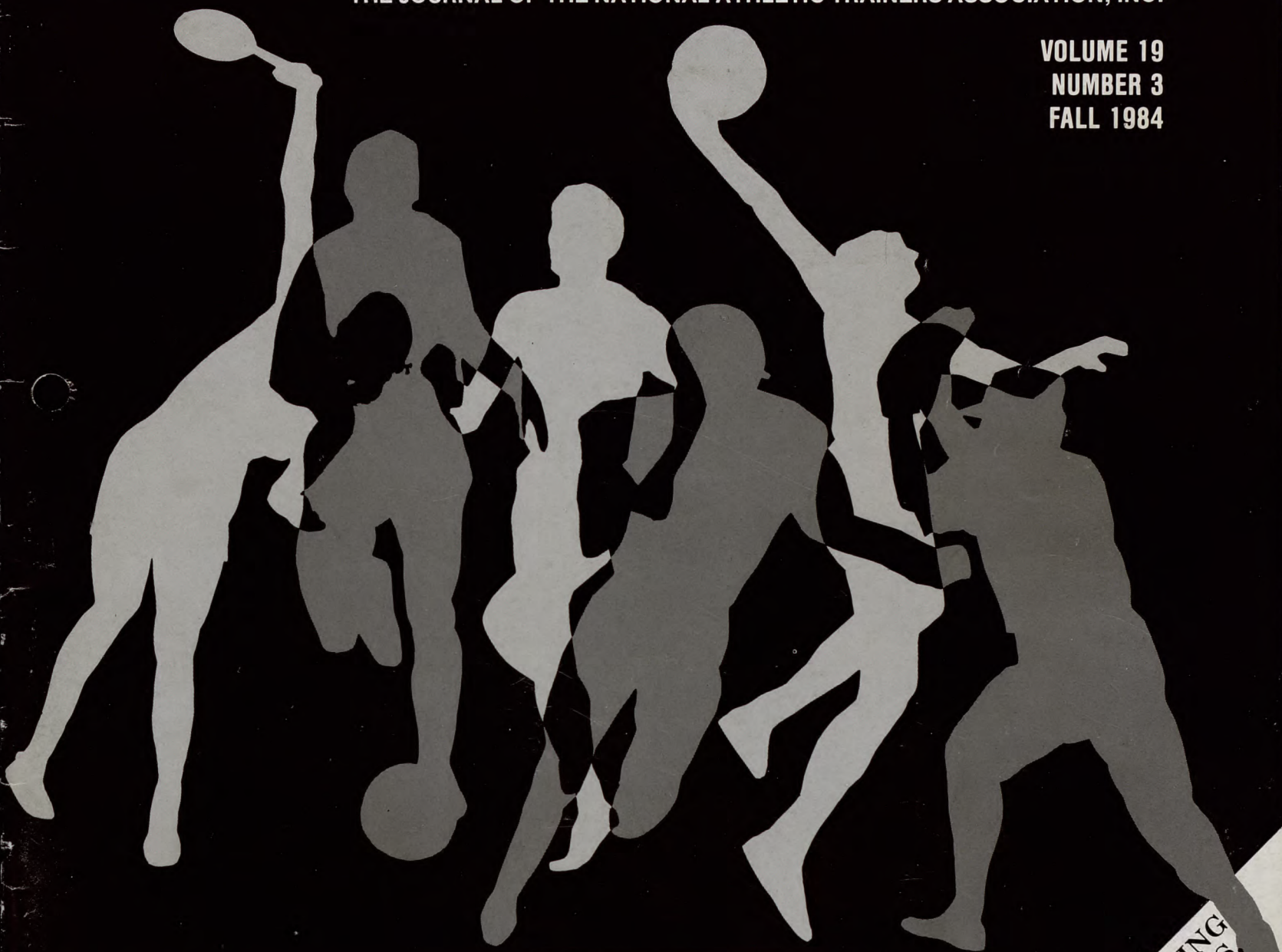




# ATHLETIC TRAINING

THE JOURNAL OF THE NATIONAL ATHLETIC TRAINERS ASSOCIATION, INC.

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NUMBER 3  
FALL 1984



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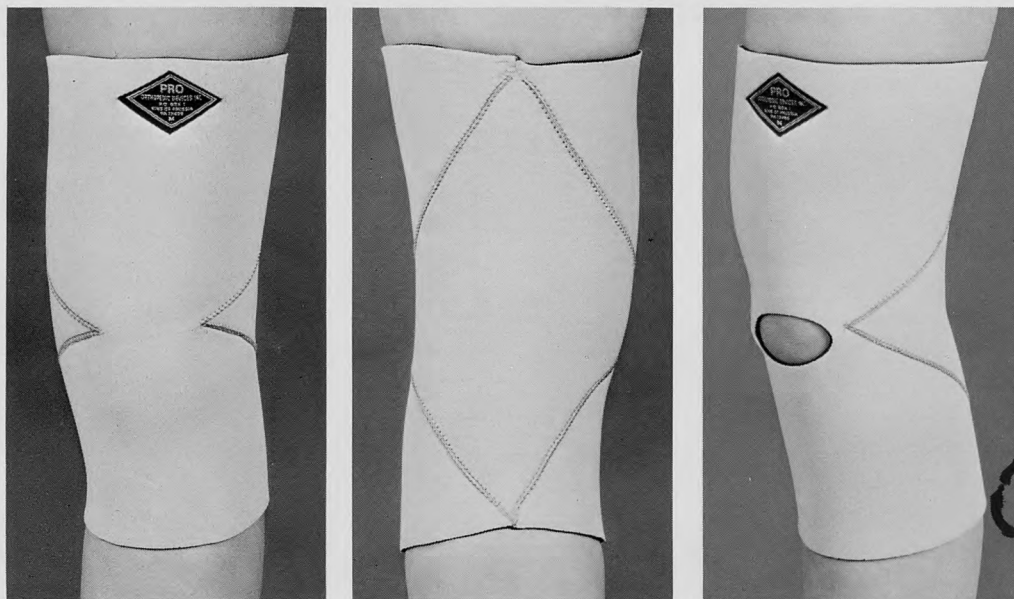
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- Androgens and Anabolism
- Call for NATA Research
- The Effects of Cryotherapy and PNF on Hip Extensor Flexibility

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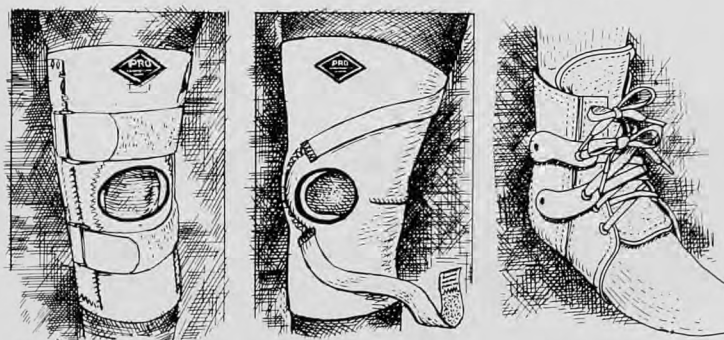
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# ATHLETIC TRAINING

THE JOURNAL OF  
THE NATIONAL ATHLETIC TRAINERS ASSOCIATION, INC.

Volume 19, Number 3, Fall 1984

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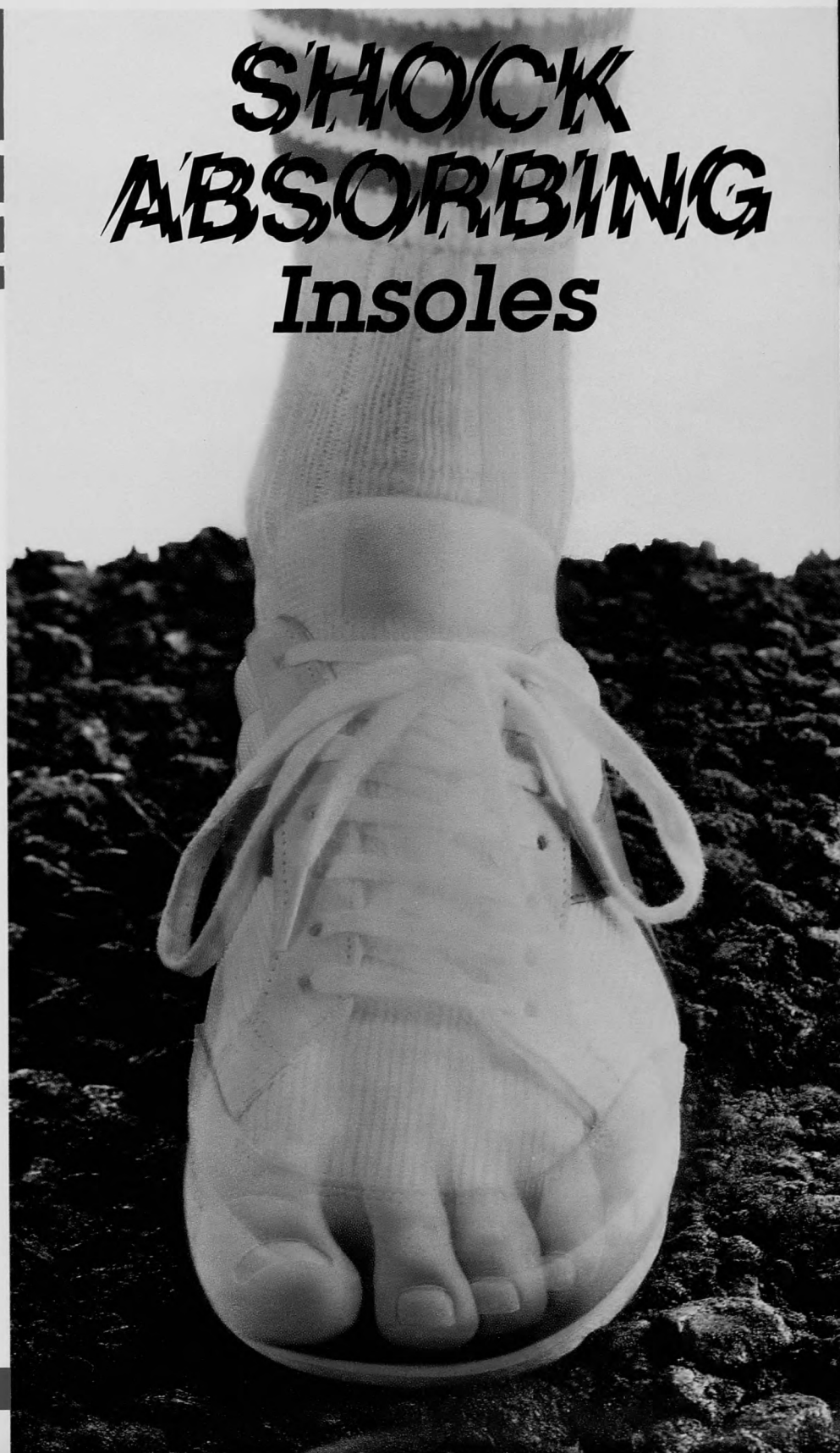
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# Editor's Comments



Steve Yates, ATC, M.Ed.  
Wake Forest University

I would like to congratulate Fred Hoover and his entire staff for the fine preparation and magnificent meeting of the National Athletic Trainers Association in Nashville. I know many hours of work went into this successful endeavor.

It was certainly a pleasure to see our colleagues and discuss the problems and pleasures associated with our profession. Now that you have had time to digest the many issues brought forth to the membership, I trust each of you will "do your part" to make these proposals a reality.

## Status of NCAA Drug Testing Proposal

Many conferences and schools will be drug-testing during the coming year. Below you will find a status report of the NCAA proposal as submitted to me by John Wells, Chairman, NATA Drug Education Committee.

### Status of NCAA Drug Testing Proposal

Resolution Number 163 entitled DRUG TESTING was submitted by the Pac Ten Conference to the NCAA. The NCAA created an eight member NCAA Drug Testing Committee chaired by Dr. Carl Blyth. This committee has been meeting to develop protocol. The "Guidelines for institutions planning drug testing of athletes" which appeared in the February 1, 1984, issue of *The NCAA News* are for those schools doing their own drug testing.

The NCAA Drug Testing Committee will be in Los Angeles starting on June 22, 1984, to observe the Olympic drug testing procedures. The NCAA Drug Testing Committee will present its recommendations to the NCAA Council on July 1, 1984. If the Council elects to, the recommendations could be presented to the NCAA membership in January, 1985. If the NCAA membership approves, the drug testing would not begin any earlier than the fall of 1985.

## Audio Visual Aids Bibliography and Cassette Tape Program

If you wish a listing of the AV Cassette tape program and bibliography contact the NATA office.

## Personal . . .

I recently received a very nice letter from Mr. Bernie DePalma, Cornell University, regarding Mr. Frank "Doc" Kavanagh. I understand Mr. Kavanagh has been an athletic trainer for more than 40 years, serving as a past President, and at the age of 85 is still "semi-active" in the profession. I salute you Mr. Kavanagh and thank you for helping the NATA get started while supporting our growth.

## Dental Poster

A few years ago in Volume 12 Number 2 of the NATA Journal (Summer 1977) a graphic dental poster illustrated the need for dental protection. Several athletic trainers have requested a reprint. There are still a few copies of this issue of *ATHLETIC TRAINING* available and I encourage you to write the National Office and purchase Summer 1977 if you are interested in obtaining the poster. (cost: \$5.00) Thank you for all the inquiries.

## Special Thanks . . .

I wish to thank all the organizations that so graciously provided the social atmosphere and refreshments for the annual meeting.

## Closing . . .

Again, I appreciate the membership's input regarding the Journal. I received many fine comments and contributions for improving our publication while in Nashville.

Have a healthy and successful fall season. I look forward to hearing from you.

SY (SSSA) +

## Question-Answer

Q. I have difficulty in differentiating impetigo from other skin conditions in my athletes. Are there some easily identifiable signs that are specific to impetigo; and at the present time what is the suggested therapy?

A. The lesions of impetigo are almost always pustular and usually less than 1 cm. in diameter. There is usually a slight redness around the primary lesions. These pus filled bullae may rupture and crust over as well as spread to the adjacent areas. Many times it can spread fairly rapidly.

Pustular and crusted lesions that are usually infected with either staphylococci or streptococci are signs of impetigo. Gentle washing of the lesions with soap and water two or three times a day followed by the application of appropriate topical antibiotics will usually control the infection. If the lesions are fairly extensive then systemic antibiotic therapy from the team physician is probably indicated.

Donald L. Cooper, M.D.  
Director, Student Health Center  
Team Physician, Oklahoma State University

## EDITOR'S NOTE:

If you have a question on a relevant topic, please submit to Steve Yates, Head Athletic Trainer, P.O. Box 7265, Wake Forest University, Winston-Salem, NC 27109



# President's Message



Dear NATA Members:

It was a pleasure seeing many of you at the 35th Annual Meeting and Clinical Symposium. The Nashville meeting will long be remembered by our members that were in attendance. I would like to publicly thank Jerry Rhea, Dan Campbell, Jack Redgren, Fred Hoover and their committee workers for a great production. Although professional obligations prevented Roy Don Wilson from being in Nashville, he also deserves a proportional amount of credit for the preliminary planning of this successful event.

Your Directors have placed public relations at the top of our priority list for the upcoming year. Several options have been presented and a definite plan of action will be explained at the San Antonio meeting. You are encouraged to forward your suggestions to your District Director.

The work of our licensure committee under the leadership of Ed Crowley will synchronize with our public relations campaign. The mailing of complete bills throughout the nation has been impossible for one person to do. Therefore I am requesting that the chairperson and/or president of each state association send the National Office the EXACT address and the EXACT procedure to follow to order a copy of your state bill (enacted or proposed for enactment) directly from your legislative research commission. A masterlist will be compiled and made available to each district.

The 1985 Annual Meeting and Clinical Symposium will be held in San Antonio from Saturday June 8 through Tuesday June 11, 1985; and the First Sports Medicine Congress and Exposition will be held in Indianapolis from Wednesday August 7 through Saturday August 10, 1985. Please mark these dates on your calendars, as they may alter your traditional summer planning.

Thank you for a very good year for our growing Association.

Sincerely,

A handwritten signature in cursive script that reads "Bobby".

Bobby Barton, ATC

## CEU Credit Quiz

# Heat Illness in the Athlete

Robert J. Murphy, MD

Edited by:  
Don Kaverman, ATC

*Heat illness is one of the most common causes of disability in American football and there are frequent deaths caused by heatstroke. Better understanding of the physiology of heatstroke has changed the manner in which the approach to heat problems has changed in the past twenty-five years. Sweating is the way the body dissipates the internal heat produced by muscular exercise. Since sweat is hypotonic, the result of excessive loss of weight through sweating is a water deficit in the body.*

*The clinical disorders resulting from exercise in hot and humid environment are heat cramps, heat syncope, heat exhaustion and heatstroke. Ways to prevent problems from heat illness include conditioning for the exercise, identifying the individuals who are most susceptible to heat problems, wearing proper clothing with as much skin as possible exposed to the air, evaluating the environmental conditions on the field and providing adequate amounts of water on the field.*

*Replacement of salt after practice through the use of electrolyte solutions and heavy salting of the food is important. However, the key to prevention of problems associated with environmental heat is to provide plenty of water before, during, and after the exercise.*

Over twenty-five years ago, on a very hot and humid day, five Ohio State University football players collapsed after their usual two-hour workout. Four of those players recovered promptly after they were cooled down in the training room and received intravenous fluids. The fifth athlete did not regain consciousness, however, and when he was taken into the hospital emergency room, he had a rectal temperature of 106.2F. He remained unconscious for 24 hours and subsequently showed considerable liver and renal damage. He was suffering from the effects of heatstroke and, although he eventually made a complete recovery, he spent three weeks in the hospital and missed the entire football season (5).

Heat illness has long been a concern of the American College Football Association, which oversees the sport

that more than any other is conducive to heat-related problems. But such problems do not occur exclusively in football. With increasing national awareness of the need for exercise, it is evermore likely that you will be seeing emergency room crises involving joggers, marathoners, and other persons intent on improving their health through one strenuous activity or another.

Problems which athletes face when exposed to environmental heat vary from temporary cramps to fatal heatstroke. It is probable that hundreds of heatstroke deaths, many of them unrecognized as such, have occurred in various sports activities over the last few decades. The American College Football Association is the only athletic organization that has kept records of heatstroke deaths, and it reports a decrease in incidence of such deaths over the past 18 years (see Table 1) (4). This decrease in heatstroke deaths has primarily been due to the unlimited use of water on the playing field and a better understanding of physiology of the exercising athlete by physicians, trainers and coaches.

---

*Dr. Murphy is the Head Team Physician at The Ohio State University, and Associate Professor of Preventative Medicine at Ohio State University College of Medicine, Columbus, Ohio 43210.*



## Materials and Methods

### Physiologic Consideration

Twenty-five years ago, those of us working on the football field had little knowledge of environmental or physiologic conditions that predisposed players to heatstroke. As we reviewed our own procedures at Ohio State, we recognized that we had no water on the field, that we had no knowledge of those players most susceptible to heat problems, and that we had no recognizable way of knowing what procedures were best followed in order to prevent heatstroke problems (5). Early in the course of our work, we started to give sips of water on the field, and gradually increased this over a period of years until, during the past twenty years, have used unlimited amounts of water throughout practice and during games. A recommendation was made by the Big Ten team physicians to the athletic directors of each school that a three-day conditioning period be conducted with players in shorts prior to putting on the pads. This allowed at least a three-day period of acclimation to heat before going to full uniform (6).

One year after the incident of the five players, we observed another athlete who had numerous episodes of heat exhaustion. We monitored his weight before and after practice and recorded as much as a 22-pound weight loss in a given session — nearly 10% of his body weight. At that time, we inaugurated a program of weighing each player before and after each practice to identify those most prone to extreme water loss. We also began to provide an unlimited amount of water on the field in an attempt to decrease the amount of weight loss in a given session.

We now understand the physiologic conditions that predispose to heat illness. Muscular exercise produces internal heat. This heat diffuses from the muscle cell to the capillary blood which subsequently passes through the lungs. Some heat is lost through the lungs, but most is carried by blood into the general arterial circulation. The amount of blood reaching the skin is controlled largely by the temperature regulatory system. Heat is lost from the skin through conduction, convection, radiation to the environment, or through evaporation of sweat (2,7).

Loss of sweat from the body is an important physiologic process. Sweat is hypotonic, that is, it has a lower concentration of salts and other solutes than does blood. Profuse sweating causes excessive loss of body water. This leads to a decrease in blood volume and, if water is not replaced, a decrease in sweating rate and evaporative cooling. Decreased blood volume can lead to circulatory collapse and decreased evaporative cooling can cause an excessive rise in body temperature (7).

### Clinical Disorders and Treatment

There are four recognizable heat disorders which may be encountered in the exercising athlete. See Table 2 (6).

#### Heat Cramps

Heat cramps are painful spasms of skeletal muscle, most commonly in the gastrocnemius. For years, the literature has suggested that this problem is due to salt loss (2). However, heat cramps are caused by a fluid volume problem only, and can be prevented by providing copious amounts of water throughout the exercise. In my experience, an exercising athlete has never overhydrated himself, so I doubt that water intoxication when fluid intake is controlled by the player himself is possible (6).

### Heat Syncope

This syndrome, which affects many persons after they have exercised in a hot environment, usually causes no more than feelings of weakness and tiredness which ordinarily improve promptly with rest and replenishment of lost fluid.

Table 1  
Football Fatalities from Heatstroke

1964 - 1973	1974 - 1983
1964 - 4	1974 - 0
1965 - 6	1975 - 1
1966 - 1	1976 - 1
1967 - 2	1977 - 1
1968 - 5	1978 - 4
1969 - 6	1979 - 2
1970 - 8	1980 - 1
1971 - 4	1981 - 2
1972 - 2	1982 - 2
1973 - 1	1983 - 1
39	15

Table 2  
Heat Disorders in Exercising Athletes

	Symptoms	Treatment
Heat cramps	Gastrocnemius spasm (60%) Thigh spasm (30%) Other muscle spasm (10%)	Rest Ice packs on muscle Application of pressure to muscle Water replacement
Heat syncope	Weakness Tiredness Dizziness Faintness Weak, rapid pulse Decreased blood pressure	Cessation of activity Removal from direct sunlight Application of iced towels Water replacement
Heat exhaustion	Extreme weakness Exhaustion Profuse sweating Normal or slightly elevated body temperature Thirst Oliguria Giddiness (often euphoria) Delirium Sometimes unconsciousness	Cooling of body Fluid replacement with cool or cold liquids Electrolyte replacement Hospitalization if unconscious or vomiting
Heatstroke	Faintness Dizziness Staggering Headache Nausea Confusion or unconsciousness High body temperature Strong, rapid pulse Hot, dry skin	Rapid cooling of body with ice packs, iced towels, cold tub bath Hospitalization Rapid fluid replacement with D <sub>5</sub> W initially and then hypotonic Ringer's solution Observation for coagulation defects

Table 3

#### Wet-Bulb Temperature Field Precautions

Under 68°	No precautions necessary except close observation of those squad members most susceptible to heat illness (those who lose over 3% of their body weight as determined from weight chart).
69° - 79°	Insist that unlimited amounts of drinking water be given on the field. Ice water is preferable.
Over 80°	Lighten the practice routine or practice in shorts. Withhold susceptible players from participation.  Whenever the humidity is over 95%, alter practice as described for "Over 80°."

## Heat Exhaustion

This syndrome is characterized by extreme weakness, exhaustion, and sometimes unconsciousness. Headache, dizziness, and profuse sweating are usually present. These symptoms are due to a decrease in blood volume. The key features that differentiate heat exhaustion from heatstroke are sweating skin and normal or slightly elevated body temperature.

Affected persons should be withdrawn from further activity for the remainder of the day and should be given fluids by mouth if able to swallow. If vomiting or unconsciousness ensues, hospitalization and intravenous administration of fluids are necessary. Review the athlete's fluid intake habits before permitting further strenuous exercise.

## Heatstroke

Heatstroke is a true medical emergency that can occur suddenly without being preceded by any of the other heat syndromes. An athlete collapses and becomes unconscious. The skin is hot and dry and the body temperature rises. When 90% or more of the total body fluid has been depleted, the brain shuts down the sweating mechanism in order to halt the loss. Once sweating ceases, body temperature can rise from 98.6°F. to 106°F. in twenty minutes (1,3).

In August of 1981, a 17-year old high school football player passed out in the pre-season conditioning program on a hot, humid day. The coaches recognized the problem immediately, cooled the player on the spot, loaded him into a stationwagon, and drove him to the local hospital which was five minutes away.

The youngster, then unconscious, was carried into the emergency room. The initial rectal temperature was 108°F., but after the player was packed in ice, his temperature dropped in eight to ten minutes to about 102°F. He woke up in 25 minutes and, though he remained hospitalized for three days, there was no significant liver or kidney damage. Three weeks later, he returned to the team for the rest of the season.

There is no doubt that the coaches saved the player's life. First aid consists of cooling the body by any available means — with cold packs, a tub of cold water, and so forth. Preventing serious injury or even death requires lowering the body's temperature within minutes. A temperature over 106°F. for more than a few minutes will begin to cause irreversible damage to liver, kidney, and brain cells.

## Results

### Preventing Heat Illness

#### 1. Condition for the Exercise

Depending upon the physical demands of the sport, the athlete should begin exercising 7 to 21 days before starting to participate. The preparation for the activity should be gradual and begin with initial workout of 30 to 45 minutes, increased to the two hours that is the usual time of exercise during the activity. Emotion plays a role in the amount of sweat that is lost. Heat cramps often occur in players during the first game of the season when emotion is at the highest level. Good conditioning for the exercise can help to prevent this problem (6).

#### 2. Identify Susceptible Individuals

Serious heat problems usually occur in those who lose the most body water. Persons with a large muscle mass seem to be particularly susceptible. Most of the deaths in American football have occurred in interior linemen who have the largest muscle bulk.

The easiest way to gauge susceptibility to heat is to measure body weight before and after exercise. A loss of greater than 3% of the total body weight should invoke caution. A loss greater than 5% indicates substantial risk, and the loss of over 7% can be very dangerous.

#### 3. Wear Proper Clothing

When environmental temperatures and humidity are high, sweat evaporates slowly and cooling is reduced. The situation is worsened by restrictive clothing because cooling by evaporation is proportional to the area of skin exposed to the air. A football uniform covers almost the entire body, which increases the amount of water loss by 70% over tennis players or track participants (3). Clothing such as shorts and fishnet jerseys should be encouraged in very hot and humid conditions (6).

#### 4. Evaluate the Environmental Conditions

The old saying, "It's not the heat that's bad, it's the humidity", certainly applies to heat-related disorders. Several deaths have occurred on the football field when the temperature was well under 75°F., but the humidity was over 95%. The greater the humidity, the more difficult it is for the body to cool itself.

It is essential that athletes be aware of the temperature and humidity. There is no room for guesswork. For coaches or trainers, an inexpensive device that can determine environmental conditions on the field is the sling psychrometer, which costs about \$40. It measures dry bulb and wet bulb temperature, and from a scale on the psychrometer, the relative humidity can be calculated. The wet bulb temperature alone is a reasonably accurate indicator of environmental conditions, if used in the manner described in Table 3 (5,6).

#### 5. Provide Plenty of Water and Other Fluids

At Ohio State University, ice water in unlimited amounts is available to players throughout practice and games. On extremely hot days, the team will consume between 100 and 125 gallons of water. Electrolyte solutions are appropriate to replenish the salt after exercise. Most athletes, though, salt their food to taste and replace lost electrolytes in that manner.

Even grade school children know that one should not drink sea water. Sea water is hypertonic compared to body fluids, but many coaches recommend that players take salt tablets or salted solutions during exercise. This practice should be condemned. A human can survive more than 30 days without electrolyte replenishment as long as water supply is adequate. But, a human can rarely survive more than three days without water.

## Conclusion

Any athlete, regardless of the sport or exercise, should allow an appropriate period to get in condition before attempting to go all out. Athletes should be encouraged to watch environmental conditions and sharply curtail or postpone activity if the humidity reaches 95% at any temperature.

In hot weather, no athlete should wear a rubbersuit or any sweatsuit. It is a dangerous practice and a useless one since virtually all water loss is replaced within a few hours as the athlete consumes liquids. The body must get rid of the heat it produces, mostly by evaporation of sweat. So, instead of inhibiting that mechanism, athletes should expose as much skin as possible to the air.

*Continued on page 170*



# CEU Credit Quiz

## HEAT ILLNESS IN THE ATHLETE

Robert J. Murphy, MD

As an organization accredited for continuing medical education, the Hahnemann Medical College and Hospital certifies that this continuing education offering meets the criteria for .3 hours of prescribed CEU credit in the program of the National Athletic Trainers' Association, Inc., provided the test is used and completed as designed.

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The NATA National Office will be notified of all members with passing scores over 70%. CEU credit will be issued to each member's record at that time. Participation is confidential.

### Questions

	a	b	c	d	e
1. Circulatory collapse may occur in the athlete who has an excessive loss of body water. a. True b. False					
2. Which of the following statements is/are true regarding heat cramps? a. Most commonly the cramping occurs in the gastrocnemius muscle. b. This problem is due to a loss of salt and water. c. both a and b above d. none of the above					
3. Profuse sweating is usually present in athletes with a. heat syncope b. heat exhaustion c. heatstroke d. both a and b above e. all of the above					
4. Symptoms of heat exhaustion include 1. extreme weakness 2. oliguria 3. giddiness 4. unconsciousness	a. 1,2,3 b. 1,3 c. 2,4 d. 4 only e. 1,2,3,4				
5. A strong, rapid pulse is present in persons with a. heat syncope b. heatstroke c. both a and b above d. none of the above					
6. Fluid replacement is indicated for the treatment of all of the heat disorders which may be encountered in the exercising athlete. a. True b. False					
7. Persons particularly susceptible to heat illness a. have a small muscle mass b. have a loss of greater than 5% of the total body weight after exercise c. both a and b above d. none of the above					
8. High humidity is a factor related to heat illness in athletes. a. True b. False					

# HEAT ILLNESS, from page 168

Lastly, a well hydrated athlete is a more efficient and effective athlete and less likely to suffer heat-related problems. Therefore, encourage adequate hydration before, during, and after exercise.

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# Trainer Counseling to Avoid Three Face-Saving Maneuvers

Barbara Kane, PhD

*Trainer's use of referral and informal counseling is discussed as a preventive for athletes' use of accidental injury, intentional injury, and malingering as face-saving maneuvers. Specific trainer behaviors are suggested.*

While the terms of their employment may or may not have required trainers to counsel with their athletes, for many trainers counseling becomes a routine part of their work. Although counseling may not be specifically required, it is a necessary and important adjunct to the other, more physical aspects of trainers' activities.

The trainer's position is one which is marked with intimacy, trust, and regard. Thus triply endowed, trainers are often expected to provide on-site crisis referral and informal counseling, even though their training may not have provided them with the necessary skills for the counseling aspects of their work. The literature reveals a paucity in the area specifically relating to trainer counseling. There is, however, a wealth of information on counseling in general and in other specific areas which may be applied to trainer counseling (1, 2, 3, 5, 6, 7).

While usually none of the physicians, coaches, and trainers with whom athletes have contact has had counselor training, the position of trainer is most amenable to the assumption of the counselor role, because its orientation is different from the others. Physicians tend to approach athletes in terms of the specifics of an injury and focus on physical details; such emphasis fragments athletes and denies them a more holistic approach. Coaches, on the other hand, take a larger view which includes not only the individual athletes but also their peers. The coaches' approach places athletes in competition with their peers in order to win some contest or game or in collaboration with their peers in order to compete with other peers, again, in order to win. While the coaches' goals include strengthening individuals and building teams, their emphasis on winning cannot be overlooked. Trainers, in contrast to physicians and coaches, tend to see the athletes as individuals, neither in terms of body parts nor in terms of winning potential but, instead, as important separate entities.

The trainer's role and function as a counselor was addressed in a recent issue of *Athletic Training* (4) in which crisis, referral, and informal counseling modes were discussed in terms of their requirements and their appropriate uses by trainers. Specific trainer behaviors

were suggested which would enable the trainer to offer athletes nonjudgmental support in order to facilitate the seeking of alternatives, decision making about those alternatives, and implementation of the decisions made.

The present discussion is a continuation of the earlier article and addresses the issue of counseling as a preventive rather than a palliative treatment. The trainer's duties emphasize seeing athletes after a crisis has occurred or after athletes have suffered some trauma. Indeed, the trainer is called to respond to athletes' experience of pain. When counseling is used as a preventive treatment, the trainer facilitates athlete's avoidance of pain. Preventive counseling occurs before pain exists when trainers counsel athletes who might use potentially harmful face-saving maneuvers. "Saving face" is to avoid embarrassment concerning one's reputation, honor, or status. Athletes who are performing poorly are counseled in order to avoid such face-saving maneuvers as accidental injury, intentional injury, and malingering. An alert trainer in a counselor role may be instrumental in preventing injury and, in so doing, help athletes to avoid the debilitation and pain the processes can cause them.

## Reduction in Athletic Potential

A recognition of athletes' continued poor performance reduces the expectations of their potential. For some athletes this awareness of loss is a devastating experience. Not only are they vulnerable to a loss of self-esteem, but also their prestige and popularity may be at risk. In order for the athletes to defend themselves against the pain of reduced self- and social esteem, some use face-saving maneuvers. The maneuvers permit the athletes to be able to maintain their pride in themselves and to avoid embarrassment with others. They can face themselves and the public and at the same time sustain their intrapsychic and interpersonal status quo with minimal discomfort.

The investment of time, energy, and possibly money in the perfection of skills is disproportionate to other areas of an athlete's life. Athletes develop an emotional commitment to their skills, with those skills taking importance in athletes' lives. They compare themselves to some standard of perfection or against some competition. They glory in their achievements, and they despair in their failures. If, however, the athletes' sense of self

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and the value they give to that self is dependent on achievements in sports, then athletic victories become vital to their self-esteem. When their skills wane, sadly, their self-esteem can be decimated.

Athletes get unique kinds of attention. The ego-inflating adulation athletic stars receive from their fans is vulnerable to a loss of athletic prowess. The special pride of families and friends may also be at risk when abilities decline. In the place of achievement athletes begin to know the despair of failure. Instead of applause, they may hear words of sarcasm or rejection. The cheering may give way to quiet disappointment. Complicating the situation are financial considerations; salaries, scholarships, and prizes are often tied to athletic competence.

Whether they are sensitive to their diminished potentials or among the last to acknowledge their declining abilities, it is a sad occasion when athletes confront the truths of their waning skills. Confrontation is a difficult task which is made especially painful when athletes naturally compare themselves or are compared with their past achievements. Athletes are often seen to polish their trophies, look at old pictures, and relive past stories when this confrontation with reality is too painful. They attempt to assuage the pain of their loss and push away their fears about the future by returning even for a short time to the joys of their past triumphs.

Fears, such as "Coach will replace me" and "I'll be passed by," may be felt or expressed openly. Sometimes athletes try to pit the coach and trainer against each other in an attempt to avoid relinquishing a position of supposed strength. In this unfortunate situation, the trainer not only needs to be sympathetic with athletes' pain but must also be aware that causing the trainer and coach to become adversaries is shortsighted and counterproductive.

Some athletes are fortunate enough to be able to realistically appraise their situations of loss and view them as they would any other nonproductive and unsatisfying positions. For them the step back is a step forward. They seek to complete the necessary tasks in a situation before they can move on (3). They search for and find alternative behaviors which will be productive and satisfying. The confrontation with their loss (6) and the discomfort of their transitions can be eased by a trainer who is supportive, sensitive, and empathic with their inner and interpersonal struggles.

Some athletes, however, refuse to accept that injuries or diminished skills have made them noncompetitive. They try even harder than before. They attempt to remain in their positions in order to meet their own demands and pressures and those of their families, fans, and coaches. Such unrealistically optimistic athletes may need the trainer's help to confront the truths of their situations.

### Face-Saving Processes

Some athletes are concerned with saving face. They may look for an excuse, a reason, or a rationale which would minimize or remove the pain of confrontation with themselves and others. They welcome processes which would permit them to leave their positions, allow them to continue feeling good about themselves, and at the same time enable them to maintain their dignity with others. Three such face-saving processes will be considered in detail: intentional injury, accidental injury, and malingering.

In the following discussion, vignettes are used to depict the three facesaving maneuvers. Although the names and specifics of the situations have been changed, the elements of the process remain true to form.

### Accidental Injury

Accidental injuries can provide athletes with an excuse for poor performance. When they are injured, athletes have a justifiable and honorable reason for no longer continuing to play. They reason that they can step back with head held high because they were victims of fate. They cannot blame themselves nor be blamed by others since what happened was not their fault.

In the first vignette, an accidental injury provided the process by which a second-string football player was able to save face. Joey was a two-year All-State first-string tackle. When Joey got to State U., however, there were enough big tough players and the coach didn't use him very much.

Every weekend someone, or even a carload, from home would drive up to State to watch him play. They didn't tease him, but he knew they were disappointed not to see their hometown pride and joy in action. After a few weeks, Joey was even more distressed; he knew they would see him sitting on the bench again. It was hard for Joey to watch the team and not be asked to "get in there." He struggled with his nagging doubts. Would he be able to match up against those big guys and be able to do a good job if he did get in?

In the fifth game, Joey got to play in the third quarter. he made a tackle that stopped a touchdown run. A searing pain shot up his left leg. The pain came over him in waves and made him sick to his stomach. he knew that something terrible had happened.

Despite his distress, Joey felt almost glad. Because of his broken leg he was "red shirted," a position which, although boring, was secure and, in some ways, prestigious. His anxiety about being on the team was relieved. Instead of derision, Joey got sympathy. His friends and family said, "Oh, Joey! How do you feel? What a bad break. You would have been terrific. Now you can't play. What a shame. It's not your fault. I'm so sorry. It's just something that happened. It was bad luck!"

The words that especially made Joey feel better were, "You would have been terrific. It was bad luck." After awhile Joey forgot that he wasn't wonderful at State U. He started to believe that he would have been terrific if he hadn't had bad luck. The accident had been something out of his control.

### Intentional Injury

Another process, seen less frequently, achieves comparable results. It is intentional, often self-inflicted, injury. When athletes employ intentional injury, they attempt to hurt themselves a little in order to avoid pain which seems larger and more severe to them. The tennis player in the second vignette did just this.

Karen had been playing in all-county tennis tournaments even before entering Barnett Junior High. She knew what it was like to win. She was "someone to watch," "hot," and "a real comer." She tried out for a place on the Fairfield High team and made it! Karen was proud but not too surprised. She knew that everyone expected great things, and she knew she could deliver. But, she couldn't. The competition with the other class A schools was too stiff.

It seemed to Karen as if everyone were giving her advice all the time. Why didn't they just get off her back and give her a little peace? She was doing the best she could, wasn't she? That's what worried Karen. She was playing her hardest, but it looked as if she were getting worse and not better. She told herself that her teammates would be better off without her. After all, Cindy, her alternate, was very tough, and Margie, behind Cindy, was as strong a player as Cindy. What could Karen do? She couldn't just quit. Everyone would know.



If she fell and hurt her bad ankle again, she could leave the team regretfully and gracefully. She did exactly that, but she was plagued with doubts. Did anyone know that her fall was as staged as any Broadway show? Did anybody suspect what she had done? Karen was a better actress than she gave herself credit for being; no one ever doubted her integrity. It was too bad that she hurt her ankle more than she meant to; it would give her trouble for a long time.

Karen heard many of the same words Joey did: "You would have been terrific. It was just bad luck." Because her remembrance of the way she had engineered her fall was dissonant with her continued self-esteem, Karen began to forget that her injury was self-inflicted. She pushed away the memory of what she had done and started to believe that her accident was just that — an unlucky accident. No one could blame her for what happened. It was just fate and out of her control. Her hurt ankle became almost like a war wound; it was something to point to with pride.

With her intentional and self-inflicted injury Karen was able to face herself and her fans with head held high. While she had hurt her ankle badly, perhaps permanently, she not only kept her dignity in place, but also may have enhanced her position in the community.

### **Malingering**

A third face-saving process, malingering, is also used to achieve the same results as accidental injury. In this last vignette, a cheerleader was successful in employing malingering as a face-saving maneuver.

Toni didn't have many illusions about herself. She was a worker, the hardest worker on the cheer squad, but she wasn't good enough. She knew how terrible it would be if she lost her balance and slipped and caused her partner to lose his grip. What could she say? It wouldn't be enough to say, "I made you look bad, and I'm sorry." And what would happen if she really fell? It wasn't just that she didn't want to get hurt; if she fell her partner might become angry with her for making him look clumsy. Everyone else might pity him for being stuck with her.

Toni's wrist ached from all the lifts. She pondered her problem. The glory and fun of being on the cheer squad weren't worth the fear, the pain, the frustration, or the fear of embarrassment. She wanted to get off the team. What could she do? It came to her in a flash! It was so simple. Toni wondered why she hadn't thought about it before. She started to complain continuously about her wrist. She taped it and wore a sling to her classes. She ate with her other hand and told funny stories about trouble with barrettes, zippers, and eye makeup. Toni heard the same words that Joey and Karen did, and the words sounded just as sweet to her as they did to the other two. After all, how could she be a responsible cheer squad member with a bad wrist?

Toni felt bad, though. She felt like a liar. She was a liar. It was hard for her to live with herself. She had tricked the others and gotten away with it, but she knew she was a cheat.

Like Karen and her self-inflicted injury, Toni's continued self-esteem was dissonant with the pain of her guilty secret. Toni almost began to start believing that she really did have a weak wrist so she wouldn't feel so rotten.

### **Trainer Counseling**

Because of their unique position in the sports community, alert trainers may be able to avert face-saving maneuvers. This position is special because of the trainer's physical intimacy with the athletes and prox-

imity to the situation. The trainer has access to X-rays, physician's reports, and test evaluations and can be realistic about athletes' strengths and weaknesses. In addition, the trainer can appraise athletes' skills in comparison with their past performance and in light of the performance of their peers. At the same time, the trainer can be sensitive to the athletes' subtle expressions of self-doubt, discouragement, and fear.

The trainer may get clues to the athletes' feelings by listening to what they say. Comments such as "I heard that Mark did what I did and he can't play on Thursday night" and "I don't think I'll be able to wrestle next Saturday do you?" may veil open admission of athletes' desires to step back. The trainer who is really listening may be able to discern the athletes' unspoken "Help me! I don't think I want to continue playing."

In addition to the verbal clues, or in their absence, the trainer may get nonverbal distress signals from the athletes. One such signal is athletes' inability to describe the exact nature or location of their pain. When the trainer mentions an area, the athletes often respond positively, "Yes, it hurts there sometimes, too." The vagueness of the response itself may very well signal the athletes' psychic distress.

Other nonverbal signals are the athletes' failures in following the trainer's directions in terms of exercise, ice, rest, or taping, for example. Also, the athletes who come in late for their appointments, or who fail to come at all, often are giving nonverbal signs of their reluctance to participate in their sport.

A trainer may be counterproductive when answering athletes' doubts with words of reassurance. If the trainer offers, "Oh, you'll be all right; just rest it," it is possible that the athletes may stop questioning their abilities. It is also possible, however, that they may just stop expressing their fears openly.

If the trainer, with a serious look and a tone of concern says, "Do you really think that you ought to play next week?", doubting or reluctant players may not have enough courage to say no. Instead, based on the clues from the trainer, they may reply by turning the question around: "What do you think?" If the trainer responds no, frightened or discouraged players may say, "Will you talk to the coach?" When the trainer intercedes with the coach, athletes avoid the pain of confrontation and also achieve the double goal of nonplay and face saving. On the other hand, if the trainer says, "Well, you do seem to be improving," the athletes' symptoms may become worse, and they may go public, complaining loudly, limping, and grimacing. They may look for allies to support them to prove that they are really hurt.

### **Referral Counseling**

A trainer's responsibility to refer athletes to appropriate professionals when necessary cannot be overlooked. Referral counseling requires that the trainer be most sensitive to the athletes' feelings and also exercise extreme tact (5). At the same time, trainers must remember that their function is only to provide information, not guidance or advice.

There are two imperatives in referral counseling. First, the trainer is obliged to be knowledgeable. An up-to-date referral list (1) of other professionals must be maintained with multiple entries in categories where appropriate. The trainer suggests professionals in a category such as career counseling in order that the athletes have information and can decide whom to call and when. It is high praise when an athlete says, "The trainer will know someone."

Simplicity of the organization of the list and ease of retrieval are necessary. New information must be enter-

ed, old information updated or discarded, and existing information assessed expeditiously. The referral list needs to be in a convenient place to assure its accessibility.

The second imperative is that the trainer maintain the trust of the athletes and their certainty that absolute confidentiality will be kept.

### Informal Counseling

Along with referral, the trainer can use information counseling (7) with athletes. Again, confidentiality is implicit.

In informal counseling, a productive stance for the trainer is a position of nonjudgmental acceptance. By listening closely to what athletes say and making responses that are noncritical, nonanalytic, and nondirective, the trainer can help athletes talk about their situations and find ways to solve their own problems.

The trainer remembers that the situations belong to the athletes, and the solutions remain within their purview. The athletes must decide and act in accord with their own wishes, not the trainer's.

The athletes lead and the trainer follows (2). The trainer does not assume responsibility for the athletes nor make choices for them. When sharing information, the trainer must exercise caution not to burden the athletes with advice or to guide them even in a most subtle manner or in any way control their decision making or the implementation of those decisions that they do make.

In informal counseling the trainer uses noncommittal responses to great advantage not only as door openers but also when at a loss for something to say. Some noncommittal responses are: "Oh," "Well, well," "Really," "How about that," "I see," and "Mmm." Such phrases when accompanied by eye contact and serious looks tell athletes that the trainer is paying attention and is concerned. The phrases carry no positive or negative content and, therefore, are totally nonjudgmental, and athletes are free to make judgments of their own.

As good as noncommittal responses are, however, they do not move athletes forward as quickly or as well as reflection (2). Reflection requires that the trainer listen carefully and be sensitive to the feelings that are expressed by the athletes verbal and nonverbal means. Then, the trainer rephrases or verbalizes what the athletes have expressed. This restatement helps clarify issues for the athletes and facilitates their continued and extended expression of their fears and self-doubts.

The restatement also tells the athletes that the trainer is concerned about them and respects them as individuals with ideas and feelings that are important enough to be given the trainer's attention. An important by-product of the reflective nonjudgmental mode is that it builds and maintains a support system for the athletes. The trainer's support may help the athletes to mobilize familial and other social support (6) at a time when athletes are especially vulnerable because of the pain of their loss and their state of transition. In being supportive the trainer is implying, "I am your ally. I am with you. I am your friend." This kind of support gives permission to athletes to evaluate their situations and to remain in their sports or, perhaps as they might do in other unfortunate positions, to step back with honesty, dignity, and grace.

The trainer may have opportunities to broaden the athletes' bases of self-esteem by helping them to change the focus of their lives to encompass other areas as well as sports. The trainer listens for and reflects on ideas in non-sports areas. In this way athletes can be helped to think about and clarify their own notions of what they want to do and be in life — after sports.

Three reflective errors should be avoided. Trainers should not overshoot by reflecting on ideas or feelings too lightly. Nor should they overshoot by reflections that are too strong. Also, trainers must not parrot the athletes by repetition rather than reflection. Accurate, empathic reflection can help athletes explore how they really feel and what they really want to do. Some reflective phrases are: "It sounds to me as if . . .", "Are you thinking that . . .?", "I hear you saying that . . .", and "Are you saying that . . .?"

Referral and informal counseling take time, patience, and practice on the part of the trainer. Using these modes athletes can be assisted to resolve their dilemmas without the necessity of using face-saving maneuvers. Some athletes recognize that their self-doubts are unrealistic, and they can continue to achieve. Others are able to confront their status as second- and third-string players and are able to continue playing in lesser positions. Still others decide that their dreams too far exceed their abilities; they no longer wish to remain on their teams or, perhaps, even in their particular sports at all, but they can leave honestly.

### Summary

The trainer's position is unique in the athletic community because of their particular knowledge of the athletes and special relationships with them. Counseling of athletes is often a routine part of the trainer's work even though they may not have had specific preparation in this area. When athletes are faced with injuries and declining potential, they may resort to face-saving maneuvers of accidental injury, intentional injury, and malingering in order to maintain their self-esteem and standing in the community. Two counseling modes, referral and informal counseling, may be used to avert athletes' employment of face-saving maneuvers. The trainer in the counseling role can ease the athletes' confrontation with loss and help them make the transitions to new behavior and status.

The trainer can help the athletes to say and believe, "I can walk away with my head held high. I have done enough. It is time for me to do something else with my life." The step back may prove to be a step forward on a new path into a new place. The support that the trainer gives to the athletes' explorations and confrontations will help them find the strength to face the ultimate sports challenge of an honorable exit.

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## Drug Education Committee Report

# Androgens and Anabolic Steroids

John Wells, PhD ATC

Scott Biron, ATC

*Factual information about anabolic steroids to the sports medicine readers to better prepare them to answer the questions and concerns of the athlete is presented. Areas emphasized are the history, physiology, effects on performance, and the adverse side effects of anabolic steroids. The article stresses the influences that athletic trainers have on the athlete's decisions. After reading the article, the athletic trainer will be able to discuss with the athlete the option of using anabolic steroids with the advantages and the disadvantages related to its use.*

The abuse of anabolic steroids is employed by some athletes operating under the theory that these compounds will enhance athletic performance. The Athletic Trainer must ask two questions. First, "Do anabolic steroids really enhance athletic performance?" Second, "What are the harmful side-effects to the individual abusing anabolic steroids?" The following report will give the Athletic Trainer some factual data for discussing these questions with the athletes.

### History of Anabolic Steroids

The adverse effects of destruction of the adrenal glands have been recognized ever since the original observations of Sir Thomas Addison. It has also been known for many years that the experimental removal of the adrenal cortices is incompatible with life. In most species, death following such an operation occurs within a week unless treatment is begun with extracts of adrenal cortex, pure steroids, or salt (6, 9).

During the decade following 1930, there was an intensive search for the active ingredients that could account for the essential role of the adrenal glands. In 1937 Reichstein and vonEuw prepared deoxycorticosterone synthetically and later demonstrated it in the adrenal glands. Although this steroid had powerful effects on salt and water metabolism, and becomes useful in the management of Addison's disease, it was obvious that extracts of adrenal cortex contained some other compounds that could influence not only salt metabolism, but also the handling of carbohydrates and proteins as well. Among the many steroids that were being isolated were some that indeed had marked glucocorticoid activity, as opposed to the mineralocorticoid deoxycorticosterone (6, 9).

World War II stimulated interest in the glucocorticoids, previously isolated by Kendall at the Mayo Clinic. It was suspected that such compounds might be valuable in the treatment of shock and exhaustion, although the scarcity of these compounds did not permit their evaluation in the human being. Intense efforts were

made to synthesize amounts of the glucocorticoids for adequate clinical trials (6,9,25).

A milestone in the history of the adrenal steroids was the report of Hench et al. on the effectiveness of cortisone and corticotropin in rheumatoid arthritis. Hench had been impressed for years with the potential reversibility of rheumatoid arthritis on the basis of the observations that patients tended to improve when jaundiced and also during pregnancy. It seemed possible that these improvements were associated with the production or retention of some antirheumatic substance. Although Hench planned to try cortisone (Compound E of Kendall) as early as 1941, it was not until 1948 that partial synthesis provided sufficient material for clinical trials (10).

Results of the clinical trials in rheumatoid arthritis were dramatic, and soon cortisone, and also corticotropin, were found to cause symptomatic improvement in an amazing number of disease conditions. It was recognized at the same time that cortisone was not a cure for these many diseases. It seemed to provide the susceptible tissues with a shieldlike buffer against the irritant (11).

Although cortisol was largely responsible for the glucocorticoid activity of adrenal extracts, it was suspected that the amorphous fraction of such extracts still contained some material whose mineralocorticoid activity was much greater than that of deoxycorticosterone. The compound responsible for this was isolated in 1953 and was named Aldosterone (6,9).

Subsequent research on the glucocorticoids led to the development of a variety of new steroids that have significantly greater anti-inflammatory potency than cortisone, although their influence on carbohydrate metabolism generally parallels their anti-inflammatory activity. A significant advantage of the newer steroids such as Prednisone, Methylprednisolone, Triamcinolone, and Dexamethasone is that these anti-inflammatory steroids exert little effect on renal sodium reabsorption while still possessing potent anti-inflammatory activity (1,6,9).

## Physiology of Anabolic Steroids

Androgenic hormones are secreted by the testis, adrenal cortex, and ovary. Testosterone, the most important circulating androgen, is the principle secretory product of the Leydig Cells, which are located in the interstitial spaces of the testes. Normal men produce 2.5 to 10.0 mg. of testosterone daily, which yields plasma concentrations of 350 to 1,200 ng/dl (nanogram is one-billionth of a gram). There is diurnal fluctuation of serum testosterone levels with maximum values in the early morning. Testosterone acts through a negative feedback mechanism involving the Hypothalamus and Anterior Pituitary to suppress secretion of Luteinizing Hormone (HL), and to a lesser extent, Follicle Stimulating Hormone (FSH). FSH is important in the initiation of spermatogenesis (1,6,8).

Under normal conditions, the Adrenal Cortex and ovary secrete relatively little Testosterone. Instead, they primarily secrete androgen precursors, such as 4-Androstenedione and Dehydroepiandrosterone, that are metabolized to testosterone in most peripheral tissues. At least 50 percent of the circulatory testosterone in normal women is derived from the metabolism of Androstenedione and, to a lesser extent, Dehydroepiandrosterone. The overall production of testosterone in women averages .23 mg daily which results in normal plasma concentrations of 15 to 65 ng/dl. Certain pathological conditions of the Adrenal Cortex or ovaries markedly increase the production of androgens and their precursors, which may cause precocious puberal development and virilism or amenorrhea in females (1,5).

In males, more than two-thirds of the testosterone precursors are secreted by the Adrenal Cortex. However, since the rate of conversion to testosterone is low, they are not as important functionally as the smaller amount of testosterone produced by the testis (1,6,14,22).

Approximately 99 percent of circulating testosterone is bound to protein, primarily to Sex Hormone-Binding Globulin (SHBG), Testosterone-Estradiol Binding Globulin (TEGB), but a small amount is bound to Albumin. As well as other steroid hormones, the biologically active portion of plasma testosterone is the free (Dialyzable) fraction. The concentration of SHBG is decreased by androgens and elevated by estrogens. Testosterone has greater binding affinity for SHBG than estrogen. The concentration of SHBG is approximately twice as high in women as in men (1,6,17).

Testosterone is metabolized primarily in the liver and is excreted mainly in the urine as the metabolites, Androstosterone and Etiocholanolone; small amounts of Testosterone Glucuronide and sulfate also are excreted. About 6 percent of the original hormone is excreted in the feces. Synthetic testosterone derivatives are metabolized in a similar manner, but more slowly, which results in longer plasma half-lives (1,6,16,27).

### The Effect of Anabolic Steroids On Athletic Performance

In 1939 Boje wrote that the administration of sex hormones or preparations of the Adrenal Cortex could theoretically enhance athletic ability. In 1974 Williams wrote that this review of the literature indicated that anabolic steroids may be an effective adjunct to weight training (28).

*The Physician's Desk Reference* states, "Warning: Anabolic Steroids do not enhance athletic ability" (18). The AMA Drug Evaluations states:

"The use of anabolic steroids to improve athletic performance is unanimously condemned. Not only

is this a medically trivial indication, but experimental evidence suggests that steroids do not significantly increase muscle size or strength in healthy young men who are already in good physical condition, and reported weight gains are probably due to fluid retention. Furthermore, adverse effects associated with the use of large doses of 17-a-Alkylated preparations commonly include alteration of liver function, reduced serum gonadotropin and testosterone levels, and decreased spermatogenesis."(1)

### Study Designs

Studies have been conducted on the following groups of male subjects: trained athletes, untrained individuals, and physical education students. The measurements evaluated have been gross body weight, lean body mass, strength tests, maximum oxygen uptake, blood chemistry, limb circumference, patellar reflex, latency time, and swimming times. The types of training studied were bench press, sit-ups, pull-ups, hand grip, standing broad jump, single isometric contractions, interval running, and swimming (2,3,12,13,14,15,19,21,22,23,24,25,26,27).

Studies that claimed improvement in athletic performance ranged in length from three weeks to 14 weeks with the average length of time being six weeks. Those studies that did not show an improvement in athletic performance ranged from 17 days to 16 weeks with the average length of time being 9 weeks. As will be noted here, the longer the study was conducted, the less improvement in athletic performance was reported (2,3,5,12,13,14,15,19,21,22,23,24,25,26,27).

The studies that have reported an improvement in athletic performance have used Dianabol (5-20 mg/day) and Nandrolone (50 mg IM every 10-14 days). Those studies that reported that athletic performance was not improved used Dianabol (10-100 mg/day), Oxandrolone (10 and 20 mg/day), Stanozol (6 mg/day), Nandrolone (11 mg/kg and 50 mg at 12-21 day intervals), and Mesterolone (2,3,5,12,13,14,15,19,21,22,23,24,25,26,27).

A question raised by the proponents of steroids is that the studies with negative results, that is, showed no improvement in athletic performance, did not use protein supplements. In those studies reporting an improvement in athletic performance protein supplements were used an average of six weeks. In those studies reporting that athletic performance did not improve, protein supplements were used an average of eight weeks. Therefore, the questions of a lack of protein supplementation is not a valid argument by the proponents of steroids (2,3,5,12,13,14,15,19,21,22,23,24,25,26,27).

### Position Statement on the Use and Abuse of Anabolic-Androgenic Steroids in Sports of the American College of Sports Medicine (20)

Based on a comprehensive survey of the world literature and a careful analysis of the claims made for and against the efficacy of anabolic-androgenic steroids in improving human physical performance, it is the position of the American College of Sports Medicine that:

- (1) The administration of anabolic-androgenic steroids to healthy humans below age 50 in medically approved therapeutic doses often does not of itself bring about any significant improvements in strength, aerobic endurance, lean body mass or body weight.
- (2) There is no conclusive scientific evidence that



extremely large doses of anabolic-androgenic steroids either aid or hinder athletic performance.

(3) The prolonged use of oral anabolic-androgenic steroids (C<sub>17</sub>alkylated derivatives of testosterone) has resulted in liver disorders in some persons. Some of these disorders are apparently reversible with the cessation of drug usage, but others are not.

(4) The administration of anabolic-androgenic steroids to male humans may result in a decrease in testicular size and function and a decrease in sperm production. Although these effects appear to be reversible when small doses of steroids are used for short periods of time, the reversibility of the effects of large doses over extended periods of time is unclear.

(5) Serious and continuing effort should be made to educate male and female athletes, coaches, physical educators, physicians, trainers, and the general public regarding the inconsistent effects of anabolic-androgenic steroids on improvement of human physical performance and the potential dangers of taking certain forms of these substances, especially in large doses, for prolonged periods.

### Adverse Side Effects of Anabolic Steroids

On March 29, 1984, Dr. Wayne Overly of Latrobe Area Hospital in Latrobe, Pennsylvania reported the death of a 26 year-old weightlifter who had abused steroids to build his muscles. This is a documented case of a healthy individual getting liver cancer as a result of abusing anabolic steroids. The liver cancer was the cause of the weightlifter's death (4).

Besides death, other adverse effects associated with the abuse of androgen and anabolic steroids include acne and hirsutism (abnormal hairiness, especially in females). The most frequent adverse effect is virilism. Signs in prepubertal children are pubic hair development, phallic enlargement, increased frequency of erections in males, and clitoral enlargement in females. In males the risk of priapism exists (persistent, abnormal erection of the penis, usually without sexual desire). In females Hirsutism, deepening of the voice, oily skin, alopecia (a disease, like mange in foxes, in which the hair falls out), acne, clitoral enlargement, stimulation of libido (sexual desire), and menstrual irregularities (1).

When anabolic steroids are abused by young individuals, the rate of skeletal maturation may exceed the rate of linear growth, thereby inducing premature closure of the epiphyses and reduces the attainable adult height. Therefore, the youngster who is participating in a sport in which height is advantageous, and abuses steroids, is actually defeating himself (1,9,18).

Androgenic and anabolic steroids with an alkyl group substituted in the alpha position on carbon 17 (i.e., Methyltestosterone [Metandren, Oretol Methyl, or Testered]; Fluoxymesterone [Halotestin]; Ethylestrenol [Maxibolin]; Methandrostenolone [Dianabol]; Oxandrolone [Anavar]; Oxymetholone [Adroyd, Anadrol-50]; Stanozolol [Winstrol]) have produced signs of liver dysfunction. Anabolic steroids are contraindicated in pregnant females because of the masculinization of the female fetus. If the female is sexually active, she may not even know that she is pregnant (1,9,18).

Oxyphenbutazone (Tandearil) is a common anti-inflammatory and analgesic. Anabolic steroids decrease the metabolism of Oxyphenbutazone, resulting in a longer, more intense, and unpredictable response (1,9,18).

### Conclusion

Who does the athlete believe when it comes to deciding whether to abuse anabolic steroids or not? In most cases the athlete will believe whom he or she wants to believe. If the athlete thinks that anabolic steroids will help, he will abuse them. If the athlete realizes that anabolic steroids will not really help improve athletic performance, and/or realizes the medical consequences, he will not abuse anabolic steroids. The Athletic Trainer can have a great influence on the athlete's decision.

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# The Effect of Taping and Exercise on Passive Foot Inversion and Ankle Plantarflexion

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*Information is presented supporting the theories behind adhesive taping and wrapping techniques in reducing ankle injuries. The effect of two taping techniques and exercise on range of motion in ankle plantarflexion and foot inversion was investigated. On the basis of the results obtained in the study, the following conclusions seem warranted: measurements of ankle plantarflexion are similar between the Hinton-Boswell method and the standard taping method before exercise and after exercise; exercise reduces the ability of the Hinton-Boswell and standard taping methods to minimize ankle plantarflexion, but both methods still maintain a stabilizing effect after exercise; the Hinton-Boswell method is initially more restrictive than the standard technique in preventing excessive foot inversion before exercise but neither technique is more effective than the other in this function as a result of exercise; exercise reduces the ability of the Hinton-Boswell and standard taping methods to minimize foot inversion, but both methods still maintain a stabilizing effect after exercise; reliable measures of inversion and plantarflexion can be obtained with the foot and ankle taped as well as untaped using a special instrument designed for this purpose.*

In recent years, a controversy has developed over the effectiveness of adhesive taping and wrapping techniques in preventing ankle injuries. Simon (8) was one of the first investigators to recognize the importance of scientific research to support the use of prophylactic taping. Although the practice of taping ankles has been employed for nearly a century, there remains a lack of scientific evidence to support the use of many current ankle taping methods.

Ankle injuries occur more often than any other type of injury in athletics (3). O'Donoghue (7) states that 85 percent of all ankle injuries are of the inversion type. These injuries occur most often with the foot in a position of plantarflexion. In this position, stress is placed on the anterior talofibular ligament and, to a lesser degree, on the calcaneofibular ligament (1, 5). The majority of adhesive ankle taping methods have been designed to prevent inversion without hindering plantarflexion; however, the extent to which adhesive ankle taping accomplishes this goal is open to question.



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Recently, Hinton (4) reported a new preventive ankle taping method (The Hinton-Boswell Taping Method) designed to prevent inversion injuries when the ankle is in a position of plantarflexion. Hinton (4) contends that this method of taping is more effective than other methods in limiting excess inversion while allowing greater range of motion in plantarflexion. However, no scientific evidence was provided to support this claim.

The new preventive ankle taping method described by Hinton (4) represents an addition to the variety of other methods presently being used. Whether or not this new taping method is, in fact, better than currently used methods in the prevention of injury-causing motion is unknown at the present time.

This study was designed to compare the stabilizing effects of a standard preventive taping method using stirrups and heel locks and the Hinton-Boswell preventive taping method using stirrups and figure sixes on foot inversion and ankle plantarflexion, before and after exercise. A secondary purpose of this study was to establish the reliability of inversion and plantarflexion measurements with the foot and ankle taped as well as untaped.

## Procedures

**Subjects:** Subjects in this study were volunteer Caucasian male physical education majors between the ages of 18 and 22 enrolled at East Stroudsburg State College during the 1980-81 academic year. Sixteen subjects were evaluated in order to determine the reliability of ankle and foot measurements under taped and untaped conditions. Twenty-nine subjects participated in the main portion of the study which dealt with the effects of exercise and the two taping methods on range of motion in foot inversion and ankle plantarflexion. None of the subjects were participating in a sport at the time of investigation. In addition, none of the subjects had any previous history of ankle injury serious enough to restrict them from activity for more than two days.

**Instrumentation:** The instrument used to measure plantarflexion and inversion range of motion is shown



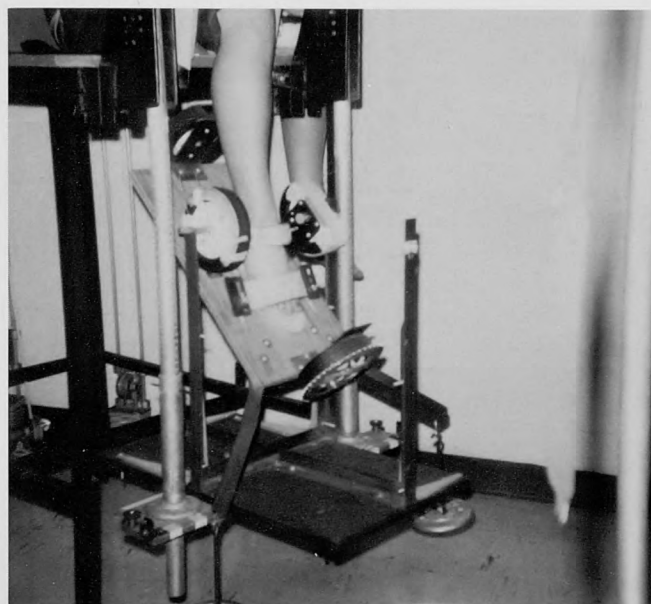


**Figure 1: Apparatus for measuring ankle plantarflexion and foot inversion.**

in Figure 1. The instrument consisted of a table with an adjustable backrest inclined at an angle of 20 degrees. Suspended from the table was a footrest assembly which consisted of a wooden platform to which the subject's foot was secured by means of two adjustable metal foot clamps. The entire footrest assembly could be raised or lowered to accommodate individual leg length. The wooden platform was capable of moving about a frontal and sagittal axis, separately, so that the foot and ankle could be placed in plantarflexion (Figure 2) and inversion (Figure 3), respectively. Protractors placed about each axis enabled range of motion to be measured to the nearest half degree. Weights placed on two weight pans suspended from the front portion of the platform provided torques of 39.45 Nm and 20.33 Nm to produce passive ankle plantarflexion and foot inversion, respectively. To produce plantarflexion motion, metal pins located at the front and back of the wooden platform were removed and motion about the frontal axis was permitted. To produce inversion motion, front and rear pins were replaced and metal pins located on each side of the wooden platform were removed to allow motion about the sagittal axis.

Subjects were tested in a sitting position, as shown in Figure 1. Measurements were taken on the right foot while the subject's left leg hung freely from the side of the table. To accommodate individual leg length, adjustments of the height of the foot platform were made by using a hydraulic jack which lifted the entire footrest assembly. To avoid undesired leg movement, the subject's thigh was secured by knee brackets located on the front of the table. The subject's foot was secured to the measuring platform such that the plantar surface formed a right angle to the longitudinal axis of the lower leg from side and front views. The foot was positioned in a standardized manner so that the assumed axes of the ankle and foot coincided with those of the instrument. Weights were then placed on the weight pans, first, to produce plantarflexion then inversion.

**Test Protocol:** The initial phase of this study was conducted to establish consistency in measuring range of motion of the ankle and foot under taped and untaped conditions. Over a period of one week, 16 subjects reported for 25-minute sessions on two separate days. During each session, measurements were taken in the following manner: a) test and retest were first taken on



**Figure 2: Passive ankle plantarflexion.**

the untaped ankle and b) test and retest were taken on the ankle taped with one of the two taping methods.

The second phase of the study was conducted to determine the effect of exercise and taping methods on range of motion in ankle plantarflexion and foot inversion. Twenty-nine subjects each reported for two testing sessions over a period of four weeks. There was a period of at least 48 hours but not exceeding 96 hours, between testing sessions for each subject. Each testing session lasted approximately one hour. Upon arrival for testing, approximately half of the subjects were first taped by the Hinton-Boswell method while the rest were taped by the standard method. In the next session, the subjects were taped with the other method. Both taping methods were applied to the skin with 1½-inch tape following the application of a tape adherent and lubricated lace pads.

A typical testing session was conducted in the following manner: a) measurements of range of motion of plantarflexion and inversion were taken upon arrival of the subject to the testing site, b) one of the two taping methods was then applied and measurements were repeated, c) the subject then engaged in a series of pres-



**Figure 3: Passive foot inversion.**

cribed exercises, d) ankle and foot measurements were again taken immediately following the exercise bout, and e) the tape was then removed and final measurements of ankle and foot motion were taken.

The exercise bout performed by each subject consisted of five items, each performed for a predetermined period of time. They included: a) running on the treadmill for 6 minutes, b) side shuffle on the treadmill for 6 minutes, c) jumping jacks for 2 minutes, and d) a series of figure-eight runs for one minute. Following these exercises, a period of five minutes was spent in the sauna.

## Results

**Reliability of Measurements:** Pearson Product Moment correlation coefficients were calculated to determine the test-retest reliability of plantarflexion and inversion measurements obtained before taping and also after taping. These results are summarized in Table 1. The correlations for test-retest measurements taken before taping were high, ranging between .93 and .99, and correlations between test-retest measurements of the taped ankle and foot were also high, ranging between .93 and .97. Also summarized in Table 1 are test-retest differences which were non-significant and differed by no more than .38 degree under any comparison. The high correlations and small differences indicate that all movements of the foot and ankle were measured consistently.

**Taping and Exercise Effects:** A summary of mean values for ankle plantarflexion and foot inversion before and after exercise is presented in Table 2. With the ankle taped by the Hinton-Boswell technique, mean values of plantarflexion ranged from 44.97 to 48.83 degrees before and after exercise, respectively. This represents an increase of 3.86 degrees. With the ankle taped by the standard technique, plantarflexion ranged from 45.17 degrees before exercise to 48.72 degrees after exercise; an increase of 3.55 degrees.

With the foot stabilized by the Hinton-Boswell technique, mean values of inversion ranged from 31.66 to 45.62 degrees before and after exercise, respectively. This represents an increase in foot inversion of 13.96 degrees. Mean values of inversion ranged from 33.59 before exercise to 45.69 degrees after exercise when measured with the foot taped by the standard technique. This represents an increase in foot inversion of 12.1 degrees.

A two-way analysis of variance with repeated measures was performed to further analyze measures of plantarflexion and is summarized in Table 3. A non-significant F-ratio ( $F = .09$ ) was found for taping main effect. This suggests that each method of taping influenced plantarflexion similarly before and after exercise. However there was a significant F-ratio ( $F = 134.47$ ) for exercise main effects, indicating that measures of ankle plantarflexion might be significantly different from one another as a result of exercise and under taped versus untaped conditions. Specific mean comparisons were made using Duncan's Multiple Range Test and are summarized in Table 4. The following results were evident: a) plantarflexion was significantly reduced (by 3.57 degrees) as a result of application of a protective taping method, b) a significant increase in plantarflexion (2.19 degrees) of the taped ankle occurred after exercise, c) a significant reduction in ankle motion was still maintained by the taping method after exercise, and d) there was no significant difference (.14 degree) between the untaped ankle's motion before and after exercise.

The analysis of variance among the measures of foot inversion is summarized in Table 5. The F-ratio for taping main effect was initially non-significant ( $F = 2.68$ )

indicating that the Hinton-Boswell and standard taping techniques have similar stabilizing effects against inversion. A significant F-ratio (493.83) for exercise main effect was found indicating that measures of foot inversion might be significantly different from one another due to exercise and under taped versus untaped conditions. However, there was also a significant interaction ( $F = 10.27$ ) between main effects of taping and exercise. Simple effects testing was then carried out using the procedures described by Winer (9), and it was found that, before exercise, the plantarflexion method was 1.93 degrees more restrictive than the standard method. This was statistically significant at the .05

TABLE 1

WITHIN-DAY RELIABILITY COEFFICIENTS AND MEAN TEST-RETEST DIFFERENCES OF ANKLE PLANTARFLEXION AND FOOT INVERSION MEASUREMENTS UNDER TAPED AND UNTAPED CONDITIONS (N=16)

Conditions	Plantarflexion		Inversion	
	r	Test-Retest Difference <sup>a</sup>	r	Test-Retest Difference <sup>a</sup>
No Tape				
Test-Retest Session 1	.98	.32	.93	.32
Test-Retest Session 2	.99	.13	.98	.00
Hinton-Boswell Taping Technique	.95	.38	.93	.19
Standard Taping Method	.97	.06	.95	.31

<sup>a</sup>In degrees

TABLE 2

MEANS<sup>a</sup> AND STANDARD DEVIATIONS OF ANKLE PLANTARFLEXION AND FOOT INVERSION UNDER TAPED AND UNTAPED CONDITIONS BEFORE AND AFTER EXERCISE (N=29)

Conditions	Pre-Exercise		Post-Exercise	
	No Tape	Taped	Taped	No Tape
Plantarflexion:				
Hinton-Boswell Method --- X	48.59	44.97	47.55	48.83
s	3.32	4.13	3.78	3.34
Standard Taping Method --- X	48.69	45.17	46.97	48.72
s	3.05	2.58	2.98	3.38
Inversion:				
Hinton-Boswell Method --- X	45.58	31.66	35.79	45.62
s	3.27	3.58	3.12	3.43
Standard Taping Method --- X	45.17	33.59	36.79	45.69
s	3.91	3.69	3.56	3.94

<sup>a</sup>In degrees

TABLE 3

ANALYSIS OF VARIANCE AMONG MEAN VALUES OF ANKLE PLANTARFLEXION (N=29)

Source of Variation	Sums of Squares	df	Mean Square	F
Between Subjects	2119.66	28	75.70	
Within Subject				
Taping Technique	.52	1	.52	.09
Error	169.10	28	6.04	
Exercise	514.70	3	171.57	134.47 <sup>a</sup>
Error	107.17	84	1.28	
Interaction	5.39	3	1.80	1.30
Error	116.48	84	1.39	
Total	3033.02	231		

<sup>a</sup>Significant at the .01 level



TABLE 4

DIFFERENCES BETWEEN MEAN VALUES<sup>a,b</sup> OF ANKLE  
PLANTARFLEXION BEFORE AND AFTER TAPING AND EXERCISE  
(N=29)

Condition	Pre-Exercise		Post-Exercise	
	No Tape ( $\bar{X}$ = 48.64)	Taped ( $\bar{X}$ = 45.07)	Taped ( $\bar{X}$ = 47.26)	No Tape ( $\bar{X}$ = 48.78)
Pre-Exercise No Tape ( $\bar{X}$ = 48.64)	---	3.57 <sup>c</sup>	1.38 <sup>c</sup>	.14
Pre-Exercise Taped ( $\bar{X}$ = 45.07)	---	---	2.19 <sup>c</sup>	3.71 <sup>c</sup>
Post-Exercise Taped ( $\bar{X}$ = 47.26)	---	---	---	1.52 <sup>c</sup>

<sup>a</sup>Hinton-Boswell and standard technique combined

<sup>b</sup>In degrees

<sup>c</sup>Significant at the .01 level

TABLE 5  
ANALYSIS OF VARIANCE AMONG MEAN VALUES OF FOOT  
INVERSION (N=29)

Source of Variation	Sums of Squares	df	Mean Square	F
Between Subjects	2051.34	28	73.26	
Within Subjects				
Taping Techniques	24.25	1	24.25	2.68
Error	253.63	28	9.06	
Exercise	7488.53	3	2496.18	493.83 <sup>a</sup>
Error	424.60	84	5.05	
Interaction	46.88	3	15.63	10.27 <sup>a</sup>
Error	127.75	84	1.52	
Total	10416.98	231		

<sup>a</sup>Significant at the .01 level

TABLE 6

ANALYSIS OF SIMPLE EFFECTS BETWEEN VALUES OF FOOT  
INVERSION<sup>a</sup> BEFORE AND AFTER TAPING AND EXERCISE (N=29)

Treatment Comparisons	Mean Difference <sup>a</sup>
Between Taping Techniques: Pre-Exercise No Tape	.41
Between Taping Techniques: Pre-Exercise Taped	1.93 <sup>b</sup>
Between Taping Techniques: Post-Exercise Taped	1.00
Between Taping Techniques: Post-Exercise No Tape	.07
Between Pre-Exercise No Tape and Pre-Exercise Taped Conditions with Hinton-Boswell Technique	13.92 <sup>c</sup>
Between Pre-Exercise No Tape and Pre-Exercise Taped Conditions with Standard Taping Technique	11.58 <sup>c</sup>
Between Pre-Exercise Taped and Post-Exercise Taped Conditions with Hinton-Boswell Technique	4.13 <sup>c</sup>
Between Pre-Exercise Taped and Post-Exercise Taped Conditions with Standard Taping Technique	3.20 <sup>c</sup>
Between Post-Exercise Taped and Post-Exercise No Tape Conditions with Hinton-Boswell Technique	9.83 <sup>c</sup>
Between Post-Exercise Taped and Post-Exercise No Tape Conditions with Standard Taping Technique	9.90 <sup>c</sup>
Between Pre-Exercise No Tape and Post-Exercise No Tape Conditions with Hinton-Boswell Technique	.04 <sup>c</sup>
Between Pre-Exercise No Tape and Post-Exercise No Tape Conditions with Standard Taping Technique	.52 <sup>c</sup>

<sup>a</sup>In degrees

<sup>b</sup>Significant at .05 level

<sup>c</sup>Significant at .01 level

level. After exercise, however, significant increases in foot inversion occurred under both taping conditions but there was no longer a difference between the stabilizing effect of the two methods. Both taping methods still maintained a significant stabilizing effect, compared to the increased foot inversion evident after the tape was removed. Finally, there was no significant differences between inversion measures of the untaped foot before and after exercise. A summary of the mean differences tested through simple effects is summarized in Table 6.

## Discussion

The fact that a significant reduction in plantarflexion was found as a result of taping is noteworthy. The two taping methods examined in this study are designed to permit plantarflexion motion of the ankle necessary for athletic performance while at the same time prevent excessive foot inversion. Whether or not the reduction in plantarflexion found in this study would significantly affect athletic performance cannot be determined from the data. However, following exercise, the mean reduction in motion of the taped ankle was only 40 percent of the initial reduction provided by the tape before exercise. This finding is similar to that reported by Fumich (2) who also found that the taped ankle loosened more than 50 percent following a two-and-one-half to three-hour football practice. In the present study, this change amounts to 2.19 degrees, on the average. It would seem that a reduction in motion this small, although significant, might not have any adverse effect on athletic performance. Since all measurements recorded in this study were the result of passive ankle motion, the active contraction of the musculature of the lower leg might have been able to overcome most, if not all, of the remaining restrictions in plantarflexion provided by taping. Perhaps a longer period of exercise might also have caused further loosening of the taped ankle, but this would have to be determined through further study. Finally, no problems were encountered by the subjects while they were performing the exercises specifically designed to place stress on the taped ankle. McCorkle (6) found that taping had no effect on performance time in the same agility run used in this study, but the taping methods used by McCorkle (6) were different from those used in this study.

It is noteworthy that the Hinton-Boswell method provided 1.93 degrees more restriction against foot inversion than the standard taping technique before exercise. After exercise, neither method had a significantly greater stabilizing effect on foot inversion than the other. There are several possible explanations for these results. First, the Hinton-Boswell taping method may, in fact, be better at restricting inversion motion than the standard taping method when first applied. Secondly, the Hinton-Boswell method may have been applied more tightly than the standard method of taping, although there was no conscious intent on the part of the investigator to do this. No provisions were made for measuring the force used to apply the tape using either method. However, the results of the reliability measurements indicated that both taping methods were consistently applied. It is possible then, that the unique design of the Hinton-Boswell taping method provides greater stability to the foot against inversion than the standard taping method, when first applied. The fact that there was no difference in the stabilizing effect provided by either method following exercise would seem to be a more pertinent criterion for selection of a taping method. Moreover, both techniques still had a significant stabilizing effect even after exercise. This means that both taping methods are performing in accordance with their design; namely, to

prevent excessive foot inversion during and following exercise and therefore both would seem equally suitable for use. Furthermore, the mean increases in inversion allowed by both taping methods after exercise were less than 50 percent of the initial reduction in motion caused by taping. As with plantarflexion, this finding is consistent with that of Fumich (2) who also found less than a 50 percent increase in inversion motion following a two-and-one-half-hour to three-hour football practice. More research is needed to determine if the residual stabilizing effect provided by either or both taping techniques is sufficient to help in the prevention of ankle injuries. This is an important consideration since in the present study a significant increase in foot inversion motion did occur as a result of only 20 minutes of exercise. Perhaps longer periods of exercise might result in further increases in foot inversion. It would be advisable in future studies to examine the stabilizing effects provided by various taping techniques periodically, within a single session, during athletic competition or prolonged exercise.

It should be noted that little if any tearing of tape occurred after exercise regardless of which taping technique was used. However, a gap in the tape was present in the Hinton-Boswell taping method, but no blisters were evident on any of the subjects after exercise. Finally, the taping methods used in this study were designed to prevent foot inversion while permitting ankle plantarflexion. The greater initial stabilization against inversion (13.9 and 11.6 degrees for the Hinton-Boswell and standard method, respectively) as compared to plantarflexion (only 3.6 and 3.5 degrees for the Hinton-Boswell and standard method, respectively) indicates that both taping methods are supporting the ankle and foot in accordance with their intended purpose.

Evidently, both taping methods provide significant residual stability to the foot and ankle after a 20-minute exercise session, and would seemingly be useful in providing support during light, everyday activities; particularly to a foot and ankle that is weak or in the process of rehabilitation. Since the Hinton-Boswell method was more restrictive before exercise, perhaps this would be the more appropriate method to use to stabilize against lighter workloads. Certainly further research would provide additional information relative to this question.

### Summary and Conclusions

The effect of two taping techniques and exercise on range of motion in ankle plantarflexion and foot inversion was investigated. On the basis of the results

obtained in the study, the following conclusions seem warranted:

1. Measurements of ankle plantarflexion are similar between the Hinton-Boswell method and the standard taping method before exercise and after exercise.
2. Exercise reduces the ability of the Hinton-Boswell and standard taping methods to minimize ankle plantarflexion, but both methods still maintain a stabilizing effect after exercise.
3. The Hinton-Boswell method is initially more restrictive than the standard technique in preventing excessive foot inversion before exercise but neither technique is more effective than the other in this function as a result of exercise.
4. Exercise reduces the ability of the Hinton-Boswell and standard taping methods to minimize foot inversion, but both methods still maintain a stabilizing effect after exercise.
5. Reliable measures of inversion and plantarflexion can be obtained with the foot and ankle taped as well as untaped using a special instrument designed for this purpose.

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# The Effects of Cryotherapy and PNF on Hip Extensor Flexibility

William Cornelius, PhD  
Allen Jackson, EdD

*Techniques of enhancing muscle flexibility gain by investigating a combination of PNF and cryotherapy indicate that cold application, in conjunction with PNF, is significantly more productive in flexibility than PNF alone.*

Most sports programs include flexibility exercise in an already crowded training schedule. Although it appears that the contemporary practitioner places importance on the values derived from a regular stretching program, many active individuals continue to be frustrated in their efforts to improve joint range of motion. A direct relationship between time spent and positive flexibility results does not necessarily result, even though considerable time increment may be expended with flexibility maneuvers during regular practice sessions. Consequently, the multifaceted benefits realized from effective flexibility methods have been quite elusive for a large number of individuals. Continued research involving effective and innovative flexibility techniques is therefore appropriate.

According to Knight (5), ample evidence exists supporting the notion that Cryotherapy provides beneficial effects for stretching during rehabilitation. Holt (3) and Knight (5) both support the idea of Cryotherapy to facilitate joint range of motion.

Furthermore, Prentice (8), Cornelius and Hinson (2), Tanigawa (10), and Holt, Travis and Okita (4) indicate that modified Proprioceptive Neuromuscular Facilitation (PNF) flexibility procedures are more effective than conventional techniques. The effectiveness of Cryotherapy used in conjunction with PNF technique has not, however, been established in the literature. The purpose of this investigation, therefore, was to determine the efficacy of the use of PNF stretching techniques upon hip extensor flexibility while using Cryotherapy.

## Methodology

The sample for this investigation were males, who were enrolled in physical education activity classes at North Texas State University. Criteria for the selection of subjects included those who had not selected physical education as a major or minor field of study, were not a member of an intercollegiate athletic team, were free from any known injuries or disabilities to the hip and legs, and were between the ages of 17 and 26 years. Subjects meeting all selection criteria were invited to participate in the study on a voluntary basis and were

given the opportunity to withdraw from the study at any time.

Consistent with accepted Cryotherapy treatment (3, 5), subjects were first given a 10 minute cold application to the skin over the hip extensors (shown in Figure 1) at temperatures ranging between 20°F and 22°F. Cold packs were kept at this temperature by utilizing a Col Pac Hydrocollator Master Chilling Unit, Model C-F.

Subjects (n=30) were randomly assigned to two PNF treatment groups. Group 1, PCP (Passive, contract, passive) performed a passive stretch of the hip extensors, agonist, then did a concentric contraction of the hip flexors, antagonist, and lastly gave another passive stretch of the agonist. Group 2, PI<sub>3</sub>CP, followed the same procedures except in between the first passive stretch and the concentric contraction of the hip flexors they did a three maximum voluntary isometric contraction of the hip extensors. A passive, static stretch (S) of the hip extensors served as a baseline measure and preceded the PNF procedures for all subjects.

The subjects were given three trials and a Leighton Flexometer was used to measure the resulting range of motion at the hip (dependent variable). All measures were taken at a terminal position of hip flexion during a passive, static flexibility maneuver indicated in Figure 2.

The design was a two (PNF condition) by four (trials) while using Cryotherapy. The data were analyzed with analysis of variance techniques (11). The reliability of the data was estimated using intraclass correlation procedures.

## Results

The descriptive statistics of the data are presented in Table 1. A one way analysis of variance on the pretest data indicated there was no significant differences between the conditions on the baseline static stretch. The average of trials 1 to 3 ( $\bar{x}$ =107.56) which occurred after manipulation was significantly ( $p<.01$ ) higher than the baseline average ( $\bar{x}$ =87.42) which verifies that PNF procedures were producing significant improvements in range of motion. A two (PNF condition) by four (Trials) ANOVA with repeated measures revealed a significant condition by trials interaction ( $p<.02$ ). The interaction can be characterized by a superior improvement across trials in the PI<sub>3</sub>CP condition and this is depicted in Figure 3. The reliability of the range of

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motion data was 0.97 indicating a high degree of true score variation.

## Discussion

The investigation revealed that PI<sub>3</sub>CP procedures resulted in significantly greater joint range of motion in flexion at the hip than did PCP procedures when Cryotherapy was applied to the agonist for 10-minutes prior to stretching. Furthermore, both PI<sub>3</sub>CP and PCP modified PNF stretching procedures resulted in significantly greater flexibility than a passive, static stretch. Cornelius and Hinson (2) however, found no difference between PI<sub>3</sub>CP and PCP under a no cold condition. Both Prentice (8) and Cornelius and Hinson (2) found PNF stretching procedures without cold application resulted in greater flexibility than did a passive, static stretch. Treatment differences between the S and PNF flexibility procedures in the present investigation were similar to those found by Cornelius and Hinson (2). Although the investigation by Cornelius and Hinson (2) did not demonstrate a significant difference between PNF flexibility procedures, the PI<sub>3</sub>CP procedure did provide 2.91 degrees greater range of motion than did PCP.

TABLE 1  
MEANS AND STANDARD DEVIATIONS

GROUP	HEIGHT	WEIGHT	BASELINE	TRIALS		
				1	2	3
PCP	70.1±2.5	155.6±20.2	86.6±10.3	101.5±10.5	104.4±8.6	104.8±8.4
PICP	70.7±2.7	154.2±18.0	88.3±8.5	109.1±11.2	112.7±13.4	112.8±13.6

HEIGHT IN INCHES.

WEIGHT IN POUNDS.

FLEXIBILITY MEASURED IN DEGREES OF MOTION.

Practical application of PI<sub>3</sub>CP used in conjunction with PNF stretching procedures can have some limitations. Both reduced tissue temperature and muscle contractions of the agonist and/or antagonist apparently can be justified only under certain circumstances. Sepega (9) suggested Cryotherapy used for increasing joint range of motion be limited to relieving adhesions, decreasing movement restrictions due to pain, and for reducing muscle plasticity. Nimchick and Knight (7) and Knight and Londeree (6) suggest, however, that cold application can be very effective in rehabilitation programs involving musculoskeletal injuries. Applications of cold, according to Knight and Londeree (6), decrease neural inhibition and pain which can be limiting to movement. Obviously, maneuvers connected with PNF flexibility procedures, such as isometric contractions of an injured agonist muscle or concentric contractions of a traumatized antagonist muscle, could result in further damage to soft tissues.

There appears to be important values that can be derived from maneuvers associated with PNF flexibility techniques. Cornelius and Hinson (2), Holt (3), and Tanigawa (10) suggested that modified PNF flexibility procedures dealing with the utilization of an isometric contraction of the agonist muscle succeeding a slow, passive stretch is followed by muscle relaxation. Tanigawa (10) concluded that this neurophysiological phenomenon stems from autogenic inhibition. The inhibition mediated from the stretched muscle acts on the motoneurons providing for the stretched muscle causing

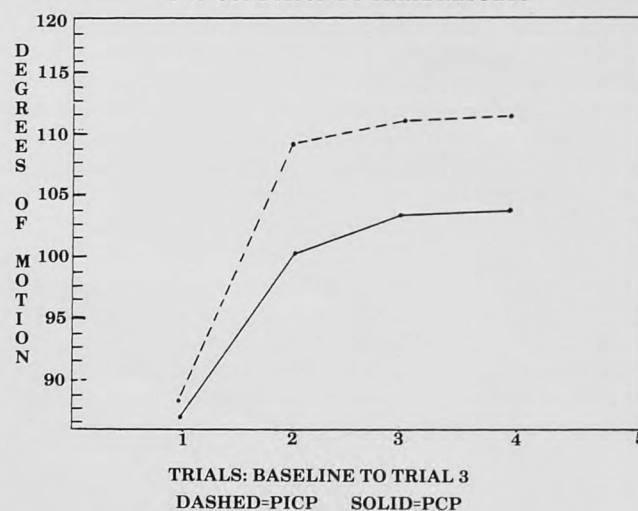


Figure 1



Figure 2

FIGURE 3  
PNF CONDITION BY TRIAL RESULTS



relaxation. Similarly, a concentric contraction subsequent to an isometrically contracted muscle which was placed on a slow, passive stretch is also accompanied by relaxation due to reciprocal inhibition. According to

*Continued on page 199*



# Is Exercise Physiology Reaching Professional Football?

Arlette Cohen, PhD  
Michael O'Shea, ATC  
John Behrens, ATC

Today, more than ever before, the demand for athletic excellence in both professional and amateur sports exceeds the limits of physical tolerance and functional capability. Each four year olympic outing hails new world records, faster times, and higher quality performances. The training facilities in Colorado Springs, Colorado and Lake Placid, New York represent a more scientific approach to exercise testing and training of Olympic caliber athletes. The employment of exercise physiologists and experts in biomechanics suggest a new direction to benefit the athlete and improve his/her performance.

The question is whether or not the older more established ranks of professional athletes are capitalizing on the recent advances in exercise physiology and available research. Some of the outdated training procedures used in professional sports are being replaced by more scientifically sound methods. The heavy red meat and potato ritual is shifting to a well-balanced meal with emphasis on complex carbohydrates. The avoidance of fluid intake during practice as a means of perpetuating the more "disciplined athlete" is being replaced by encouragement to drink as much as necessary during and after practice.

The following report is based on a questionnaire sent to 28 professional football teams in the National Football League. A total of 25 athletic trainers returned completed questionnaires (89% return).

## Pre Practice Supplements

In response to giving salt and/or other electrolyte tablets before practice, 92% of the trainers do, 8% do not.

The most popular tablet taken by players is Fosfree®. This is a high calcium supplement which is used to prevent cramping and neuromuscular disorders. It is given to cramp prone athletes a few hours before practice.

Salt tablets, K-Lyte®, and Sports Mins® are also quite popular being used by 40%, 36%, and 32% of the teams

respectively. The majority of teams use a combination of these supplements.

Most of the salt tablets taken are a supplement called Slo Salt K®. This contains small dosages of sodium chloride, and potassium and helps to delay gastric emptying causing less digestive disturbances for athletes. K-Lyte® is a high potassium supplement which helps to replenish depleted stores of this mineral. Sports Mins contain a combination of essential minerals.

Two out of 25 responding teams (8%) give nothing to players either before or after practice.

## Post Practice Supplements

K-Lyte is the most popular supplement given to players after practice. A total of 36% of the teams supply K-Lyte. 32% of the teams receive Fosfree; 32% administer salt tablets; and 28% give Sports Mins after practice. Salt and other electrolyte tablets are given to players in order to replenish the loss of the electrolytes in heavy sweating.

## Function of Sweat Glands

The main purpose of sweating is to prevent hypothermia. For every gram of sweat evaporating from the skin, a loss of .58 kilocalories of heat occurs (1). Primary sweat is an isotonic fluid containing approximately 50 mEq/liter of sodium, 40 mEq/liter of chloride, 4.5 mEq/liter of potassium and 3.25 mEq/litre of magnesium (2). The fluid then moves through a duct toward the dermis of the skin at which point sodium chloride is reabsorbed and potassium and bicarbonate ions are secreted. The emergent sweat becomes a hypotonic solution containing 99% water. At rest the body's ability to conserve electrolytes is commensurate with its ability to promote evaporation and cooling. In heavy exercise the body's ability to conserve electrolytes during rapid fluid losses is questionable (3). It has been postulated that successive exercise in the heat causes severe losses of sodium, chloride, and/or potassium leading to neuromuscular cramping and heat stress (4).

## How Does Aldosterone Affect Sodium Reabsorption?

Reabsorption of sodium and chloride appear to be under control of the mineralcorticoids, essentially Aldosterone (5). The activity of aldosterone is greatly

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TABLE 1 SPECIFIC TABLETS GIVEN TO PLAYERS BEFORE AND AFTER PRACTICE

TYPE OF TABLET	BEFORE PRACTICE		AFTER PRACTICE	
	# of Teams	% of Total	# of Teams	% of Total
1. Salt Tablets	10	40%	8	32%
2. Sport Mins <sup>®</sup>	8	32%	7	28%
3. Sport C's	1	4%	1	4%
4. Fosfree <sup>®</sup>	12	48%	8	32%
5. K-Lyte <sup>®</sup>	9	36%	9	36%
6. Other	5	20%	4	16%
7. None	2	8%	2	8%

\* all responses are rounded off to nearest percent

TABLE 2 FLUIDS ADMINISTERED DURING AND AFTER PRACTICE

TYPE OF FLUID	DURING PRACTICE		AFTER PRACTICE	
	# of Teams	% of Total	# of Teams	% of Total
1. Water	20	80%	16	64%
2. Gatorade <sup>®</sup>	10	40%	14	56%
3. Sqwincher <sup>®</sup>	2	8%	3	12%
4. Pripops <sup>®</sup>	1	4%	5	20%
5. Quick Kick <sup>®</sup>	1	4%	3	12%
6. Other	4	16%	4	16%

TABLE 3 ADMINISTRATION OF VITAMIN & PROTEIN SUPPLEMENTS TO PLAYERS

SOURCES OF SUPPLEMENTS	AFFIRMATIVE		NEGATIVE	
	# of Teams	% of Total	# of Teams	% of Total
1. Vitamins	19	76%	6	24%
2. Proteins	12	48%	13	52%

TABLE 4 PREFERRED EQUIPMENT FOR STRENGTH AND REHABILITATION

TYPE OF EQUIPMENT	STRENGTH TRAINING		REHABILITATION	
	# of Teams	% of Total	# of Teams	% of Total
1. Free weights	23	92%	15	60%
2. Nautilus	22	88%	5	20%
3. Cybex	11	44%	18	72%
4. Orthotron	12	48%	18	72%
5. Kinetron (includes Fitron and Mini-Gym)	5	20%	4	16%

increased during exercise due to increases in plasma renin activity and angiotensin mediated by the renal juxtaglomerular mechanism.

Appenzeller and Atkinson (6) have cited numerous cases in the literature suggesting a time delay in the onset of aldosterone which may last anywhere from 30 minutes to two hours, and may have a significant impact upon the short and high intensity exercise bouts of football players. Sodium reabsorption may not become physiologically effective until the exercise bouts are over. This lends support to the administration of dilute

salts solutions (hypotonic) prior to high intensity exercise. In heavy sweating, 1/3 teaspoon of salt added to one liter of water has been recommended (40).

In a study by David Costill (7) it was shown that neither sodium nor chloride were significantly decreased following successive days of running for approximately one hour per session. Water was given ad libitum and subsequent sodium ingestion equalled 188 mEq/day. Costill also found that muscle potassium levels actually increased and plasma potassium remained unchanged after the intense running schedule. It was thought that hemodilution was responsible for the hypokalemic state reported in earlier studies.

One factor that must be considered when examining the literature, is the salt content in the diet of many athletes. The higher than average salt content in the diet of many football players may act to minimize electrolyte deficiencies encountered during practice.

### Administration of Fluids During Practice

Dehydration is probably the biggest problem confronting football players. A total of 84% of the teams responding give fluids during practice. Water is the most popular followed by Gatorade<sup>®</sup> and other drinks such as Sqwincher<sup>®</sup>, Pripops<sup>®</sup>, and Quick Kick<sup>®</sup>. The most popular combination of fluids taken both during and after practice is water and Gatorade. Gatorade is a 4% sucrose and 2% glucose solution. It also contains sodium, potassium, chloride, and phosphates in proportion to concentrations of these electrolytes in plasma. Fluids which can be ingested without causing either swelling (hemolysis) or shrinkage (crenation) of blood cells are said to be isotonic. A .9% solution of sodium chloride and/or 5% glucose solution is approximately isotonic (3).

Appenzeller and Atkinson (6) report a greater increase in plasma volume following intake of water as opposed to drinking electrolyte containing fluids. Paralleling an expanded plasma volume is an increase in sodium reabsorption. The authors' views are based on work done with athletes exercising over a 5-day period. Appenzeller and Atkinson refer to the athletes "protective cushion" against intracellular fluid losses. Based on their review, water alone is sufficient to restore normal fluids and electrolyte balance. This work is supported by Costill (8) who reports that adding electrolytes to fluids only increases the osmolality and delays gastric emptying.

As a general rule, football players should be weighed before and after each practice. If weight loss exceeds 2% of body weight, the cardiovascular and thermal regulatory systems may be seriously compromised (1). Under such conditions athletes should be encouraged to drink fluids to prevent dehydration.

### Vitamin and Protein Supplementation

Of the teams given vitamins, 62% give to all players, 26% give to players only upon request, and 12% give vitamins upon physicians' request only.

Vitamins are classified as either water or fat soluble. Most of the water soluble vitamins function as necessary components of coenzymes important in the central metabolic pathway. The fat soluble vitamins serve other important functions i.e., vitamin A serving a visual function in the formation of red cells; vitamin K serving a function in the blood clotting mechanism (3).

Vitamins are stored to some extent in all cells. Some vitamins are stored to a major extent in the body. Vitamin A and D can be stored for up to 2 months in the liver. Water soluble vitamins are not stored as well and must be kept at adequate levels through proper diet (3).



The requirements of vitamins vary considerably from person to person. The greater a person's size, the greater his/her vitamin requirement. Indeed, football players may need a greater quantity of vitamins than recommended for the average adult male. These players, however, consume a greater quantity of food containing many of the vitamins. Exercise for the most part does not increase the vitamin needs of an individual. During exercise the requirements of thiamine (B complex) may be increased due to its co-enzyme function during the conversion of pyruvate to acetyl co-A in the tricarboxylic cycle (3). Utilization of greater amounts of carbohydrates (as occurs in higher intensity exercise) necessitates greater activity levels of coenzymes involved in glycolysis.

There is no data to support the fact that large doses of vitamins enhance fitness and athletic performance (6). The indiscriminate dispensing of vitamins to players can lead to medical problems. Vitamin C in large doses can lead to rebound scurvy. Excessive vitamin C is converted to oxalate which may precipitate kidney stones (9). According to the Health Letter, ingestion of high levels of vitamin C can destroy as much as 95% of vitamin B-12 consumed in a meal containing moderate amounts of B-12 (10). Vitamin B-6 in large doses can lead to jaundice and liver dysfunction (9). Excess vitamin E in animals interferes with bone calcification and growth, elevated fat in the liver and decreases absorption of vitamin E and K. It may also increase the time required for blood clotting. People using anticoagulants such as Coumadin are advised not to take vitamin E. The most common disturbances of people taking excess vitamin E are nausea, gas, and diarrhea (11). There is no sound documentation research stating the protein requirements of athletes. In the average male an allowance of 1 gram of protein per kilogram of body weight is more than adequate in most situations (12). According to Apenzeller and Atkinson (6), activities such as weight lifting and throwing cause lean body mass and nitrogen retention to increase. This increase is augmented by higher protein intake. The authors suggest that these types of athletes may benefit from protein intake of almost 2.4 grams per kilogram of body weight per day. Anything more than this causes extra work for the kidneys eliminating nitrogenous end products of digestion. The liver also works overtime in converting extra protein into fat.

This survey shows that 48% of the teams give out protein supplements to their players. The majority of these supplements, however, are given with a physician's recommendation only.

The authors fail to understand the tremendous indulgence in vitamin and protein supplementation. Perhaps advertising campaigns professing beneficial and therapeutic effects of vitamin supplementation have reached the ranks of professional football. Our records show that the players themselves ask for vitamins and that these supplements are made available to them upon request.

### **Strength Training and Rehabilitation**

The questionnaire shows that free weights are most frequently used for strength training. Free weights work muscles isotonicity. In an isotonic contraction, resistance is constant and the tension is varied throughout the entire range of motion. It is most popular among athletes because neuromuscular patterns and range of motion are predominately limited by the body's connective tissue, joint capsule, and muscle tissue instead of the mechanical devices of machines. There is less restriction in movement patterns and this greater freedom

of movement more closely resembles neuromuscular coordination required in football.

Nautilus machines are the second most popular piece of strength training equipment. This system relies upon disk-shaped cams for achieving maximum resistance throughout the entire range of motion. The resistance is weakest at the weakest point in the joint angle. The advantages of free weights over isokinetic machines have been debated and discussed elsewhere (13, 14).

The Cybex and Orthotron work isolated and individual muscle groups isokinetically and are most frequently used for rehabilitation. Both machines operate at controlled velocities so that resistance is proportional to muscular capacity at every point within the entire range of motion and tension generated is maximum throughout the entire range of motion (1).

Both the Fitron and Mini-Gym work muscles isokinetically. The Fitron is actually a stationary bicycle ergometer which helps improve cardiovascular endurance as well as quadriceps strength and endurance.

### **Nutrition and Athletic Performance**

The questionnaires show that there are relatively few vegetarians in football. A total of 14 vegetarians are dispersed among 9 teams. Only 1% of the total number of players in the NFL are vegetarians. Many of the trainers commented that their players go through periods when they are on a vegetarian diet and other periods when they are not.

There are only four teams in football that report giving high energy bars before a game. During heavy exercise at near maximal workloads glycogen is the major fuel source for muscular work. The energy metabolism is predominately anaerobic and leads to an accumulation of lactic acid. Lactic acid suppresses free fatty acid mobilization which further limits the metabolic fuel source to carbohydrates. It has been shown that high energy food bars taken before a game are relatively useless. Stored muscle glycogen is a more readily available substrate for energy metabolism than exogenous glucose. It is true that some glucose from the blood enters the muscle cell at all times. This amount, however, is negligible especially in the high intensity work-out bouts of football. The entrance of glucose into muscle cells becomes a factor only when prolonged exercise results in depleted glycogen stores. In a sport such as football, the body preferentially utilizes stored glycogen for energy sources (12).

The ingestion of carbohydrates before a game may be deleterious to performance. Elevated glucose levels initiate a temporary increase in insulin. The pre-game inflation of glucose and insulin levels suppress the player's normal output of glucose. According to Costill (9), this causes a rapid decline in blood glucose resulting in clinical levels of hypoglycemia after exercise has begun. The athlete resorts to greater muscle glycogen utilization and may actually fatigue from the pre-exercise carbohydrate load. Costill (8) recommends a carbohydrate type meal no later than two and a half to three hours prior to the event.

Most teams (23 teams - 92%) have their big meal at least 4 hours in advance of their game. During the season, lunch is generally the pre-game meal. In summer training camp, teams provide 3 meals per day. Although most players control their own diet, 16% of the trainers emphasize a high carbohydrate diet, and 14% emphasize a well balanced diet. A total of 70% of the players choose their own diet. None of the trainers emphasize a high protein diet.

Because the digestion of a meal causes redistribution of blood from the muscles to the gastrointestinal organs,

physical exercise shortly after a meal will result in a competition between the muscles of digestion and the working muscles for available blood and energy supplies. Generally, pregame meals should be light and ingested no later than 2½ to 3 hours before a big athletic event (2).

### Summary

Based on this questionnaire, the professional football teams follow some good and other poor training practices. The intake of fluids is encouraged during and after practices; trainers encourage well-balanced meals with an emphasis on complex carbohydrates; and sufficient time is allotted between the last big meal and the game.

The tremendous utilization of salt and other electrolytes is unwarranted and even hazardous. The fact that four teams do not drink any stated fluids provides even greater cause for concern. The free dispensing of vitamins by the majority of teams is a questionable procedure and can lead to cellular toxicity, destruction of other vitamins, and essential minerals. The tremendous utilization of salt tablets, K-Lyte, and Fosfree before and after practice causes hypertonicity of tissue cells and is not recommended. Based on the available research, plain cold water is most beneficial in preventing dehydration. Cold drinks empty more rapidly from the stomach than warmer fluids (15). They also cool gastric temperature. The encouragement to drink during and after practice is imperative, particularly during the summer months when reduction in fluid volume can drop to dangerously low levels and precipitate symptoms of heat stroke and exhaustion. Moreover, certain positions in professional football have been shown to lose large amounts of body weight in a single practice session (16).

The fact that four teams still dispense high energy bars before a game reinforces outdated procedures. The ingestion of carbohydrates immediately prior to the game perpetuates a hypoglycemic response resulting in decreased availability of free fatty acids during vigorous activity and earlier fatigue (7).

Future research should incorporate further in depth surveys and subsequent follow-up questionnaires sent to professional football teams. Such research should be expanded to include other professional sports i.e.: baseball, basketball. The evaluation of scientific training methods is imperative for quality preparation and ultimately performance of professional athletes.

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*Continued on page 208*



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# ANNUAL SURVEY OF FOOTBALL INJURY RESEARCH 1931-1983

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National Collegiate Athletic Association Committee on  
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and

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**Prepared for:**

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National Collegiate Athletic Association, Shawnee Mission, Kansas  
The National Federation of State High School Associations,  
Kansas City, Missouri

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## Section I

### INTRODUCTION

In 1931 the American Football Coaches Association initiated the First Annual Survey of Football Fatalities. The original survey committee was chaired by Marvin A. Stevens, M.D., of Yale University, who served from 1931-1942. Floyd R. Eastwood, Ph.D., Purdue University, succeeded Dr. Stevens in 1942 and served through 1964. Carl S. Blyth, Ph.D., University of North Carolina at Chapel Hill, was appointed in 1965 and served through the 1979 football season. In January 1980, Frederick O. Mueller, Ph.D., University of North Carolina at Chapel Hill, was appointed by the American Football Coaches Association and the National Collegiate Athletic Association to continue research under the new title, Annual Survey of Football Injury Research.

#### Data Collection

Throughout the year, upon notification of a suspected football fatality, immediate contact is made with the appropriate officials (coaches, admin-

istrators, physicians and trainers.) Pertinent information is collected through questionnaires and personal contact. In every case during the past year the appropriate officials responded to the inquiries. Data collection forms were returned and, in many cases, covering letters giving valuable information were included.

Football fatalities are classified for this report as direct and indirect. The criteria used to classify football fatalities are as follows:

**Direct** — Those fatalities which resulted directly from participation in football.

**Indirect** — Those fatalities which are caused by systemic failure as a result of exertion while participating in football activity or by a complication which was secondary to a non-fatal injury.

In several instances of reported football fatalities, the respondent stated that the fatality should not be attributed to football. Reasons for these statements are that the fatally injured was not playing football when

the accident occurred or that the fatality was attributed to physical defects that were unrelated to football injuries.

Dr. Mueller compiled and prepared the survey report on college, professional and sandlot levels, and Mr. Richard D. Schindler of the National Federation of State High School Associations assumed complete responsibility for collecting and preparing the senior and junior high school phase of the study.

At the conclusion of the football season, both reports are compiled into this Annual Survey of Football Injury Research. This report is sponsored by the American Football Coaches Association, the National Collegiate Athletic Association, and the National Federation of State High School Associations.

#### Acknowledgements

This 1983 report was compiled with the assistance of association executive officers, high school and college coaches, athletic directors, school administrators, physicians, a national

newspaper clipping agency, and professional associates of the authors. Dr. Carl S. Blyth served as a consultant for the 1983 report.

## Section II

### Summary

1. Four fatalities were directly related to football during the 1983 season. All four of the direct fatalities occurred in high school. There were no direct fatalities in college. (Table I)

2. The incidence of direct fatal injuries is very low on a 100,000 player exposure basis. For the approximately 1,575,000 participants in 1983, the number of direct fatalities was .25 participants per 100,000 players.

3. The incidence of direct fatalities in high school football was .30 participants per 100,000 players. The incidence of direct fatalities in college was 0.00 participants per 100,000 players. (Table III)

4. Most direct fatalities usually occur during regularly scheduled games. During the 1983 season three direct fatalities occurred in games and one in practice.

5. The 1983 survey shows that of four direct fatalities one occurred in August, one in September, and two in October.

6. The major activities in football would naturally account for the greatest number of direct fatalities. In 1984 two players were injured on defensive play (exact cause unknown), one player was tackled head on, and one player was participating in a one-on-one blocking drill. (Table V)

7. In 1983 all four direct fatalities resulted from injuries to the head. (Table VI)

8. In many cases football cannot be directly responsible for fatal injuries (heat stroke, heart failure and so forth). In 1983 there were nine indirect fatalities. Seven of these were the result of heart failure, one from a congenital brain defect, and one from heat stroke. Six of the indirect fatalities were associated with high school football and three in college football. (Table VIII)

9. In addition to the direct and indirect fatalities there were three fatalities not related to football. Two of these fatalities were in high school football and the causes of death were lightning and natural causes. One fatality was in college football and the cause of death was lightning.

## Section III

### DISCUSSION AND RECOMMENDATIONS

The 1983 survey shows that there has been a major reduction in direct fatalities from nine in 1982 to four in

1983. The trend for fewer football fatalities, when compared to fatality data collected for the past 25 years, has continued in 1983. Progress has been made and an all out effort must be made to continue this trend and to avoid another rise in direct fatalities.

### Head and Neck Injuries

Past efforts that were successful in reducing fatalities to the level indicated in the 1979 and 1983 data should again be emphasized. Rule changes for the 1976 football season which eliminated the head as a primary and initial contact area for blocking and tackling is of utmost importance. Since 1960 most of the direct fatalities have been caused by head and neck injuries. The 1983 survey shows that all four of the direct fatalities resulted from injuries to the head. We must continue to reduce head and neck injuries.

Several suggestions for reducing head and neck injuries are as follows:

1. Athletes must be given proper conditioning exercise which will strengthen their necks so that participants will be able to hold their heads firmly erect when making contact.

2. Coaches should drill the athletes in proper education in the fundamentals of football skills, particularly blocking and tackling.

3. Coaches and officials should discourage the players from using their heads as battering rams when blocking and tackling. The rules prohibiting spearing should be enforced in practice and in games. The players should be taught to respect the helmet as a protective device and that the helmet should not be used as weapon.

4. All coaches, physicians, and trainers should take special care to see that the players' equipment is properly fitted, particularly the helmet.

5. When a player has experienced or shown signs of head trauma (loss of consciousness, visual disturbances, headache, inability to walk correctly, obvious disorientation, memory loss), he should receive immediate medical attention and should not be allowed to return to practice or game without permission from the proper medical authorities.

Another important effort has been and continues to be the improvement of football protective equipment under the guidance of the National Operating Committee on Standards for Athletic Equipment (NOCSAE). The NOCSAE organizations continue their research on improving helmets for football. It is imperative that old and worn equipment be properly renovated or discarded and continued em-

phasis be placed on developing the best equipment possible. Manufacturers, coaches, trainers, and physicians should continue their joint and individual efforts toward this end.

The authors of this survey are convinced that the current rules which eliminate the head blocking and tackling, the helmet research conducted by NOCSAE, and better medical supervision have played the primary role in reducing fatalities and serious head and neck injuries in football.

### Heat Stroke

A continuous effort should be made to eliminate heat stroke deaths associated with football. Since the beginning of the survey through 1959 there were five cases of heat stroke deaths reported. From 1960 through 1983 there have been seventy heat stroke cases which resulted in death (Table IV). Since 1974 there has been a dramatic reduction in heat stroke deaths with the exception of 1978 when there were four. One death was associated with heat stress in 1983. All coaches, trainers, and physicians should continue their efforts toward eliminating athletic fatalities which result from physical activity in hot weather.

Heat stroke and heat exhaustion are prevented by careful control of various factors in the conditioning program of the athlete. When football activity is carried on in hot weather, the following suggestions and precautions should be taken:

1. Each athlete should have a complete physical examination with medical history and an annual health history update. History of previous heat illness and type of training activities before organized practice begins should be included.

2. Acclimatize athletes to heat gradually by providing graduated practice sessions for the first seven to ten days and other abnormally hot or humid days.

3. Know both the temperature and humidity since it is more difficult for the body to cool itself in high humidity. Use of a sling psychrometer is recommended to measure the relative humidity and any time the wet-bulb temperature is over 78° practice should be altered.

4. Adjust activity level and provide frequent rest periods. Rest in cool, shaded areas with some air movement and remove helmets and loosen or remove jerseys. Rest periods of 15-30 minutes should be provided during workouts of one hour.

5. Provide adequate water replacement during practice. Water should always be available and in **unlimited quantities** to the athletes.



### **Give Water Regularly.**

6. Salt should be replaced daily, and liberal salting of the athletes' food will accomplish this purpose. Coaches should not provide salt tablets to athletes while they practice. Attention must be directed to water replacement.

7. Athletes should weigh each day before and after practice and weight charts checked in order to treat the athlete who loses excessive weight each day. Generally, a three percent body weight loss through sweating is safe, and a five percent loss is in the danger zone.

8. Clothing is important and a player should avoid the use of long sleeves, long stockings, and any excess clothing. Never use rubberized clothing or sweatsuits.

9. Some athletes are more susceptible to heat injury. These individuals are not accustomed to work in the heat, may be overweight, and may be the eager athlete who constantly competes at his capacity.

10. It is important to observe athletes for signs of heat illness. Some trouble signs are nausea, incoherence, fatigue, weakness, vomiting, cramps, weak rapid pulse, flushed appearance, visual disturbance, and unsteadiness. If heat illness is suspected, seek a physician's immediate service. Recommended emergency procedures are vital.

### **Recommendations**

Specific recommendations resulting from 1983 survey data are as follows:

1. Mandatory medical examinations and medical history should be taken before allowing an athlete to participate in football. The NCAA recommends a thorough medical examination when the athlete first enters the college athletic program and an annual health history update with use of referral exams when warranted. If the doctor or coach has any questions about the athlete's readiness to participate, the athlete should not be allowed to play. High school coaches should follow the recommendations set by their state high school athletic associations.

2. All personnel concerned with training football athletes should emphasize proper, gradual, and complete physical conditioning. Particular emphasis should be placed on neck strengthening exercises.

3. A physician should be present at all games and practice sessions. If it is impossible for a physician to be present at all practice sessions, emergency measures must be provided.

4. All personnel associated with football participation should be cog-

nizant of the problems and safety measures related to physical activity in hot weather.

5. Each institution should strive to have a team trainer who is a regular member of the faculty and is adequately prepared and qualified.

6. Cooperative liaison should be maintained by all groups interested in the field of Athletic Medicine (coaches, trainers, physicians, manufacturers, administrators, and so forth).

7. There should be strict enforcement of game rules, and administrative regulations should be enforced to protect the health of the athlete. Coaches and school officials must support the game officials in their conduct of the athletic contest.

8. There should be a renewed emphasis on employing well-trained athletic personnel, providing excellent facilities, and securing the safest and best equipment possible.

9. There should be continued research concerning the safety factor in football (rules, facilities, equipment, and so forth).

10. Coaches should continue to teach and emphasize the proper fundamentals of blocking and tackling to help reduce head and neck fatalities. **KEEP THE HEAD OUT OF FOOTBALL.**

11. Strict enforcement of the rules of the game by both coaches and officials will help reduce serious injuries.

12. When a player has experienced or shown signs of head trauma (loss of consciousness, visual disturbances, headache, inability to walk correctly, obvious disorientation, memory loss), he should receive immediate attention and should not be allowed to return to practice or game without permission from the proper medical authorities.

### **Section IV CASE STUDIES DIRECT FATALITIES**

#### **High School**

A 15-year-old high school football player died on August 13, 1983. He was injured while participating in a one-on-one blocking drill in practice. He was unconscious after the drill and died the same day. Cause of death was a subdural hematoma.

On September 22, 1983, a 15-year-old high school football player received a severe head injury during the third quarter of a junior varsity game. He was playing defensive end and was being blocked at the time of the injury. He died September 29, 1983, of brain damage. After his death it became known that he had a history of severe headaches.

A 14-year-old high school player

died on October 12 of a subdural hematoma received on October 7, 1983. He was playing defensive half-back in a junior varsity game but the exact cause of injury was not known.

On October 8, 1983, a high school football player was knocked unconscious while being tackled in the third quarter of the game. He tried to run over the tackler and there was head-to-head contact. He never regained consciousness and died on October 12, 1983, of a subdural hematoma. He had complained of severe headaches several weeks before the game and was hospitalized due to the headaches.

### **Section V CASE STUDIES INDIRECT FATALITIES**

#### **High School**

A 14-year old high school football player collapsed at the end of practice in August, 1983, and died the same day. The autopsy showed an enlarged heart and the physician stated it was a typical picture of sudden death syndrome.

A 16-year-old high school football player died on August 3, 1983, of a heart defect that could not be determined in a routine physical exam. He collapsed twenty minutes after practice.

On August 23, 1983, a high school football player died during the water break in practice. It was the second day of conditioning drills and cause of death was attributed to an enlarged heart. Physician stated that 99 percent of the time this problem would not be detected in a school exam.

A 16-year-old high school football player collapsed on the field during the first day of practice September 6, 1983. He died on September 9, 1983, apparently from a stroke.

In September, 1983, a 15-year-old junior varsity football player collapsed during a game and later died. Cause of death was cardiac arrest. He was playing without having a physical exam and it was also learned that he had open heart surgery at the age of seven.

On November 4, 1983, a high school player collapsed after chasing a player seventy yards after a pass interception. He died that night of heart failure.

#### **College**

An 18-year-old college football player received a head injury during the seventeenth day of spring prac-

tice on April 26, 1983. He died on May 12, 1983, from a congenitally weak artery in the brain and the physician stated it was not related to football.

A 21-year-old college player died of

heat stroke on August 20, 1983. The player was dressed in shorts and was running the last of four 440-yard sprints of a conditioning test. The player had a mild case of heat exhaustion in the fall of 1982.

A 19-year-old college football player collapsed on the sideline during the third quarter of a game in November 1983. Cause of death was an abnormal heart problem. +

**TABLE I**

Fatalities: Directly Due to Football - 1931-1983\*

	SANDLOT	PRO AND SEMIPRO	HIGH SCHOOL	COLLEGE	TOTAL
Year	Direct	Direct	Direct	Direct	Direct
**1931-1959	115	68	262	41	486
1960	1	1	11	1	14
1961	3	0	10	6	19
1962	6	1	12	0	19
1963	1	1	12	2	16
1964	4	1	21	3	29
1965	4	0	20	1	25
1966	4	0	20	0	24
1967	5	0	16	3	24
1968	4	1	26	5	36
1969	3	1	18	1	23
1970	3	0	23	3	29
1971	2	0	15	3	20
1972	3	1	16	2	22
1973	2	0	7	0	9
1974	0	0	10	1	11
1975	1	0	13	1	15
1976	3	0	15	0	18
1977	1	0	8	1	10
1978	0	0	9	0	9
1979	0	0	3	1	4
1980	0	0	9	0	9
1981	2	0	5	2	9
1982	2	0	7	0	9
1983	0	0	4	0	4
TOTALS	169	75	572	77	893

\* No study was made in 1942

\*\* Yearly totals available from past reports

**TABLE II**

Fatalities: Indirectly Due to Football - 1931-1983\*

	SANDLOT	PRO AND SEMIPRO	HIGH SCHOOL	COLLEGE	TOTAL
Year	Direct	Direct	Direct	Direct	Direct
**1931-1959	72	12	112	28	224
1960	0	0	2	2	4
1961	4	1	11	0	16
1962	0	1	4	2	7
1963	2	0	4	2	8
1964	3	0	12	1	16
1965	4	1	14	5	24
1966	0	0	6	2	8
1967	0	0	4	1	5
1968	2	0	8	2	12
1969	3	1	8	3	15
1970	0	0	12	2	14
1971	2	1	7	2	12
1972	0	0	10	1	11
1973	0	0	5	3	8
1974	0	0	5	3	8
1975	2	0	3	3	8
1976	1	0	7	2	10
1977	0	0	6	0	6
1978	0	0	8	1	9
1979	1	0	8	1	10
1980	0	0	4	0	4
1981	0	0	6	0	6
1982	1	0	7	3	11
1983	0	0	6	3	9
TOTALS	97	17	279	72	465

\* No study was made in 1942

\*\* Yearly totals available from past reports

**TABLE III**

Direct Fatalities Incidence Per 100,000 - 1931-1983\*

YEAR	HIGH SCHOOL	COLLEGE
**1931-1959		
1960	1.78	1.53
1961	1.62	9.23
1962	1.94	0.00
1963	1.94	3.04
1964	2.23	4.56
1965	2.00	1.33
1966	2.00	0.00
1967	1.60	4.00
1968	2.60	6.60
1969	1.64	1.33
1970	1.92	4.00
1971	1.25	4.00
1972	1.33	2.67
1973	0.58	0.00
1974	0.83	1.33
1975	1.08	1.33
1976	1.00	0.00
1977	0.53	1.33
1978	0.60	0.00
1979	0.23	1.33
1980	0.69	0.00
1981	0.38	2.67
1982	0.54	0.00
1983	0.30	0.00

\* No study was made in 1942.

\*\* Yearly totals available from past reports.

Based on 1,300,000 junior and senior high school players and 75,000 college players.

**TABLE IV**

Heat Stroke Fatalities 1931-1983\*

YEAR	TOTAL	YEAR	TOTAL
1931-1954	0	1970	8
1955	1	1971	4
1956-1958	0	1972	7
1959	4	1973	3
1960	3	1974	0
1961	3	1975	0
1962	5	1976	1
1963	0	1977	1
1964	4	1978	4
1965	6	1979	2
1966	1	1980	1
1967	2	1981	2
1968	5	1982	2
1969	5	1983	1

\* No study was made in 1942.

**TABLE V**

Direct Fatalities 1983: Type of Activity Engaged In

Type of Activity	Sandlot	Pro	High School	College	Total
One-on-One Blocking Drill	0	0	1	0	1
Collision with Person(s) (Defensive Play)	0	0	2	0	2
Tackled Head to Head	0	0	1	0	1
Totals	0	0	4	0	4



## THE ROLE AND FUNCTION OF THE ATHLETIC TRAINER

Today's athletic trainer is a well-trained professional who is an integral part of a complete athletic program. The trainer's duties consist of implementing prevention-of-injury programs, and immediate treatment and rehabilitation procedures for the injured athlete as directed by the team physician.

The trainer's skills are varied: a certified trainer must have a thorough knowledge of anatomy, physiology, psychology, hygiene, nutrition, taping, conditioning, prevention of injury methodology, and protective equipment. Such a knowledge is a part of a continuing process. Many trainers have earned advanced degrees to improve their ability to meet the requirements of this demanding profession, for the care of athletic injuries is essential and must be administered with great skill.

In addition to these many skills and abilities, the trainer must have an excellent rapport with the team physician, the coaches, the administration, and the athletes in order to perform his/her job effectively. While the physician diagnoses and prescribes treatment for the injury, the trainer carries out this treatment in addition to keeping the coach informed of the athlete's physical and emotional condition. Therefore, the trainer must be a diplomat, getting along with everyone while protecting the athlete's well-being at a level of physical fitness that will enable him/her to achieve maximum potential.

## WHY IS ATHLETIC TRAINING IMPORTANT

With the exception of the athletes and their parents, the only others who truly recognize the value of an athletic trainer are those who work most closely with that trainer. These include the coach and the team physician. Even under the most ideal conditions, all who engage in physical activities are subject to the possibility of injury at some time or another, and the nature of competition indicates that injuries are likely to occur.

More and more administrators are recognizing what a trainer contributes to justify the necessity for this skilled professional. However, there are still too many administrators who believe that coaches should assume this area of responsibility. They fail to understand that the coach frequently is not well-schooled to incorporate the skills of the modern trainer. By attempting the trainer's duties with those of the coach, one of these roles suffers, and the coach, all too often, becomes involved in unfortunate legal or medical problems.

The most important services offered by a good trainer are more efficient medical management and the prevention and treatment of injuries. Under the supervision of a certified trainer, the competition is safer, squad morale is higher, and subsequently, a higher level of performance is achieved.

University, college, and high school trainers' responsibilities might also include the care of the physical problems which arise in physical education, recreation, and intramurals.

## HOW TO BECOME A CERTIFIED ATHLETIC TRAINER

The most fundamental requirement for becoming a trainer is a sincere interest in athletics and the athlete's well-being. Another important requirement is the ability to get along with people. Additionally, one must have a

certain amount of ingenuity and the ability to work with one's hands. Other necessary basics would include poise, confidence, cleanliness, and common sense, plus a willingness to work.

The high school curriculum offers a logical beginning. One should take subjects such as health, first aid, biology, physiology, chemistry, physics, and general science. Working as a student trainer or manager is also very helpful, as is searching out books and articles that pertain to athletic training. Student trainer camps and clinics are also now available throughout the country. With this early beginning one gains valuable experience and skills.

## The Undergraduate Athletic Training Curriculum

### Educational Requirements

- A. A college degree.
- B. Completion of specific required courses:
  - 1. Human Anatomy
  - 2. Human Physiology
  - 3. Physiology of Exercise
  - 4. Applied Anatomy and/or Kinesiology
  - 5. Psychology
  - 6. First Aid (including CPR)
  - 7. Nutrition
  - 8. Adapted Physical Education
  - 9. Personal, Community, or School Health
  - 10. Basic Athletic Training
  - 11. Advanced Athletic Training
  - 12. Clinical Experience (800 clock hours) distributed over a period of at least two academic years under the supervision of a qualified clinical instructor in an acceptable clinical setting.
- C. Recommended but not required.
  - 1. Physics
  - 2. Pharmacology
  - 3. Histology
  - 4. Pathology
  - 5. Organization and Administration of Health and Physical Education
  - 6. Psychology of Coaching
  - 7. Coaching Techniques
  - 8. Chemistry
  - 9. Tests and Measurements

## The Graduate Athletic Training Program

### Educational Requirements

- A. Proof of a Bachelor's degree awarded by an accredited college or university.
- B. Completion of the specific undergraduate course and clinical requirements either before or during graduate level studies.
- C. Completion of the specific course work and clinical experience requirements at the graduate level:
  - 1. Advanced Athletic Training (2 courses)
  - 2. Advanced instruction in one or more of the following subject matter:
    - a. Human Anatomy
    - b. Human Physiology
    - c. Physiology of Exercise

- d. Kinesiology or Applied Anatomy
3. Elective work is recommended in the following subject matter:
  - a. Statistics
  - b. Research design
  - c. Injury and pathology evaluation
  - d. Organization and administration (athletic training programs)
  - e. School law
  - f. Sports psychology
  - g. Nutrition
  - h. Human anatomy
  - i. Human physiology
  - j. Exercise physiology
  - k. Kinesiology/biomechanics
  - l. Pharmacology
  - m. Therapeutic exercise
  - n. Therapeutic modalities
4. Clinical experience — a minimum of 400 clock hours under the supervision of a qualified clinical instructor in an acceptable clinical setting.

## PROCEDURES FOR CERTIFICATION

To become certified as an athletic trainer by the Board of Certification of the National Athletic Trainers' Association, Inc. a candidate must meet the CORE REQUIREMENTS and those requirements stated in the SECTION under which they are applying.

### CORE REQUIREMENTS

1. Proof of graduation (official transcript) from a college or university. Students in their last semester of school are eligible to take the Certification Examination provided the CORE and SECTION REQUIREMENTS have been fulfilled at the time of application. Certification will not be awarded until the Board of Certification is presented with official proof of graduation.
2. Proof of current American National Red Cross Standard First Aid Certification and CPR. Must be current on examination date.
3. EMT equivalent instead of First Aid and CPR. Must be current on examination date.
4. Completion of the Certification Application; available by writing to the following address:  
 NATA Board of Certification  
 Application Request  
 1001 East Fourth Street  
 Greenville, NC 27835-1865
5. Pass the NATA Certification Examination.

### SECTION REQUIREMENTS

#### SECTION ONE: Graduate of an NATA Approved Curriculum

Successful completion of an NATA Approved Athletic Training Education Program from a college or university sponsoring an NATA Approved Graduate or Undergraduate program. See NATA approved schools below.

Applicants who are applying for NATA certification from an NATA Undergraduate Program must receive their bachelors degree from that college or university. Applicants who are applying from an NATA approved Graduate Program must complete a Coursework Verification Form (available from their supervising athletic trainer or the Certification Office).

## SECTION TWO: Internship

A minimum of 1800 hours under the direct supervision of an NATA Certified Athletic Trainer must be completed by the time of application. These hours must have accumulated over a minimum of two years and not more than five years under the direction of an NATA Certified Athletic Trainer.

Of these 1800 hours, 1600 hours must be attained in an athletic training setting at the interscholastic, collegiate or professional level. The additional 200 hours may be obtained from the acceptable related areas (NATA Approved Allied Settings) under the direct supervision of an NATA Certified Athletic Trainer.

PROSPECTIVE CANDIDATES WHO WISH AN INTERPRETATION OF THEIR ELIGIBILITY FOR CERTIFICATION CANDIDACY CAN CONTACT THE CHAIRMAN OF THE BOARD OF CERTIFICATION IN WRITING TO REQUEST A REVIEW OF THEIR CREDENTIALS.

SPECIFIC QUESTIONS CONCERNING NATA CERTIFICATION REQUIREMENTS, EXAMINATION TIMES AND SITES SHOULD BE DIRECTED TO THE NATA NATIONAL OFFICE.

### The Importance of Education

Education is the backbone of the training profession, and a well qualified trainer is striving constantly to improve. The trainer should further formal education whenever possible. Constant reading, attendance at clinics and meetings, will help to update the trainer's knowledge and promote continuous education.

A person who is once certified remains so as long as he or she meets the minimum requirements for Continuing Education as defined by the Continuing Education Committee.

### Employment Potential

The key to the future is for the employment of certified athletic trainers on the high school level. This would be a faculty member who would teach a regular class schedule in addition to having duties as an athletic trainer. This is the same principle by which many high school coaches are hired. The additional cost to the school system would be equivalent to adding another coach to the school's staff.

Many of the injuries and reinjuries which occur in high school athletics — injuries that can be troublesome throughout an athlete's life — could be prevented, or at least better cared for, if a certified athletic trainer were a part of the scene. There must be someone at this level who can recognize the severity of an injury, administer proper first aid, and refer the athlete for the necessary medical attention.

Public high schools and private secondary schools offer the possibility of between 10,000 and 20,000 jobs. The number of available jobs will be in proportion to how well administrators recognize the need. The NATA no longer requires a teaching license specifically in physical education or health. But if you should major in some other area, it is highly recommended that you should at least minor in either health or physical education. A rule of thumb to remember is that the more subjects you are capable of teaching, the greater the chance of employment.

### Colleges and Universities

Colleges and universities offer more prestige than high schools, but generally speaking, a good high school system pays better than the average college. College jobs fall into three categories: (1) staff assignments by the athletic department; (2) combination teacher-trainer



with teaching areas in physical education, health, or athletic medicine; (3) combination physical therapist-trainer with the morning duties usually spent in the student health center. Staff assignments generally offer less security and pay than the combination jobs.

College jobs will be dependent on one's experience and reputation. The beginning trainer might start as an assistant in a large school or possibly as a head trainer in a smaller one. The college field remains rather stable, and the turnover in jobs is usually slight.

#### **District Trainer**

Under this system, the school district employs a certified trainer for a group or all of the schools within its jurisdiction. This person could be centrally located and the district could realize a substantial saving on staff and facilities.

#### **Faculty Re-Training Program**

This program involves educating an interested faculty member in the skills of athletic training and providing a salary supplement for that individual to become a certified trainer.

#### **Professional Teams**

The professional athletic trainer works only one sport, usually football, soccer, basketball, baseball or hockey. Most professional teams operate approximately six months out of the year, however, professional employment is usually 12 months because of off-season programs of conditioning and rehabilitation. Total pay would be determined by the length of contract, the team's financial status, play-offs, and championships.

There are fewer employment opportunities in professional sports than there are in school athletic programs. The professional teams can be more selective than either the high schools or colleges. This indicates that one must be established as a capable, experienced trainer to find professional major league placement. The chances of starting as a professional trainer are very slim.

#### **Women's Athletics**

Most universities, colleges, high schools, and even junior high schools have made rapid strides in the expansion of women's athletics. The need for qualified women athletic trainers to handle the area of health and injury care for female athletes is tremendous and is increasingly being recognized.

At present, most opportunities for women seem to be mainly at the college level. There are numerous graduate assistantships available throughout the country as well as an increasing number of full-time positions.

### **MOST REQUESTED INFORMATION**

#### **Financial Aid**

Prospective students of athletic training must develop their own financial assistance programs. Planning should include the help of teachers and guidance counselors.

Areas of financial aid which should be investigated: Scholarships, Basic Educational Opportunity Grants, Federal Education Opportunity Grants, College Work Study Programs, National Defense Student Loans, Federal Insured Student Loans, United States Aid Funds, Inc., Short Term College Loans, GI Bill for returning Servicemen, Social Security and the **National Athletic Trainers' Association, Inc.**

Detailed information may be obtained by contacting the Chairperson of the NATA Committee on Grants and Scholarships.

#### **NATA Membership**

Inquiries regarding membership in the National Athletic Trainers' Association Inc. should be directed to the Membership Committee and sent to the NATA National Office. Details and membership applications should be requested.

#### **Placement Committee**

The Placement Committee of the NATA was established to serve as a liaison between athletic trainers and prospective employers and serves as a clearing house for schools and teams wishing to employ trainers and for those NATA members seeking positions. In this capacity, the committee has channels of access to school administrators, athletic directors, physicians and high school principals.

A Current Placement File is maintained by the Placement Committee. NATA members interested in being included in this cross-indexed file should mail a resume to the Placement Committee Chairperson.

The NATA presently operates a 24-hour telephone "Hot Line" listing daily updated job opportunities. This service to the membership is accessible by calling (919) 752-1266.

### **THE NATIONAL ATHLETIC TRAINER'S ASSOCIATION, Inc.**

The National Athletic Trainers' Association, Inc., is an organization dedicated to the advancement, encouragement and improvement of the athletic training profession. Through the NATA, its officers, committees, and professionally trained members, we are continually striving to enhance competitive athletics and to eliminate many of the problems confronting school athletic programs. The Association has implemented certification and continuing education programs to insure that its membership maintains a high degree of competency. Many colleges and universities have established NATA approved curriculums to prepare students for careers as teachers and athletic trainers.

### **NATIONAL ATHLETIC TRAINER'S ASSOCIATION, Inc. APPROVED ATHLETIC TRAINING EDUCATION PROGRAMS**

Programs listed here are approved by the National Athletic Trainers Association, Inc. For detailed information, write to the program director whose name is given in parentheses in the listing. Two basic plans of education for athletic training are listed according to the following key:

- (1) Undergraduate Athletic Training Education Programs
- (2) Graduate Athletic Training Education Programs

#### **ARIZONA**

##### **UNIVERSITY OF ARIZONA (2)**

Department of Physical Education  
Tucson, Arizona 85721 (Gary Delforge)

##### **ARIZONA STATE UNIVERSITY**

Department of Health, Physical Education & Recreation  
Tempe, Arizona 85281 (Michelle Piette)

#### **CALIFORNIA**

##### **CALIFORNIA STATE UNIVERSITY, FULLERTON (1)**

Department of Health, Physical Education & Recreation  
Fullerton, California 92634 (Jerry Lloyd)

##### **CALIFORNIA STATE UNIVERSITY, LONG BEACH (1)**

Department of Physical Education  
Long Beach, California 90840 (Keith Freeseemann)

##### **CALIFORNIA STATE UNIVERSITY, NORTHRIDGE (1)**

Department of Health, Physical Education & Athletics  
Northridge, California 91324 (Dale Rudd, Acting Director)

**CALIFORNIA STATE UNIVERSITY, SACRAMENTO (1)**

Department of Athletics and Sport  
Sacramento, California 95819 (Doris Fennessy)

**DELAWARE****UNIVERSITY OF DELAWARE (1)**

Department of Physical Education & Athletics  
Newark, Delaware 19711 (C. Roy Rylander)

**IDAHO****BOISE STATE UNIVERSITY (1)**

Department of Physical Education  
Boise, Idaho 83725 (Ron Pfeiffer)

**ILLINOIS****EASTERN ILLINOIS UNIVERSITY (1)**

School of Health, Physical Education & Recreation  
Charleston, Illinois 61920 (Dennis Aten)

**ILLINOIS STATE UNIVERSITY (2)**

Department of Health, Physical Education & Dance  
Normal, Illinois 61761 (William Kauth)

**SOUTHERN ILLINOIS UNIVERSITY (1)**

127 Davies Gym  
Carbondale, Illinois 62901 (Sally Rouse Perkins)

**UNIVERSITY OF ILLINOIS (1)**

Department of Physical Education  
Urbana, Illinois 61801 (Gerald Bell)

**WESTERN ILLINOIS UNIVERSITY (1)**

College of Health, Physical Education & Recreation  
Macomb, Illinois 61455 (Larry J. Leverenz)

**INDIANA****BALL STATE UNIVERSITY (1)**

Department of Men's Physical Education  
Muncie, Indiana 47306 (Mary E. O'Carroll)

**INDIANA UNIVERSITY (1,2)**

School of Health, Physical Education & Recreation  
Bloomington, Indiana 47401 (John Schrader)

**INDIANA STATE UNIVERSITY (1,2)**

School of Health, Physical Education & Recreation  
Terre Haute, Indiana 47809 (Kenneth Knight)

**PURDUE UNIVERSITY (1)**

Department of Physical Education, Health and Recreation  
Studies  
West Lafayette, Indiana 47907 (Dennis Miller)

**IOWA****UNIVERSITY OF IOWA (1)**

Department of Physical Education for Men  
Iowa City, Iowa 52242 (Dan Foster)

**KENTUCKY****EASTERN KENTUCKY UNIVERSITY (1)**

College of Health, Physical Education, Recreation and  
Athletics  
Richmond, Kentucky 40475 (Robert M. Barton)

**LOUISIANA****LOUISIANA STATE UNIVERSITY (1)**

Department of Health, Physical Education and Recreation  
Baton Rouge, Louisiana 70803 (Marty Broussard)

**MASSACHUSETTS****BRIDGEWATER STATE COLLEGE (1)**

Department of Physical Education  
Bridgewater, Massachusetts 02324 (Marcia Anderson)

**NORTHEASTERN UNIVERSITY (1)**

Department of Physical Education  
Boston, Massachusetts 02115 (Kerkor Kassabian)

**SPRINGFIELD COLLEGE (1)**

Division of Health, Physical Education & Recreation  
Springfield, Massachusetts 01109 (Sherrod W. Shaw)

**MICHIGAN****CENTRAL MICHIGAN UNIVERSITY (1)**

Physical Education Department  
Mount Pleasant, Michigan 48859 (Ron Sendre)

**GRAND VALLEY STATE COLLEGE (1)**

Department of Physical Education & Recreation  
Allendale, Michigan 49401 (Doug Woods)

**WESTERN MICHIGAN UNIVERSITY (2)**

Department of Health, Physical Education & Recreation  
Kalamazoo, Michigan 49009 (Jack Jones)

**MINNESOTA****MANKATO STATE UNIVERSITY (1)**

Physical Education Department  
Mankato, Minnesota 56001 (Gordon Graham)

**MISSISSIPPI****UNIVERSITY OF SOUTHERN MISSISSIPPI (1)**

Department of Athletic Administration & Coaching  
Hattiesburg, Mississippi 39401 (James B. Gallaspy)

**MISSOURI****SOUTHWEST MISSOURI STATE UNIVERSITY (1)**

Hammons Student Center  
901 S. National  
Springfield, Missouri 65802 (Ivan Milton or Gary Ward)

**MONTANA****UNIVERSITY OF MONTANA (1)**

Department of Health and Physical Education  
Missoula, Montana 59801 (Russ Cagle)

**NEBRASKA****UNIVERSITY OF NEBRASKA (1)**

University Health Center  
Lincoln, Nebraska 68588 (Roland E. LaRue)

**NEVADA****UNIVERSITY OF NEVADA - LAS VEGAS (1)**

Department of Physical Education  
Las Vegas, Nevada 89119 (A.G. Edwards)

**NEW JERSEY****KEAN COLLEGE OF NEW JERSEY (1)**

Department of Physical Education  
Union, New Jersey 07083 (Gary Ball)

**WILLIAM PATTERSON COLLEGE OF NEW JERSEY (1)**

Department of Movement Sciences and Leisure Studies  
Wayne, New Jersey 07470 (Tobias Barboza)

**NEW MEXICO****UNIVERSITY OF NEW MEXICO (1)**

Department of Health, Physical Education & Recreation  
Albuquerque, New Mexico 87131 (L.F. Diehm)

**NEW YORK****CANISIUS COLLEGE (1)**

Department of Physical Education  
Buffalo, New York 14208 (Peter Koehneke)

**STATE UNIVERSITY COLLEGE AT CORTLAND (1)**

Division of Health, Physical Education & Recreation  
Cortland, New York 13045 (John Sciera)

**ITHACA COLLEGE (1)**

Department of Health, Physical Education & Recreation  
Ithaca, New York 14850 (Kent Scriber)

**NORTH CAROLINA****APPALACHIAN STATE UNIVERSITY (1)**

Department of Health, Physical Education & Recreation  
Boone, North Carolina 28608 (Ron Kanoy)

**EAST CAROLINA UNIVERSITY (1)**

Department of Health, Physical Education, Recreation &  
Safety  
Greenville, North Carolina 27834 (Rod Compton)

**MARS HILL COLLEGE (1)**

Physical Education Department  
Mars Hill, North Carolina 27854 (Herb Amato)

**UNIVERSITY OF NORTH CAROLINA (2)**

Department of Physical Education  
Chapel Hill, North Carolina 27514 (William Prentice)

**NORTH DAKOTA****NORTH DAKOTA STATE UNIVERSITY (1)**

Department of Health, Physical Education, Recreation &  
Athletics  
Fargo, North Dakota 58102 (Denis Isrow)

**UNIVERSITY OF NORTH DAKOTA (1)**

Department of Health, Physical Education & Recreation  
Grand Forks, North Dakota 58201

**OHIO****BOWLING GREEN STATE UNIVERSITY (1)**

School of Health and Physical Education and Recreation  
Bowling Green, Ohio 43403 (Bill Jones, Acting Director)

**MIAMI UNIVERSITY OF OHIO (1)**



Withrow Court, Room 6  
Oxford Ohio 45056 (Patricia Troesch)  
**OHIO UNIVERSITY (1)**  
School of Health, Physical Education & Recreation  
Athens, Ohio 45701 (Skip Vosler)  
**TOLEDO UNIVERSITY (1)**  
Department of Physical Education  
Toledo, Ohio 43606 (James D. Nice)

#### OREGON

**OREGON STATE UNIVERSITY (1)**  
Physical Education Department  
Corvallis, Oregon 97331 (Richard F. Irvin)  
**UNIVERSITY OF OREGON (2)**  
Department of Physical Education  
Eugene, Oregon 97403 (Louis R. Osternig)

#### PENNSYLVANIA

**CALIFORNIA UNIVERSITY OF PENNSYLVANIA (1)**  
Department of Health & Physical Education  
California, Pennsylvania 15415 (William Biddington)  
**EAST STROUDSBURG STATE COLLEGE (1)**  
Koehler Fieldhouse  
East Stroudsburg, Pennsylvania 18301 (Lois E. Wagner or John R. Thatcher)  
**LOCK HAVEN STATE COLLEGE (1)**  
School of Health, Physical Education & Recreation  
Lock Haven, Pennsylvania 17745 (David J. Tomasi)  
**THE PENNSYLVANIA STATE UNIVERSITY (1)**  
College of Health, Physical Education & Recreation  
University Park, Pennsylvania 16802 (John W. Powell)  
**UNIVERSITY OF PITTSBURGH**  
Health, Physical Education & Recreation  
Pittsburgh, Pennsylvania 15261 (David H. Perrin)  
**SLIPPERY ROCK STATE COLLEGE (1)**  
Health Sciences Department  
Slippery Rock, Pennsylvania 16057 (James R. Pennell)  
**WEST CHESTER STATE COLLEGE (1)**  
Physical Education Department  
School of Health Sciences  
West Chester, Pennsylvania 19380 (Phillip Donley)

#### SOUTH DAKOTA

**SOUTH DAKOTA STATE UNIVERSITY**  
Department of Health, Physical Education & Recreation  
Brookings, South Dakota 57007 (Jim Booher)

#### TENNESSEE

**EAST TENNESSEE STATE UNIVERSITY (1)**  
Department of Physical Education & Recreation  
Johnson City, Tennessee 37601 (Jerry Robertson)

#### TEXAS

**LAMAR UNIVERSITY (1)**  
Department of Intercollegiate Athletics  
P.O. Box 10066, Lamar Station  
Beaumont, Texas 77710 (Paul Zeek)  
**SOUTHWEST TEXAS STATE UNIVERSITY (1)**  
Department of Health & Physical Education  
San Marcos, Texas 78666 (Bobby Patton)  
**STEPHEN F. AUSTIN STATE UNIVERSITY (1)**  
Department of Health and Physical Education  
Nacogdoches, Texas 79562 (Sandy Miller)  
**TEXAS CHRISTIAN UNIVERSITY (1)**  
Department of Athletics  
Fort Worth, Texas 76129 (Ross Bailey)

#### UTAH

**BRIGHAM YOUNG UNIVERSITY (1)**  
Department of Physical Education  
Provo, Utah 84602 (Earlene Durrant)

#### VERMONT

**UNIVERSITY OF VERMONT (1)**  
Intercollegiate Athletics and Physical Education  
Department  
Burlington, Vermont 05405 (Roger T. Bryant)

#### VIRGINIA

**JAMES MADISON UNIVERSITY (1)**  
Department of Intercollegiate Athletics  
Harrisonburg, Virginia 22807 (Ronald Stefancin)

**OLD DOMINION UNIVERSITY (2)**  
Department of Intercollegiate Athletics  
Norfolk, Virginia 23508 (Marty Bradley)  
**UNIVERSITY OF VIRGINIA (2)**  
Athletic Department  
Charlottesville, Virginia 22903 (Joe H. Gieck)

#### WASHINGTON

**WASHINGTON STATE UNIVERSITY (1)**  
Department of Physical Education for Men & Women  
Pullman, Washington 99163 (Douglas Sebold)

#### WEST VIRGINIA

**WEST VIRGINIA UNIVERSITY (1)**  
Department of Professional Physical Education  
Morgantown, West Virginia 26505 (John Spiker)

#### WISCONSIN

**UNIVERSITY OF WISCONSIN - LA CROSSE (1)**  
150 Mitchell Hall  
La Crosse, Wisconsin 54601 (Karen R. Toburen)

### Brochure Requests

Requests for the brochure entitled "Careers in Athletic Training" should be sent to the National Office at P.O. Drawer 1865, Greenville, N.C. 27834. Single brochures are supplied upon request at no charge. NATA officers and committees, schools having an approved athletic training curriculum, and those having an apprenticeship program are furnished multiple copies of the brochure at no charge.

### Districts of the National Athletic Trainers Association, Inc.

- |                    |  |
|--------------------|--|
| <b>DISTRICT 1</b>  | Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont, Quebec                |
| <b>DISTRICT 2</b>  | Delaware, New Jersey, New York, Pennsylvania   |
| <b>DISTRICT 3</b>  | Maryland, North Carolina, South Carolina, Virginia, West Virginia, District of Columbia        |
| <b>DISTRICT 4</b>  | Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin, Manitoba, Ontario                     |
| <b>DISTRICT 5</b>  | Iowa, Kansas, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, University of Colorado |
| <b>DISTRICT 6</b>  | Arkansas, Texas  |
| <b>DISTRICT 7</b>  | Arizona, Colorado, New Mexico, Utah, Wyoming   |
| <b>DISTRICT 8</b>  | California, Nevada, Hawaii   |
| <b>DISTRICT 9</b>  | Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, Tennessee                         |
| <b>DISTRICT 10</b> | Alaska, Idaho, Montana, Oregon, Washington, Alberta, British Columbia, Saskatchewan            |

See page 159 for names and addresses of District Directors and District Secretaries.



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# Notes from the National Office

"To inform and update the membership on various subjects of interest and answer the most frequently asked questions."

## NASHVILLE

\*\*\*During the days in Nashville it was heard over and over again, "This is our biggest and best meeting ever." One member said, "It's almost a cliché every year that 'This is the biggest and best meeting the Association has ever had' but it's true! Every year *does* get bigger and better." The fact that this is true and such observations are made speaks well for the Association. NATA grows and progresses as an association as athletic training grows and progresses as a profession. The atmosphere at the Nashville meeting made very clear why this is so. The enthusiasm and camaraderie of the caring people who make up the NATA assures the Association's continued growth and progress.

## JOURNAL CHANGES

\*\*\*Watch for new ideas, new approaches to old dilemmas, changes in some formats and many other implementations of input gleaned from the Nashville meeting. One innovation, executed for the first time in this issue, is the collective presentation of the various departments. The Editor-in-Chief is interested in how you feel about this new format. It was suggested that it be tried out and the only way the Journal staff can know your feelings, pro or con, is for you to communicate. Let Steve Yates hear from you. Or, should you have occasion to contact the National Office on some other matter, give your thoughts to Barbara Manning.

\*\*\*Another new idea to help the membership stay in touch will be the listing of the District Meetings in the CALENDAR OF EVENTS. The District Representatives will keep Jeff Fair up to date on this so all you need do for complete District Meeting information is turn to the CALENDAR OF EVENTS. Watch for the 1985 schedule in the Winter issue.

## DAMAGED JOURNALS

\*\*\*More and more frequently we get calls from members and subscribers reporting that their journals arrived damaged. We would like to have such issues returned to enable us to examine the condition and try to determine the cause of this problem. If you receive an unreasonably damaged issue of ATHLETIC TRAINING, please do not just throw it away. Mail it back to us and we will be happy to replace it with a new copy.

## FROM THE CERTIFICATION OFFICE

\*\*\*Form A and Form B for Documentation of Internship Hours are located in this issue. (see pages 205 and 206) Internship hours are to be submitted to the Certification Office on an annual basis for the calendar year. Form A is for the student intern to complete and send to the Certification Office. Form B is to be completed by the Supervising Athletic Trainer and sent to the Certification

Office (one Form B lists all of the interns who credited hours in 1984). Forms must be received in the Certification Office by January 31, 1985.

\*\*\**Important notice to Certification applicants:* Please remember that each certification examination site has a limited number of seats available. Submitting your application before the deadline *does not* guarantee that you will be scheduled. If you are closed out of a site, you will need to select a new site and/or date. We DO NOT have waiting lists.

## GRAFFITI

\*\*\**Attention; Head Athletic Trainers:* Bulk quantities of membership applications are available from the National Office. Direct your requests to Sandra Robinson in the Membership Office.

\*\*\**Reminder:* Research papers are being solicited for publication. Please respond to John Powell. (see page 225)

\*\*\*Recent visitors to the National Office were: Bobby Barton, Eastern Kentucky University; Jerry Weber, University of Nebraska; Maryann Zickler, Kansas State University; Florence Cottrell, Oklahoma State University; Dave Burton, Duncanville High School, TX; Herb Amato, Mars Hill College, NC; and Sherry Buickel, University of Florida.

\*\*\*The *National Center for Catastrophic Sports Injury Research* is again gathering data on football fatalities and catastrophic injuries. They have requested the assistance of the membership of NATA in this endeavor. With football season upon us they are especially interested in enlisting the help of certified trainers. In addition to your input during football season, the Center would also appreciate your help concerning ALL sports — men's and women's — throughout the year. Data collection is now a continuous twelve month process and should information or a newspaper clipping come to your attention, please send it to: Fred Mueller, 311 Woolen Gym 047-A, University of North Carolina, Chapel Hill, NC 27514, (919) 962-2021 (office) (919) 929-5097 (home).

\*\*\*This year's \$5,000 grant from NFL Charities brings to \$40,000 the total support given the NATA by the clubs of the National Football League and the Board of Directors of NFL Charities since 1977. The NATA's Grants and Scholarships program succeeds because of support such as this and other donations. Mr. Pete Rozelle, President of NFL Charities, stated in a letter to Mr. Pinky Newell, Chairman of the Grants and Scholarships Committee at the time of the grant, "NFL Charities is again appreciative of the opportunity to join with you in this most worthwhile effort." What a beautiful way to present a gift!

HAVE A FINE FALL!+

## Schedule of Future Sites and Dates NATA Certification Examination

All regional sites are subject to a **minimum** of six candidates per site and limited to a maximum of **thirty** candidates.

Completed applications must be received in the Certification Office by the deadline for the date chosen. However, this does not guarantee the site and date selected. Applications are accepted and scheduled in order of receipt.

**January 6, 1985 — DEADLINE FOR RECEIPT OF APPLICATIONS:**  
November 26, 1984

New Britain, CT	Fort Worth, TX
Montclair, NJ	Albuquerque, NM
Pittsburgh, PA	Costa Mesa, CA
Charlotte, NC	Richmond, KY
Chicago, IL	Portland, OR

**March 17, 1985 — DEADLINE FOR RECEIPT OF APPLICATIONS:**  
February 4, 1985

Boston, MA	Lincoln, NE
Harrisburg, PA	Tucson, AZ
Springfield, VA	Sacramento, CA
Chicago, IL	Richmond, KY
Holland, MI	Boise, ID

**June 23, 1985 — DEADLINE FOR RECEIPT OF APPLICATIONS:**  
May 13, 1985

New Britain, CT	Maryville, MO
Montclair, NJ	Houston, TX
Philadelphia, PA	Denver, CO
Raleigh, NC	Nashville, TN
Columbus, OH	Seattle, WA
Madison, WI	

**July 14, 1985 — DEADLINE FOR RECEIPT OF APPLICATIONS:**  
June 3, 1985

Boston, MA	Lawrence, KS
Harrisburg, PA	Costa Mesa, CA
Anderson, IN	Knoxville, TN
Holland, MI	

Application requests must be in written form. Telephone call requests cannot be honored. To obtain an application write to:

**NATA Board of Certification  
Application Request  
1001 East Fourth St.  
Greenville, NC 27834**



## CRYOTHERAPY, from page 184

Astrand and Rodahl (1) and Tanigawa (10), these procedures add to the ability of the Golgi tendon organs to be stimulated causing reflex inhibition of the agonist allowing greater joint range of motion to occur.

### Conclusions

This study revealed that both PI<sub>3</sub>CP and PCP used with Cryotherapy are more effective than static stretch technique. Although the PI<sub>3</sub>CP technique was found to be superior to the PCP technique, there are limitations. While the PI<sub>3</sub>CP technique can not be used when a muscle is traumatized, the PCP technique used in conjunction with Cryotherapy can be used effectively. It may be possible however, to use the PI<sub>3</sub>CP technique and Cryotherapy when the agonist muscle has recuperated to the point of being able to contract near maximum.

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### ABSTRACTS, from page 221

protein needs of an athlete interested in his or her peak performance have been estimated to be .8 grams per kilogram of body weight per day. Too much protein is not well received by the body as the metabolism of excessive amounts of this nutrient place an inordinate strain on the liver and kidney functions during digestion and metabolism. In addition, dehydration becomes a possibility as the body attempts to excrete a substance it cannot use, resulting in costly urine. Even if additional protein was necessary, commercial supplements do not represent a very cost-effective way of getting the needed protein. Dedication, hard work and healthy diet are what it's all about.

Troy Kauffman +

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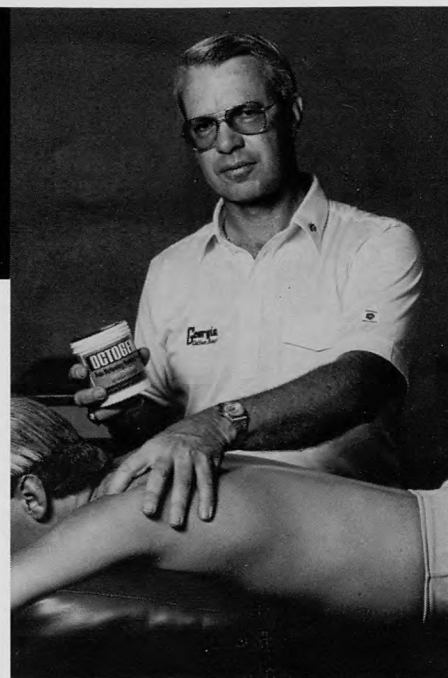
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Head Trainer  
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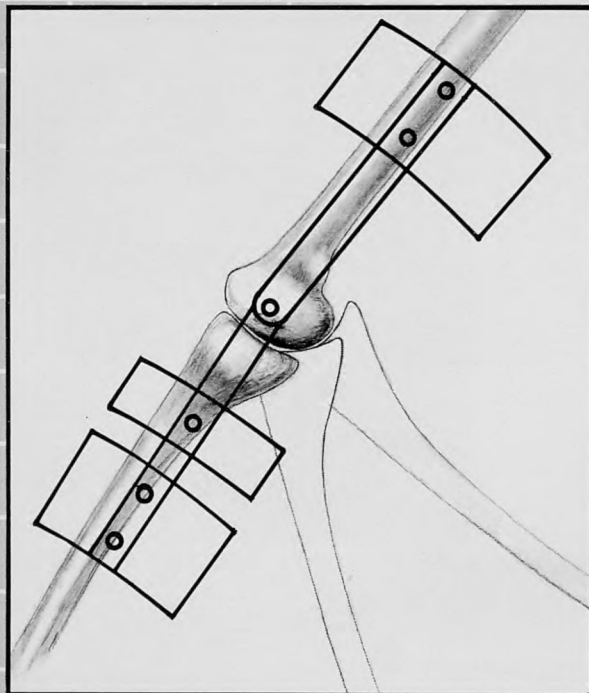
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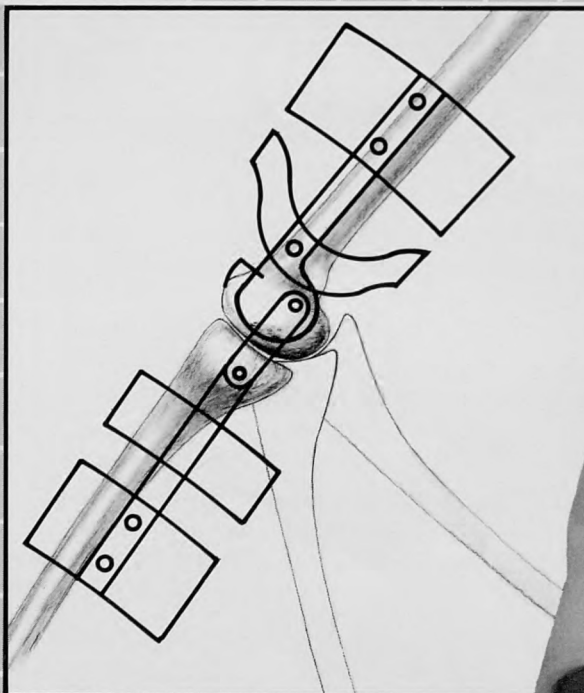
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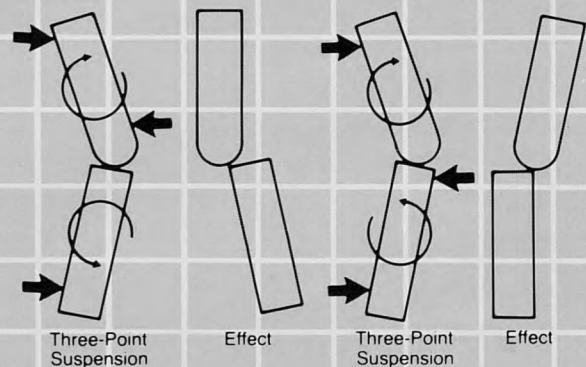


Another Camp Therapy product

# KO

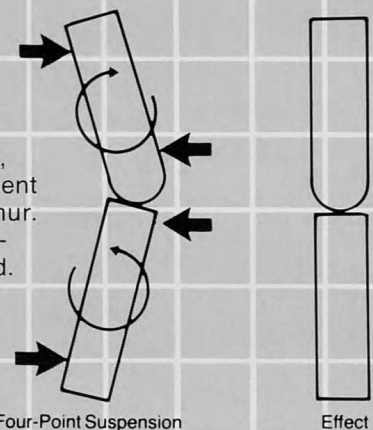
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Four-point suspension is superior to three-point suspension provided by single-axis and polycentric designs.



With three-point suspension, unequal and insufficient pressure results in uncontrolled motion in the inadequately supported limb segment.

With NuKO's four-point suspension, two points are applied to each segment ... two at the tibia and two at the femur. Distal migration, slippage, misalignment and skin irritation are reduced. Tests show 76% less pistoning with NuKO.



## The nu knee orthosis



Please send the NuKO informational kit.

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ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

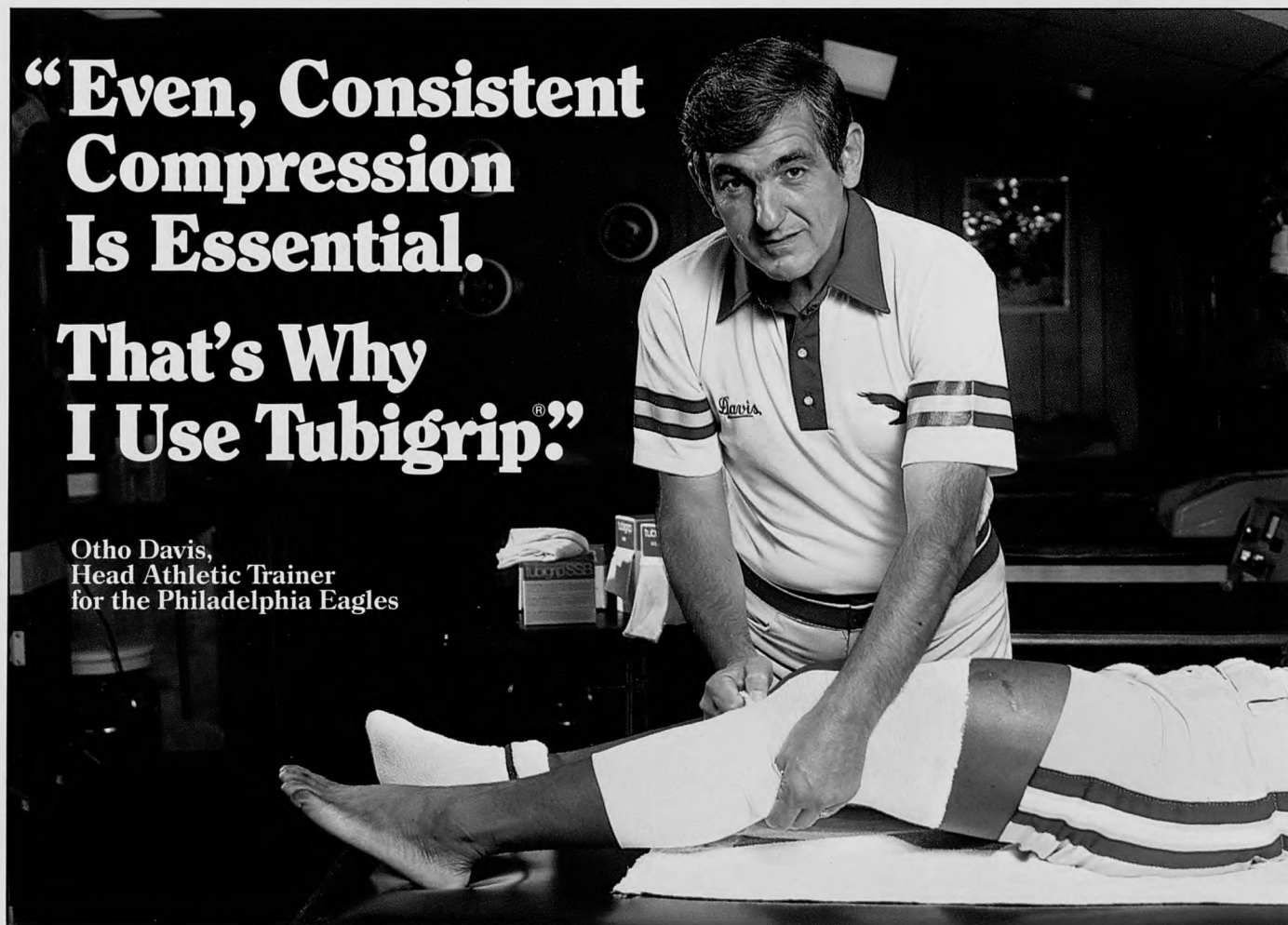
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# "Even, Consistent Compression Is Essential."

## That's Why I Use Tubigrip®."

Otho Davis,  
Head Athletic Trainer  
for the Philadelphia Eagles



"In my opinion, the advantage of Tubigrip® is that it gives you firm, even pressure. Tubigrip doesn't overlap the way an elastic wrap does.

With some of those elastic wraps, you get more cotton and less elasticity. You end up pulling it too tight, and then you're left with nothing there!

Also, if an elastic wrap is left on too long, too tight, you can very easily get a tourniquet effect.

If it's too loose, it's ineffective. With Tubigrip, you get a firm, even type of compression every time.



We use Tubigrip on new injuries to help control edema and reduce swelling. We also use the bandage to protect against turf burn, particularly on the forearms and elbows.

For injuries, I usually cut the desired length of Tubigrip and put it on double.

But for some applications, such as an arm sleeve for protection against turf burn, the athlete knows what size he wants and likes, so he can come in and apply his own.



Tubigrip is also very effective at holding a dressing or ice bag in position.

For example, we take an ice bag and use a double thickness of Tubigrip to make an envelope to secure the ice.

I've even used Tubigrip under adhesive tape. Sometimes a player needs the extra support or compression that Tubigrip provides. And when you have a player with some arthritic changes in the joint, Tubigrip helps hold the heat in.

Our players wear Tubigrip both at practice and in games. It's very comfortable and it's always worked effectively for us.

I think it's important for students and

professionals alike to find out about new products and to keep informed on the latest topics in the athletic training field.

I take a position about keeping informed on the latest in sports medicine. It all comes down to how much time you devote to your educational reading.

Educational reading familiarizes me with new techniques and new products such as Tubigrip support bandages."

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TUBIGRAM EDUCATIONAL SERVICES, P.O. BOX 906,  
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# Association Activities



**David G. Yeo, DPE, ATC**  
Montgomery County  
Community College  
Blue Bell, PA

The annual presentation and announcement of awards and scholarships to members and associates of the NATA is a source of great pride and satisfaction to the Association. Prominent leaders within the profession are honored for their significant and continued contributions, initiative, and dedicated years of service. Outstanding young men and women who are currently enrolled in athletic training programs are awarded scholarships in recognition of their excellent performance and potential. To these established professionals and these future leaders, the NATA extends the sincere thanks and congratulations of the entire membership. The *Journal* is proud to recognize the award and scholarship winners in the Fall issue each year. Additional recipients of District scholarships will be presented at respective District meetings.

Once again, sincere appreciation is extended to William E. "Pinky" Newell, Chairperson, NATA Scholarship Committee, for his efforts in coordinating the awards, and George Sullivan, Chairman of the Honors and Awards Committee.

## **First Interstate Bank Athletic Foundation Hall of Fame**

James H. Goostree, University of Alabama  
Louis K. Grevelle, Coronado High School  
Walter A. Grockowski, Wesleyan University  
Fritz Massmann, New Jersey Nets  
Joseph J. Stanitis, Amherst College  
Raymond V. Ulinski, Penn State University  
Joe Worden, Vanderbilt University

## **NATA Twenty-five Year Awards**

Donald R. Cochren, Dallas Cowboys Football Club  
George H. Crow, Goose Creek School District  
Fern R. Hitchcock, Jr., Western Maryland College  
Carl E. Nelson, Colby College  
Joe Edwin Richardson, Stephen F. Austin State University  
Sherrod Shaw, Springfield College

## **President's Challenge Cup Award**

Robert Brashear, MD  
Team Physician, University of Tennessee

## **Honorary Membership Awards**

Raymond C. Mauro, Spokane, Washington  
John M. Miller, MD, Bloomington, Indiana  
Frederick O. Mueller, PhD, Chapel Hill, North Carolina

**Distinguished Athletic Training Educator Award**  
W.E. "Pinky" Newell  
Purdue University Student Hospital

## **SCHOLARSHIP AWARDS**

### **Eddie Wojecki 1984 Achievement Award**

Deborah Harned, University of North Carolina  
Sponsor: Mueller Chemical Company

### **Undergraduate Scholarship Awards**

Mitchell Dean Christenson  
Pennsylvania State University  
Sponsor: National Football League Charities

Robert Lee Brinkman, Northern Arizona University  
Sponsor: National Basketball Trainers Association

Christopher William Triolo  
East Stroudsburg University  
Sponsor: Professional Football Athletic Trainers Society

Jeffrey Ryan, Temple University  
Sponsor: Professional Baseball Athletic Trainers Society

### **Robert H. Gunn Scholarship Award**

Thomas Dean Lyle, University of Iowa  
Sponsor: National Athletic Trainers Association, Inc.

### **Sayers J. Miller, Jr. Scholarship Award**

Lisa Kaye Metcalf, Ohio University  
Sponsor: National Athletic Trainers Association, Inc.

### **Chuck Cramer Scholarship Award**

Sandra Lee Foltman, Eastern Illinois University  
Sponsor: Cramer Products, Inc.

### **Frank Cramer Scholarship Award**

Cathleen M. Dolan, Michigan State University  
Sponsor: Cramer Products, Inc.

### **William F.X. Linskey Scholarship Award**

Jennifer Leslie Donner, Springfield College  
Sponsor: Johnson & Johnson Products, Inc.

### **William E. Newell Scholarship Award**

Linda Catherine Combs, West Virginia University  
Sponsor: Chattanooga Pharmaceutical Company

### **Post Graduate Scholarship Awards**

Gary Lee Harrelson, University of Southern Mississippi  
Sponsor: National Football League Charities

Sandra Janine Shultz, California State at Fullerton  
Sponsor: National Basketball Trainers Association

David Allen Kaiser, Brigham Young University  
Sponsor: Professional Football Athletic Trainers Society

Karen Jane Swanson, University of Minnesota  
Sponsor: American Orthopedic Society  
for Sports Medicine

Louise Ann Bashore, Lock Haven University  
Sponsor: Sqwincher-United States  
Football Trainers Society

Mary Black Johnson, University of Utah  
Sponsor: Cybex Division of Lumex, Inc.

### **Otho Davis Post Graduate Scholarship Award**

Terry Mark Jordan, Oregon State University  
Sponsor: National Athletic Trainers Association, Inc.

**Del C. Humphrey Post Graduate  
Scholarship Award**

Teresa Vollenweider, Iowa State University  
Sponsor: Schutt Manufacturing Company

**G.E. "Moose" Detty Post Graduate  
Scholarship Award**

Michael S. Cortese, The Colorado College  
Sponsor: Pro Orthopedic Devices, Inc.

**Good-Smith Post Graduate Scholarship Award**

Sandra Lyn Eggerding, Indiana University  
Sponsor: School Health Supply Company

**Annual 1984 Student Writing Contest**

W. Scott Barker, University of Arizona  
Andrew Winterstein, University of Arizona  
Sponsor: National Athletic Trainers Association, Inc.

\* \* \*

Pennsylvania has officially joined ten other states in providing credentialing legislation which legally defines the responsibilities and qualifications of an athletic trainer.

\* \* \*

Dean Nesmith recently retired as Head Athletic Trainer at the University of Kansas after 51 years of service. A member of the NATA Hall of Fame, Nesmith had a post graduate scholarship named after him this year. While his retirement is mandated by state law (age 70), Nesmith hopes to remain involved with KU athletics in a part-time advisory role.

Wayne Rudy, Head Athletic Trainer for the Kansas City Chiefs, has retired after 38 years of NFL and college head trainer experience. Rudy worked a total of 606 straight college (SMU) and pro football games without missing a scrimmage, practice, preseason or postseason game. Rudy was elected to the NATA Hall of Fame, served as NATA national director of the United States Sports Academy group which was recently invited to Bahrain, Persian Gulf, to speak at the Middle East Sports Science Symposium. Kleinschmidt spoke to leading health care professionals on injury treatment and rehabilitation techniques.

\* \* \*

Ron O'Neil, former assistant to Philadelphia Eagles' Otho Davis since 1973, has been named the new head trainer for the New England Patriots.

\* \* \*

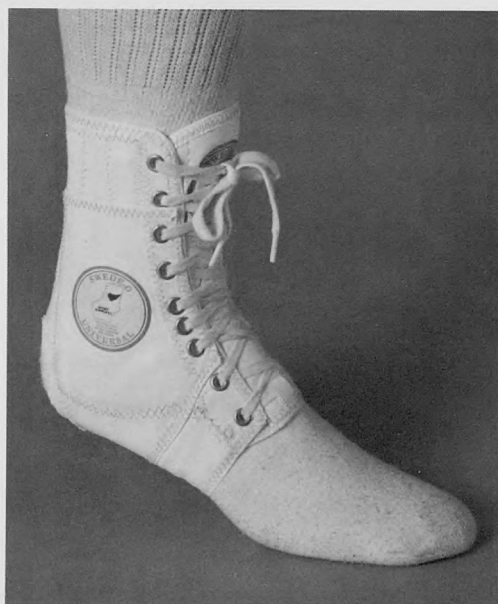
West Virginia has officially formed its own organization. The West Virginia Athletic Trainers Association announces the first Executive Board as follows: President: Greg Ott, President-Elect: George Brindley, Secretary: Cynthia "Sam" Booth, Treasurer: Dave Woods.

\* \* \*

Reminder: All information regarding member accomplishments, district news, and individual honors should be mailed to David Yeo, MCCC, Blue Bell, PA 19422. +

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**NATIONAL ATHLETIC TRAINERS' ASSOCIATION, INC.  
BOARD OF CERTIFICATION**

**Student Documentation of Internship Hours  
Form A**

January 1, 19\_\_ to December 31, 19\_\_

NAME: \_\_\_\_\_ SS No. \_\_\_\_\_

Address: \_\_\_\_\_ Member No. \_\_\_\_\_

\_\_\_\_\_ District \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Are you a member of the NATA? Yes \_\_\_\_\_ No \_\_\_\_\_

**Institution where Internship hours were attained:**

Name: \_\_\_\_\_

*Note: Use only one form for each*

Address: \_\_\_\_\_

*institution if hours were completed*

\_\_\_\_\_

*in more than one setting*

\_\_\_\_\_

\_\_\_\_\_

Supervising Athletic Trainer: \_\_\_\_\_

I have interned under the above mentioned NATA Certified Athletic Trainer and have acquired \_\_\_\_\_ hours during the one year period noted above. Furthermore, the hours were completed in compliance with the Internship requirements located in the Guidelines for Certification brochure.

Signature \_\_\_\_\_ Date \_\_\_\_\_

Please note: Form B is to be completed by the supervising athletic trainer.

PHOTOCOPY THIS FORM FOR FUTURE USE

**NATIONAL ATHLETIC TRAINERS' ASSOCIATION, INC.  
BOARD OF CERTIFICATION**

**Documentation of Internship Hours Form B**

This form is to be completed by the internship supervising athletic trainer and sent to the Certification Office by **JANUARY 31st** of each year. Do not attach any log forms.

Name of Supervisor: \_\_\_\_\_ Membership # \_\_\_\_\_

Title: \_\_\_\_\_ Certification # \_\_\_\_\_

Place of employment including address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Please list names of other NATA Certified Athletic Trainers who supervised interns at the institution listed above.

Name	Member No.	Certification No.
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**INTERN HOURS LOG**

January 1, 19\_\_\_\_ to December 31, 19\_\_\_\_

Name	Social Security No	No. of Hours
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

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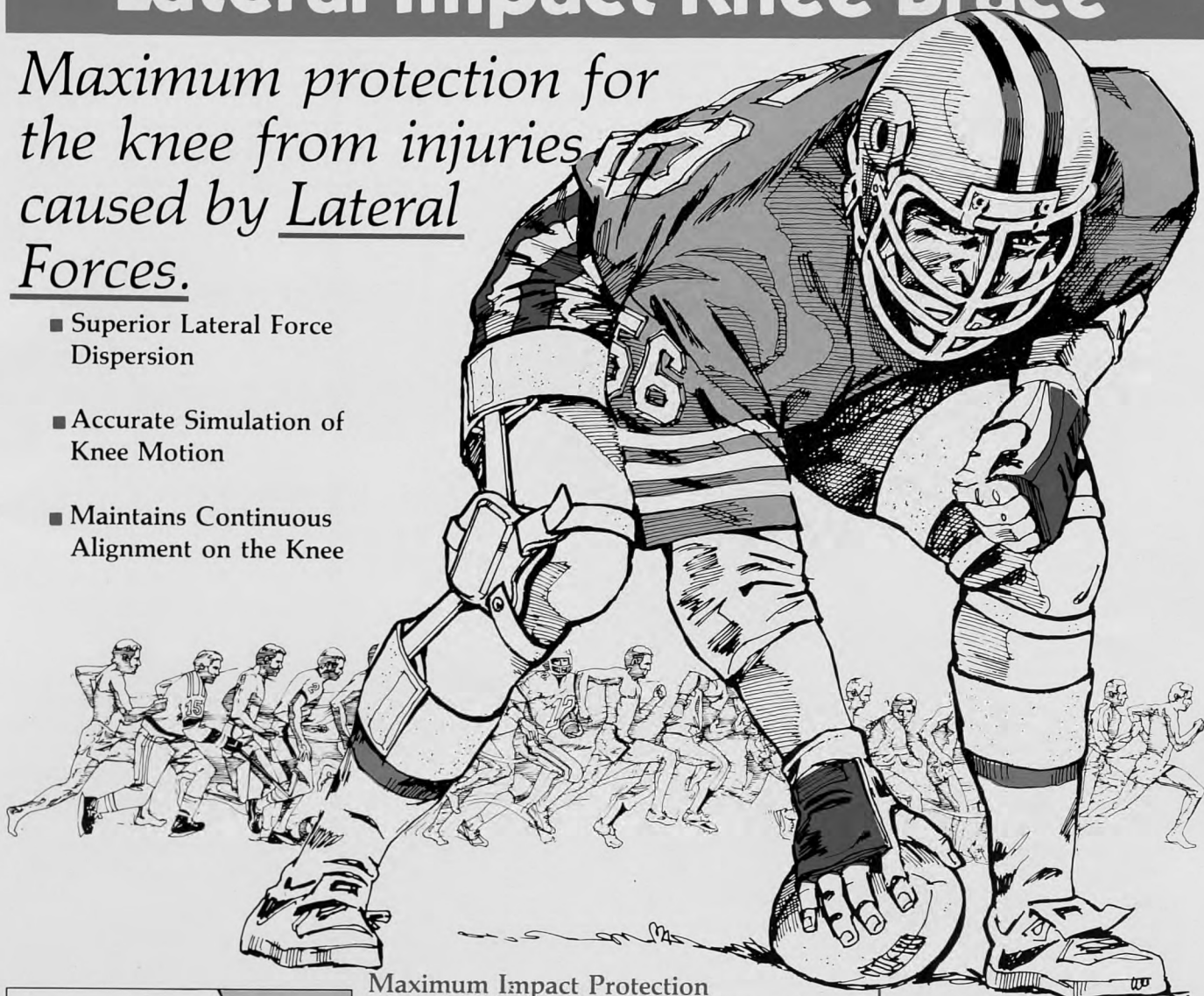


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- Superior Lateral Force Dispersion
- Accurate Simulation of Knee Motion
- Maintains Continuous Alignment on the Knee



### Maximum Impact Protection

Longer shafts of highly resilient aluminum transfer forces to —

Plastic thigh and calf wings, padded with high density foam rubber to dissipate and absorb the shock of impact over a wide surface area.

### Simulates Natural Motion of the Knee

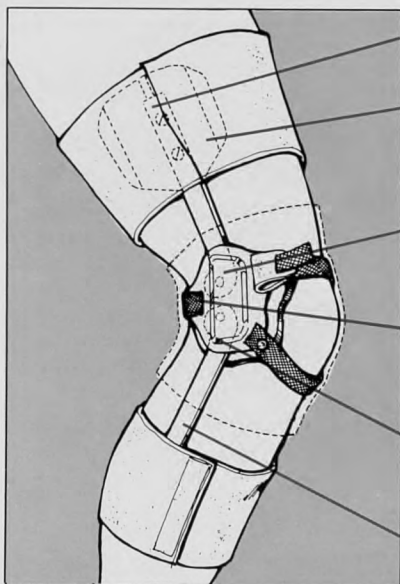
Collataguard's dual axis hinge closely approximates the action of the knee providing protection without restricting normal function.

Popliteal straps effectively maintain the position of the condular pads and the hinge axis to the knee to insure normal function under game conditions.

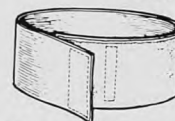
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The padded encasement of the hinge components protect the wearer and competitors from abrasive contact.

Contoured shafts are preformed to conform to the normal leg.

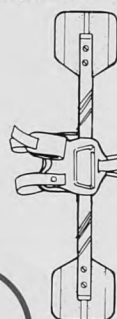


CG-100 Collataguard  
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Latex Straps



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TABLE VI

Direct Fatalities 1983: Cause of Death

Causes	Sandlot	Pro	High School	College	Total
Head Injury	0	0	4	0	4
Totals	0	0	4	0	4

TABLE VII

Direct Fatalities 1983: Position Played

Position	Sandlot	Pro	High School	College	Total
Running Back	0	0	1	0	1
Defensive End	0	0	1	0	1
Interior Defensive Lineman	0	0	1	0	1
Defensive Back	0	0	1	0	1
Totals	0	0	4	0	4

TABLE VIII

Indirect Fatalities 1983: Cause of Death

Causes	Sandlot	Pro	High School	College	Total
Heat Stroke	0	0	0	1	1
Heart Failure	0	0	6	1	7
Congenital Brain Ailment	0	0	0	1	1
Totals	0	0	6	3	9

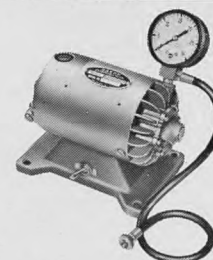
**EXERCISE PHYSIOLOGY, from page 188**

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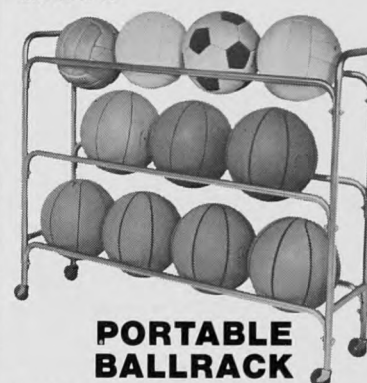
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# Calendar of Events



Jeff Fair, ATC, MS  
Oklahoma State University

## September

**10-14** LaCrosse Exercise Program on Weight Control, Lacrosse, WI. Contact Philip K. Wilson, LaCrosse Exercise Program, University of Wisconsin - LaCrosse, LaCrosse, WI 54601.

**14-16** Fall Quarterly Conference, TARGET ON TRAUMA, Gloucester, OH. Contact S.E.O.M.S., Route 4, Box 144, Gallipolis, OH 45631.

**16** 2nd Annual Pioneer Valley Sports Medicine Conference, West Springfield, MA. Contact Nancy Caron, S.T.A.R.T., Inc., 91 School Street, Springfield, MA 01105.

**21-22** How to Implement and Manage a Sports Medicine Program - Should You Do It!, Atlanta, GA. Contact Ronald G. Peyton, The Sports Medicine Education Institute, Inc., 993 Johnson Ferry Road, NE, Suite AC-130-F, Atlanta, GA 30342.

## October

**8-10** EMERGENCY MEDICINE TODAY '84, Winston-Salem, NC. Contact Michael Eddinger, P.A. or Ed Browning, Office of Emergency Medical Services, P.O. Box 12200, Raleigh, NC 27605.

**17-20** LaCrosse Health and Sports Science Four-in-One Symposium, LaCrosse, WI. Contact LaCrosse Exercise Program, Mitchell Hall, University of Wisconsin - LaCrosse, LaCrosse, WI 54601.

**19-20** How to Implement and Manage a Sports Medicine Program - Should You Do It!, New York, NY. Contact Ronald G. Peyton, The Sports Medicine Education Institute, Inc., 993 Johnson Ferry Road, NE, Suite AC-130-F, Atlanta, GA 30342.

**19-21** Sports Vision Conference, Las Vegas, NV. Contact National Academy of Sports Vision, 200 South Progress Avenue, Harrisburg, PA 17109.

**31-Nov 3** Radiographic Assessment - Spine and Pelvis, Orlando, FL. Contact Cynthia L. Dotto, AAOSPT, 3849 Stirrup Drive, Erie, PA 16506.

## November

**2-3** Annual Meeting of New England Chapter of American College of Sports Medicine, Boxborough, MA. Contact Bernice McPhee, Executive Secretary NEASCM, Emerson Hospital, Old Road to Nine Acre Corner, Concord, MA 01742.

**2-3** Fourth Annual Southwest ACSM Convention, Las Vegas, NV. Contact Gene Adams, Physical Education Department, California State University, Fullerton, CA 92634.

**2-4** Sports Vision Conference, Atlantic City, NJ. Contact National Academy of Sports Vision, 200 South Progress Avenue, Harrisburg, PA 17109.

**8-11** Sports Medicine - Orthopedic Injuries Seminars, White Sulphur Springs, WV. Contact George M. Converse, Lloyd Noland Hospital and Health Centers, 701 Ridgeway Road, Fairfield, AL 35064.

**9-10** How to Implement and Manage A Sports Medicine Program - Should You Do It!, Ft. Lauderdale, FL. Contact Ronald G. Peyton, The Sports Medicine Education Institute, Inc., 993 Johnson Ferry Road, NE, Suite AC-130-F, Atlanta, GA 30342.

**10-11** Cybex-Isokinetic Clinical Workshop, LaCrosse, WI. Contact George J. Davies, Orthopedic and Sports Physical Therapy, 2501 Shelby Road, LaCrosse, WI 54601.

**11-16** LaCrosse Exercise Program - Teaching Stress Management and Relaxation Skills, LaCrosse, WI. Contact Philip K. Wilson, LaCrosse Exercise Program, University of Wisconsin-LaCrosse, LaCrosse, WI 54601.

**12-16** LaCrosse Exercise Program - Cardiac Rehabilitation, LaCrosse, WI. Contact Philip K. Wilson, LaCrosse Exercise Program, University of Wisconsin-LaCrosse, LaCrosse, WI 54601.

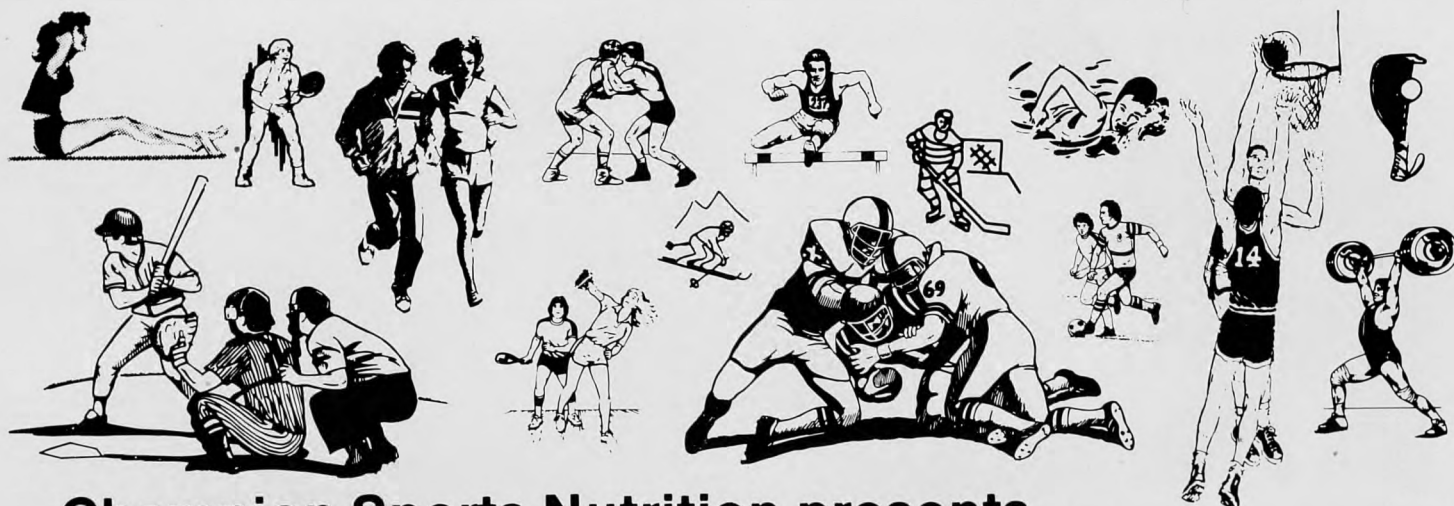
**14-16** Annual Conference of National Council of Youth Sports Directors, Indianapolis, IN. Contact Sporting Goods Manufacturers Association, 200 Castletown Road, North Palm Beach, FL 33408.

## February 1985

**9-16** Fifth Annual Sports Medicine Now Conference, Maui, Hawaii. Contact Stuart Zeman, MD, Course Chairman, 2999 Regent Street #203, Berkeley, CA 94705.

*Athletic Training* will list events of interest to persons involved in sports medicine, providing the information is received **at least two months in advance of publication**. Please include all pertinent information and the name and address of the person to contact for further information. This information should be sent to: Jeff Fair, Head Athletic Trainer, Athletic Department, Oklahoma State University, Stillwater, OK 74078.+

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**John Wm. Perry, MD**  
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- to help prevent muscle cramps and spasms, promotes muscle elasticity
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# Potpourri



Dennis Aten, ATC, RPT, MS  
Eastern Illinois University

## Addiction to Exercise Unlikely *News Release*

Certain drug-like substances that are released in the body during prolonged exercise are not responsible for the strong feeling of euphoria that some people have called "runner's high," according to a researcher at the University of North Carolina at Chapel Hill.

Dr. Robert G. McMurray, assistant professor of physical education, said his experiments contradict what is becoming an increasingly entrenched tenet of athletic lore. It had been thought that the substances known as endorphins, which are produced to help pain control, can result in physical addiction.

McMurray reached his conclusions after completing tests that involved having six healthy women walk to the point of exhaustion on a treadmill.

During the past three years or so, it has been proven that endorphin levels do increase during heavy exercise, and the popular idea was that the body becomes dependent on them like heroin or morphine. The study investigated whether blocking endorphins would increase the length of time a person could exercise, make a particular level of exercise seem more difficult, or change physical measures like heart rate and breathing.

The six women, who were physically fit, walked on a treadmill that gradually became steeper to make walking more difficult. The volunteers were asked to rate on a 15-part scale how hard they were working at various intervals and to continue as long as they could. Their responses were compared with what the researchers measured directly with electronic devices.

Before exercising, the women were injected with either salt solutions, control substances or naloxone, a drug that would block the action of endorphins and often is used to counteract heroin overdose.

Each of the subjects completed trials with each of the mixtures, but neither they nor the investigators knew which they had received until the experiments ended. It was found that there was essentially no difference between the drug trials and the normal trials in terms of perceived exertion, the time it took to reach exhaustion. Maximum heart rates and total breathing volumes were slightly lower with naloxone, but those differences may have been due to small differences in the length of exercise.

"Our research suggests that if there really is such a thing as 'runner's high', it is not being caused by endorphins," McMurray said. "It's more likely that this feeling of well-being comes from adrenalin or the release

of built-up stress." None of the women reported feeling anything other than exhaustion during or directly after the trials. McMurray, a former All-American swimmer in college who continues to swim and jog regularly, said he has never experienced any form of exercise "high." "The attraction of prolonged exercise is probably psychological," he said. "It is so good at relieving stress that some people who are particularly susceptible to stress may begin feeling like they can't do without it."

## Exercise Promotes Wellness

A University of Michigan Medical School study indicates that exercise may have more than just fitness advantages. The increased temperature, or induced fever, stimulated by exercise may kill many germs before they cause complete illness. Regular exercise may show some real value in this area.

## "Athletic Hearts" Often Mistaken For Chronically Diseased Hearts

*New Release*

The heart of a trained athlete is similar — at least at first glance — to that of a person suffering from heart disease, according to Richard L. Jones, MD. Resulting from regular conditioning of the heart muscle, the "athletic heart syndrome" often leads physicians to misdiagnose extremely healthy patients for those on the brink of severe cardiac illness.

Ask yourself these questions: Is your resting heart rate less than 60 beats per minute? While resting, can you see or feel your chest wall throb as your heart beats? Has your doctor said that you have a heart murmur or that your heart appears to be enlarged? Do you experience brief lightheadedness when you move quickly from a sitting to standing position? Do you occasionally perceive an extra or skipped heartbeat? A "yes" to one or more of these questions, according to Dr. Jones, may indicate the "athletic heart syndrome."

The most pronounced effect of the athletically trained heart is an enlarged left ventricle — the chamber that pumps blood to the body after receiving it from the lungs. This enlargement often is mistaken for a generally enlarged heart, characteristic of some forms of heart disease. Other similarities between the athletic and diseased heart include electrocardiogram rhythm abnormalities in the resting state; frequent dizziness and irregular beats due to a transient drop in blood pressure that accompanies lower heart rates; and heart murmurs, the result of blood flow turbulence due to the larger amount of blood pumped with each beat.

"There is one distinct and very important difference," says Dr. Jones, "between the trained athlete and an individual with chronic heart disease. The athlete has developed the athletic heart syndrome, a physiological condition caused by regular conditioning of the heart muscle, resulting in increased cardiac reserve; patients with progressive heart disease have used up their cardiac reserve and possess dilated, enlarged, and failing hearts."

## Behavior and Nutrition

*October, 1983 Contemporary Nutrition*

The finding that there is an effect upon measurements relevant to school performance, depending on whether or not the child had breakfast that morning, may seem trivial and like common sense to any parent who has had to remind their child not to leave for school without

breakfast. Yet, it is an example of a hypothesis finally being tested. Caffeine in children and adults tends to increase vigilance. Differences in caffeine effects are seen among different personality types and among those who self-select high or low amounts of the stimulant in their diets. There is no clear behavioral toxicity from caffeine in normal children. Those self-selecting high caffeine diets generally do not seem to get negative effects.

Whether most other beliefs about behavioral effects of food and nutrients are facts or myths still needs to be determined. Until adequate scientific evidence is collected, individual beliefs about sugar, hyperactivity and crime must remain only beliefs, regardless of how strongly public policy may or may not endorse them. At this time, there is no proven causal relationship. More studies with adequate design details are needed to assess behavioral toxicity as well as the benefit/risk ratio of any dietary manipulation.

## Caffeine

*May, 1984 Contemporary Nutrition*

Food manufacturers in recent years have introduced a number of caffeine-free colas, decaffeinated teas, caffeine-free herbal teas and improved versions of decaffeinated coffees. These alternative products are not necessarily more risk-free than their caffeine-containing counterparts. For example, there are conflicting data from animal studies on the safety of various solvents used to decaffeinate coffee. Most researchers agree, however, that the risks, if any, are low.

Although herbal teas do not contain caffeine, they do contain many other components that have not been subjected to as much scientific scrutiny as has caffeine. Many of these are probably harmless, but others have been shown to have a variety of toxic effects, even when used in moderate amounts.

While many questions about the ultimate safety of caffeine remain to be answered, the available data indicate that mankind will suffer no harm by consuming currently available caffeine-containing beverages in moderation.

## Health Alert: Blacks Are At Risk For Glaucoma

The American Academy of Ophthalmology has issued a health alert that glaucoma is now the leading cause of blindness in black Americans.

Glaucoma in blacks is 8 times the rate among whites, says Bruce E. Spivey, MD, the Academy's executive vice president. In the high-risk group 45 to 64 years old, the rate among blacks is 14 to 17 times greater than among whites. The rate of blindness from other eye disorders is relatively equal among the two races. An estimated 62,000 Americans are blind from glaucoma and approximately 2 million citizens have the eye disease.

Among the probable reasons for the higher rate of glaucoma among blacks are:

- a high incidence, earlier in life, of elevated pressure within the eye
- a more severe elevation in pressure
- delayed detection and treatment
- less effect of therapy on the glaucoma

To help reduce the number of cases of glaucoma in blacks, the Academy is encouraging more:

- eye examinations for this group
- frequent follow-up
- careful attention to treatment of glaucoma
- attention to economic and other factors that may interfere with adequate detection and treatment

- interest from governmental, private and voluntary agencies to increase screening among high-risk groups (socially deprived populations likely to have limited access to health care)
- attention to glaucoma detection among existing health screening programs of blacks for hypertension, sickle cell disease and diabetes
- joint efforts by governmental agencies and other institutions in organizing and coordinating this effort.

For copies of the Academy's Public Health Note on blacks and glaucoma, send a stamped, self-addressed business envelope to the American Academy of Ophthalmology, PO Box 7424, San Francisco, CA 94120-7424.

## Ophthalmologists Detect Hypertension Through Eye Examinations

Early diagnosis of hypertension (high blood pressure) is possible by detecting changes in the retina of the eye, according to the American Academy of Ophthalmology.

Eye physicians are in a unique position to identify patients with prolonged, undetected hypertension, which requires immediate medical evaluation and treatment, stated the Academy's Public Health Committee.

One of mankind's most common diseases, hypertension affects 15 to 20 percent of those over 18 years old. Stroke and heart disease are among the clinical conditions associated with hypertension. The major difficulty in controlling the disorder is identifying people who have it but show no symptoms, the committee statement emphasized.

Carefully conducted clinical trials have demonstrated that hypertension can be effectively treated, reducing its impact on health and longevity, according to the Academy. In community-based screening and treatment programs, the survival rate of those with hypertension approached that of the general population.

In addition to diagnosing the disease through an eye examination, ophthalmologists help detect those with early or milder cases by measuring blood pressure not under the care of another physician.

Academy guidelines on hypertension suggest the following:

- Whenever an eye examination indicates that the disease may be present or may be poorly controlled, patients should be alerted and urged to seek appropriate medical care.
- Results of the eye examination should be given to any physician providing medical care for the patient's condition.
- Ophthalmologists should periodically measure the blood pressure of all adult patients not under the care of another physician screening for hypertension. Those with high blood pressure should be urged to seek appropriate consultation and follow-up care. +

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**1 Ankle Injuries** 22:00 Anatomical models are effectively used to take you through basic ankle anatomy. David Craig, of the Indiana Pacers, provides an understandable approach to recognition and treatment of ankle injuries. The three grades of ankle sprains are discussed and both preventative and rehabilitative techniques are clearly demonstrated on professional athletes.

**2 Shoulder Injuries** 23:00 Basic anatomy and the mechanics involved in common shoulder injuries are clearly illustrated for better understanding, via anatomical models. Mike Abdenour, of the Detroit Pistons, shows the six common shoulder problems, their recognition, immediate treatment and rehabilitation.

**3 Foot Injuries** 20:00 Running and jumping cause a tremendous impact on the foot. Dick D'Oliva, of the Golden State Warriors, discusses stress fractures which are the cumulative result of repeated force to the foot. Other trainers discuss stress on arches, toe injuries including "turf toe," heel bruises, severe stress on the bottom of the foot, inflammation of the Achilles tendon, blisters, calluses, ingrown toenails, and remedial techniques.

**4 Knee Injuries** 23:00 The four principal ligaments of the knee are discussed, as well as the kneecap, cartilage placement and arthroscopic surgery. Jeff Snedeker, of the Milwaukee Bucks, describes five common knee problems and the tests which check for knee damage. In addition, immediate treatment of knee injuries and rehabilitation programs are discussed, as well as taping procedures, sleeves, braces and casts.

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# Student Trainer Corner



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## Rotator Cuff Injuries: The Need for Specific Exercises in A Prevention and Treatment Program

Scott Barker  
Andrew Winterstein

The shoulder joint is classified as a ball and socket joint, capable of more movement than any other joint in the body. The overhand throwing motion highly stresses the shoulder joint's stability; continually placing the shoulder at the extremes of its range of motion. The most important factor in dynamic joint stability during the throwing motion is the muscle group known as the rotator cuff. For the highly skilled athletes, a rupture of the rotator cuff may result in a terminated career. With these catastrophic effects kept in mind, the importance of preventing rotator cuff injuries deserves serious consideration. It is easier to prevent a rotator cuff injury than to treat one. Prevention, however, is statistically difficult to document: if no injury occurs, who is to say just why it did not. It is therefore important to include specific exercises for the prevention and treatment of rotator cuff injuries.

### Anatomy

The shoulder girdle is made up of three bones: the clavicle, humerus, and scapula. These bones make up three movable articulations; the sternoclavicular, acromioclavicular, and the glenohumeral. These bony articu-

lations work synchronously to allow the humerus to move through its large range of motion.

The head of the humerus is spherical and faces medially to articulate with the glenoid fossa. The glenoid fossa is a shallow depression on the lateral aspect of the scapula. The incongruity between the head of the humerus and glenoid cavity is partially compensated for by the glenoid labrum, a fibrocartilaginous structure that serves to deepen the cavity. As the glenoid labrum contributes to static shoulder stability, so does the articular capsule. The articular capsule is a thin and somewhat lax cylindrical band of ligaments which surround the glenohumeral joint. When considering rotator cuff injuries, it is important to be familiar with the subacromial and subdeltoid bursae. Because of location they are often associated with rotator cuff injuries.

The rotator cuff is made up of four individual muscles. (Fig. 1) One of these is the *subscapularis*, the most anterior of the rotator cuff muscles. Medially, the subscapularis attaches to the anterior surface of the scapula and laterally, its tendon crosses the front of the shoulder joint and attaches to the lesser tubercle of the humerus. Its functions include: depressing the head of the humerus and pulling it into the glenoid fossa (stabilization), and adducting the humerus. In addition, it is a strong internal rotator of the humerus.

Two other muscles of the rotator cuff are the *teres minor* and *infraspinatus*, which are similar in function. The *teres minor* attaches medially to the dorsal surface of the scapula near the axillary border. Laterally, it attaches to the lower portion of the greater tubercle of the humerus. The *infraspinatus* attaches medially to the middle two-thirds of the *infraspinatus* fossa below the

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*Scott Barker is a 1984 graduate of the University of Arizona with a degree in Physical Education. He is currently pursuing a Master's Degree in Athletic Training at the University of Arizona in Tucson, Arizona. Andrew Winterstein is in his final semester at the University of Arizona pursuing a degree in Biology. Both authors were inspired into the field of Athletic Training by the late Warren H. Lee, and have dedicated this paper to him.*



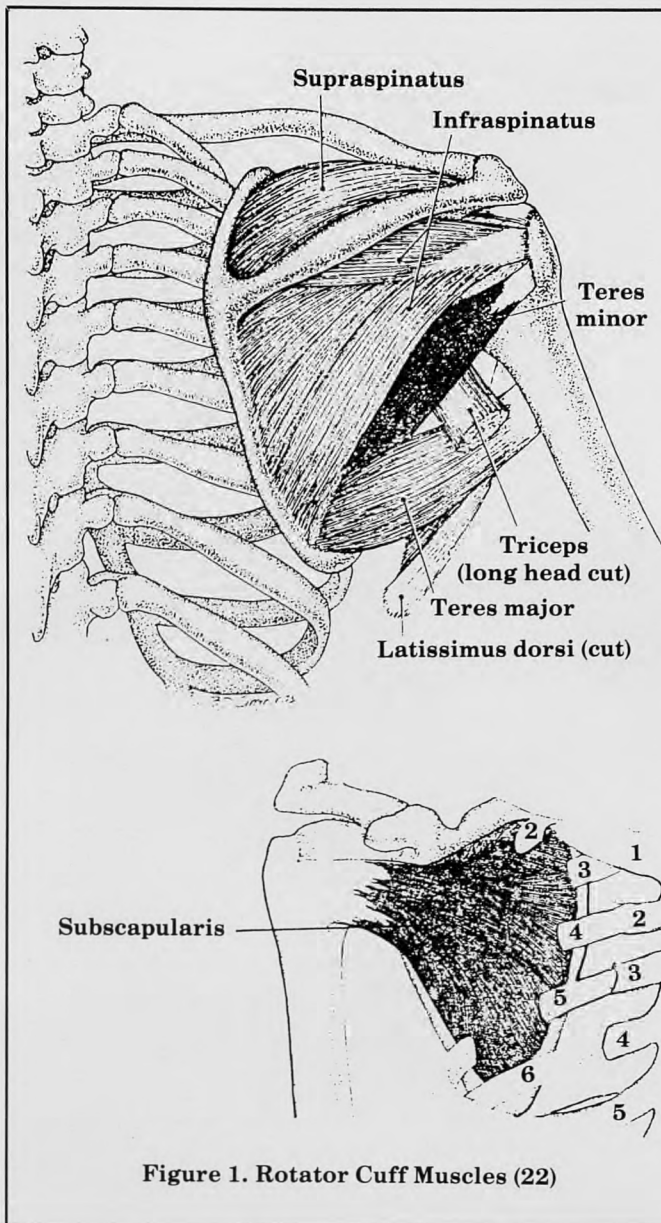


Figure 1. Rotator Cuff Muscles (22)

spine of the scapula. Laterally, it attaches to the posterior aspect of the greater tuberosity of the humerus. The functions of these two muscles are: to externally rotate the arm at the shoulder, regardless of its position, and to stabilize the head of the humerus in the glenoid cavity during movement of the arm.

The fourth muscle of the rotator cuff is the *supraspinatus*. The supraspinatus attaches medially to the supraspinatus fossa above the scapular spine. Laterally, it attaches to the upper portion of the greater tuberosity of the humerus. Its functions include: abduction of the arm, and stabilization of the humeral head in the glenoid fossa (14).

### Injuries and Treatment of the Rotator Cuff

There are various types of injuries that can occur to the rotator cuff. These have been divided into four stages. Stage I displays inflammation of the tendon and often a contracted and atrophied muscle results. Stage II, called an impingement syndrome, is when some musculotendinous tissue separation has occurred, but is not completely torn. Impingement then occurs when the tendinous portion of the rotator cuff is pinched between the humerus and the acromion process. Stages I and II are treated similarly. Initial treatment usually consists

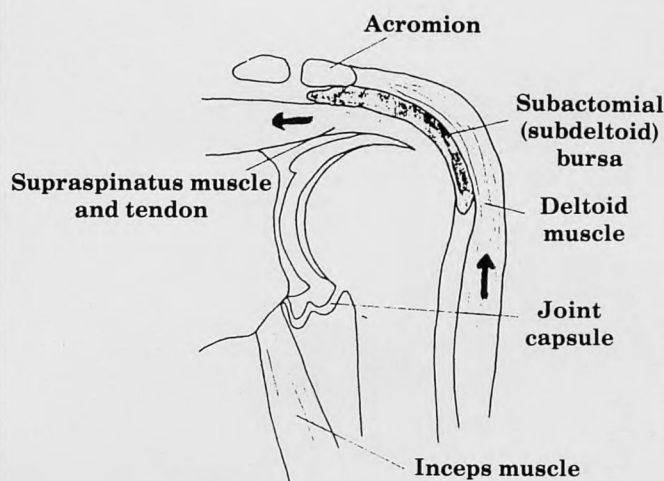


Figure 2. Functional pull of the Deltoid and Supraspinatus (14)

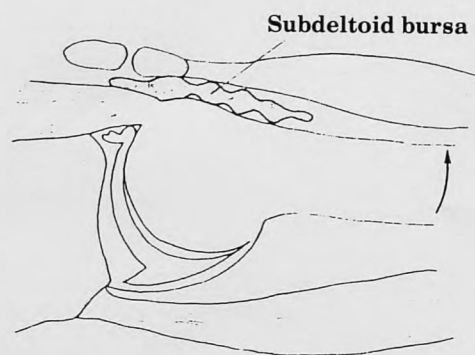


Figure 3. Resultant superior humeral displacement, leading to decrease in subacromial space (14)

of rest, ice and/or heat, along with stretching and strengthening exercises. Additional methods of treatment include anti-inflammatory medication, ultrasound, and in severe cases, even steroid injection. Given the possible degenerative effect due to repeated steroid injections, this option must be approached with caution.

The rotator cuff tendons are particularly susceptible to tendonitis because of the poor blood supply, especially near the insertion of the supraspinatus. Because of this, nutrition to the area may not meet the metabolic demands of the tissue. As a result of the overuse and lack of blood supply, a resultant local cell death occurs and this sets up an inflammatory response. Weakness of the rotator cuff muscles further exacerbates the shoulder problem via increased inflammation, and abnormal joint biomechanics and decreased joint stability. During abduction, if the rotator cuff muscles do not hold the head of the humerus into the glenoid fossa, the deltoid will pull the humeral head superiorly. This superior displacement of the humerus results in a decreased subacromial space (Figs. 2 and 3). Therefore, further impingement is placed upon the supraspinatus tendon. If the strength of the rotator cuff muscles are not considered in the treatment program, the muscles atrophy during the rest period. Upon resuming activity, further impingement will result with recurrence of the tendonitis symp-

## EXERCISES

The following are some exercises that would be beneficial to a prevention or rehabilitation program for the rotator cuff.

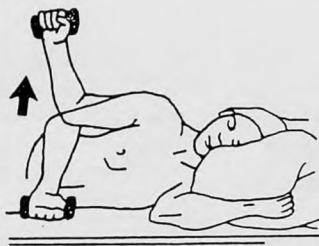


Figure 4

**External Rotation:** Lie on your side with your elbow held close against your ribs. Slowly raise the weight until it is pointed at the ceiling, and then lower it slowly. External rotation exercises the infraspinatus and the teres minor muscles (11).

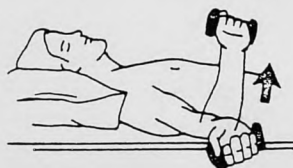


Figure 5

**Internal Rotation:** Lie on your back with your arm held at the side, raise the weight until it is pointed toward the ceiling. Then lower the weight slowly. Internal rotation exercises the subscapularis muscle (11).

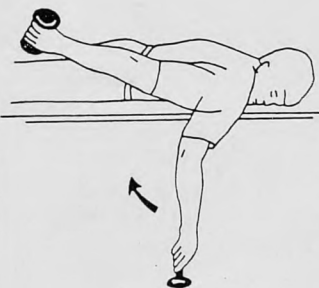


Figure 6

**Shoulder Extension:** Lie on your stomach, raise arm behind you as high as possible. Remember to keep your elbow straight and the arm close to your body. This exercises the posterior deltoid, some latissimus dorsi, and some lower trapezius (11).

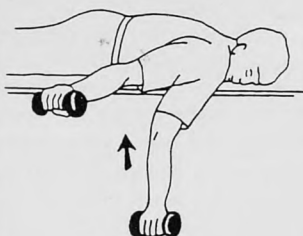


Figure 7

**Horizontal Abduction:** Lie on your stomach, raise the weight until the arm is straight out to your side. Slowly lower it to the starting position. This exercise works the Rhomboids (major and minor) and the posterior deltoid (11).

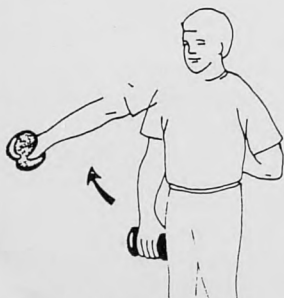


Figure 8

**Shoulder Abduction:** Standing with arm at side, lift weight laterally until arm is parallel with the ground (90° abduction). Slowly lower weight to the starting position. This exercises the middle deltoid as well as rotator cuff stabilization function (11).



Figure 9

**Shoulder Flexion:** Standing with arm at side, lift the weight directly in front of you until it is parallel to the ground. Slowly lower the weight. This works the anterior deltoid (11).



Figure 10

**Supraspinatus:** This exercise should be done with the elbow straight and thumb turned toward the floor. Rather than putting the arm straight out to the side, slowly raise the arm in a plane about 30° forward of that posture. Do not lift the arm higher than just below shoulder level; slowly lower it to the starting position and repeat (11).



Figure 11

**Rhythmic Stabilization Exercise:** Lie on your back with your arm extended straight up. Maintain this position while person administering exercise applies pressure randomly in all four directions. Some movement should take place until subject reacts to direction of pressure. This should be done in 30 second intervals. This provides high speed eccentric muscle contractions to the muscles surrounding the shoulder girdle.



toms. This can lead to a vicious cycle that can eventually result in a Stage III or Stage IV rotator cuff lesion (14).

Stage III is described as a gross tear, up to one centimeter in length, in the rotator cuff tendon. Stage IV is a larger tear, greater than one centimeter, of the rotator cuff tendon. Many times Stage III and IV injuries are treated by surgery.

Rarely will an athlete suffer from a Stage III or Stage IV injury without having first suffered a Stage I or Stage II injury. Serious rotator cuff injuries usually occur over an extended period of time. It is of utmost importance to correct these problems during Stage I, however correcting this injury is not an easy task. Once corrected, work must be continued to prevent this condition from recurring. Preventative measures are essential even if the athlete has no history of rotator cuff injury.

Recent research has been done on the function of the rotator cuff muscle group using EMG analysis. This research was done by Dr. Frank W. Jobe and his results printed in the January 1983 American Journal of Sports Medicine (9). Dr. Jobe's EMG study looked at the level of activity of the rotator cuff muscles during throwing motion. This study showed a lack of rotator cuff activity in the acceleration phase. In the follow-through stage, the rotator cuff muscles were most active. This shows the rotator cuff muscles are decelerating the arm. This muscle activity would exemplify an eccentric muscle contraction. An eccentric contraction is a lengthening contraction of the muscle. In view of this information, rotator cuff tears may occur when the muscle tendon group is unable to lengthen at the required rate. This would be especially true for weak, overused, rotator cuff tendons.

### Prevention and Rehabilitation

The rehabilitation process takes place following a rotator cuff injury. This encompasses rehabilitation following any injury from Stages I to IV, however, preventative exercises take place prior to the onset of an injury. Even though rehabilitation and prevention are different by definition, the exercises are the same for both. The only differences being in intensity and progression.

When considering exercises for a prevention or rehabilitation program for the rotator cuff, it is important to note that there are a vast number of programs available. It is difficult to decide which is "the best" program. The form of resistance can vary as long as the exercise is specific to the rotator cuff muscles. Some examples of the types of resistance commonly used are: free weights, surgical tubing, manual resistance, Cybex, or buckets of rice. The type of resistance is only limited by the creativeness of the program designer. By specific, each rotator cuff muscle should be considered individually during the exercise program.

As mentioned, the rotator cuff muscles are working eccentrically during the throwing motion. Therefore, an eccentric portion of the exercise program should be considered. To add eccentric emphasis to the exercise program, the let-down phase of isotonic exercises should be at least as long in duration as the concentric phase. Both concentric and eccentric phases should be done in a slow, controlled manner.

When considering exercises for throwing, isokinetic exercises (Cybex) provide more specificity because of the high speeds and accommodating resistance throughout the range of motion. This has proven to be one of the best methods for specific concentric muscle training (21). Given the expense involved in isokinetic exercising machines, they are rarely practical to most prevention and rehabilitation programs. One exercise that is an

alternative to this is the rhythmic stabilization exercise (Figure 11). This exercise incorporates high speed, eccentric muscle contractions, with the arm held in a position similar to the release point in throwing.

A preventative exercise program should be initiated progressively to avoid injury or undue soreness. It has been shown that eccentric muscle contractions are a large contributor to delayed onset muscle soreness until the athlete becomes accustomed to this type of exercise (20). Therefore, the athlete should gradually work his way into this exercise program.

It should be noted that in addition to strengthening exercises, the athlete should follow a complete shoulder flexibility program. This should include stretching the shoulder in all directions: flexion, extension, external rotation, internal rotation, abduction, horizontal adduction, horizontal abduction, etc. There are a great number of flexibility exercises to accommodate these motions. The most important factor here is that a good flexibility program should be developed and followed in order to maintain a full range of motion. Loss in range of motion, may make the athlete more susceptible to injury.

### Conclusion

The highly mobile shoulder joint is a very complicated part of the human anatomy. Our understanding of this joint is further complicated when considering its function in the highly skilled thrower. The throwing motion involves excessive forces that threaten joint stability. Once the rotator cuff is significantly injured, the shoulder joint's functional stability is reduced and unable to withstand the stress involved in throwing.

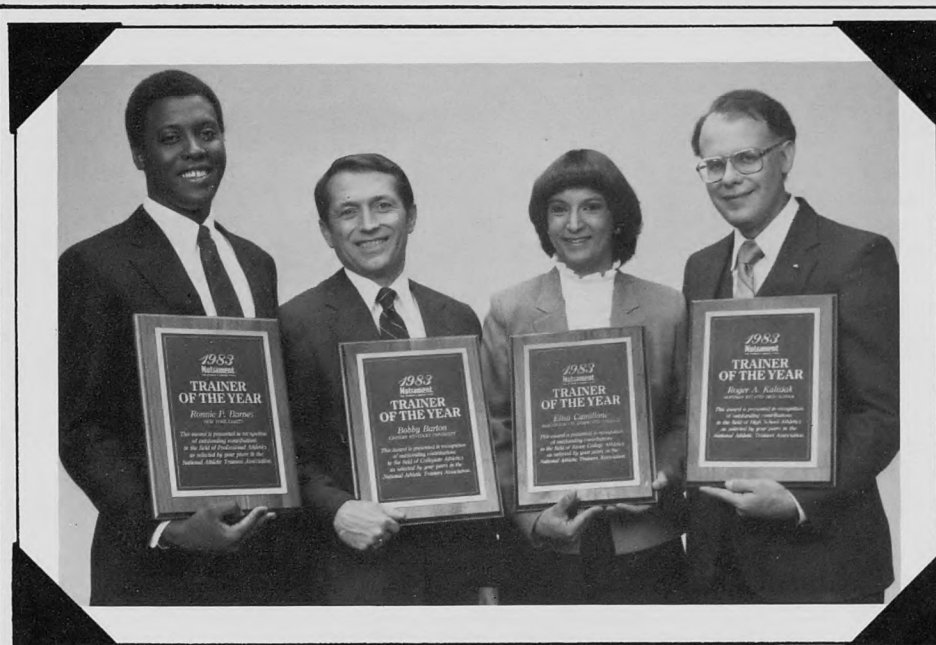
With an understanding of the function of the rotator cuff muscles in joint stability, serious consideration must be given to the implementation of exercises in a prevention and treatment program. This program for rotator cuff injuries should focus on alleviating the symptoms as well as correcting the underlying cause of these symptoms. Preventative exercises demand a schedule that must be strictly followed. However, it is often difficult to convince the athlete who has never had a serious injury to follow preventative exercise programs. It is usually not until after an injury occurs that the athlete fully realizes the importance of a preventative exercise program. In some cases, the injury may be too severe and the athlete never returns to competition.

When considering an exercise program, it should be one that is most specific to the shoulder in the high skilled throwing motion. The most specific exercises are those which include high speed concentric and eccentric muscle contractions. Practicality is another important consideration. This program is very specific and practical to the rotator cuff in the throwing athlete.

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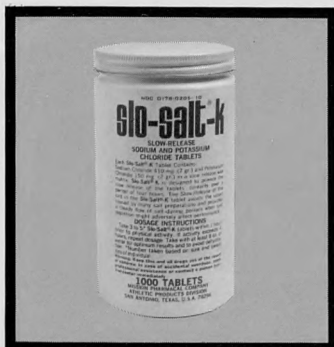
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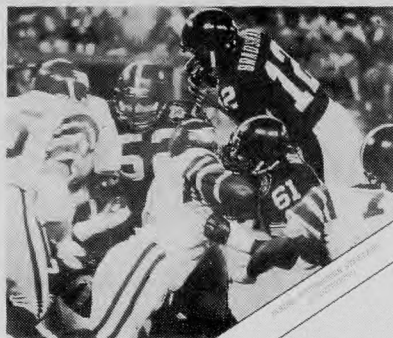
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# Abstracts



John Wells, ATC, PT, PhD  
Mars Hill College

"The Athletic Polydrug Phenomenon", Hill, J.A., et al., *The American Journal of Sports Medicine*, 11: 269-271, July-August 1983.

Drug abuse in general is a significant problem in the general population, but one type of drug abuse unique to competitive athletics is that of anabolic steroids. Anabolic steroids are taken by the athlete in the belief that they increase muscle development and strength, which has not been proven. The athletes are often extremely knowledgeable regarding the side effects, thus compounding the drug abuse problem and potential for long-term side effects. The following case presentation is an example of a 24 year old white male, world class power lifter who ingested megadoses of various drugs in preparation for a meet. He admits to taking anabolic steroids for several years. He was admitted to the hospital for bilateral thigh pain. His history showed that on the day of admission he was warming up for a meet by squatting 750 pounds when he felt "something give way" in both knees. The subject was found to have a complete rupture of his left rectus femoris and a minor rupture of his right quadriceps. Besides the megadoses of anabolic steroids, the subject lost 11 pounds secondary to taking a diuretic before the meet. All of the drugs were obtained from sources other than physicians. This case was presented to demonstrate the high doses of anabolic steroids that athletes are taking without medical supervision despite the lack of convincing data that these substances are more efficacious than placebo.

Dave England

\* \* \*

"The Effects of Vitamin C on Maximum Grip Strength and Muscular Endurance," Robert E. Keith, Ph.D., and Elizabeth Merrill, *The Journal of Sports Medicine*, 23: 253-255, 1983.

Data in the area of ascorbic acid and physical performance are conflicting. Several researchers have reported positive effects of ascorbic acid supplementation on heart rate, work capacity, oxygen consumption and metabolic energy sources for working muscle. However, other investigators have various indices of physical performance. In research more directly pertinent to the present study, several investigators have reported effects of vitamin C on muscular endurance and fatigue. Margolis, in a study with galvanizing shop workers, reported

that seven months of daily 100 mg ascorbic acid supplements reduced fatigue and increased muscular endurance. No placebos were used; thus, results of the study could be biased. Fifteen healthy, white males participated in the experiment. The volunteers received either a single 600 mg ascorbic acid supplement or an equivalent sugar placebo dissolved in four ounces of unfortified grape juice. Subjects used their dominant hand for testing. Handle placement for the dynamometer adjusted and remained constant for both treatments. No significant differences were found between treatment for maximum grip strength or muscular endurance. Eleven of the 15 subjects recorded their best muscular endurance performances while on the placebo. Individual variation was large. Under the conditions of the present study, vitamin C had no effect on maximal grip strength or muscular endurance.

Troy Kauffman

\* \* \*

"Arthroscopic Meniscectomy: A Follow-up Report," Her- sham, E.B., and Nisonson, B.: *The American Journal of Sports Medicine*, 11: 253-257, July-August 1983

All patients undergoing arthroscopic meniscectomy during a 14-month period in 1979 and 1980 were included in the study group. There were 102 patients with 117 torn menisci in 102 knees. Seventy-eight of the patients were males and 24 were females. The average age was 37 years with the range of 15 to 64 years of age. All patients were immediately begun on straight leg raises and quadricep setting exercises the day of surgery. Eighty patients completed the postoperative questionnaire and returned for physical examination. Thirty-four percent of the patients rated their knees normal, 58% rated their knees improved, 6% felt there was no change in the knee, and 3% rated their knees as worse after surgery. Clearly 92% of the patients had a normal or improved knee post-operatively. The findings of this preliminary report suggest that arthroscopic meniscectomy is a useful technique for treatment of patients with torn menisci. The advantages include a short hospital stay, limited time on crutches, few complications, and early return to work. The long-term results are still to be defined, but in our initial experience, the technique is certainly recommended.

Dave England

\* \* \*

"Dietary Protein: Myth or Magic?," Frederick F. Andres and Lisa Kanner, *Athletic Journal*, 44: 66, October 1983.

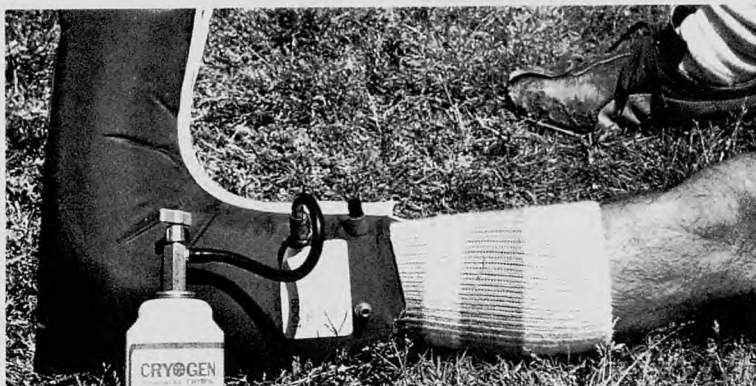
Of all the performance aids used and misused by athletes, protein ranks high on the list of those substances most abused. This is a result of the basic misconception that since muscle is composed of protein, the ingestion of large amounts of high protein pills, liquids and powders will build MORE muscle. Protein is required for cellular growth and tissue repair, physiological phenomena that occur at rapid rates in the athlete. Foods that contain the essential and non-essential amino acids, building blocks of proteins that the body uses to replace worn-out cells, are considered to be the best sources of proteins: such high quality protein foods as animal tissue, milk products, nuts and grains. Protein requirements can also be successfully met by a diet high in beans, nuts, cereals and white grains, and low-fat milk products. The

*Continued on page 199*

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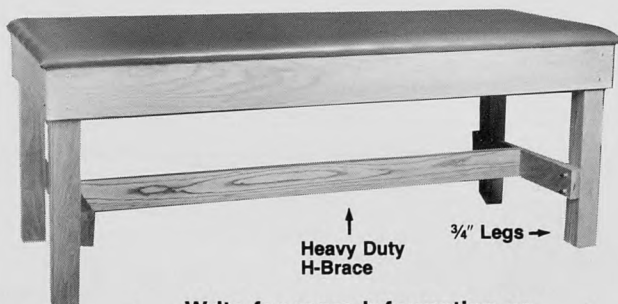
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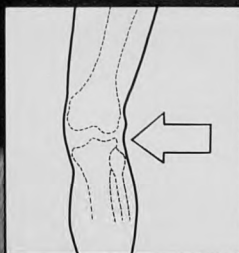
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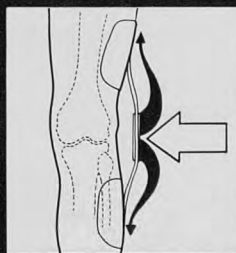
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# Announcements

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## National Athletic Trainers Association Outstanding Research Award Call for Papers

The Research and Injury Committee of the National Athletic Trainers Association has as its overall mission to encourage members of our Association to conduct, document and report research in the athletic training profession. In order for our profession to continue to grow we must continually search for new methods of prevention, care and rehabilitation of athletic related trauma. We also have a responsibility to continually monitor and strive for excellence in our current procedures. To this end the NATA Board of Directors has approved the establishment of an Outstanding Research Award. The Award is to be provided by Cybex Isokinetic Systems and will be in the form of a plaque and cash.

The Outstanding Research Award will be selected on a competitive basis from those completed and written documents submitted to Dr. Robert Moore at San Diego State University by February 15, 1985. A sub-committee for Outstanding Research Award consisting of Members of the NATA Research and Injury Committee will

review all completed projects. Each member of this group will conduct the review without benefit of the author's name or clinical affiliation. From the projects submitted to this Sub-Committee, the six most highly rated projects will be submitted to a Final Selection Committee. This Committee will consist of three athletic trainers who have proven competency in the conduct of research projects. The two non-athletic trainers will be selected based on their record of excellence in research within the professional discipline closely associated with Sports Medicine, i.e.: Exercise Physiology or Biomechanics. All review will be done without knowledge of author or institution. The final selection committee will submit their established order of merit to the Chairman of Research and Injury Committee for announcement of the Award. This year's Award will consist of \$500 for 1st, \$300 for 2nd and \$150 for 3rd place.

### OUTSTANDING RESEARCH AWARD Application Form

Please complete the following information and return this form with the six (6) copies of your completed research project.

Name \_\_\_\_\_ Position \_\_\_\_\_

Institution Address \_\_\_\_\_

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Phone ( ) \_\_\_\_\_

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Certification Number \_\_\_\_\_ Membership Number \_\_\_\_\_

Contributing Authors \_\_\_\_\_

\_\_\_\_\_  
If you have any questions relevant to this award, please contact:

Dr. Robert Moore  
Athletic Department  
San Diego, State University  
San Diego, CA 92182  
(619) 265-5551



In order to be eligible for this Award the following criteria are established:

1. Principal investigator must be a Certified Athletic Trainer.
2. The project must be of original design and not have been published at the time of application.
3. The project must have been completed at the time of application.
4. The paper must be manuscript format according to the standards established by the NATA Journal and Award winners must submit an article to the NATA Journal relevant to their research.
5. Completed papers must be sent to Dr. Robert Moore, Chairman, Sub-Committee for Outstanding Research Award, San Diego State University, San Diego, CA 98182, prior to February 15, 1985. (6 copies)

The basic criteria for final selection will be as follows:

1. Originality
  - a. Background for research design
  - b. Creativity
  - c. Need based on existing review of literature

### Grants and Scholarships

The NATA offers three separate categories of grants and scholarships to student athletic trainers. They are:

1. Undergraduate Scholarships — for students who have completed their sophomore or junior years;
2. Athletic Training curriculum students — for students in an approved curriculum who have completed their sophomore or junior years; and
3. Post Graduate Scholarships — for senior students, enrolled in a graduate program.

Each applicant must have performed with distinction as a member of a student athletic trainer program. NOTE: THE DEGREE OF THE STUDENT'S ATHLETIC TRAINING ACHIEVEMENT SHALL BE WEIGHED AT LEAST EQUALLY WITH THE DEGREE OF HIS/HER ACADEMIC PERFORMANCE.

### Nominating Instructions

1. To be eligible a student must be a member of NATA for one year prior to receiving the scholarship.
2. Each Certified Athletic Trainer may submit one candidate per year.

Please send requests for applications to the National Office at the following address:

NATA Office  
1001 East 4th Street  
Greenville NC 27834

Be sure to indicate the type of application desired. Once completed, the application with supporting academic transcript must be mailed to your District Director prior to February 1, 1985.

### Free Communications Call for Abstracts June 1985

Each year during our National Convention, members are continually sharing ideas, procedures, techniques and innovations in and for the profession of athletic training. Most of these conversations are among small groups of members and much of the information exchanged would be highly meaningful for the larger group. Many of these ideas have been developed through systematic data collection and observations made by

2. Depth of Analysis
  - a. Use of appropriate statistical designs and methodologies
  - b. Application of theoretical and practical design
  - c. Interpretations based on the project design
3. Application of profession
  - a. Effectiveness and relationship of research to the clinical setting
  - b. Application for growth of the profession
  - c. Contributions to the theoretical and practical knowledge
4. Presentation
  - a. Clarity of organization
  - b. Internal consistency
  - c. Bibliography

It should be noted that this project is not to be confused with the Call For Abstracts for the 1985 Free Communication Session in San Antonio. The Outstanding Research Award is offered based on fully completed research projects and requires written documentation of background, method, data collection, findings, discussion, bibliography, and auxiliary funding sources.

the athletic trainers in the performance of their responsibilities. The accumulation of this information represents an important form of applied research.

With this in mind, the NATA Research and Injury Committee will offer a *Free Communications Section* at our National Meeting in San Antonio in June 1985. The purpose of this section is to provide a forum in which information regarding the techniques and knowledge attendant in athletic training rooms all over the country can be openly exchanged. In order to provide organization to this session, the Committee is issuing a **CALL FOR ABSTRACTS** from the NATA membership. The titles of the projects to be presented will be available to members prior to the convention so that they will know which topics will be discussed and at what time during the session.

The response to this session has been excellent. We encourage each member to participate in these information exchanges. So please submit your abstract soon and we look forward to seeing you in San Antonio.

Yours in sport,

John W. Powell, PhD, ATC  
Chairman  
Research and Injury Committee

### Instructions for Completion of Free Communication Abstract

Please read all instructions before preparing abstract. Carefully develop your abstract so it can be placed easily in the space provided on the following page. Mail the original and 3 copies prior to February 15, 1985.

1. Type title of paper or project in all caps.
2. Type the name of all authors with the author that will make the presentation listed first.
3. Indent three spaces on a new line and type the text of your paper.
4. Indicate any funding or grants information on one line at the bottom.
5. Indicate if presenting author is "member of the NATA."
6. Indicate any audio-visual aids required.
7. Sign the completed abstract.

Remember: Your abstract should be of the informative type and should contain:

*Continued on page 227*

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**ANNOUNCEMENTS, from page 225**

- A. Sentence stating the specific objective of the project.
- B. Brief statement of methods.
- C. Summary of results.
- D. Statement of conclusion.

Due to the time frame a limited number of papers will be presented. The Committee will select the papers to be presented. Submission of an abstract therefore does not mean you will automatically be responsible for a presen-

tation. Notification will be made in plenty of time for final paper preparation.

Refer questions to: John W. Powell, Research Chairman, (814) 863-0435

MAIL TO: John W. Powell, PhD, Chairman,  
Research and Injury Committee  
19B White Building  
The Pennsylvania State University  
University Park, PA 16802

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NATIONAL CONVENTION  
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Member Signature: \_\_\_\_\_

Membership No: \_\_\_\_\_

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# Seventh Annual N.A.T.A. Student Writing Contest

In an effort to promote scholarship among young athletic trainers, the National Athletic Trainers Association, Inc. sponsors an annual writing contest.

1. This contest is open to all undergraduate student members of the NATA.
2. Papers must be on a topic germane to the profession of athletic training and can be case reports, literature reviews, experimental reports, analysis of training room techniques, etc.
3. Entries must not have been published, nor be under consideration for publication by any journal.
4. The winning entry will receive a \$100.00 cash prize and be published in *Athletic Training* with recognition as the winning entry in the Annual Student Writing Contest. One or more other entries may be given honorable mention status.

5. Entries must be written in journal manuscript form and adhere to all regulations set forth in the "Guide to Contributors" section of this issue of *Athletic Training*. It is suggested that before starting students read: Knight KL: Writing articles for the journal. *Athletic Training* 13:196-198, 1978. NOTE: A reprint of this article, along with other helpful hints, can be obtained by writing to the Writing Contest Committee Chairman at the address below.

6. Entries must be received by March 1. Announcement of the winner will be made at the Annual Convention and Clinical Symposium in June.

7. The Writing Contest Committee reserves the right to make no awards if in their opinion none of the entries is of sufficient quality to merit recognition.

8. An original and two copies must be received at the following address by March 1, 1985.

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# NATA Professional Education Committee DISTINGUISHED ATHLETIC TRAINING EDUCATOR AWARD

Nominations are being received for the first **Distinguished Athletic Training Educator Award** to be presented annually by the NATA Professional Education Committee in recognition of excellence in athletic training education:

## I. Qualifications

To be nominated for the award, educators must have the following qualifications:

1. Current member of the National Athletic Trainers Association, Inc.
2. Member of a teaching faculty in the area of athletic training/sports medicine for at least ten (10) years.
3. Minimum of ten years of outstanding service in the area of athletic training education and research.
4. Recognized excellence in the field of athletic training education.
5. Outstanding service in district, state or national professional organizations concerned primarily with the field of athletic training.
6. Evidence of quality in publications and public speaking on topics in athletic training/sports medicine.

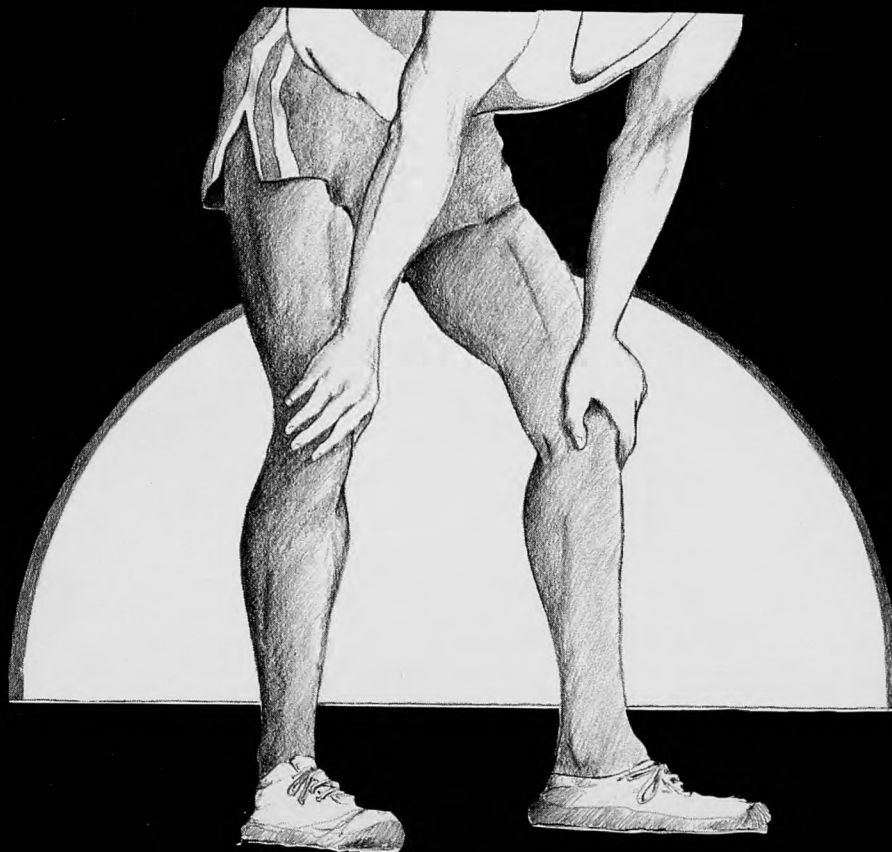
## II. Nomination Procedures

Nominations may come from any certified athletic trainer, athletic training student, or faculty member of a college or university. The nominator must submit the following materials.

1. the candidate's current personal resume which includes:
  - a. academic background
  - b. employment background
  - c. published research and other publications (journal articles, books, etc.)
  - d. course work taught (during past five years)
  - e. classroom teaching innovations
  - f. course work/curriculums developed
  - g. professional memberships
  - h. positions on state, district, or national level of the National Athletic Trainers Association, Inc.
  - i. positions on state, district, or national level of related sports medicine professional organizations
  - j. consultant work
  - k. speaking engagements on community, state, regional, and national levels
  - l. community service
  - m. college or university service (i.e. committee involvement, thesis advising, etc.)
  - n. any other pertinent materials
2. A minimum of three letters (additional letters may be submitted) from professional colleagues, administrators, or students providing detailed rationale in support of the candidate's nomination.

Nominations including the above materials should be sent to the Professional Education Committee Project Director, Honors and Award, and must be received by **March 1, 1985**. Presentation of the award will be made to the recipient at the 1985 NATA Annual Meeting and Clinical Symposium in San Antonio, Texas. Send nominations to:

Ken Murray  
Athletic Department  
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P.O. Box 4199  
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\*These tests were conducted with controlled heat and humidity with temperatures up to 80°F and relative humidity of 70%.

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### ANDROGENS, from page 177

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"How to Improve a Baseball Player's Performance Through Vision Training"
- James Dietz, B.S., M.A.**, Baseball coach  
*San Diego State University*  
"Importance of Good Vision in Baseball"
- Craig L. Farnsworth, O.D.**  
"How to Improve Concentration Skills of Athletes"
- Jack Runninger, O.D.**  
"Advising Coaches and Athletes"
- Larry Star, M.Ed., A.T.C.**  
Head Trainer Cincinnati Reds Baseball Team

## SPORTSVISION '84 East

November 2, 3 and 4, 1984  
Bally's Park Place Casino Hotel  
Atlantic City, New Jersey

### Partial list of speakers

- James R. Gregg**  
"How to Prescribe for the Special Visual Needs of the Sports-Minded Patient"
- Robert C. Pashby, M.D., F.R.C.S.**  
"Prevention of Eye Injuries in Canadian Sports"
- Robert Shank, B.S., M.Ed.**  
"Are Your Athletes Physically Fit, But Not Visually Fit?"
- Paul F. Vinger, M.D.**  
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# Current Literature



Paul Concialdi, ATC, MA  
Kiskiminetas Springs School

- "Blunt Injury to the Radial and Ulnar Arteries in Volley Ball Players: A Report of Three Cases of the Antebrachial-Palmar Hammer Syndrome", Kostianen, S., *et al.*, *British Journal of Sports Medicine*, September 1983, 17(3): 172.
- "Cardiac Dimensions in Athletes in Relaxation to Variations in Their Training Programs", Snoeckx, L.H., *et al.*, *European Journal of Applied Physiology*, 1983, 52(1): 20.
- "Cervical Spine Injuries in Rugby Players", Sovio, O.M., *et al.*, *Canadian Medical Association Journal*, March 15, 1984, 130(6): 735.
- "Competition Trait Anxiety in Youth Sport: Differences According to Age, Sex, Race, and Playing Status", Smith, T., *Perception and Motor Skills*, December 1983, 57(3, part 2): 1235.
- "Current Concepts in the Rehabilitation of the Injured Athlete", Scott, S.G., *Mayo Clinic Proceedings*, February 1984, 59(2): 83.
- "Evulsion of the Optic Nerve in Association with Basketball Injuries", Chow, A.Y., *et al.*, *Annals of Ophthalmology*, January 1984, 16(1): 35.
- "Frictional Forces and Ankle Fractures in Sports", Menck, H., *et al.*, *British Journal of Sports Medicine*, December 1983, 17(4): 135.
- "Hydration and Vascular Fluid Shifts During Exercise in the Heat", Sanka, M.N., *et al.*, *Journal of Applied Physiology*, January 1984, 56(1): 91.
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- "Muscle Capillary Supply and Fiber Type Characteristics in Weight and Power Lifters", Tesch, P.A., *et al.*, *Journal of Applied Physiology*, January 1984, 56(1): 35.
- "Naproxen and Aspirin in Acute Musculoskeletal Disorders: A Double-Blind Parallel Study in Patients with Sports Injuries", Andersen, L.A., *et al.*, *Pharmatherapeutica*, 1984, 3(8): 531.
- "The Nature and Response to Therapy of 196 Consecutive Injuries Seen at a Runner's Clinic", Pinshaw, R., *et al.*, *South African Medical Journal*, February 25, 1984, 65(8): 291.
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- "Perceived Competence Among Interscholastic Sport Participants and Dropouts", Felix, D.L., *et al.*, *Canadian Journal of Applied Sport Science*, December 1983, 8(4): 231.
- "The Role of Arthroscopy in the Management of Knee Injuries in the Athlete", Rand, J.A., *Mayo Clinic Proceedings*, February 1984, 59(2): 77.
- "Roller Skating Accidents and Injuries", Sedlin, E.D., *et al.*, *Journal of Trauma*, February 1984, 24(2): 136.
- "Rowing Performance: A Mathematical Model Based on Analysis of Body Dimensions as Exemplified by Body Weight", Secker, N.H., *et al.*, *European Journal of Applied Physiology*, 1983, 52(1): 88.
- "Scintigraphic Diagnosis of Stress-Induced Incomplete Fracture of the Proximal Tibia", Collier, B.D., *et al.*, *Journal of Trauma*, February 1984, 24(2): 156.
- "Skiing Injuries in Children and Adults: A Comparative Study From an Eight Year Period", Ungerholm, S., *et al.*, *International Journal of Sports Medicine*, November 1983, 4(4): 1539.
- "Socialization of Adolescent Girls into Physical Activity", Butcher, J., *Adolescence*, Winter 1983, 18(72): 753.
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- "Tympanic Membrane Perforations from Water Sports: Treatment and Outcome", Rybak, L.P., *et al.*, *Otolaryngology and Head and Neck Surgery*, December 1983, 91(6): 659.
- "Ultrasonography in the Evaluation of Muscular Trauma", Forsage, B.D., *et al.*, *Journal of Ultrasound in Medicine*, December 1983, 2(12): 549.
- "World Cup Hockey", Whitney, S., *Physiotherapy*, November 1983, 69(11): 190.

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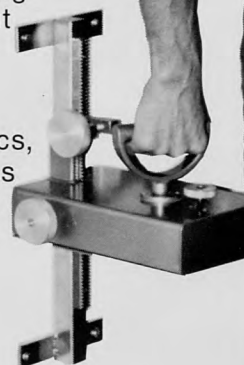
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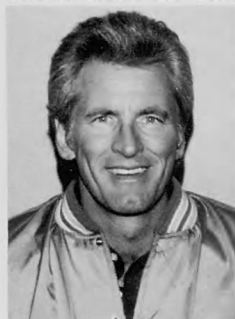
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# Historical Flashbacks

Mike O'Shea, MA, ATC  
University of Miami

## How Good Are You With NATA History?

Answer the following questions and test yourself.

1. Who was the "father" of Modern Athletic Training and author of the *Trainers Bible*?
2. Who was the athletic trainer at Kansas University for 51 years and this year had a post graduate scholarship named after him?
3. Who is the "dean" of Professional Education of the NATA?
4. How many NATA Conventions have there been to this date?
5. When was the first NATA scholarship awarded?
6. Name the "father" Company of athletic training room supplies.
7. Who was the first National Secretary of the NATA?
8. When and where was the first NATA certification exam?
9. When was the beginning of the NATA, Inc?
10. What was the first year for the Athletic Trainers Hall of Fame?
11. Who was the first Honorary Member of the NATA and winner of the 1984 President's Challenge Cup Award?

12. Name the site of the 1985 NATA Convention.

PLEASE NOTE: Please send material and pictures to me of anything from the past in NATA history.

Mike O'Shea  
University of Miami  
P.O. Box 248167  
Coral Gables, FL 33124

## Answers

1. Dr. S.E. Billik
2. Dean Nesmith
3. Pinky Newell
4. 35
5. 1971 Baltimore
6. Cramer Chemical Company
7. Charles Cramer
8. July, 1970 SWATA District 6 Meeting, Waco, Texas
9. May, 1983
10. 1962
11. Robert Brashear, MD, University of Tennessee
12. San Antonio, Texas

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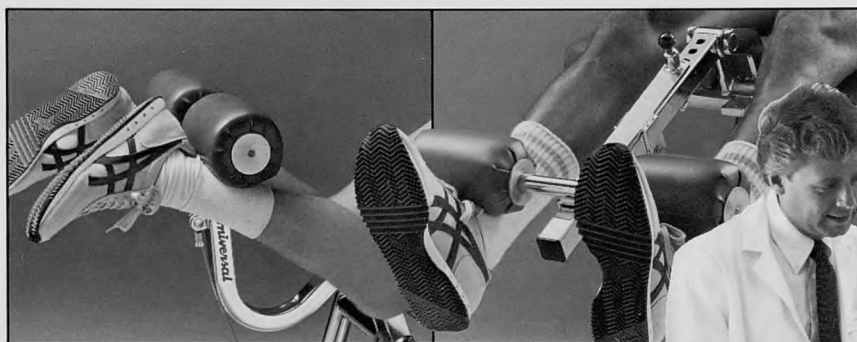
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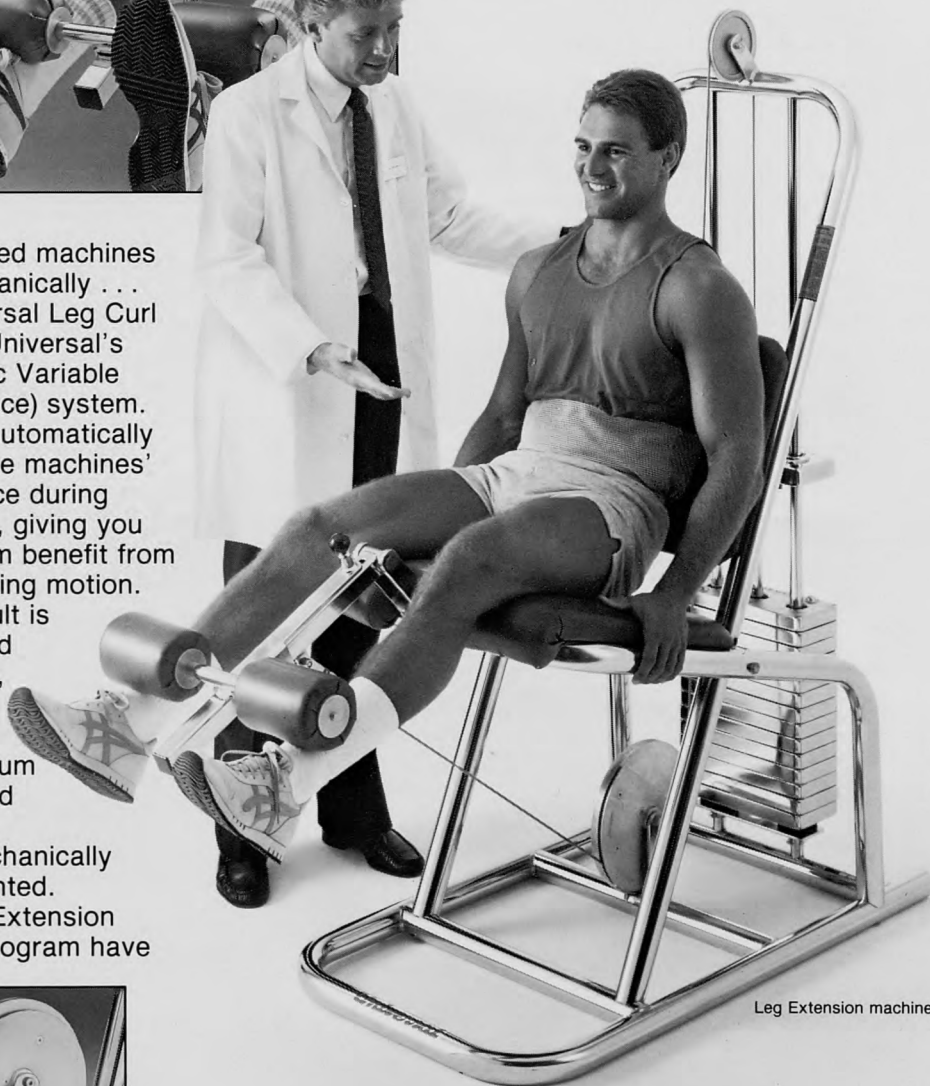
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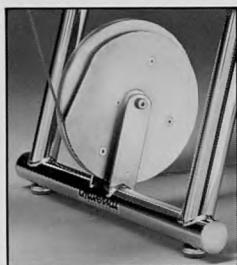
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# Guide to Contributors

*Athletic Training*, The Journal of the National Athletic Trainers Association, Inc. welcomes the submission of manuscripts which may be of interest to persons engaged in or concerned with the progress of the athletic training profession.

## The following recommendations are offered to those submitting MANUSCRIPTS:

1. Four copies of the manuscript should be forwarded to the editor and each page typewritten on one side of 8½ x 11 inch plain paper, triple spaced with one inch margins.
2. Good quality color photography is acceptable for accompanying graphics but glossy black and white prints are preferred. Graphs, charts, or figures should be of good quality and clearly presented on white paper with black ink in a form which will be legible if reduced for publication. Tables must be typed, not hand written. Personal photographs are encouraged; however photographs cannot be returned if the manuscript is published.

All artwork to be reproduced should be submitted as black and white line art (either drawn with a Rapidograph [technical fountain pen] or a velox stat or PMT process) with NO tonal values, shading, washes, Zip-a-tone — type screen effects, etc. used.

All artwork to be reproduced in black plus a second (or more colors) should be submitted as black and white line art (see above paragraph), with an Amberlith® or similar-type overlay employed for each area of additional color(s). Also, all areas of tonal value, shading, "washes", etc. should be supplied on a separate clear or frosted acetate or Amberlith® overlay. In addition, all areas to be screened (a percent or tint of black or color) should be supplied on an Amberlith® overlay. Artwork cannot be returned if the manuscript is published.

3. The list of references and citations should be in the following form: a) books: author, title, publisher with city and state of publication, year; b) articles: family names, initials and titles of all authors, title of article, journal title, with abbreviations accepted as per Index Medicus, volume, page, year. Citations in the text of the manuscript will take the form of a number in parentheses, (7), directly after the reference or name of author being cited, indicating the number assigned to the citation bibliography. Example of references to a journal, book, chapter in an edited book, and presentation at a meeting are illustrated below:
  - a. Knight K: Preparation of manuscripts for publication. *Athletic Training* 11 (3):127-129, 1976.
  - b. Klafs CE, Arnheim DD: *Modern Principles of Athletic Training*. 4th edition. St. Louis, CV Mosby Co. 1977 p. 61.
  - c. Albohm M: Common injuries in womens volleyball. *Relevant Topics in Athletic Training*. Edited by Scriber K, Burke

EJ, Ithaca NY: Monument Publications, 1978, pp. 79-81.

- d. Behnke R: Licensure for athletic trainers: problems and solutions. Presented at the 29th Annual Meeting and Clinical Symposium of the National Athletic Trainers Association. Las Vegas, Nev, June 15, 1978.
4. In view of *The Copyright Revision Act of 1976*, effective January 1, 1978, all transmittal letters to the editor must contain the following language before manuscripts can be reviewed for possible publication: "In consideration of the NATA taking action in reviewing and editing my submission, the author(s) undersigned hereby transfers, assigns or otherwise conveys all copyright ownership to the NATA, in the event that such work is published by the NATA." We regret that transmittal letters not containing the foregoing language signed by all authors of the manuscript will necessitate return of the manuscript.

Manuscripts are accepted for publication with the understanding that they are original and have been submitted solely to *Athletic Training*. Materials taken from other sources, including text, illustrations, or tables, must be accompanied by a written statement from both the author and publisher giving *Athletic Training* permission to reproduce the material. Photographs must be accompanied by a signed photograph release form.

Accepted manuscripts become the property of the Journal. For permission to reproduce an article published in *Athletic Training*, send requests to the Editor-in-Chief.

5. Manuscripts are reviewed and edited to improve the effectiveness of communication between the author and the readers and to assist the author in a presentation compatible with the accepted style of *Athletic Training*. The initial review process takes from six to eight weeks. The time required to process a manuscript through all phases of review, revision, and editing, to final publication is usually six to eight months depending on the timeliness of the subject. The author accepts responsibility for any major corrections of the manuscript as suggested by the editor.
6. It is requested that submitting authors include a comprehensive abstract, a brief biographical sketch and acceptable black and white glossy photograph of themselves. **Please refrain from putting paper clips on any photograph.**
7. Published manuscripts and accompanying artwork cannot be returned. Unused manuscripts will be returned when submitted with a stamped, self-addressed envelope.

Address all manuscripts to:

Clint Thompson  
Jenison Gym  
Michigan State University  
East Lansing, Michigan 48824

Manuscripts must be sent to:

Clint Thompson  
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East Lansing, MI 48824  
(517) 353-4412

Information on upcoming events for the "Calendar of Events" section should be sent to:

Jeff Fair, ATC  
Athletic Department  
Oklahoma State University  
Stillwater, OK 74074

"Tips From the Field" should be sent to:

Dave Burton  
Duncanville High School  
Duncanville, TX 75116

The following recommendations are offered to those submitting CASE HISTORIES:

1. The above recommendations for submitting manuscripts apply to case studies as well but only two copies of the report need be sent to the Editor-in-Chief.
2. All titles should be brief within descriptive limits. The name of the disability treated should be included in the title if it is the relevant factor; if the technique or kind of treatment used is the principal reason for the report, this should be in the title. Often both should appear. Use of subtitles is recommended. Headings and Subheadings are required in the involved report but they are unnecessary in the very short report. Names of patients are not to be used, only first or third person pronouns.
3. An outline of the report should include the following components:
  - a. Personal data (age, sex, race, marital status, and occupation when relevant)
  - b. Chief complaint
  - c. History of present complaint (including symptoms)
  - d. Results of physical examination (Example: "Physical findings relevant to the physical therapy program were...")
  - e. Medical history — surgery, laboratory, exam, etc.
  - f. Diagnosis
  - g. Treatment and clinical course (rehabilitation until and after return to competition) use charts, graphs when possible
  - h. Criteria for return to competition
  - i. Deviation from the expected
  - j. Results — days missed

## 4. Release Form

It is mandatory that *Athletic Training* receive, along with the submitted case, a signed release form by the individual being discussed in the case study injury situation. Case studies will be returned if the release is not included.

The following recommendations are offered to those submitting material to be considered for TIPS FROM THE FIELD:

1. The above recommendations for submitting manuscripts apply to Tips From the Field but only two copies of the paper need be submitted.
2. Copy should be typewritten, brief, concise, in the first or third person, and using high quality illustrations and/or black and white glossy prints.

The following guidelines must be met for submission of papers or material to the "STUDENT TRAINER CORNER."

1. Author must be an undergraduate student member of NATA.
2. Topics must relate to athletic training. (case reports, experimental reports, suggestions, new ideas, tips and/or specifics for a given problem)
3. Articles should be no more than 2 to 3 pages in length, double spaced.

Items for the "Student Trainer Corner" should be sent to:

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Greenville, NC 27834

The Editorial Board will review papers submitted on an individual basis, work with the authors and prepare these papers for publication.

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In order to avoid confusion and delays for any contributions to the Journal the deadlines for various sections of the Journal are provided below.

Send material for "Announcements", "Case Studies", "Letters to the Editor", and "New Products" to:

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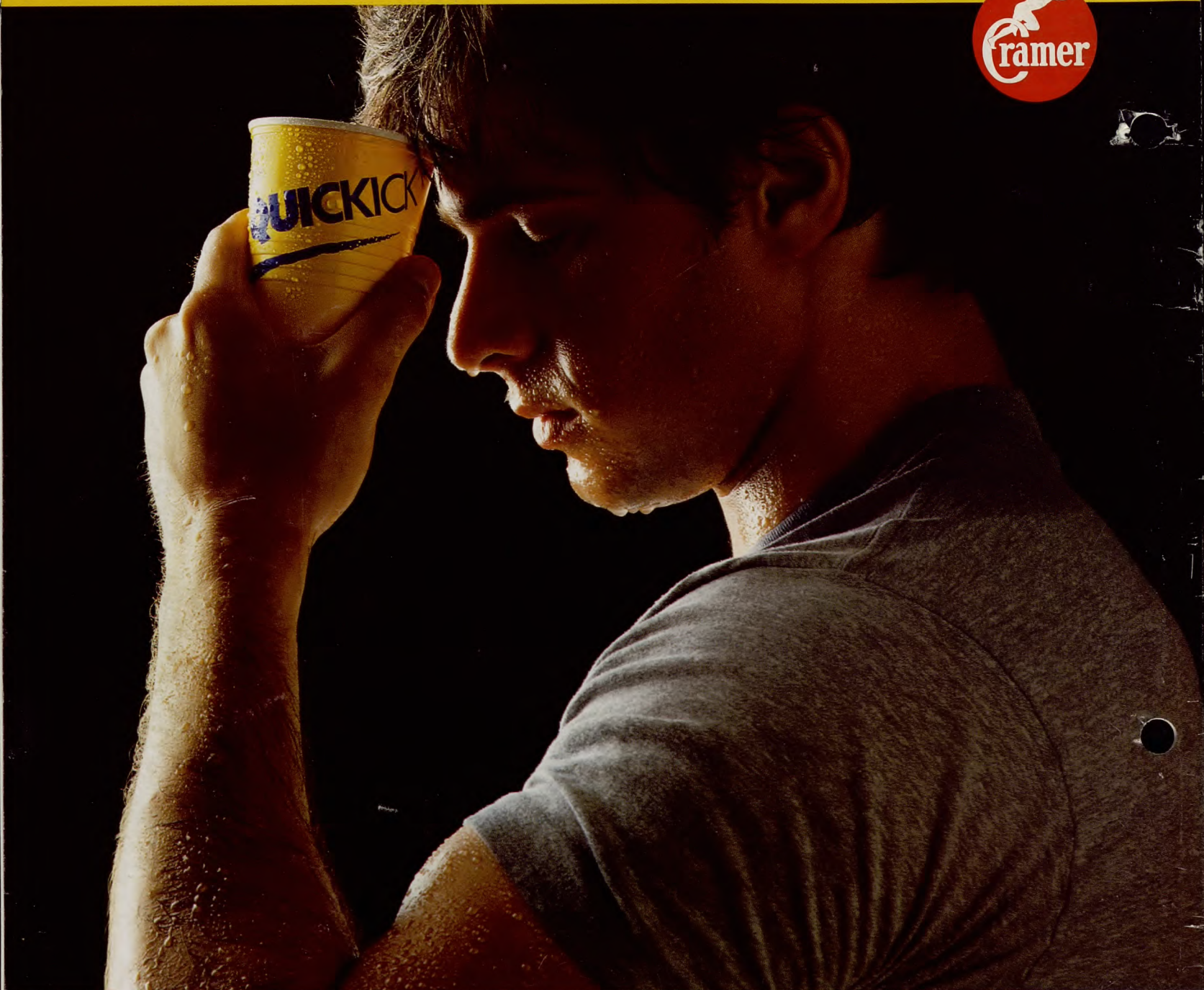
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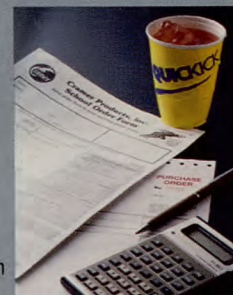
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