

# ATHLETIC TRAINING

THE JOURNAL OF THE  
NATIONAL  
ATHLETIC TRAINERS  
ASSOCIATION

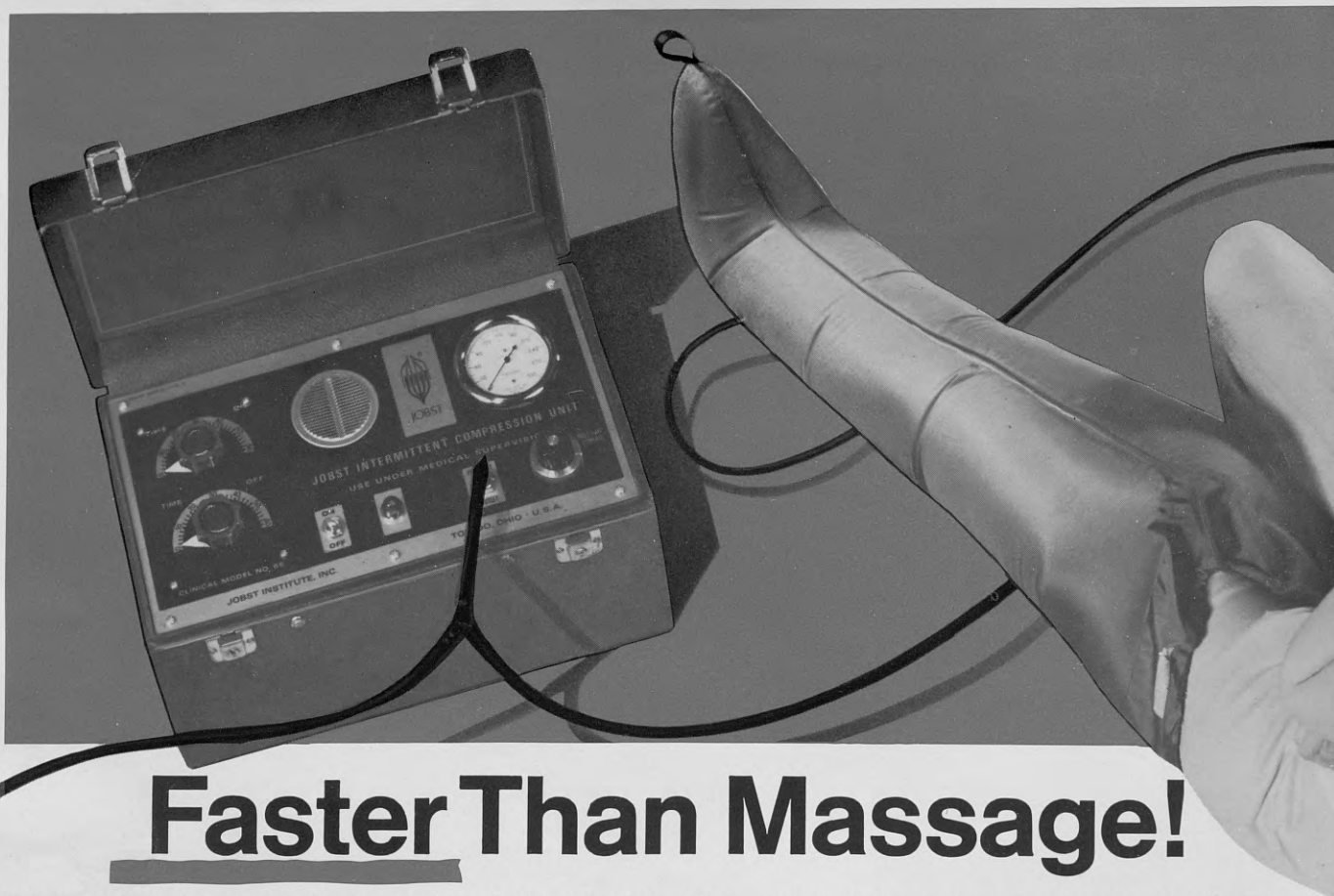


VOLUME 7  
NUMBER 4  
SEPTEMBER 1972

TURNER  
ATHLETIC TRAINERS  
GUNN  
HOUSTON  
P O BOX  
HOUSTON  
1516  
TX 77001

IN THIS ISSUE:  
COLLEGE FOOTBALL INJURY  
SURVEILLANCE  
GROIN ERUPTIONS IN THE  
ATHLETE  
CONDITIONING PROGRAMS





# **Faster Than Massage!**

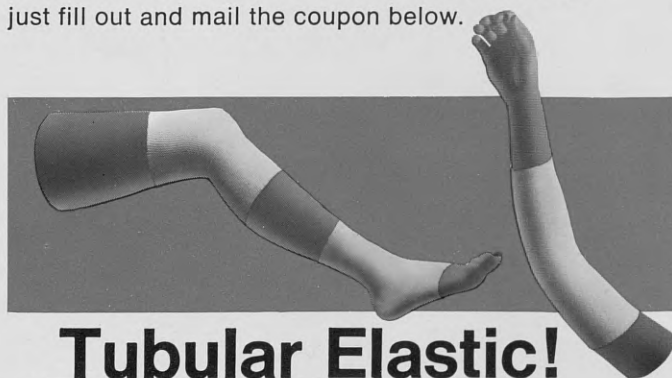
Venous congestion caused by trauma is quickly reduced through use of Jobst Intermittent Compression Unit therapy, often in half the time normally needed for hand massage! And these units won't get tired or traumatize the skin. Their use will prevent venous stasis and edema; will promote circulation and healing.

Many athletic trainers at professional and collegiate levels are finding these units tremendous time-savers. The Jobst Intermittent Compression Unit is offered in four models with ten nylon pneumatic appliances available. For full information and medical references, just fill out and mail the coupon below.



## **Instant Air Splints!**

The Jobst-Jet™ Air Splint offers *instant* control of fractures and injuries. Applied in seconds, gives immediate, even splinting pressure and stops venous bleeding. Transparent, allows observation of injury. Excellent hemostasis and edema control. X-ray transparent, washable and reusable. Offered in seven sizes.



## **Tubular Elastic!**

Jobst Elasto-Net™ Stockinet Tubular Elastic Bandage is made of quality ring-spun cotton and pure natural rubber. It has a one-way stretch in the circumferential direction only. Its mild pressure will help prevent or relieve swelling. Washable or sterilizable by autoclave. Multiple layers may be used to increase pressure.



### **Jobst Institute**

Box 653, Dept. 83, Toledo 43601

Please send full information and medical references on ☐ Intermittent Compression Units ☐ Air Splints ☐ Tubular Elastic Bandage.

Name \_\_\_\_\_

Institution \_\_\_\_\_

Address \_\_\_\_\_

City, State, Zip \_\_\_\_\_



# Equalizer

Tubigrip—the modern pressure bandage—provides equal pressure over the entire area to which the bandage is applied. Old-fashioned wraparound bandages can't match it.

Tubigrip has specially wrapped elastic threads plus a tubular knit to provide firm, even pressure all over—automatically.

Tubigrip slips on quickly and simply, with or without applicators.

**tubigrip**

the modern  
tubular bandage  
for support  
and rehabilitation

OEC

Extra pressure can be applied by adding extra layers of Tubigrip. Widths are available to fit every body contour.

Write us today for complete information.



**Orthopedic Equipment Company, Inc.**  
Bourbon, Indiana 46504



# WHY Colorless Tuf-Skin?

In the beginning there was U.S.P. tincture of benzoin. It was a sticky—brown film and in 1930 the most appropriate base for tape. 1971 is a different story—There really is no need for color—the protective film is still there—the tannic acid which helps to toughen skin is still at work. The Colorless Tuf-Skin dries—really fast! It is fungicidal and germicidal. It makes tape stick—solid. It does the job. Try some today and you will agree with "Field Testers" who make these remarks.

Bill Chambers, Head Trainer, Fullerton Junior College, California, says, "I have tried to test Colorless Tuf-Skin under every condition possible. The results are that I feel that it would be a great product to add to your line. If I were ordering right now, I would specify "Colorless Tuf-Skin". It does not leave a black build-up on the feet, it is easier to tape to, the athletes like it better, and there is less itching."

The late Ernie Biggs, Head Trainer, Ohio State University, said, "We used nothing for three days but Colorless Tuf-Skin on the entire squad for all types of bandages and tape jobs in preparing for practice. Nearly all players felt it was tackier, spread smoother, and adhered better. Generally preferred to any other adherent."

Elmer Brown, Head Trainer, Texas Christian University, says, "In my personal opinion, it is much better than regular Tuf-Skin because the tackiness is less gummy and the drying time is shorter. The ability to help tape stick was very good. The valuation of color is an excellent idea. This is one thing the kids mentioned all the time—no coloration."

Bryon Bird, Head Trainer, Oklahoma State University, says, "Over a period of two months I have tried to compare Colorless Tuf-Skin with another product. Our boys are sold on your new product."

It is packaged in two new convenient sizes—the slim pocket—fitting 10 oz aerosol can, and the handy, economical 16 oz. size for the training room. Available now from your favorite sporting goods store.



**PRICE:** 10 OZ. \$1.95  
16 OZ. \$2.85  
**cramer products, inc.**

GARDNER, KANSAS U.S.A. 66030



# ATHLETIC TRAINING



THE JOURNAL OF THE NATIONAL ATHLETIC TRAINERS ASSOCIATION

VOLUME 7

NUMBER 4

SEPTEMBER 1972

## Editor-in-Chief:

Clyde Stretch  
Department of Athletics  
Michigan State University  
East Lansing, Michigan 48823

## Editor:

Clinton Thompson  
Department of Athletics  
Colorado State University  
Fort Collins, Colorado 80521

## Journal Committee:

Clyde Stretch, Chairman  
Clint Thompson  
Dennis Aten  
Tom Waugh  
Tom Carter  
Fran Sheridan

## Advertising Manager:

Mrs. Harriett Franklin  
3315 South Street  
Lafayette, Indiana 47904  
Telephone: 317/447-6025

College Football Injury Surveillance .....109

*G. L. Martin and S. I. Fuenning*

Athletic Dermatology .....112

*Groin Eruptions in the Athlete—S. B. Webster*

Educational Programs .....114

Scientific Foundations for the Development  
of Conditioning Programs .....115

*A. A. Annarino*

Potpourri .....118

N.A.T.A. Reports .....120

Book Reviews .....124

Abstracts .....129

Recent Athletic Training Literature.....132

Calendar of Coming Events .....134

*Athletic Training* is published in the months of March, April, June, September, October, December by the National Athletic Trainers Association, a non-profit organization.

Copyright 1972 by the National Athletic Trainers Association.

Second class postage paid at Lafayette, Indiana 47904, and additional mailing offices. Address correction requested: Send Form 3579 to 3315 South Street, Lafayette, Indiana 47904.

The views and opinions expressed in *Athletic Training* are those of the author and not necessarily those of the National Athletic Trainers Association.

Nonmember subscriptions are available at \$6.00 per year and may be obtained by writing to 3315 South Street, Lafayette, Indiana 47904.

CHANGE OF ADDRESS may be made by sending old address and new address with zip code number. Instructions should state whether change is temporary or permanent. Allow thirty days for changeover. Address

changes should be sent to 3315 South Street, Lafayette, Indiana 47904.

**SUBMITTING MANUSCRIPTS**—Information concerning manuscripts for publication in the Journal appears under "Guide for Contributors," page 104 of the June issue.

**ADVERTISING**—Although advertising is screened, acceptance of the advertisement does not necessarily imply NATA endorsement of the product or the views expressed. Advertising rates available on request, 3315 South Street, Lafayette, Indiana 47904.

# THE NATIONAL ATHLETIC TRAINERS ASSOCIATION

## *President*

Robert Gunn  
Houston Oilers  
P.O. Box 1516  
Houston, Texas 77001

## *Executive Director*

Otho Davis  
Baltimore Colts  
600 North Howard Street  
Baltimore, Maryland 21201

## BOARD OF DIRECTORS

*Dist. 1* Frank George  
Brown University  
Providence, Rhode Island 02912

*Dist. 2* Francis J. Sheridan (*Vice President*)  
Lafayette College  
Easton, Pa. 18042

*Dist. 3* Joseph Gieck  
University of Virginia  
Charlottesville, Va. 22903

*Dist. 4* Roland E. "Duke" La Rue  
Western Illinois University  
Macomb, Illinois 61455

*Dist. 5* Byron J. Bird  
Oklahoma State University  
Stillwater, Oklahoma 74074

*Dist. 6* Eddie Lane  
Southern Methodist University  
Dallas, Texas 75222

*Dist. 7* Rodney Kimball  
Brigham Young University  
Provo, Utah 84601

*Dist. 8* Lewis C. Crowl  
5207 J Street  
Sacramento, California 95827

*Dist. 9* Warren Morris  
University of Georgia  
Athens, Georgia 30601

*Dist. 10* Sayers "Bud" Miller  
University of Washington  
Seattle, Washington 98105

## DISTRICT SECRETARIES

*Dist. 1* Joseph Abraham  
Hobart College  
Geneva, New York 14456

*Dist. 2* Joseph Abraham  
Hobart College  
Geneva, New York 14456

*Dist. 3* Craig Lewellyn  
The Citadel  
Charleston, South Carolina 29409

*Dist. 4* Charles "Skip" Vosler  
Ohio University  
Athens, Ohio 45701

*Dist. 5* Bill Flentje  
University of Missouri at Rolla  
Rolla, Missouri

*Dist. 6* James Dodson  
Midland High School  
Midland, Texas 79701

*Dist. 7* Warren H. Lee  
University of Arizona  
Tucson, Arizona 85721

*Dist. 8* Tom Little  
Chico State College  
Chico, California 95926

*Dist. 9* Steve Moore  
Tennessee Technological University  
Cookeville, Tennessee 38501

*Dist. 10* Sayers "Bud" Miller  
University of Washington  
Seattle, Washington 98105

## COMMITTEE CHAIRMEN

Audio-Visual Aids—Dick Hoover  
Certification—Lindsy McLean  
Drug Education—Al Hart  
Ethics—L. F. "Tow" Diehm  
Grants and Scholarships—W. E. "Pinky" Newell  
Honor Awards—George Sullivan  
Journal—Clyde Stretch  
Membership—Bruce Melin

National Convention—Fred Hoover  
Placement—A. G. Edwards  
Professional Education—Sayers "Bud" Miller  
Sub-Committee for Graduate and  
Continuing Education—Gary Delforge  
Public Relations—Dick Malacrea  
Recruitment—Mel Blickenstaff  
Research and Injury—Gordon Graham



# College Football Injury Surveillance

GARY L. MARTIN, Ph.D.  
SAMUEL I. FUENNING, M.D.  
University Health Center  
University of Nebraska  
Lincoln, Nebraska

## BACKGROUND

Epidemiological methods have traditionally been used in the determination of causative factors associated with infectious and chronic diseases. More recently these techniques have been successfully applied to such diverse areas as automobile accidents, farm safety, childhood poisonings, and similar areas that have been found to be of a high risk nature (1).

The high incidence of football related injuries has marked this as a potentially productive area of investigation. Consequently within the past few years there have been many programs directed at football injury surveillance and these efforts have resulted in many degrees of success and failure. Because of the different focus of many of these efforts, they will not be incorporated in the present report. This report is directed primarily at documenting some of the findings of the 1970 Joint Commission project on Football Injury Reporting (2). A longitudinal perspective of college football injuries will also be provided by comparing the 1970 report with data collected in 1969 and a report on the 1958 football season.

In 1968, the Joint Commission in cooperation with the Injury Control Program of the United States Public Health Service began a project on Football Injury Surveillance. Approximately 45 NATA Trainers were actively involved in data collection and reporting for the 1969 and 1970 playing seasons. Unfortunately the many efforts of this group have been unrecorded, for in 1970, a change in priorities lost the continuity of reporting, collecting, and analyzing of the data.

The 1970 report was one of the most complete college football injury reports to date in that it represented a wide variety of schools both in terms of size and geographical location. It also attempted to provide indications of the population at risk as well as a detailed description of the factors associated with 2,782 football injuries to 1,468 players.

## FOOTBALL INJURIES

A primary intent of a surveillance project is to monitor injuries as a function of time. The 1958 NCAA

Injury Surveillance Project (3) used a sample similar to that provided in 1969 and 1970 and will be used for comparison. While certain standard questions were asked in all three projects, many of the items were so different as to be uncomparable.

For items such as game injuries, reinjuries, hospitalizations and quarter of play, similar information was collected for all three years. A comparison of these figures is given in Table 1. The differences in hospitalization rates can be attributed to some problems in definition where in 1970, more of the minor, non-disabling injuries were reported. This also explains some of the large increase in total injuries. It is readily evident how important it is to have a well standardized instrument (e.g., a standard definition of "what is an injury") to provide meaningful comparisons.

For other items such as game injuries, the excessive injury experience in the second and third quarters of play, and the reinjury rates (1% initial injuries) remain relatively stable over 13-year time span. There appears to be a trend toward more reinjuries and fewer second and third quarter injuries, but the stability of these factors is apparent. It does appear that the relative number of injured players sustaining injuries requiring surgical correction has risen dramatically in the intervening years.

For the 1970 playing season, additional items were added to provide more detail on the severity of the injury. One question asked, "Will long term disability

Table 1 A Comparison of Football Injury Experience for 1958, 1969, and 1970

	1958	1969	1970
No. Schools	38	44	40
No. Injuries	1,359	1,783	2,782
% Hospitalized	8%	9%	7%
% New Injuries	87%	81%	83%
% Game Injuries	46%	44%	45%
% Game Injuries in 2nd & 3rd Quarter	69%	66%	61%
Surgery Required % of All Inj. Players	4%		11%
Knee Injuries % of All Inj.	33%	21%	18%
Ankle Injuries % of All Inj.	27%	14%	12%

**Table 2 Hospitalization Rates For Frequently Encountered Injuries Reported in 1970**

Type of Injury	N	% Hospitalized
Sprains	857	8.2
Contusions	707	2.5
Strains	476	3.7
Concussions	180	16.9
Fracture	118	16.9
Body Part	N	% Hospitalized
Knee	504	14.5
Ankle	326	2.5
Head & Face	292	12.7
Thigh	159	2.5
Shoulder	147	.7

result?" For 101 players, or 6.9% of all injured, the response was "Yes."

It was also asked for the game injuries in 1970, "... did a rules infraction contribute to the injury?" In only 4.4% of the cases the response was "Yes." However, in over 80% of these cases, no penalty was reported as being called.

In Table 2, the five most frequently reported types of injury for 1970 and the five most frequently reported injured body parts are given. With an overall hospitalization rate of 6.5% of all injuries, it appears that there is little relation between the most severe and most frequently encountered injuries. The knee injuries are the only category that appears to occur with both high frequency and high severity. This does point out the need to consider injury experience in the two separate dimensions of frequency and severity.

One of the primary problems in the use of information from surveys such as this has stemmed from a lack of a definition of the population at risk. Thus little information is provided when we find that 90% injuries are associated with (for example) a given shoe type if at the same time 90% of the non-injured players are also using that same type of shoe.

Somewhat better control is offered when the game and scrimmage injuries are examined for, during these high risk activities, it can be assumed that there are

equal numbers of players on offense and defense. For example, in Table 3 it appears that the activity of Tackling or Being Tackled is about equally hazardous for defensive and offensive players, both in terms of the hospitalization rates and in terms of the number of injuries.

For the blocking injuries a somewhat mixed picture emerges. Overall, it appears that there were slightly fewer defensive injuries (323) than offensive injuries (390) but the defensive injuries were much more severe with a hospitalization rate of 10.2% as compared with 6.7% hospitalized on offense. Much of the difference in terms of frequency appears to be due to shoulder blocking where nearly twice as many offensive players were injured in association with the shoulder block. The now illegal crack-back block appears to be particularly dangerous for the defensive players, injuring about six defensive men for each offensive player and with a hospitalization rate of almost two times that for the offensive players.

For practice injuries, there appears to be a decline in incidence as a function of time. That is, the first few sessions appear to have many injuries, with fewer injuries as the sessions progressed. With respect to severity there appears to be little conclusive evidence as to when the more severe injuries occurred.

For the practice injuries occurring after the first game, a similar pattern appears. That is, the majority of the injuries occurred during practice sessions for the first four or five games of the season.

The relationship between the equipment used and injury rates remains cloudy, due to the correlational nature of the data. In terms of age of the helmet, a greater proportion of the initial head injuries occurred to players using either a new helmet or one which was less than one year old, as compared to the helmet type worn by the entire group of injured players. Also there was a greater proportion of head and neck in-

**Table 3 Offensive and Defensive Activity and Hospitalization Rates for Player Injuries, 1970**

ACTIVITY	OFFENSE		DEFENSE	
	Percent Hospitalized	Total Injuries	Percent Hospitalized	Total Injuries
Kicking/Blocking Kick	—	11	—	7
Being Tackled/Tackling	6.3	428	6.6	515
Shoulder Blocking/Shoulder Blocked	6.9	216	6.8	117
Crack-back Blocking/ Crack-back Blocked	7.6	13	14.4	83
Butt Blocking/ Butt Blocked	5.9	67	7.1	47
Other Blocking	6.3	94	15.7	76
(TOTAL BLOCKING)	(6.7)	(390)	(10.2)	(323)
Piled On	7.6	91	7.3	68
Stepped On	3.3	59	1.3	74
Running, No Contact	2.7	185	2.8	104
Running, Fixed Object	7.6	52	—	24
N/A	3.9	253	4.5	221
TOTAL	5.5	1,469	6.4	1,336



juries for players using nonreconditioned headgear as opposed to those wearing reconditioned helmets. It would be most hazardous to assert that head injuries could be reduced by having players wear old or reconditioned helmets. An equally likely possibility is it is possible that a self-selection process allows the higher risk players (say in terms of ability and position) to be the ones receiving the newer equipment. Further study is clearly needed.

Hospitalization rates for injuries to the Jaw, Face, Nose, Eye, Eyelid, Lip, Teeth, and CNS indicate that while slightly more of these injuries occurred to players using the full cage faceguard, a much smaller percent required hospitalization. The hospitalization rates were: Two bar—15.7%, Half cage—16.7%, and Full cage—7.1%. Very few players were reported as using the One bar type of faceguard.

Players were asked at the start of the season if they routinely taped their ankles for the prevention of injury. Attack rates were computed by dividing the number of players with knee injuries by the entire population of injured players for each category of ankle support. It was found that the attack rates for initial knee injuries were slightly higher for players who used tape or wrap as opposed to players using no ankle support. The reverse was true for reinjuries to the knee and initial ankle injuries. That is, for these injuries the higher attack rates were for the players indicating no routine ankle support.

In the 1969 study, there were two questions relating to the effect of equipment on the injury. The first asked, "Is there any evidence which indicates that the injury caused or the severity amplified because of inadequate, improperly worn or failure in the design or materials in the equipment?," 85% responded "No," 6% said "Yes" and 9% were either uncertain or did not know.

A more direct question asked, "Is there any evidence that the severity of the injury was lessened by the protective equipment worn at the moment of the injury?," 70% responded "No," 19% said "Yes" and 11% were either uncertain or undecided.

If taken at face value it seems that these responses are saying that for the injured players, there was relatively little trouble with the equipment and most of the players were using it properly. At the same time there was a tendency for the equipment to lessen the severity, but the majority of the injuries were not equipment related.

Within the last year, a good deal of publicity has been directed at the relationship between artificial sur-

faces and injuries. Consequently, additional efforts were expended in attempting to provide denominator data indicating the amount of game time spent on the various surface types. This was then related to the game injury experience on the different surfaces in the form of attack rates.

In terms of both frequency and severity of injury, there is no indication that there is any difference between grass and the artificial surfaces. There are some preliminary indications that there may be more subtle differences in terms of the types of injury experience and in terms of the types of surfaces. These differences if they exist, do not appear to be large and more sophisticated study will be needed.

## SUMMARY

The data presented here should not be considered to be complete. It is only summary information compiled from other reports, documents, and data used in the surveillance of college football injuries. It was anticipated that this information would be of greatest interest to athletic trainers. It does not, and indeed should not, attempt to provide a list of "do's" and don't's." It does provide information compiled from many injury situations which may provide a broader perspective for those individuals involved in the prevention and care of football injuries.

Although it is sometimes stated that football is a rough game and injuries "just happen," this data indicates that these injuries may be quite lawful and regular, thus indicating that prediction and consequently prevention are possible. Also, it is readily apparent that some activities and some injuries are particularly high risk and should receive additional attention. It would be naive to expect that all injuries can be eliminated. It is, however, quite possible that a concerted effort can reduce the severity, if not the frequency, of football related injuries.

## REFERENCES

1. Haddon, W., Suchman, E., and Klein, D., *Accident Research: Methods and Approaches*, New York: Harper and Row, 1964.
2. Martin, G., Fuenning, S., Costello, D., and Inganzo, J., *National Football Injury Report*, Joint Commission on Competitive Safeguards and Medical Aspects of Sports, April 1972.
3. *Report of NCAA Committee on Sports Injuries and Safety*. Kansas City, The National Collegiate Athletic Association, May 1961.

# Athletic Dermatology—Fourth of a Series

## Groin Eruptions in the Athlete

STEPHEN B. WEBSTER, M.D.

Henry Ford Hospital  
Detroit, Michigan 48202

An irritation or inflammation of the skin of the groin can be a very disabling condition for an athlete. While there are several different types of irritation of the skin of the groin, which will be mentioned in this paper, they are frequently grouped under the term intertrigo. The athlete does not, of course, know it by this name, but will refer to it by the more common terms of "jock itch," "hot thighs," etc. These are more general terms, referring to an inflammation of the groin due to any cause. In all probability any athlete has, at one time or another, suffered from "jock itch."

Mechanical intertrigo, basically, is an irritation of the skin which develops in areas where two skin surfaces rub together. Obviously this most commonly involves the groin. It usually occurs in warm weather when the individual is sweating a good deal, likely while wearing heavy football or baseball gear. It can be seen in any active person, however. He complains of a burning, itching, and stinging of the groin, and usually walks into the office with a typical waddling gait which can only be appreciated by those who have suffered with this affliction.

The initial cause of the eruption is irritation of the skin produced on a mechanical basis by rubbing of the skin surfaces associated with irritation by sweat. This rubbing and irritation will be aggravated by equipment such as protective cups. While initially it may be a purely mechanical irritation, it can become secondarily involved with bacteria which find an easy site of infection in the acutely inflamed skin. In a severe case of intertrigo there may be an extensive secondary infection manifested by impetigo, folliculitis, or even an extensive cellulitis. This complication will obviously prolong the disability from the intertrigo.

In addition to bacteria, a fungus or a yeast may complicate the picture of intertrigo. While either can cause a groin rash on its own, it can also easily become established in a moist inflamed area of intertrigo and should therefore be considered a possible complicating feature. Certain differential points will be mentioned later which will indicate whether or not these organisms are pres-

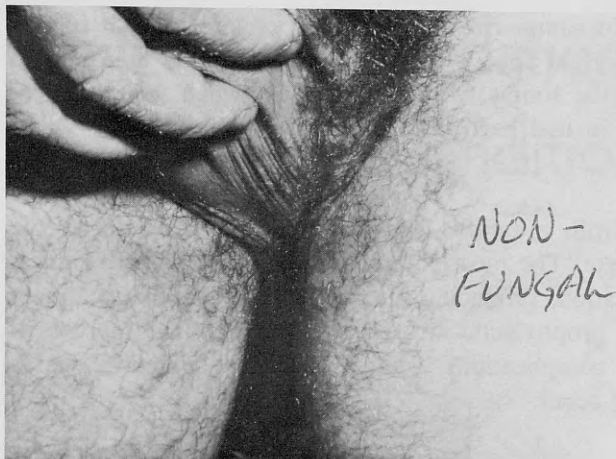
ent. In addition, it should be kept in mind that the athlete could have an eczematous condition which happens to involve the groin and irritate it. In this respect it is important to make sure the patient is not applying any patent medicine or home remedy to the area. This can act as a further irritating factor, and indeed could be the source of a true allergic contact dermatitis. It is amazing to see some of the home remedies an athlete may try before he comes in for medical aid. They vary from turpentine to "goose grease."

If there is only a mechanical intertrigo involved, the skin will look red and inflamed and perhaps swollen (Fig. 1). The margins of the eruption are sharp, and scaling is usually absent due to maceration of the area. The changes are most marked on the inner thighs where they rub together. The scrotum will show the same scaling and redness. In more severe cases the inflamed skin will start to weep, adding to the moisture of the area. A crust may then develop in this region, causing more discomfort on movement. In the more severe cases the macerated skin will frequently become eroded which, in turn, makes the area even more susceptible to secondary bacterial infection.

The bacterial infection may start as pustules around the hair follicles, producing a folliculitis. It may also present as an ordinary impetigo, or as a rather extensive cellulitis with systemic symptoms of fever and toxicity. It is usually only the neglected intertrigo which will become secondarily infected. For this reason, the athletes should be urged to come in early for even a seemingly minor groin irritation.

The morphologic picture of mechanical intertrigo with and without bacterial infection, can be differentiated from the picture seen when a yeast or fungus is involved. In a fungus or dermatophyte infection of the groin there is usually an elevated scaling border (Fig. 2) which spreads slowly outward to form a rather regular annular lesion. The scaling is a prominent feature as opposed to mechanical intertrigo and the scrotum is usually spared. In a yeast infection of the groin, the lesion is red, shiny and has a sharp but irregularly out-





**Fig. 1** Mechanical intertrigo—symmetrical. Red inflamed skin without scaling.

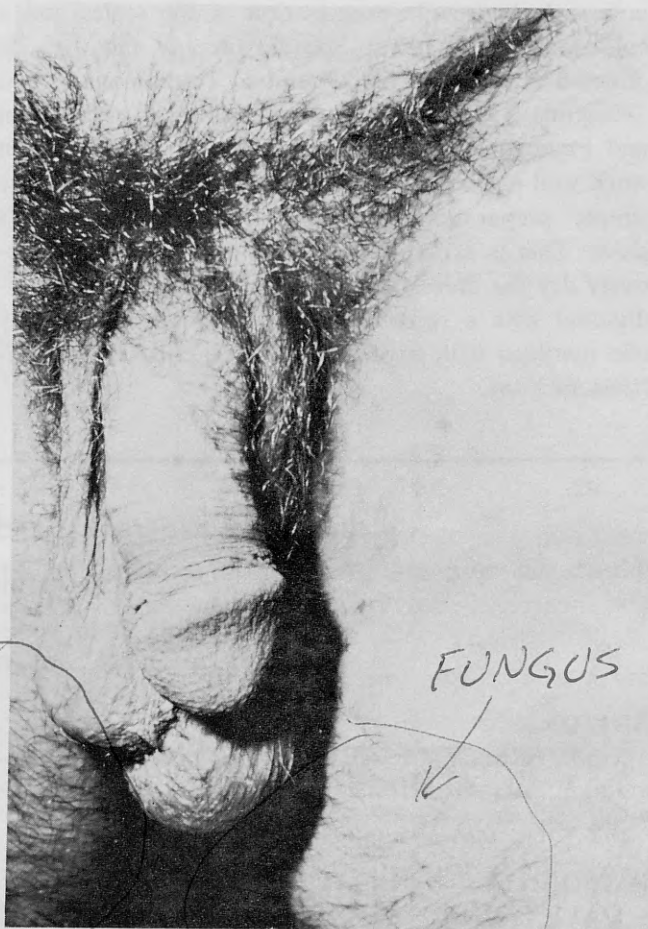
lined border. Characteristically, there are small pustules or satellite lesions scattered on the normal skin at the periphery of the lesion. A direct potassium hydroxide examination of scrapings from the area should be done if there is a question of a yeast or dermatophyte being present. A culture on Sabaraud's media can also be done.

A contact dermatitis of the groin due to some medication may be superimposed. This will produce more redness and swelling of the area and usually will show some diffuse scaling. The examiner should always question the patient to see if he has applied any material to the area.

### TREATMENT

The treatment of intertrigo consists—most importantly—in keeping the area dry and cool. The patient should avoid tight confining clothes. Boxer type shorts should be worn rather than jockey shorts in order to allow free circulation of air in the area. Indeed, heavy clothing should be avoided as much as possible, as should any protective gear which rubs on this area. The area should be gently washed with an anti-bacterial soap two times daily, making sure all the soap is rinsed off. This should be followed with a simple talc dusting powder. Proprietary baby powders are fine for the purpose of keeping the area dry. A steroid lotion can be used here, but greasy ointments should be avoided as they occlude and further macerate the area. Topical steroids are very useful as anti-inflammatory agents in the groin but should be employed no longer than absolutely necessary.

Sometimes, in more severe cases, it is necessary to keep the patient in bed for several days to allow the area to be at complete rest. While the patient is resting in bed, a useful therapeutic measure is to place a goose-



**Fig. 2** Dermatophytosis of groin. Note active elevated scaling border.

neck lamp with an ordinary 60 to 75 watt bulb in it over the groin area. This can be placed under the covers, but care should be taken to avoid burns. It will help keep the area dry and will hasten clearing. An electric fan directed over the area is also beneficial. In addition, if there is considerable inflammation and swelling, cool compresses of saline solution will offer relief. A saline solution can be made by mixing 1 tsp. of ordinary table salt in a pint of cool water. Ice cubes may be added to further cool the solution and help relieve the discomfort. This should be applied to the groin as an open compress, using a soft rag or old diaper. This can be followed by the application of a topical steroid lotion or light cream, but again specifically greasy ointments should be avoided.

If bacterial infection is present, or is suspected, a culture should be taken and appropriate antibiotic therapy started by mouth. Frequently, a B-hemolytic streptococci will be present so a 10-day course of penicillin or its equivalent should be started. If there is much bacterial infection present, the patient should be put in bed and therapy started as outlined above. Topical antibiotic creams may also be utilized here.

If a dermatophyte or yeast infection is suspected,

potassium hydroxide examination of the scales and a culture should be done. Specific therapy can then be directed at the involved organism. Tolnaftate solution (Tinactin) is an effective topical antifungal preparation and Fungizone lotion (amphotericin B) or Mycostatin work well against the yeast infections. A very effective simple preparation is one-half strength Castellani's paint. This is a carbol-fuchsin solution and will effectively dry the area. One additional point is that an individual with a recurrent groin infection, particularly one involved with a yeast, should be checked for diabetes mellitus.

To summarize the treatment of intertrigo, it is very important to avoid over-treatment of the area and to use the simplest, mildest therapy which will be effective in that particular case.

### SUMMARY

Groin eruptions can be a serious problem to the athlete. The most common cause is simple mechanical irritation, producing intertrigo. Early simple treatment and prophylactic measures will prevent the more serious complications, such as bacterial infection, which may occur.

---

## Educational Programs Leading to Professional Qualification in Athletic Training

Programs listed here are approved by the National  
Athletic Trainers Association.

### ARIZONA

UNIVERSITY OF ARIZONA. (Master's level program).<sup>2</sup> Tucson, Arizona 85721. Contact: Gary Del-forge.

### CALIFORNIA

CALIFORNIA STATE COLLEGE, LONG BEACH.<sup>1</sup> Contact: Daniel D. Arnheim, Ph.D., Physical Education Department, California State College, Long Beach, California 90801.

### ILLINOIS

WESTERN ILLINOIS UNIVERSITY.<sup>1</sup> Macomb, Illinois 61455. Contact: Duke La Rue.

### INDIANA

BALL STATE UNIVERSITY. Muncie, Indiana 47304. Contact: Ron Sendre.

INDIANA STATE UNIVERSITY.<sup>1,2</sup> Contact: Mel Blickenstaff, School of Health, Physical Education and Recreation, Indiana State University, Terre Haute, Indiana 47809.

PURDUE UNIVERSITY.<sup>1</sup> Contact: William E. Newell, Basketball Arena, Purdue University, West Lafayette, Indiana 47907.

### MASSACHUSETTS

NORTHEASTERN UNIVERSITY.<sup>1</sup> Boston, Massachusetts 02115. Contact: Prof. Kerkor Kassabean

### MINNESOTA

MANKATO STATE COLLEGE.<sup>1</sup> Contact: Gordon L. Graham, Athletic Trainer. Athletic Department, Mankato State College, Mankato, Minnesota 56001.

### MONTANA

UNIVERSITY OF MONTANA.<sup>1</sup> Contact: Walter C. Schwank, Chairman Department of Health, Physical Education and Recreation, University of Montana, Missoula, Montana 59801.

### NEW MEXICO

UNIVERSITY OF NEW MEXICO.<sup>1</sup> Contact: L. F. "Tow" Diehm, Athletic Trainer, Department of Inter-collegiate Athletics, University of New Mexico, Albuquerque, New Mexico 87106.

### OREGON

OREGON STATE UNIVERSITY.<sup>1</sup> Corvallis, Oregon 97331. Contact: Bill Robertson or Dick Irvin.

### PENNSYLVANIA

WEST CHESTER STATE COLLEGE.<sup>1</sup> Contact: P. B. Donnelly, Athletic Trainer, School of Health, and Physical Education, West Chester State College, West Chester, Pennsylvania 19380.

### TEXAS

SOUTHWESTERN TEXAS STATE COLLEGE<sup>1</sup> San Marcos, Texas 78666. Contact: Dr. Bobby Patton.

LAMAR STATE UNIVERSITY.<sup>1</sup> Contact: Paul Zeek, Athletic Trainer, Department of Intercollegiate Athletics, Lamar Tech Station, Box 10066. Lamar State University, Beaumont, Texas 77705.

TEXAS CHRISTIAN UNIVERSITY.<sup>1</sup> Fort Worth, Texas 76100. Contact: Elmer Brown.

### WASHINGTON

WASHINGTON STATE UNIVERSITY.<sup>1</sup> Pullman, Washington 99163. Contact: Dick Melhart.

<sup>1</sup>Undergraduate program.

<sup>2</sup>Master's level program.



# Scientific Foundations for the Development of Conditioning Programs

ANTHONY A. ANNARINO, P.E.D.

Associate Professor  
Physical Education  
Purdue University

The determination of the most suitable conditioning program is difficult if one does not have an understanding or knowledge of the scientific principles that serve as basic foundations for the selection and implementation of these programs.

Whether a conditioning program is developed for the handicapped individual, the normal child, the middle-aged, the old-aged or the highly competitive athlete, basic principles or guidelines should be followed.

**PRINCIPLE: THE ESTABLISHMENT OF A SCIENTIFIC CONDITIONING PROGRAM IS BASED UPON AN UNDERSTANDING OF THE PHYSIOLOGICAL FACTORS AND CHANGES INVOLVED IN VARIOUS EXERCISES.**

Basically, a sound exercise program should contribute to five physiological areas. They are: (a) muscle strength, (b) muscle endurance, (c) flexibility, (d) cardiovascular or circulorespiratory endurance, and (e) neuromuscular coordination. The latter would include motor performance components of balance, power, speed, agility, reaction time, and kinesthetic sense.

Muscle strength is the maximum amount of force exerted by a muscle or muscle group. This strength may be evaluated by determining the maximum force exerted by a muscle or muscle group. This strength may be evaluated by determining the maximum force for one effort. Strength is developed by working a muscle near its maximum capacity against a maximum resistance for seven to ten repetitions. Isotonic or isometric exercises incorporating the overload principle will develop strength.

Sometimes muscle endurance is confused with strength. Muscle endurance is located to the muscle groups. It is the ability of a muscle or muscle group to sustain effort for a prolonged period of time. A common measurement of muscle endurance is the number of repetitions of an exercise such as pull-ups or sit-ups. Muscle endurance is developed when the muscle or

muscle groups work against light resistance with many repetitions. Repetitive isotonic exercises will develop muscle endurance. Isometrics, contribute very little to muscle endurance.

Flexibility is the range of joint motion. It is a specific factor for each joint and not a general factor. Therefore, specific tests such as the toe-touch and curls only indicate the degree of flexibility in those joints involved. Any exercise that involves moderate, steady stretching will improve flexibility.

Cardiovascular endurance is dependent upon the combined efficiency of blood vessels, heart, and lungs. It determines the capacity of an individual to persist in strenuous activity for lengthy periods. The motivation variable makes objective measurement of this factor difficult. However, standardized bench-stepping or distance running tests may be used. Cardiovascular endurance is developed by working at top-capacity levels and gradually increasing the workload per unit of time. Circuit training and interval training will develop cardiovascular endurance.

Neuromuscular coordination is the speed and accuracy with which the nervous system acts with the correct muscles. This must be done at the proper time so that the exact force is exerted in order to execute a desired movement. Coordination requirements may differ for different activities. It is interrelated with other factors, such as balance, speed, power, agility, reaction time and kinesthetic sense. Strength and endurance may indirectly affect coordination due to fatigue. Training in the proper skill techniques and continued practice in the coordination of movements improves neuromuscular coordination of movements.

**PRINCIPLE: THE DEGREE AND TYPE OF PHYSIOLOGICAL CHANGE IS DETERMINED BY THREE VARIABLES—INTENSITY, DURATION, AND REPETITIONS.**

The type and degree of physiological changes caused

## An Analysis of Various Exercise Programs and Their Contribution to Physical Conditioning

Exercise Program	Muscle Strength	Muscle Endurance	Cardiovascular Endurance	Flexibility	Intensity	Duration	Repetitions
Circuit Training	High	High	High	High	X	X	X
Interval Training	Med.	Med.	High	High	X	X	X
Weight Training	Med.	High	None	High			X
Weight Lifting	High	Low	None	Low	X		
Calesthenics	Low	Low	Low	High			X
Exer-Genie	High	High	None	Low	X	X	
Isometrics	High	Low	None	None	X		

by any given exercise program is determined by the utilization of three variables—intensity, duration, and repetitions. Intensity is defined as load or overload. The duration is determined by the continuing or sustaining effort exerted with a high energy output. Repetition is the repeating of a specific exercise.

Muscle strength is developed by exercises with an intensity component; muscle endurance is developed by repetitions of an exercise; cardiovascular endurance is developed by exercises or programs with intensity and duration involving the heart, blood vessels, and lungs; and, the degree of flexibility is determined by the extent of joint motion in the execution of the exercise.

### DESCRIPTION AND EVALUATION OF VARIOUS CONDITIONING PROGRAMS

#### *Circuit Training*

Circuit training has gained immeasurable popularity during the past decade as a method of conditioning. This may be due to the liberalizing process that has been reshaping the aims and objectives of contemporary physical education and athletics.

The method was developed in England in 1953. It implemented a modified form of an industrial "assembly line" incorporating the variables of intensity, duration, and repetitions.

The general purpose of circuit training is to develop muscular strength, muscular endurance, and cardiovascular endurance. The arrangement of a circuit permits a large number of heterogeneous individuals to train together. The arrangement and selection of exercises determine the degree and type of physiological changes occurring in the individual.

The utilization of the circuit training method for the development of specific or general physical fitness has many advantages. They are:

1. It involves the three variables of training—intensity, duration, and repetitions.
2. It permits a large or small number of participants to train at the same time.
3. It gives consideration to individual differences in terms of general fitness levels from sub-minimal to maximal.

4. It may be designed for any sex or age group.
5. It may be conducted with or without equipment.
6. It may be designed for any specific time requirement.
7. It may include any number or type of exercises dependent upon objectives.
8. It incorporates a built-in motivation factor.
9. It may be used in any type of facility.
10. It can be used as a method of self-testing.

Therefore, since the three training variables are utilized in circuit training, its contribution to development of the physical fitness components is high.

#### *Interval training*

The term, interval training, may be applied to any conditioning program involving repetitions, intensity, duration and the addition of another variable—recovery or rest interval. Interval training's chief contribution is to the development of cardiovascular endurance.

A simplified interval training program could consist solely of running. An individual would run a specified distance in a defined time limit. He would run this distance four or five times with an intervening rest period. As cardiovascular endurance is developed or as discomfort levels decrease, the rest interval would be shortened.

The same principles of interval training with different exercise elements could be utilized for the development of other physical fitness components.

#### *Weight Training and Weight Lifting*

Weight training involves performing progressive resistance exercises repeatedly. The degree of variance between the three training variables—intensity, duration, and repetition would determine the degree of contribution to either the development of muscle strength or muscle endurance.

Muscle strength is developed by using relatively heavy weights with a small number of repetitions. Muscle endurance is developed by using less weight with increased repetitions. The former is the method used in weight lifting. The latter is the method used in weight training.

The "overload principle" may be employed in either method. To develop more muscle strength increase the



weight. To develop muscle endurance increase the number of repetitions.

### Isometric Exercises

The value of isometric exercises is limited to the development of muscle strength. Its superiority over isotonic exercises in this area of development is not justified. It does not contribute to cardiovascular endurance or flexibility. Its advantages are in the use of space and equipment.

### Calisthenics

The typical calisthenic exercises are limited to the development of increased flexibility. Its contribution to the other components of physical fitness is minimal dependent upon the degree of intensity, duration, and repetitions. It should be used primarily for warm-up or stretching. If the intensity, duration, and repetition are at the "over-load" level, it can contribute to the other components of physical fitness.

### Exer-Genie

The exer-genie may be used either isotonically or isometrically. Therefore its contribution is toward the development of muscle strength and muscle endurance. Flexibility development is dependent upon the range of motion in the isotonic exercises. It does not aid in the development of cardiovascular endurance.

### SUMMARIZING PRINCIPLES

1. Exercise programs involving progressively increased resistance with repetitions will develop muscle strength and muscle endurance.
2. Cardiovascular endurance is developed by working the heart, lungs, and blood vessels to a high level of capacity and progressively increasing the work intensity.
3. The amount of time and intensity of work for an exercise program is dependent upon the status of the individual.
4. Various sports demand varying levels of the fitness components.
5. The selection, design, and administration of a conditioning program should be based on answers to the following questions:
  - a. What is its purpose?
  - b. Will this program accomplish the purpose claimed for it?
  - c. Does it violate any principles of good mechanics?
  - d. What joints and muscle groups are involved?
  - e. What about its difficulty and intensity from the standpoint of the individual?

- f. What are the dangers in regard to injury or strain?

### CONCLUSION

The inclusion of these principles; some knowledge of anatomy, physiology, and kinesiology; and understanding of the hereditary and environmental influences on the body structure; and the ability to analyze and evaluate exercises will provide a scientific basis for the development of sound conditioning programs.

### BIBLIOGRAPHY

1. AAHPER, Weight Training in Sports and Physical Education, AAHPER, Washington, D. C., 1962.
2. Annarino, Anthony A., and Purvis, Duane, *Calisthenic Programs for Physical Education*, Tri-State Publishing Company, Cincinnati, Ohio, 1961.
3. Brouha, Lucien, "The Step Test: A Simple Method of Measuring Physical Fitness for Muscular Work in Young Men," *Research Quarterly*, AAHPER, 14: 31-36, March, 1943.
4. Calvin, Sidney, "Effects of Progressive Resistive Exercises on the Motor Coordination of Boys," *Research Quarterly*, AAHPER, 30:387-398, December, 1959.
5. Campbell, Robert L., "Effects of Supplemental Weight Training on the Physical Fitness of Athletic Squads," *Research Quarterly*, AAHPER, 33:343-348, October, 1962.
6. Carlo, J., "Off-Season Conditioning," *Athletic Journal*, 40:76-79, September, 1959.
7. Casady, D. R., Mapes, D. F., and Alley, Louis E., *Handbook of Physical Fitness Activities*, MacMillan Co., N.Y., 1965.
8. Clinnin, Gerald A., *A Circuit Training Program for High School Football Players*, unpublished master's project, Purdue University, 1966.
9. Dennison, J. D., Howell, N L., and Morford, W. R., "Effect of Isometric and Isotonic Exercise Programs upon Muscular Endurance," *Research Quarterly*, AAHPER, 32:348-352, October, 1961.
10. Howell, Maxwell L., and Morford, W. R., "Circuit Training for a College Fitness Program," *Journal of Health, Physical Education and Recreation*, 35:33-35, February, 1964.
11. Howell, Maxwell L., Hodgson, James L., and Sorenson, Thomas J., "Effects of Circuit Training on the Modified Harvard Step Test," *Research Quarterly*, AAHPER, 34:154-157, May, 1963.
12. Kozar, A. J., and Hunsicker, P., "A Study of Telemetered Heart Rate During Sports Participation of Young Adult Men," *Journal of Sports Medicine and Physical Fitness*, 3:1, 1963.
13. Morgan, R. E., and Adamson, G. T., *Circuit Training*, G. Bell and Sons, Ltd., London, 1961, 94 pp.
14. Pudlowski, S. D., "A Conditioning Program-Summer," *Athletic Journal*, 38:3, June, 1958.
15. Rasch, Philip, *Weight Training*, Wm. C. Brown & Co., Dubuque, Iowa, 1966.
16. Smoldaka, V., "Interval Training in Heart Disease," *Journal of Sports Medicine and Physical Fitness*, 3:93, 1963.

# Potpourri

## SNACKS AND NUTRITION

A study conducted by professors at the Harvard School of Public Health showed trends of fruits, vegetables, milk, and cereals being replaced with fats and other high caloric, low-quality foods in general public diets. Hundreds of newly developed snacks are designed for continual consumption during TV viewing. Snacking seems to be largely responsible for the trend away from proper diets. From 1955 to 1965 the percentage of U.S. household diets classified as "good" dropped from 60 to 50 per cent.

Other factors contributing to the nutritional lag are fad weight loss diets, TV dinners, misleading claims, and instant dehydrated foods. Old wives tales and myths about food also gives rise to misconceptions regarding proper diet. For instance, U.S. white bread was found to be the second most nutritious bread tested from comparisons of breads around the world. (A Finnish semi-white bread ranked first.)

## DON'T GO WITH A "NAP"

The National Safety Council reported that football players fall nine times more frequently when moving in the same direction as the nap of artificial turf. The problem may intensify when the synthetic surface is wet or matted down. According to the report noncontact falls occurred because there is not enough friction when moving in the direction of the turf. They said their tests were verified by observing game films.

It was suggested that in future games the referee would toss the coin, call the winning captain and ask: "Captain Jones, do you elect to run with or against the nap of the turf?"

## ETHICS AND PAINKILLERS

Many articles have been dealing with the ethics of painkillers. One headline questioned, "When you kill the pain, do you kill the body?" Several physicians answered generalized questions involving the use of pain killing drugs. All the interviewed physicians indicated that their use of novocaine, procaine, etc., on participating athletes was limited to specific situations. Injections might possibly be given to areas where the athlete was in no danger of further damage and in such a way that would not incapacitate motor ability. Consideration was also given to the importance of the event.

Some views have considered any thought of painkillers as unethical and immoral. Various authorities feel that judgements in this area must be left up to a competent physician to decide each case on its own merits. It is fairly obvious that there is a difference between injecting a painful blister on the little toe before the Super Bowl and injecting a painful knee joint of an eleven-year-old prior to the second game of the little league season.

Ethics of painkiller use is, by no means, a solid, clear cut, straight line. Regardless, answers in this area, as well as other realms of drug use and abuse, must be found.

## SEX AND THE ATHLETIC

With all the emphasis this society places on sex today, it is inevitable that athletics would eventually be an area of concern regarding sexual freedom. A recent newspaper article investigated the "old theory of sexual abstinence" prior to a contest. The author of the article consulted many medical personalities concerning sex and athletic performance. Quotes from these people indicated that there is a lot of opinion on the topic and very few facts.

Habits of famous athletes were cited. Specific incidences were studied. The conclusion seemed to be that doing activities which were a part of the normal routine would not be harmful. This investigation into this topic would make it appear that athletic trainers now have to deal with another problem . . . and this could be much harder to control than drugs.

## KEEP FIT

The Swiss are using "Vita Parcours" for a fitness program. This is a one and one-half to two-mile jogging course laid out in a wooded area. Jogging, however, is only part of the program. Placed along the course are 20 exercised stations. The exercises begin easy, developed toward extremely strenuous, and finish with relaxing type exercises. Completing the course, according to instructions, corresponds roughly to a one-hour gymnastics class (exercise, calisthenics). According to the Swiss, however, Vita Parcours is much more pleasant. It has many advantages . . . You are out of doors, there are no admission fees, there are no regulations concerning hours, and individuals participate at their own pace.

## ATHLETIC TRAINING



Switzerland has more than 170 courses and it is spreading to Germany and Austria. Germany has 130 courses and Austria, who has just started building them, has 15. One resort has more than 5000 people using their course each week.

### FCA

The first annual Fellowship of Christian Athletes breakfast was held in St. Louis during the convention. More than 100 trainers and families turned out for the Tuesday morning breakfast. It is hoped that this time of fellowship and sharing can grow in future years.

### SEVEN-CLEAT GRID SHOE

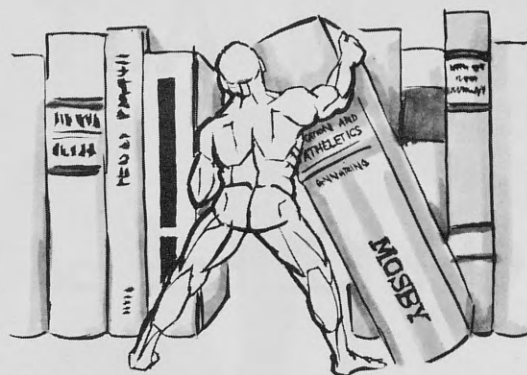
A study recently completed by a Temple University physician and trainer reinforced some current thought regarding the dangers of the conventional seven-cleat football shoe. This particular study, carried out over three years in the public school league and two years in the Catholic league, indicated that soccer type shoes were far superior when related to knee injuries than the conventional football shoe.

The public league had 51 knee injuries in 1968 while using the standard seven-cleat shoe compared to 24 in 1969, 32 in 1970 and 29 in 1971 while using the soccer shoe. The Catholic league showed 93 knee injuries in 1969 with the conventional shoe and only 38 in 1970 and 35 in 1971 using the soccer style footwear. The theory of the researchers is that foot fixation is dependent upon number and size of the cleats. This theory and the results of the three year study led the researchers to believe that any coach, athletic director, or responsible administrative authority who permits the use of the conventional football shoe is derelict in responsibility for the health and welfare of the athlete.

The study, along with a request to ban the seven-cleat shoe in high school, college, and professional football, was presented to the National Collegiate Athletic Association. The NCAA did not act upon their request. Speculation gives rise to many factors that might be involved in the NCAA decision. Many people feel that the evidence to date is not sufficient. Even if the shoe were proven unsafe, there is much controversy over the best replacement for the conventional shoe. There have been many tests indicating that any one of a half dozen shoe alterations is the best method of preventing knee injuries. Fear of major change has also been attributed as a reason to ignore the request of the research. Another reason could be great expenses incurred by manufacturers for something that people fear might be just a passing fad.

As these studies come under greater national scrutiny, possibly more concrete direction will be taken.

## Two new references beef up your bookshelf!



A New Book!

Annarino

### DEVELOPMENTAL CONDITIONING FOR PHYSICAL EDUCATION AND ATHLETICS

Different students require different conditioning programs. This new text enables you to guide each student in a program specifically designed for him. Basing his book on scientific principles, the author explains the "how" and the "why" of the routines: *how* they promote all-around development, *why* they are adaptable to varying ages and capabilities. Circuit training, weight training, and isometric exercises get full coverage; while prominent coaches contribute sample conditioning programs. Order now!

By ANTHONY A. ANNARINO, P.E.D., Purdue University, Lafayette, Ind. March, 1972. 212 pages plus FMI-X, 6½" x 9½", 288 illustrations. Price, \$5.90.

New 3rd Edition!

Cooper-Glassow

### KINESIOLOGY

Written by two leading authorities on the science of human movement, the new edition of this book incorporates the latest knowledge in this subject area. New research methods and equipment... the most recent advances in instrumentation and computer analysis... a new teaching method based on man's skeletal framework as the true moving part. You will find especially interesting a section on the psycho-social aspect of movement—the processes by which an individual learns and improves performance. Don't miss this one!

By JOHN M. COOPER, Ed.D., Professor of Physical Education, Indiana University, Bloomington, Ind.; and RUTH B. GLASSOW, M.A., Professor Emeritus of Physical Education, University of Wisconsin, Madison, Wis. January, 1972. 3rd edition, 332 pages plus FMI-X, 6½" x 9½", 140 illustrations. Price, \$9.50.

## MOSBY

### TIMES MIRROR

THE C. V. MOSBY COMPANY  
11830 WESTLINE INDUSTRIAL DRIVE  
ST. LOUIS, MISSOURI 63141

# N. A. T. A. Reports

## Clan Gathers on Shores of Mighty Miss.

Over 1000 people gathered on the shore of the Mighty Mississippi in St. Louis for the Twenty-Third Annual Meeting of the National Athletic Trainers Association on June 12-14, 1972. A record number of 560 trainers were in attendance including 102 student trainers.

Program Chairman Bruce Melin and his committee planned a very fine, multi-faceted program covering many new and different areas of athletic training. John Omohundro, the Entertainment Chairman, had an enjoyable round of events planned for the members and their 198 wives and children registered.

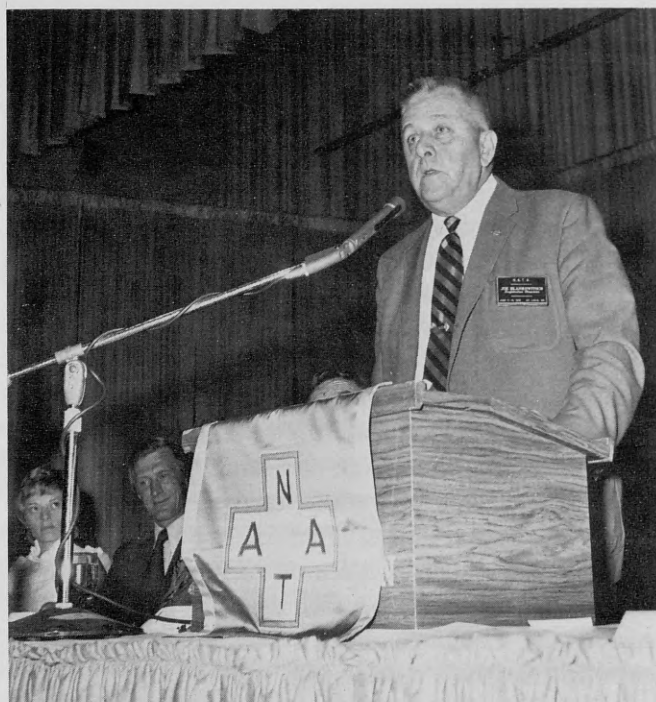
The big social event of the convention was the Annual Awards Banquet, which this year was highlighted by a heart-warming talk by Larry Wilson, "weak" safety for the St. Louis Cardinals. Honorary memberships were awarded this year to David Arnold, the Assistant Executive Director of the National Federation of State High Schools, Richard Schafer, Assistant Executive Director of the National Federation of State High School Athletic Associations, and three team physicians, Dr. Joseph Pollard of Dartmouth, Dr. Thomas Quigley from Harvard, and Dr. Fred Reynolds with the St. Louis football Cardinals.

This year found two trainers who have served as National officers for many years being inducted into the Helms Hall of Fame. They were Registration Chairman Joe Blankowitsch and William "Pinky" Newell, who served for many years as Executive Secretary of N.A.T.A.

Joe Blankowitsch has served as a high school and college trainer in the Allentown-Bethlehem, Pennsylvania, area for all of his 27 years in athletic training. He started in 1945 at Allentown High School. Then after 14 years tried his hand at college athletics with Muhlenberg College in Allentown until 1965 when he went to Bethlehem Liberty High School. Two years later he was appointed Athletic Trainer and Equipment Manager for the new Bethlehem Freedom High School.

Joe has received the N.A.T.A. 25-Year Award and an Outstanding Achievement Award from Cramer Products, Inc. He has been the Registration Chairman of the National Athletic Trainers Association for 17 years and has served in the same capacity for 15 years with the Eastern Athletic Trainers Association. President of the E.A.T.A. and a 3-year stint as director for District 3 have also marked Joe's career.

William "Pinky" Newell started his 33-year career in athletic training as a student trainer at Purdue University. Following his graduation from Purdue, he took his physical therapy training at Stanford and then became assistant trainer for the Indians. In 1949 he was named head trainer at Washington State and the follow-



Joe Blankowitsch, inductee into Helms Hall of Fame, addresses group.





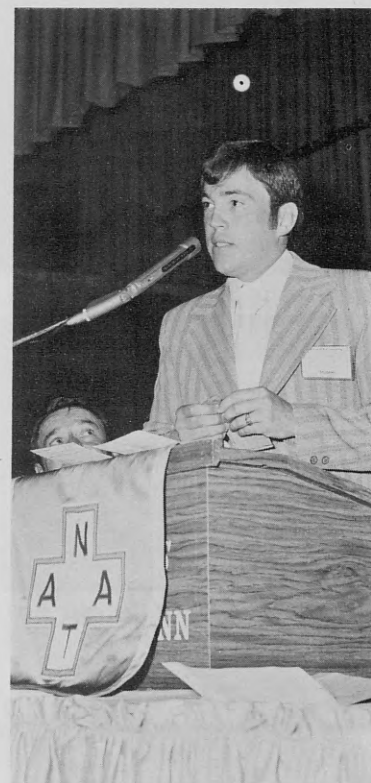
Larry Wilson of the St. Louis Cardinals was guest speaker for the Awards Banquet.



Dr. Fred Reynolds, right, St. Louis Cardinals, received honorary membership from George Sullivan, Chairman, Honorary Awards Committee.



Left: N.A.T.A. President Bobby Gunn received the Sports Technology Award which was presented to the Association. Right: James Murphy, recipient of William E. Newell Scholarship.



# GET IT ON

with



Q.T.P. .... 1.75 ea.



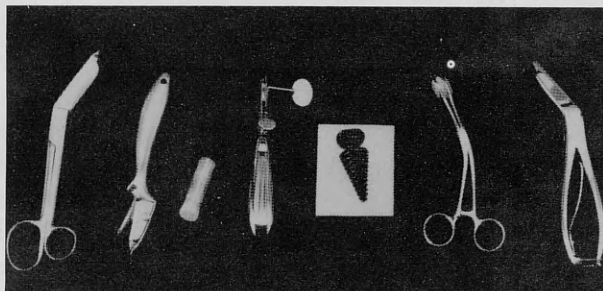
SKIN FREEZER ... 1.55 ea.



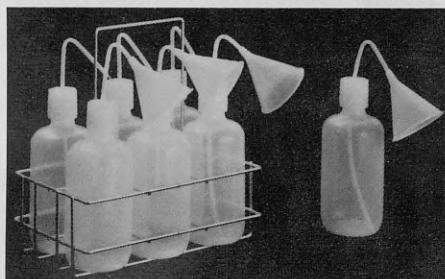
TAPE PREP. .... 1.60 ea.



S/S/T. .... 2.00 ea.



TOOLS OF THE TRADE. .... 32.50/Set



TRAIN-AID NEW SANITARY DRINKING BOTTLES  
SWB-632 Complete with 6-32 oz. bottles .... 14.50/Set

## School Health Supply Co.

300 LOMBARD ROAD ADDISON, ILLINOIS 60101  
Write today for Free Catalog

ing year returned to his alma mater as Head Athletic Trainer. During his 22-years of caring for the Boiler-makers injuries, he has also served as trainer for the East-West Shrine Football Game and the College All-Stars three times. In 1963 he was a United States trainer to the Pan-American Games in Brazil. Pinky has received innumerable awards from many national and international organizations. He has also been a lecturer at many clinics and conventions. He is probably most noted for the fine job he did as executive secretary for the N.A.T.A. for so many years, while still building a very fine athletic training program at Purdue.

This year's William E. Newell Scholarship was awarded to James Murphy, a student trainer in Gordon Graham's N.A.T.A. certified program at Mankato State College, Minnesota. It was also announced at the banquet that the N.A.T.A. had received the Sports Technology Award from the American Football and Basketball Association.

Twenty-three members were given 25-year Awards by the N.A.T.A. this year. The Eastern Athletic Trainers Association had 5 named; Alden Coder from Montclair State, N.J., Walter Grockowski of Wesleyan University, Conn., William Morrow with Williamsboro High School, Pa., Richard Morsch at Haverford College, Pa., and Thomas Sullivan of Princeton University. Two of the 4 trainers named from District #3 were from Baltimore; Ed Block with the Colts and Leroy Brandimore from John Hopkins University. "Red" Romo at U.S. Naval Academy and Joe Kuczo, who works with the Washington Redskins and Georgetown University were also named from District 3. The Midwest and District 4 were represented by Len Paddock of Michigan, Gayle Robinson at Michigan State and Joe Begala with Kent State.

District Director Byron Bird, trainer with Oklahoma State, and Wayne Rudy from the Kansas City Chiefs were named from District 5. Two Texans honored were Ross Moore from University of Texas at El Paso and Wayne Rideout of Austin High School in Bryan, Texas. Richard Carr of Tucson Sahwaro High School was named from District 7. California and District 8 were represented by 3 fine trainers; Lincoln Kimura with the San Francisco 49ers, Joe Romo from the Oakland Athletics, and Ray West at St. Mary's University. Louisiana State and Tulane had their trainers honored; Marty Broussard from L.S.U. and Earl "Bubba" Porche at Tulane.



# ISOKINETICS *As Opposed to Fixed Weights*

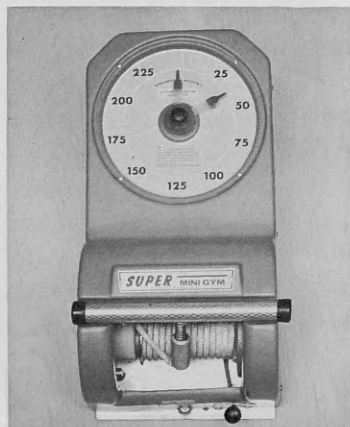
Isokinetic resistance is ideal for Trainers. The resistance accommodates to the impaired part of the body because it is only equal to the force capacity of that injured area. This unique resistance is accomplished with a controlled speed braking mechanism that allows the patient to exert maximum effort, yet at the same time, can never exert what he is able to do at that specific angle, with that specific repetition.

The Isokinetic or "accommodating resistance" gives automatic adjustment for pain or fatigue and automatic progression in perfect pace with an improvement in capacity. A safer approach for the patient as he can never overdo his immediate capacity and it is virtually impossible for him to experience joint or muscle discomfort. A quicker approach for the Trainer because there are no exerciser adjustments to make, none to release as the different patients utilize the units for rehabilitation.

## ACCOMMODATOR DIAL

Model #125T — measures 5 to 65 lbs.

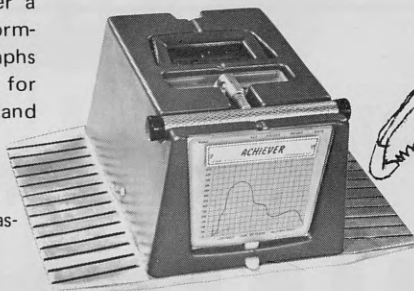
The Accommodator Dial easily detects arm and leg muscle weakness or strength through a full range of motion — with two hands similar to that of a clock. The first hand travels to one's peak effort, while the second hand fluctuates with the effort exerted throughout the range of motion.



## ACHIEVER MODEL

Model #300T — measures 5 to 70 lbs.

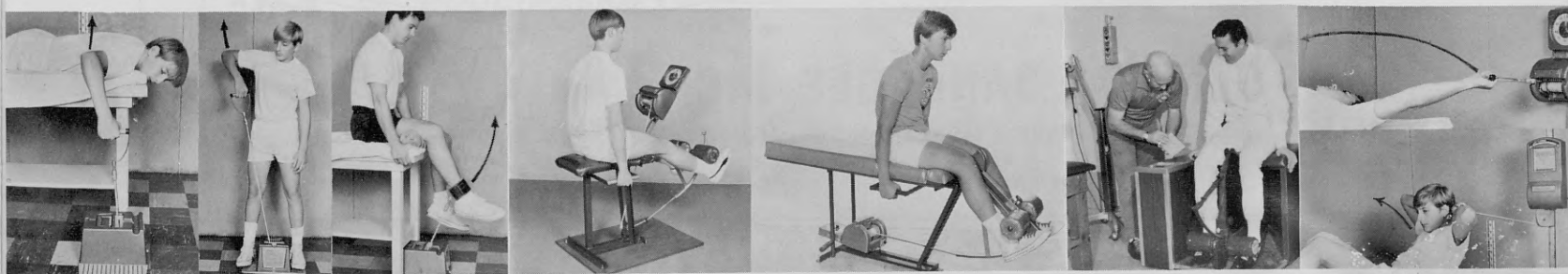
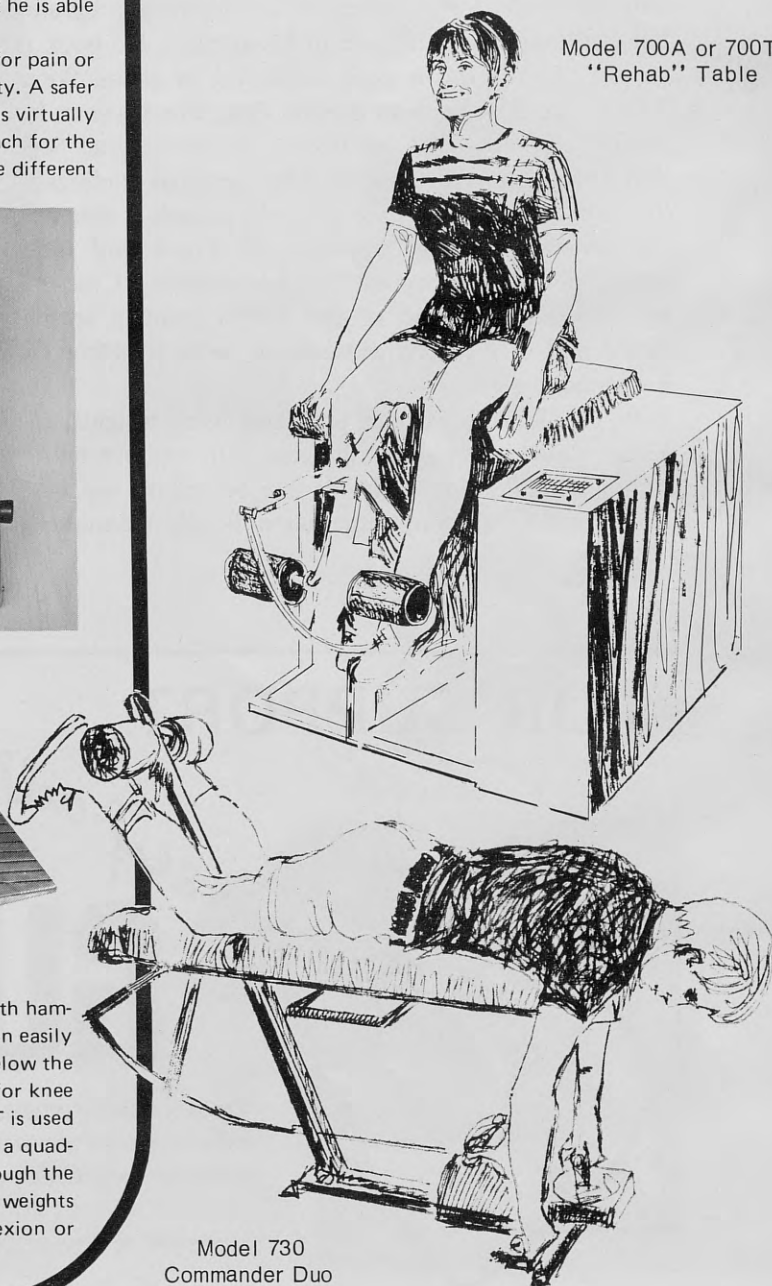
The Isokinetic Achiever model with its pen marking mechanism provides a continuous graph tracing of the user's strength over a range of motion, measuring muscle performance with great accuracy. The paper graphs are easily inserted and may be retained for permanent record, yet may be reinserted and new tracings made with different colored pens for comparison. The recoil mechanism makes possible quick repetitious exercises. There is no setting or releasing of tension.



## "COMMANDER DUO"

Model #730

The "Commander Duo" Model 730 Hamstring Exerciser is designed for both hamstring and quadricep exercise. As the patient does knee flexion, the individual can easily view the amount of effort he is exerting as the exerciser is stationed directly below the table. The seat slides back and the quadrant readjusts so the table is useable for knee extension as illustrated below. The Accommodator Dial Model #125A or #125T is used for this application. All isokinetic knee flexion and extension exercisers utilize a quadrant so the resistance always remains at the same position as one moves up through the range of motion. This feature is not available with other knee units as they use weights for the resistance and they lose their resistance as the user extends to full flexion or extension.



## Book Reviews

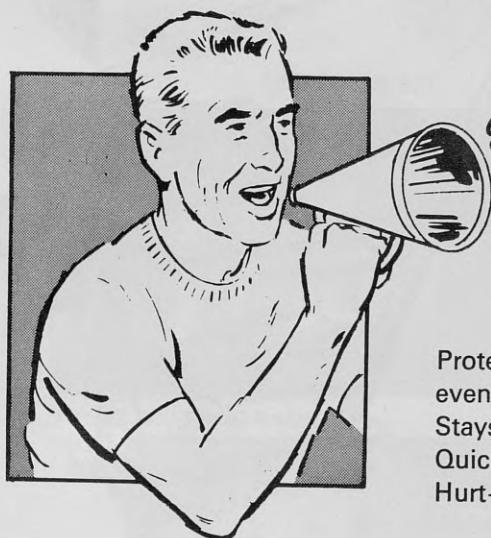
*Developmental Conditioning for Physical Education and Athletics* by Anthony A. Annarino is published by C. V. Mosby Company and sells for \$5.90. Mr. Annarino is attempting "to describe and illustrate not only the 'how' for a variety of conditioning programs but also the 'why'." In spite of his attempt, the book is mostly "hows" but a good collection of them. Some "whys" are dealt with in Section One, Foundations for the Development of Conditioning Programs, and Section Three, Interval Training. The suggested readings at the ends of the sections are generally complete although the volume and page numbers for *Track and Field News* references in Section Three are missing. Citations by Berger at the end of the weight training section would add to the enlightenment of those pursuing the suggested readings.

When discussing circuit programs using weights, the author failed to recognize the ease with which a multi-station weight training device can be put to use in a circuit weight training situation although mention of

the device is made in Section Seven, Exercise Program and Equipment Innovations. The weight poundage suggested for the weight training circuit programs seemed inadequate, i.e., in the third year of college participation, for doing squats, the recommended weight is 70 pounds. This reviewer was in the dark as to the reasoning behind increasing the number of repetitions between different grade classifications, i.e., for squats, an increase from 4 to 10 repetitions per set going from senior high to college age and only decreasing the weight poundage by 10 pounds. The author's determination of maximum poundage for a 10-RM work load, 50% of maximum, disagrees significantly with Berger's percentage determination of a 10-RM work load, 80% of maximum.

A lengthy Section Eight on athletic conditioning programs is a compilation of individual programs attributed to twenty different athletic trainers and two coaches. The section includes programs for agility, flexibility, weight training, basketball handling, presea-

## FOR SUPPORT

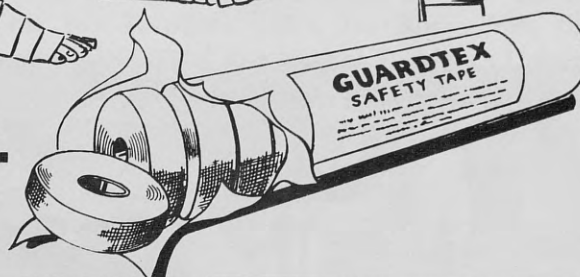


self-adhering wrapping tape

# GUARD-TEX

Protect hands, wrists, fingers even in rough contact sports. Stays on despite perspiration. Quick and easy to apply—Hurt-free removal.

Sticks only to itself not to skin or hair. Stays where you put it and stays dry.



### GENERAL BANDAGES, INC.

SAMPLE  
SENT FREE  
JUST WRITE Dept. NT-12

8300 LEHIGH AVENUE • MORTON GROVE, ILLINOIS  
60053





# wool & leather belong together

## **Wigwams** OF WOOL MAKE LEATHER SHOES LAST LONGER

### **wool keeps feet drier**

Wool fibers absorb perspiration faster and in greater volume than any other fiber or combination of fibers! Wool will absorb up to 30% of its own weight without feeling wet! The capillary action of wool carries moisture away from the foot and out of the shoe.

### **wool helps prevent blisters**

Wet socks create a harsh, abrasive action between the foot and shoe. Moisture keeps the skin soft and susceptible to abrasions, blisters and infections.

### **wool keeps shoes drier**

By dissipating or "bleeding away" perspiration, wool fibers prevent the shoe uppers from becoming saturated. Shoes that are always damp are the breeding ground for fungus.

### **wool makes shoes last longer**

Perspiration retained in the shoe

deteriorates leather and canvas uppers. By wearing wool content socks to eliminate moisture shoe life can be increased as much as 30% or 40%!

### **wool provides a better cushion**

Wool fibers are hollow. That's why they absorb moisture better than any other fiber, and why they have a natural resiliency and cushion effect not found in any other fiber.



Wigwam Mills, Inc., Sheboygan, Wis.  
In Canada: Hanson Mills, Ltd.,  
Hull, Quebec

son programs, running programs, summer programs, winter and off-season programs.

Well illustrated section on calisthenics, isometrics and physical education conditioning testing round out the book.

• • •

Making a good book better is difficult to do in the field of muscle testing but such is the second edition of *Muscles, Testing and Function* by H. O. Kendall, F. P. Kendall and G. E. Wadsworth and published by the Williams and Wilkins Company, Baltimore, Maryland. This 1971 edition contains nearly twice as much material as the first edition. An addition is the chapter on Joint Motions and Joint Positions. Drawings now accompany the excellent illustrations of the testing of each muscle discussed. The drawings are presented in such a way to duplicate the body position of the accompanying photograph of the muscle and are able to help the reader better perceive surface anatomy by comparing the drawing with the photograph.

Other new parts of the book include a bibliography, helpful drawings of the brachial plexus, updated data from anatomy texts, dermatome drawings on charts and areas of distribution of cutaneous nerves.

In an interesting segment of Chapter VI, on Trunk Muscles, the authors pursue the discussion of the value of the bent knee sit up as an aid in negating the iliopsoas contribution to the straight leg sit up. The authors maintain, with some scientific reference, that rather than negating the iliopsoas' role in trunk raising by flexing the hips, the load on the iliopsoas is increased due to the fact that the same amount of work (trunk lifting) is required and done. Caution is recommended, when performing the bent knee sit up, that the hip flexors may shorten due to the decreased range of work motion coupled with the increased work load.

*Muscles, Testing and Function* presents a comprehensive volume on a very vital aspect of one of the athletic trainer's daily problems, testing and evaluating muscles.

• • •

**EASY TO USE  
COLD APPLICATION**

**REUSABLE**

**COL PAC  
HYDROCOLLATOR®**

**A SIZE FOR  
ANY AREA**



**THROAT**



**HAND  
WRIST**



**SHOULDER  
SCAPULA**



**KNEE-THIGH**



**NECK**



**ANKLE-FOOT**

For free sample, tear out this ad and send to:

**CHATTANOOGA PHARMACAL CO.**  
CHATTANOOGA, TENNESSEE 37405



# Abstracts

**"A Method of Comparing the Impact Absorption Characteristics of Football Helmets,"** Kindt, Glenn W., Schneider, Richard C., and Robinson, John L., *Medicine and Science in Sports*, Vol. 3, 203-209, 1971.

An attempt at simulating conditions during which most common serious and fatal football injuries occur. During these conditions the impact absorption characteristics of various helmets were simulated by using a plastic headform supported by a simulated flexible metallic rod neck. These forms were attached to a sled riding on a track that runs into an anvil covered with synthetic turf.

Two types of impact were studied for this report: 1) An impact to the occiput to simulate a blow producing a subdural hematoma; 2) An impact to the vertex of the head to simulate a cervical fracture with tetraplegia or a severe brain stem contusion or hemorrhage.

Impact test on helmets unsatisfactory due to lack of knowledge of human tolerance and inability to judge angulation, hair and skin absorption qualities, and human variability.

Although all types of helmets attenuated the blows markedly when compared to impacts to the bare head form, there was considerable variation in the effectiveness between the helmet types.

D. Aten

**"Look What They're Doing for Jet Fatigue!,"** Luce, Gay G., *Travel and Leisure*, Vol. 2, p. 42, April, 1972.

In indicating that the human body undergoes daily, regular rhythmic changes on a 24-hour schedule, these daily changes known as circadian rhythms, the traveler moving through a number of time zones has difficulty adjusting his bodily functions as may be dictated by the local time schedule. The implications pertaining to the scheduling of athletic events indicates that it would be better to stay on home time for eating and sleeping unless there is to be a lengthy period of adjustment. In international competition, athletes have found it beneficial to spend several days pre-adapting the body to the prevailing time at their destination.

G. Graham

**"Effects of a Counterirritant on Muscular Distress in Patients with Arthritis,"** White, James R., and Sage, John N., *Physical Therapy*, Vol. 51, pp. 36-42, January, 1971.

Fourteen patients suffering from osteoarthritis, and sixteen patients suffering from rheumatoid arthritis

were tested electromyographically and subjectively regarding pain in the joints and the surrounding musculature. Electromyographic readings of action potential of muscles were taken both before and after the application of a topic analgesic and a placebo. These readings indicated that the placebo did not reduce muscle action potential while the counterirritant reduced action potential significantly. Subjective data also revealed similar findings using a thymometer to determine pain levels. Data from a subjective questionnaire indicated that 1) the application of the active medication produced a sensation of warmth and reduction of pain while 2) the application of the placebo did not produce a feeling of warmth or reduction of pain.

D. Aten

**"Causative Factors in Hamstring Strains,"** Burkett, Lee Nelson, *Medicine and Science in Sports*, Vol. 2, Spring 1970, pp. 39-42.

Using football players and track sprinters, Burkett set out to decipher possible causes in the riddle of hamstring strains. These subjects were divided as follows: Those who sustained hamstring strains (five football players and twelve sprinters) were designated as the experimental group; those who had no hamstring injury were chosen as the control group (32 football players and 18 sprinters).

The working hypothesis assumed was that a causative factor in hamstring strain may be imbalance of strength between certain leg muscles. Attempts were made, then, to establish:

1. Strength imbalance between knee flexors of both legs.
2. Strength imbalance between knee extensors of both legs.
3. Strength ratio of flexion-extension.
4. Bilateral strength (equal development of total muscular power in both legs).
5. Sit-and-reach scores.

All results but the sit-and-reach scores were converted to relative scores (%) so as to make up for differences of individual strength.

It was found that both the football players and track sprinters in the experimental (injured) group showed significant differences in strength imbalance between flexors (a difference of over 10% seemed the critical point, with the weaker leg being more likely to sustain

injury) and flexion-extension ratio. In addition, the sprinters showed significant differences in imbalance between extensors and bilateral muscle strength.

Emphasis was placed on the fact that these are not the only causes of hamstring strains by far, but that proper conditioning of balance between muscles of the leg may prevent many such injuries.

*Greg Vergamini*

**"Passive Shoulder Exercise,"** Dontigny, Richard L., *Physical Therapy*, Vol. 50, No. 12: pp. 1707-1709, Dec., 1970.

As a supplement to existing programs, four simple exercises for passively stretching the shoulder are presented. The exercises allow stretching in lateral rotation, flexion, extension and abduction-elevation. The exercises should be done slowly and rhythmically. A table is the only equipment needed.

To stretch in lateral rotation the patient is positioned at a right angle to the table with the elbow flexed and the forearm parallel to the table's edge. The patient then leans forward from the waist until his head is level with the table.

Stretching in flexion is accomplished with the patient positioned at a right angle to the table with the forearm resting parallel to the edge of the table. The patient simultaneously leans forward from the waist and slides his forearm forward along the edge of the table.

By sitting at a right angle to the table with the forearm pointing across the table and the palm up, the patient moves his body away from the table and the head to his shoulder accomplishing abduction-elevation.

Extension is accomplished by standing the patient with his back to the table. Grasp the edge of the table with both hands and squat slightly.

*B. Flentje*

**"Relation to Maximum Isometric Strength and Relative Isotonic Endurance of the Elbow Flexors of Athletes,"** Shaver, Larry G., *The Research Quarterly*, Vol. 43, No. 1.

Due to conflicts in prior reported research, Shaver set out to determine, if possible: (1) the relationship between maximum isometric strength and relative isotonic endurance (percentage of maximum) of the right forearm flexor group, (2) whether individuals with high maximal isometric strength can maintain a higher per-

centage of that strength during an isotonic endurance exercise than those of middle and low maximal strength.

To do so, 120 male college athletes were chosen and classified according to maximal isometric strength scores. The 40 strongest composed one group, the 40 weakest another, and the 40 in between the final group.

Using a cable tensiometer, maximum isometric strength was recorded on these successive days. Relative isotonic endurance was also recorded on three successive days, through the use of a modified arm lever ergometer. Relative loads used on the ergometer were 35, 40, and 45% of the maximum isometric strength. These were given at random, lest excessive error leak in due to the effect of practice or strength development. In addition, no subject performed both isometric and isotonic tests within 24 hours of each other.

The results obtained seem to point to the fact that those with the highest maximal isometric strength have higher relative isotonic endurance when using 35, 40, and 45% of their maximum isometric strength than those of low and middle maximal strength. Also, those of highest maximal isometric strength level can maintain a higher percentage of that strength during a relative isotonic endurance bout (when using 35, 40, or 45% of maximum strength) than those of middle and low maximum strength.

*Greg Vergamini*

**"Immediate Effect of Four Types of Warmup Activities Upon Static Flexibility of Four Selected Joints,"** Cotten, D. J., and Waters, J. S., *Amer. Corr. Ther. J.*, Vol. 24, No. 5, pp. 133-135.

The study was done in order to compare the effects of four types of warmup activities upon the static flexibility of four selected joints. Calisthenics, static stretching, ballistic stretching, and hot showers comprised the warmup conditions, and the joints selected were the trunk, right ankle, right thigh, and right shoulder. Thirteen subjects of college age were tested twice following each of the warmup activities over a period of three weeks. Test-retest reliabilities for the static flexion tests using the Leighton Flexometer were in the range of 0.78 to 0.99. All of the warmup conditions resulted in significant increases in the static flexibility of the four selected joints; however, hot showers were the least effective of the four warmup conditions.

*J.C.P.*



**NOW THERE'S A  
TOTALLY NEW  
STRAPPING TAPE  
THAT'S BETTER  
THAN ANYTHING  
YOU'VE  
EVER USED**



**New Arno super tape with exclusive Z-57 adhesive... a stronger tape that holds better, resists tearing and stretching and is easier to work with.**

That's a strong statement... and this new Arno tape can back up every word of it. It's a better tape. There's a much higher thread count in the fabric to provide greater tensile strength and help eliminate tearing and stretching. New Z-57 high-tack adhesive stays put and reduces creeping and wrinkles. You'll also be pleasantly surprised at how evenly it unwinds from start to core.

Arno Super Tape, with Z-57 adhesive, was developed and tested in conjunction with the Arno advisory staff of professional trainers. It has already proven itself.

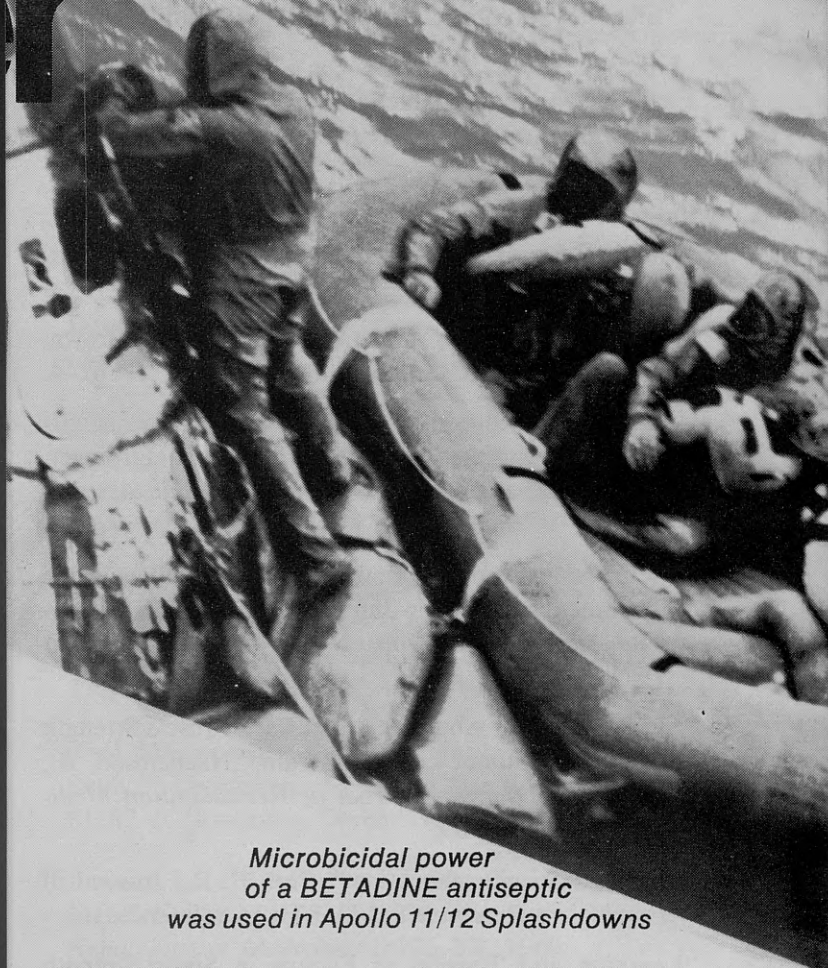
Try it yourself. Write for free sample.

**Arno®**

Arno Adhesive Tapes, Inc.  
Michigan City, Indiana 46360  
A Division of

**D<sup>r</sup> Scholls**

**Microbical**



*Microbical power  
of a BETADINE antiseptic  
was used in Apollo 11/12 Splashdowns*

## **Elimination of water**

which was used in decontamination procedures after BETADINE Whirlpool Concentrate.

### **Reduces bacterial contamination of water**

physical therapy procedures...kills microorganisms in water, *Staphylococcus* and *Staphylococci*.

...to skin, mucous membranes, and to natural body fluids. It substantially provides the efficacy of iodine without its odor. One fluid ounce of BETADINE Whirlpool Concentrate.

See chart giving specific amounts for various tank sizes.

York 10701

injury) and flexion-extension ratio. In addition, the sprinters showed significant differences in imbalance between extensors and bilateral muscle strength.

Emphasis was placed on the fact that these are not the only causes of hamstring strains by far, but that proper conditioning of balance between muscles of the leg may prevent many such injuries.

*Greg Vergamini*

**"Passive Shoulder Exercise,"** Dontigny, Richard L., *Physical Therapy*, Vol. 50, No. 12: pp. 1707-1709, Dec., 1970.

As a supplement to existing programs, four simple exercises for passively stretching the shoulder are presented. The exercises allow stretching in lateral rotation, flexion, extension and abduction-elevation. The exercises should be done slowly and rhythmically. A table is the only equipment needed.

To stretch in lateral rotation the patient is positioned at a right angle to the table with the elbow flexed and the forearm parallel to the table's edge. The patient then leans forward from the waist until his head is level with the table.

Stretching in flexion is accomplished with the patient positioned at a right angle to the table with the forearm resting parallel to the edge of the table. The patient simultaneously leans forward from the waist and slides his forearm forward along the edge of the table.

By sitting at a right angle to the table with the forearm pointing across the table and the palm up, the patient moves his body away from the table and the head to his shoulder accomplishing abduction-elevation.

Extension is accomplished by standing the patient with his back to the table. Grasp the edge of the table with both hands and squat slightly.

*B. Flentje*

**"Relation to Maximum Isometric Strength and Relative Isotonic Endurance of the Elbow Flexors of Athletes,"** Shaver, Larry G., *The Research Quarterly*, Vol. 43, No. 1.

Due to conflicts in prior reported research, Shaver set out to determine, if possible: (1) the relationship between maximum isometric strength and relative isotonic endurance (percentage of maximum) of the right forearm flexor group, (2) whether individuals with high maximal isometric strength can maintain a higher per-

# ONLY ARNO GIVES YOU THIS PROFESSIONAL CHOICE FOR FOOT AND LEG PROTECTION



Arno not only gives you a better product, they also give you a better choice of specialized aids for foot and leg protection. Arno doesn't make everything, or even try to. But what they do make does the job. They make sure of that by testing and evaluating every new product through a staff of professional trainer-advisors. New Arno Super Strapping Tape, with Z-57 adhesive, is just one of many examples.

Whether it's insoles, foot powder, knee and ankle supports, underwraps, moleskin, tape, or a chemical cold pack, you'll find Arno has only one grade of quality. And it's totally professional.

Write for our catalog.

## Arno®

Arno Adhesive Tapes, Inc.  
Michigan City, Indiana 46360  
A Division of

*Dr. Scholl's*



# Microbicidal power



*Microbicidal power  
of a BETADINE antiseptic  
was used in Apollo 11/12 Splashdowns*

## For effective decontamination of water in whirlpool baths

The same broad-spectrum microbicidal power which was used in decontamination procedures after Apollo 11/12 Splashdowns is available in BETADINE Whirlpool Concentrate.

**BETADINE Whirlpool Concentrate promptly reduces bacterial contamination of water** in whirlpool baths and tanks before and during physical therapy procedures...kills microorganisms in the bath, including *Pseudomonas* strains, *E. coli* and staphylococci.

**Virtually nonstinging, nonirritating and nonstaining** to skin, mucous membranes, and to natural fabrics, BETADINE Whirlpool Concentrate substantially provides the efficacy of iodine without its drawbacks. It is also economical to use. As a rule, one fluid ounce of BETADINE Whirlpool Concentrate disinfects about 20 gallons of water.

Supplied: One (1) gallon. Also available: Dilution chart giving specific amounts for various tank sizes.

**Purdue Frederick**

The Purdue Frederick Company, Yonkers, New York 10701

©COPYRIGHT 1970, THE PURDUE FREDERICK COMPANY E42370

## Recent Athletic Training Literature

This list is generally restricted to subject matter considered to be areas of interest in athletic training and athletic rehabilitation. Topics belonging to broader areas such as athletics, physical education and physical therapy will usually be omitted.

- "Principles for the Prevention of Sports Injuries in the Eight to Seventeen Year Old Age Group," Hogue, S. A., *Progress in Physical Therapy*, 1:18-23, 1970.
- Field Diagnosis of Athletic Injuries," Lavine, S. A., *Maryland State Medical Journal*, 20:45-7, November, 1971.
- "Preservation of Sight in Sports," Berkow, J. W., *Maryland State Medical Journal* 20:57-9, November, 1971.
- "Physical Medicine in Athletic Rehabilitation," Brown, A. M., *Maryland State Medical Journal*, 19:61-4, August, 1970.
- "First Aid Management of Sports Injuries," Harbinger, E. W., *Journal of the American Osteopathic Association*.
- "Use and Misuse of Physical Therapy Modalities in the Treatment of Athletic Injuries," Cohen, B.S., *Maryland State Medical Journal*, 20:48-51, November, 1971.
- "Measurement of Abdominal and Back Muscle Strength With and Without Low Back Pain," Nachemson, A., et al, *Scandinavian Journal of Rehabilitation Medicine*, 1:60-3, 1969.
- "Is Pain a Specific Sensation?" Perl, E. R., *Journal of Psychiatric Research* 8:273-87 (36 references).
- "Learning and Tension as Factors in Static Strength Gains Produced by Static and Eccentric Training," Laycoe, R. R. et al, *Research Quarterly* 42:299-306, October, 1971.
- "Towards Standardization of Muscle Strength Testing," Kroemer, K. H., et al., *Medicine and Science in Sports*, 2:224-30, Winter, 1970.
- "The Safety of Ultrasound," Dewhurst, C. S., *Proceedings of the Royal Society of Medicine*, 64:996-7, September, 1971.
- "Use It or Lose It," Spackman, B., *Scholastic Coach*, 41:46, May, 1972.
- "The Circulatory Requirements of Heat Stroke," O'Donnell F. R., et al., *Surgical Forum*, 22:12-4, 1971.
- "Mechanical Function of the Patella," Kaufer, H., *Journal of Bone and Joint Surgery*, 53A:1551-60, December, 1971.
- "Brain Tolerance to Impact in Football," Reid, S. E., et al., *Surgery, Gynecology and Obstetrics*, 133:929-36, December, 1971.
- "Power Makes the Athlete," Berger, R. A., Coker, C., and Zinkin, H., *Scholastic Coach*, 41:42, June, 1972.
- "Reconstruction of the Athlete's Injured Knee: Anatomy, Diagnosis, Treatment," *Orthopaedic Clinics of North America*, 2:207-30, March, 1971 (24 references).
- "Cold — Man's Assiduous Remedy," Henderson, A. R., *Medical Annals of the District of Columbia*, 40:583-8, September, 1971.
- "An Electromyographic Investigation of the Rectus Abdominis in Abdominal Exercises," Gutin, B. et al., *Research Quarterly* 42:256-63, October, 1971.
- "An Electromyographic Study of Vastus Medialis and Vastus Lateralis During Selected Isometric Exercises," Bos, R. R., et al., *Medicine and Science in Sports*, 2:218-23, Winter, 1970.
- "Functional Anatomy of the Hand," Brown, H. G., *Orthopaedic Clinics of North America*, 1:199-204, October, 1971.
- "Auxiliary Heating of the Hands During Cold Exposure and Manual Performance," Lockhart, J. M., et al., *Human Factors*, 13:457-65, October, 1971.
- "Determiners of Muscle Strength," Berger, R. A., *Athletic Journal*, 52:81-3, April, 1972.
- "A Double Blind Clinical Study—DMSO for Acute Injuries and Inflammations Compared to Accepted Standard Therapy," Brown, J. H., *Current Therapeutic Research*, 13:536-40, August, 1971.
- "Who's for Tennis?" Lewis, C. W., *New Zealand Medical Journal*, 74:21-4, July, 1971.
- "Fitted Mouthguards Afford Key Protection," *Journal of the American Dental Association*, 84:531, March, 1972.
- "Manipulation in General Practice," Fisk, J. W., *New Zealand Medical Journal*, 74:172-5, September, 1971.
- "Athletic Nephritis: Pseudo and Real," Gardner, K. D. Jr., *Annals of Internal Medicine*, 75:966-7, December, 1971.



- "The 'Second Wind' Phenomenon in Constant Load Exercise," Lafcoe, N. M., et al., *Journal of Sports Medicine and Physical Fitness*, 11:135-8, Sept., 1971.
- "Evaluation for Exercise Participation. The Apparently Healthy Individual," *Journal of the American Medical Association*, 219:900-1, February 14, 1972.
- "Investigations Concerning the Theory of 'Spurt' and 'Shunt' Muscles," Stern, J. T., Jr., *Journal of Biomechanics*, 4:437-53, October, 1971.
- "Gross Spinal Movements and Their Restriction as the Basis of Joint Manipulation," Paris, S. V., *Progress in Physical Therapy*, 1:208-13, 1970.
- "The Mechanics of Two-Joint Muscles Rectus Femoris, Sartorius and Tensor Fasciae Latae in Relation to Their Activity," Carlsoo, S., et al., *Scandinavian Journal of Rehabilitation Medicine*, 1:107-11, 1969.
- "The Significance of the Vertebral Posterior Elements in the Mechanics of the Thoracic Spine," White, A. A. 3rd, et al., *Clinical Orthopedics*, 81:2-14, November-December, 1971.
- "Apparatus and Method for Determination of Isometric Muscle Strength in Man," Hook, O., et al., *Scandinavian Journal of Rehabilitation Medicine*, 1:139-42, 1969.
- "Manipulation: A Tool in the Armament of the Physical Therapist," Showers, M. C., *Progress in Physical Therapy*, 1:275-8, 1970.
- "Stress Limits in the Young Athlete," Buskirk, E. R., *Maryland State Medical Journal*, 20:35-7, November, 1971.
- "The Use of Drugs in Athletics," Buterbaugh, G. G., *Maryland State Medical Journal*, 19:69-70, August, 1970.
- "Psychological and Psychosomatic Problems of Athletes," Husman, B. F., *Maryland State Medical Journal*, 19:71-7, August, 1970.
- "Hydrosonic Therapy: Immersed Three-Dimensional Ultrasound," Braun, G. S., *Journal of the American Podiatry Association*, 61:477-84, December, 1971.
- "Biomechanics of the Knee," Frankel, V. H., *Orthopedic Clinics of North America*, 2:175-90, March, 1971.
- "The Mechanics of the Knee Joint in Relation to Normal Walking," Morrison, J. B., *Journal of Biomechanics*, 3:51-61, January, 1970.
- "Knee Instability, My Foot," Klein, R., *Medical Journal of Australia*, 2:856-9, October 23, 1971.
- "Medial and Anterior Instability of the Knee. An Anatomical and Clinical Study Using Stress Machines," Kennedy, J. C., et al., *Journal of Bone and Joint Surgery*, 53A:1257-70, October, 1971.
- "Multi-Factorial Analysis of Walking by Electromyography and Computer," Milner, M., et al., *American Journal of Physical Medicine*, 50:235-58, October, 1971.
- "The Mechanics of Muscle Function in Locomotion," Morrison, J. B., *Journal of Biomechanics*, 3:431-51, July, 1970.
- "Electromyography of Deep Back Muscles in Man," Donisch, E. W., et al., *American Journal of Anatomy*, 133:25-36, January, 1972.
- "Integrated Actions of the Four Heads of the Quadriceps Femoris: An Electromyographic Study," Basmajian, J. V., et al., *Anatomical Record*, 172:15-20, January, 1972.
- "The Maximum Torque Generated by the Eccentric, Isometric and Concentric Contractions of the Hip Abductor Muscles," Olson, V. L., et al., *Physical Therapy*, 52:149-58, February, 1972.
- "Spinal Manipulation Causing Injury. A Three Year Study," Livingston, M. C., *Clinical Orthopedics*, 81:82-6, November, December, 1971.
- "Effects of Local Cooling on Monosynaptic Reflexes in Man," Knutsson, E., et al., *Scandinavian Journal of Rehabilitation Medicine*, 1:126-32, 1969.
- "Terminal Extension Exercises for the Knee," Donigny, R. L., *Physical Therapy*, 52:45-6, January, 1972.
- "Evaluation of the Effects of Different Forms of Physiotherapy in Cervical Pain," Goldie, I., et al., *Scandinavian Journal of Rehabilitation Medicine*, 2:117-21, 1970.
- "The Function of Back Muscles in Standing and While Holding Weights," Asmussen, E., *Progress in Physical Therapy*, 1:89-93, 1970.
- "Prediction of Maximum Loads in Lifting from Measurements of Back Muscle Strength," Poulsen, E., *Progress in Physical Therapy*, 1:146-9, 1970.

# Calendar of Coming Events

1. OCTOBER 12, 13, 14, 1972. This same A.A.O.S. Course on Emergency Care will be given in New York, New York, with William G. Hamilton, M.D., 343 West 58th Street, New York, New York 10019 in charge.

2. OCTOBER 13, 14, 15, 16, 17, 1972. The American School Health Association will hold its annual convention in San Diego, California. Further details may be obtained from Glenn R. Knotts, Ph.D., ASHA Building, Kent, Ohio 44240.

3. OCTOBER 16, 17, 18, 1972. A Canadian Symposium on Sports Medicine will be presented at the Sheraton-Mount Royal Hotel in Montreal, Quebec. Dr. Carroll A. Laurin is in charge of arrangements and can

be contacted at 3875 St. Urbain Street, Suite 209, Montreal 131, Quebec, Canada.

4. NOVEMBER 26, 27, 28, 29, 1972. The A.A.O.S. Course on Emergency Care will be given in St. Louis, Missouri. More details can be procured from Marshall B. Conrad, M.D., 4960 Audubon Avenue, St. Louis, Missouri 63110.

5. NOVEMBER 26, 1972. The 14th Annual Conference on the Medical Aspects of Sports is being sponsored by the AMA Committee on the Medical Aspects of Sports in conjunction with the AMA meetings at the Sheraton-Gibson Hotel in Cincinnati, Ohio. More details can be acquired from Timothy Craig, Ph.D., American Medical Association, 535 North Dearborn Street, Chicago, Illinois 60610.

• • •

## KEEP YOUR PLAYERS IN THE LINE-UP

### ILLE TRAINERS-AID WHIRLPOOLS

Most Efficient, Highest Quality Whirlpools Available . . . Low Priced to Fit All Athletic Budgets.

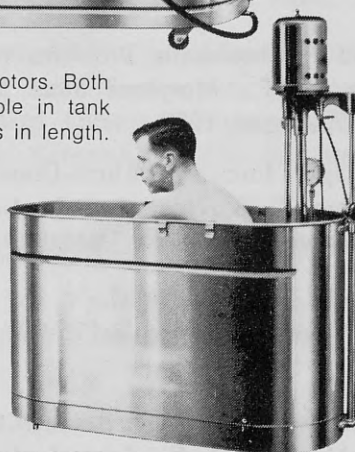
MOBILE UNIT

Mobile whirlpool units include two (2) motors. Both mobile and stationary units are available in tank dimensions from 42 inches to 54 inches in length.



STATIONARY UNIT

All units bear these seals of approval



Write for details—

**ILLE ELECTRIC CORPORATION**

Reach Road, Williamsport, Pa. 17701



ARM PARAFFIN BATH — MODEL PB114  
For higher heat application, safely thermostatically controlled; leakproof, stainless steel tank.



# One box will support 32 athletes

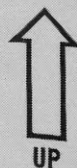


PARKE-DAVIS

**ORTHALETIC®** TEAM  
PACK  
trainers adhesive tape

32 ROLLS/1½ IN. X 540 IN. (15 YD.)  
PARKE, DAVIS & COMPANY / DETROIT / MICHIGAN 48232/U.S.A.  
STORE IN A COOL PLACE

REORDER  
30-45-307



You get 64 taped ankles out of every Team Pack of ORTHALETIC 1½" Trainers Tape.

#### Easy stripping for quick strapping

ORTHALETIC Tape features special controlled-tension winding that allows the tape to unwind freely and easily...from the beginning to the very end of the roll.

#### Support your local athletes

Order a supply of ORTHALETIC Tape today. Available in both regular and heavy-duty weight...in tubes as well as Team Packs.

**Orthaletic®**  
Adhesive Tape & Trainers Tape

PARKE-DAVIS PARKE, DAVIS & COMPANY, Detroit, Michigan 48232

Medical-Surgical Products Division. Att. Dept. 5434  
PARKE, DAVIS & COMPANY, Detroit, Michigan 48232  
Please send me complete information about athletic products  
available from PARKE-DAVIS.

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

ADDRESS \_\_\_\_\_

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



# The score is 9 to 1 in favor of Tinactin<sup>®</sup> when doctors prescribe for athlete's foot.

Until recently Tinactin was available on prescription only.

Now you can use and recommend the athlete's foot product that has both proven efficacy and proven safety.

**Here's why doctors prefer TINACTIN:**  
**TINACTIN Cream—actually kills most athlete's foot fungi, is also effective against jock itch and ringworm of the body.**

- Begins to relieve itching, burning, and soreness in 24 hours
- Clears lesions, usually in 2 or 3 weeks
- Does not usually sting or irritate
- Odorless and nonstaining



**The only treatment you will ever need to beat most athlete's foot infections.**

**TINACTIN Powder Aerosol—helps prevent athlete's foot reinfection.**

- Cooling and soothing
- Aids drying of naturally moist areas

The TINACTIN team offers almost complete protection against athlete's foot—TINACTIN Cream clears the infection...TINACTIN Powder Aerosol helps prevent reinfection.

*Schering*

## **Tinactin<sup>®</sup>**

brand of tolnaftate, U.S.P., 1%

Now available without prescription for your use and recommendation.

Schering Laboratories, Kenilworth, New Jersey 07033.