The JOURNAL

JUNE 1959

OF THE

NATIONAL ATHLETIC TRAINERS ASSOCIATION

10th ANNUAL MEETING, COLUMBUS, OHIO

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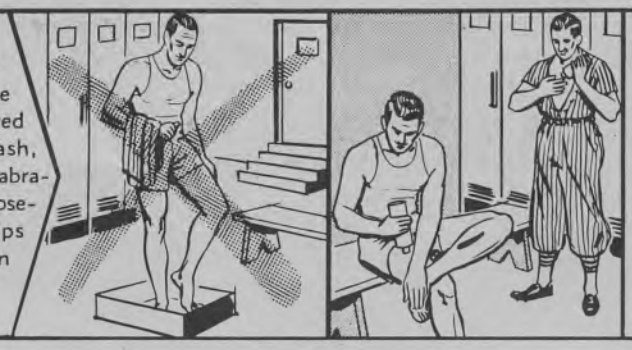

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BODY DEVELOPMENT THROUGH WEIGHT TRAINING

By EMIL MAMALIGA

The technical advances of the present day and age permit a mode of living that does not require excessive physical responses and great muscular development. However, evolution of the skeletal frame and the body does not adjust so rapidly, and the fundamental characteristics of physical fitness such as power and endurance, balance, flexibility, agility, and strength are still essential for, and are indicative of good health.

We in the profession are well aware of the relatively poor fitness and developmental levels of our charges, not only in athletics but in physical education as well. We begin early in a boy's career to develop the skills and techniques necessary for ultimate success in a given sport. How many times have you said of a junior or senior in high school, "He has everything, but if he only had the physical prowess to back it up!" To the author, this is where a mistake is made. If, as previously mentioned, our present society with its autos, TV, highly organized games, driving youngsters to school, etc., does not provide the opportunity for running, falling, dodging, pushing, pulling, climbing, jumping, and all the other actions necessary for large muscle growth and development, we must then seek a means of accomplishing this end.

Through the years many an individual has by-passed the activity of working with the weights primarily through misunderstanding the use and application of weights and allied equipment. "Weight lifting" is now applied only to the sport of competing to amass the greatest total in three recognized lifts.

"Body building" is merely a play on words, but is usually interpreted to mean development through using weights solely for the purpose of building the "body beautiful."

"Weight Training" now means the scientific application of the principles of anatomy, kinesiology, and physiology in designing a program in keeping with the individual's age level, body type, physical condition, and personal needs and goals.

Running is used as a conditioner for any sport in which the act of the running is necessary. By the same token, weights are used in any of the three previously mentioned categories. Many coaches advise against a boy participating in other sports not akin to theirs, claiming that it will affect them adversely in the muscular sense. It is true that during seasons certain sports do not complement one another. However, this is as much from the neuromuscular aspect and not from just the muscular system. A muscle in good tone will perform more efficiently than one that is not. The crux of the matter is to have the athlete ready for and during a specific season.

"Weight Training" can provide such an answer to those seeking a method which will contribute to the growth and development of young boys. Once again, study the definition of weight training. Many things have been said against using weights, but it must be pointed out that this activity, like anything else, must be used wisely.

There are many who believe that using weights will slow the muscular response. To the contrary, rehabilitation technique after World War II proved the value of using light weights as resistance to develop muscle size and response. Reaction to a stimulus is gained through "behavior reaction patterns." Regardless of the techniques used, speed of reaction cannot be appreciably increased through the senses and over the nervous system. As muscles develop they gain tonus and exert more pull on the tendons. This serves a two-fold purpose to all, but is especially important to those engaged in athletics. A muscle in good tone is in a state of "readiness" and will respond more quickly and for a greater period of time to stimuli than a muscle that is not in tone. Thus we have possibly a speeding up of reflex action. This increase of tone and resultant pull on the tendons provides greater stability to the joints of the body, thereby reducing the possibilities of injury. It is common knowledge among physical educators that lack of physical tone results in postural faults accompanied by related problems. In the athletic realm, among coaches and trainers, it is common knowledge that many pre-season and seasonal injuries occur due to the simple fact that the boys lack the muscular power and conditioning to undergo the rigors of workouts and game conditions.

It takes muscles to perform athletic activities. A boy who cannot handle his own body or weight certainly cannot handle an opponent in competition. He may be able to hit him, but can he knock him down; he may be able to grab the ball, but can he hold it? Using a program of weight training will definitely overcome this shortcoming. It also gives a boy confidence in himself, and sets definite objectives which will develop him into a champion rather than just a performer.

Since plates are adjustable and are available in light poundages a program can be instituted down to the junior high level. It is agreed among the medical profession that a level of physiological and psychological development begins about the age of 13 years. Caution: A weight program is to supplement growth and development; to accelerate the program and build too much bulk for a given frame and body type is wrong; some boys need only an agility program. We are after muscle development, but not at the expense of all important joint flexibility. To be beneficial, a demand for effort or resistance must be placed upon the muscles to develop them and create "behavior reaction patterns." Hence, by beginning at the proper level for an individual, a light weight program can be fitted into his pattern of everyday living, growth, and development. It must be guarded against that the boys try to do too much, too soon. A weight program is designed as a supplement to in-season and off-season athletic routines, not as a replacement for them.

The author recommends three weight workouts per week with short agility drills following these workouts, and agility work being done exclusively on week days in between the weight workouts. Each exercise in a program is designed to work a specific group of muscles as primary movers. Placing the working parts only a matter of inches from the prescribed position changes the muscles involved. For example: In Exercise "A" "Pull Toward Chest" (total weight being used is 45 pounds); muscles involved, back of upper arm, back of shoulder muscle, muscles directly across the back between the shoulder blades, the neck (since the head is held high), and the entensor of the spine (keeping back flattened). Exercise "B" is a variation of "A" (total weight 75 pounds). Since the weight is too heavy to maintain body balance and position as in exercise "A," the weight is pulled up under the waist and the

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BODY DEVELOPMENT (Continued)

legs must be bent to avoid excessive strain on the back of the knee. This movement brings into use other musculature, namely the "Lats" (latissimus dorsic) and Teres Major. Several of the muscles in "A" still work but the desired work across the high upper back is omitted.

ILLUSTRATION "A"

ILLUSTRATION "B"

Better results are obtained by performing an exercise precisely as described with lighter resistance than by "overloading" and requiring muscles, which should be acting in a minor role, to act as primary movers. Proper rest periods must be had during the workout itself. Only by adhering to a scientifically designed program can the desired results be achieved.

Such a basic program, requiring a minimum of space and equipment, has been evolved and time tested in the Health and Physical Education Department at Texas A. & M. College. It has been applied to many of A. & M. athletic greats over the past 11 years. The author has aided many coaches throughout the state in constructing a program for their boys. This program is now available in an illustrated, easy to understand, all-inclusive booklet. It may be obtained by ordering from the author at the Health and Physical Education Department, A. & M. College of Texas, College Station, Texas.

BODY DEVELOPMENT THROUGH WEIGHT TRAINING
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ADULT CONDITIONING AND RECREATION
By Emil Mamaliga
Associate Professor of Health and Physical Education
The A. & M. College of Texas

THE JOURNAL of the NATIONAL ATHLETIC TRAINERS ASSOCIATION

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SPORTS MEDICINE CONGRESS

CHICAGO CAMPUS-NORTHWESTERN UNIVERSITY

(Thorne Hall 434 E. Huron St., Chicago, Illinois)

September 1, 1959

8:30- 9:00 Registration for the Congress. Thorne Hall, lower level.

9:00- 9:30 First Plenary Session. Chairman, T. R. Van Dellen, M.D.
Thorne Hall, Assembly
Address: "The Advantages of Physical Fitness," Paul Dudley White, M.D.

9:45-11:15 Roundtable Discussions.

A. "New Techniques in Athletic Training and Conditioning"
Thomas K. Cureton, Ph.D.
Col. David Stubbs
Wieboldt Hall, Room 408

B. "Interval Training"
Mr. M. E. "Bill" Easton
Mr. Edward M. "Ted" Haydon
Mr. J. Kenneth Doherty, Alternate
Wieboldt Hall, Room 409

C. "The Effect of Altitude on Training"
Peter Karpovich, M.D.
Felipe Mendoza, M.D.
Arthur Steinhaus, P.D.
Wieboldt Hall, Room 421

D. "The Importance of Diet on the Conditioning of the Athlete"

E. Motion pictures and practical demonstrations.
Chairman: Dr. Fred Hein
Thorne Hall, lower level

Members are invited to show films or to make practical demonstrations of new ideas or procedures in sports medicine.

Those desiring to participate must report their intentions giving full details, in writing to Dr. T. R. Van Dellen, Pan American Sports Medicine Congress Office, 310 S. Michigan Ave., not later than August 1st. Presentation must be limited to a maximum of 15 minutes. There will be facilities for projecting 16 mm films and 2" x 2" (50 x 50 mm) diapositives.

11:30-12:30 Second Plenary Session. Thorne Hall, Main Assembly.
Moderator, Dr. Arthur Steinhaus.
Delegates who desire to make brief contributions (maximum 10-15 minutes) must notify Dr. T. R. Van Dellen, Pan American Games-Sports Medicine Congress, 310 S. Michigan Ave., not later than August 1, 1959.

12:30 Luncheon. Members of the Congress are invited to lunch.

September 2, 1959

8:30- 9:15 Third Plenary Session. Thorne Hall, Main Assembly.
Chairman: Dr. Fred Hein.
Address: "The Prevention and Treatment of Athletic Injuries," Allen J. Ryan, M.D.

9:30-11:15 Roundtable discussions continued.

F. "Treatment of Injuries to the Lower Extremities"
Edward Compere, M.D.
William Paul, M.D.
Wieboldt Hall, Room 408

G. "Treatment of Injuries to the Upper Extremities"
Irwin Schultz, M.D.
Stephen Reid, M.D.
Wieboldt Hall, Room 409

H. "The Use of Physical Agents in Training"
Dr. Joseph Doller
Mr. Frank Newell
Mr. Thomas E. Healion
Wieboldt Hall, Room 421

I. "The Effects of Physical Training on the Cardiovascular System"
Louis F. Bishop, M.D.
Joseph B. Wolffe, M.D.
Wieboldt Hall, Room 421

11:30-12:30 Summary Session. Thorne Hall, Main Assembly
Moderator: Dr. T. R. Van Dellen
Reports by recorders from roundtable discussions.

12:30 Luncheon. Members of the Congress are invited to lunch.

Exhibits in Thorne Hall, lower level, will be for members of the Congress at any time between 8:00 A.M. and 2 P.M. on September 1st and 2nd.

KNEE INJURIES IN ATHLETICS

By DR. EDWARD J. COUGHLIN, M.D.
Athletic Teams Physician
Williams College
Williamstown, Mass.

This is a lecture taken verbatim from a tape recording made January 19, 1959, at the Hotel Kenmore, Boston, Mass., at the E.A.T.A. clinic:

"The knee joint injury is perhaps one that poses the greatest problem to all of us interested in the management of injuries in sports. Second to only the ankle joint it is the most frequently injured. It is the largest joint in the body and the most complex. I personally explored over 400 knees as well as managing many hundreds more conservatively and it is on the basis of this experience that the papers are being presented. I am going to be a little fundamental at first and I apologize for doing so but I think review of the differential diagnosis of the knee joint injuries is of value.

"First the acute injury. I always stress the point of trying to understand the mechanism of the injury and this group is unique in that they are the ones that usually see the injury occur. If they don't actually see it they can review it in their movies of the game and study exactly how the injury occurred. As you know the commonest thing is being struck on the lateral aspect of the knee either in the clipping of football or the twisting injury in basketball, so that the tibia is forceably abducted on the femur and at the same time the cautional rotational forces exerted. I was going to show a slide of the anatomy but because of the problem of setting up a screen I am going to withhold that until later. The immediate exam is of terrific importance, I feel. Joe and I have gone out on the field to examine these boys within seconds of the time of injury. It is most important because at that time one can palpate to locate the maximum area of tenderness and make a presumptive diagnosis which later on may be massed by a more diffused tenderness. Instability should be tested immediately at that time. We have had two or three cases when we have been able to demonstrate right on the field, lateral instability of the knee, due to a tear of one of the major ligaments and an hour or two later unable to demonstrate it because of one of the muscle spasms. Fluid of course is extremely rare at this immediate examination. Then at the end of the scrimmage or at the end of the game a more detailed exam may be carried out. By this time the tenderness is usually more diffuse. Instability may or may not be present because of increasing muscle spasm and one gets the evidence or beginning of jointed fusion. Examination 24 hours later again presents quite a different picture. The tenderness by this time may be more localized.

"Instability may not be demonstrable because of the marked increase in muscle spasm and by this time of course joint fusion is quite marked. It is usually at this point now where we take X-rays and in the majority of these cases the X-rays are of little or no value, because of the fact that the injuries are primarily ligamentive. That is enough for the examination of the acute injury.

"All too frequently we see the recurrent injuries, the boys who have been hurt in high school and then re-injure their knees while playing football or in some other sport. And I'd like briefly to go over the salient points while arriving at a diagnosis with the recurrent injury.

"First, one of course, has the history of pain. It's usually with a twisting motion and usually the patient will suddenly experience a sharp pain, mostly on the medial aspects of the knee.

"The second point in history, is the history of locking. Now if a patient has a definite history of knee joint locking, it is pathogenic or diagnostic of one of two things. It is either a displaced medial meniscus, medial cartilage or it is a loose body in the joint. I do not know of any other thing that will produce a locked knee. Unfortunately though, only about 50 per cent of the people we see give such a history. I think far more important is the history of buckling. Now that is expressed by the boys in a variety of ways. He may say that the knee suddenly jacks out or gives away, or it dislocates or it buckles and he falls down but that is of extreme importance and is usually the lead that this is an internal derangement of the knee probably a meniscus. Parenthetically I would like to say when I refer to internal derangements I mean tears of the menesci, the two cartilages, the medial and the lateral cartilages, or tears of the cardinal ligament of the knee joint, the internal and the external collateral ligaments of the cruciate. Those are what we call the external and internal derangements. Then, on an examination of a recurrent injury, I think we all have pretty good eyes and inspection is one of the really valuable points in arriving at a diagnosis. These boys, when they walk in having sustained a recent recurrent injury will have a perfectly characteristic limp. They walk with the knee flexed at about 20°, they walk on their toes and they get off that foot as fast as they can. It is a so-called limp and you can almost make a diagnosis of a displaced meniscus when the individual walks into a room.

"The second thing that you can see is atrophy, atrophy of the quadriceps, and I will mention that in more detail in a moment or two, but it is an extremely important sign in the internal derangement. The third sign that you can see is fluid in the knee joint. If you will all inspect your own knee, normally there is a concavity on the medial aspect of the knee at the level of the patella. The first point where fluid will show is in this area and instead of having a normal concavity that collar will be obliterated and actually null so that you can see fluid.

"Next in the examination I would like to measure the quadriceps. In New York, a good many years ago, I did some experimental work in dog surgery. They happen to have a meniscus too. We removed the meniscus on a large number of dogs. These dogs were never immobilized. As soon as they were out of the anesthetic they were running around in their cages. In spite of that every single one of them within 48 hours had measurable atrophy in their quadriceps.

"We then did another series where we did a preliminary sympathectomy on these dogs and not one of those developed quadriceps afterwards, so that this atrophy which we all see following a knee joint injury is not atrophy of disuse—it is actually a neuromuscular reflex type of thing which produces rapid atrophy which in the vast majority of cases is measurable within 24 to 48 hours after the injury. Incidentally, in measuring quadriceps, all too often I see people use the superior pole of the patella as the point from which to measure up to get the circumference of the quadriceps. I think that's an extremely fallacious type of measurement because as you know if you can contract your quadriceps, you can elevate your patella anywhere from one-half to three-quarters of an inch. Also, if you have large jointed fusion, the patella rides high and I much prefer to take the anterior superior of the spine of the pelvis as the fixed point, which is actually a fixed point and then measure down ten to fifteen inches. I think the measure-

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KNEE INJURIES IN ATHLETICS (Continued)

ments are important, not only in the primary diagnosis, but also in following cases as we go through the program of rehabilitation. You can evaluate very well how your progressive resistance therapy is going simply by charting a record of the building up of the quadriceps mechanism.

"Next is the measurement of ranges of motion, and I personally prefer to use the so-called anatomical position, in other words with the knee extended at 180°, the knee flexed at an angle of 90° and that again is charted. The range of motion should be both active and charted as that and also passive. The value of the passive one is that many of these knees perhaps actively be able to extend to 160°, in other words, 20° short of a straight line and when you depress the knee and try to extend it further it will promptly spring back, the so-called spring and hyper extension which usually means something interposes between the joint surfaces and that is a thing usually a displaced meniscus or cartilage.

"And finally, testing for instability—or before that palpation. Now you palpate for fluid which you already have been able to see if your eyes are good. But by squeezing the fluid out of the super patella bursa, down into the knee joint, one can then block the patella against the femur and get a characteristic plate as the patella hits the femur through the fluid medium. Also, careful palpation for areas of tenderness remembering that the internal and external platter of ligaments are much more posterior than we think of, and tenderness over the ligaments and not over the joint margin is usually strongly suggestive of the primary ligamentus injury where tenderness of the joint margin itself suggests the allesion of the meniscus itself.

"In final—testing for instability. Now the so-called draw sign, rocking the tibia on the femur is said to be diagnostic of tear of the anterior cruciate ligaments. I have a slide which I will show later, of an individual who has no cruciate ligaments and I would defy anyone in the room to demonstrate a positive draw sign. I think it is of value in the few cases where you demonstrate it as a positive sign but if the sign is negative, it does not mean that a cruciate ligament has not been torn.

"In this series of approximately 400 knees, we found an unsuspected tear of the anterior cruciate ligament in 20 cases and even on the operating table we were unable to demonstrate any instability by the so-called draw sign. Then testing for the collateral ligaments, I am sure you all know, but one point I would like to bring out and that is in order to test the stability of the collateral ligaments, the knee must be in complete extension. If the knee is flexed as much as 10° you can demonstrate instability in the lateral claim in the normal knee, so that the knee must be in complete extension.

"Then finally, X-rays should be taken in all cases and these should be taken in four different projections—the routine AP and routine lateral, what we call a tunnel shot, and also an axial view to show the patella.

"Now, in the differential diagnosis, I think by all odds, the most frequent injury that we encounter is a tear in the medial meniscus and the reason for that is two fold. One is more or less called a physiological one, inasmuch as the inner aspect of the right knee is protected at most times by the outer aspect of the left knee and vice versa. So that you are much more apt to be struck on the outer aspect of the knee than on the medial aspect. The other is a purely anatomical one which I can show you when we put the screen up and that is the medial collateral ligament is jointed to the internal medial cartilage and this is not true of the lateral collateral ligament so that if you have a partial tear of the collateral ligament at the knee joint level, you may very well have an associated tear of the meniscus which will not show up until later on.

"As I mentioned, the lateral meniscus is much more rare and in this series that I had it was about eleven to one—eleven medial to one lateral. The medial collateral ligament is again much more prone to injury than the external lateral, and we have had occasion to operate on a number of these and I will speak on that later. The lateral collateral ligament is a rare bird. We have had three that I know of, of the isolated tear of the lateral collateral ligament in almost twenty-five years of doing knee joint surgery.

"Cruciate ligaments, I have already mentioned, are torn frequently and yet not recognized. I think far too much emphasis has been placed on the cruciate ligament. I think if we have a good quadriceps mechanism and intact collateral ligament the cruciates are of little or no importance. Then there are a variety of other lesions.

"One can have a rupture of the quadriceps tendon, a rupture of the patella tendon, fracture of the patella, dislocations, etc., which we will not go into. Now as far as treatment is concerned, first and most important, particularly for this group I think, is prophylaxis. I feel very strongly that adequate pre-conditioning is of vital importance in order to prevent knee joint injury. This is true whether it is in football, whether it is in skiing, or whatever the sport may be.

"Second in prophylaxis is the protection of what I call the high school knee. These boys come to us with the history of having had a sprain and a recurrent sprain perhaps when playing football in high school or prep school, and Joe and I make it a rule that every one of these knees is taped for every single contact. This does not mean just for games, but Joe and Bert have been having a time taping up before scrimmage and before practice. Now, as far as management of the acute injury is concerned, our present procedure is something of this order. We immediately apply some pressure that can be in the form of a horseshoe shaped pad cutting out a hole for the patella or a large bulky foam type of compression dressing. Regardless of the student's desire, he is put on crutches with no weight bearing until we can further evaluate him and he's packed either in ice or in full compresses.

"The delayed treatment if there is a jointed fusion—then I think aspiration is of definite value. If we do aspirate, we usually inject hyaluronidase which tends to absorb any additional fluid that may be there. This is not without hazard. In a period of three years, I had the occasion to operate on four knees which had been treated by aspiration and injection, and all of them went septic and developed infection in the knee joint. So it is something to be done in case of tremendously extended knees but it is vitally important.

"I think you have all seen a balloon that you have gotten for one of your kids, and it is nice—it is good, a nice firm texture to it. You blow it up and leave it blown up for a period of 24 hours, and then let the air out and the balloon is all wrinkly and stretched and the same thing pertains to the knee joint. If you have a tremendously distended knee over a period of time, then inevitably the ligaments and capita are going to be stretched and then there is going to be a prolonged period of rehabilitation.

"Whether or not to put a cast on is always a problem. I feel that if the patient has symptoms suggesting a partial tear of the internal colligament and has pain on force

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KNEE INJURIES IN ATHLETICS (Continued)

abduction of the tibia on the femur but no demonstrable instability, that patient is a candidate for a cast and he does much better because he doesn't develop the atrophy of the quadriceps which he might do with crutch walking. He's treated in physical therapy in the form of some type of heat —microwave, diathermy, or one of the modalities. We have used sound. I think it is of definite value. I'm afraid I can't be quite as enthusiastic as the salesman for the sound machines but I think it has definite place in acute athletic injuries which are particularly in need.

"In other modalities, such as neuro muscular stimulation, again we have restricted weight bearing until the symptoms have subsided.

"And finally, rehabilitation of the acute knee, where we continue physical therapy and we start on a program of intensive progressive resistance exercises which has been planned by Dr. DeLorme and his group and find that we can build up our knees much more rapidly by the use of heavy resistance and low repetition, rather than the high repetition and light resistance.

"Next, the recurrent injury. This is one time that I feel that it is not a baseball thing—three strikes and you are out. I think any knee that gives a characteristic history as I have outlined and shows the physical signs of that mentioned on two occasions, I think that is the time to operate. All too frequently the knees are postponed and they have repeated injuries and when you go in and operate on them they have not only a torn cartilage but also have damage to the lining of the joint. In exactly 50 per cent of the 400 cases that I reported recently we have multiple totality. Two or more lesions present in the knee joint, usually softening of the under surfaces of the patella, and softening of the condyle of the femur.

"Now, I think the most important problem that we run into are the acute major ligamentus injuries. These I feel very strongly about and I have been interested in the last few years. As you all know, Dr. Donahue of Oklahoma and Dr. Quigley in Boston have written a great deal about it and I feel as strongly as they do that an early diagnosis and early treatment of the acute severe tear of the ligament is imperative.

"I'd just like to read a few paragraphs here from a paper on ligamentus injuries that I presented last fall.

"As team physician for Williams College football team, I have had the opportunity of examining knees within a matter of seconds after injury. Last fall our first string guard sustained an injury to his left knee when he was struck from the lateral aspect, sustaining a combination twisting and abducting injury. He was seen on the field within a matter of 30 seconds. At that time, there was obvious abduction instability of approximately 30°. He was carried off the field and approximately five minutes later a more complete examination was able to be carried out. Within that short period of time because of the muscle spasm I was not able to obtain any demonstrable lateral instability with the knee in complete extension. One hour later, when examined at the field house, there was still no

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No. 88
No. 77
No. 59
41-280
No. 75
GENERAL PURPOSE TAPE
TRAINERS TAPE
87
ELASTIC ADHESIVE TAPE
2"

KNEE INJURIES IN ATHLETICS (Continued)

jointed fusion present but, on careful palpation one could feel what seemed to be a rolled up internal collateral ligament just proximate with the joint line. Twenty-four hours later there was a marked jointed fusion with the fused tenderness over the entire medial aspect of the knee joint. He was explored 42 hours after the injury. Stressed films which I will show you were taken on the operating table under anesthesia and revealed marked widening of the joint with forced abduction of the fully extended knee. On exploring the medial aspect of the knee joint, there was a complete rupture of the internal collateral ligament which was repaired. This boy, incidentally, has made a complete recovery, has a stable knee, and is doing well.

"I would like to compare this with an almost identical injury which happened when we were having a scrimmage with Springfield, with a 250-pound boy. We saw the injury happen. I saw him try to walk off the field and as he did his leg just flopped from side to side. He had better than 30° of demonstrable abduction instability. His family was contacted and early surgery was most emphatically suggested. They desired to have an infinitive treatment done at his home, and accordingly he was immobilized in a plaster cylinder and was returned to his home the same day. At the original exam he had better than 30° of lateral abduction instability. Apparently when he was examined the following day by his surgeon, he showed no instability and it was felt it was justifiable to temporize. This boy has never received surgery and he continues to have a completely unstable knee and has been unable to indulge in any active sports since the time of the original injury.

"We have seen a number of almost identical injuries and on all of whom immediate surgical repair was carried out. Of six football players, all have returned to active athletics. One of these was the co-captain of the 1957 Little Three Champion Team who played three consecutive years following his repair in freshman year. Another is the present backfield coach at Williams. Third, also a football player, has passed his physical examination for the Air Force Cadets and is now in the third year of the Air Force Academy, and playing football. The remaining three, all of whom sustained their injuries while skiing have resumed this sport, which is very lucrative for the orthopedic surgeon.

"Now I think at this point I would like to show the slides, if I could.

"This slide is the explanation of why the medial meniscus is so much more frequently involved. As you can see, here is the external collateral ligament here, and no connection whatever with the lateral meniscus. Whereas, here is the internal collateral ligament which is by the coronary ligament which comes around here, is actually joined to the medial meniscus. So that any lesions of a tear of the internal collateral ligament at the knee joint level is apt to produce an injury to the joint.

"Next slide—These are just a couple of specimens of the meniscus injuries, with a characteristic tear. This happens to be a posterior tear and through a small peep-hole incision would have been completely missed. You can see the mark of the clamp here, this is the anterior portion of the meniscus. But this thing flipped right into joint.

"Next slide—This boy is interesting because he shows what happens when a knee is not explored when one suspects a tear of the ligament. This boy had a very severe twisting injury in high school. He was put in a cast for three weeks and then allowed to run around on it. He reinjured when he stepped in a hole and then sustained another severe injury and when he came to Williams he had a completely unstable knee with 30° of abduction instability and markedly positive draw sign. He had the O'Donahue sign of a torn medial meniscus, a torn internal collateral ligament and a torn interior cruciate ligament. Obviously these were long standing and instead of being able to do a neat primary repair, reconstruction had to be carried out and this boy's knee is still not completely adequate although it is better than it was.

"Next slide—This shows the value of taking more than one projection. This boy struck the anterior aspect of the flexed knee forceably. He had routine films which were reported as negative when seen first about a week after the original injury. He still had a marked fusion, he had discoloration of the entire medial aspect, and a special projection shows a sliver of bone which was knocked off of the medial pole of its patella and on exploration he had a complete tear of the medial expansion of his protoceps mechanism.

"Next slide—This boy is presented as a rupture of the patella tendon. If you will notice where the patella rides here and I have got another of which I will show you in a minute. You can see that the patella is tremendously displaced upwards. This boy was a mountain climber and he and another companion fell into a ravine. The other boy was killed and this boy was rescued about 15 hours after the accident. He had a dislocation of the ankle on the opposite side and multiple abrasions and the ankle was reduced and a cast was applied. He swears that he was actively able to extend his knee following the injury on this leg and when he came back to Williams, his walking heel slipped on a patch of grease and all of his weight was put on the left leg which was this one and he immediately fell to the ground and was unable to extend his knee. Now this X-ray was taken out in Colorado and I still cannot explain why with almost a complete rupture of the patella tendon that he was able to walk on this leg for a period of three weeks at which time he completed the rupture.

"Next slide—This shows the other knee which shows the normal position of the patella on the femur.

"Next slide—This is one of the football players that I mentioned. This is the film, the film on your right—is the film taken with abducting the tibia on the femur and you see a relatively normal joint space. Here—with abduction of the tibia on the femur you can see the tremendously wide joint space and actually a displacement laterally is the entire tibia.

"Next slide—This is the boy that I spoke about earlier, that we had last fall and again you can see the tremendous widening of the medial joint space on forced abduction.

"Next slide—This was a skier, a woman who was not an expert skier at all, who fell down. She happens to work in the pathological laboratory at the hospital. She swears that when she looked at her leg the tibia was at right angles to the femur, pointing laterally. Someone came along and she felt something snap as they pulled it back in and she stood up and had little or no pain, so she said I might as well go down the rest of the hill. So, she went about 10 feet and she fell down again and at that time she swears that the tibia was at right angles but in the opposite direction. If her story were true, she must have had a complete dislocation of her knee joint, and we believed her and therefore gave her an anesthetic and took these films. I think in the abduction film you can see the marked widening medially.

"Next slide—And, in the abduction film, widening of the lateral joint space. She was explored within 48 hours of the time of her injury. She had a complete rupture of the

Continued on page 11

KNEE INJURIES IN ATHLETICS (Continued)

internal collateral ligament, a complete rupture of the external collateral, a complete tear of the medial meniscus, a complete tear of the lateral meniscus, and a complete tear of the andrea cruisias ligament.

"Next slide—Incidentally, the ligaments were all repaired both menisci removed and she scoots around as though nothing ever happened to her.

"Next slide—This is one of the rare ones, a tear of the lateral collateral ligaments. This girl to whom it happened —it was not an injury of sports, but I just brought it in because it shows a marked widening—who was a car hop and was waiting on a customer with the door open and another car backed up and pinned her legs between the bumper of one car and the running board of another and she was flipped over and she sustained a complete rupture. This fragment of bone came from the fibula and this fragment came from the tibia with a complete rupture of all the structures of the lateral aspect.

"Next slide—This is the only football injury that I have had occasion to see with an isolated rupture of the external collateral ligament. This boy weighs—what about 260 pounds Joe?—About 250-260, he's about six feet four inches and I did not see this, I happened to be out of town when he had his injury but, my associate saw him and he had obvious abduction instability. He was explored 24 hours after his injury and a complete tear of the external collateral ligament was found. They are an extremely rare bird.

"Next slide—This last case, I don't know whether you can see this or not—it is rather a poor slide, is another rare bird. This was a skier who sustained a complete posterior and lateral dislocation of his knee with a large fracture going down here, and an evulsion or something down here. We don't have a lateral view because this X-ray was taken while he was being put under anesthesia because he had no circulation in his foot, due to compression of the popliteal vessel.

Continued on page 12

KNEE INJURIES IN ATHLETICS (Continued)

"Next slide—This is the post reduction film—you can see that the dislocation is reduced but there is still a defect in here.

"Next slide—Again, the slide is not good, but I think some of you may be able to see this fragment setting here which represents the entire central portion of the tibia which remained displaced when the dislocation was reduced. He was explored within about 48 hours.

"Next slide—This is the fragment that you couldn't see before because there was a hole there but, you could see in the lateral view. He had a complete tear of his internal collateral, his exterior collateral, his medial meniscus, and both cruciates. In order to put this fragment back, which is sort of like a jig-saw puzzle, I had to excise both of his cruciate ligaments and everything else was repaired except that the meniscus was removed and the bolt was put in to take care of the fracture of the tibia. The only thing that wasn't involved was his external meniscus.

"Next slide—This is the lateral view. This man is now back skiing and has been for the past five years without any difficulty whatsoever.

"Major ligamentus injuries. I have no compunction whatsoever, if I suspect a major ligamentus injury, to administer an anesthetic and to test for instability under anesthesia if you can't demonstrate it without it when the patient is conscious. I think if we do recognize these things, and I think this group is the group that can do it because you see them inmediately after the injury, and that is the time you can demonstrate it. I think if that is done more frequently, we are going to salvage a great many more of these knees than we have in the past."

VETERAN TRAINER SUCCUMBS AT 67

Earl (Click) Clark, trainer of University of Washington athletic teams from 1929 to 1958, died recently of cancer in a Seattle hospital. He was 67.

Clark began his athletic career at Everett High School. From there he went to Washington, where he played football under the late Gilmour Dobie.

After a year at Washington, Clark transferred to the University of Montana. He was a star end for the Grizzlies for three seasons.

After his graduation, Clark became football coach at Montana and held that position for two years. In 1929 he came to Washington as trainer and served continuously in that capacity until he retired.

Clark became ill shortly after Christmas, 1958, and remained in the hospital until his death.

After his graduation from Montana, the Clicker, as he was affectionately known in the sports world, played on a barnstorming professional football squad assembled by the late C. C. (Cash and Carry) Pyle. The squad was split into teams, one headed by Red Grange, the other by George Wilson, former Washington All-American.

Clark came to Washington at the request of Enoch Bagshaw, then Husky football coach. Click had played for Bagshaw at Everett High.

Bagshaw left as Husky coach after the 1929 season, but Clark stayed on as trainer for several succeeding coaches. He became a fixture at Washington and was one of the best-loved figures in the nation's collegiate-sports scene.

When Clark retired after the 1957 football season, he was given a farewell banquet by friends and former Husky athletes. He and Mrs. Clark, who survives him, were given a trip to Europe. He accompanied the Huskies last summer when they rowed at Henley, England.

OUTLINE OF FOOTBALL MANAGERS' DUTIES AT PURDUE UNIVERSITY

Freshmen (12-16)

Practice Duties

1. Attend all practices.
2. Be responsible for appearance of practice field, dummy shed, and manager's room in sub-basement.
3. Handle footballs during punting and passing practice.
4. At least three to be assigned to freshman practice field and remainder to varsity field.
5. Set up dummies and helmets before practice and replace them in shed following practice.

Game Duties

1. Attend all home games.
2. Two assigned to each goal post for retrieving footballs after extra points.
3. Two or three assigned to visiting team.
4. One to help sophomore manager keep time of individual players.
5. Four to help behind Purdue bench.
6. Set up field and dressing room Saturday morning.
7. Clean up dressing room and field after game.
8. One to keep officials' jackets during game.
9. Those not assigned to specific tasks, sit together.

Following Fall and Spring Practice

1. Clean shoes and helmets.
2. Put all dummies in proper place.

Qualifications for Promotion to Sophomore Manager

1. Good attendance.
2. Good attitude and interest in job.
3. Hustle.

Sophomores (8)

Practice Duties

1. Assigned to open and close and take charge of freshman and varsity fields.
   a. All equipment to be ready for practice.
   b. Handle keys for field and lights.
   c. Be responsible for balls.
   d. Keep everyone busy.
2. Check all visitors through gate.
3. During fundamental drills each group (backs, guards, ends, etc.) has a sophomore manager.
4. Blow whistle during scrimmage.
5. One manager to assist in packing trunks before games.

Game Duties

1. Attend all home games and some away games.
2. Set up field and dressing room Saturday morning.
3. One assigned to visiting team.
4. One to keep individual player's time.
5. Two to keep extra clean and dry game balls on sidelines at line of scrimmage.
6. Two behind Purdue bench.
7. One to fix up dressing room before half time and to clean it up after half time.

Following Fall and Spring Practice

1. Clean up shoes and helmets.
2. Put all dummies away.
3. Assist equipment manager.

Qualifications for Promotion to Junior Manager

1. Organization of practice field when in charge.
2. Neatness in their outward appearance and duties.
3. Manner of assuming and delegating responsibility.
4. Popularity with coaches and players.
5. Initiative.

Continued on page 13

FOOTBALL MANAGERS' (Continued)

Juniors (2)

Practice Duties

1. Attend all practices.
2. One or both come back for early fall practice.
3. Oversee practice field.
4. Be responsible for training of sophomores and freshmen.
5. Assist equipment manager in packing game trunks.
6. Work in cooperation with senior managers.
7. Attend all away games if possible.

Game Duties

1. One junior to accompany team night before home games.
2. See that field and dressing room are properly set up.
3. One junior assigned to each side of the Purdue bench.
4. Assign duties to sophomore and freshman managers before games.

Qualifications for Promotion to Senior Manager

Promotion to senior manager is automatic unless otherwise specified by Athletic Director of coaches.

Seniors (2)

Practice Duties

1. Come back for early September practice.
2. One to be present at all practice sessions and meetings.
3. Be host to all guests at practice sessions.
4. Check with coaches, trainer, and equipment manager for any changes in daily schedule.
5. Overall supervision of all managers.
6. Be responsible for all security measures at practice.
7. Both seniors eat at training table.
8. Assist coaches with written material for squad meetings.

Game Duties

1. Have general supervision of all managers and work in close cooperation with coaching staff and trainer.
2. One to accompany trainer on field at all time outs.
3. Be responsible for kickoff and extra point tees.

Duties for Trips

1. Work in cooperation with Head Coach, Athletic Director, and team trainer.
2. Work with Assistant Athletic Director in making arrangements for all trips.
3. Be responsible for insurance roster.
4. Be responsible for trip schedule.
5. Carry ample cash for incidental expenditures; handle tips for bus driver, police escorts, stadium guards, etc.
6. One senior manager to proceed to hotel or motel ahead of traveling squad and be responsible for issuing keys and making room assignments. Register party at hotel.
7. Know where meeting places, private dining room, taping room are.
8. Both senior managers attempt to anticipate the needs of team and coaching staff and keep special party informed of any changes or additions to traveling schedule.
9. One senior manager to arrange for police escort.
10. Arrange for movies and church on eve of game.
11. Check for hotel keys while taking roll call on buses prior to departure to stadium.
12. THINK!
13. Count players.

Two outgoing seniors and two new seniors on advice of coaching staff, trainer, and equipment manager select eight sophomore and two junior managers for next season.

Varsity Games Away

1. Two (2) senior managers.
   a. Get traveling list and pack trunks.
   b. Take all checks and make all calls.
      (1) Bed check, calls in morning, meals.
      (2) Shows—arrange for.
      (3) Church—arrange for confessions.
      (4) Buses—see that they are set up when needed.
   c. Set up pre-game practices if necessary.

Game Day at Away from Home Games

1. One (1) man at Stadium.
   a. Taking care of trunks and equipment.
2. Two (2) seniors at hotel with team.

Saturday Morning—Game Day at Home

1. Managers take care of equipment for game.
   a. Field Equipment.
      (1) Flags
      (2) Markers (Goal and Sideline)
      (3) Tubs for ice and water (Thursday order ice, oranges, gum, and two (2) bushels of apples).
      (4) Wrap goal posts.
      (5) Set up coaches' chairs and tables.
      (6) Get towels.
      (7) Get stretcher.
      (8) Get programs.
      (9) Ice cokes and cut up oranges.
      (10) Check on chains and down marker.
   b. Equipment for players
      (1) Unload trunks (14 of them) with Shriner.
      (2) Clean stadium rooms before and after game.
      (3) Lay out equipment.
   c. Trunks for the field
      (1) Blankets
      (2) Field coats
      (3) See that there is ice, water, towels, kits, balls on the field.

12:30 p.m. Saturday Afternoon

   a. Meet and unload bus from pre-game home.
   b. Station guards on locker room.
   c. Help check players (pads, shoes, cleats, etc.)

Pre-Game Practice

1. Two (2) freshman managers, each goal post to retrieve balls.
2. Manager with passers.
3. Manager with kickers.
4. Manager to assist the linemen.

Procedure at Half Time

1. Managers to go in five minutes before half time. (One junior, one sophomore, and two freshmen.)
   a. Lay down mats.
   b. Get out oranges, towels, ice.
   c. Change water and towels for field.
2. Assign guards for dressing room door.
3. Two managers pass out gum, towels, oranges, coke, and check on cleats, straps, etc.
4. Clean up after team returns to field.

After Game

1. Guard at door will pass out apples, programs.
2. Help reload trunks and equipment.
3. Clean up.

MISSOURI UNIVERSITY TRAINING CLINIC

This fifth annual program is dedicated to high school coaches who have maintained continued interest for a keen knowledge on the Management of Athletic Injuries.

To these men who guide our youth, the leaders of tomorrow, do I dedicate this program.

FRED WAPPEL
Trainer

A. Shoulder Dislocations
1. Manner of occurrence
   a. Abduction and external rotation—identical to catcher throwing ball to second from ear
   b. Force directly to shoulder when arm is stabilized on ground or player
2. Method of examination and evaluation
   a. Hollow pit in shoulder
   b. Pain
   c. Inability to raise arm with a complete limitation of motion
3. Immediate Action
   a. Refer to qualified physician and have reduced as *quickly* as possible. *Don't wait!*
   b. *Do not reduce* or attempt to reduce
   c. Immediate reduction will aid in reducing muscle spasm and will not stretch capsule and ligaments in shoulder joint
   d. Many times the athlete must be given a sedative to reduce dislocation
4. Treatment
   a. Immobilization for 30 days with the arm strapped to side and elbow supported
   b. No treatment necessary during this time because of severity of injury
      (1) An individual who plays before this time will have a chronic shoulder for life!!!
   c. After 30 days, initial mild exercise but do not permit arm over head—this is manner in which shoulder dislocates
      (1) Exercise will increase progressively as individual can tolerate without undue pain—with weights
   d. A *shoulder harness* must be worn when individual begins active participation.
      (1) Rawlings L.A.S. Shoulder Harness is one
   e. Duration of recovery
      (1) Five to eight weeks

B. Shoulder separation—Acromio-Clavicular Type (knock-down shoulder)
1. Manner of occurrence
   a. Tackling
   b. Fall on elbow or shoulder
2. Prevention
   a. Proper fitting shoulder pads
   b. Shoulder exercises for power and strength
      (1) Chins
      (2) Ladder walking with arms
      (3) Push ups
   c. Discourage arm tackling
   d. Agility exercises
3. Method of examination and evaluation
   a. Irregularity of shoulder tip
   b. Able to push tip of collar bone up and down
   c. Inability to raise arm well with definite limitation of motion
   d. Sharp pain
4. Immediate treatment
   a. Sling to support *arm* and *elbow*
   b. Refer to physician and X-ray
   c. If no broken bones, shoulder should be taped from junction of neck to arm muscle, and elbow supported for at least a week
      (1) Tape should be removed daily to prevent tape rash—skin must get air
   d. Treatment
      (1) Diathermy 25 minutes daily
      (2) Moist heat—wet towels 40 minutes daily
      (3) Ultrasound may be substituted for diathermy five minutes
      (4) Exercise
   e. Duration of recovery
      (1) Three to four weeks depending on severity and then longer
      (2) Surgery is sometimes necessary

C. Ankle Injuries
(First Day)
1. Check area for any abnormal swelling and bone displacement if any on the field
2. If athlete cannot bear weight, assist him, or remove by stretcher
3. Remove shoe and examine
   a. Swelling
   b. Broken bones
   c. Mobility
   d. Limitation of motion
4. If *swelling present* apply *pressure bandage, ice,* and *elevate* limb
   a. Ice for 45 to 60 minutes
   b. Shave ankle and apply open basket weave for support and pressure
      (1) Apply pressure bandage over taping
   c. Use crutches if athlete cannot bear weight

(Important)
5. Have athlete *elevate* limb at home, and apply ice all evening and night if swelling is severe
6. Should be seen by Doctor for diagosis and opinion

(Second Day)
7. Apply infra red heat for 30 minutes
   a. If *swelling* is severe use ice for at least 48 hours
   b. If swelling is not severe, and pain is present
      (1) Heat lamp
      (2) Cold whirlpool 98° to 100°
      (3) Gentle massage
      (4) Pressure bandage important—keep on athlete while swelling is present
      (5) Mild exercise on table

(Third Day)
8. Diathermy after 48 hours for 20 minutes
   a. Whirlpool 110° for 20 minutes
   b. Massage after whirlpool
   c. Resistive exercise
      (1) Sitting on table, coach applies force against foot with hand
   d. Tape
      (1) Allow athletes to jab if he can tolerate running
   e. Pressure bandage after practice

(Fourth Day and After)
9. Same as third, but increase activity
   a. Do not allow athlete to run if he is limping too badly
   b. Increase to active exercise
      (1) Have athlete raise upon toes 25 times, rest, 25, rest, 25, finish
   c. *Be fair* in your evaluation of progress, but be *positive* in your thinking, if athlete cannot bear weight, do not *criticize him; however,* do not *pamper him*

D. Knee Injuries
(First Day)
1. *Ice, pressure, crutches* preferred
2. Heat lamp, cold whirlpool
   a. Water on the knee (bursitis)
      (1) Pressure best; heat lamp with wet towel
3. Use of whirlpool 110° normal treatment temperature
   a. *Never,* on initial sprain or bruise
   b. After 24, most of the time, is acceptable 100°
   c. Sore muscles, jammed thumbs, arm 110° bruises, sprains (ankle, knee)
   d. *Never,* water on knee (bursitis)
      (1) Pressure bandage
4. Heat Lamp
   a. 18" from area
      (1) When moist heat is desired apply wet towel over area
   b. Early sprains and bruises
   c. Bursitis with towel
   d. Muscle soreness
5. Diathermy
   a. 48 after injury
   b. Sprains, strains, bruises, bursitis, muscle pulls
      (1) Arms
      (2) Shoulders
      (3) Back
      (4) Ankles
      (5) Ribs

E. Muscle Injuries
1. Pulls or strains (same)
   a. Cause
      (1) Improper warmup
      (2) Poor flexibility
      (3) Working too long—fatigue factor—athlete pushes too hard and he gets sloppy
         (a) Poor conditioning

(4) Having someone step in front of you throwing you off stride
b. Prevention
(1) Adequate warmup—thorough calisthenic program
(2) Eliminate long and extended work outs
(3) Educate athletes about field safety
c. Calisthenics Program
(1) Jog 440
(2) Alternate toe touch
(3) Side bender
(4) Trunk twister
(5) Trunk circle
(6) Toe touch with arm thrust
(7) Step forward
(8) Step to the side (fencers position)
(9) Touch toe from sitting position
(a) left, center, right
(b) bow with each touch two or three times
(10) Standing—knee to chest—alternately
(11) Leg lifts
(12) Set-ups with knees bent bringing elbows between knees
(13) Set-ups with knee straight—opposite elbow to opposite knee
(14) Push ups
(15) Bridging—Football, wrestling
(16) Chins
(17) Run—loosen up—stretch

Summary on exercises:

Exercise should not be executed rapidly. Muscles can be pulled by rapid execution by over-stretching muscle sheath.

In order to build strength in muscles the exercises must be done slowly so gravity does not assist the athlete in returning to exercise position—the muscles must place athlete in proper position.

You will also note that calisthenic program is initiated from standing position, then to sitting. Also consideration is given upper extremity stretching before vigorous stretching is initiated to lower extremity. This is done because all tissue is connective so we loosen all areas of the body—upper to lower.

I encourage all exercise with locked knees, not rigidly, but firm so when stretching takes place the athlete will be prepared for activity.

In conclusion, make it a practice to include exercise in your daily practice routine. It pays dividends.

d. Method of examination and evaluation
(1) Inability to walk, if severe
(2) Pain and point tenderness
(3) Limitation of motion
(4) Muscle enlargement
(5) Irregularity of area
e. Immediate Action
(1) Ice and pressure—all night if necessary
(2) Pressure bandage
f. Treatment (after 24 hours)
(1) First day
(a) Moist heat—40 minutes
(b) pressure and analgesic pack overnight
(2) Second day
(a) Diathermy—25 minutes—after 48 hours
(b) Moist heat—40 minutes
(c) Analgesic pack overnight
(3) Third day
(a) Same as second except initiate massage gently
(4) Fourth, fifth, sixth and seventh day—same
(5) After seventh day
(a) Initiate vigorous massage
(b) Start stretching limb manually
1. The above are very important and the above treatment is continued along with the above
2. Diathermy, moist heat, massage, stretching, and hot packs have proven highly successful
g. Duration of recovery
(1) Mild strain, not much tissue tearing—two weeks
(2) Moderate strain, tissue tearing—four to eight weeks
(3) Severe—season

F. Muscle bruises, contusions, or charley horse
1. Manner of occurrence
a. A blow to an area from an outside force, as a helmet
2. Method of examination and evaluation
a. Pain
b. Swelling or muscle enlargement
(1) Compare with other arm or leg
(a) bilateral comparison
c. Tenderness
d. Inability to move part
e. Limitation of motion
3. Immediate Treatment
a. Ice and pressure overnight
b. If leg is severe, place on crutches that is if swelling is extensive
4. Treatment
a. First day
(1) Infra red heat—40 minutes
(2) Ultrasound—5 minutes
(3) Cold whirlpool—88 to 90 degrees
(4) Analgesic pack
b. Second day
(1) Same as first day
c. Third day—if not severe diathermy may be initiated
(1) Moist heat—40 minutes
(2) Ultrasound—5 minutes
(3) Whirlpool—20 minutes
(4) Analgesic pack overnight
d. Fourth day
(1) Same as third
(2) Treatment will remain the same until athlete has fully recovered
e. Caution
(1) Do not massage bruise!!!
(2) Do not apply heat too soon on severe charley horse
(a) blood vessels will begin bleeding and injury will become more severe
f. Exercise may be initiated as soon as can be tolerated
(1) Exercise to unaffected parts can be initiated immediately
g. Before participation is initiated protective pad should be provided

Summary:

Many of the severe charley horses at Missouri are being treated by injection of hormone and enzymes for several days to speed recovery.

Immediately after injury *team physician*, Dr. J. M. Baker, will inject muscle with hyalurandase, cortisone, and novicane mixed. The following day Kymar, an enzyme, is injected by student clinic three times a day, morning, noon and evening, and this is continued for three days. The fourth and fifth day, twice a day.

Varidase Buccal enzymes have been used in place of Kymar because it is in pill form and easier to administer—four tablets daily for three to five days depending on severity.

G. Hip Pointers
1. Treated exactly like muscle, or bone contusion, or charley horse

H. Groin Strains
1. Treated exactly as muscle pull, but if handled properly immediately treatment need not be extensive
2. Method of treatment
a. Analgesic pack with Spika ace bandage wrap
b. Will demonstrate
c. Many and most times this treatment above is all that is needed
3. If more severe, diathermy or moist heat may be used

I. Neck injuries commonly jammed, neck
1. Manner of occurrence
a. Tackling
b. Blocking
2. Method of examination and evaluation
a. Do not move until individual is coherent and conscious
b. Pinch him all over for feeling and movement
c. Ask athlete about pain; where it is; can he move head, *don't you move it until you are certain he is o.k.*
d. Summon a physician before moving moving
e. If athlete responds to the above examination he may be moved by stretcher
f. Have athlete X-rayed and have examined carefully and extensively if pain persists
(1) Do not rely on *judgment* and *experience*. It may mean a life
g. Many times there is a referred pain down the arm for several days
(1) This could be a cervical disc
h. There may be a burning pain shooting down arm, and then goes away, this is a pinched nerve, and generally goes away with no recurrence and is not considered serious
3. Treatment
a. Moist heat—40 minutes
b. Diathermy—25 minutes—after 48 hours
c. Massage
d. Sayre neck traction after severe soreness subsides

4. *Caution*
   a. If severe involvement, physician guide and direct treatment
   b. All neck injuries are not serious but let physician bear the responsibility in rendering his opinion as to the seriousness

J. Rib Injuries
1. Manner of occurrence
   a. Blow
   b. Quick twisting
2. Method of examination and evaluation
   a. Broken
      (1) Irregularity of structure
      (2) Swelling
      (3) Severe Pain
      (4) Inability to take a deep breath
      (5) Sharp pain in coughing and sneezing
      (6) Limitation of motion
   b. The above symptoms are present in lower rib injuries because of the cartilage attachment of the ribs, as well as the intercostal muscles of the ribs
      (1) The above injuries must be evaluated individually
3. Immediate Treatment
   a. X-ray and taping to control chest expansion and reduce pain
   b. Ice
4. Treatment
   a. Moist heat—40 minutes
   b. Diathermy—25 minutes—after 48 hours
   c. Continued taping until breathing and normal functions are painless
   d. Protection pad must be used when athlete is ready for participation
5. Duration of recovery
   a. Slow
   b. 2 to 6 weeks depending on seriousness. Could be longer if break is extensive

K. Evaluation of various pieces of medical equipment, and when they are indicated, and what is most effective in treating injuries.
1. Whirlpool—Cost: $350 to $700
   a. Types
      (1) Ille
      (2) Whitehall
      (3) Dakon
      (4) Virbra Whirl
      (5) Logan
   b. Indications for use
      (1) Prior to massage to ankles, muscles, and arms
      (2) Prior to manual stretching in training room
      (3) *Not before* practice
      (4) Not immediately after sprains
      (5) Temperature of water
         (a) After 24 hours injury with large amount of swelling 90° to 95° degrees
         (b) Treatment time—20 minutes
   c. In treating
      (1) Ankles and knee sprains
      (2) Bruises to muscles (charley horse)
      (3) Jammed toes or fingers
      (4) Sprained thumbs
      (5) Sore pitching as throwing arm and elbow
      (6) Shin splints
      (7) Groin strains
   d. Do not use for water on the knee. It encourages more water
   e. Function
      (1) Aids in increasing circulation in removing swelling, relieving pain, and restores normal function to areas with heat by circulating water over injured parts
2. Diathermy—Cost: $500 to $700
   a. Types
      (1) Burdick
      (2) Birtcher
      (3) Microtherm
   b. Indications for use after 48 hours always—treatment time—25 minutes
      (1) Knee, ankle, shoulder, thigh, back, bruises, sprains and strains
      (2) Pulled muscles
      (3) Twisted knee
      (4) Bruised shoulder, thigh, shin, arm
   c. Function of diathermy
      (1) Diathermy has the capability of penetrating into the deep layers of muscle tissue to bone where swelling is present, and whirlpool or infra red heat cannot come close to penetrating this area

L. Ultrasonic—Cost: New $500 to $700, Used $250 to $300
1. Types
   a. Dallon
   b. Medcosanolator
   c. Birdick
   d. Aloesonic
   e. Birtcher
   f. Linquist
2. Indications for use
   a. Essentially the same as diathermy except Ultrasound may be used after injury along with ice and pressure
   b. Treatment time—5 minutes to involved area; if large area—10 minutes
3. Function of Ultrasound
   a. Increases permeability of tissue or membranes. Reduces pain and swelling by vibration of the tissue or cells. Brings about chemical changes in tissue necessary for normal function

M. Hydrocollator—Cost: $245
1. Manufacturer
   a. Chattanooga Pharmaceutical House
   b. Lansberg Company, St. Louis, Missouri
2. Indications for use after 24 hours
   a. Muscle soreness
   b. Muscle pulls
   c. Shoulder, knee, rib, hip, groin, thigh, leg bruises and sprains
   d. Low back pain and muscle soreness
   e. Boils
   f. Jammed necks
   g. Treatment time—20 to 40 minutes
3. Function of hydrocollator
   a. Provides moist heat for 20 to 30 minutes per pack from a salicylate gel
   b. Pack is kept in water constantly and heated
   c. Does not penetrate to bone, but does provide intense heat to involved areas
   d. Packs are wrapped in bath towels and placed over injured area

N. Infra Red Lamp
1. Types—Many filament best, but will blister. Use 24" away
2. Indications for use after 24 hours
   a. Superficial areas of the body only. Does not penetrate far
   b. Muscle soreness
   c. Sprains 24 hours old. This is helpful and does not cause bleeding in sprains or bruises 24 hours old because it is not intense
   d. Can be used over wet towel to provide moist heat for any area. Shoulder, leg, hip, etc.
   e. Treatment time—45 minutes to an hour
   f. Can be used over analgesic balm

O. There are many medical appliances but I believe the modalities mentioned are most widely used in athletic training