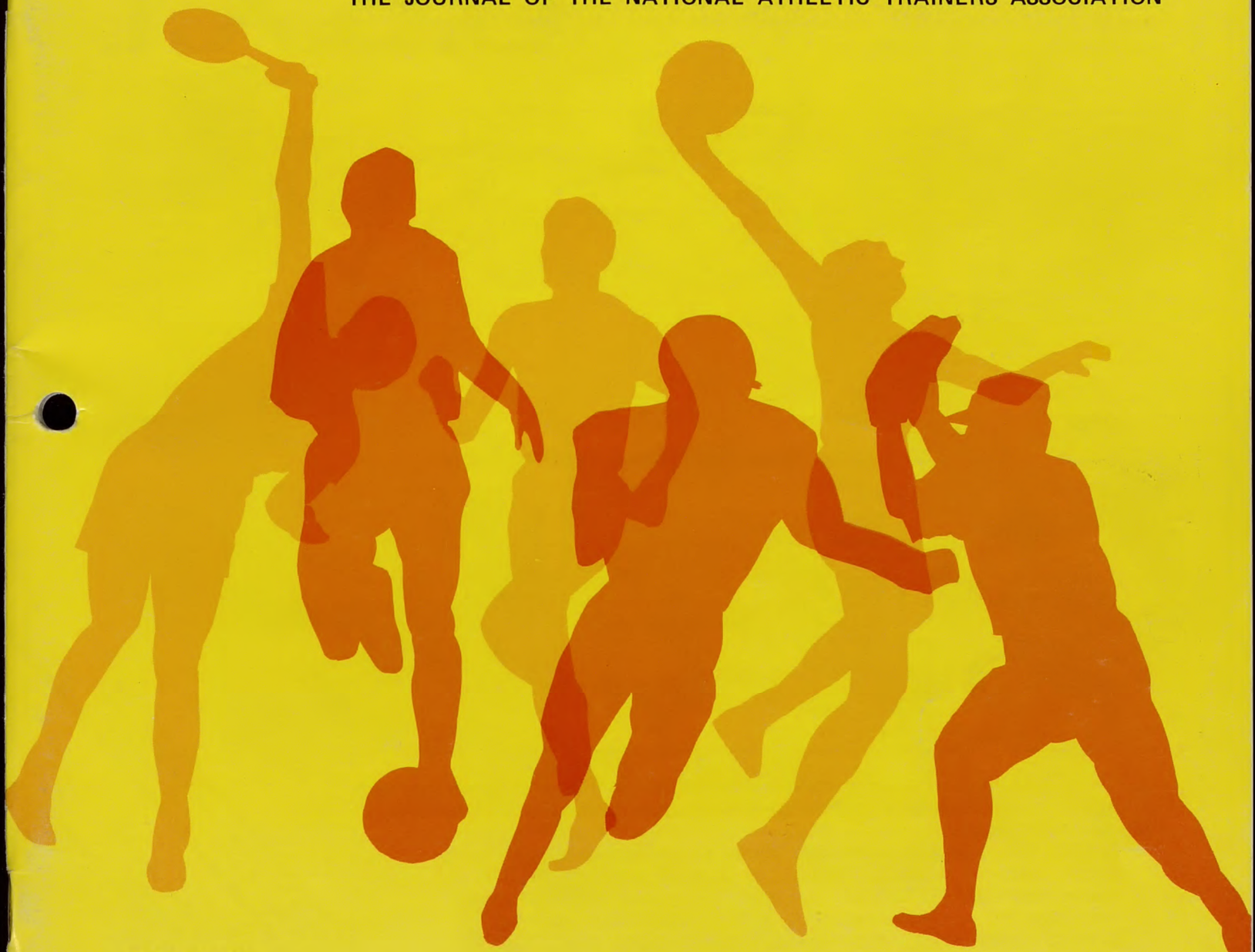
ATHLETIC TRAINING

THE JOURNAL OF THE NATIONAL ATHLETIC TRAINERS ASSOCIATION



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VOLUME 15
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ATHLETIC TRAINING

THE JOURNAL OF
THE NATIONAL ATHLETIC TRAINERS ASSOCIATION

VOLUME 15/NUMBER 1/SPRING 1980

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FEATURES

TIPS FROM THE FIELD

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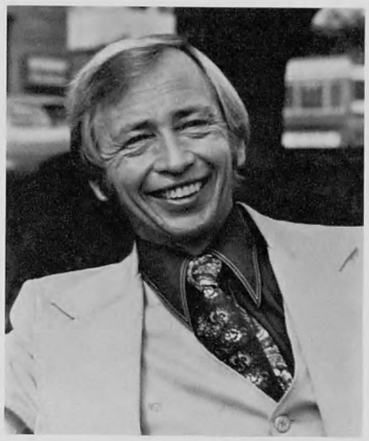
President's Message



Dear N.A.T.A. Member:

As we begin a new decade, I feel all of us should seriously consider what goals our Association should establish. The complexity of our ever-changing society plus the increasing demands of our jobs makes it imperative that we do not wander aimlessly during the 80's.

The twenty-nine year existence of NATA has seen us attain many of the goals that were established by the founding athletic trainers in Kansas City. We must give serious thought to what the NATA should strive for and in what direction we should go. A place to begin may be to come up with a statement on the fundamental objectives for an athletic trainer. Perhaps we need to re-establish what our function is and determine what the scope of our profession includes.

One thing I feel very strongly about is that we must find a way to make the athletic trainer more placeable, particularly at the secondary level. We need to find out why some school districts hire athletic trainers and others do not. What are the circumstances of their employment and what is their educational background?

The NATA has grown at a healthy rate in every respect. Our membership will exceed 8,000 members in the near future. The Journal is of a consistent high quality and something all of us can be proud of. Our certification procedures are widely recognized and accepted. The work of the various committees has involved a lot of people. They have made significant contributions in broadening our development. Our office staff in Greenville has done an excellent job in keeping pace with demands placed upon them by our increasing size.

With our anticipated growth, we will continue to experience growing pains. I sincerely hope each of you will continue to communicate with your officers. Your input is vital to the ongoing success of the National Athletic Trainers Association. Let us know what you think the goals for the 80's should be. The direction *YOUR* Association takes will be dependent upon each of you.

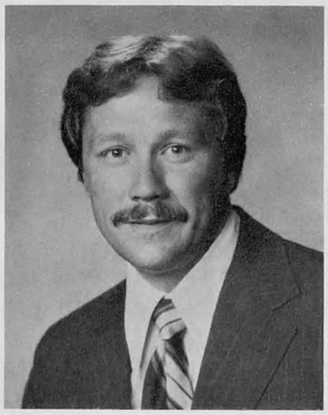
In closing, I hope most of you will attend our annual meeting and clinical symposium in Philadelphia. You can expect the usual high quality clinical sessions and large number of exhibitors that have become the trademark of our meetings.

Best wishes,

Bill

William H. Chambers

Editor's Remarks



Ken Wolfert, ATC
Miami University

PROCEDURAL CHANGES . . . .

In this issue we attempt to update a few things by the changes noted. In particular please check the "Guide to Contributors" information, especially if you are proposing to submit a manuscript at any time soon. Along these lines, observe the new deadline for submitting "Calendar of Events" items. There are also some other more subtle adjustments that will be found.

SURVEY COMING . . . .

Within a few weeks after receiving this issue, look for a survey questionnaire to be sent in a separate mailing. The purpose of this instrument is to give our membership an opportunity to make their thoughts and attitudes known about this Journal. We hope that the results can enable us to provide a publication that will be useful to as many as possible. The last time a survey was made about the Journal was in the spring of 1974. It is appropriate, then, to do it once again. The potential usefulness of this survey, however, will depend on how seriously it is taken by the membership. We have decided that a separate mail survey will assure us of obtaining a more accurate representative sampling of the feelings of the membership. If many members feel that this survey does not matter because of "what's one vote. . ." — it is a mistake. The low response would only provide us with a bias attitude of those feeling strongly one way or the other and give us only the kind of information that is found in a suggestion box. That is not the intent of the survey. We want to determine that the response is a representative, accurate sampling characterizing our entire membership.

We are counting on your professional responsibility being the reason that as many questionnaires as are received and read will be returned. Thanks.

EDITORIAL COMMENTARY . . . .

At the start of a new year it is quite appropriate to have a bright outlook on what the upcoming months will bring. This refreshed feeling can occur because we hope to reverse the frustration caused by our falling behind on the objectives and promises we tried to uphold but let slide by as the previous year progressed. This happens often because of unforeseen things that always seem to complicate these well meant plans.

As we begin yet another year, our outlook might be more ambitious since this is the start of a new decade as well. This is a great time to plan not only what our immediate goals are but what may be long range accomplishments too. What we strive to do in the next ten years will have a profound effect on the image and understanding of our profession.

Here are some thoughts about our professional business that should be seriously considered.

Will the name "Trainer" or "Athletic Trainer" that we are currently known by finally gain acceptance and understanding? Or will we be known by some other title such as, "Athletic Therapist" or "Sports Paramedic"? More importantly, will we have the proper identity to afford us protection in the legal arena? Will we have adequate standards of proficiency that make certain we are capable of performing the duties required of us in the upcoming years? Will the present CEU program be enough? Will our curriculums do an adequate job? Will we need to have an EMT rating as a minimal standard? Consider perhaps our most immediate concern — will we successfully see the change from National Certification to a licensure law by each state across the country? Will we continue to attract the unselfish, highly dedicated and compassionate type of person to enable our profession to continue to grow and be effective? Will we be able to create jobs when school finances on all levels of public and private education are as troubled as they are? Will Title IX directives enable our programs to flourish and grow in the co-educational atmosphere? Will we be caring for more than varsity sports — like club sports and intramural activities? Will we continue to share with one another our techniques, methods and other discoveries by participating in clinics and workshops and seeking to publish even when our time is at a premium? (See article in this issue by Sam Kegerreis titled, "Professional Advancement of Athletic Training Via Documentation and Publication".) Will we continue to be aware of our accountability in this profession and strive to act in a responsible enough manner showing that we care about those depending on our expertise, and to subsequently keep our malpractice insurance at an affordable amount? Will we finally be universally accepted for what we really are?

In addition to these "professionalism" points, there are other changes and trends in Sports Medicine that we must also be concerned with because we may be dealing more and more with some of them. Among some of the more important are things like (1) wider usage and accomplishments with arthroscopy, (2) movement away from the use of drug medication, (3) greater understanding and acceptance of transcutaneous electrical nerve stimulation (TENS), (4) proficiency and belief in the theories of acupuncture/acupressure, (5) more and more common use of hypnosis, (6) the radioisotope (bone scan) being prescribed sooner and more often, (7) better understandings in exercise physiology as it pertains to so many disputed or poorly understood concepts that explain what we know now, (8) changing trends in the principles of strength training and rehabilitation, (9) better working knowledge and skill in regular uses of sport orthotics and other supportive devices, (10) consideration of beneficial results in the control of extremity swelling with the use of intermittent compression pump sleeves, (11) use of videotape programming formats in teaching "How to do . . . .", and (12) computerized record keeping systems.

With so much to be totally cognizant of and continually on top of, are we going to be able to meet the challenge and keep up with all of this? If we want to, we can. Here's to accomplishing the most in the next ten years.

Do it and keep it safe. . . .

K.W.

Champions aren't
You have to build

Every coach and trainer knows that. You start with a kid who's got talent and determination. Then, you build him into an athlete. It takes time and planning, tough training and a good diet. That's where Nutrament® comes in.

Nutrament body building energy food is a complete, scientifically balanced energy food. It has the essential proteins, carbohydrates, vitamins and minerals to build strong muscles, and help athletes perform at their peak. In addition, Nutrament supplies the calories your athletes need for extra energy during sustained physical competition.

Because Nutrament is a liquid, it digests quickly. So it's less likely to cause stomach upset during competition. That makes it a natural as a pre-game meal.

And as part of a conditioning program, Nutrament is a most valuable player. Athletes can drink it between meals to gain weight, or in place of meals to lose extra pounds.

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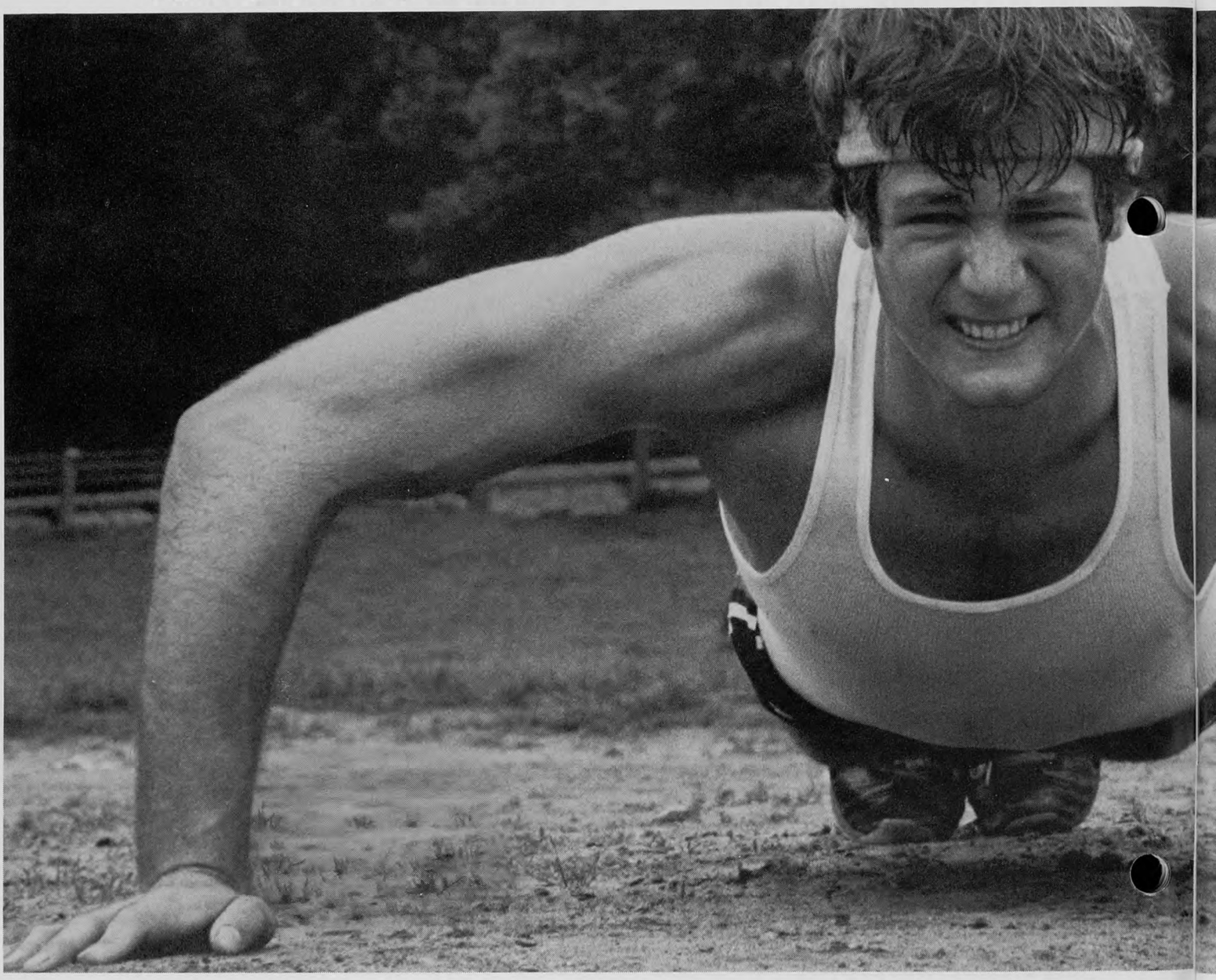

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trainers in most major sports make Nutrament part of their regular training program. Nutrament helps make building champions easier than it looks.

And if you're a high school coach, you'll want to take advantage of the "Nutrament Performance Nutrition Program."
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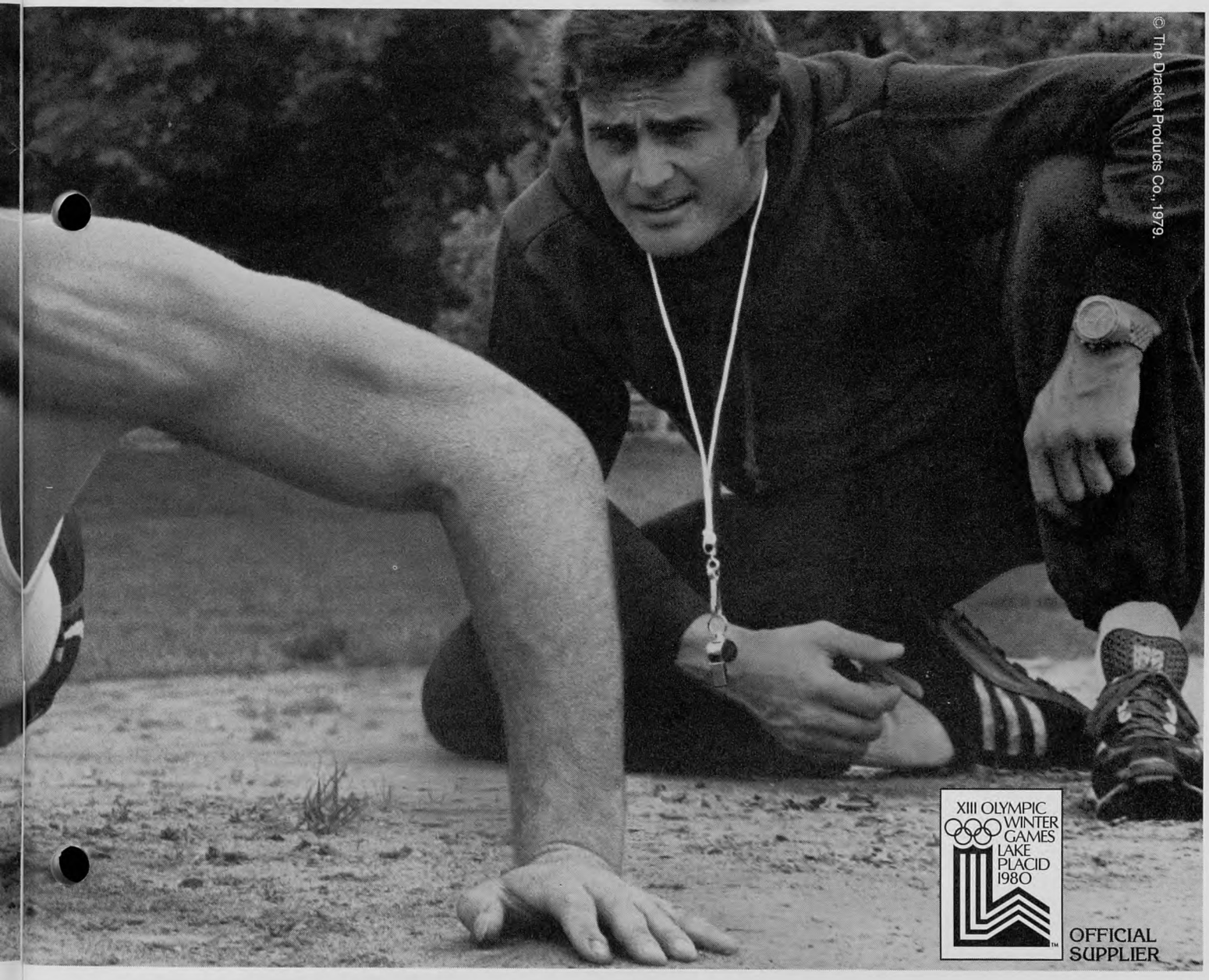

Letters to the Editor

Dear Editor:

Regarding the article on the Esophageal Airway in the Spring 1979 issue of the *Journal*: In many states and localities, only Paramedics are allowed to insert these particular airways. In these same localities basic EMTs are not even allowed to use them: only oropharyngeal airways.

In some places, the basic EMT can insert them (esophageal) if that is the policy of the local ER doctor. For example, here in Cookeville and Putnam Co., Tenn., basic EMTs cannot do this. As matter of fact Paramedics cannot do this, because of local policy between the hospital and the Emergency Medical Services of this county. In the adjoining county. Jackson County, basic EMTs can insert the esophageal airway upon radioed instructions from their ER doctor.

In no case can anyone who is not at least a basic EMT insert an esophageal airway. I am sure that of the members of the NATA, that only a small percentage of us are EMTs. I would like to see more trainers become EMTs in the future.

I thought that the article was well written and informative. For those persons who are duly qualified to use esophageal airways, it is of interest.

We must remember that the non-EMT athletic trainer may not utilize such a device. The EMT-trainer may do so only on direct orders from a doctor if such a policy is in force.

Sincerely yours,

Steve Moore ATC, EMT
Tennessee Technological University
Cookeville, Tenn.

Editor's Note: Mr. Moore works regularly as a part-time member of a local ambulance service in his community and although he is a registered EMT is not *allowed to use the esophageal airway. It is important to be certain of the legal interpretation in your community regarding the use of this important lifesaving equipment.*
— K.W.

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Durable, lightweight, shock absorbing, perspiration resistant. Rigid enough for support, soft enough for comfort.

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(2) *Arch - Gives you a latitudinal and longitudinal support. Helps aid against stress fractures and plantarfaciitis.*

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(4) *Metatarsal Rise - To help relieve pressure on the metatarsal heads.*

For Details Contact:
J. J. Bush, Head Trainer, University of Maryland, College Park, MD.
Hunter Smith, Head Trainer, Salisbury State College, Salisbury, MD.

**Pat. Pend.*

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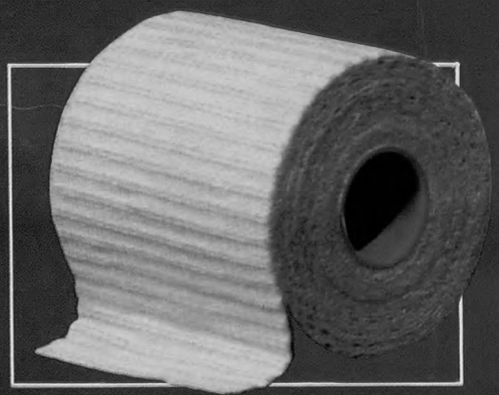
BIKE has a complete line of tape for all sports applications but of particular importance today is the CONFORM Elastic Tape System. It is exclusive and unique, comprising three kinds of tape, CONFORM® for ankles and wrists, H.T.C.® for ankles and knees, and PRO-LASTIC® for post surgical knees.

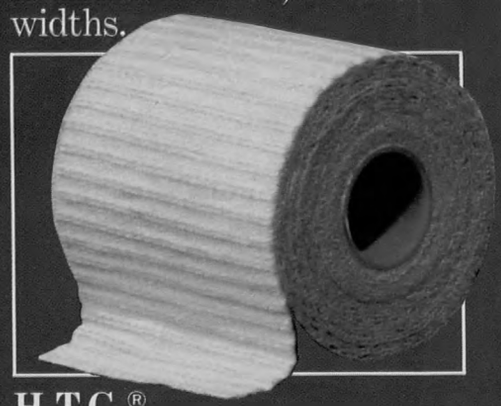
Unlike conventional cloth adhesive tape, the CONFORM System is a true athletic training tape application developed expressly for use in school and team athletics according to specifications of professional athletic trainers.

The System's unique material ingredient is an elastomer, a rubber fiber covered with fine cotton thread which is woven into the back cloth of the tape.

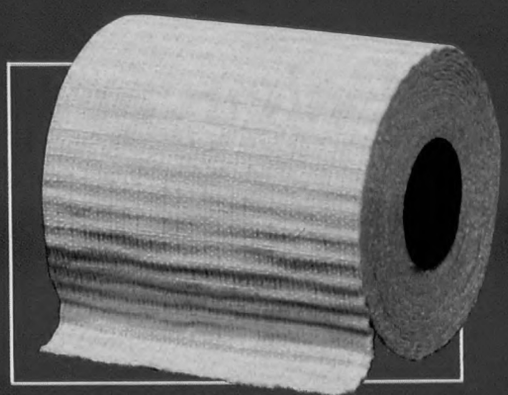
For the System's high tensile tapes, H.T.C.® and PRO-LASTIC,® the tape is also honeycombed with nylon fiber for added strength without extra weight or bulk.



CONFORM® — Stretches like elastic. Is more compliant than regular cloth tape. Consistent, easy unwind. Strong in use yet easy to hand-tear for taping. Compliant to body contours. Molds easily. Applies smoothly. Saves taping time. Metered stretch for total taping control. Available in 1½", 2" and 3" widths.



H.T.C.®
Ideal strong-grade strapping tape with a 50 lb. tensile strength, plus all the features of CONFORM® Available in 2" and 3" widths.



PRO-LASTIC® — In addition to post surgical knees, it is also used to protect knees of very heavy players. It has a 69 lb. tensile strength plus all the features of CONFORM®. Available in 2" and 3" widths.

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	CONFORM	Conventional
1 ankle	15-20 sec.	60-90 sec.
10 ankles	2-3 min.	10-15 min.
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60 ankles	15-20 min.	1-1½ hrs.
90 ankles	22-30 min.	1½-2¼ hrs.

(Taping time may vary slightly depending on skill of person taping and the technique used. Durations indicated include only time actually spent in taping).

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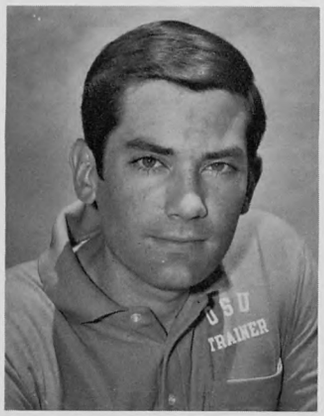
Calendar of Events



Jeff Fair, ATC, MS
Oklahoma State University

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

March, 1980

29 4th Annual Sports Medicine Clinic, Orlando, Florida. Contact Ronald F. Ribaric, ATC, Head Athletic Trainer, University of Central Florida, Orlando, Florida 23816.

31-April 2 Medical Aspects of Football, San Franciso, California. Contact Carol McDowell, St. Francis Hospital, 900 Hyde Street, San Franciso, California 94109.

April, 1980

9-20 Cardiac Rehabilitation 1-2 Week Workshop, LaCrosse, Wisconsin. Contact Phillip K. Wilson, Executive Director, LaCrosse Exercise Program, Mitchell Hall, University of Wisconsin-LaCrosse, LaCrosse, Wisconsin 54601.

11-13 Week-End Cardiac Rehabilitation Seminar, Orlando, Florida. Contact Phillip K. Wilson, Executive Director, LaCrosse Exercise Program, Mitchell Hall, University of Wisconsin-LaCrosse, LaCrosse, Wisconsin 54601.

11-13 Special Fifth Annual Dogwood Conference, Atlanta, Georgia. Contact Registration Secretary, Dogwood Conference, Suite 400, 20 Linden Ave, NE, Atlanta, Georgia 30308.

17-19 Annual course on Sports Medicine, Cleveland, Ohio. Contact John Bergfeld, MD. Section on Sports Medicine, Cleveland Clinic, 9500 Euclid Ave., Cleveland, Ohio 44106.

18-19 Third Annual Seminar on Sports Medicine, Canandaigua, New York. Contact Charles F. Moyer, 52 Granger St., Canandaigua, New York 14424.

19-20 Boston Marathon Sports Medicine Running Seminar and Runner's Expo '80, Boston Massachusetts. Contact Jody Rappaport, Conventures, Inc., 11 Newbury St., Boston, Massachusetts 02116.

May, 1980

16 Symposium on Sports Medicine, Houston, Texas. Contact Texas Medicare Association, 1801 N. Lamar Blvd., Austin, Texas 78701.

16-18 Week-End Cardiac Rehabilitation Seminar, San Francisco, California. Contact Phillip K. Wilson, Executive Director, LaCrosse Exercise Program, Mitchell Hall, University of Wisconsin-LaCrosse, LaCrosse, Wisconsin 54601.

17 Fifth Annual Sports Medicine Seminar, Salisbury State College, Salisbury, Maryland. Contact Hunter Smith, Physical Education Department, Salisbury State College, Salisbury, Maryland 21801.

26-30 American College of Sports Medicine Annual Meeting, Las Vegas, Nevada. Contact Carol Christison, ACSM, 1440 Montroe Street, Madison, Wisconsin 53706.

June, 1980

6-8 Week-End Cardiac Rehabilitation Seminar, Williamsburg, Virginia. Contact Phillip K. Wilson, Executive Director, LaCrosse Exercise Program, Mitchell Hall, University of Wisconsin-LaCrosse, LaCrosse, Wisconsin 54601.

8-11 31st Annual National Athletic Trainers Association Meeting, Sheraton Hotel, Philadelphia, Pennsylvania. Contact NATA, P.O. Box 1865, Greenville, North Carolina 27834.

12-14 Facilex-Athletic and Recreational Facilities Exposition, Las Vegas, Nevada. Contact Golden Gate Enterprises, Inc., 1307 So. Mary Avenue, Sunnyvale, CA 94087.

13-15 Fourth Annual National Institute of Preventative Sports Medicine, Conditioning and Training: A Comparative Analysis, Reno, Nevada. Contact Marjorie Cutler, Program Coordinator, Extended Programs & Continuing Education, University of Nevada-Reno, Reno, Nevada 89557.

16-27 Cardiac Rehabilitation 1-2 Week Workshop, LaCrosse, Wisconsin. Contact Phillip K. Wilson, Executive Director, LaCrosse Exercise Program, Mitchell Hall, University of Wisconsin-LaCrosse, LaCrosse, Wisconsin 54601.

18-21 Post-graduate Course on The Art and Science of Sports Medicine, Charlottesville, Virginia. Contact Clifford E. Brubaker, University of Virginia, Room 25 Memorial Gym-Emmet, Charlottesville, Virginia 22903.

22-24 Athletic Training Workshop for High School Students, Pittsburgh, PA. Contact David Perrin, Suite

140 Trees Hall, University of Pittsburgh, Pittsburgh, PA 15261.

22-27 Student Athletic Trainers Workshop, Ohio State University, Columbus, Ohio. Contact Buckeye Sports Camps, 410 West Woodruff Avenue, Ohio State Athletic Department, Columbus, Ohio 43210.

July, 1980

27-August 1 11th Annual Miami University Sports Medicine Workshop, Oxford, Ohio. Contact Ken Wolfert, Workshop Director, Withrow Ct., Miami University, Oxford, Ohio 45056.

CRAMER WORKSHOPS

Contact Hugh Grubiss
Cramer Products, Inc.
P.O. Box 1001
Gardner, Kansas 66030

CRAMER COACHES ATHLETIC TRAINING WORKSHOPS

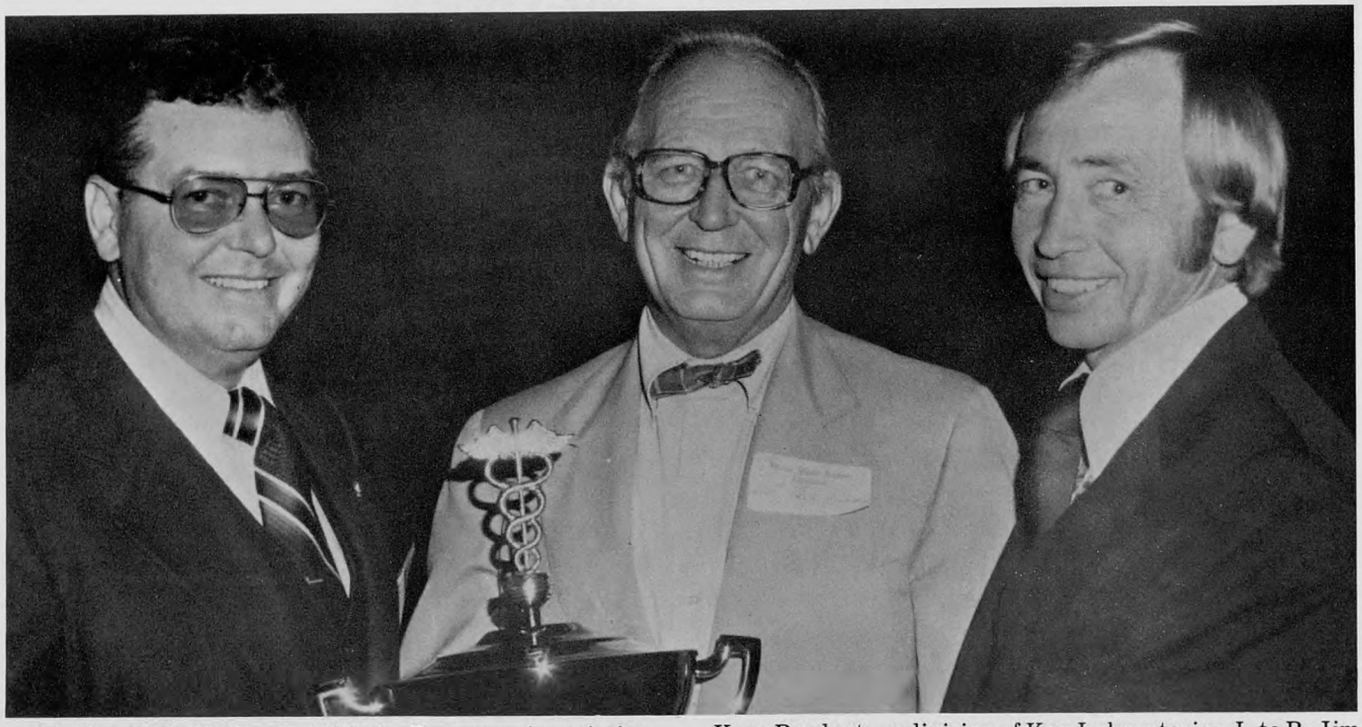
June 10-14	University of Oregon Eugene, Oregon
June 16-20	University of Florida Gainesville, Florida
June 16-20	Lamar University Beaumont, Texas
June 16-20	University of Nebraska Lincoln, Nebraska
June 23-27	Montana State University Bozeman, Montana
June 23-27	Syracuse University Syracuse, New York

CRAMER STUDENT ATHLETIC TRAINER WORKSHOPS

June 15-18	Kent State University Kent, Ohio
June 22-25	North Alabama University Florence, Alabama
June 22-25	Southern Colorado University Pueblo, Colorado
June 22-25	Southern Methodist University Dallas, Texas
June 29-July 2	Florida State University Tallahassee, Florida
June 29-July 2	George Williams College Downers Grove, Illinois
June 29-July 2	University of Maryland College Park, Maryland
June 29-July 2	Texas A&M University College Station, Texas
June 29-July 2	Washington & Lee U./ Virginia Military Institute Lexington, Virginia

Announcements

Kwik Kare Honors Hughston with the 1979 President's Challenge Award



At the 1979 National Athletic Trainers Association Awards Banquet held in St. Louis, Missouri, Dr. Jack C. Hughston, Director of the Orthopaedic Training Program, The Medical Center, Columbus, Georgia was the recipient of the President's Challenge Award presented by Kwik Kare Products, a division of Kay Laboratories. L to R: Jim Cody, VP Kwik Kare Products; Dr. Jack Hughston; and William Chambers, President of the National Athletic Trainers Association.

Dr. Jack C. Hughston, Director of the Orthopaedic Training Program, The Medical Center, Columbus, Georgia has been named the 1979 recipient of the President's Challenge Award of the National Athletic Trainer's Association.

The award, presented annually by Kwik Kare, First Aid Division of Kay Laboratories, to a physician who has contributed most to sports medicine, was made in St. Louis, Missouri at the 1979 National Athletic Trainers Association Awards Banquet. Jim Cody, Vice President of the First Aid Division and William H. Chambers, President of the National Athletic Trainers Association presented the award.

Dr. Hughston is successful not only in practice but in periodicals as well. He recently wrote an article in the March-April 1979 issue of the American Journal of Sports Medicine entitled "Getting Involved," in which he stressed the necessity for personal involvement with athletic teams on the part of the physician who wishes to practice sports medicine. Such a practice, Hughston suggests, should stem from "A love of excellence, quality and desire, no matter the level - little league or professional." A fine example of such involvement himself, Hughston gives of his time to travel with Auburn University teams.

He has also written several comprehensive articles on athletic injuries and is presently Clinical Associate Professor, Division of Orthopaedic Surgery to Tulane University School of Medicine, as well as being a member of the Committee on Continuing Education, American Academy of Orthopaedic Surgeons. He is Editor-in-chief of the *Americn Journal of Sports Medicine*.

In addition to being selected "Mr. Sports Medicine" Hughston is also an honorary member of the National Athletic Trainers Association.

Kwik Kare also awarded $1,500 to education or research in the field of athletic training. The grant will be made in Dr. Hughston's honor to continue advancement in Sports Medicine.

Kwik Kare, located in San Diego, California, manufactures first aid products for the medical, sports, industrial and home markets.

Memorials

All news and supportive information regarding the death of one of our members should be sent to:

Jim Rudd
Athletic Department
Kansas State University
Manhattan, Kansas 66506

Alcohol Studies Available

By Thomas C. Harford, NIAAA National Study: An Overview. Alcohol Problems Among Youth: Proceedings of a Workshop, Pittsburgh, Pa: 2-3 Dec. 1977. 26 p.

Copies available from Joseph Newman, Director, Western Pennsylvania Institute of Alcohol Studies, Division of Specialized Professional Development, Program in Rehabilitation Counseling University of Pittsburgh, Pittsburgh, Pa 15260. Cost: $2.00 (entire proceedings).

N.A.T.A. Honors Top Trainers

Left to right: Glen Snow, Joe Gieck, Bill Boswell, Vice President, Drackett Company, Bill Chambers, Jerry Rhea.

The National Athletic Trainers Association (NATA), recently announced winners of the NUTRAMENT Fourth Annual Trainer of the Year Awards.

Presented to top trainers in professional college, junior college and high school athletics, the awards honor trainers who have made outstanding contributions to their profession and the care of athletes.

Trainers of the Year for 1979 are:

Professional Division Jerry Rhea
Atlanta Falcons

College Division Joe Gieck
University of Virginia

Junior Collge Division Bill Chambers
Fullerton (CA) Junior College

High School Division Glen Snow
Floyd Central High School
New Albany, Indiana

Winners of the fourth annual awards were selected from among all certified athletic trainers by a vote of the association's international membership. The awards are sponsored by NATA and The Drackett Company, makers of NUTRAMENT, a food supplement used widely by athletes. The winners of the high school, college, and junior college divisions awards will have $1,000 donated in their names to the athletic programs at their schools by The Drackett Company. For the professional trainer, a $2,000 grant is presented to the NATA scholarship fund.

Professional Division winner, Jerry Rhea, is a veteran of 20 years as an athletic trainer, serving as Head Trainer for the N.F.L. Atlanta Falcons for the past ten years. He is currently president of the N.F.L. Athletic Trainers Society and Chairman of the Georgia Board of Athletic Trainers. Before going to the Falcons, Rhea served as Assistant Trainer with the Los Angeles Rams.

College Division Trainer of the Year, Joe Gieck, is head trainer at the University of Virginia and directs the University's Masters Program in Athletic Training. He began his career as a student trainer at his alma mater, the University of Oklahoma, was an assistant trainer at the U.S. Military Academy before becoming head trainer at the University of Virginia in 1962. Widely published and honored for his work in athletic training, Gieck is a past Chairman of the Board of the NATA.

Bill Chambers, head trainer at Fullerton Junior College since 1962, is Junior College Division Trainer of the Year for the third time. He won the honor in 1976 and 1977. Recently re-elected president of the Association, he is a graduate of the University of Missouri, where he served as assistant trainer before his appointment at Fullerton Junior College.

High School Division winner, Glen Snow, directs athletic training and physical education training at Floyd Central High School, New Albany, Indiana. He wins the top honors for high school trainers some 15 years after serving as a student trainer at New Albany High School. He is a graduate of Ball State University and was at the University of Washington, Seattle, before joining Floyd Central in 1972.

Schedule of Future Sites and Dates N.A.T.A. Certification Examination

Revised: March 1980

REGIONAL

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

January 18, 1981

Eugene, Oregon
Fort Worth, Texas
Grosingers, New York (EATA)
Lexington, Kentucky
Saratoga California
Tampa, Florida
Vlaparaiso, Indiana
(All sites subject to change)

Deadline for requesting application forms:
October 15, 1980*
Deadline for returning applications:
December 1, 1980*

March 15, 1981

Odessa, Texas
Oxford, Ohio
Pullman, Washington
Tucson, Arizona
West Chester, Pennsylvania
Lincoln, Nebraska
(3-20-81)
Raleigh, North Carolina
Bloomington, Minn. — overflow/alternate site
(3-21-81)
(All sites subject to change)

Deadline for requesting application forms:
December 15, 1980*
Deadline for returning applications:
February 1, 1981*

NATIONAL

June 7, 1981, National Convention Site: Fort Worth, Texas

(Subject to a maximum of 50 candidates — applications accepted in order of remittance — only 25 additional candidates accepted for written examinations — June and August applications are processed under the same deadlines)

August 2, 1981

Ann Arbor, Michigan
Cedar Fall, Iowa
Chattanooga, Tennessee
Eugene, Oregon
New Britain, Connecticut
Saratoga, California
State College, Pennsylvania
Terre Haute, Indiana
West Chester, Pennsylvania
(All sites subject to change)

Deadline for requesting application forms:
March 15, 1981*
Deadline for returning applications:
April 30, 1981*

(Please indicate date you wish to take the exam when requesting application; also indicate the section under which you plan to apply: I-NATA Approved Curriculum, II-Apprenticeship, III-Special Consideration, IV-Physical Therapy)

NOTE: 1982 exam dates will approximate the 1981 dats and sites on a regional basis. The national exam will be at the site of the annual N.A.T.A. convention with similar numerical limitations.

***All items must be received by the NATA Board of Certification Office by the specified deadline dates.**

A Timely Reminder . . .

Your contributions and continuing support to the NATA Scholarship Fund are always welcome and are necessary so that the endowment goal of $500,000 can become a reality. Please remember that our program of financial assistance is a four-fold one that offers scholarships, loans, grants and part-time employment. Organizational support from the NATA to the Fund continues, but your individual contributions are vital to the Scholarship Fund's ultimate success. All contributions are tax deductible. Won't you consider now the importance of your participation in the NATA Scholarship Fund? Make your checks payable to Scholarship Program, and mail them to this address: **William E. Newell, Purdue University Student Hospital, West Lafayette, Indiana 47907.**

Brochure Requests

All requests for the brochure entitled "Careers in Athletic Training" should go to **Charles O. Demers, A.T.,C. Chairman, NATA Career Information Services, Athletic Department, Deerfield Academy, Deerfield, MA 01342. The cost of the brochure is 10¢.**

Journal Deadlines

In order to avoid confusion and delays for any contributions you have for the Journal the deadlines for various sections of the Journal are provided below.

Send any materials for any section of the Journal other than formal articles and "Calendar of Events" to:

Ken Wolfert
Miami University
Oxford, OH 45056

This includes sections such as "Tips From the Field", "Announcements", "Case Studies", "Letters to the Editor", etc. The deadlines are:

Journal	**Deadline**
Fall Issue	July 15
Winter Issue	October 15
Spring Issue	January 15
Summer Issue	March 15

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

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

Fall Issue	July 15
Winter Issue	October 15
Spring Issue	January 15
Summer Issue	April 1

Articles must be sent to:

Clint Thompson, ATC
Jenison Gym
Michigan State University
East Lansing, Michigan 48824
(517) 353-4412

The Editorial Board will then review each article and work with authors to help prepare the articles for publication. Each article is handled on an individual basis.

Guide to Contributors

Athletic Training, the Journal of the National Athletic Trainers Association, welcomes the submission of manuscripts which may be of interest to persons engaged in or concerned with the progress of the athletic training profession. The following recommendations are offered to those submitting manuscripts:

1. One original and six copies of the manuscripts should be forwarded to the editor and each page typewritten on one side of 8½ x 11 inch plain paper, double spaced with one inch margins.

2. Articles being resubmitted with corrections and revisions, only one copy needs to be sent.

3. The first page of the manuscript should include title of paper, full name of author(s), academic degrees, name of the department and institution of author(s).

   The second page should contain a **brief** biographical sketch of each author, suitable for publication with the article. A recent black and white glossy photograph of each author is also requested.

   The text of the article should begin on page three and is to be followed by the bibliography, tables, and illustrations and legends to illustrations in that order.

4. Photographs must be **glossy black and white** prints 5½ x 7 unless color is absolutely necessary to indicate detail. Graphs, charts, and figures should be of good quality and clearly presented on white paper with black ink, in a form which will be legible if reduced for publication. Legends to illustrations should be typed separate from the illustrations on a page following the last illustration. Copies of all illustrations should accompany each of the six copies of the manuscript.

5. It is the understanding of the editor of Athletic Training that manuscripts submitted will not have been either previously published or simultaneously submitted to any other publications. The author accepts responsibility for any major corrections of the manuscript as suggested by the editor.

6. For reprints, authors are authorized to reproduce their material for their own use or reprints can be reproduced at time of initial printing if the desired number of reprints is known.

7. References should be typewritten (double spaced) beginning on the first page following the manuscript. They must be alphabetized and numbered consecutively. Citations in the text of the manuscript should take the form of a number in parenthesis (7) directly after the name of the author being cited, or after the reference if the author's name is not used. The style of the references to a journal, book, chapter in an edited book, and presentation at a meeting are illustrated below:

   1. Knight K: Preparation of manuscripts for publication. Athletic Training 11(3):127-129, 1976.
   2. Klafs CE, Arnheim DD: *Modern Principles of Athletic Training.* 4th edition. St. Louis, CV Mosby Co. 1977, p. 61.
   3. Albohm M: Common injuries in women's volleyball. *Relevant Topics in Athletic Training.* Edited by Scriber K, Burke E.J, Ithaca, NY: Monument Publications, 1978, pp. 79-81.
   4. Behhnke R: Licensure for athletic trainers: problems and solutions. Presented at the 29th Annual Meeting and Clinical Symposium of the National Athletic Trainers Association. Las Vegas, Nev. June 15, 1978.

8. Potential authors are referred to reference 1 above, for help in preparing their manuscripts.

9. Unused manuscripts will be returned, when accompanied by a stamped, self-addressed envelope.

10. Manuscripts not following the preceding procedures will be returned to the author.

    Address all manuscripts to:

    Clint Thompson
    Department of Athletics
    Michigan State University
    East Lansing, Michigan 48824

Second Annual N.A.T.A. Student Writing Contest

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

1. This contest is open to all undergraduate student members of the NATA.

2. Papers must be on a topic germane to the profession of athletic training and can be case reports, literature reviews, experimental reports, analysis of training room techniques, etc.

3. Entries must not have been published, nor be under consideration for publication by any journal.

4. The winning entry will receive a $100.00 cash prize and be published in *Athletic Training* with recognition as the winning entry in the Annual Student Writing Contest. One or more other entries may be given honorable mention status.

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

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

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

8. An original and two copies must be received at the following address by March 1, 1980.

NATA Student Writing Contest
c/o Dr. Ken Knight
Men's Physical Education
Indiana State University
Terre Haute, Indiana 47809

Current Literature

Ed Christman, ATC, MEd
College of William and Mary

"A Functional Semirigid Support System for Ankle Injuries," Stover, C. *The Physician and Sportsmedicine*, 4015 West 65th Street, Minneapolis, Minnesota 55435. 7(5):71, May, 1979.

"A Total Baseball Conditioning Program," Covell, W. *Athletic Journal*, 1719 Howard St., Evanston, Illinois 60202. 60(4):28, December, 1979.

"An Epidemiologic Study of Tennis Elbow. Incidence, Recurrence, and Effectiveness of Prevention Strategies," Gruchow, H and Pelletier, B. *The American Journal of Sports Medicine*, 428 East Preston St., Baltimore, Maryland 21202. 7(4):234, July/August, 1979.

"Anterior Tibial Compartment Syndrome in Soccer Players," Leach, R. and Corbett, M. *The American Journal of Sports Medicine*. 7(4):258, July/August, 1979.

"Body Fatness and Performance Differences Between Men and Women," Cureton, K., Hensley, L., and Tiburzi, A. *Research Quarterly*, 1201 16th Street, Washington, D.C. 20036. 50(3):333, October, 1979.

"Bone Resorption of the Distal Clavicle," Norfray, J. *Journal of the American Medical Association*, 535 North Dearborn Street, Chicago, Illinois 60610. 241(18):1933-4, May 4, 1979.

"Coach and Trainer Guidelines to Productive Coexistence," Worden, B. and Falla, J. *Scholastic Coach*, 50 West 44th Street, New York, N.Y. 10036. 49 (5):34, December, 1979.

"Cryotherapy - Putting Injury on Ice," Barnes, L. *The Physician and Sportsmedicine*. 7(6):130, June, 1979.

"Degenerative Arthritis of the Ankle. Secondary to Long Standing Lateral Ligament Instability," Harrington, K. *Journal of Bone and Joint Surgery*, 10 Shattuck St., Boston, Mass. 61(3):354-61, April, 1979.

"Effects of Cold Submersion on Intramuscular Temperature of the Gastrocnemius Muscle," Johnson, D., Moore, S., Moore, J., and Oliver, R. *Physical Therapy*, 1156 15th Street N.W., Washington, D.C. 20005. 59(10):1238, October, 1979.

"Electrical Stimulation in Exercise of the Quadriceps Femoris Muscle," Currier, D., Lehman, J., and Lightfoot, P. *Physical Therapy*. 59(12):1508, December, 1979.

"Evaluating the Endurance Athlete's Heart: A Non-Invasive Graphic Study," Zoneraich, S. et al. *Angiology*, 320 Northern Blvd., Great Neck, N.Y 11021. 30(4):223-39, April, 1979.

"Heat Injury in Runners," Hanson, P. *The Physician and Sportsmedicine*. 7(6):91, June, 1979.

"Improve Flexibility to Prevent Injuries," Wells, R. *Athletic Journal*. 60(2):54, October, 1979.

"Internal Rotator-Adductor Tendinitis: A Shoulder Injury Analagous to Tennis Elbow," Nolan, M. *Physical Therapy*. 59(5):544-5, May, 1979.

"Isolated Lateral Meniscectomy. A Study of Twenty-six Patients with Isolated Tears," Yocum, L. et al. *Journal of Bone and Joint Surgery*. 61(3):338-42, April, 1979.

"Jogging. Thou Shalt Not Kill (thyself)" McIntosh, H. *Journal of the American Medical Association*. 241(23):2547-8, June 8, 1979.

"Lacrosse Injuries," Kulund, d. *The Physician and Sportsmedicine*. 7(5):82, May, 1979.

"Living Without Meat," MacEwan, K. *Runner's World*, Box 366, Mountain View, California 94042. 14(10):114, October, 1979.

"Nine Common Pitfalls in Running," Subotnick, S. *Runner's World*. 14(10):90, October, 1979.

"Runner's Heel," Schuster, R. *The Runner*, One Park Avenue, New York, New York 10016. 2(1):83, October, 1979.

"Swimmer's Ear," Strauss, M. *the Physician and Sportsmedicine*. 7(6):101, June, 1979.

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"The Role of the Musculature in Injuries to the Medial Collateral Ligament," Pope, M. et al. *Journal of Bone and Joint Surgery*. 61(3):398-402, April, 1979.

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Referred Visceral Pain in Athletics

Christine Elaine Boyd, MEd, ATC

Introduction

In any type of contact sport, the athlete is susceptible to abdominal trauma. Yet the donning of protective gear similar to the baseball catcher or the hockey goalie is unfeasible in the majority of sports. Fortunately injury to the abdominal contents occurs relatively infrequently. Nevertheless, when it does take place, immediate identification, treatment, and medical referral is imperative. The alternative to such action may lead to disastrous sequelae. Therefore, the trainer's ability to fully and accurately *assess* abdominal trauma to the athlete is paramount in avoiding a potentially fatal situation.

Abdominal injuries can present rather misleading symptomology. Specifically, the visceral organs are relatively insensitive to pain — even from stimuli such as cutting or burning[5]. In addition, the phenomenon of referred pain often results in the confusion and delay of appropriate diagnosis. This is because a person can feel pain in a part of the body that is considerably removed from the tissues which are causing the pain. A knowledge of this phenomenon is extremely important as many visceral afflictions cause no other signs except the referred pain.[5]

It is the purpose of this article to explore the topic of referred pain in sufficient depth so that its occurrence can be detected and understood in order to expedite the proper diagnosis and indicated treatment for the athlete. The mechanisms for referred pain shall be discussed. Diagrams are included to clarify the principles. In addition, specific examples of referred pain from visceral organs subject to athletic injury shall be presented. Finally, the basic concepts shall be summarized and implications for the trainer shall be stressed.

Ms. Boyd is the instructor of Anatomy in the Department of Health and Physical Education of the University of Virginia. She has served as student and graduate assistant trainer for the University since 1975, and is currently pursuing a doctoral degree in Adapted Physical Education, in Charlottesville, Virginia.

Mechanisms for Referred Pain

The human body does not perceive pain in an identical fashion with respect to its various parts. An important characteristic of pain relative to visceral injury is its tendency to *irradiate* and to give rise to *referred pain*.[10] Indeed, visceral pain is usually referred to a cutaneous surface. For example, pain due to heart damage may be experienced by the patient as a pain of the left upper arm or a pain passing down the left arm into the hand.[5, 10] Splenic injury may be referred to the left shoulder and arm — Kehr's sign.[6] Pain from the liver may be referred to the right shoulder.[7] These misdirections of pain sensation appear to be due to the excitation of a common pool of neurons within the spinal cord, brain stem, or cortex acted on by different afferent sources.[10]

This concept is more specifically illustrated in Figure 1 which depicts the general organization for the afferent pathways of visceral pain at one spinal level. "It is generally believed that visceral pain fibers may synapse in the spinal cord with certain neurons transmitting pain sensation from the skin".[7] Their synapses may actually cross so that stimulation of visceral pain fibers results in the sensation of cutaneous pain. (See Figure 2). Furthermore, "referred pain may be due in part to reflex muscle spasm, also mediated through intraspinal nerve connections".[7]

In addition, the perception of visceral pain can be extended to many other spinal levels. This fact demonstrates the existence of intermediate neurons connecting the posterior horn cells, as well as internuncial cells, connecting the higher and lower segments of the cord. As will be explained, this may be the mechanism responsible for the characteristic referral of splenic pain (ie, Kehr's sign).

Specifically:

> "Impulses transmitted to the spinothalamic tract result in thalamic and cortical action in the awareness of pain. Impulses transmitted to the intermediolateral

(sympathetic) nuclei may call for the sympathetic discharges responsible for causalgic states, and impulses transmitted to the motor cells of the anterior horn produce the reflex muscular spasm associated with pain".[7]

In each case, the neurons that supply the skin area in which the pain is felt enter the same segment of the spinal cord as do the neurons which actually conduct the pain stimuli from the visceral organ. An appreciation of this merger into a common path is essential to the understanding of the distributions of visceral pain. Concisely stated: *Visceral pain will be noted in that somatic area with which it shares a final common path.* Figure 3 attempts to diagrammatically describe the relationship of the visceral organs and their afferent pathways. Exactly where these visceral afferents enter the spinal cord and mingle with somatic afferents is the key to the principle of referred pain. Figure 4, the dermatomes[1] (ie, segments of cutaneous sensation with respect each spinal level), directly compliments Figure 3 by identifying the corresponding area of somatic sensation due to the intersecting visceral afferents.

Under some circumstances, only slight trauma to the abdomen may result in hemorrhage. Free blood in contact with the peritoneum results in peritonitis, which in itself is a medical emergency. This, too, presents referred pain corresponding to the location of the incoming afferent impuses.

Specific Examples of Referred Pain

Figure 3b is illustrative of the specific pathologies of referred pain from each selected organ. For example, *cardiac* pain is experienced by substernal discomfort projected to the base of the neck and the left jaw, as well as the left shoulder and arm over the distribution of the ulnar nerve. This is because dermatomes T1-T8 are generally represented. Less frequently, pain may be referred to the right shoulder and arm or both shoulders, arms, and hands. Occassionally, anginal pain may be projected posteriorly to the area of the left scapula at the interscapular region[7] as in left ventricular involvement.

With respect to the *lungs*, extreme damage may occur in the absence of pain until inflammation extends to the parietal pleura. The pleural irritation then gives rise to pain along the dermatomes corresponding to the spinal levels of the incoming afferent impulses C8-T8.[7]

The *diaphragm* is supplied by somatic nerves which enter C3-C5. Any appropriate painful stimulus to the parietal peritoneum is referred along to the corresponding cutaneous nerves. Thus, diaphragmmatic pain is

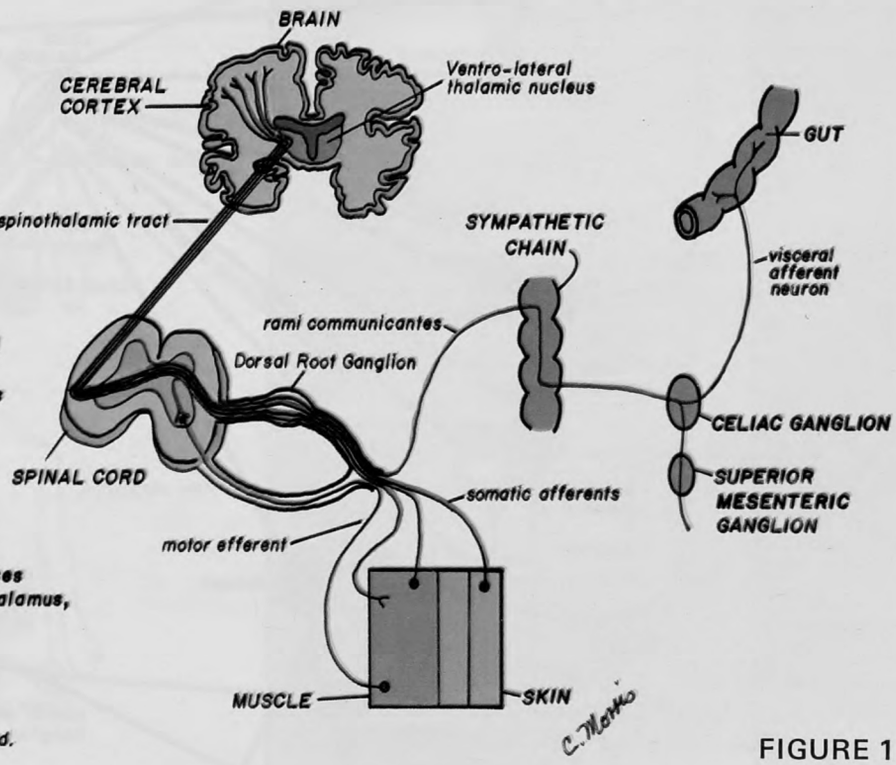

Figure 1. Sensory impulses from visceral structures within the abdomen are carried by visceral afferent nerve fibers which pass along the sympathetics to the dorsal root ganglia. There, fibers enter the posterior horn of the spinal cord, along with somatic neurons. There, they cross to the opposite side and ascend in the lateral spinothalamic tract--along with impulses from somatic pain pathways--to the thalamus, and finally to the cerebral cortex.

Illustrated by Cindy Morris.

Created and Designed by Christine E. Boyd.

FIGURE 1

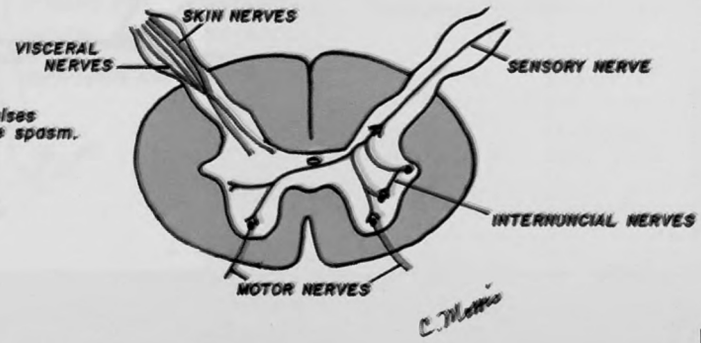

Figure 2. Visceral and somatic (skin) afferents are shown to intermingle in the posterior horn, therefore demonstrating the theorized mechanism of perceived cutaneous pain due to deep abdominal pain. Motor neurons are also shown to be involved with the afferent impulses therefore resulting in possible reflex muscle spasm.

Illustrated by Cindy Morris.

Created and Designed by Christine E. Boyd.

FIGURE 2

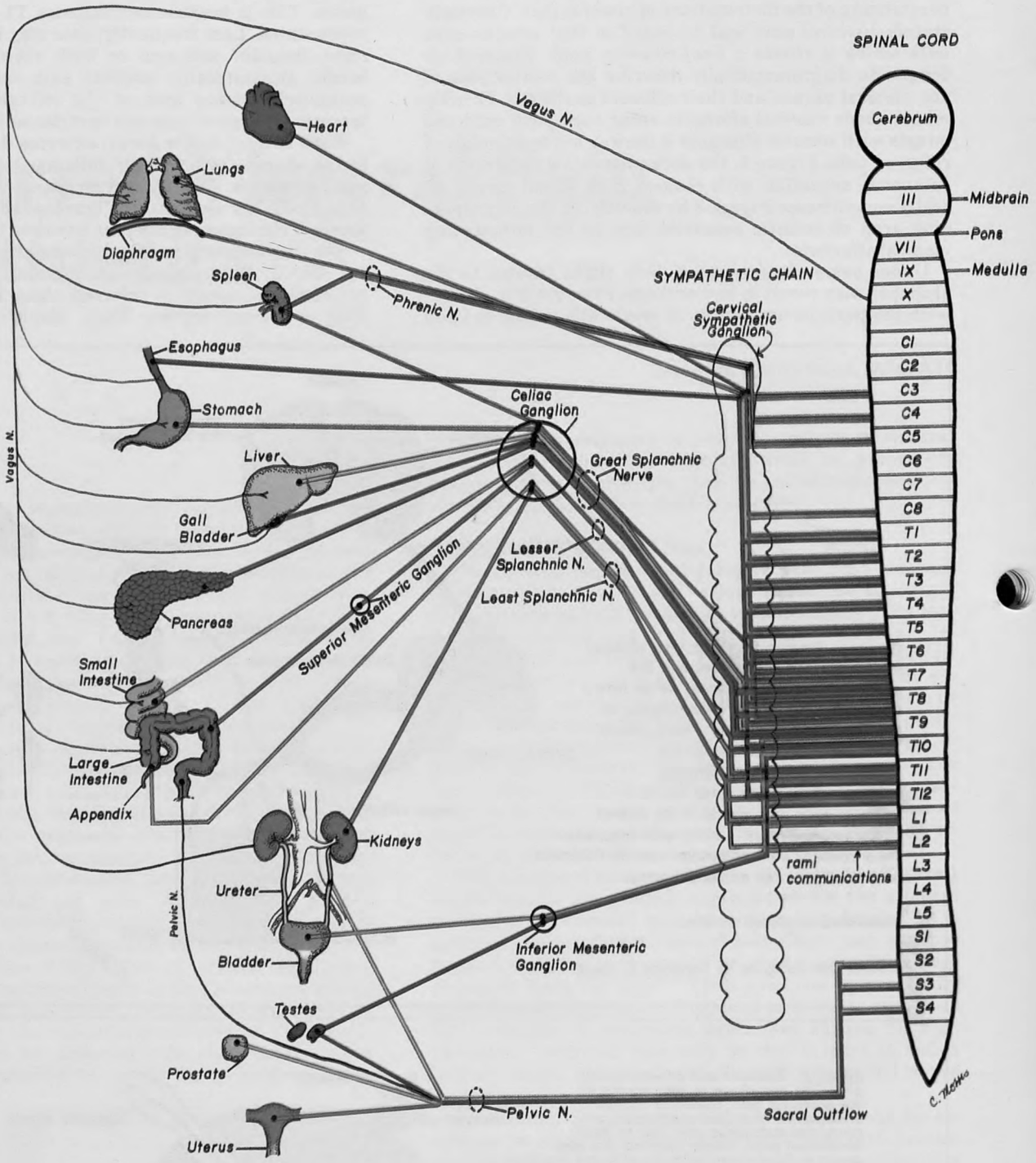
SPINAL CORD
Cerebrum
III
Midbrain
Pons
VII
IX
Medulla
X
CI
C2
C3
C4
C5
C6
C7
C8
TI
T2
T3
T4
T5
T6
T7
T8
T9
TIO
TII
TI2
LI
L2
L3
L4
L5
SI
S2
S3
S4
Vagus N.
Heart
Lungs
Diaphragm
Spleen
Phrenic N.
SYMPATHETIC CHAIN
Cervical Sympathetic Ganglion
Esophagus
Stomach
Celiac Ganglion
Great Splanchnic Nerve
Liver
Gall Bladder
Lesser Splanchnic N.
Least Splanchnic N.
Superior Mesenteric Ganglion
Pancreas
Small Intestine
Large Intestine
Appendix
Kidneys
Ureter
Bladder
Pelvic N.
rami communications
Inferior Mesenteric Ganglion
Testes
Prostate
Uterus
Pelvic N.
Sacral Outflow

FIGURE 3a

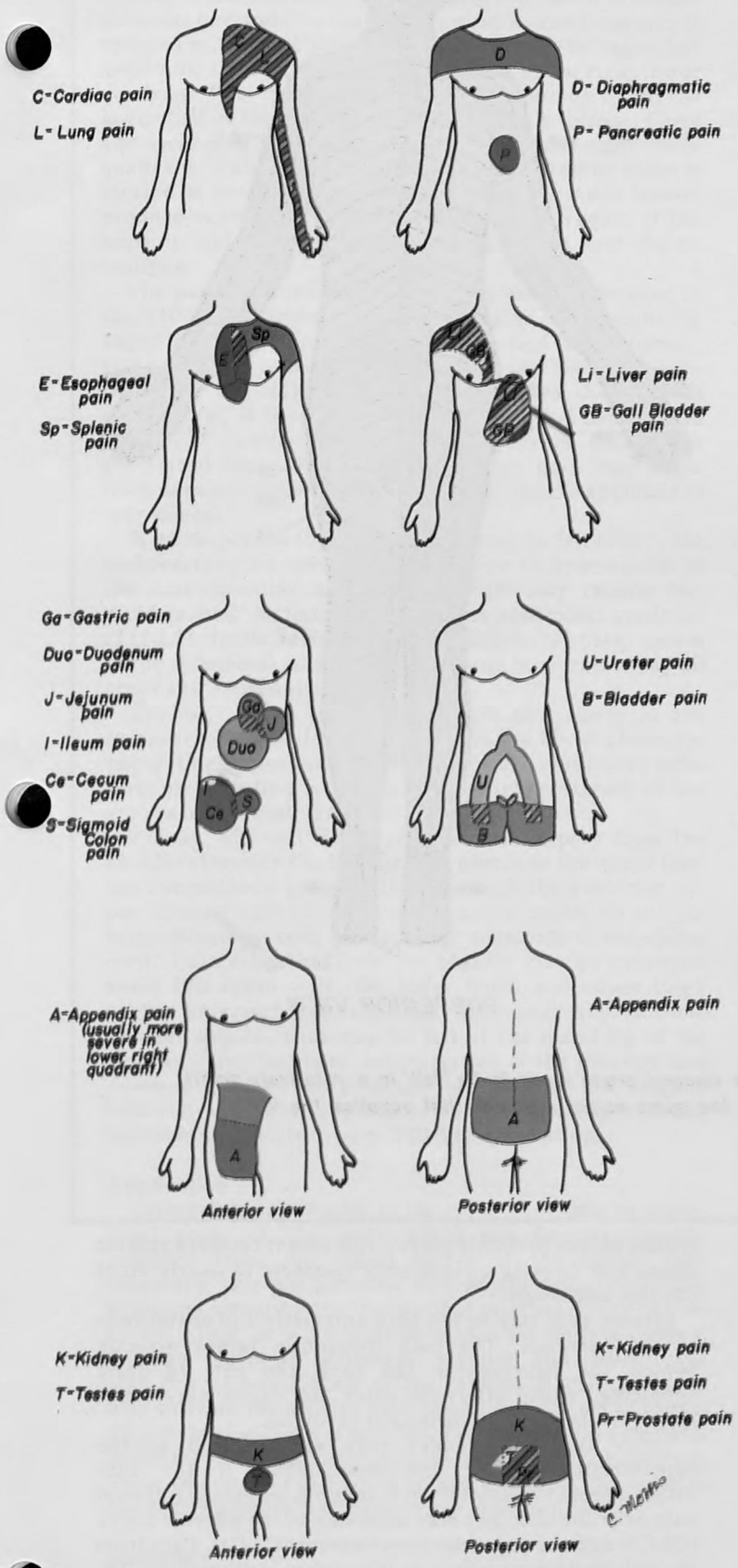

FIGURE 3b

Figure 3a. Simplified schematic representation of the levels of afferent innervation for selected visceral organs (many of which are subject to trauma), and ....

Figure 3b. The resulting clinical presentation of referred somatic pain for each organ.

Referred pain depends on the distribution of afferent fibers and their course. Pain fibers from the viscera run to the spinal cord with the sympathetic nervous system, and the impulses are transferred to the neurons of the somatic sensory nerves (see Figure 4).

Note: Impulses in the parasympathetic afferents are rarely intense enough to produce pain on the conscious level. However, these impulses can be refferred to cutaneous regions resulting in the very real experience of pain.

Illustrated by Cindy Morris.

Created and Designed by Christine E. Boyd.

FIGURE 4

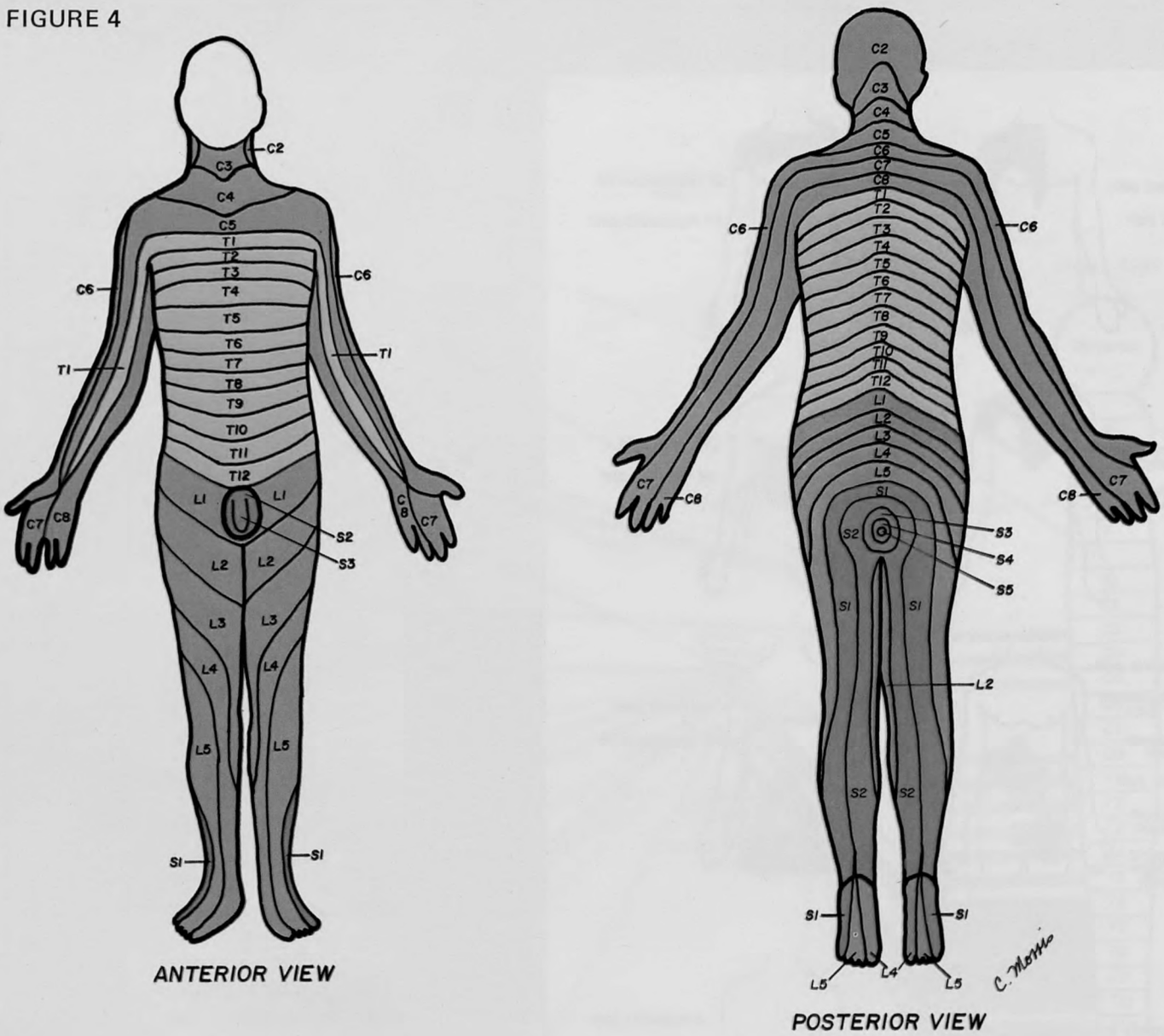

Figure 4. ***The Dermatomes. Pain referred to the skin from a visceral organ tends to be 'felt' in a relatively small, circumscribed area, within the compass of the dermatome of the same spinal segment that supplies the viscus. (Carpenter, 1972).***

Illustrated by Cindy Morris.

characteristically referred to the shoulder cap cutaneous distribution of C3-C5.[6]

Trauma to the *esophagus* gives rise to pain on the sternal region of the thorax corresponding to the site of the lesion (ie, an upper esophageal lesion yields manubrial pain . . . a lower esophageal lesion yields xiphoid pain or pain in the epigastrium.[5]) Esophaegeal afferent fibers enter the lower cervical and all thoracic levels, but especially T5-[5]6, which corresponds to the above regions of perceived pain.

Splenic afferent impulses course the phrenic nerve at the C3-C5 levels[8] presenting sharp cutaneous pain projected to the left shoulder and about one third the way down the arm (Kehr's sign). This region does not really correspond to that of the spinal levels of the phrenic nerve. Apparently, as mentioned previously, longitudinal intermediate neurons within the spinal cord itself become involved, mediating and projecting the impulses further down the cord to the T2-T3 dermatome. Also, the diffuse coeliac plexus probably plays a role sine it receives splenic fibers and directly or indirectly connects to nearly all of the thoracic levels.

Intense pain may be felt both anteriorly and posteriorly to the *pancreas*. The pain frequently refers directly behind the pancreas in the back and can be quite agonizing.[5] Some afferents enter the vagus nerve, but spinal levels T7-T9 are primarily involved.

Liver and *gall bladder* pain are referred to the epigastrium and its immediate right. If the subdiaphragmmatic parietal peritoneum is irritated, referred pain over the shoulder may arise due to the phrenic nerve (C3-C5) and the supraclavicular nerves (C3-C4). Pain from the gall bladder usually is in the region of dermatome T8. The pain follows its course to the back, just below the right scapula, to the right shoulder, to the substernal area, and sometimes to the anterior left chest. Knife-like pain is often associated with hyperesthesia of the skin.[7]

Pain of *gastric* origin is most often felt in the

epigastrium, usually in the midline or in the left quadrant.[7] Spinal levels anywhere from T5-T10 may be involved.

Backache or sharp pain in the back may result from lesions of the *intestines*. Specifically, the *small intestine* presents periumbilical pain. For example, *duodenal* pain is epigastrial, *jejunal* pain will be referred to the upper left quadrant, and *ileal* pain will be referred to the right lower quadrant. Pain from *colonic* lesions is generally felt in the lower half of the abdomen and is relatively diffuse. *Cecal* and *ascending colon* pain is usually felt in the right lower quadrant.[7] Pain of the *transverse* and *descending colon* is located in the left lower abdomen.[7] *Sigmoid colon* lesions produce suprapubic pain posteriorly in the region of the scarum.[7] Spinal levels T7-T11 are associated with the intestines.

The pain from *acute appendicitis* is usually localized to the T10-T11 cutaneous nerve distribution on the right.[9] A vague referred pain is felt in the region of the umbilicus. It may spread to both flanks. Later, when the pain shifts to where the inflamed appendix irritates the parietal peritoneum, it becomes precise, severe, and localized to the right lower quadrant. Spinal levels L1-L2 are associated here. Furthermore, lumbar pain may arise from appendicitis especially if the individual's appendix is retrocaecal.[3]

With respect to the *kidneys*, pain may be felt high in the costovertebral angle, posteriorly, due to hyperthesia of the corresponding dermatomes.[7] Pain may radiate forward around the flank into the lower abdominal quadrant (T11-L1). Ipsilateral, generalized abdominal pain, spasm of the abdominal muscles, and rebound tenderness may all occur and exceed the posterior pain.[7]

Typically, pain of *ureteral* origin also starts in the costovertebral angle and radiates to the lower abdomen, upper thigh, and testis or labium of the respective side. This presentation is mainly due to hyperesthesia of the associated dermatomes (T12-L1).[7]

Finally, afferent fibers are believed to pass from the *bladder* (through the hypogastric plexus to the upper lumbar sympathetic ganglia, then through the posterior upper lumbar and lower thoracic nerve roots) to the intermediolateral cells of the T9-L2 segments of the spinal cord.[2] Pain sensation from the bladder may be conveyed along this route — ie, the lower trunk and upper thigh region, anteriorly, and especially suprapubically. In some bladder lesions, pain may be felt at the distal tip of the *urethra*.[7] One last note, inflammation of the *prostate* and *seminal vesicles* may cause low lumbar or sacrally referred pain. This appears to be in agreement with the testicular/prostate/uterus T10-T12 association.

Application

Visceral injury results in the referral of pain to superficial areas of the body which can be considerably removed from the actual source of the lesion. Furthermore, this phenomenon may be the only presenting symptom signaling the trainer that internal injury has occured. Alone, or in conjunction with other signs of visceral damage (such as abdominal rigidity and shock), the trainer's understanding of the concept of referred pain may provide the athlete with lifesaving minutes as the indicated medical care is secured. Figure 3 should especially facilitate this diagnostic process by noting by cutaneous areas in question in Figure 3b and matching the color to the correspondingly colored organ in Figure 3a.

Summary

Gray best summarizes the features of referred pain:

> "Although most physiological impulses carried by visceral afferent fibers fail to reach consciousness, pathological conditions or excessive stimulation (eg, trauma and inflammation) may bring into action those which carry pain. The central nervous system has a poorly developed power of localizing the source of such pain, and by some mechanism not clearly understood, the pain may be referred to the region supplied by the somatic afferent fibers whose central connections are the same as those of the visceral afferents".[4]

Furthermore, an alteration in motor activity may accompany referred pain. This is exemplified by muscle guarding in the region of the referred pain. Such muscular contractions, if prolonged, may become an additional source of pain and tenderness.

Gray and this author conclude that:

> "The study of clinical cases of referred pain can be very useful in tracing the path of afferent fibers from the various viscera, and a knowledge of these paths may be of great assistance to the diagnostician in locating a pathological process."[4]

Hopefully the trainer's protocol has been given an additional dimension, enhancing it to the degree where a future life threatening situation can be quickly and correctly identified. Although more pathological situations have been presented here than each and every trainer is likely to encounter, it would behoove one to at least make a mental note of the principles involved. Special concern for the complete understanding of the more common sites of injury (eg, liver, spleen, kidney, etc.) is clearly indicated. One cannot afford to risk the alternative of ignorance where human life is at stake.

Acknowledgements

The author wishes to express sincere thanks to Dr. Joe Gieck who reviewed the manuscript; Drs. Diane Wakat, Barbara Bancroft, Michael Hakala, Dan Kuland, Greg Shasby, and Cliff Brubaker for their valuable guidance and support; Mr. Dan Grogan and Seth Graves for their photographic services; Mrs. Joanne Redmond and Rebecca Parks (UVa Dept. of Orthopedics) for the kind use of their secretarial facilities; and Mrs. Cindy Morris, the medical illustrator, whose special talents made this article possible.

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Potpourri

Dennis Aten, ATC, RPT, MS
Eastern Illinois University

Ambitious Athletes

Athletic competition has played an important role in school curricula since the time of the ancient Greeks. Today, with so many cuts in school funding, sports are on the endangered list. And, says Dr. Steven Picou, a Texas A&M University sociologist, by eliminating sports, schools are getting rid of something that fosters educational ambition in females, lower-class blacks and rural youths.

Dr. Picou, who surveyed 3,248 Louisiana high-school students, found that those who participated in interscholastic sports were more inclined to have college plans than their nonactive peers. "The athlete has the experience of operating in situations where he or she has to perform," says the professor. "This experience enhances achievement behavior in the working world, since educational ambition usually leads to educational achievement, which in turn leads to better jobs and higher incomes later in life.

Chronic Disease

Just before he resigned as Secretary of Health, Education and Welfare, Josephy Califano released "Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention." The report notes that the pattern of killing and disabling diseases has shifted from infectious diseases to chronic diseases such as heart disease, cancer and stroke, and cites individual habits, pollution of the environment and harmful social conditions like poverty, hunger and ignorance as the primary causes of these modern killers. The report emphasizes that health is each individual's responsibility.

Pullup Evaluation

The October, 1978, issue of *Physical Fitness Research Digest* revealed, among many others, the following results of specified research:

1. The full pullup test is difficult for boys, but is even more so for girls; some age differences also exist. In a national normative survey, not more than one pullup with pronated grasp could be completed by the boys at the following ages: 55 percent, ages 9 and 10; 45 percent, ages 11 and 12; 30 percent, age 13; 20 percent, age 14; 15 percent, age 15; 10 percent, age 17 + ; and 5 percent, age 16. In the norms for girls in the California Physical Performance Test, one full pullup is listed at the 80th percentile at ages 10-12, the 85th percentile at ages 13 and 14; and the 90th percentile at ages 15-18.

2. In one study, the energy cost was approximately twice as much when performing pullups as when executing floor pushups; the caloric cost of chinning was greater for men that for women, probably due to their greater body weight. In another study, the correlations between energy cost and Rogers' and McCloy's arm strength scores were low but significant (.30 and .41).

Desires Vs. Need

The following verse, often associated with Max Cleland (Director Veterans Administration) in connection with disabled persons, seems appropriate for those involved in sports medicine also. It has special meaning to me and I would like to share it with you.

I asked God for strength, that I
might achieve

I was made weak, that I might
learn humbly to obey.

I asked for health, that I might
do greater things,

I was given infirmity that I might
do better things.

I asked for riches, that I might
be happy,

I was given poverty, that I might
be wise.

I asked for power, that I might
have the praise of men,

I was given weakness, that I
might feel the need of God.

I asked for all things, that I
might enjoy life,

I was given life, that I might
enjoy all things.

I got nothing that I asked for —
but everything I had hoped for.

Almost despite myself, my
unspoken prayers were answered.

I am, among all men, most
richly blessed.

Author Unknown

Handgrip Strength

The following suggestion, from Every Inch and 1/2 Newsletter, may be of interest to athletic trainers.

"Make your own dynamometer: roll an arm blood pressure cuff and secure with rubber bands and/or casting sock. Inflate and squeeze to distribute pressure evenly. Deflate to an arbitrary base pressure (30 mm Hg). Keep diameter of roll constant (about 6 cm.). This records even the weakest grip strength. Make your own norms by testing staff men and women. Strong males grip over 360

mm Hg." (Heather Campbell, Chief PT, North Bruard Rehab. Center, 2327 Palmetto St., Mims, Fl. 32780)

"Inexpensive dynamometer and pinch meter available from Psytech Corp., St. Michaels, Md. 21663." (Maureen Gribben, RPT, Wichita Clinic, 3244 E. Douglas, Wichita, KS, 67220)

Sports Medicine Task Force

The Governor of Illinois has charged a task force with the responsibility of determining the problems relating to sports injuries, especially at the secondary level, and recommended steps that may be taken to alleviate those problems. Members from this task force represented the medical, legal, school, governmental, retail, athletic training communities in Illinois. This group arose from the results of a governor's conference on sports medicine, chaired by Dr. David Bachman.

The efforts in Illinois parallel similar work done in North Carolina several years ago. North Carolina's sports medicine program for secondary schools appears to be developing very successfully. Under the leadership of Al Proctor many school systems now have athletic trainers and sports medicine programs established. Although many of the athletic trainers are not presently certified, North Carolina is undertaking an ambitious educational program to remedy this situation.

Officials are hopeful that health care and safety conditions in the Illinois sports scene can have a similar success story to the one in North Carolina. Although other approaches have been used successfully in a few other states, it would appear that a Governor's Conference-Task Force approach would meet the needs of most states. Hopefully, more states will follow with similar actions.

Cold Cures

An Israeli physician says that he's come up with a cure for the common cold. He's invented a device that sends 109.4°F steam into the nostrils, reports *Medical World News*. This is hot enough to kill cold germs, but not hot enough to damage tissue. In tests at Israel's Weizmann Institute, 85 percent of the patients with colds felt relief from their symptoms after the first treatment. The device is not available in this country, and U.S. experts, while acknowledging that the cure seems possible, are greeting the Israeli claims cautiously.

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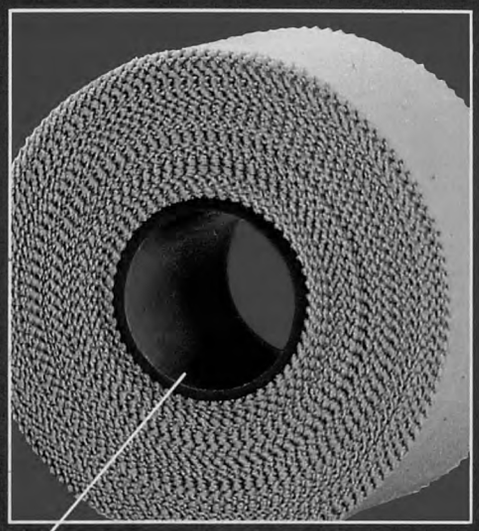

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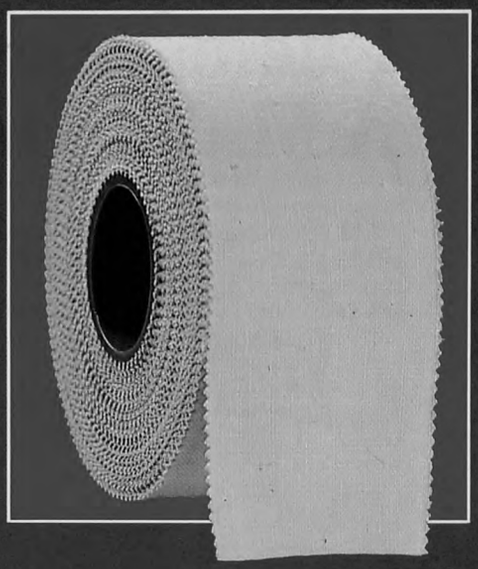

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Phencyclidine*: A Major Drug of Abuse

John Wells, ATC, PhD, PT

The following article is the first in a series to be presented by the Drug Education Committee

Introduction

When phencyclidine made its illicit debut in 1965 it was marketed as a mild psychedelic. It was taken orally in the form of tablets and capsules. Dealers described this new drug as a mild psychedelic, "a little stronger than marijuana." The effects were often unpredictable. Since the dosage could not be titrated, users often experienced an adverse reaction. Hence, phencyclidine gained a bad reputation and subsequently was not seen on the streets.

By 1972, a change was observed in both the method of use and the attitude of the users about the drug. Phencyclidine became available primarily in the form of a leaf mixture in California, with crystalline phencyclidine sprinkled on parsely, mint, or marijuana and sold as "joints." By this newly discovered method the user was able to more effectively control the dosage, thus decreasing the chance of overdose. Experienced users for the first time were able to inform new users how to take it effectively and to describe what the effects would be like. As first time users were being prepared for this unique experience, and with better methods of controlling the dosage, the popularity of phencyclidine spread rapidly. Illicit laboratories increased in proportion to the new demand for material. Because of the ease of manufacturing in clandestine laboratories, its availability has dramatically increased. Youth are now taking phencyclidine in social settings in a similar fashion to marijuana. According to the 1977 National Youth Polydrug Study 33 percent of drug abusers under 19 years of age were using phencyclidine. As other drugs of abuse become difficult to obtain, phencyclidine, in many areas, is continuously available. Hence, groups of users are likely to select phencyclidine as their drug of choice to share it with their friends.

Perhaps the most notable difference between those who ever abuse phencyclidine and those who do not is the greater involvement of phencyclidine abusers in polydrug use. Phencyclidine abusers report abusing twice as many substances as those who do not take phencyclidine.

It is of particular interest in the NYPS (New York Public School) Study that not a single subject used only phencyclidine. All phencyclidine abusers abused other substances either at other times or concurrently with phencyclidine; 99.5 percent used marijuana, 97.7 percent used alcohol, 75.8 percent used amphetamines, and 72.2 percent used hallucinogens.

*Phencyclidine is the generic name for the street names: PCP, angel dust, horse tranquilizer, Pea Ce Pill, hog, dust, crystal joints, CJ, KJ, supergrass, rocket fuel, elephant tranquilizer, horse tanks, cyclone, or goon.

Mr. Wells is Associate Professor of Physical Education and Supervisor of Sports Medicine at Mars Hill College in Mars Hill, North Carolina. In addition to serving as Abstract Coordinator, for *Athletic Training* John is also Chairman of the NATA Drug Education Committee.

Dosage

The oral "sedative" dose for humans is considered to be between 1-5 mg. Following oral administration of a subanesthetic dose of 7.5 mg, subjects report changes in their psychological or physiological state with 45 minutes and maximum effects at 90 minutes.

Overdose Signs and Symptoms

When taking phencyclidine affectively charged experiences are often evoked and some subjects exhibit negativism and hostility or apathy. Thinking is slowed with disruption of attention span, inability to sustain organized directed thought, and impairment of learning. Subjects are distractable and perseverate (spontaneous repetition of a past experience). Time appreciation is disturbed, with underestimation of time intervals. Escholalia (the meaningless repetition by a patient of words addressed to him), neologisms (a meaningless word uttered by a delirious patient), and word salad may be observed with loss of time "boundness." Some subjects manifest echopraxia (the meaningless or purposeless repetition, on the part of the patient, of motions which have been started by the examining physician) and repetative motor behavior. Reaction time, tapping speed, and rotary pursuit performance and weight discrimination have been reported to be impaired.

The patient with an overdose of phencyclidine may exhibit many different signs and symptoms during the course of intoxification depending upon the dose, how recently it was injested, and the frequency of prior use. Some cardinal signs of phencyclidine overdose are:

Ataxia
Vertical and horizontal nystagmus
Assaultiveness or catatonic staring
Generalized anesthesia

Severe convulsions may also occur in extremely heavy overdoses, and phencyclidine exhibits the lethal properties of a central nervous system depressant, with respiratory depression, coma, and death.

Profile of the Phencyclidine Abuser

These comparisions are made with non-phencyclidine abusers, but abusing other drugs.

1. Regularly abused with a greater number of different drugs.
2. More often takes more than one drug at a time to "boost, balance, or counteract the effects" of one drug.
3. Become drunk from drinking alcohol more often.
4. Has more arrests for drug related offenses.
5. Is picked up more times by the police.
6. Has more overdose episodes.
7. Reports more obstacles to school attendance.
8. Lists more reasons for contacting a drug treatment program.
9. Adjudicated delinquent.
10. More often made suicidal attempts.

Patterns of Abuse

As the availability of phencyclidine increases in a community, there is a direct relationship with the number of emergency room contacts and community problems such as driving under the influence and violent and bizarre behavior - behavioral toxicity. New problems have surfaced in communities in direct proportion to the frequency and regularity of phencyclidine abuse. Violent and bizarre behavior is seen in the home, in public places, and in schools, often disrupting education. Young people exhibit unexplained speech problems, memory loss, thinking disorders, personality changes, anxiety, severe depression, and suicidal and homicidal tendencies. An increasing number of young people appearing violent, bizarre, unresponsive, extremely confused, or acutely psychotic are being seen at local emergency rooms. With increased abuse of phencyclidine, an upsurge of violent crimes that culminate in homicide is observed. Police report erratic driving and an appropriate behavior following automobile accidents in individuals who have no apparent evidence of alcohol or sedative hypnotic injestion. On toxicological examination only the isolated presence of phencyclidine is often discovered. Young people who are observed to be highly intoxificated in public are often arrested for the sale, possession, and being under the influence of phencyclidine. In addition, an increasing number of referrals by family, friends, and the criminal justice system are made to community drug abuse programs in an effort to deal with this new drug symptom.

Lerner and Burns report of chronic phencyclidine abusers, 80 percent considered their first phencyclidine experience to be pleasant and wanted to take the drug again. They found it "fun," exhilarating," and felt "happy" or "euphoric." Phencyclidine seemed to be a "perfect escape" or a "dream world."

Only 15 percent of the chronic abusers disliked their first experience with phencyclidine feeling "scared" or finding it "terrible" while only five percent of these 15 percent characterized the experience as "strange," "weird," but interesting."

The phencyclidine "high" is reported to be very intense, several times stronger than marijuana, comparable to LSD, although shorter in duration. Most individuals compared it with LSD, but insist phencyclidine is different, "in a class by itself."

Phencyclidine has a pronounced effect on thinking, time perception, sense of reality and mood. Thinking is described as "speeded," or "wired," the mind going faster while time was slowed down, with no more reality." Everything is reported to be different, in another dimension, and seen from a new point of view. Life is dramatized, a fantasy world where "you don't have to dream, your wishes are fulfilled," and "what you want to happen comes true." Everything is felt to be complete and makes more sense. The mind supposedly can focus on one object and see beauty in the smallest thing. A sense of community oneness with others and with animals is reported. Religious thoughts and experiences of death are frequently mentioned. Mood states are intensified, with users in most cases feeling happy or euphoric, although severe depression is also reported with the recognition of the drug's potential for bringing one to either "the heights or depths of being." Music is "absorbed," light is "felt," and space and depth are distorted, being seen in 2D. Frequently users report feeling like they are floating. Rarely are visual hallucinations reported.

Abusers also experience a feeling of strength and endurance, a possible excuse for an athlete to be using phencyclidine. They also report feeling "powerful," "superior," "arrogant,": with "bursts of energy," "like God was with you, and you could move mountains," There is also a loss of inhibitions.

In 95 percent of cases reported, first abuse occurred in a social setting, with 70 percent smoking and sharing a joint at a party or with a small group of friends at someone's house. Some first time abusers report minor injuries, repeated vomiting, or arrests by police.

Chronic abuse of phencyclidine also takes place in a social setting with the sharing of joints. Individuals may join in with from two to five others at a friend's house or at home. The membership of the group who share in the abuse of phencyclidine remains quite stable over long periods of time. They listen to music, talk, dance, and enjoy sex together while high. The enjoyment of sex is thought to be brought about by the loss of inhibitions while under the influence of phencyclidine. Less often the abusers go to a rock concert or go out in public. The time of day is unimportant.

The majority of phencyclidine abusers continue to abuse it because they enjoy or like the "high". Frequently all of their friends use phencyclidine and it becomes a life style.

At times the availability of phencyclidine or making money from phencyclidine sales plays a role. For 80 percent of phencyclidine abusers, phencyclidine is the drug of choice. Nonavailability, incarceration, or hospitalization are the major factors interrupting the regular abuse of phencyclidine.

Case Studies

Case 1: A 15-year-old Caucasian male with no clothes on was found by the police in a field, hanging on a barbed wire fence. He was disoriented and incoherent upon questioning. A medical examination revealed a confused, disoriented youth with inflamed eyes, bloody mouth with an upper incisor missing, multiple scratches of the trunk, and scratches and lacerations of the extremities. Fluctuations in orientation were observed over the next seven hours ranging from cooperation and alert to unrousable. Prior to being discharged the patient stated that he had "smoked some phencyclidine and got awfully stoned."

Case 2: An 18 year-old Caucasian male injested tablets and capsules in his possession prior to a police traffic stop. Immediately after the officers departed he was driven to an apartment where the other occupants of the automobile induced vomiting of what they believed to be all of the injested material. Later he began screaming and having convulsions. He was driven to a hospital where he was pronounced dead on arrival. The coroner ruled that death was caused by aspiration of gastric contents due to phencyclidine injestion. Phencyclidine (urine level of .5 mg/ml) was the only drug found on toxicological examination.

Case 3: During the summer a youth gave a pool party while his parents were away on vacation. A 17 year-old Caucasian female guest was discovered at the bottom of the swimming pool. Post mortem examination revealed no head or neck trauma and the isolated presence of phencyclidine in the urine. (.5 mg/ml).

Homicides

In addition to hospital presentations for complications related to phencyclidine intoxification, recently there have been several homicides committed by youths in which phencyclidine was implicated (San Jose and Los Angeles, California; Las Vegas, Nevada; and Kansas City, Kansas). The defence attorneys in the majority of cases claim their clients were not guilty either by reason of diminished capacity or of insanity (drug induced psychosis). With defendents showing bizarre and violent behavior and sometimes defendents claiming amnesia to the event, (given the unique properties of phencyclidine)

and the circumstances of many of these homicides, it appears that the legal issues raised will require much further debate and study.

Deaths

A large number of deaths have occurred in association with phencyclidine intoxification. In the majority of cases the immediate cause of death was asphyxia by drowning, or trauma, circumstantial evidence suggesting the death was secondary to the "behavioral toxicity" of phencyclidine. The abuser could not indicate where his limbs were in relation to three dimensional space or could not respond appropriately to imminent danger.

Other individuals have been found dead without apparent cause, the presence of phencyclidine in high concentrations constituting the only positive finding. The most probable cause of death in high dose phencyclidine intoxification is primary respiratory depression.

Phencyclidine abusers report going swimming while intoxificated because they experience an unusual but pleasant sensation from the water. Sensory disturbances, incoordination, and muscle rigidity resulting from "street" doses of phencyclidine may seriously interfere with the abuser's ability to swim, drive, climb at heights, flee from a fire, or sense imminent danger.

Suicide

Suicide by self-inflicted trauma or massive oral overdose of phencyclidine has occurred in chronic abusers who became moody or severely depressed. It is the chronic abuser who is in possession of large amounts of phencyclidine. Threatening behavior or violence has resulted in provoked homicide.

Blood levels of phencyclidine as low as .1mg/ml may be associated with behavioral effects leading to death by injury or trauma. Levels greater than 1.0mg/ml are associated in most individuals with coma and may result in death secondary to medical complications or respiratory depression and seizures. Doses of 2.0mg/ml to 2.5mg/ml and greater are probably uniformly fatal producing primary respiratory depression and seizures.

Tolerance

Tolerance to the psychic effects of phencyclidine is reported by chronic abusers. Initially the abusers can get "high" after two or three puffs on a phencyclidine joint. Following a one week period of daily abuse they require one-half to one joint. After smoking for a period of two to six weeks, most individuals use one or two joints at a time. Some abusers report being able to smoke up to ¼ gram of street-purchased material at one sitting, following several months of regular, daily abuse. Phencyclidine dependence, described as a craving, is noted by chronic abusers.

Phencyclidine taken in typical street doses is reported to prevent sleep for 8 to 12 hours, decrease appetite, and to cause constipation and urinary hesitancy. Chronic abusers average one meal or less per day and lose 10 to 35 pounds during periods of regular abuse.

Toxicity

Chronic phencyclidine abusers report persistent problems with memory and speech, and difficulty with thinking following long periods of regular abuse of the drug. Recent memory capability appears to be primarily affected. Abusers complain of stuttering, inability to speak, and difficulty with articulation. Speech and memory difficulties last as long as six months to one year following prolonged daily abuse of large doses of phencyclidine.

Abusers complain of anxiety and/or nervousness during and following periods of regular phencyclidine abuse and seek psychiatric care. Some individuals become severely depressed and attempt suicide on repeated occasions after chronic exposure to phencyclidine. The suicide rate is 55 times greater while under the influence of alcohol. No documentation is available yet on the suicide rate while under the influence of phencyclidine.

Abusers report personality changes, social withdrawal, social isolation, and divorce resulting from their abuse of phencyclidine. Employment may be lost and education disrupted as a result of the effects of phencyclidine. Frequent arrests for being under the influence of phencyclidine, and for possession, results in a criminal record.

Chronic phencyclidine abuse has culminated in a picture of violent and aggressive behavior, paranoia, delusional thinking, and auditory hallucinations. In most cases, no known behavioral disturbance or psychiatric problems preceded the abuse of phencyclidine. Typically, the individual had abused phencyclidine over several months, or a few years, with the same group of friends. For no apparent reason a sudden development of paranoia and auditory hallucinations was accompanied by violent unpredictable behavior. Friends and family often become fearful and bring the abuser to medical attention.

Phencyclidine and Schizophrenia

The epidemic of phencyclidine psychoses did not initially seem related to drug abuse at all. What appeared to be happening was an epidemic of schizophrenia. This was unusual only because the rate of new cases of schizophrenia in a given population does not fluctuate widely. Until it was learned that these psychoses were drug-induced these patients were being diagnosed and treated as schizophrenics.

About one fourth of the patients treated for phencyclidine psychoses return within one year with schizophrenic psychoses in the absence of drug abuse. By contrast, these later episodes lack the characteristic violence of the phencyclidine-induced ones, and they are much more quickly responsive to antipsychotic drugs, yet they have also left behind typical shcizophrenic personality changes. These patients who had experienced the longer phencyclidine psychoses were generally the same ones who returned later with schizophrenic psychoses.

Epidemics of drug abuse are nothing new in the United States. The past decades have seen epidemics of heroin, LSD, marijuana, and several other drugs, while alcohol has been epidemic for centuries. The widespread abuse of phencyclidine in a community produces manifestations which are not only different, but also more dangerous in some ways.

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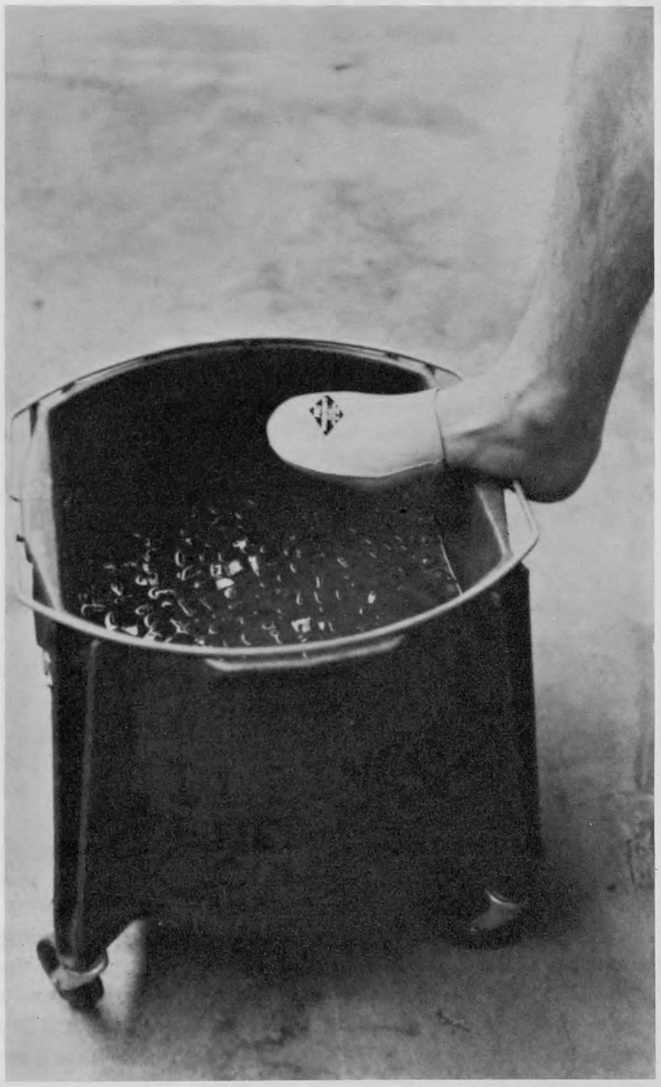
Tips From the Field

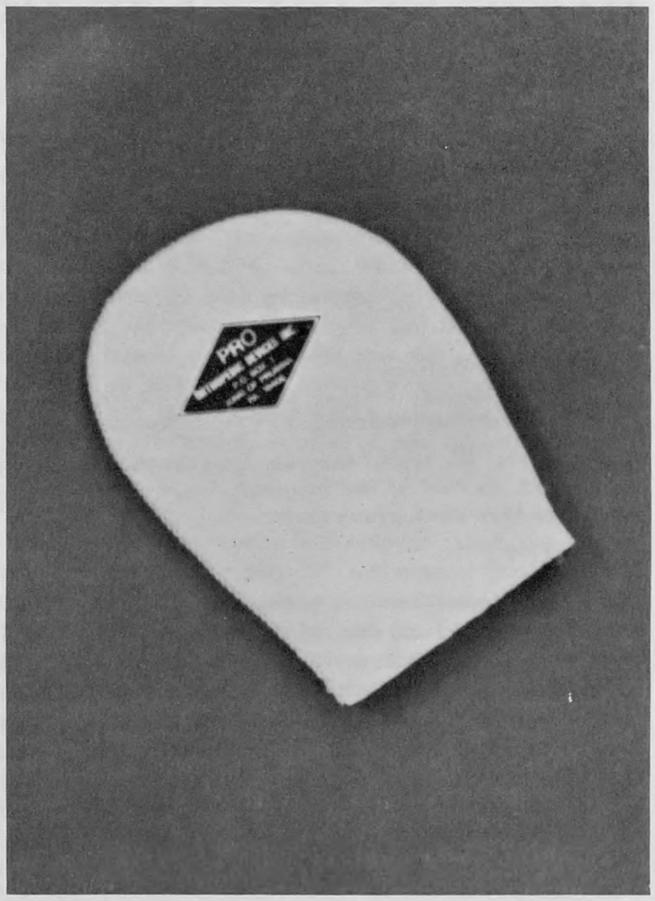
Ice Immersion Toe Cap

Jim Tovell, ATC
Illinois Benedictine College
Lisle, Illinois

Athletes using ice immersion for the treatment of lower leg and foot problems are often forced to subject their toes to the discomfort of the cold in spite of the absence of toe injury.

After using various unsatisfactory materials to protect the toes, it seemed that the neoprene rubber used in the Thermo Elastic Garments from Pro Products might be ideal for this purpose. The toe cap pictured here was the result of communicating this idea to "Moose" Detty of Pro Products. It has proven to be quite satisfactory, especially to our athletes' toes.





Editor's Note: Anyone wishing to have an idea, technique, etc. considered for this section should send one copy to **Ken Wolfert, Miami University, Oxford, Ohio 45056.** *Copy should be typewritten, brief, and concise, using high quality illustrations and or black and white glossy photos.*

Schering

The Schering Symposium

Management of hand injuries in a professional football team

Review of 15 years of experience with one team*

James C. Ellsasser, MD, and Arthur H. Stein, MD

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Editors Note: We regret the quality of the pictures is not comparable to that of the originals inasmuch as it was necessary to re-photograph them.

ABSTRACT

Thirty-eight players from one professional football team suffered 46 major hand and wrist injuries during a 15-year period. Twenty-one of the injuries occurred in offensive players and 25 occurred in defensive players. The injuries included fractures, dislocations, fracture dislocations, and soft tissue injuries of the phalanges, metacarpals, carpals (particularly the navicular), and distal radius/ulna, including intra-articular injuries. Twelve surgical procedures were performed. Open reduction, internal fixation, and Lightcast immobilization devices (3M Company, Atlanta, Georgia) allowed the players to return to active participation with a minimum loss of practice time and virtually no loss of Sunday game availability. Early aggressive surgery for intra-articular and certain metacarpal fractures is the correct course of treatment, according to our analysis, in order to achieve the best possible functional results.

We have reviewed 15 years of experience (1962 to 1976) in the management of major hand and wrist injuries in the players from one professional football team. Having recognized the difficulties associated with late surgical treatment of intra-articular fractures and certain metacarpal fractures, we adopted a more aggressive surgical approach toward these injuries in 1971. We have used open reduction and internal fixation and immobilized the joints in Lightcast external devices, which have allowed the players to return to active participation in their occupation with a minimal loss of practice time and virtually no loss of Sunday game availability.

The vulnerability of the hand and wrist to injury during football activities is well-recognized by the participants of the game. Elaborate rituals of taping and padding (Fig. 1) are well-known to all physicians who frequent the locker rooms. They are also well-aware of the deformities and articular deterioration that can result if injuries are not treated or are self-treated

*Presented at the Fourth Annual Meeting of the American Orthopaedic Society for Sports Medicine, Lake Placid, New York, June 30 to July 4, 1978 and again at the NATA Clinical Symposium, St. Louis, Missouri, June 16-20, 1979.

Dr. Ellsasser and Dr. Stein are staff members of the Division of Orthopedic Surgery, Washington University School of Medicine, St. Louis, Missouri.

(Fig. 2). We contend that early aggressive surgery for intra-articular and certain metacarpal fractures is the correct course of treatment in order to achieve the best functional result possible and to prevent undesirable features that result from delayed surgical treatment.

CLINICAL MATERIAL

During this 15-year period, 38 players suffered 46 major injuries. Twenty-one of the injuries occurred in offensive players and 25 occurred in defensive players. Twelve surgical procedures were performed. These injuries included fractures, dislocations, fracture dislocations, and soft tissue injuries.

There were 12 finger fractures without dislocation in 11 players. Eight of these fractures occurred in offensive players and four occurred in defensive players. Only one of these injuries was operated upon. The injuries included an intra-articular fracture of one distal interphalangeal joint, two intra-articular fractures of proximal interphalangeal joints, one transverse fracture of a distal phalanx, four oblique fractures of proximal phalanges, and four mallet fingers with avulsion fractures.

Fig. 1. *The high risk of injury to the hand and wrist in football is graphically demonstrated by the elaborate protection that this veteran lineman wears. In addition to the padding, he carefully trims his fingernails just before the start of a game.*

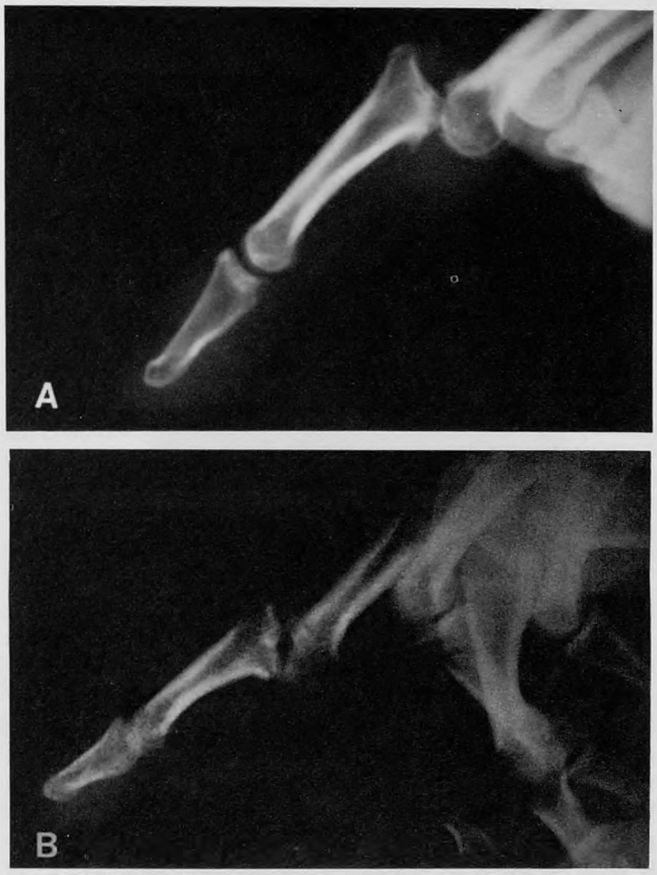


Fig. 2. *The lateral views of the right (A) and left (B) long fingers of the same cornerback show the severe deformity and articular deterioration which have resulted from multiple self-treated dislocations. Arthrodesis was performed on the right and was recommended for the left finger. If these injuries had been reduced and immobilized adequately after the initial injury, it is possible that these severe joint changes might have been avoided.*

Intra-articular fractures

The three intra-articular fractures in this group were small and minimally displaced. They were all treated with small metal splints during nonfootball time and by adhesive taping with adjacent finger splinting for play and practice. All healed with good functional results. The transverse fracture of the distal phalanx was treated similarly with an excellent result. Three of the four oblique fractures of proximal phalanges occurred in the early years of the study. They were managed by external splinting. Although both men (defensive players) were able to play, both had shortening of the fingers at the fracture site. The third injury occurred in a quarterback. He was not able to resume play until the 4th week, at which time the finger was taped with adhesive to the adjacent finger and splinted. It is likely that internal stabilization of this fracture would have allowed the quarterback to return at an earlier time with a better result. The fourth injury was treated in 1976 with an open reduction and Kirschner wire fixation followed by protection with a Lightcast splint for football activities. The end result was anatomically and functionally better than those in the earlier cases. The four mallet fingers with avulsion fractures were treated in splints, except for football activites when heavy adhesive wrapping was used. All of these obtained good active joint extension. Some slight deformity could be seen on the x-ray films in all four cases.

Metacarpal fractures

There were eight metacarpal fractures in seven players. Two of these fractures occurred in offensive personnel and six in defensive personnel. Two of these injuries were openly reduced and fixed with Kirschner wires. When the fracture demonstrated minimal or no displacement, only external immobilization was used for treatment. The two fractures that were surgically treated were displaced and shortened before open reduction. In both cases the players, wearing protective casts, participated in the following week's game before removal of their sutures. The end result of all of these injuries was good.

Wrist fractures

Five wrist fractures occurred in five players. All of these injuries occurred in defensive players. One surgical procedure was performed. Four of these injuries were navicular fractures, and one was a nondisplaced fracture of the distal radius. In the early years of the series, two of the navicular fractures were not recognized until after the season had been completed. One of these was not symptomatic, and the other was bone grafted in the off season with failure of the graft. This player continued to play professional football for 9 years, but had a symptomatic wrist. The other two navicular fractures that were diagnosed immediately were immobilized, one for 4 months and the other for 6 months. Both healed and function returned to normal. Football activities were continued in the splint in both cases. The distal radius fracture healed in 8 weeks, during which football activites were not curtailed.

Fracture dislocations

Three fracture dislocations occurred in three players. One of these injuries was in an offensive player and two were in

defensive players. All three injuries required surgical repair. Two of these were Bennett fractures of the thumb carpometacarpal joint; both were treated with internal fixation. One required open reduction and the other was treated by closed reduction and pinning. Both players returned to play the following Sunday with conventional external splinting. One of these men did bend a fixating pin but no difficulty was encountered in removing it. The functional result in both cases was good. The third injury was an unstable volar fracture dislocation in the proximal interphalangeal joint of the ring finger, with damage to the extensor hood mechanism. This was treated by open repair (Fig. 3). Because of the serious nature of this injury, the entire hand was protected in a mitten cast for football activities (Fig. 4). The player was an offensive lineman, and he was able to function quite well in spite of this device. The end result was essentially a normal finger.

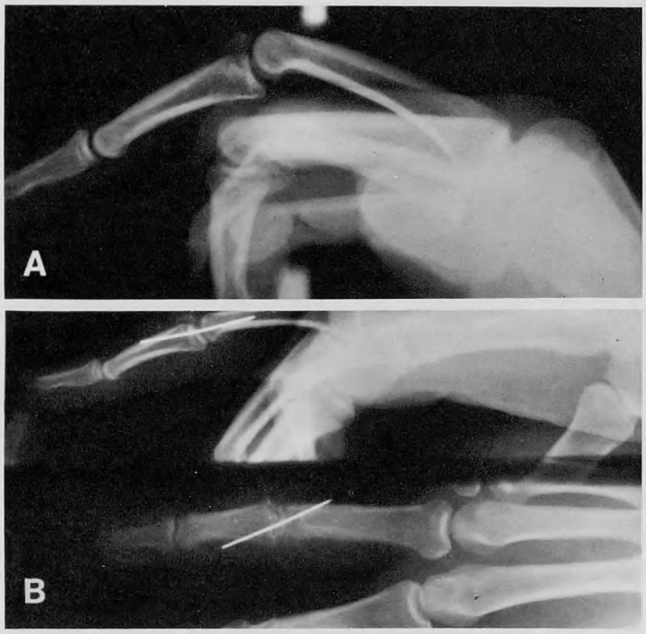


Fig. 3. *The x-ray (A) was taken after this lineman reduced this dislocated proximal interphalangeal joint himself. There is a dorsal lip fracture of the middle phalanx with a tendency for volar subluxation. Open reduction of the fragment and repair of the disrupted dorsal hood was followed by inter-articular Kirschner wire fixation. (B) Postoperative films.*

Fig. 4. *The serious injury shown in Figure 3 was protected with a complete mitten cast during football. The player was an offensive lineman and was able to function well in spite of this cumbersome protection.*

Dislocations without fractures

Ten dislocations without fractures occurred in eight players. Four were offensive players and four were defensive personnel. Two of the defensive men had two injuries each. Four open surgical procedures were performed. There was one distal interphalangeal finger dislocation and six proximal interphalangeal finger dislocations. There were two dislocations of the thumb metacarpophalangeal joint, and one distal radioulnar joint dislocation. The closed interphalangeal dislocations were all reduced and splinted for nonfootball activites for 3 weeks and protected with adhesive wrapping and adjacent finger splinting for practice and games. One patient had an unsatisfactory result in a finger on each hand. Three surgical procedures were performed on this individual. These included two procedures before fusion of his right long finger distal interphalangeal joint was achieved and a surgical reconstruction of his left long finger proximal interphalangeal joint. One proximal interphalangeal joint dislocation was open, and it was treated in the operating room with debridement, reduction, and wound closure. The postoperative management was the same as for the closed injuries. Both thumb dislocations required off the field manipulation under local anesthesia for reduction. One was easily reduced with local infiltration, while the other required a formal median nerve block. Neither player missed any game time; they wore conventional casts. The distal radioulnar dislocation was easily reduced, but was unstable. The patient refused the advice of the treating physician that a long arm cast immobilization be used, since this would have kept him from playing football. He was treated with local adhesive strapping. By the end of the season, the joint was stable.

Soft tissue injuries

The eight significant soft tissue injuries occurred in eight players. Six of these men were offensive players and two were defensive players. One surgical procedure was performed. This was a wound closure of a 3-cm volar laceration across the ulnar metacarpophalangeal area without any tendon or nerve involvement. There were five significant ulnar collateral thumb metacarpophalangeal sprains. All were immobilized for 3 weeks and then taped. One player had residual instability but declined a surgical reconstruction. One player had a wrist sprain of such severity that cast protection for 3 weeks was required to maintain his active status. One player avulsed his flexor profundus tendon to his ring finger. Surgery was deferred until after the season but spontaneous healing had occurred by that time.

COMMENT

The mechanism of injury in the majority of cases of a phalangeal injury, regardless of type, involved an attempt to handle the football, either as a pass receiver on the offense or as a pass defender on the defense. The increased incidence of ball handling by the offensive personnel is reflected by the fact that of the 32 injuries of this type, 18 occurred in offensive players and 14 in defensive players. In contrast, injuries that involved the metacarpal and wrist area were almost all sustained in tackling activities. Twelve of the 14 injuries in this category were in defensive players and 7 of the 12 players were linebackers. This suggests that the defensive linebacker may be at higher risk for metacarpal and wrist injuries.

As we have tried to improve the end results of treatment in this group of people, it is apparent that a more aggressive approach to surgical intervention developed. This is especially true in terms of significant intra-articular fractures and displaced phalangeal and metacarpal fractures.

From a review of these cases, it has become apparent that

the following types of serious injuries are frequently encountered: (1) fracture dislocation of the proximal interphalangeal joints; (2) Bennett fractures; (3) dislocation of interphalangeal joints with ligamentous instability; (4) metacarpal and phalangeal fractures and angulation and rotational deformity; and (5) wrist fractures, particularly carpal navicular fractures.

If not managed properly, these injuries may result in significant permanent disability in the hand. We have concluded that the players should be encouraged to accept early definitive treatment in order to achieve the best functional result. Fracture dislocations of the proximal interphalangeal joints should be reduced within the first 24 hr. The stability should be tested and, if there is any question as to stability, supplemental fixation with an intra-articular pin should be considered. This, of course, must be supplemented with external fixation.

The Bennett fracture must not go untended and either closed or, if necessary, open reduction with internal fixation should be carried out as soon as feasible.

Simple dislocations of interphalangeal or metacarpophalangeal joints should be evaluated carefully for instability after reduction. The player who has an interphalangeal joint dislocation which he reduces on the field must not be neglected at the termination of the game. Examination of the joint, if necessary under local block anesthesia, to assess the ligamentous damage should be done. Then appropriate immobilization to allow soft tissue healing can be carried out. This probably is one of the easiest of injuries to miss with the end result being an unstable or slightly subluxed joint, followed by repeated dislocations and degenerative changes.

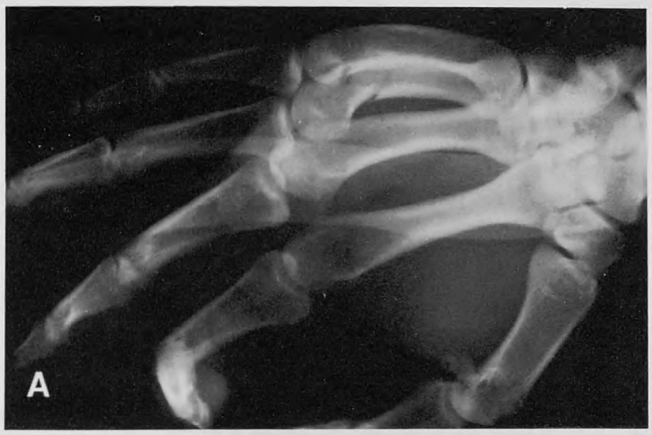


Fig. 5. *The x-ray film (A) shows a displaced, angulated, and rotated fracture of the distal fourth metacarpal in a linebacker. In order to assure and maintain stability in a more anatomical position, open reduction and internal fixation were performed (B series). This was followed by external immobilization and an early return to football activities.*

Metacarpal and phalangeal fractures must not be allowed to remain in an angulated or malrotated position (Fig. 5). If simple manipulation and immobilization will not suffice to maintain proper alignment, then the addition of internal fixation either by percutaneous pinning or open reduction should be carried out. This is easiest and most effectively done in the first 48 hr from the time of the injury. All pins should be cut off beneath the skin so that wounds are healed as soon as possible and thus allow the patient to return to active football as soon as possible.

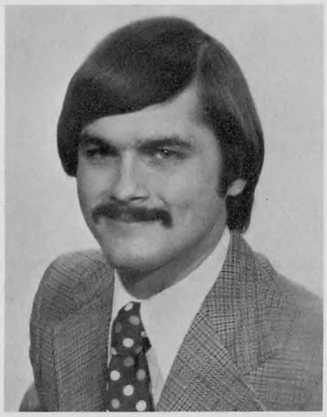
Many of these procedures can be carried out under local anesthesia, if the surgeon is skilled in blocking the superficial radial, median, and ulnar nerves at the wrist. This type of anesthesia will shorten the morbidity as compared to procedures done under general anesthesia. Allowing the injuries described to remain essentially unattended until the end of the season may allow the patient to participate in football, but reconstruction of deformities at the end of the season may be impossible and leave the patient with a disability that could have been avoided. Because of the intensity and competitive spirit of these athletes, the surgeon may have to use some powers of persuasion to treat these hand injuries early and thus achieve the best possible result.

After surgical stabilization, Lightcast splints (Fig. 6) were effective in protecting the repair in spite of active combat on the field. A basic approach was to utilize the short arm or thumb gauntlet cast unless phalangeal injuries were involved. In the case of minor phalangeal injuries, excellent protection was provided by adhesive strapping, utilizing an adjacent finger as an additional splint. In the case of major phalangeal injuries, two or three fingers were encased in the Lightcast in order to allow some residual grasp function for the player. In the one case in which complex interphalangeal fracture dislocation required internal fixation and repair of the extensor hood, a complete Lightcast mitten was used.

Although the professional player is in the unique position of being able to play with a cast, the principle of early aggressive surgical management of appropriate injuries applies equally to the high school and college athlete, if the best possible function result is to be obtained.

Fig. 6. *In most cases external immobilization with or without surgery was provided with conventional or modified Lightcast devices.*

Book Reviews



BOOK REVIEW EDITOR
Don Kaverman, ATC, MA

Foot and Ankle Pain

By: Rene Cailliet, M.D.
List Price: $5.50
112 pages illustrated
F.A. Davis Co.
1915 Arch St.
Philadelphia, PA 19103
Copyright © 1964

Foot and Ankle Pain is one of the eight books written by Dr. Cailliet on pain. His eight volumes cover the subjects of upper and lower extremity, back, and soft tissue pain. Each book is well illustrated and deals with normal functional anatomy, discusses various painful conditions and how each is related to the mechanism of injury and disability. Also included are logical steps to pursue a corrective measure.

Foot and Ankle Pain is divided into ten chapters that deal with every type of problem that a therapist or trainer would most likely encounter when dealing with athletes of all ages. The main content of this book explains and reviews structured anatomy, nerve and blood supply. He shows through illustrations and explanations how to examine the foot, shoe and gait. Dr. Cailliet deals with the foot in childhood and classification of foot deformities, the adult foot and toe pain. Also discussed is heel pain and causes, including plantar faciitis, fractures, and bursitis. Ankle injuries as well as neurological and dermatological conditions of the foot are discussed.

This book is of distinct value to all trainers because the foot is so important to the over all comfort and performance level of the athlete. The anatomy and practically all aspects of pain causing elements are described, illustrated and corrected. The subject matter is presented in a thorough and logical sequence, and is of value not only to the student but also to the experience therapist and trainer. This book would be a worthwhile investment for any library, or used as a supplement to a class textbook.

Maria J. Hutsick, ATC

The Sportsmedicine Book

By: Gabe Mirkin, M..D., and Marshall Hoffman
List Price: $12.50
225 pages - Illustrated
Little, Brown, and Company
Boston, MA
Copyright © 1978

This book is written for coaches, trainers, athletes, and physical fitness buffs involved in any sport. The information is kept simple so sportsmedicine can easily be

Continued on page 41

1980 N.A.T.A.
CLINICAL SYMPOSIUM & WORKSHOP

June 8-11, 1980 - Philadelphia Sheraton Hotel

Preview of Clinical Sessions & Workshop

Theme: Meeting the Challenge of the 80's

Sunday Morning
Professional Education Workshops will include topics on:
1. Athletic Nutrition
2. Update on the Field of Biomechanics with an Emphasis on Practical Application
3. Hip & Upper Leg - Trauma & Stress Injuries

Sunday Afternoon
Schering Symposium - topic will cover foot & ankle injuries from a biomechanical and orthotic point of view

Monday Morning
Topics will include:
1. Keynote Address - James Nixon, M.D.
2. Biomechanical Considerations in Running - Peter Cavanaugh, Penn State University
3. Posterior Glenohumeral Subluxation - Joseph P. Zawodsky, M.D., Princeton University

Additional concurrent sessions will cover On the Field Evaluation and practical workshops

Monday Afternoon
Concurrent sessions will include:
1. Drugs, Athletic Training & the Law - Moderator-Larry Graham. Participants-Richard Libowitz, Federal Drug Enforcement Administration; Chris Patrick, University of Florida; Tim Kerin, University of Tennessee
2. Free Communications Session - Conducted by the N.A.T.A. Research & Injury Committee

Tuesday Morning
Topics will include:
1. The Physiology of Tissue Injury & Repair - Sandy Burkhardt, West Virginia University
2. Emergency Medical Care in Athletic Training - Pepper Burris, New York Jets
3. Educating Athletic Trainers in the 80's - N.A.T.A. Professional Education Committee
4. Implications of Tissue Injury & Repair on the Rehabilitation Process - John Spiker, West Virginia University

Tuesday Afternoon
The highlight of the Educational Agenda of the 1980 Meeting will be a symposium on Head & Neck Injuries presented at this time. The speakers & topics will include:

Moderator - Joseph Torg, M.D., University of Pennsylvania
Anatomy - Robert Johnson, M.D., University of Pennsylvania
Epidemiology - Kenneth Clarke, Ph.D., University of Illinois
Pathomachanics - Albert Burnstein, Ph.D., Cornell University
Central Nervous System Lesions - Leonard Bruno, M.D., University of Pennsylvania
Cervical Spine Injuries - Dr. Torg; Emergency Recognition &
Management - Joe Vegso, A.T.,C., University of Pennsylvania
Concurrent sessions will include topics of On the Field Evaluation

Wednesday Morning
The final session of the 1980 Meeting will have topics concerning:
1. DMSO in Athletic Training - Dr. Stanley Jacobs, University of Oregon
2. Strength Development - Patricia Whiteside, Penn State University

This is a brief summary of the educational program of the 1980 Meeting. Other topics are scheduled and this should be one of the best programs in the history of the N.A.T.A.

Abstracts

ABSTRACTS EDITOR
John Wells, ATC, PT, PhD
Mars Hill College

"The New Football Softwear," Ralph Wiley, *Professional Sports Journal* 38-40: July 1979.

Byron Donzis is a 47-year-old master tinkerer from deep in the heart of Houston who has tweaked the slow curiosity of the NFL with a completely new line of football pads. It was Donzis' nylon flak jacket Houston Oiler quarterback Dan Pastorini wore around his ribs and nearly to the Super Bowl last season. Donzis' prototype pads were tested by two players before NFL Films cameras, Miami Dolphin Coach Don Shula and a representative of the league's influential competition committee in Miami the week of May 17. The uniform consisted of shoulder pads, bicep pads, rib pads, thigh pads, and knee pads, all made with air-inflated tubes designed to absorb and disperse the shock of monumental hits, which are a matter of course in the pro game. Each football pad consists of a nylon air sac and a hard plastic outer shell. When the sac is inflated, the air spreads evenly into several small compartments. Each compartment has a valve that prevents the air from rushing back and forth between compartments when the pad gets hit. On impact, the valve stops the air, then disperses it slowly into the other compartments. The equipment covers 50-60 percent more surface area and weighs five times less than traditional gear. The flak jacket, for instance, weighs only 5 ounces. The pads are also much cooler because air circulates freely through large holes in the air sac. Another advantage is that they don't have to be reconditioned every year. There are no foam pads or leather straps that can wear out in the middle of the season. Occasionally one of the air sacs will puncture, but they are easy to repair. Yet there are complications he hadn't counted on. "It seems the players have a psychological problem with the equipment. They're used to wearing 25 pounds of stuff, which I suppose makes you feel secure. For a 270-pound player, my equipment weighs 4 pounds, 13 ouces doesn't get heavier because it won't absorb water and can compress into a six-inch ball. Mentally the players aren't ready for that." Donzis is delighted, of course, by the attention he is getting from the NFL but feels the equipment is better suited for younger players. The pre-season prayer "If We Can Avoid Injury" has long gone unheeded in the NFL. Last year Griese's banged-up ribs prevented him from performing up to capability in the play-offs and the Dolphins lost to Pastorini and the Oilers.

Paul Concialdi

"Assessing Pain," Ada K. Jacox, *American Journal of Nursing:* 895-900, May, 1979.

Evaluating a patient's pain is difficult. The person in pain has attitudes shaped by social and cultural forces, as well as by personality characteristics. The person making the assessment also has attitudes about how much pain should be tolerated or expressed. The ability of one person to interpret accurately what is felt by another is complicated when the attitudes of the assessor and the person being assessed differ. Any attempt to evaluate pain must begin with the recognition that pain is a subjective phenomenon, response, and report of subjective events. This poses many problems for the assessor and the person experiencing pain. A major implication of this is that the patients should be carefully questioned about what they are experiencing. The problem with difficulty in assessing pain has several dimensions. One is that we do not yet know enough about how pain is experienced by patients. A second is that wide variation in how pain is reported, and a third is that health professionals may gradually become less sensitive to patient's complaints of pain. (The author) speculated that persons who are in constant contact with patients in pain may be so overwhelmed by a person's pain that they protect themselves by denying it, or that the health professional becomes so familiar with pain that they tune it out. We should examine our own attitudes toward pain, and what we expect of ourselves and others. Careful attention to what the person in pain is feeling, while trying to minimize one's beliefs about how much pain should be tolerated may help to make the assessment more objective. Perhaps even more important, however, is for those who have been in practice for some time to become resensitized to the need for careful pain assessment. It is too easy to slip into an acceptance of the familiar, and when one works for days, weeks, and years with patients in pain, one may well tend to become immune to expressions of pain.

Tim Garl

"The National Athletic Injury/Illness Reporting System: 3 Year Findings of High School and College Football Injuries," Alles, Powell, Buckley, and Hunt, Jr., *The Journal of Orthopedic and Sports Physical Therapy* 1: 103, Fall, 1979.

The National Athletic Injury/Illness Reporting System (NAIRS) is a national surveillance system whose primary objective is to provide a feasible and inexpensive mechanism for the continuous collection and analysis of information on sports-related injuries, while additionally offering institutions a meaningful recordkeeping system for self analysis offering comparison with other schools. The present report is an attempt to clarify the risk of injury for high school and college varsity football. For purposes of this study, a reportable injury is defined as any injury that caused cessation of an athlete's customary participation for at least one day after the injury. Injuries are categorized as minor, moderate, major, and severe. The3-year reportable injury rate for high school football was about 8 per 1,000 athlete-exposures. The college population experienced a case rate of about 11 per 1,000 athlete-exposures. Data concerning neurotrauma, meniscus/knee sprains, and ankle sprains is presented. Also examined is whether or not artificial surfaces contribute an additional important or statistical risk of injury. It would appear that surface hardness and surface friction do not represent an added risk of injury among college football players in the NAIRS population. The shoe-turf interface contention does seem to warrant additional study of knee and ankle injuries as related to playing surface. NAIRS data show an association between playing surface and the risk of knee and ankle injury.

Marty Erb

"Athletic Training - And How Diet Affects It," Daniel F. Hanley, Jr., M.D., *Nutrition Today* 14:5 - 9, November/December, 1979.

Everyone has had the experience of pushing his body to

its limit against some physical task and still not be able to attain the goal. What are the things in our bodies that limit our abilities, that keep us from attaining these goals? In the end, it is the muscles that must do the task, defined by the brain with fuel supplied to it by the heart, liver, and lungs. If the muscle is the engine that helps us perform tasks, then cell physiology tells us about how this "engine" burns the fuel we eat, and how we can best tune this "engine" to produce a maximal performance. Selection of the proper gasoline for a car is not particularly different from the selection of a proper diet for the body. The best nutrition combined with the untrained muscle will have little effect on performance, just as high octane is wasted on an old car. The opposite is equally true; an excellent performance should not be expected from a trained muscle if it has been fueled with too little or the wrong kind of nutrients. The final fuel for muscle activity is ATP, but the muscle store is quite limited. Information gathered from the biopsy and biochemical assay of human muscle suggests stores of ATP can fuel activity for a matter of five to ten seconds. Muscles carry no debts when it comes to ATP. They continually regenerate their ATP supply from foodstuffs. After eating and digestion, the body is left with two primary nutrients for fuel: glucose and fatty acids, which both serve as fuel for the contracting machinery in muscle. Both glucose and fatty acids are constantly circulated to the muscles via the bloodstream. They are continally absorbed into the cell and metabolized (with the aid of enzymes) into carbon dioxide and water with the simultaneous production of ATP. The athlete who out-performs his peers is surely the individual with the best muscular "equipment" and that "equipment" requires a diet balanced in carbohydrates, fats, and protein.

John Wells

Book Reviews *Continued from page 38*

understood by the public.

The text begins with an introduction to sportsmedicine, and highlights its relevance by providing the number of participants in specific activities each year.

In the second chapter, the authors address fifteen common sportsmedicine myths. Some of the myths are longstanding while others represent new fallacies resulting from the sports boom. This chapter provides interesting reading on sportsmedicine misconceptions and includes statements by great athletes in the margins.

The remainder of the book deals with training, endurance, exercise programs, nutrition, drugs, prevention and treatment of injuries, exercise in extreme weather, and how to choose a sportsmedicine physician. The appendix contains information on where to get a stress electrocardiogram.

In general, the text is easy to read and understand. The authors have interviewed hundreds of professional and amateur athletes in addition to trainers and doctors. They have achieved their goal of disseminating sportsmedicine information that is universally applicable. This book is highly recommended for coaches, athletic trainers, and anyone involved in physical activities.

Charma Shiroky Herlan

Patronize
Athletic Training
Advertisers

The Effect of Biofeedback and Static Stretching on Muscle Pain

George H. McGlynn, PhD and Neil Laughlin, PhD

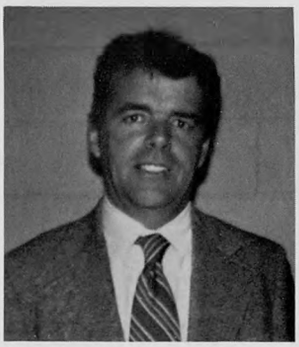
Introduction

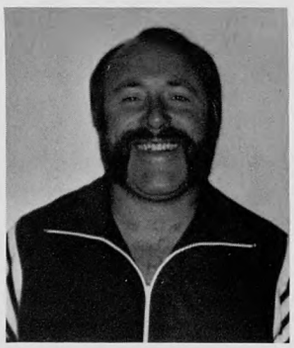
It is a common occurrence for individuals who engage in rigorous muscular activity to experience pain in the muscles. The pain may occur during the activity, immediately afterwards, or be delayed up to 24-48 hours after the termination of physical activity. The pain that occurs immediately after exercise is thought to be primarily due to biochemical end-products of metabolism, accompanied by local tissue edema.[1, 4]

The basis for pain or soreness that occurs 1-2 days after exercise has still not been firmly established. For many years it was hypothesized that this kind of pain was caused by minute ruptures or tears in skeletal tissue. This theory was at first advanced by Hough[17] and later by Hill[16] and Staton[24]. However, more recently, deVries[10, 11, 12] advanced a spasm theory concerning muscular distress. He contended that rigorous muscular exericse caused ischemia, ischemia causes pain, and pain results in increased reflex activity; then greater motor activity causes more muscle tension, more tension produces more ischemia, and so forth. deVries[11] recommends a static stretch technique for the relief of this type of muscle pain. His findings indicated that a static stretch depresses the monosynaptic response, thus reducing electrical activity in the muscle and diminishing ischemia and pain.

In one study de Vries[10] found that static stretching reduced perceived pain in 6 out of 7 subjects with shin-splint type of muscle pain. In another study he had 17 subjects hyperextend both wrists during a four-minute exercise which produced pain[9]. The subjects then applied static stretching techniques to the non-dominant arm immediately after exercise and 2, 6, 20, and 22 hours afterwards. Greater pain was found in the non-stretched arm and the highest pain levels were found 24 and 48 hours after the exercise. In another study deVries[12] induced pain in both brachialis and biceps brachii. He found that pain decreased immediately after exercise and then increased sharply at 48 hours following exercise. Static stretching significantly decreased pain. If, as deVries[11] states, delayed muscle pain resulting from rigorous exercise is the rsult of muscle spasm, and static stretching reduces spasm and pain, then perhaps EMG biofeedback techniques will also lessen spasm and pain.

However, the spasm theory still does not explain why pain usually affects an athlete more in the early training stages. In addition, some research indicates that muscle pain is unique to activities involving eccentric contraction or "negative work"[27]. One limitation of studies in the past has been that almost none have used EMG feedback to treat artificially induced pain and compared its effectiveness with static stretching and a control group which receives no treatment. The purposes of this study





Dr. McGlynn is chairman of the Department of Physical Education and Health Education while Dr. Laughlin is an associate professor of Physical Education at the University of San Francisco in California.

are:

1. to determine if EMG feedback can be an effective means of treating muscle pain induced by eccentric contraction;
2. to compare its effectiveness with static stretching and a control group which rests.

Review of the Literature

There is considerable evidence that complete relaxation of normal human striated muscle at rest can be demonstrated by electromyography and that a normal individual can reduce neuromuscular activity in the skeletal muscle by relaxing [13, 21, 22, 23, 25, 26]. Basmajian[2] gave subjects auditory and visual cues of myoelectrical potentials recorded by means of intra muscular electrodes. The cues provided the subjects with an awareness of twitching of individual motor units. He found subjects could control this activity in a few minutes. Harrison[15] successfully trained subjects by auditory feedback in firing motor units at will. A number of other studies have found similar results in the ability of subjects to control motor activity by means of biofeedback[3, 7, 19].

Several other studies have also dealt with the use of auditory feedback in muscle therapy. Jacobs[18] utilized electromyographic feedback to reduce painful neck spasms by relaxing affected muscles. Hardyk[14] used biofeedback successfully in abolishing laryngeal muscular activity in certain types of reading problems. Swaan[26] found that auditory feedback of the peroneus longus muscle resulted in better inhibition of unwanted muscle activity than conventional physical therapy. His study indicated that feedback therapy was more effective because it was continuous, immediate, and more quantitative. Cleeland[8] used auditory amplification with 10 patients suffering from spasmodic activity of the neck and found reduced spasms in 8 out of 10. There is also evidence that biofeedback gained from the frontalis muscles with surface electrodes is effective in reducing tension produced headaches[5, 6, 28]. Finally, in an earlier study McGlynn[20] found that when compared with a control group, biofeedback significantly reduced quadriceps pain resulting from negative work.

Procedure

The subjects were 48 males aged 18 to 23 who had not engaged in any systematic activity with their non-dominant arm for at elast 30 days prior to testing and for the duration of the experiment. Subjects were assigned at random to one of three groups: biofeedback, static stretching, and control.

Muscle soreness was induced through the use of eccentric contraction by means of a dumb-bell with the weight adjusted to 80% of each subject's maximum level. A similar technique was utilized by Talag[27] and found to be effective in producing muscle soreness. The subjects were seated at a table with their elbows flexed at a 45° angle and resting on a 2-inch thick felt pad. The cadence was 60 counts per minute. The individual was seated so that no other part of the body could aid the non-dominant arm in the contraction. On the count of "one," the subject slowly lowered the weight to the table level (180°) and the weight was then taken from his hand. At the count of "two" he returned his arm to the starting position and the weight was replaced in his hand. Counts "three" and "four" were a rest period. The cycle was then repeated, the subject continuing the exercise until exhausted. After a 2-minute rest the subject repeated the exercise until he could no longer continue.

Each subject's pain level was recorded immediately after exercise and at 24, 48, 72 hours following exercise. He was asked to rate on a chart the degree of pain, stiffness, or soreness which he felt in the biceps brachii by marking a number from 1 to 10 in one of three categories: "mild," "moderate," and "severe." (See 1.)

The subjects in the biofeedback group reported for 15-minute sessions of biofeedback given at 6, 25, 30, 49, and 54 hours after exercise. An automatic timer was used to monitor the 15-minute intervals. The instrument employed to implement biofeedback was a highly sensitive, miniaturized battery-powered electronic device* specifically designed to monitor and measure muscle activity and provide immediate audio-feedback by means of an earphone attachment. The electromyograph was calibrated by the use of an audio-occilator and precision attenuator.

The subjects were seated in a comfortable position in a room which was free from noise and distraction. Two silver-chloride surface electrodes were placed on the biceps brachii at 2" and 3" above the elbow joint respectively. The third (ground) was placed laterally on the forearm about 1" below the elbow. The electrodes connected to the EMG instrument were attached to the non-dominant arms of the subjects and the earpiece was placed in one ear. The subjects had been given the following written instructions:

> "Try to see yourself in a situation where you are warm, content and comfortable. Concentrate on the specific details of the scene, e.g., the color of the room, time of day, person you are with, etc. Now try to relax your muscles so that you slow down the speed at which the instrument clicks. Continue trying to slow down the rate of clicking for approximately 15 minutes."

The subjects in the stretch group also reported for 15-minute sessions at 6, 25, 30, 49, and 54 hours following exercise. They employed a static stretch technique described by deVries[10] in which the forearm is hyperextended for 2 minutes, then rested for 1 minutes. This 3-minute sequence was then repeated four times.

Results

Table 1 presents the means and standard deviations for the perceived pain of the subjects in three treatment groups: biofeedback, stretch, and control. Means and standard deviations for pain are presented for the sum of recordings taken four times during the research and for each individual recording. Recordings were made immediately after exercise and 24, 48, and 72 hours following exercise.

Figure 2 presents a graph of the means for perceived pain recorded immediately after exercise and 24, 48, and 72 hours following exercise. Analysis of the differences between each treatment group and across each treatment's recordings was performed by one-way analysis of variance using Biomedical Computer Program 01V. Every difference which attained the .05 level of significance is presented in Table 2.

As Table 2 shows, the four-day means perceived pain of the biofeedback group (i.e., the total of the means for each treatment's recordings) differed significantly from that of the stretch group and the control group. Table 2 also indicates that the mean perceived pain of the biofeedback and control groups significantly differed across recordings. The difference between the four-day mean for the stretch and the control group was *not* significant, but the differences across recordings for the stretch group approached significance (p. 10).

Discussion

It is apparent from the results presented in Tables 1 and 2 that subjects in the biofeedback group had significantly more perceived pain than subjects in the

*The Myotron, Somatronics, St. Joseph's Hospital, 355 Buena Vista Avenue East, San Francisco, California.

static stretching and control groups. A possible explanation why the biofeedback group had significantly more perceived pain than the control group is that the subjects in the biofeedback group may have been more conscious or sensitive to pain in their biceps brachii because the biofeedback treatment had them focus on this muscle group and perceived pain is a subjective measure which depends on the focus of each individual. For this explanation to attain a good deal of credibility, the static stretching group should also have significantly more perceived pain than the control group because the static stretching treatment also had its subjects focus on the biceps brachii. However, the static stretching group did *not* significantly differ from the control group. These findings contradict those of an earlier study by McGlynn[20] in which subjects who used biofeedback for three days following exhaustive exercise had significantly less perceived pain in the quadriceps muscle group than a control group which rested.

The finding that the perceived pain of the static stretching group was not significantly lower than that of the control group is somewhat at variance with a finding of deVries[12], who noted a significant decrease in perceived pain in the brachialis and biceps brachii as a result of static stretching. However, deVries' stretching was not begun until 48 hours after exercise and his control was the dominant arm, which was not subjected to exercise. Thus a close comparison with this study cannot be made.

It was interesting to find that the perceived pain of the biofeedback group was higher than that of the static stretching and control groups immediately following exercise (see the post tests in Table 1.) Since an initial difference in the way each treatment group perceived pain immediately following exercise might account to some extent for differences which occurred between these groups at 24, 48, 72 hours following exercise, and ANOVA was run on the post test means, but they did *not* significantly differ.

Unlike the static stretching and control groups, the perceived pain of the biofeedback group was considerably higher at 24 hours following exercise than it was immediately after exercise. These findings suggest that

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR PERCEIVED PAIN

		4-DAY MEAN	DAY 1 POSTTEST	DAY 2 24 HOURS	DAY 3 48 HOURS	DAY 4 72 HOURS
Biofeed-back	$\bar{X}$	6.77	6.13	10.25	7.38	3.31
	SD	4.93	4.24	5.80	4.30	2.36
Stretch	$\bar{X}$	4.25	4.81	5.06	4.88	2.25
	SD	4.18	3.90	3.99	5.30	2.89
Control	$\bar{X}$	3.98	4.00	4.56	5.31	2.06
	SD	4.10	3.81	4.56	4.56	2.89

TABLE 2

ANALYSIS OF VARIANCE FOR PERCEIVED PAIN

Source	df	MS	F	p
Biofeedback vs. Stretch	1,63	202.51	12.37	$>.001$
Biofeedback vs. Control	1,63	247.53	10.97	$>.005$
Biofeedback Across Conditions	3,45	132.52	11.57	$>.001$
Control Across Conditions	3,45	30.89	4.41	$>.01$

Pain Levels

NONE (0): Noticeable effects

MILD: Barely perceptible symptoms of pain or stiffness

MODERATE: Symptoms of pain, soreness or stiffness which interfere with normal muscular function to a slight degree

SEVERE: Symptoms of pain, soreness or stiffness which interfere with normal muscular function to a MARKED degree

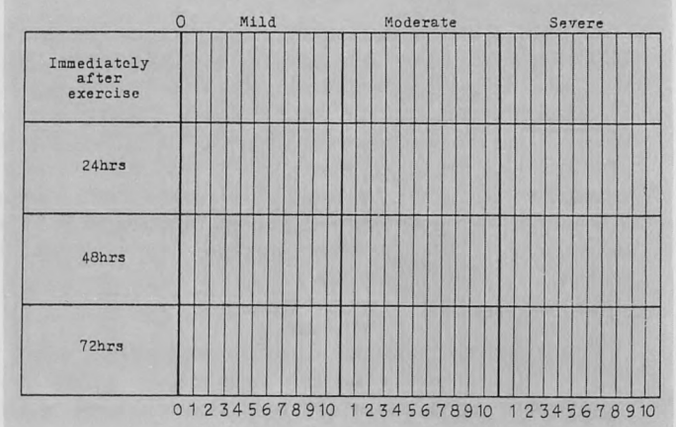


FIGURE 1 - Pain Chart

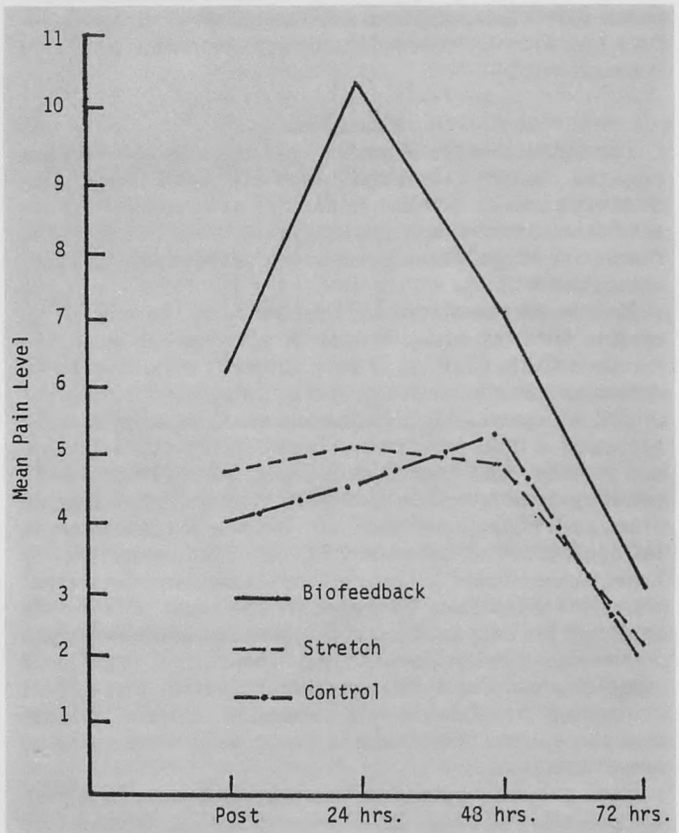


FIGURE 2 - Mean Pain Levels

biofeedback was not very effective in reducing perceived pain in the biceps brachii and are at variance with the results of a number of earlier studies in which biofeedback reduced pain. For example, Cleeland[8] and Jacobs[18] successfully used EMG auditory feedback to reduce pain caused by neck spasms and Budzynski[5], [6] and Wickramasekera[28] used biofeedback to reduce tension-produced headaches.

One possible explanation for the variance of the results of this research with the studies cited in this discussion is that different muscle groups were used in each study. Perhaps the biceps brachii is less susceptible to biofeedback therapy than other muscle groups. This explanation is especially plausible when comparing the two McGlynn studies since both were conducted under very similar conditions.

The biofeedback and control groups significantly differed across recordings and the stretch group's differences across recordings approached significance. When examining the means for each recording in each treatment group (see Table 1 and Figure 2), it is interesting to note that in all three treatment groups pain reaches its highest level at 24 or 48 hours following exercise and then declines at 72 hours. This pattern is consistent with earlier research by deVries[9], [12] and Talag[27].

Conclusion

While there has been considerable research on the effect of biofeedback on pain, most of the research has been concerned with pain not produced by exercise. The fact that this study indicated that biofeedback was significantly less effective than static stretching and rest in reducing pain produced by exercise suggests that the effect of biofeedback therapy on various kinds of pain incurred in sport needs to be examined more extensively. The fact that in contrast with earlier research by deVries[9], [10], [12] static stretching was *not* significantly more effective than rest in reducing pain produced by exercise indicates that pain produced by sport needs to be examined further in research involving different muscle groups, different methods of inducing pain, different kinds of athletes, and different kinds of therapy.

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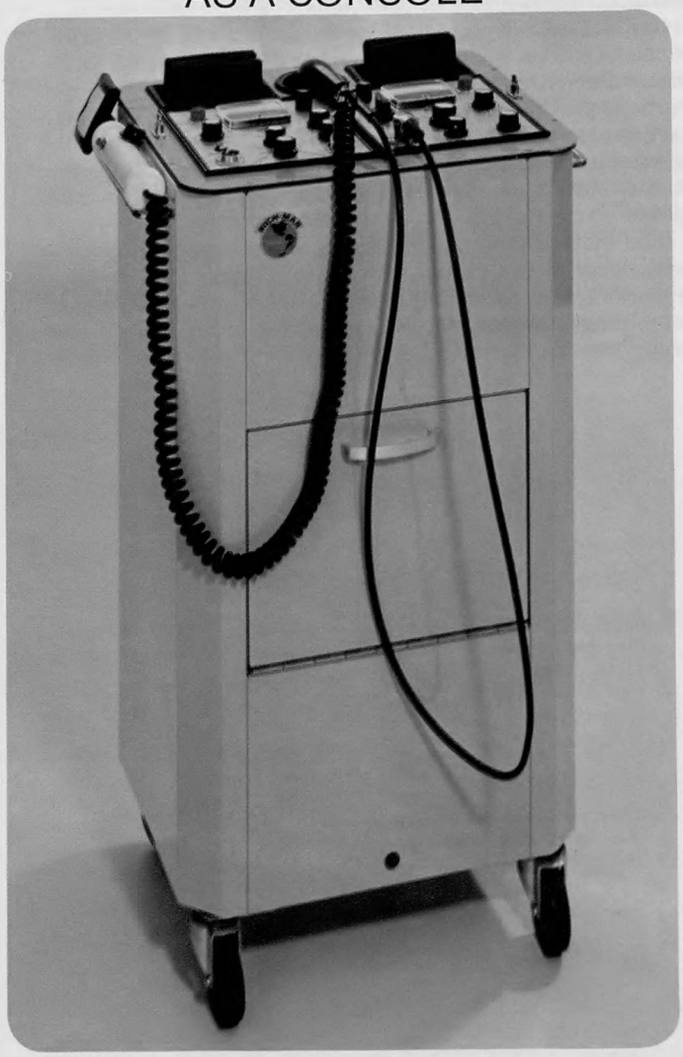

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Professional Advancement of Athletic Training Via Documentation and Publication

Sam T. Kegerreis, ATC, PT, MS

A wealth of empirical knowledge has saturated athletic training settings for countless years. The relative repetitiveness of specific sports related injuries has provided a clinical laboratory in which a multitude of treatment regimes have been implemented, evaluated, and contrasted. The value of this undocumented wisdom has always been appreciated from within the profession. Aspiring young athletic trainers have treaded in the shadows of their predecessors, eager to embrace scraps of brilliance falling, however randomly, from the tables of experience. In this manner, transfers of information have taken place throughout the years, adequately maintaining an elite core of individuals, each having been fortunate enough to have been adopted and tutored by a "caretaker of knowledge."

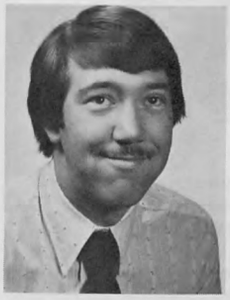
In the past, a minimum of documented data has been provided to assist the young trainer in analyzing contemporary techniques in the prevention, treatment, and rehabilitation of athletic injuries. Recently, this situation has been somewhat alleviated by a deluge of sports medicine publications. However, casual investigation indicates that a majority of such literature is authored by concerned sports medicine specialists, other than athletic trainers. The contribution of such works to athletic trainer education is significant and not to be taken for granted. Publications by sports oriented physicians, physical therapists, podiatrists, and research physiologists are currently studied by athletic training educators and synthesized into lesson plans and clinical usage. With the possible exception of contributions to the quarterly published National Athletic Trainers Association *Athletic Training* one must pause considerably when searching for scholarly research and publications submitted *by* athletic trainers *for* athletic trainers.

Several theories can be offered to explain the aforementioned lack of scholarly literature published by practicing athletic trainers. Athletic training has traditionally been recognized as a pragmatic profession. Hypothesis may be presented and levels of significance may be calculated, but the bottom line mandating an athletic trainer's ultimate attention remains the return of injured athletes to safe effective competition in the least possible time. The possessiveness of athletic trainer's energies, as commonly exhibited by coaching staffs and athletic departments, also contributes to a lack of scholarly productivity. Job descriptions which include the responsibilities of team travel arrangements and the projection of game films are inconsistent with athletic trainer aspirations of elevating their present professional lot. Cumulative time demands on athletic trainers can perhaps only be truly appreciated by those who have actively engaged in the field.

The void in athletic training research and publications can also be attributed to the relative infancy of athletic training as an allied health profession. The NATA was formally organized in 1950. Prior to this time word of mouth and field experience served adequately in preparing young trainers for gainful employment. The scope of athletic training consisted primarily of professional and collegiate positions, with only a handful of high school trainers in existence. A finite athletic population was adequately served by a self-perpetuating group of individuals with little need for extensive publication. As long as an athletic trainer could "get 'em back by Saturday," the job was being done, and being done well.

The athletic trainer has evolved as a "jack-of-all trades" in meeting the above requirement. He is expected to evaluate orthopaedic injuries with skills sufficient to determine if physician consultation is warranted. A familiarity with neurology, dermatology, and other medical specialties is required to insure adequate sports medicine referral. The athletic trainer is expected to be well versed in nutrition, physiology of exercise, psychology, and a multitude of other areas. By virtue of his/her inherited role, athletic trainers are required to maintain an adequate grasp of a multitude of subjects, often at the expense of feeling entirely comfortable with any one. The reader can therefore appreciate an athletic trainer's hesitancy when attempting to publish. For instance, the possibility of a medical physiologist critically reviewing an article on local inflammatory response as it pertains to athletic injuries is an imposing threat.

A final argument in defense of non-publishing athletic trainers revolves around the cliche, "the treatment of athletic injuries is an art, not a science." The writer is the first to agree that soft tissue injury is a dynamic process, and the management of such injuries can not be fully appreciated via print. Techniques which work on one athlete may fail miserably on another. Knowing when to change treatment regimes or move on to the next stage of rehabilitation is a gift most often granted by experience. In viewing this circumstance and others, one appreciates more fully the historical evolution of today's athletic



Mr. Kegerreis is an athletic trainer and instructor in the Athletic Training Curriculum at West Virginia University, Morgantown, West Virginia.

trainer and the accompanying lack of productivity in areas of research and scholarly publications.

Professional, public, and political recognition of athletic training is perhaps more crucial now than ever before. The passage of "Proposition Thirteen' in California imposes ominus threats on the creation of high school athletic training positions, as well as education as a whole. Liaison between the NATA and the APTA (American Physical Therapy Association) has great implications pertaining to state licensure of athletic trainers. The availability of federal and state grants, as reflected by NAIRS (National Athletic Injury/Illness Reporting System), remains entirely dependent on athletic training credibility. The youth of the NATA has placed athletic trainers at a distinct disadvantage among older more established professional groups. Acceptance of athletic training appears contingent on the abolishment of the cigar chomping, sweatshirt attired stereotype so ingrained in the minds of many. If twelve hour days are not spent administering whirlpools and taping ankles, just what do trainers do? A conscientiously prepared library of scientifically documented publications by practicing athletic trainers could sufficiently answer this and other questions pertaining to a new species, the professional athletic trainer.

Personal employment dividends represent a secondary purpose for elevating the professional status of athletic trainers via published literature. One might assume that professional employees so clinically involved that they have no time for research or academic concerns would possess optimum faculty status and equitable salary renumeration. Unreasonable work loads and dependence on the whims of coaching staffs have prevailed for so long that athletic trainers have begun to accept such unpleasantries as "part of the job". The athletic training room represents an ideal laboratory for the teaching of sports medicine skills and accompanying research. One must remember that the athletic trainers first loyalty remains with his/her athletes and respective coach. However, beyond this assignment lies the obligation to investigate and document innovative techniques for the benefit of peers and posterity. Deserved recognition from the academic community must follow accordingly, with athletic trainers rising in faculty status for services beyond that of longevity. The opportunity to publish and conduct research should be allocated to every athletic trainer for his/her personal self improvement as well as for that of the field.

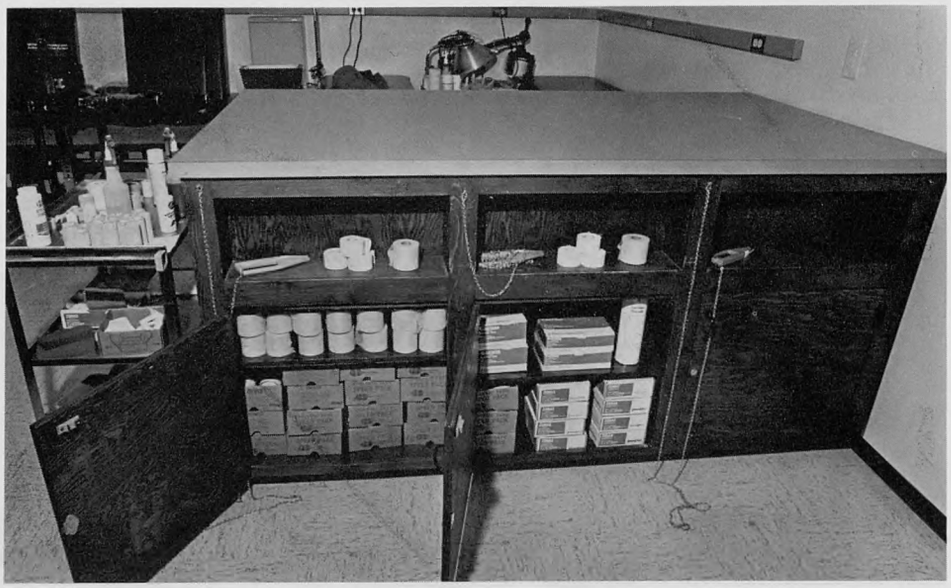
The emergence of athletic training curriculums lends further emphasis to the call for publications *by* athletic trainers *for* athletic trainers. Increasing numbers of young trainers becoming certified annually adds credence to the belief that each of these individuals can not possess the personal experiences of their predecessors. It is ridiculous to assume that members of a curriculum consisting of forty student trainers can accrue the same laboratory experiences enjoyed by four or five students in an apprenticeship program. It is equally difficult for apprenticeship students to obtain comprehensive academic preparation for careers in athletic training as provided in better curriculums. Publications by sports medicine physicians, research physiologists, etc. currently supplement student trainer education, but who can more readily translate basic science to young athletic trainers than athletic trainers currently practicing in the field? By adding literature published by athletic trainers to the already blossoming publications of other sports medicine specialists the young athletic trainer benefits immensely in identifying his/her role inproviding care for student athletes.

A final plea for publication by athletic trainers involves the growing public need for education pertaining to sport oriented injuries. While physicians, physicial therapists, etc. treat a majority of tennis elbows, sprained ankles, etc. sustained by weekend athletes the empirical knowledge accumulated by athletic trainers lies unused and unappreciated. It is the writer's contention that qualified athletic trainers provide more efficient and appropriate acute care for soft tissue injury than does any other medical group. In addition the secondary treatment and rehabilitation of sport related injuries in many clinics could benefit greatly from the knowledge of individuals whose primary job has been to "get 'em back by Saturday."

Athletic trainers have a unique opportunity via publication to improve their professional status while contributing to the health care of thousands. In order to meet this challenge they must shake off their bonds of subjugation and establish themselves as qualified members of an academic society. They must improve their command of the basic sciences and take the initiative to document their successes and failures. This new group of professionals is to be evaluated by established practitioners as well as the public. Will they have a body of literature available at that time to present in answer to the question, "What is an athletic trainer anyway?"

Tips From the Field

Taping/Storage Table



Ronald F. Ribaric, ATC
Head Athletic Trainer
University of Central Florida
Orlando, Florida

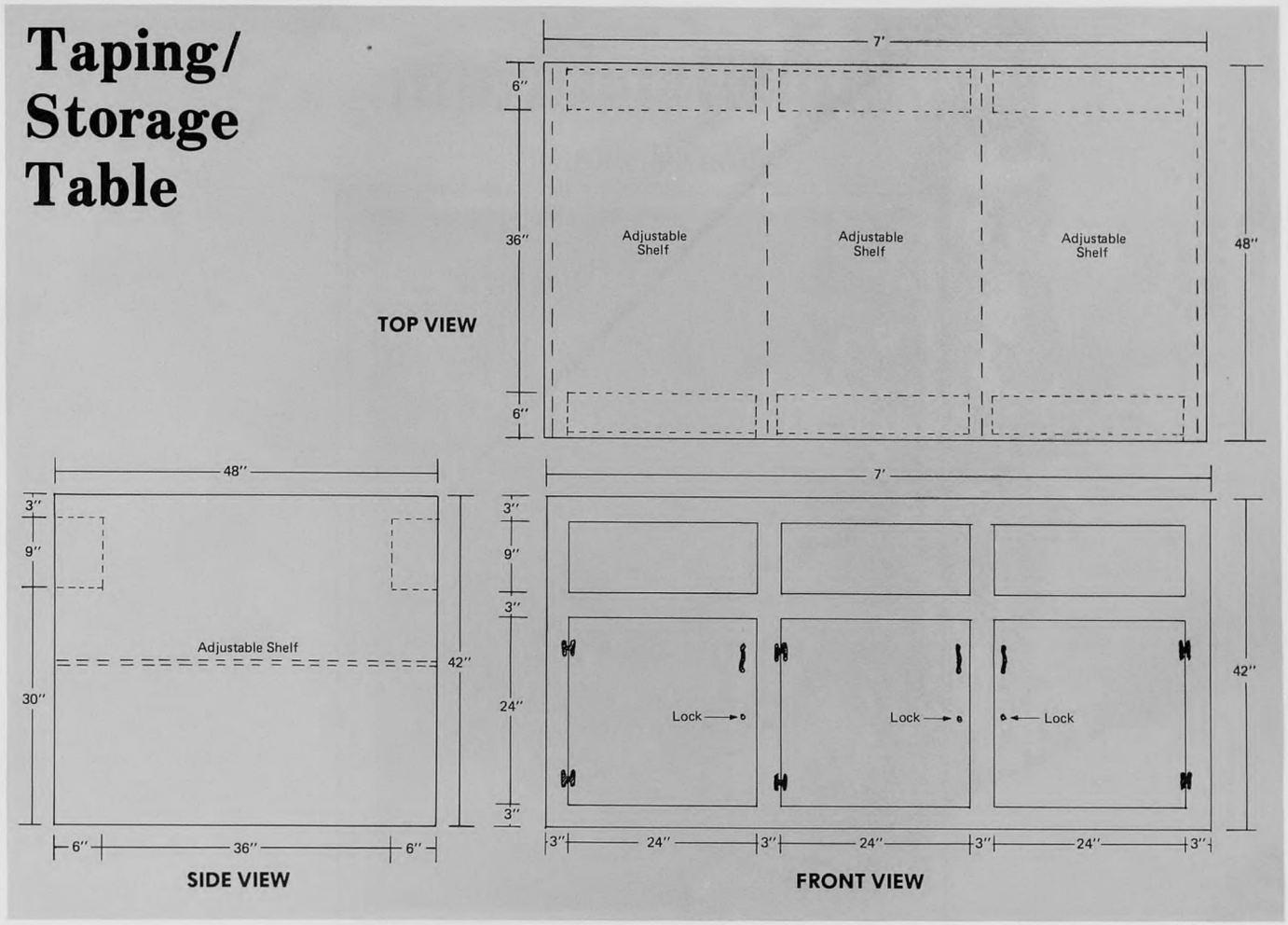
The University of Central Florida started a Division III football team for the 1979 season. No increase in facility size was given, as a result space was at a premium.

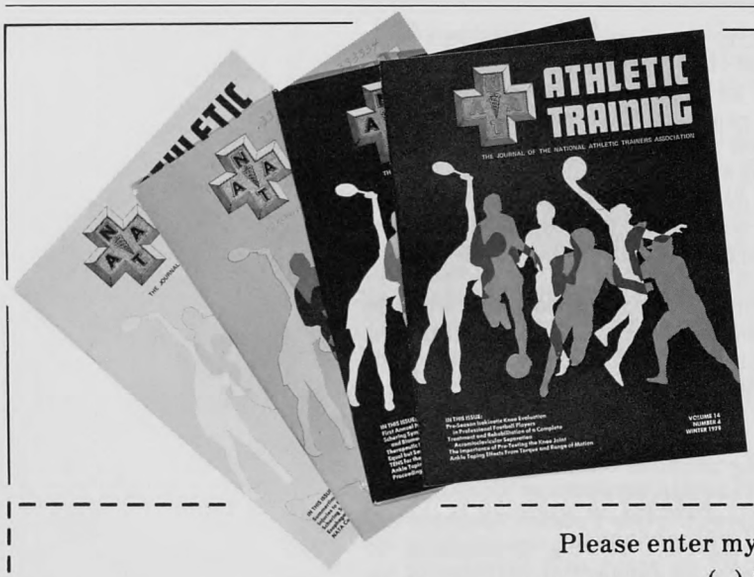
This taping table was devised to solve two problems we faced: storage and a taping table. One benefit we found with the table was the ability to use either side for taping. This increases the options for placement in the facility. The shelves in the cabinets are adjustable with the entire area open for storage if needed. This has greatly increased our storage capacity. The top is covered with formica which makes for easy cleaning. We found that wiping the top with tape remover before using a soap gave us the best results. Doors for the cabinets have locks and are all keyed the same. This provides needed security. At first glance it may seem that the table is too high. We have all suffered the "TRAINER'S BACK SYNDROME" from long taping sessions. After a short time, you will not notice the height difference of the table.

3/4 inch plywood was used to build the cabinet. All the work was done on campus by our carpentry shop. This kept our labor cost down. Actual cost for the table was $700.00. Different sizes can be devised to meet other needs by adding or deleting sections (each door being a section). The finished product was stained and varnished. This held up well with all the use it received. The table was constructed in pieces and assembled in the training room. This allows it to be moved if the facility has to be vacated.

Editor's Note: Anyone wishing to have an idea, technique, etc. considered for this section should send one copy to **Ken Wolfert, Miami University, Oxford, Ohio 45056.** *Copy should be typewritten, brief, and concise, using high quality illustrations and or black and white glossy photos.*

Taping/ Storage Table





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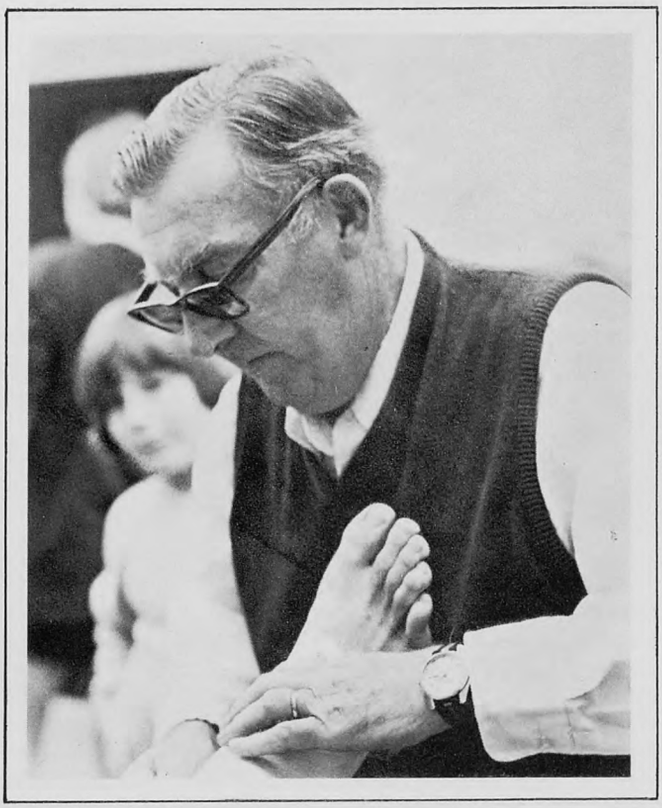
In Memoriam

JOHN F. BRONK



During more than thirty-five years on the Phillips campus, "Jake Bronk won the respect and affection of thousands of students as a trainer and counselor who treated their physical problems with skillful hands and professional wisdom and their other problems with understanding, compassion and humor.

Born in Medford, he grew up in Reading and attended Reading schools. As a schoolboy, he excelled in sports, playing for a professional football team, the Pierre Marquettes, while still in high school.

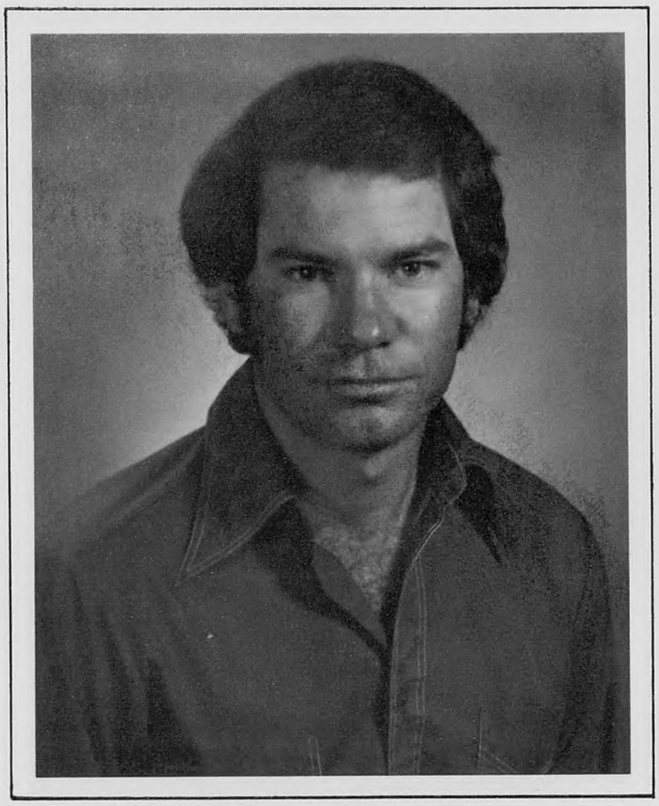
He studied bone and muscle formation and athletic training at the Nylin School and apprenticed at Harvard University under Dr. Augustus Thorndike and Jack Fadden. He was head trainer at Dartmouth College for four years, until he accepted the job at Phillips in May, 1944.

In 1958 he became a house counselor and faculty member at Phillips, teaching physical education. In 1959 he received his license as a registered physical therapist. He also led workshops at Lowell State College, teaching advanced techniques in athletic training procedures to coaches and other trainers. In January of 1978 one of his legs was amputated, but he resumed his work as athletic trainer that fall.

At the ground-breaking ceremony for the Athletic Complex in the spring of 1978, it was announced that the new trainers and coaches room would be named in honor of John F. Bronk and his wife Helen, the office manager of the Alumni Office.

In Memoriam

CRAIG GILBERT



When 2,500 people crowded into the Plano, Texas, High School Gym to pay their respects to Craig Gilbert, it epitomized the way the 27-year-old trainer had lived his life — by giving to others.

Gilbert had been trainer at Plano, just north of Dallas, for five years. During that time, every one he came in contact with quickly came to know of his love for his work and his generosity during his off hours.

It was that feeling for mankind that placed him in a boat on Lake Lavon on August 5, 1979. The father of two Plano students had died the week before and Gilbert thought it would be a nice gesture to take them fishing, along with some of his colleagues.

As fate would have it, the boat struck something and flipped Gilbert out. He was struck in the head and did not recover.

Gilbert was born on May 27, 1952 in Dallas. He was a graduate of Bishop Lynch High School in Dallas and Texas Tech University in Lubbock. He served as a student trainer for four years under Bob Bissell.

During his five years at Plano, Gilbert worked with students from all sports, including one of the state's top football programs. He also taught health and physical education.

"He had a combination of duties", said head football coach Tom Kimbrough. "He helped the kids physically and mentally . . . he was a very special person."

The trainer is survived by his wife, Karen Gilbert of Plano; his parents, Mr. and Mrs. Larry Gilbert of Dallas; a brother Mark Gilbert of Tyler, also a trainer; and grandparents, Mr. and Mrs. Sam Gilbert of Cumby and Mrs. Ora Sessions of Brownwood.

In Memoriam

LAURENCE "PORKY" MORGAN

The unexpected and sudden passing of Porky Morgan on February 7, 1980, of a heart attack was a shock to all of his friends and the entire campus community of Kansas State University.

Morgan, a native of Moline, Illinois, was born January 14, 1916. He graduated from St. Ambrose College, Davenport, Iowa in 1949 and served in the U.S. Army from 1941-1946 ending his career as a Captain. He was a trainer at St. Ambrose in 1939, at the Citadel, Charleston, South Carolina in 1940 and at St. Ambrose again from 1949-1951.

Porky came to Kansas State in 1951 as their first athletic trainer. He served as the only Head Trainer for Kansas State University for the next 29 years.

DeLoss Dodds, KSU Athletic Director and former KSU athlete and Track Coach, said of Porky: "He was an institution. He was a tremendously loved and tremendously respected professional, and he will be dearly missed." Porky will always be remembered for his stories and jokes, which he used to bring perspective to the daily problems in athletics.

Morgan's accomplishments also included serving as a district officer in the N.A.T.A. District 5. He was the trainer for the U.S. Track Team in the 1967 Pan American Games in Winnipeg, Canada. In 1974 Lawrence "Porky" Morgan was inducted into The Helms Hall of Fame.

Morgan is survived by his two daughters, Mary Lawrence Morgan of Denver, Colorado and Mrs. Anne Theresa Behl of Hobbs, New Mexico. Also surviving are two grandchildren, two brothers and three sisters.

In 1977 the KSU Athletic Department established The Porky Morgan Scholarship Fund. Contributions may be made to: Porky Morgan Scholarship Fund, KSU Endowment Association, Kansas State University, Manhattan, KS 66502.

In Memoriam

A. EUGENE "DOC" SMITH

A. Eugene "Doc" Smith, long time trainer at Memphis State University, died last Wednesday at his home, following a lengthy illness. He was 52. He is survived by his wife, Paula, his two children; Matt, a student at Memphis State, and Dana (Mrs. Mark Davis of Starkville, MS.), and his mother, Mrs. Sarah Blanche Smith of Sterling, KS.

An overflow group, comprised of family, friends, associates, former and current athletes, and MSU staff members attended funeral services, and burial at Memphis Memory Gardens.

Dr. Billy M. Jones, President of Memphis State University, led the tributes, which poured in from around the nation. Dr. Jones said, " 'Doc' Smith was an integral part of the athletic program at Memphis State University for almost two decades. His impact, not just on the health, but on the lives of hundreds of young men is known and appreciated. He will be missed."

Billy J. Murphy, Athletic Director at MSU, echoed those sentiments, and announced a Doc Smith Scholarship Fund for Student Trainers at Memphis State. Murphy said: " 'Doc' did not have a selfish bone in his body. He worked countless hours, always for the welfare of the athlete. It was Doc's wish that a scholarship fund be set up at Memphis State. That's the way he was; always trying to help his fellow man, and we shall see that this fund is sustained in Doc's memory for years to come." Murphy added, " Doc' was the finest trainer I've ever run into. His death is a great loss to us all."

Doc Smith was born in Kingman, KS., on Feb. 9, 1927. He attended Sterling (Kansas) High School and Sterling College, receiving his Bachelor of Science Degree in 1949. From there, he attended the University of Indiana, where he received his Masters Degree in athletic training, in 1954.

His first full-time job was athletic trainer at Palo Duro High School in Amarillo, Texas, where he stayed 5 years before coming to Memphis State in 1960 as Head Trainer and professor in the physical education department. He remained in those positions until his death last week.

On the national level, "Doc" Smith was an active member of the National Athletic Trainers Association (NATA), serving as a board member from District Nine. This past summer, he chaired the organization's national convention in St. Louis. In addition, he was selected as the trainer for the American All-Stars, and toured China in the summer of 1974. Just last month, he was inducted into the Memphis State University Athletic Hall of Fame.

Dr. Clifton Woolley, one of Memphis State's team doctors who worked closely with Doc Smith, said: "I don't think there could be a better man that Smitty. He was respected by everyone who knew him. He was strictly business all the way for the betterment of the athlete."

Head football coach Richard Williamson, said: " 'Doc' was a fine trainer and more importantly a fine person. I personally lost a friend who has always had the time to listen and understand the many situations one faces when dealing with athletes."

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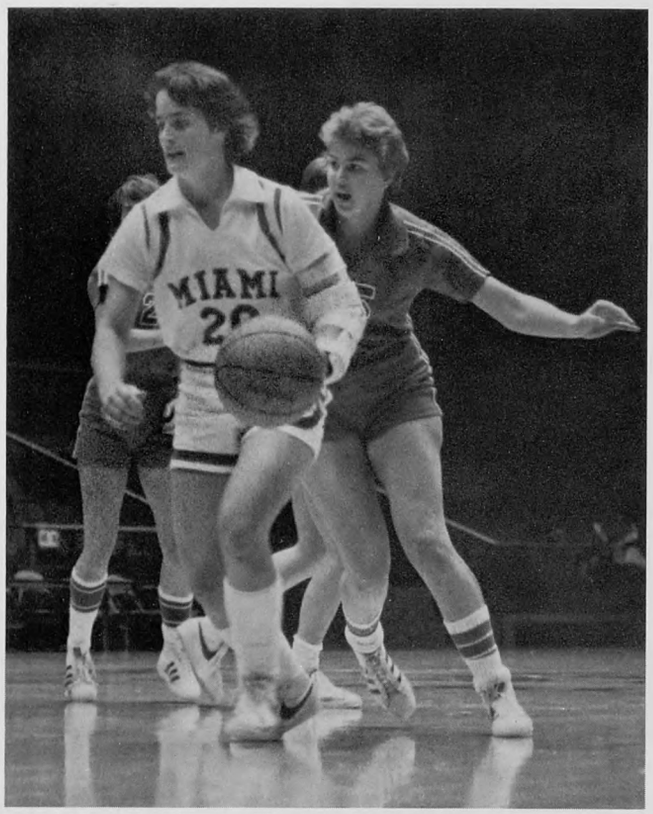

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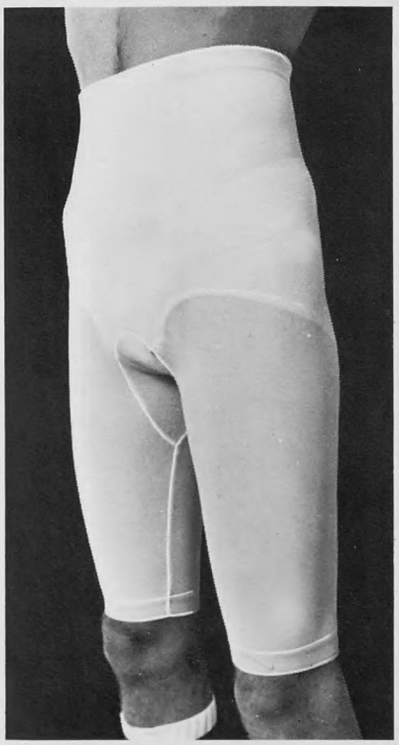

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