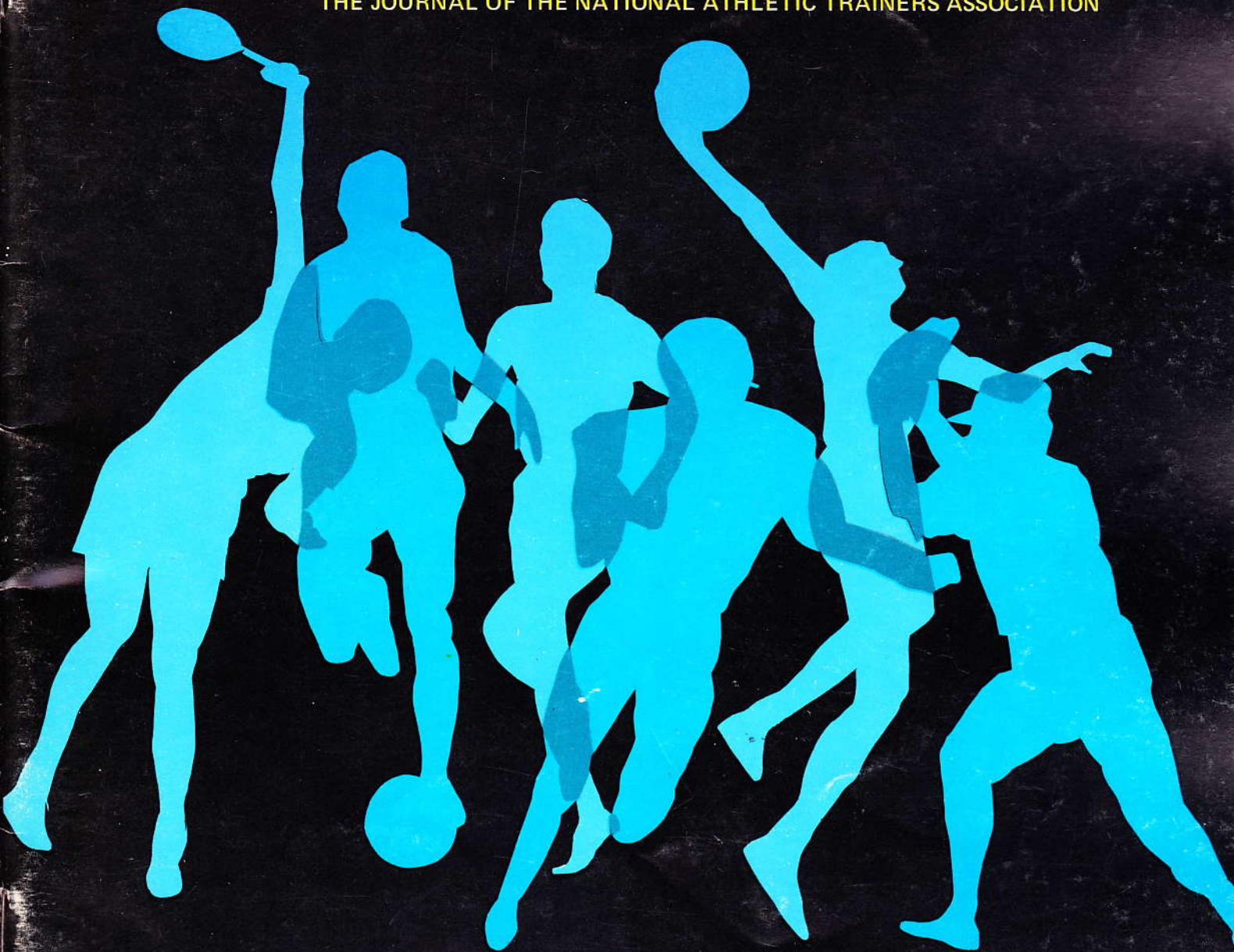




ATHLETIC TRAINING

THE JOURNAL OF THE NATIONAL ATHLETIC TRAINERS ASSOCIATION



IN THIS ISSUE:

THE TEAM DENTIST AND PHYSICIAN
CRYOTHERAPY AND VASODILATION
ATHLETE'S FOOT, RINGWORM & JOCK ITCH

VOLUME 8
NUMBER 3
SEPTEMBER 1973

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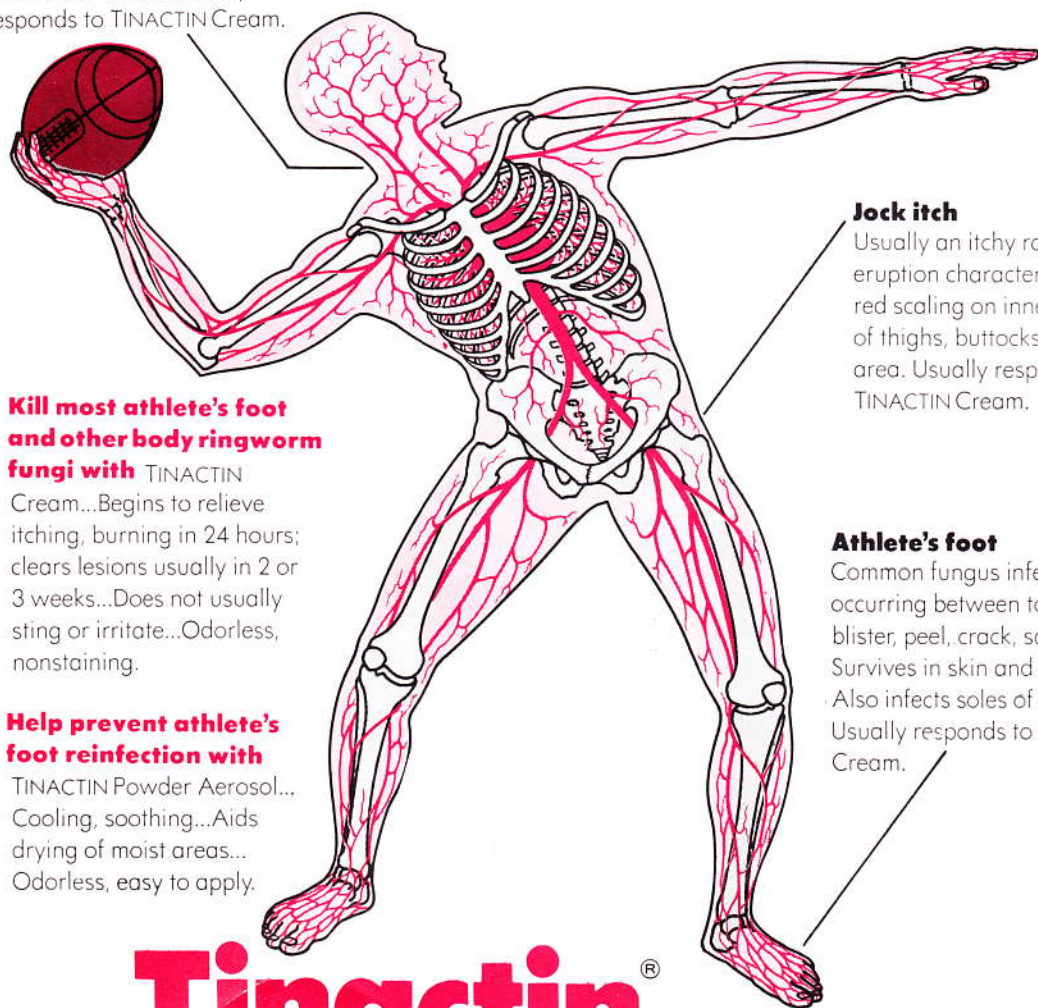
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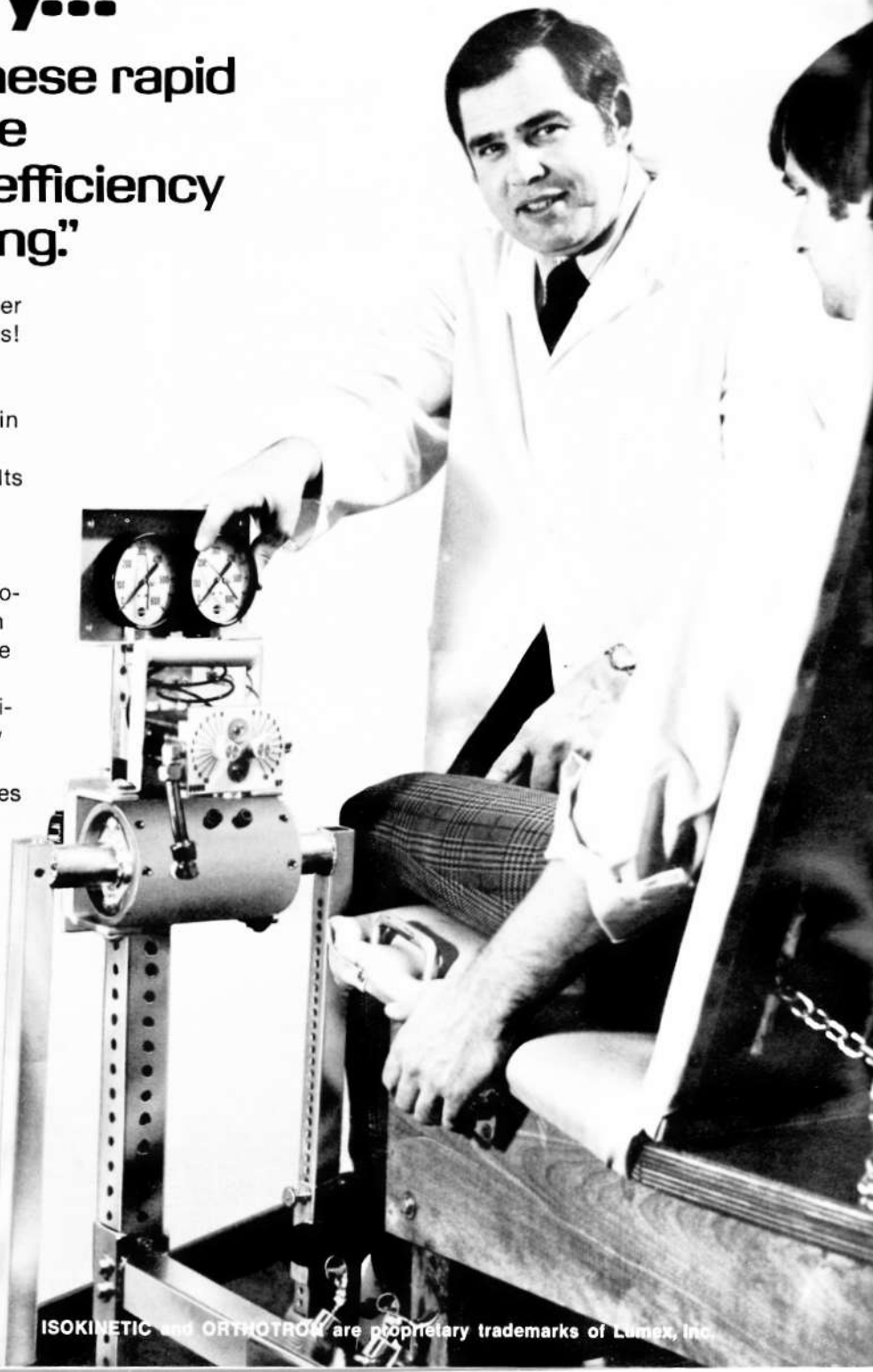
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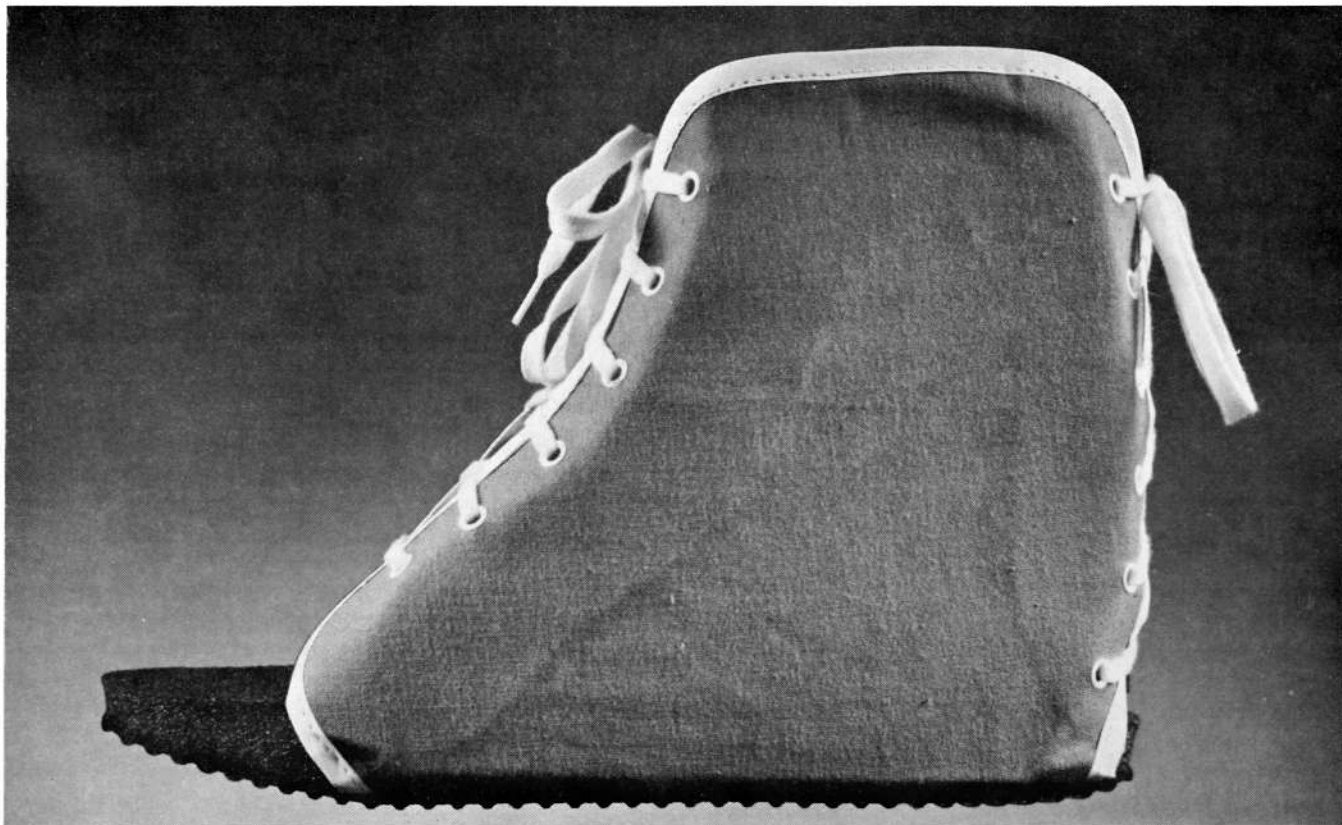
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CRYOTHERAPY AND VASODILATION



Robert Behnke
Certified Athletic Trainer
University of Illinois
Champaign, Illinois

It cannot be denied that the number one aim of the athletic training profession is the promotion of the welfare of athletes. While prevention of injuries is of the utmost in importance, (it is well known that it is easier to prevent an injury than treat one), a portion of the trainer's daily routine is spent in the treatment and rehabilitation of athletic injuries. Trainers are charged with the responsibility of providing the athlete with the most effective type of treatment for his particular

injury, and also, must see to it that the athlete is returned as a full-time participant to his sport as soon as the team physician deems the athlete medically sound. Through a mutual understanding between physician and trainer, a number of therapeutic modalities are at the disposal of the trainer for use in treatment of athletic injuries.

In the past few years there has been widespread publicity given to the use of cold applications as a therapeutic modality in the treatment of athletic injuries. While it is generally accepted that cold applications are essential in the initial stage of an injury to control post-traumatic swelling, many individuals concerned with the treatment of athletic injuries question the use of cold in the rehabilitation process. It will not be the purpose of this article to debate the use of cold or heat in the treatment of athletic injuries.

Literature is available to produce evidence of the analgesic effects and vasodilatation effects which result from the application of some form of heat to various parts of the human body. These effects provide the patient relief of pain and a promotion of circulation essential to the healing process. Literature available on the effects of cold also have shown evidence of an anesthetic effect, and the promotion of circulation by a reflex vasodilatation. It is this last aspect of cold application, cold vasodilatation, which the investigator will attempt to explore.

With the thought in mind that the desired result in therapy of any nature is the relief of pain and the promotion of healing, how then can cold applications produce these results? Let us examine the phenomenon known as cold vasodilatation. Although most researchers agree that the phenomenon exists, there is considerable disagreement as to the mechanism. Downey (3) sums up this disagreement by the simple statement that "the mechanism of cold vasodilatation is not fully understood."

Review of Literature:

A review of the literature provides evidence showing that cold can and does increase blood flow to a cooled area of the body. Clarks, Hellon, and Lind (2) have shown a marked increase in blood flow to an area cooled in water 1°C. In some of their subjects the flow reached 3-4 times that at room temperature before immersion. Downey (3) points out that if a part is immersed in water below 10°C there is initially an intense vasoconstriction of the vessels followed by a period of vasodilatation. Lewis, (15) in 1929, described the response to cold as an initial constriction of the vessels followed after some minutes by a sudden dilatation and this was usually interrupted by further periods of constriction and dilatation. This cyclic behavior of the blood vessels was called the hunting reaction. Anyone exposing his hand to cold water usually experiences four fairly distinct reactions.

(Cont. on p. 133)

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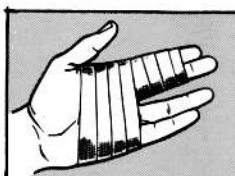
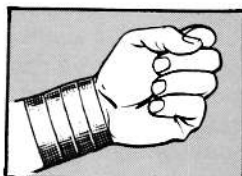
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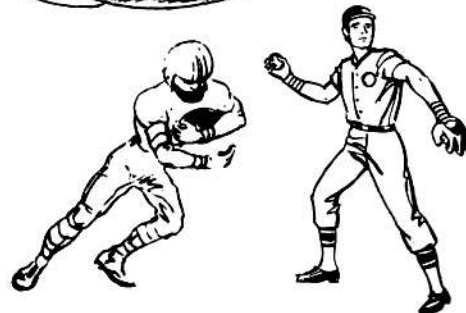
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ATHLETE'S FOOT RINGWORM & JOCK ITCH

Fenwick L. Watts, M.D.
Port Arthur, Texas

INTRODUCTION

L. W. Stauffer, M.D.
Eugene, Oregon

Fungus infections of human skin, hair and nails are among the most common skin problems. It has been said 90% of the adults have such organisms on the webbs of the toes. Only 5% of this group will have symptoms, however, because most people "get along" quite well with their fungus.

There are a few generalities about fungus infection that are worth remembering. Fungi are microscopic plants related to mushrooms, propagated by seeds called spores. These are highly resistant to drying or freezing and can survive for many years if not exposed to sunlight, boiling or chemical agents. Fungi were grown from between the toes of bodies in Northern



Figure A

Alaska that had been buried 30 years in frozen tundra. There are many different fungi that grow on or in human skin but only 5 or 6 are commonly encountered.

In general a fungus infection tends to create more tissue reaction at the advancing border of infection than in the older center. (Figure A) This accounts for the ring shaped lesion frequently seen. Not all fungus infections do this, however, so the name "ring worm" lacks accuracy--not all form rings, and worms have nothing to do with the problem.

Scalp is involved with fungus infections before age

13 and rarely after that period in life, probably because of a great increase in sebum activity at puberty. Many, but not all, fungus infections of the scalp produce hair involvement so that there is fluorescence of the hair under black light. Fungus infection of the skin, with one exception, does not fluoresce, so black light is useless as an aid to diagnosis of fungal skin infections. Tinea versicolor is that exception.



Figure B

Many eruptions of feet are erroneously diagnosed and treated as "athletes foot." Bacterial infections, allergic rashes, and sweat abnormalities often become much more severe when so treated. If there is no involvement or minimal involvement of the little toe webb--do not treat as a fungus infection--prove the presence of fungi first. (Figure B)

Most important of all: when severe reaction to fungus infection is encountered, i.e. blistering, weeping or marked irritation (itching or soreness) do not use local fungicides for treatment. These cases should be given oral griseofulvin and local steroid or steroid and antibiotic creams. Strong local treatment will cause marked increase in damage and needless time loss. After acute eruptions have quieted down, more potent local treatment can be used.



Figure 1-A

TINEA PEDIS or Athlete's Foot

Athlete's foot usually starts with dry scaling or moist scaling between the toes and on the bottom surfaces of the toes. This will frequently spread over the sole of the foot as a dry scaling. Oc-



Figure 1-B

casionaly a few small scattered blisters will occur in these areas. The cause of this condition is a specific fungus. Sweating and physical activity probably contribute to the growth of this fungus. No specific preventative measures are effective. Foot baths should **not** be used to treat or prevent this condition, as it usually turns out to be a cess pool for the fungus. The most common complication is over-zealous treatment or secondary infection with bacteria which can incapacitate the person. (Figure 1A and 1B)

The most common condition with which athlete's foot is confused is one where there are groups of many water blisters which usually itch. The cause of this condition is not a fungus and should not be treated as a fungus infection. For mild cases of athlete's foot where the skin is not broken, most of the usual anti-fungus medicines will suffice. When the scaling ceases a good foot powder will tend to keep the feet dry as possible. In treating athlete's foot with any of the anti-fungus preparations any irritation should be noted and the treatment stopped immediately if it develops.



Figure 2

TINEA CRURIS or "Jockey Itch" (Figure 2)

This condition starts in the groin, frequently as an itching red rash consisting of small bumps or blisters which usually have a very distinct curved border. Sometimes an extension of this rash is noted on the buttocks and even on the trunk. This condition is caused by a specific fungus. Here again sweating and physical activity as well as

wearing an athletic supporter aggravates the condition. The usual complication is due either to delayed treatment or over treatment. The skin usually ends up being quite raw which limits most athletic activities. Treatment consists of cleanliness first of all. This can be overdone by strong soaps or too vigorous scrubbing which aggravates the condition. The usual anti-fungus medications are effective treatment. Care must be used in applying these medications, because those which are in an alcohol base tend to sting and should be allowed to dry thoroughly before resuming activity. Those preparations which have a vaseline type of base should be used very sparingly, otherwise it makes the skin quite soggy and causes aggravation.



Figure 3

This condition is most commonly confused with plain chapping due to sweating, physical activity, and wearing an athletic supporter. In the summertime a yeast may be the cause of this condition. Usually there are at least a few small pus pockets scattered over the area which will tip you off to the yeast being present. (Figure 3)



Figure 4

TINEA VERSICOLOR (Figure 4)

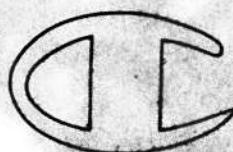
This condition is most often discovered in the summertime and is usually blamed on the sunlight. The actual cause is a specific fungus which does filter out the sunlight and does not allow the skin to tan normally in the area where it is

(Cont. on p. 131)

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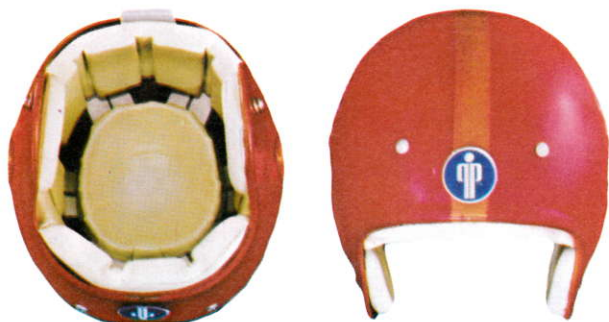
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THE STUDENT TRAINERS' CORNER



by Ray Baggett
Certified Athletic Trainer
Indiana State University

The following three articles have been written by recent graduates from Indiana State University, which has a N.A.T.A. approved curriculum. The articles concern their athletic training experiences during their student teaching period.

All Athletic Training curriculums consist of three phases: classroom, supervised practice at the college or university, and field practice. Usually the field practice is done in conjunction with student teaching under the supervision of a high school trainer. To me this last phase is very important to the student trainer about to graduate and enter the high school level of training. Many of the student trainers about to begin their field experience wonder if it will be valuable or just a waste of time. They have worked at least two years on the college. What could they possibly learn or see new in the short period of time of student

teaching? I will agree that the student trainer may not see much new, except subtle differences of technique; but he can learn many valuable lessons that will make his adjustment from the college to the high school level much easier.

It would be advantageous for the student trainer to work under a certified trainer, but there are not enough of these men at the high school level for this to happen. Even though the student trainer may not be working with a certified trainer, he can still learn valuable lessons. When I did my field practice, I worked with a man who had no training experience. He was just a teacher that enjoyed athletics and agreed to act as the trainer during basketball season. Since I had completed the training curriculum at Indiana State University, I knew more about training room procedures than the "trainer". But I learned three very valuable lessons during my field experience. They were:

1. The difference between the high school and college athlete.
2. The different medical procedures used in the high school situation.
3. The effect of the limited budget on taping and treatment of injuries.

Let me elaborate on these three items.

While in college the student trainer deals with dedicated athletes, more or less. When they get hurt the trainer treats them with the modalities he has and with his knowledge of trauma. With high school athletes this is not enough. On a high school team the trainer may deal with one or two dedicated athletes. These people can be treated as college athletes. The rest of the high school team pose another problem when injured. These people need psychological support besides the normal treatment. This psychological "treatment" may be more valuable in getting the athlete ready to return than any of your treatments. If the trainer shows a genuine interest in the injured athlete and explains to him how the treatment will help, the athlete will be more apt to follow his treatment schedule and therefore return to practice sooner. The high school athlete must be mentally ready to return when he is physically able to continue his sport. The mental readiness helps cut down the number of imagined reinjuries.

On the college level when an athlete is referred to a doctor, it is usually the school's team physician. This doctor works in conjunction with the athletic trainer. In the high school situation the trainer must work with the injured athlete's family physician. This means that the trainer may have to work with ten or more doctors. Many times these doctors will be very conservative in their treatment and diagnosis of injuries. In this situation the high school trainer must gain the confidence of these physicians. If he gains this confidence by ethical conduct, he will find the doctors more open to his suggestions and treatment theories. Of course, no matter what the high school trainer thinks, he must follow the doctor's orders concerning the return of an injured athlete.

Lastly, the student trainer taking field practice should take notice of the money available for the high school athletic training program. Is the trainer on a budget? How much taping can he afford to do? Can he afford to put ankle wraps on the backs, ends, and linebackers or is he only able to tape the injured players? This item of budget can be tough for a first-year trainer to handle after working in a college situation where money was more plentiful. During field practice the student trainer should try to learn some of the methods that the high school trainer may use to save money.

No matter what type of training situation a student trainer enters during field practice it can be very beneficial. The student trainer can see the many differences between the high school and college level. If the student trainer plans to join a high school staff this knowledge is mandatory for an easy adjustment into his new situation.

Dwight Frazee

I thought that my athletic training experience during my student teaching was very beneficial because while I was at the school I was facing the problems I will have when I get out of school and have a job.

I student taught at an inner-city school, and the biggest problem one has there is money. The inner-city schools have to use the least amount of supplies possible, and there isn't anything to waste. For example, you use everything, even the scrap ends of tape.

While doing my student teaching I also learned about filling out insurance forms, and keeping proper records just in case there should be an athlete who says he received an injury during the sport in which he was participating, but he really did not.

When you are doing your student teaching you also have to evaluate the injuries that you may face, and you do not have anybody looking over your shoulder telling you if you are right or wrong. I thought this was very good because I was getting the chance to use the knowledge I gained through my four years of college.

I think that everyone who is in a training curriculum should have a student training experience while doing their student teaching because the problems you face while you are there will be just about the same ones you will have when you get a job, and this experience will help you handle them better.

Kevin Gerlach

My student teaching in athletic training had some good and bad points. First the supervising trainer trusted my ability and let me handle things at

basketball games while he was at the city wrestling tourney. He let me decide what was injured and how to treat the injury. I also learned how to work on a limited budget.

On the other side of the coin, the trainer had just graduated from college and was inexperienced and new in the school. He had a class conflict with practice schedules and I had to do most of the pre-practice taping before the supervisor arrived. He did not give the appearance that he was really interested in the job because he was too eager to pass the responsibility on to the student trainer. For example, I sat on the bench during basketball games and the supervisor sat with the athletic director. He did not give many follow-up treatments and allowed the training room to become a lounge for coaches and a store room for equipment and uniforms.

Tom Drake



SPORTS MEDICINE FOUNDATION OF AMERICA

The Sports Medicine Foundation of America was incorporated in 1972 as a non-profit, voluntary health agency. The President and founder of the Foundation is Fred L. Allman, M.D., the Executive Director is Jack Rockwell, and the Professional Relations Consultant to the Foundation is Kenneth S. Clarke, Ph.D.

The two prime areas of consideration for the Foundation will be research and education. The interrelationship of these two areas and the aims of the Foundation are set forth in the following Program Goals:

1. Injury Prevention
2. Improved Athletic Performance
3. Increased Availability of Quality Health Supervision to Sports Programs in All Communities
4. Improved Treatment and Rehabilitation of Athletic Injuries
5. Improved Methods of Financing Medical Care for Injured Athletes
6. Establishment of an Athletic Injury data and Retrieval System
7. Correlation of Financial and Professional Resources

The Foundation is at the present time acting as one of the co-sponsors of the National Sports Safety Congress held in Cincinnati during February 1973. The Foundation plans to continue co-sponsorship of this very worthwhile project.

The Sports Medicine Foundation of America is currently evaluating important research and educational projects. It is the desire of the Foundation that the membership of the N.A.T.A. participate in as many of the Foundation's activities as possible.

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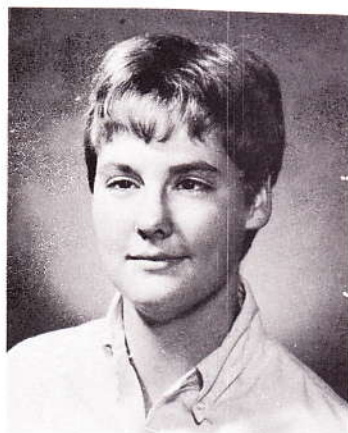
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NOT FOR MEN ONLY



by Holly Wilson
Certified Athletic Trainer

Ms. Marge Albohm, who recently completed the graduate athletic training curriculum at Indiana State University and served as my assistant trainer, submitted the following article. She expresses the belief that there is a definite need for more women to enter the field of athletic training and that women physical educators should provide more adequate injury prevention and care for the female athlete.

Athletic training for women is a long overdue necessity. Upon entering the field of athletic training I found myself relatively unaware of the actual duties and responsibilities of an athletic trainer and the great importance of this person in the total athletic program. After having spent a year as assistant athletic trainer for the women's physical education department and women's intercollegiate athletic program, and having completed the athletic training curriculum at Indiana State University, I have encountered a very rewarding and necessary profession and one which has been seriously neglected in the area of women's sports. For the most part, we as physical educators and athletic coaches have been guilty of neglecting our moral obligation to our female athletes by not truly providing for their health, safety and care. Fortunately, however, I believe women are recognizing this neglect and the trend is certainly changing. However, with any change there must occur an educational process on the part of coaches and players as to the role of an athletic

trainer and the vital part he or she plays in the athletic program. This process may involve diplomacy and certainly cooperation, as we are introducing a totally new professional role into the field of women's athletics. However, when this is accomplished I feel the athletic trainer will become an indispensable part of any women's sport program.

I feel it is of vital importance that we urge women to become professionally prepared in the area of athletic training and to then enter the field to serve women. We are greatly appreciative of the training and knowledge given to us by the men in the field of athletic training, for they are truly seasoned professionals with a great deal of experience and they certainly have been very instrumental in our preparation. However, I personally feel we are still not meeting our total moral obligation to our women athletes if we remain in the men's athletic arena or if we expect the men to assume our obligations. It is **our** responsibility to serve our women and to have proper care and protection provided to our women athletes by women athletic trainers. I feel only then will our previous negligence be truly negated.

With the professional preparation of women athletic trainers and their entrance into the area of women's athletics our moral obligation for the protection, safety and care of female athletes will be met.

RECOMMENDED READING:

"Women in Sports," a three part series in **Sports Illustrated** by Bill Gilbert and Nancy Williamson (May 28, 1973; June 4, 1973; June 11, 1973).

Part I, "Sport is Unfair to Women," deals with the discrimination of the female athlete and the fact that she has been unable to acquire her fair share in the use of facilities and athletic funds, and, in the professional ranks, equal earnings with her male counterpart. The female athlete has been handicapped in the attainment of her goals by lack of funds, facilities and inadequate coaching and, even in some cases by regulations prohibiting her from participating in sports, e.g., Little League Baseball. If, after dealing with such difficulties, the female athlete still has the desire and tenacity to persist, she will no doubt meet social and psychological pressures and receive little recognition for her success.

Bill Gilbert and Nancy Williamson tell it like it is — the double standard in athletics. One area that they failed to mention was the often inadequate medical coverage provided at athletic events for women.

Part II, "Are You Being Two Faced?"—Opposition to women in sports has traditionally been based upon the belief that such participation is harmful to the reproductive organs, the menstrual cycle, and

that it complicates pregnancy. In Part II the authors dispel this popular mythology by citing research and examples where females have not been maimed by participating in even the most rigorous sports, e.g., boxing, roller derby. Only when females compete in co-ed contact sports after the onset of puberty might they be subjecting their bodies to the increased risk of injury. The last myth in the biological argument is the masculinization of the female athlete. While it is true that many females with masculine body types participate successfully in sports, sports participation is not the villain, heredity is. The authors also include a discussion of two other popular arguments: females are neither skilled enough nor interested enough in sports to have the right to demand fair play.

Part III, "Programmed To Be Losers" includes a discussion of the recent court rulings that allow females to compete on established men's teams and the consequent battle of the sexes on the athletic field. The biggest hangup, so the authors contend, is the male ego that could not withstand the embarrassment of female superiority on the athletic field. Another fear of the growing interest in women's sports is that the men will no longer have a monopoly on facilities and athletic funds. Females are no longer satisfied with the "token programs" offered to them. As the article points out, females are now willing to take a stand supported by whatever legal ammunition they can find.

Athletic Training Workshops:

September 14-15, 1973—University of Northern Iowa, Cedar Falls, Iowa.

A workshop in athletic training for men and women which satisfies the state requirements for coaching certification. Workshops in track and field and gymnastics will be run concurrently.

Contact Dr. Elinor Crawford, Women's Physical Education, University of Northern Iowa, Cedar Falls, Iowa 50613 for further details.

September 22, 1973—DGWS Mini-clinic in Athletic Training for Women, Indiana State University, Terre Haute, Indiana.

Open to anyone interested in obtaining a basic background in athletic training.

Write to Mrs. Barbara Passmore, Women's Physical Education, Indiana State University, Terre Haute, Indiana 47809 for more information.

Fellow Trainers—If you know of any workshops in athletic training for women or if you have any information that pertains particularly to women and would like it published, please send it to me at Indiana State University. I will try to include all submitted information in this section.



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THE TEAM DENTIST AND PHYSICIAN



William D. Heintz, D.D.S.
The Ohio State University

Thoughtful consideration has long led informed opinion to the realization that most schools that have the opportunity would sooner or later avail themselves of the many benefits of a team dentist.

The reasons are substantially the same as those which have prompted so many schools to have a team physician.

Physical examinations by a physician are required for team sports participation in all high schools and colleges. In addition, the appointment of team physicians is strongly recommended by national and local school and athletic leaders. Most high schools have team physicians. The team physician is a medical consultant for the team and handles first aid and medical emergencies, if the family doctor is not immediately available.

The need for and value of team dentists in a like capacity has rapidly become apparent. Many teams already have such an arrangement. In one Ohio dental society, of approximately fifty schools, all but three had team dentists in 1963. (Corydon Palmer Dental Society; Mahoning, Trumbull and Columbiana Counties).

Physicians and dentists alike usually hold this position as a community service, generally for token fees or gratis.

Particular Value of Dentists

The value of dentists to players and coach cannot be over-emphasized. They relieve the coach of much responsibility which should not be his.

There are few boys with mouth pathology, such as tissue or tooth infections, who should not wear a guard until the mouth is returned to health.

Players with cleft palates or some other malformation need dentist consideration in fitting protectors.

Boys wearing orthodontic appliances and some types of bridgework and dentures also should have professional judgement applied.

There are many teeth that to a dentist are in obvious need of extraction to avoid almost certain toothache or infection. A coach cannot prevent a broken leg, but with dental advice he can pretty surely avoid losing his star halfback for an important game, because he suddenly develops a toothache.

Finally there are still some protectors with methods of forming them and using materials that are actually harmful to mouth tissues. The dentist can also guide you in this judgement.

Only a dentist properly can place a fitted mouth protector. Careful, experienced positioning, mension and form, are required for maximum comfort and easy acceptance for players. Surveys continue to show that fit and comfort are the factors most often lacking.

The preponderant opinion of researchers is that it is very necessary that protectors be worn on the upper teeth, except in the case of a lower prognathic jaw. Among the most important reasons are these: The upper teeth overlap and are partly in front of the lowers. Some face bars may still slip past another player's bar. If the chin strap breaks or becomes unfastened, the player's own face guard has frequently injured teeth and

mouth. Helmets are often knocked off leaving the front teeth open to injury. There are some helmets now being made with a release device which, under severe blows, allows them to be dislodged upward, and so again the teeth are unprotected.

No coach or layman should want to risk the responsibility of placing a protector in a mouth that was not in proper condition. Only a dentist is qualified to recognize and judge conditions that need special treatment or correction before a guard may be safely used.

Schools should be advised that the placing of mouth formed protectors by a person other than a dentist is considered a violation of the dental practice act. To foster this is to place school officials in serious jeopardy of criticism and responsibility, should unfortunate consequences result.

Clarification of Some Misconceptions

The mouth protection program and rule nationwide has prevented thousands of mouth injuries. Many schools have benefited to the fullest extent at nominal or no cost from the participation of dentists.

Through misunderstanding of one kind or another many other schools are still inviting problems and criticism. Primarily the following points are involved.

1. Though mouth protector rule is in effect, some schools are careless about enforcing it, especially during practice.
2. There are only three basic types of mouth protectors—the stock, the mouth formed and the custom made. If available, dentists should participate in the placing of any of the three.
3. Unfortunately, a misconception that dentists should or would offer their services only for the custom made variety, has led some schools into a position of possible criticism and has certainly resulted in loss to the players and school of the many benefits of dentist assistance.
4. The most effective and satisfactory solution for all mouth health problems is attained under the direction of a team dentist, if such a person is available.

The Team Dentist's Position

The dentist must understand his position with the school. Any decisions regarding the dental health of the players would be jointly considered with the school and team physician. The school almost always concurs with the recommendations of the dentist, but the final decision and approval must be reserved for the school. Briefly—dentistry cannot and must not try to dictate to the schools. Dentists must maintain a position of service and consultation.

Some dentists who have misunderstood, need to

be reminded of the satisfying results in dental health, of the properly conducted programs. In addition to the proven worth of the protectors, without exception, more players have become dental health conscious, and many players have had dentistry done for the first time, as a result.

The Team Physician's Role

In many ways the team physician is in the best position to understand the contribution of a team dentist and to bring the school administration to this realization.

The team dentist relieves the physician of oral health decision, both in policy and emergencies, that would otherwise in effect be forced upon him.

The School's Role

(Guided or directed by the school system administration in larger communities)

1. It selects a dentist who is a logical choice for team dentist (dental consultant). Such a dentist would usually have manifested interest in the athletics of that school, have a direct tie with the school by relationship to players, teachers, or community, or be considered because of a geographical location or home, office or practice.
2. The school and dentist both, out of courtesy, should discuss this proposed arrangement with the other local dentists as a group or society, **before** the participation of the dentist begins.
3. The final selection would be the school's. Having conferred with responsible representatives of the dentists or dental society, it would be rare indeed for the other dentists to disagree with the school choice.
4. The school and dentists would spell out in detail the responsibility of the team dentist and his relation to other dentists in the community. There is no suggestion or implication that his position entitles or requires him to do the routine dentistry for the team as such.
5. A mutually agreeable financial arrangement must be clearly defined. (Usually nominal fees, if any, are involved.)

The Dental Society

(or the dentist in a smaller community)

If the school does not know that a dentist or a society is willing to be of assistance it is perfectly proper for either to let the school know.

The approach must very carefully be handled however, to avoid the interpretation of publicity seeking, or a practice building motive. A team physician may aid greatly.

When more than one dentist may be considered, or interested, the final decision must be agreeable

to the school. Occasionally more than one dentist may share or alternate the responsibilities (as physicians also do). But the dental society must not attempt to dictate the decision. Actually this is usually no problem, as the school or school system officials would meet with those of the dental society and a mutually agreeable arrangement would be arrived at. If there is a token fee involved, it might be part of such a discussion. (Some team physicians and team dentists return such a fee to the athletic equipment fund or to indigent care funds, or children's health week, etc.)

In some areas the schools or school system has welcomed, or requested a letter from the dental society, outlining the suggested points for the school to consider, regarding dental health, injuries, and fees beyond insurance coverage, (school or parents).

Team Dentist Responsibility

He covers three general areas of responsibility.

1. The primary concern is to have the players in good mouth health to start the season—which really means the beginning of practice. The team dentist together with school officials decides how this might best be accomplished, taking into consideration all the factors involved, with that particular school. Among the steps which may be taken are to ask the players to have an examination by their family dentist. (This should assure the most complete examination and treatment). Some schools are already requiring such an exam, even as they do the physical examination. The Senate League (public and private high schools of the City of Cleveland) has a policy of requiring players to have needed dental work completed before competing.

If players fail to have this examination or do not have a family dentist, the next best approach is a "mouth mirror and explorer" examination by himself or by him as part of a group of dentists at the time the mouth protector program is begun. This kind of simple examination will reveal problems obvious to a dentist, such as teeth which should be extracted and those with large cavities. Each of these conditions are very likely to cause toothache and probable loss of playing time during the season, as well as being a health hazard to the player. Most soft tissue infection or irritation would also be noted. In each of these instances mouth protectors should not be constructed before the condition is corrected. Problem malformations (such as cleft palate and others) will also be revealed. Special construction of the protector must be decided upon.

The team dentist will make the player and the school aware of such conditions and the player will surely be referred to his family dentist.

If he has no family dentist the **school** will decide how the problem should best be handled.

Many schools already will not permit players with such serious conditions to play until corrected. They do this both because of their concern for the player's welfare and also the possibility of criticism should regrettable eventualities result from letting a boy compete in less than the best of health. Some leagues also prohibit using players in questionable physical condition.

Players wearing orthodontic appliances are a special problem. They are referred to their orthodontist for his action or advice as to how the mouth protector would best be provided.

2. Arranging for dental emergency treatment is also a responsibility of the team dentist. Generally, the policy is to call the player's family dentist. If he has none or he is not available, the team dentist will do the emergency work needed, or have an arrangement to have available such service as soon as possible.

As in the case of the team physician, it is not necessary for the dentist to be at the practices, but he lets the school know where he may be reached, in case of necessity.

3. Mouth Protector Program. The team dentist should make every effort to keep up on mouth guard developments.

His relation to the mouth protector program may vary greatly in detail, according to the local situation, which in turn affects the type of protector chosen. The value and need of dentists and their willingness to participate with the mouth formed types must be emphasized. Many people have thought that dentists would only be involved with custom made protectors. **This is not true.**

Mouth formed types can much better be placed and formed by dentists. This results in greater comfort for players, which many studies have proven to be the greatest concern to the players.

Summary

Summarizing, it is quite obvious that the team physician and team dentist position are almost completely analogous, in their respective professional areas.

The seriousness (and lasting effort) of some dental injuries have been too much overlooked, and therefore also, the value of dental consultation. The question is not the percentage of dental mouth injuries, versus other physical injury. The concern is the seriousness of some dental injuries, and the fact that they can be almost eliminated by professional guidance.

Having a team dentist will surely become policy when schools fully appreciate how much it is in their interest and that of the player's health.

Unfortunately there are schools where dentists, as there are where physicians, are not available for this position.

It must be emphasized also that the team dentist, where the arrangements are properly handled, facilitates the health program, saves time and money, and relieves the school of responsibility. Contrary experience on any of these points has simply been the result of mishandling by some of those involved.

The maximum in health for the players results from physicians' and dentists' cooperating efforts. Many schools already realize this and have appropriate programs. Other schools fortunate enough to have professional assistance available have an obligation to players and parents to follow suit.

Many people working closely with mouth protectors have long been convinced of their value in reducing the risk of concussion. Many schools have reported a complete or nearly complete absence of concussions among layers while wearing mouth protectors. The team physicians of the Wheeling, West Virginia area have for some years insisted that the mouth protectors for their teams be placed by dentists, in order to assure maximum protection and comfort. This has been because of their expressed conviction that mouth protectors guard against concussion.

Now we have scientific support for this premise, in the five year study at Notre Dame (2) and the study at Kentucky (3).

Some of the mouth protectors which have reinforcing inserts have proven unsatisfactory. A number of the inserts have been broken out chewing and usage. Such a loose fragment presents the hazard of aspiration. If this type of protector is used, it should be frequently and closely checked for this failure.(4)

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2. Stenger, J.M. and others. Mouthguards: Protection Against Shock to Head, Neck and Teeth. *JADA*, 69:273, September, 1964.
3. Hickey, J.C. and others. The Relation of Mouth Protectors to Cranial Pressure and Deformation. *JADA*, 74:735, March, 1967.
4. Heintz, William D. Mouth Protectors: A Progress Report. *JADA*, Vol. 77, September, 1968.

Editors Note: For a complete list of suppliers of mouth protectors and fabricating materials contact The American Dental Association, 211 East Chicago Avenue, Chicago, Illinois.



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BOOK REVIEWS

By Ken Murray, Certified Athletic Trainer

THE FEMALE ATHLETE

by Carl E. Klafs, Ph.D.
and M. Joan Lyon, Ph.D.

List price \$5.75
206 pages
Illustrated

The C. V. Mosby Company
St. Louis, Missouri

Women's athletics is an up and coming field; and with this in mind, athletic training for women is becoming more important. Klafs and Lyon with this in mind cover such topics as: (1) historical background, (2) anatomical and physiological factors in sports performance, (3) psychological and cultural influences, and (4) conditioning and training.

This book is aimed, in the reviewer's opinion, toward not only the trainer, but at the coach who must do both training and coaching. The area of conditioning for women shows different training methods and the way they should be set up for women. The reviewer did feel that more taping techniques should have been demonstrated rather than bandaging techniques. The book also reveals that athletic competition by girls and women indicate both a higher degree and a greater severity of injury than are found in men. Statements like this indicate women's athletics as a wide open field that need lots more research to prove or disprove such statements.

ERGOGENIC AIDS AND MUSCULAR PERFORMANCE

edited by William P. Morgan
University of Wisconsin

Academic Press, Inc.
New York, New York

List price \$22.50
396 pages

The primary purpose of this book is to present an "academic synthesis of the literature dealing with ergogenic aids". The author does not attempt to answer the ethical and legal questions relevant to the subject.

While most other texts deal only in a negative context in this area, and often limit their discussion to substances such as powerful drugs, anabolic steroids, and dietary supplements; Morgan takes a positive approach in dealing not only with substances such as drugs, hormones, oxygen, salts, and vitamins, but also with work-producing phenomena, such as hypnosis, mental practice, physical warm-up, music, and hot and cold applications, among others.

Part I of the book discusses methodological

considerations in evaluating ergogenic aids.

Part II deals with ergogenic aids that would be classified as phenomena.

Part III deals with the effects of those ergogenic aids classified as substances.

The author deals with ergogenic aids in the perspective of the difference in individuals; whereas these aids produce different results with different individuals.

The book is well-written and highly recommended for the trainer's library.

ENCYCLOPEDIA OF ATHLETIC MEDICINE

Compiled by George Sheehan, Ph.D.

Runners World Magazine

List price \$1.95

Post Office Box 366

84 pages

Mountain View, California 94040

Illustrated

This book is written mainly with the track athlete in mind. Since running and conditioning are involved in all sports, the information can be applied to any sport that involves running. The book may be of benefit to the athlete to understand some problems that may be affecting him. Different people do things differently as you can observe in Dr. Sheehan's book.

Contents of the book cover: (1) causes and prevention of injuries, (2) structural problems of the body, (3) internal problems, (4) environmental problems, and the last chapter, (5) medical care.

This is a well-written, easy to understand, book on training.

GRECO-ROMAN WRESTLING

by M. Briggs Hunt

List price \$3.95

The Athletic Press

P. O. Box 2314-D

167 pages

Pasadena, California 91105

Illustrated

This book has little information for athletic training except that the trainer may be interested in the sport he has to be trainer of. There are two areas in the book that do pertain and are of interest to the trainer. They are: (1) conditioning, (2) diet and the pre-game meal.

The conditioning program is different in that it is an "overload principle" and by use of the "buddy system". The information on diet and pre-game meal is, in the reviewer's opinion, somewhat out of date. The author talks about "high protein" diet and how it helps the "general health and conditioning of the wrestler". No mention is made of the benefits of carbohydrates for use as body energy for work.

Greco-Roman Wrestling is becoming more popular throughout the United States; and, therefore a trainer may have need of this book for general information.



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CALENDAR OF COMING EVENTS

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September 17-19, 1973—The American Academy of Orthopaedic Surgeons will sponsor "General Sports Medicine" in New York City. For details contact James A. Nicholas, M.D., 150 East 77th Street, New York, New York 10021.

September 22, 1973—The Southwest District of the Indiana Association for Health, Physical Education and Recreation is sponsoring the DGWS Mini-Clinic on Athletic Training for Women at Indiana State University. For details write Mrs. Barbara Passmore, W.P.E., Indiana State University, Terre Haute, Indiana 47809.

October 1-3, 1973—The American Academy of Orthopaedic Surgeons will sponsor "Orthopaedic Nursing" in Atlanta, Georgia. For information write The American Academy of Orthopaedic Surgeons, 430 North Michigan, Chicago, Illinois 60611.

October 6, 1973—The Washington State Medical Association and The Washington Interscholastic Activities Association will sponsor a Sports Medicine Workshop at Tacoma, Washington. For details write the Washington State Medical Association, 444 N.E. Ravenna Blvd., Seattle, Washington 98115.

October 7-10, 1973—The American Academy of Orthopaedic Surgeons will sponsor "Diseases of the Intervertebral Disc" in Philadelphia, Pennsylvania. For information contact the American Academy of Orthopaedic Surgeons, 430 North Michigan, Chicago, Illinois 60611.

October 11-13, 1973—The American Academy of Orthopaedic Surgeons will sponsor "The Elbow, Wrist and Forearm" in Kansas City, Missouri. For details write the American Academy of Orthopaedic Surgeons, 430 North Michigan, Chicago, Illinois 60611.

October 25-27, 1973—The American Academy of Orthopaedic Surgeons will sponsor "Engineering in Orthopaedic Rehabilitation" in Boston, Mass. For information contact the American Academy of

Orthopaedic Surgeons, 430 North Michigan, Chicago, Illinois 60611.

November 4-7, 1973—The American Academy of Orthopaedic Surgeons will sponsor "Hip—Adult and Child" in Durham, North Carolina. For information contact The American Academy of Orthopaedic Surgeons, 430 North Michigan, Chicago, Illinois 60611.

November 5-9, 1973—The American Academy of Orthopaedic Surgeons will sponsor "Biomechanics" in Cleveland, Ohio. For details contact the American Academy of Orthopaedic Surgeons, 430 North Michigan, Chicago, Illinois 60611.

November 13-15, 1973—The American Academy of Orthopaedic Surgeons will sponsor "Femur, Injuries and Complication" in Palm Springs, California. For details write the American Academy of Orthopaedic Surgeons, 430 North Michigan, Chicago, Illinois 60611.

November 14-16, 1973—The American Academy of Orthopaedic Surgeons will sponsor "Pathophysiology of Trauma" in Columbus, Ohio. For information write The American Academy of Orthopaedic Surgeons, 430 North Michigan, Chicago, Illinois 60611.

December 14-16, 1973—The American Academy of Orthopaedic Surgeons will sponsor "Current Status/Joint Replacement" in Miami Beach, Florida. For details contact the American Academy of Orthopaedic Surgeons, 430 North Michigan, Chicago, Illinois 60611.

Athletic Training will be happy to list events of interest to persons involved in sports medicine, providing we receive the information 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, Athletic Department, Oklahoma State University, Stillwater, Oklahoma 74074.



CURRENT LITERATURE



by Tom Waugh
Certified Athletic Trainer

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"Potentiation of Wound Infection by Adhesive Adjuncts," Panek, P.H., Prusak, M.P., Bolt, D., and Edlich, R.F., **The American Surgeon** 343-345, June, 1972.

Experimental and clinical investigations have demonstrated that surgical wounds closed with tapes are less susceptible to infection than wounds closed by sutures. However, the use of tape to close wounds has not been a widely accepted technique. The reasons for its nonacceptance is the surgeon's difficulty in achieving adequate wound edge opposition. The tapes fail to hold because of the blood, sweat, and irrigating solutions on the skin.

A study was performed by the authors by producing incisions on guinea pigs, applying *Staphylococcus aureus* into the wounds, and closing the wounds with tape closures. Five adhesive adjuncts were applied to the skin prior to the tape closures. After five days the wounds were inspected for inflammatory responses. Induration was measured and the wound inspected for purulent exudate. Pretac, tincture of benzoin, Ace Adherent, and Vi-Drape significantly impaired the resistance of the taped wound to infection. Aerozoin scores were higher than the four others but not statistically significant. It was noted that the width of the indurated edges of the wounds containing an adhesive adjunct were greater than the edges of the control wounds.

The study indicates that spillage of the adhesive

adjuncts into the wound during tape closure significantly impaired the ability of the wounds to resist infection. The effects of these adhesives suggests the necessity of either a new nontoxic adhesive or care in avoiding spillage into the wound with the presently available adhesives.

Kent P. Falb

"An Electromyographic Study of Four Abdominal Exercises," Lipetz, Stanley and Gutin, Bernard, **Medicine and Science in Sports** Vol. 2, No. 1, pp. 35-38, Spring, 1970.

This study was designed to determine the intensity and duration of muscle action potentials in the upper and lower portions of the rectus abdominis muscle during four abdominal exercises. The results should give an indication as to which exercises would be best for conditioning of the rectus abdominis for athletic events.

Four exercises were used for this study: the conventional sit-up, the hook sit-up, the arched back sit-up, and the double leg raise. With the exception of the arched back sit-up, the results of these exercises served to replicate previous research. The arched back sit-up extended the analysis to an exercise not studied previously.

The subjects were eight well-conditioned athletes. They were chosen because of their well defined abdominal musculature which helped in accurate placement of the electrodes.

The results of this study indicated that:

1. All three types of sit-ups were significantly better in both the upper and lower portions of the rectus abdominis than the leg lift exercise. The sit-ups, however, did not differ from each other in intensity.
2. In duration of contraction, the arched back sit-up significantly surpassed both of the other sit-up exercises used in the study.
3. It was also found that the mean values for the upper rectus abdominis were generally more than 50 per cent higher than those for the lower rectus abdominis.

In many respects, the results of this study concur with other studies in this area. The investigation did show, however, that the arched back sit-up gives a greater sustained effort in the rectus abdominis than the other exercises used. This would seem to indicate, therefore, that this exercise should be very effective in the development of abdominal strength and endurance.

Tom Carter

"Brain Tolerance to Impact in Football," Reid, S.E.; Tarkington, J.A.; Epstein, H.M.; & O'Dea, T.J., **Surgery** Vol. 133, #6, December 1971.

The authors began with some brief historical studies on concussions in football followed by basic anatomy and definition of concussions. There was a rather extensive survey of past research into the pathology of concussions as there were a number of different opinions as to why concussions occurred ranging from deformation of the skull to impact to stretching of the cervical cord at the foramen magnum. A fairly extensive survey of past investigations into the amount of force required to give brain damage ranging from 16-56 ft./sec. to 1,000 G's to 40,000 radians/sec.²

A description of the technique of telemetry within the football helmet at the Northwestern University Technologic Institute was described and the results indicated that the blow was secondary to four factors.

1. Voluntary and instinctive reaction of the head.
2. Unpredictable resistance of muscles of neck and head movement.
3. The direction and point of contact of the blow to the head.
4. Individual variations of scalp and skull to absorb the force of the impact.

A final summary showed that the tolerance of the human brain to acceleration was found to be in the range of 180-230 G. with a duration of 310-400 milliseconds. Other factors include stretching of the cervical spinal cord, rotational acceleration, multiple impacts at short intervals and an increase in the involved mass.

Dwight E. Aultman III

"Traumatic Fibrosis of the Rectus Femoris Muscle," Rask, Michael R., M.C., and Lattig, Gerald J., M.D., **The Journal of the American Medical Association** 221:268-269, July 17, 1972.

Although injury to the rectus femoris is a common occurrence, resultant fibrosis of the muscle is rare. The pathogenesis of the injury is in effect a third-degree tear of the muscle with retraction of the muscle, and hemorrhage with a resultant fibrotic mass. Injury to the muscle is usually by an uncoordinated force acting upon the tightly contracted rectus femoris and causing partial rupture of the muscle with hemorrhage. After this injury there is usually recovery and repair without cicatrix, or in unusual cases, a long discrete fusiform scar develops which is imbedded in the muscle and causes weakness of knee extension in extreme athletic endeavors. Five case histories were presented including surgical techniques.

Most injuries to the rectus femoris muscle heal spontaneously. The group of people that form the long painful fibrotic scars must be very small in comparison to the number of those with injuries to this muscle. Once the lesion develops, it limits the

athlete, especially in running or jumping. because the lesion completely interferes with the quadriceps mechanism. All of these fibrotic cicatrices have been found in the rectus femoris, suggesting a similar kinetic cause. Surgical excision has proved dramatic and curative without recurrence of cicatrix, and has allowed the patient to return to extreme athletic endeavors.

John Wells

"Manipulation in General Practice," Fisk, J.W., MB Chb DCH, **N.Z. Medical Journal** 74, 172, September, 1971.

The magnitude of soreback problems is little realized by the general practitioner. During manipulation various sounds are elicited. These sounds are necessarily produced for successful treatment. In order to elicit these sounds the manipulative thrusts must be made at right angles to the facets. A different technique is used for each area of the spine.

Of the 378 lesions treated, 90 per cent were considered complete successes, 5 percent were worthwhile, and 5 percent were failures. Twenty-seven per cent had a recurrence of symptoms within one year.

The relief of pain is often dramatic and immediate. Manipulation often works in cases where no definitive explanation is possible. A theoretical explanation of the cause of pain is given. It is specifically pointed out that manipulation does not preclude the possibility of a recurrences of symptoms.

The techniques of manipulation should be a part of the training of all doctors. The effectiveness of simple manipulative techniques was demonstrated in order to urge the general practitioner to adopt manipulation as a routine office technique.

Bill Flentje

"Nutrition for Maximal Sports Performance," Bergstrom, Jonas, M.D., and Hultman, Eric, M.D., **Journal of the American Medical Association** 221:999-1006, August 28, 1972.

At low intensities of work, energy is mainly derived from lipids. However, the fraction of carbohydrate used as an energy source increases with increasing work load. The carbohydrate contribution to the total energy output cannot be replaced by any other substrate. Local glycogen stored in the muscle tissue is the main source of carbohydrates. In a well-trained athlete with his high ability of oxidative phosphorylation it is evident that in short-time high-intensity exercise, the size of the glycogen store is not a limiting factor,

provided that it is not grossly subnormal at the beginning of the exercise. On the other hand, with high-intensity exercise of long duration (30 minutes or more), the size of the glycogen store can be the limiting factor for the performance capacity. It has been shown that there is an increased release of glucose from the liver as early as 10 to 15 minutes after beginning hard exercise. Thus, there is a risk of hypoglycemia, if the glycogen store in the liver is insufficient to meet the increasing demand. It is mandatory to keep the glycogen store well filled before the period of hard exercise to avoid glycogen depletion with hypoglycemia. This can be achieved only by giving carbohydrate on the days before and some hours before the competition. During the competition the absorption of glucose from the gastrointestinal tract is limited. Hypertonic solutions of any kind should also be considered undesirable, since they will exert an osmotic effect forcing water into the stomach from the extracellular fluid. Filling the liver with glycogen before the competition is therefore more important than the feeding during the competition. As a carbohydrate source enhancing glycogen synthesis, starch-rich foods are recommended in preference to sucrose or glucose.

With a water loss amounting to 4 per cent to 5 percent of the body weight, the capacity for hard muscular work must be expected to decline by 20 per cent to 30 per cent. The risk of circulatory collapse could be very great when dehydration amounts to 10 per cent of the body weight. The subject should be well hydrated before competition.

There is no indication that excessive protein intake is of any additional value in building the muscle mass.

John Wells

"Champs Don't Win On Diets," Chamberlin, Jo, *Science Digest*, pp. 64-68, September, 1971.

Coaches and trainers throughout the nation are very diet conscious and constantly look for the right food combinations to bring about maximum performance. Any number of food fads have been tried over the last several years.

All evidence gathered indicates that a well-balanced diet is the best possible energy source. There is no one food that will provide large amounts of extra energy, whether it be protein, carbohydrate, fat, vitamin, or mineral.

Other more specific findings of the research indicate:

- There is no need for vitamin supplements unless the physician sees evidence of a shortage of nutrients following illness or accident.
- Alcohol should be avoided prior to and during sports activity because of little nutritional value.

- Beverages containing caffeine (coffee, tea, etc.) decrease fatigue awareness, but may cause nervousness if used in large amounts.
- There has been no difference found in performance comparing diets with milk and those without milk.
- Wheat germ adds nothing more than any other food which is high in protein.
- Skipping breakfast or having an inadequate one (coffee and donut) results in decreased work output.
- In short duration events, the use of quick energy foods (honey) does not significantly improve performance, but they may be of use in endurance events.
- There is some evidence supporting a diet a little higher in carbohydrates in sports lasting a period of hours (football, basketball, soccer, etc.).
- Coaches should lean away from the high protein diet for training meals, such as the steak and eggs pre-game meal.

The food "fad" of today for athletes should be the well-planned, balanced diet with three meals a day.

Gary Lake

"Localized Hypothermia for the Relief of Pain in Musculoskeletal Injuries," Lane, Lauren E., *Physical Therapy* Vol. 51, Number 2, February 1971.

Lane suggests that hypothermia (ice massage) may be used to provide immediate relief of pain musculoskeletal involvement, resulting in speedy return to full duty status on the part of the patient.

Supporting this a single case report of a 54 year old man suffering from acute bicipital tendonitis of left shoulder. Initially, the subject had little pain-free range of motion (30° flexion, 25° abduction, 20° lateral rotation, 15° medial rotation) and tests (Yergason's and Speed's) for bicipital tendonitis were positive. In addition, palpation resulted in pain along the short head of the biceps and scapulohumeral rhythm was poor. The patient had treated himself at home using dry heat (electric pad) with no prolonged relief. However after 4 treatments of ice massage (using water frozen in small cans or plastic cups) of approximately 10 minutes each (treatments stop when the area is anesthetized), he was able to return to full duty status with complete range of motion in the shoulder.

The demonstrative measures of this case on musculoskeletal injuries is self-evident as a treatment recommendation.

Greg Vergamini



(Cont. from p. 109)

present. It usually shows up in one of three forms. The first is an area where there is loss of color, but upon close inspection a fine scale can be seen. The second most common appearance is that of small red areas up to a quarter of an inch in diameter where there is scaling present. The condition may appear as just small scattered areas or they may run together and cover large areas of the body. The most common locations are the back, chest, neck, upper extremities. Very seldom is it found below the waist. No specific precautions are effective. The treatment of this condition requires that every area be treated long enough. Usually this will require up to three months of regular treatment. The preparations for fungus infections which are in liquid are much more acceptable than ointments.



Figure 5

PITYRIASIS ROSEA (Figure 5)

This condition is not as common as fungus infections, but is one which most frequently is confused with "ring worm." This condition may or may not itch, but when it does it is frequently quite annoying. Usually it starts with one spot which is more often oval than circular and appears as a "ring worm" on the skin. Most frequently it is treated as a "ring worm" but just doesn't seem to disappear. About a week after the appearance of this one spot several other much smaller, round or oval, slightly red and scaly spots develop usually on the trunk of the body first. Sometimes many more of these develop in a short period of time, scattered over any or all parts of the body. Occasionally just a few appear over a few weeks period. Most of these cases will disappear, without treatment, in 6 to 9 weeks. The cause of this condition is not known but it is thought by some to be due to a virus. No particular complications develop unless the areas are scratched and infected with bacteria.

In the cases where no itching is present it is best to let the condition run its course. When there is considerable itching present, ultra-violet light treatment will usually shorten the course of this condition substantially. This should be given by a physician or a supervised technician. Otherwise, severe sunburn can result.



LETTER TO THE EDITOR

AN OPEN LETTER OF APPRECIATION

Dear Editor:

We wish to express our appreciation to Mr. Dwayne (Spike) Dixon, Dr. Charles Turner and the Certified Trainers and other members who assisted us with the Student Clinic at your convention in Atlanta, Georgia.

It was a great opportunity for us to be exposed to the various basic and advanced techniques in the treatment and prevention of athletic injuries employed by the many trainers present and through the use of practical demonstrations and informal discussions.

This type of informal gathering lends itself to a better working relationship between the students and the members of the N.A.T.A. By working closely together in this fashion, not only do we benefit but the high school and college athletes as well.

We would like to publicly thank the many companys that donated materials and showed an active interest in us.

We are happy to see that the N.A.T.A. is recognizing and taking an active interest in the Student Trainer by planning a special clinic and get-together for the student members in Kansas City.

Sincerely,
Al Green, University of Michigan
Bruce Stewart, Maryville College
Student Trainers

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Jim Bryan

*Athletic trainer with U.S.A. team in national and international competition.

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- As only wool can, a sock must absorb, then dissipate perspiration to reduce blistering and chafing, keep feet and shoes drier to inhibit fungus growth or infection.
- To help prevent injury and foot fatigue, it must act as a cushion against the shocks and burning abrasions of sudden and rapid movements, hard surfaces and long periods of strenuous exercise. These are the situations in which only the resilient fibers of a wool sock provide adequate protection.

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ANNOUNCEMENTS

CERTIFICATION INFORMATION

Persons wishing to be certified as an athletic trainer by the N.A.T.A. must fully qualify under the Procedures for Certification prior to taking the certification examination.

The examination is given one day prior to the annual convention in June at the convention site, and on the third Sunday of January on a regional basis. In certain rare instances other dates may be announced on the district level by newsletter.

Persons desiring to take the examination may obtain application materials from N.A.T.A., 3315 South Street, Lafayette, Indiana 47904, provided the individual meets the membership requirement. The application must be requested in writing ninety (90) days prior to the date of examination. No applications will be furnished to applicants less than sixty (60) days prior to the examination date in order to assure that the application deadline of six weeks prior to the examination may be met.

If further information is required, contact Lindsay McLean, Chairman, N.A.T.A., Board of Certification, 1000 South Street, Ann Arbor, Michigan 48105.

N.A.T.A. WORKSHOP APPROVAL

N.A.T.A. approved clinics and workshops will be listed in the **Athletic Training**. Application forms and guidelines for N.A.T.A. approval may be obtained from Sayers Miller, University of Washington, Seattle, Washington 98105, or Kerkor Kassabian, Boston-Bouve College, Northeastern University, Boston, Massachusetts 02115. All program approvals by the N.A.T.A. are only on a year basis and all 1973 approved programs if offered in 1974 must seek reapproval.

CURRICULUM DEADLINES

All institutions desiring N.A.T.A. approval of their curriculums must submit their applications to Sayers Miller at the University of Washington, Seattle, Washington 98105 prior to September 1st for the final action at the Board's Meeting in January and prior to February 1st for final action at the Annual Meeting. If applications are received after the above listed dates they will be carried over to the next evaluation period.

The first is obviously the sensation of cold. The second reaction is a feeling of warmth or heat caused by the reflex vasodilatation. (15) The third reaction is the aching or throbbing which is the result of the blood vessels dilating and constricting (hunting reaction). (15) The fourth reaction is that of anesthesia, or numbing. (15) Folkow (5) suggests that pain fiber axon reflexes are probably partially responsible for the hunting reaction. He believes that the strong cooling of the skin excites the pain fibers which produces the axon reflex vasodilatation. As this increased blood flow raises the tissue temperature, the pain fiber discharge is eliminated, and with this also the axon reflex vasodilatation is eliminated. The tissue temperature again starts to fall to the level where the pain fibers are again excited and the cycle repeated. Folkow (5) attributes these pain fiber axon reflexes to being a major factor in local protection against frost-bite. He also states that this local nervous mechanism contributes to the local defense and repair in the surface tissues by creating a local blood flow increase.

When Lewis (5) made his observations of the vasodilatation response to strong cooling of fingers when immersed in ice water, the finger temperatures actually rose above pre-immersion levels upon removal from the immersion bath. Fox (8) and Greenfield and Shepard (9) present what they term "after reaction" or "after duration" which they describe as the large rise in local temperatures of body parts after removal from a cold environment.

The investigator has presented only a few of the many available sources producing evidence that the so-called cold vasodilatation does exist. It is now of interest to attempt to find out what is the mechanism controlling this phenomenon. A number of theories exist and the major ones will be presented preceding a brief review of vascular control.

Rushmer (18) states that the "vascular smooth muscle is generally supplied by nerve fibers derived solely from the sympathetic nervous system." The sympathetic nervous system supplies the vessels with vasoconstrictor and vasodilator nerve fibers. The blood flow is controlled largely by sympathetic vasoconstrictor nerves and, therefore, the increase in blood flow during dilation is the result of the release of vasoconstrictor tone.

Stimulation of sympathetic nerves cause arterioles of most tissues to constrict. (11) The sympathetic vasoconstrictors transmit a continuous supply of impulses to the vessels and this maintains a state of slight constriction in the vessels at all times. This state is often referred to as vasomotor tone. (11)

Guyton (11) states that the importance of vasodilator fibers has yet to be proven. He believes this to be true because removal of all sympathetic nerves hardly affects the degree of vasodilatation.

(11) Therefore, his basis for dilation of blood vessels is the release of vasoconstrictor tone permitting increased blood flow. With this in mind, Guyton points out that nerve fibers producing vasodilatation are not absolutely essential to most parts of the circulatory system.

The existence of sympathetic vasodilators has not been readily demonstrated. (18) As early as 1858, Bernard believed there was a special group of nerves that exerted an inhibitory influence on the smooth muscles of the blood vessel walls and he, therefore called these nerves vasodilator nerves. (1)

Although Guyton does not stress any importance of the vasodilator fibers, Rushmer (18) points to the fact that complete elimination of vasoconstrictor influence does not cause maximal vessel dilation and, therefore, there must be some other mechanism in operation to produce maximal blood flow through a vessel. This mechanism is thought to be the vasodilator nerve fiber system.

Bard (1) makes the following observations about vasodilator fibers: 1) They are truly afferent because their cell bodies are located in the ganglion of the somatic sensory system, 2) As afferent fibers, they cannot serve effectively to convey centrally initiated vasodilator impulses to the periphery since impulses proceeding from both ends of a neuron would extinguish each other, 3) They are not activated in the course of any known vasomotor response mediated by the central nervous system. 4) They are distributed, as far as is known, entirely to the blood vessels of the skin.

Folkow (1) mentions that there has been some evidence of parasympathetic vasodilator fibers, but these fibers run strictly to the cranial and sacral cord areas. It is still questionable whether there are any specific parasympathetic vasodilator fibers in many vascular areas. It is this information which substantiates Rushmer's theory that the vascular smooth muscle is basically under sympathetic control.

Although there is not complete agreement, it can be said that the vascular system is controlled through its smooth muscle walls by vasodilator and vasoconstrictor nerve fibers of sympathetic origin and with the vasoconstrictor fibers playing the principle controlling role.

If it can be accepted that the vessels are basically under the controlling influence of the sympathetic nervous system, an investigation into the various aspects of how this control functions is now in order.

Lewis (15) found that cold vasodilatation occurred in a sympathectomized limb, even after there was a sufficient amount of time elapsed for nerve fibers to have degenerated. He also found that cold vasodilatation occurred in denervated limbs before, but not after the degeneration of somatic nerve fibers. From these observations he concluded that an axon reflex mechanism was responsible for the cold vasodilatation.

An axon reflex has the basic function of providing a local increase in the blood flow through superficial tissue exposed to noxious influences (1) Assuming cold is a noxious influence, it can stimulate thermosensory receptors in the skin causing an impulse to travel into all branches of a nerve fiber as well as upward to the cord. When the impulse reaches the terminals near the blood vessels, a hormone, possibly histamine, is released causing the vessels to dilate.(11) Guyton suggests that the axon reflex provides increased blood flow to damaged tissues and aids in their repair.(11) This factor is obviously important when considering the effects of various therapeutic modalities used in the rehabilitation of athletic injuries.

McDowell (17) cites an example of an axon reflex in his research and describes it as "that local rise in temperature when a part is withdrawn from exposure to extreme cold." Folkow (6) provides clear evidence that axon reflexes from their afferent fibers (presumably pain fibers) are of considerable importance for inducing cold vasodilatation. It is felt that in the skin, the axon reflexes from more abundant supplies of pain fibers definitely play a role in cold vasodilatation. Strong cooling of the skin excites the pain fibers with a consequent axon reflex vasodilatation.(5) This was previously mentioned as one of the ways in which the body provides for repair of tissue.

The axon reflex theory by no means is the full answer to cold vasodilatation. Keating (13) has shown that since sensation had disappeared from fingers exposed to iontophoresis before blood flow returned, their sensory nerves had ceased to function. He claims that this is evidence that the dilatation, therefore, is unlikely to have been initiated by axon reflexes. The fact that blood flow returned in the presence of constrictor hormones is evidence Keatinge feels supporting the view that response of the vessels was due to the warming of deeper vessels and their ability to respond as blood flow returned.

Greenfield, Shepherd, and Whelan (10) elicited a cold vasodilatation from chronically denervated fingers. They felt that while it seems evident that cold vasodilatation can take place in the absence of local axon reflex pathways, the size of the response was found to be greater and more readily elicited when the nerves were intact. They conclude that cold vasodilatation does not depend on the integrity of the sympathetic nervous system. Also, cold vasodilatation is unimpaired after blocking of sensory nerves, and in early days after nerve section. And finally, they conclude that the response to cold does not depend on the integrity of the somatic sensory nerve fibers, although when they are intact the response is much larger than when they are not.(10)

Chemical factors also are involved in the mechanism of cold vasodilatation. Folkow (7) has presented research showing the sympathetic

vasodilator fibers are cholinergic and the vasoconstrictor fibers are adrenergic regarding the transmitter mechanisms. What roles these transmitter mechanisms play in cold vasodilatation seem questionable. Keatinge (14) has shown that when vessels were at a low temperature (near 0°C) they failed to respond to such constrictor drugs as adrenalin, histamine, and petressin. Folkow (6) has noted that cooling depressed the sensitivity of vascular smooth muscles to the released adrenergic transmitter which will reduce the actual vascular influence of these fibers.

Hertzman and Roth (12) suggest that vasodilatation is elicited by the liberation of an "H-substance" which, in turn, excited the axon reflex. This agrees with the line of reasoning presented by Folkow who believes that the axon reflex mechanism is supported by a non-nervous vasodilator response which is partly due to the release of an H-substance. It might be well to note the reference to an H-substance rather than the use of the word histamine. Most authors indicate a preference in the term H-substance because they feel the substance is histamine-like but does not possess the exact same qualities of histamine.

Duff, et. al. (4) state that histamine and acetylcholine play parts in the natural phenomenon of vasodilatation, but question their roles in cold vasodilatation. Their experiments failed to provide evidence for or against histamine as the mediator of cold vasodilatation. Evidence against acetylcholine playing a vital role in cold vasodilatation was provided with the use of atropine. The effectively atropinized finger was found to behave in a way indistinguishable from the normal finger upon immersion in cold water.(4) Bard (1) also shows that since the vasodilator responses were not antagonized by atropine or by an antihistamine drug, the response was not due to acetylcholine or histamine. Folkow (5) also found that administration of antihistamine drugs did not significantly affect the axon reflex vasodilatation. Likewise, Duff (4) was unable to delay onset of cold vasodilatation by the use of antihistamine drugs.

The experiments with acetylcholine seem to provide no evidence that it plays a role in the cold response, and the atropine experiments have indicated that acetylcholine is not responsible for the release of the initial cold vasoconstriction to permit cold vasodilatation.(4)

Guyton (11) suggests that the diminished oxygen supply to tissues produced from vasoconstriction causes vasodilator substances to be formed in muscle; but he concluded that it was more likely that the simple lack of oxygen directly caused the blood vessels to dilate. Folkow (6) also presents a theory on an accumulation of specific vasodilator compounds that are released locally as a result of low blood flow from vasoconstriction. He expresses the idea that with cooling, tissue metabolism is depressed and less metabolites are produced which, other things being constant, enhances vascular tone. The reduction in

(Cont. on p. 136)

POPPOUR

ARTIFICIAL ALERTNESS?

Various "stay awake" preparations on the market contain caffeine as the active ingredient. Food and Drug Administration examination of these products shows that each tablet contains about 110 milligrams of caffeine. The caffeine content of each tablet thus approximates that of a cup of coffee or tea, and the stimulating effect is essentially the same. These preparations are not in the same category as the amphetamines.

FDA believes that when a person is tired he should rest rather than rely on a stimulant for carrying on physical activities. FDA has strong reservations about the use of a stimulant type preparation while driving since such stimulants temporarily mask mental or physical fatigue. The consequences may be dangerous.

FDA suggests to the manufacturer of these products that their label claims be limited to use for the temporary relief of drowsiness, and that the article bear a warning that the use of caffeine is not a substitute for normal rest or sleep.

FDA Fact Sheet

MORE DISCRIMINATE EXERCISE URGED FOR HEALTH CONSCIOUS

"An increased nationwide concern about regular exercise and the frequency of ischemic heart disease has led to indiscriminate practices in jogging and other popular forms of physical activity," according to Neal Tremble, associate professor at Drake University. He stated that too many well-intentioned individuals "prescribe" exercise

programs for people without adequate medical supervision.

Dr. Tremble has devised twelve step procedural outline for prescribing exercise programs. This includes adjustments for age and physical condition.

VITAMIN C - PROPHYLAXIS TO COLDS?

New tests administered by a team of investigators in Dublin University's Department of Pharmacology give some support to Dr. Linus Pauling's theory of the prophylactic effect of vitamin C against the common cold.

Professor Cedric Wilson stated that in an eight year series of trials in four boarding schools, supplemental doses of 200-500 Mg/day of vitamin C reduced the severity of certain types of colds in girls and lessened the symptoms felt during colds in both boys and girls. He declared that a daily dose of 2 grams could be effective for 80% of the population. The studies, however, indicated no statistically significant reduction in the number of colds.

Professor Wilson suggests that vitamin C plays a role in the natural tissue defense mechanism. To maintain normal vitamin C levels in the blood, he said, girls should have 1000 Mg. of ascorbic acid every six hours for 48 hours following the appearance of cold symptoms and boys should receive between 1500 and 2000 Mg.

BLOCKING ABOVE THE WAIST

Epidemiological evidence has consistently revealed in football players a high incidence of lower extremity injuries.

A recently enacted rule made it illegal for an end or back to block below the waist after returning to the scrimmage area from downfield or from a flanking position. Thus, the so called "Crack back block" was prohibited. This change, although limited to a few players and in effect for only one season, resulted in a substantial reduction in the number of knee injuries sustained.

Since blocking above the waist does not cause an increase in the incidence of internal injuries, the Committee on Medical Aspect of Sports recommends that appropriate action be taken to prohibit downfield blocking below the waist in football on all kicking plays-the kickoff, the punt and the free kick play.

CERVICAL FOOTBALL COLLAR

Dr. James Funk, M.D., surgeon for the Atlanta Falcons professional football team said that more widespread use of the rubber football collar could protect against a growing number of neck injuries in football. He feels one of the reasons for the increased number of neck injuries is the false of security afforded by modern helmets. Most injuries to the neck occur when the head is used as a weapon and the chin is forced downward to the chest. Currently football cervical collars protect abduction and extension injuries but provide no protection from flexion injuries. Dr. Funk felt that collar modifications could easily be made to eliminate most of the serious neck injuries.



vasodilator metabolites by the increase in blood flow counteracts somewhat the vascular relaxation brought on from the inhibition of myogenic activity. (6) Keatinge (14) has also made mention of vasodilator substances which may be released by cold independently of the nerves, but on present evidence he sees no need to postulate such a release.

A Theory on Cold Vasodilatation

Before presenting a theory on how cold vasodilatation might function, it may be interesting to see what investigators think about where the increased blood flow to an exposed part is distributed. Surprisingly, this is one area in which all researchers have reached agreement. Lewis (15) Hertzman and Roth, (12) Greenfield and Shephard, (9) Bard, (1) and Guyton (11) all agree that it is through the arterio-venous anastomoses that blood flows during cold vasodilatation. The arterioles and the venules dilate while the capillaries remain constricted or slightly dilated. (9) Obviously these reactions are most pronounced in skin areas that are rich in these anastomoses. (1) The larger lumen of these vessels permits a greater quantity of blood to pass through the skin in a given period of time than would be possible just in the capillaries. (17) When the arteriovenous anastomoses are dilated, the blood bypassed the capillary system and flushes extremely rapidly into the plexuses. It is this way that the feet, hands, and ears receive great amounts of blood flow when exposed to cold. (11) Although the blood bypassed the capillary system upon initial response to cold, the increased flow does eventually contribute to a promotion of flow through the capillary system. This is essential for the healing process to occur between the vascular system and the cell.

The last theory to be presented in an attempt to explain cold vasodilatation is a theory based upon the direct effect of cold on the blood vessels. Simply stated, Keatinge (14) suggests much of the phenomenon of cold vasodilatation is due to the direct effect of temperature on the vessels. Hertzman and Roth (12) are in agreement when they suggest failure of conduction of impulses by the vasoconstrictor fibers directly due to a decrease in temperature. Rushmer (15) produces evidence showing inhibition of the relaxation of smooth muscle permitting vascular distention by the intraluminal pressure.

Folkow (6) states that it is known that the vessels exhibit pronounced tone when denervated and deprived of any extrinsic vaso-excitatory agents, and in all probability this tone is truly myogenic in origin. He, therefore, assumes that this inherent smooth muscle activity, like most activities of living cells, will be greatly reduced, or even eliminated, when the tissue temperature is reduced to levels low enough to produce cold vasodilatation.

Now that evidence seems in favor of the direct

effect of cold on the vessels being a possible answer to what the mechanism of cold vasodilatation is, let us look at the other side. Even though the progressive vasodilatation seems to suggest a decrease in vasomotor activity, Hertzman and Roth (12) believe that cold vasodilatation is not due to vasomotor paralysis because they have demonstrated it occurs even when vasoconstrictors can be shown to be still effective in a cooled area.

Greenfield, Shepheard, and Whelan (10) have measured the temperature inside a finger during vasodilatation and found it to be between 20° and 30°C. which is well above the temperature level necessary for nerve impulse conduction. Lundberg (16) found conduction in the unmyelinated C-fibers continued even when the fibers were cooled to 0°C.

Clarke, Hellon, and Lind (2) believe the action of severe cooling in increasing circulation is purely a local one. They find no evidence that there is any central release of any hormone or a cold pressor effect which can cause increased blood flow in the cooled area.

While two other possibilities exist (central release of constrictor tone, or central discharge of dilator impulses), both of these ideas seem unlikely. A third explanation is the blocking effect of cold on the constrictor nerve supply to the vessels. (2) All of these possibilities were discarded by Clarke, Hellon, and Lind when their experiments on sympathectomized patients showed responses to cooling similar to normally innervated areas. (2) These researchers tentatively concluded that the vasodilator response to cooling is due to either a direct action on vessels or to an axon reflex in the somatic nerve supply. (2) Folkow (6) sums up the discussion by stating that "cold vasodilatation is produced by a complex co-ordination of several quite different mechanisms."

Summary

It is evident from the research that the phenomenon of cold vasodilatation does exist and that blood flow to a body part can be increased through cold application. The difficult task is the determination of exactly how this vasodilatation occurs. The evidence presented suggests the possibilities of direct effects of cold on the vessels (most obviously a paralysis of vasoconstrictor nerve conduction), axon reflex mechanisms involving vasoconstrictor and vasodilator nerve fibers, and the possibility of local vasodilator substances contributing to the cold vasodilatation.

One of the values attributed to the use of cryotherapy has been that it actually promotes blood flow to the treated part to aid the healing process. Evidence has been presented which substantiates this belief. An attempt was made to explain the physiology behind this belief. Although there is not one prevailing specific explanation on the theory of how cold vasodilatation occurs, it is safe to say it does occur and must be accepted as fact.

Whether one chooses to treat athletic injuries by use of cryotherapy or with other accepted therapeutic modalities is strictly a matter for the trainer and his team physician. As was stated initially, it is the responsibility of all athletic trainers to treat athletes using the most effective method known for each specific type of injury. We must have open minds to new ideas and be willing to investigate new methods. If trainers, with help from the physiologists and physicians, can provide our athletes with the best care, and fully understand the mechanisms involved, the main goal of the profession cannot help but be realized.

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Guide to Contributors

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2. Photographs should be glossy black and white prints. Graphs, charts or figures should be clearly drawn on white paper, in a form which will be readable when

reduced for publication.

3. The list of references should be in the following order: a) books: author, title publisher with city and state of publication, year, page; b) articles: family names and initials of all authors, title of articles, the full journal title.

4. It is the understanding of the *Athletic Training* editor that manuscripts submitted will not have been published previously; and that the author accepts responsibility for any major corrections or alterations of the manuscript.

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