Given the size, level, and location of an educational institution, make a diagram of the organizational framework of the personnel involved with athletic health care at that institution in a period of twenty minutes.

Enabler 1

Prepare a brief job description for an athletic trainer at an ideal school at the level of your choice.

Enabler 2

List ten characteristics that you feel every athletic trainer should have in order to perform his job effectively.

Entry level

Successful completion of the previous module.

Instructional Resources

Allman, op. cit., pp. 3-5.

Taylor and Novich, op. cit., pp. 15-20.

Jim Bryant, "Contributions of Athletic Trainers to Human Dignity," Journal of the NATA, V (Fall, 1970), pp. 13-14.

Module 20

Physical Examination: The Trainer's Responsibility

Introduction

The basis for sound medical care of an athlete is a pre-season medical examination. Administrators, athletic director, coach, trainer, or doctor cannot assume an athlete is fit just because he came out for a team. To prevent being held legally liable for negligence, a medical examination is mandatory prior to all participation. Coaches should not allow any athlete to try out before he has had a physical examination. Some purposes of the exam are: to eliminate unfit candidates, to screen out silent diseases and congenital abnormalities, to establish a profile, and to demonstrate the school's concern for the candidate's health and welfare.

Each medical examination should include a history of past illnesses and injuries, laboratory and electrodiagnostic tests, and medical, dental, visual, and auditory surveys. Disqualifying conditions can be separated into medical, neurologic, ophthalmologic, and orthopedic reasons. Medical conditions that justify disqualification include uncontrolled diabetes, high blood pressure, heart disease, nephritis (kidney inflammation), tuberculosis, asthma, venereal disease, drug dependency, blood disorders, and

absence of an organ. Neurologic conditions include convulsive disorders, tremors, ataxia, cerebral hemorrhage, labyrinthine (inner ear) problems, and chorea. Ophthalmologic reasons include extreme myopia, or useful vision in only one eye. Orthopedic conditions that justify disqualification include scobiosis, spina bifida, Klippel-Feil syndrome, absence of parts, epiphyseal injuries, osteomyelitis, and painful flat feet.³⁹ A disqualified athlete should have the justification explained to him. If the athlete is a minor, his parents should be informed of the reason for disqualification.

The thoroughness of the physical will be somewhat determined by the financial resources and medical assistance available to the program. It would be ideal for every athlete to have an electrocardiogram. Obviously, the expense makes this impossible in many situations. However, the steps in preparing a physical examination are basically the same in all situations. The basic steps include obtaining the services of a qualified physician, providing an examination area, providing assistance, and keeping complete medical records.

Most sports medicine texts provide a sample physical examination form. Each school should decide upon a standard

³⁹Taylor and Novich, op. cit., pp. 49-58.

form to be used on all athletes. An excellent form was developed relatively recently by Dr. Richard Shaara and Chris Patrick and is presently being used by most southern universities.⁴⁰

Goal

The goal of this module is to show the student the importance of the trainer working with the physician in providing a comprehensive physical examination for each athlete.

Task 1

Given the needed equipment, the student will measure a classmate's blood pressure and vital capacity and record the results in a period of five minutes.

Enabler 1

Practice taking a classmate's pulse rate at the carotid, brachial and radial arteries.

Enabler 2

Briefly explain why vital capacity would be an important parameter to measure in a pre-practice physical examination.

⁴⁰Brown, op. cit., pp. 232-243.

Entry level

Successful completion of the previous module.

Instructional Resources

NATA, Athletic Institute, AMA, op. cit., pp. 4-5.

Russell Lane, "Medical Qualifications for Participants in Interscholastic Athletics in Maine," Journal of the NATA, V (Spring, 1970), 9-10.

R. C. Thurmond, "Secondary School Administrative Problems in Athletic Training," Journal of the NATA, III (Winter, 1968), 6-8.

Module 21

Rehabilitation

Introduction

A very important duty of the athletic trainer is the supervision of rehabilitation programs. After receiving the physician's prescription, the athletic trainer should schedule a standing appointment with the athlete of at least a half an hour's duration. This appointment should be kept on a regular basis until the athlete is ready to resume regular practice.

Reconditioning exercises are the foundation of any rehabilitation program. These exercises are categorized as passive, assistive, active, and resistive. Passive exercise requires no effort on the athlete's part. The injured limb or body part is moved through various ranges of motion by another person or a device. Assistive exercises require a minimal amount of effort from the athlete. The injured limb or body part is moved through various ranges of motion by the athlete with assistance from another person. Assistive exercises do a great deal to increase the athlete's confidence. Active exercises are performed completely by the athlete. No assistance is offered by the athletic trainer. These exercises are of great importance in restoring function to an injured part in a minimal

amount of time. Resistive exercises involve the athlete applying pressure against a resistive force. Resistive exercises include both isometric and isotonic exercises. Following surgery, the athlete should follow each of these four exercise progressions.⁴¹

The trainer will be involved with ankle and knee rehabilitation on a relatively regular basis. These two joints are prone to injury in many sports. The ankle joint is particularly susceptible to injury in basketball. Due to its muscular arrangement, the ankle is not an easy joint to rehabilitate. Muscular strength will not compensate for significant looseness in a ligament. However, muscle strengthening is an important part of rehabilitating a mild or moderate ankle sprain. Some reconditioning exercises for the ankle joint include: plantar flexion and dorsiflexion with and without resistance, heel raises, plantar and dorsal resistance against a towel, plantar flexion and dorsiflexion with a foot boot, inversion and eversion with a foot boot, and many others. Ankle exercises should be done daily following a sprain. Supplemental exercises for the ankle include using the crawlstroke kick in water, straight jogging and rope jumping. The knee joint is particularly prone to injury in contact sports. Following successful surgery, the

Klafs and Arnheim, op. cit., pp. 238-239.

knee joint can greatly be strengthened through reconditioning exercises. This is because several muscles and muscle tendons actually pass through the knee joint. Some excellent rehabilitation exercises for the knee include: quadriceps setting, quadriceps and hamstring knee table exercises, ski set against a wall, Harvard Step Test exercise for two minutes, and many others. Supplemental exercises for the knee include bicycle riding, stationary swimming, stadium climbing and various swimming strokes.

Most athletic training textbooks include reconditioning exercises for most athletic injuries. However, the athlete's physician should furnish written suggestions for specific rehabilitation exercises. Running should be incorporated into all reconditioning programs eventually.⁴² The athlete that cannot run a mile at a reasonable pace is not ready to resume practice regardless of appearance.

Goal

The goal of this module is to expose the student to various rehabilitation procedures.

⁴²Taylor and Novich, op. cit., p. 59.

Task 1

Given a limited amount of equipment, improvise (in writing) a rehabilitation program for a given injury to cover one month, in a period of twenty minutes.

Enabler 1

Briefly describe three types of resistive exercise apparatus that are advertised as rehabilitation equipment.

Enabler 2

List two exercises that help increase the range of motion for each of the following joints: ankle, knee, hip, shoulder, elbow, and wrist.

Entry level

Successful completion of the previous module.

Instructional Resources

Dennis Aten, "Underwater Exercises in Athletic Rehabilitation," Journal of the NATA, V (Fall, 1970), 14-15.

Klafs and Arnheim, op. cit., pp. 238-247.

K. K. Klein, "Skin Splints: Prevention and Rehabilitation," Journal of the NATA, II (Spring, 1967), 9-10.

NATA, Athletic Institute, AMA, op. cit., pp. 93-110.

National Federation of State High School Associations and the Committee on the Medical Aspects of the American Medical Association, "Isometric and Isotonic: No Comparison," Journal of the NATA, VIII (June, 1973), p. 98.

Module 22

Shoulder

Introduction

The shoulder girdle is a loosely constructed, mobile mechanism of bones, muscles, and ligaments designed to give great mobility to the upper extremity. The girdle is composed of two bones, the clavicle and scapula, that actually form four joints. The joints are the sternoclavicular, the acromioclavicular, the coracoclavicular, and the glenohumeral joint. The coracoclavicular joint is not moveable, while the three other joints are moveable.

The clavicle supports the anterior portion of the shoulder and actually prevents the shoulder from dropping forward across the chest. The medial two thirds of the clavicle is circular, while the lateral one third is more flattened. The point where the clavicle changes shape is a weak spot of the bone. Many fractures occur at this point.

The scapula is a triangular shaped bone that serves mainly as a point for muscle attachments and as an articulating surface for the head of the humerus. The glenoid fossa is the articulating cavity for the humerus head.

The clavicle articulates with the sternal manubrium to form the sternoclavicular joint. This joint is weak due

to its bony arrangement but it is held securely by strong ligaments.

The acromioclavicular articulation is a gliding joint that is reinforced by the superior acromioclavicular ligament, the inferior acromioclavicular ligament, and the coracoclavicular ligament. The coracoclavicular ligament divides into a conoid part (more medial) and a trapezoid part (more lateral). When the clavicle rotates on its long axis, the coracoclavicular ligament develops some slack.⁴³

The coracoclavicular joint is an amphiarthrodial joint that permits little movement. It suspends the scapula and the clavicle and also gives strength to the acromioclavicular joint.

The glenohumeral joint is actually what is commonly called the shoulder joint. It is a ball and socket joint that is surrounded by an articular capsule. The muscles that cross the shoulder joint help compensate for weak bone and ligament arrangement. The muscles can be divided into superficial muscles and deeper muscles. The superficial muscles originate from the thorax and shoulder girdle and attach to the humeral shaft. These muscles are the deltoid, pectoralis major, latissimus dorsi, and teres major. The deep muscles begin at the scapula and attach to the humeral

⁴³Klafs and Arnheim, op. cit., pp. 361-367.

head. These muscles are the supraspinatus, infraspinatus, subscapularis, and teres minor. These four muscles are called the rotator cuff, due to their rotating function. Strains to the rotator cuff are common in athletics.

Fractures of the clavicle are much more common than fractures of the scapula or upper humerus. Fractures to these areas are practically impossible to splint. The trainer should apply a supporting sling, treat for shock, and transport the athlete to a hospital.⁴⁴

Sprains and strains to the shoulder are common in athletes. They vary from mild to severe and can take a considerable amount of time to heal. Severe sprains often must be treated as fractures and/or separations, since an X-ray is often required to determine the full extent of the injury.

Goal

The goal of this module is to cause the student to develop the skills required for the proper first aid management of shoulder injuries.

Task 1

Given simulated symptoms of a fracture in the area of the shoulder girdle, provide support to the affected

⁴⁴O'Donoghue, op. cit., pp. 111-115.

area, treat for shock, and move the injured athlete in an appropriate manner within a period of five minutes.

Enabler 1

Practice applying cervical arm slings and shoulder arm slings with a triangular bandage.

Enabler 2

Practice identifying the bones and ligaments of the shoulder girdle on a classmate and a skeleton.

Task 2

In a period of four minutes, given the needed supplies, tape a classmate's shoulder using the acromio-clavicular strapping technique.

Enabler 1

Locate, examine, and compare X-rays of a separated A-C joint with an X-ray of a normal shoulder

Enabler 2

Apply an elastic wrap to a classmate's shoulder using a single spica bandage reinforced with adhesive tape.

Entry level

Successful completion of the previous module.

Instructional Resources

Klafs and Arnheim, op. cit., pp. 370-374.

Taylor and Novich, op. cit., pp. 163-178.

Module 23

Skin

Introduction

An area of the human body that is sometimes neglected is the epidermis, or skin. There are many different types of skin problems and the majority of them have the potential of becoming infected. For this reason all skin problems, particularly blisters, abrasions, lacerations, and punctures, must be cared for in as sterile a manner as possible. Blisters under callouses present particularly difficult problems. Blisters are treated in both conservative and radical methods. There is considerable debate regarding these procedures, but the radical methods appear to be more prone to infections. Possibly the best way to prevent foot blisters is to give the athlete the shoes he will be practicing in at least a month early.

Abrasions are conditions where the epidermis and dermis are worn away. They usually occur when the skin is scraped against a rough surface. Since numerous blood capillaries are exposed, abrasions should be properly debrided and cleansed. In lacerations, the skin is jaggedly cut by a pointed object. The skin receives a direct penetration by a pointed object in puncture wounds. Tetanus bacillus can easily enter the bloodstream in both

lacerations and puncture wounds. Athletes should be given a tetanus shot if they have not had one in the last year. Some advocate giving all athletes tetanus shots at their physical examination since they will receive several skin wounds during a normal athletic season.⁴⁵

Other common skin problems include verracu vulgaris (warts), herpes simplex (fever blisters), and various bacterial infections. Verracu vulgaris is caused by an infectious virus. The trainer should protect these areas until they are removed by a physician. Herpes simplex normally appears at sites of infection. It is treated by a coating of camphor, alum, alcohol, or silver nitrate.

Athletes experience various bacterial infections such as impetigo, furuncles, carbuncles, folliculitis, comedones (blackheads), and acne. A physician should be consulted if infection is suspected. Some of these conditions can spread through a team rapidly.

Two problems that are of a great hindrance to athletes are Dhobie's itch and manealis. Dhobie's itch can be controlled by the use of extreme care in cleanliness on the part of the athlete and by supplying clean supporters daily.

⁴⁵Hirata, op. cit., pp. 109-121.

Goal

The goal of this module is to acquaint the student with some of the more common skin problems.

Task 1

Given the needed supplies, apply protective padding to a classmate for a skin irritation caused by a bunion of the first metatarsal, a boil on the olecranon, and a wart on the medial side of the first metacarpal in fifteen minutes or less.

Enabler 1

Briefly explain the duties of a dermatologist, and a podiatrist that are useful to sports medicine.

Enabler 2

List three companies that make protective pads that are designed to protect skin disorders.

Enabler 3

List five symptoms of skin disorders that should be referred to a physician immediately.

Entry level

Successful completion of the previous module.

Instructional Resources

A. G. Edwards, "Blisters: No Problem," Athletic Journal, XLVIII (June, 1968), 16.

T. E. Frank, "A Discriminative Study of Four Methods of Preventing Blisters," Journal of the NATA, II (Winter, 1967), 9-10.

J. H. McCreary, "Recognition of Common Skin Disorders," Journal of the NATA, I (Winter, 1960), 6-7.

L. W. Sauffer, "Boils, Furuncles, Carbuncles," Journal of the NATA, VIII (December, 1973), pp. 154, 169.

F. L. Watts, "Athlete's Foot, Ringworm, and Jock Itch," Journal of the NATA, VIII (September, 1973), 108-109.

Module 24

Therapy and Healing

Introduction

The goal of physical therapy is to aid the normal progression of the healing process. In competitive athletics, this is obviously of great interest to many of the people involved. Unfortunately, athletic injuries heal no faster than other injuries. The well-trained amateur athlete usually has age and good physical condition on his side. However, athletic injuries usually proceed through the same stages of healing and require the same amount of time. The following principles apply to the healing process of athletic injuries.

1. Bruises, sprains and strains follow the same course: tissue tearing, hemorrhage, edema, hematoma, hematoma absorption, and fibrous regrowth. Hemorrhage is the escape of blood from a ruptured blood vessel. Edema is an abnormal accumulation of fluid in intercellular spaces of the body. Hematoma is a tumor-like mass produced by coagulation of blood in a tissue or cavity.

2. Hemorrhage, edema, and inflammation are necessary parts of the healing and can be decreased by cold, mild compression and elevation.

3. When muscle is injured, sensory receptors are activated which produce reflex stimulation of other muscles in the injured area. This can be reduced with cold application.

4. After edema has stopped, cold, exercise, or possibly thermal application may be used to decrease congestion, increase circulation, minimize adhesions, and prevent atrophy.

5. Tissue subjected to repeated injury may develop excessive scar tissue or calcium deposits.

6. Drugs have not been found to stimulate wound healing.

7. Treatment and drugs should only be used to support the normal healing process under the physician's directions.⁴⁶

Physical therapy in athletics is usually concerned with the application of cold and/or heat. The physiological effects of short term cold application are: (1) constriction of blood vessels followed by an eventual dilation, (2) tightening of skeletal muscle followed by relaxation, (3) decrease in tissue metabolism, and (4) decrease in pain sensation. Cold application should be given in ten minute segments for ice massage and twenty-minute segments for

⁴⁶NATA, Athletic Institute, AMA, op. cit., pp. 55-56.

total immersion. Each segment should be followed by five minutes of exercise. The physiological effects of heat are: (1) dilation of blood vessels, (2) increased tissue metabolism, and (3) some relaxation of skeletal muscle. Heat is generally applied for thirty minutes.

Cryotherapy is usually administered in the forms of ice massage, cold packs, cold tank immersion, and ice bags. Heat is usually administered in the forms of: moist heat pack, and whirlpool baths. Other heat producing devices such as infrared, ultra sound, diathermy, dyna-wave, low voltage electrical currents, and ultra violet should never be used by untrained personnel or without a prescription from the team physician. It is very doubtful that these devices offer advantages over moist heat packs and whirlpool baths. Massage with or without heat producing ointments is a debatable practice. Although they may feel good, there is little if any physiological advantage. Jogging creates far more circulation in muscle than ointments and massage combined.

Many therapeutic devices are quite expensive. Fortunately, a training room can be very effective with hot and cold hydrocollator units, a freezer, and a whirlpool. This basic equipment offers an effective and relatively inexpensive means of handling most injuries.⁴⁷

⁴⁷Brown, op. cit., pp. 23-24.

Goal

The goal of this module is to cause the student to understand the goals and procedures of athletic therapy.

Task 1

In a period of five minutes, given the simulated symptoms of an injury, prescribe in writing the recommended therapy and explain the desired physiological outcome of that therapy.

Enabler 1

Briefly describe how analgesic balms are used in medicine and in therapeutics not associated with athletics.

Enabler 2

List each piece of equipment in the athletic training room and briefly describe its physiological purpose.

Entry level

Successful completion of the previous module.

Instructional Resources

Robert S. Benhke, "The Therapeutic Use of Cold in the Care of Athletic Injuries," Journal of the NATA, II (Summer, 1967), 6-8.

NATA, Athletic Institute, AMA, op. cit., pp. 55-61.

Wayne Sawyer, "Ultrasound," Journal of the NATA, VIII (June, 1973), pp. 60-64.

APPENDIX C

**INSTITUTIONS AND CURRICULUM SUPERVISORS
PARTICIPATING IN THE STUDY**

**Institutions and Curriculum Supervisors
Participating in the Study**

University of Arizona	Dr. Gary Delforge
California State at Long Beach	Dr. Daniel Arnheim
Western Illinois University	Mr. Roland LaRue
Ball State University	Mr. Ron Sendre
Indiana University	Mr. Robert Young
Indiana State University	Mr. Mel Blickenstaff
Purdue University	Mr. William Newell
Louisiana State University	Dr. John Wells
Northeastern University	Mr. Kerkor Kassabian
Central Michigan University	Mr. Kenneth Kopke
Mankato State College	Mr. Gordon Graham
University of Montana	Dr. Walter Schwank
University of New Mexico	Mr. L. F. Diehm
Appalachian State University	Mr. Ron Kanoy
University of North Dakota	Mr. A. G. Edwards
Ohio University	Mr. Charles Vosler
Oregon State University	Mr. Richard Irvin
West Chester State College	Mr. Philip Donley
Lamar University	Mr. Paul Zeek
Southwest Texas State University	Dr. Bobby Patton

Other Accredited Programs**University of Oregon****Mr. Lou Osternig****Texas Christian University****Mr. Elmer Brown****Washington State University****Mr. Richard Melhart**

APPENDIX D

ITEM ANALYSIS

PERFORMANCE OF CLASS ON EACH TASK
(Computer Number 1-16)

Module	Task		Number of Students Passing Task	Number of Students Not Passing Task
1	1	P P P f P P P f P P P P P P P P	30	2
	2	P P f P P P P P f P P P P P f P	27	5
2	1	P P P P P P P f P P P P P P P P	31	1
	2	P P P f P P P P P P P P P P P P	28	4
3	1	f P f P P P P f P f P P P f P f	22	10
4	1	f f f P P P P P f f f P f f f P	13	19
5	1	f P P P P P P P f P f f P f f P	22	10
6	1	P P P f P P P f P f f P P P P P	27	5
7	1	P P P P f P P P P P P P P P f P	28	4
8	1	f f P P f P f P f P f f P P f f	18	14
9	1	f P P f P P P P f f P P P f P P	25	7
	2	f P P f P P P f P P P P P f P P	27	5
10	1	f P P P P P P f P P P P P P P P	26	6
	2	P f P f P P P P P P P P P f P	28	4
11	1	f P P P P P P P P f P P P P f P	28	4

PERFORMANCE OF CLASS ON EACH TASK (Cont.)

Module	Task		Number of Students Passing Task	Number of Students Not Passing Task
11	2	P P P P P P P P P P P f P f	26	6
	3	P P P P P P P f P f P P P P f P	28	4
12	1	P f P P P P P P f P f f P P P f	23	9
	2	P P P P P P P P f P f P P P P f	27	5
13	1	f P P f P P P f P P P P P f f f	19	13
14	1	f P P P P P P P f f P P f f P P	19	13
15	1	f P P f P P P f P f P P f f f P	17	15
	2	P P P P P P P P f P P P P P f P	21	11
16	1	f P f P P P f f f f P P P f P f	17	15
17	1	P P P f P P P f P P P P P P P P	28	4
18	1	P P P f P P P P f f f P P f f f	19	13
19	1	P P f P P P P P P f P P P f P	29	3
20	1	f P f P P P P f P f P P P P P P	25	7
21	1	P P P P P P P P P P P P P P P P	31	1
22	1	f P P P P P P P P f P P P P P P P	30	2
	2	P P P f P P P P f f P P P P f P	23	9
23	1	INCOMPLETE		
24	1	INCOMPLETE		

PERFORMANCE OF CLASS ON EACH TASK (Cont.)

Computer Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
PASSED	17	27	25	21	29	31	29	19	19	16	24	28	28	20	17	24
FAILED	14	4	6	10	2	0	2	12	12	15	7	3	3	11	14	7

PERFORMANCE OF CLASS ON EACH TASK
(Computer Number 17-32)

Module	Task		Number Students Passing	Number Students Not Passing
1	1	P P P P P P P P P P P P P P P P P P P P	30	2
	2	P P P P P P P P f P f P P P P P P P P	27	5
2	1	P P P P P P P P P P P P P P P P P P P P	31	1
	2	f P P P P P P P P P P P P P P f P f P	28	4
3	1	f P f P f P P P f P P P P P P P P P P	22	10
4	1	f P f f P f f f f f P f P f P P P	13	19
5	1	f P P P f P f P P P P P P P P P P f P	22	10
6	1	P P P P f P P P P P P P P P P P P P P	27	5
7	1	P P P P P P P P P P f P P P P P f P	28	4
8	1	f P P P f P f P P P P P P P P f f P	18	14
9	1	P P P P P P f P P P P P P P P P P P P	25	7
	2	P P P P P P P P P P P P f P P P P P f	27	5
10	1	P P P f P P P f f P P P P P P P f P	26	6
	2	P P P P P P f P P P P P P P P P P P P	28	4
11	1	P P P P P P P f P P P P P P P P P P P	28	4
	2	P P P f f P P f f P P P P P P P P P P	26	6
	3	P P P P P P P P P P P f P P P P P P P P	28	4
12	1	P P P P f P f f P P P P P P P P f P	23	9
	2	P P P P f P P P f P P P P P f P P P	27	5

PERFORMANCE OF CLASS ON EACH TASK (Cont.)

Module	Task																	Number Students Passing	Number Students Not Passing
13	1	f	P	P	P	P	P	f	P	P	P	f	P	P	f	f	f	19	13
14	1	f	P	P	P	P	f	f	P	f	P	f	P	P	f	f	f	19	13
15	1	f	P	f	P	f	P	f	P	f	P	f	P	P	f	f	P	17	15
	2	P	P	f	f	P	f	f	f	P	f	f	f	P	P	P	f	21	11
16	1	f	P	f	P	P	f	f	P	f	P	P	P	P	f	P	f	17	15
17	1	P	P	P	P	P	P	f	f	P	P	P	P	P	P	P	P	28	4
18	1	P	P	f	P	f	P	f	P	f	P	f	P	P	f	P	P	19	13
19	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	29	3
20	1	P	P	f	P	P	P	P	P	P	P	P	f	P	P	f	P	25	7
21	1	P	P	P	P	P	P	f	P	P	P	P	P	P	P	P	P	31	1
22	1	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	30	2
	2	P	P	f	P	f	P	f	P	P	P	f	P	P	f	P	P	23	9
23	1	INCOMPLETE																	
24	1	INCOMPLETE																	

Computer Number	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
PASSED	22	31	23	27	21	27	16	23	22	26	24	28	30	22	21	25
FAILED	9	0	8	4	10	4	15	8	9	5	7	3	1	9	10	6

Tasks Which Have a Discriminating Power
Power of Less Than +0.20

M1-T1	(+0.1818)
M1-T2	(+0.1818)
M2-T1	(+0.0909)
M2-T2	(+0.1818)
M4-T1	(+0.1818)
M7-T1	(+0.0909)
M10-T1	(+0.1818)
M10-T2	(+0.1818)
M11-T2	(+0.0909)
M12-T1	(+0.1818)
M12-T2	(+0.1818)
M15-T2	(+0.1818)
M19-T1	(+0.1818)
M21-T1	(+0.0909)

**Tasks Which Require Access
Protective Football Equipment**

- M3-T1 (Resuscitation)
M8-T1 (Protective Equipment)

Tasks Requiring Library Acquisitions

- M4-T1 (Contrast)
M6-T1 (Drugs)

**Tasks Requiring Laboratory Sessions in
Addition to Scheduled Class Periods**

- M2-T1 (Back and Spine)
M20-T1 (Exam)

**Tasks Which American Red Cross
Instructors May Evaluate**

- M3-T1 (Resuscitation)
M9-T11 (Elbow)

Tasks Costing Sixty Cents or More Per Student

- M1-T2 (Ankle)
M2-T2 (Back)
M9-T1 (Elbow)
M11-T1 (Head and Wrist)
M15-T2 (Knee)
M22-T2 (Shoulder)

Tasks Requiring Large Units of Equipment

M2-T1 (Back and Spine)
M13-T1 (Heat)
M15-T1 (Knee)
M17-T1 (Neck)
M22-T1 (Shoulder)

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C. Personal Correspondence

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D. Special Meetings

N.A.T.A. Board of Directors Meeting, June 8, 1973, Atlanta, Georgia.

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