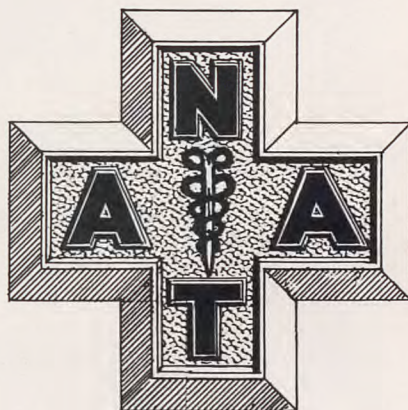


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OF THE
NATIONAL
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14th ANNUAL MEETING

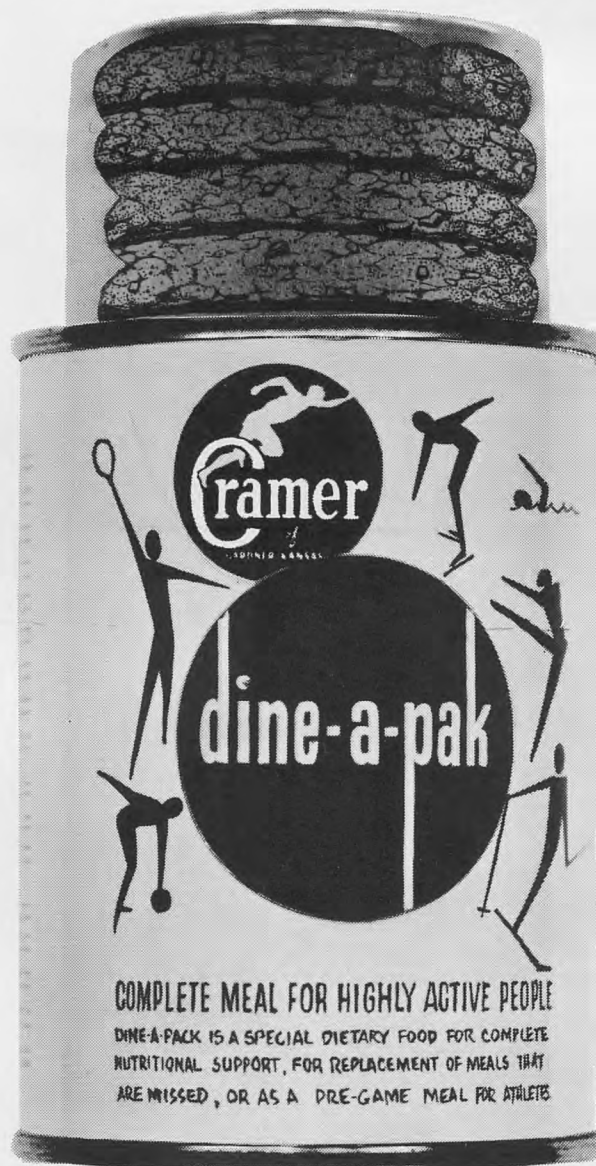
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FUNCTIONAL ISOMETRIC CONTRACTION PROGRAM FOR FOOTBALL

University of Kentucky Athletic Association
Charles I. Bradshaw, Head Football Coach.
Compiled by John W. Payne, Athletic Trainer

In the 1940's, Marty Broussard (trainer at L.S.U.) started experimenting with dynamic tension and isometric muscle contractions in rehabilitating knee injuries. This quad-tension exercise was used in addition to weight lifting (iso-tonic) exercises and gained widespread popularity among trainers.

Iso-metric exercises have been used for years by trainers and doctors in injury rehabilitation. However, only in the past couple years tremendous publicity has been given to weight training programs and iso-metric programs. Outstanding athletic performances have been contributed to improved training techniques with weights and iso-metric contractions.

ISO-METRIC—*Iso*—means "the same" and *metric* refers to "length." Iso-metric means that the length remains the same. In this type of contraction, there is no change in the length of the muscle, but augmentation of tension. This is apparent when one pushes vigorously against an immovable wall. Nothing moves; yet a great amount of energy is expended. This is an example of iso-metric contraction (I.C.).

ISO-TONIC—When a muscle changes its length either increasing or decreasing, it is called iso-tonic contraction. The development of tension without changing the length is called iso-metric contraction.

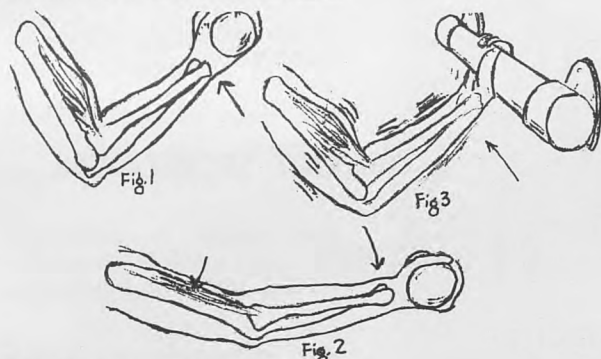


Fig. 1. Decrease of muscle length.

Fig. 2. Increase of length—when muscle resists lowering of forearm.

Fig. 3. Muscle tension increased without change in length.

Advantages and Limitations:

Functional I.C. is the best method of developing muscle strength and explosive power known today. This is a real "break through" for athletes. Improved techniques and methods will be developed in the near future. You can be a part of this phenomenal advancement.

All exercise programs have certain hazards. Functional I.C. is no exception.

Advantages of I.C.:

1. Less time to complete a routine.
2. Less cost involved in equipment.
3. Less fatigue developed.
4. Less equipment required.
5. Can have entire athletic squad complete a routine before practice with a minimal loss of time.

Disadvantages of I.C.:

1. Does not constitute a "work out" by itself.
2. Does not give athlete a feeling of accomplishment for a few days.

3. In order to measure progress, you must test athletes on weights first; then re-test weekly.

4. You must learn to relax the autogantist muscles when exercising.

I.C. Methods and Principles:

Remember you are exerting force against an immovable bar. You should attempt to exert all the force you can for a period of 6 seconds.

The first week—hold force for 6 seconds—the second week for 8 seconds. The reason for this time interval is of vital importance.

- a. It is easier to strain a muscle doing I.C.

b. After maximum constant tension has been exerted, on a muscle for 8 seconds, the muscle reaches its peak of tension and the force being exerted begins to decline. After doing I.C. a few weeks, you will have strengthened the muscles enough that you may be able to hold maximum tension up to 10 or 12 seconds, but this will only come with training. Under no circumstances should maximum tension for a longer period be attempted in an untrained or poorly conditioned person.

To obtain the maximum benefit from an I.C. program, you should attempt to learn some of the principles involved.

There are three types of muscle tissue.

1. Skeletal muscles
2. Smooth—internal organs
3. Heart muscle

Each muscle has only so many muscle fibers and each fiber remains constant. You may increase their size or length, but you cannot increase the number of fibers.

All-or-None Principle:

Each muscle fiber contracts to its maximum or not at all. If you bend your arm down to pick up a marble, very few muscle fibers contract in the biceps. Just enough to lift the marble and the arms. However, if you pick up a 20 pound weight, several muscle fibers will contract.

This does not apply to the entire muscle, but only to muscle fibers and "Motor units."

Skeletal muscles are activated via motor nerves and since nerve impulses are of all-or-none character, the muscle contractions will also be all or none. Each motor nerve fiber innervates about 100 muscle fibers. Such a nerve-muscle complex is termed a "motor unit."

Due to this muscle-nerve complex, we are limited in contracting individual muscles. We cannot contract the biceps muscle; we can only flex the arm. This is due to antagonistic muscles. *Ordinarily* when a flex or group of muscles contract in a bodily movement, the antagonistic group of extensors relaxes. This is coordination. These muscle changes are effected by the coordination action of the nerves of these muscles. Therefore, when doing an I.C. forearm curl, you will automatically contract your biceps as well as your triceps and create tension on both. Try to avoid this. Concentrate on relaxing the triceps and increase tension on the biceps. It will be necessary for you to check your boys on this and try to get them to relax their antoganist muscles.

What Will Iso-Metric Contraction Do For You?

An average person will make a 5% gain per week in strength and in a twenty week period will double their strength. Outstanding trainers and coaches believe the iso-metric contraction, along with bar bell lifting, will advance muscle strength and endurance as much as two years beyond the non-user. In simplest terms, you can advance your athletic ability by two years.

continued on page 3

FUNCTIONAL ISOMETRIC

(Continued)

You Must Have Faith

You must have utmost confidence in the system if you expect to receive the desired benefits. Just because it is simple, don't be misled into thinking it has no value. It has given great strength to many athletes in a short period of time.

Mental Concentration Is Important:

Iso-metric contraction is based on the principle of maximum resistance of the body against an immovable object. Neither the body nor the object should move. The effort is sustained for 6 to 12 seconds. During this period your mental concentration must increase and thereby the effort of your muscles is increased.

It is very important that the student realize that about 90% of his strength is mental and unless he can concentrate mentally while doing the exercises, he will not obtain the maximum benefit. *Think and do an ideal application of mental concentration.*

How Often Should You Exercise:

Adjust your work on the "power rack" to your strength. Train daily and specialize on the exercise that you feel you need most. Your energy reserve will develop as you progress your work on the rack.

How Much Time Is Needed For The Program:

The proven experts feel that maximum strength can be accomplished in 10-15 minutes of exercising each day. If you also use weights, more time will be necessary.

How Many Repetitions?

It has been found that one effort in each exercise from a single position will give as much improvement as several. It is essential that each effort be done with complete concentration. Specialization can be accomplished through moving the bar up or down in an attempt to give a variation to exercises. Begin by exerting a maximum force for 6 seconds. After four weeks of exercise, increase maximum tension to 9 seconds. After eight weeks you may be able to hold maximum tension for 12 seconds. Do not extend the period of time beyond 12 seconds.

Measure Progress:

At least once a week progress should be measured by lifting weights. Do the same exercises with weights as with I.C. For maximum results, it is recommended you use weights once a week.

Precautions:

1. All exercises should be performed with gradual tension. The athlete should take up to 3 or 4 seconds to reach maximum tension; then hold this for 6 seconds. By going into the exercise gradually, the athlete can determine when there is too much strain on the muscle. Pain is the body's way of indicating excessive strain.

2. All athletes using I.C. should condition themselves gradually. There will be little fatigue or soreness with I.C. Because of this many football players think they are not getting maximum results and will exert maximum effort too soon and consequently may tear or strain a muscle. Do not hurry the results beyond reasonable development.

3. Include flexibility and agility drills in the workouts. Strength alone will not make an athlete, although it is the single most important factor in athletic ability. Running and agility must be included in your program.

4. Do not hold breath for a long period of time when exerting a strong effort. Many individuals will become dizzy and faint from holding their breath 5 or 6 seconds.

When their muscles are under extreme stress, holding the breath and exerting extreme force at the same time increases thoracic pressure and decreases circulation to the brain. Exhaling at the end of 5 or 6 seconds will allow complete circulation and relieve this pressure.

5. Do not do more than ten exercises. There are many more similarities among athletes than there are differences, however all athletes will not develop in the same way. Some will get stronger faster than others. One of the common faults of those who make adjustments is to include too many contracting positions. This causes over work. Remember, stimulate the muscles for development, but don't approach complete fatigue.

The chief advantage of functional I.C. is that it does not make you tired. Instead of waiting a full day before you can exercise again, you can exercise the following day and continue training day after day. With this system you should at least double your progress. You must remember, however, that you can do too much of I.C. training. It seems so easy—it does not tire you—that you feel like going on and on performing exercise after exercise trying to speed your progress at a still greater rate. So if you find yourself not progressing as rapidly as you expect, perhaps you have been working too hard. Perform less exercise on your regular training days.

All research seems to prove that one hard contraction a day is enough stimulus to develop the muscle to its maximum. Any work beyond this tends to hinder rather than help development.

One of the hardest theories of functional iso-metric contraction for most football players to accept is that *one contraction per day in each position is enough of a workout.* Most athletes, after they train with I.C. for a few weeks, begin to feel their new power and want to increase their workout to obtain more power. The only way to increase the workout should be to develop the ability to put forth more effort in each contractional position. Progress is measured in direct proportion to the lifter's ability to put forth a supreme effort in each of the exercises.

Many athletes who increase their workouts, that is, increase the number of movements, after three or four weeks of functional I.C. have stopped gaining in functional strength. That is the time to reduce the program as far as the number of movements are concerned. However, don't decrease the supreme effort in each exercise.

Don't overwork. Follow the principle of work set up in the functional iso-metric contraction system of training.

Specialized exercises for passers, punters, linemen and backs are listed on the last two pages. Those of you who wish to develop specialized skills of your position should do at least one of the specialty skills listed.

WHERE TO PURCHASE EQUIPMENT:

Weights: Bur Barbell Co., Inc., 319 Orient Way, Lyndhurst, New Jersey. Plates—12¢ per lb.—2½ to 40 lbs.; Lock collars—25¢ each; 5 ft. bar—\$3.00; 38" chrome plated sleeve—\$3.00.

Bob Hoffman Foundation, York, Pennsylvania
York Barbell Co., York, Pennsylvania

Iso-metric power racks—\$34.95—\$49.94—\$99.95

REFERENCES:

Marty Broussard—Trainer—LSU
Bubba Porche—Trainer—Tulane
Ed Butler—Coach—Massillon High School, Ohio
Bob Hoffman—(Book) Functional Iso-Metric Contraction
Cramers First-Aider—Cramer Chemical Co., Gardner, Kansas

WELCOME TO CINCINNATI

A greeting reflecting in its sincerity the breadth of the Queen City's heritage, for this welcome mirrors not only the reserved and solid friendliness of Cincinnati's New England origins and the warmth and gaiety of her proximity to the gracious South but also the *gemutlichkeit* of her affable German inheritance.

Since December 1788, when John Cleves Symmes founded the infant frontier settlement on the banks of the Ohio and first called Losantville, Cincinnati has been welcoming the thousands who have come to make the Queen City their home and also those who have chosen to pay her a visit. With this welcome you are now a part of the tradition.

Cincinnati has come to maturity with a long experience of constructive growth to her credit. First, the pioneers put seeds in the ground and harvested the crops. Next, banks were opened, small manufacturers were encouraged to expand, and soon the Cincinnati waterfront became increasingly important to the great Ohio River traffic. The city developed into one of the nation's ship-building centers, and from her boatyards for more than fifty years came some of the fastest, grandest and most luxurious floating palaces in river history.

Sweating men loaded and unloaded its steamers thronging the crowded landing, and from their decks disembarked the thousands of immigrants and native Americans who swelled the bustling city's population. Others came by overland waterway on the Miami and Erie Canal, which ribboned its course northward through rich farming country to Lake Erie. Some after 1842, travelled by train over the strap rails of the Little Miami, Ohio's first railroad.

With them they brought ambition, industry, and cultural flavor of the regions from which they came. By 1870, Cincinnati was a cosmopolitan community and the nation's sixth largest city. She was the world's greatest meat packing center, and already other industries were beginning to adopt the assembly line technique developed in the disassembly lines of "Porkopolis." With a by-product of this packing industry the Queen City was changing the washing habits of the world. From her foundries had come the beautiful wrought iron which graced many a down-river mansion and also the nation's first successful steam fire engine. And by 1870, she justifiably boasted about the most spectacular engineering feat of the era—the magnificent suspension bridge to the Kentucky shore.

But the character and personality of Cincinnati were evidenced not only in her industrial might but also in the intellectual and cultural interests of her people. In 1819, Cincinnati College, later absorbed by the University of Cincinnati, was founded largely through the efforts of the dynamo of energy, Dr. Daniel Drake. In the same year, the Western Museum, now the Cincinnati Museum of Natural History, came into existence, and a young man named John James Audubon worked there stuffing birds and animals. A year later, the first medical school west of the Alleghenies, Medical College of Ohio, came into being, followed in 1829 by Ohio Mechanics Institute, the first technical school in the West.

The Cincinnati College of Law opened its doors in 1835, and remains today, as a part of the University, the fourth oldest law school in the country. In that year too, a group of young men banded together for self-improvement and established the Mercantile Library. Ex-President John Quincy Adams in November of 1843, laid the cornerstone of the Cincinnati Observatory, the nation's first. The

Literary Club of Cincinnati—the only club ever to hold a regular meeting in the White House and the oldest organization of its kind in the country—was founded in October 1849. By the middle of the century the textbooks of two Cincinnati teachers, Joseph Ray and William H. McGuffey, were familiar in households the nation over. And by the same date, Cincinnati public schools were well established and were serving as models for systems in other states.

Music has always been a part of Cincinnati. The boatmen with their river-soaked shanties, the volunteer fire laddies with their social clubs and Saturday night "chowders", and not least of all, America's Stephan Foster—who worked during the 40's in his brother's office on the levee—did their part to establish the Queen City's musical tradition. But music on the Cincinnati scene received one of its greatest early boosts when on June 1, 1848, the first Saengerfest in America was held in Armory Hall. By 1873, these song fests had developed into the May Festival, still a biennial event in Cincinnati.

The congeniality and hospitality of the Queen City are famous far and near. Perhaps the gay colorful resorts located on the heights above the basin at the turn of the century did much to establish Cincinnati's reputation as a light-hearted and gracious spot. It was then that the city city received another of her nicknames—"The Paris of America."

Throughout her history Cincinnati has been shaped by the political, economic, and cultural conservatism of her people. Yet her conservatism has always been accompanied by progress and growth. Today Cincinnati looks ahead with confidence, strong in her wide diversity of industry, keenly aggressive, richly profitable. 1,324,860 people live in the Greater Cincinnati area (U. S. Census, 1950)—the hub of a wheel which finds 40 percent of the nation's population within a 350-mile radius.

Again, welcome to Cincinnati! May your stay be a happy one.

RIB INJURIES

By Weaver Jordon Baylor University

Injuries to the abdominal wall are common and serious injury to the abdominal viscere (organs) can occur but is rare. Soreness may persist for some time even after a relatively minor injury. On the other hand, the apparent rapid recovery of a young, healthy athlete does not exclude internal injury. The realization that the spleen, liver and small bowel can be injured, coupled with careful and repeated examinations of the injured athlete will improve the safety of sports. Hemothorax (an effusion of blood into the pleural cavity) and collapse of the lung, with or without fractured ribs, are possible complications of severe chest trauma. The presence of shock, pallor, continued pain or any respiratory difficulty warrants the patient's hospitalization for careful observation.

"Fissure" and Green-stick" fractures are more frequent than more severe fractures. The side is bruised, there is soreness and pain, aggravated when the patient takes a deep breath. Most commonly involved are the 5th and 9th ribs; but fractures of the 11th and 12th (floating ribs) are not a rarity. Snug strapping with adhesive brings relief. Healing is usually quite rapid. Occasionally a jagged fragment may injure the underlying pleura or even the lungs.

Ribs may dislocate partially or completely, at the vertebral, the sternal, or the costo-chondral (which mean rib cartilage) articulations. Usual symptoms: irregularity

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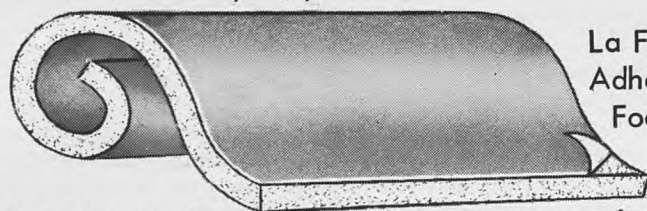
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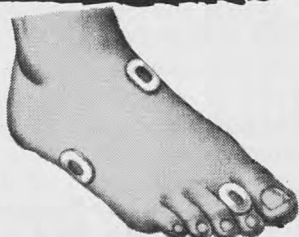


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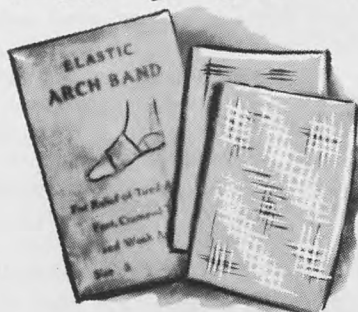
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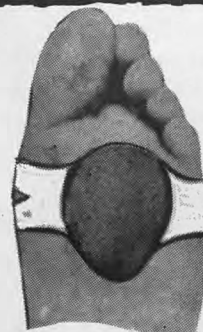
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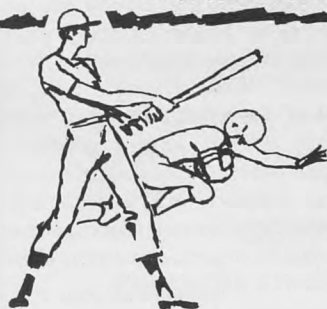
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RIB INJURIES

(Continued)

of outline, localized swelling, pain accentuated on exertion, deep breathing, coughing or sneezing. To reduce pain, stretch the thorax by abducting the arms while manipulating the dislocated end back into position. Apply a pad of felt and strap with adhesive. Orthopedics claim that partial dislocations (luxations) of the ribs at the costo-vertebral or costo-chondral junction may cause a great deal of pain and disability. The treatment is reduction as outlined above. Hanging from a horizontal bar may help.

It is of the utmost importance in ascertaining the severity of a contusion in and about the thorax, to rule out any possible injury to the underlying bony structures, such as the ribs, costo-chondral junction, sternum and vertebrae. To localize a muscle contusion, it is essential to have a thorough knowledge of muscle function tests. It is not sufficiently accurate to make the diagnosis of "contusion". The diagnosis should include the structure or structures involved. The treatment of these specific contusions is that of contusions in general, with the additional use of adhesive strapping to take the strain off an injured muscle while the reparative process is taking place. All subjects with fractures, should be watched for signs of injury to the lung and pleura and should have chest roentgenograms taken. The treatment of fractured ribs is similar to that of costo-chondral separations. When the fractured rib or sternum is incompletely broken, roentgenograms seldom reveals the lesion until bony union or callus is visible. The treatment of these fractures of ribs and sternum is to strap the entire chest with a circular adhesive bandage while the patient exhales. The use of pliable adhesive material, such as "Elastoplast" or "Elasticon" is recommended.

Contusion of the lower ribs is a form of costo-chondral separation of the lower four ribs. The area of injury is along the anterior costal margin. Pain and tenderness are not severe, and seldom last more than one week. Some patients with these contusions may require adhesive strapping for twenty-four to forty-eight hours. All patients with contusions of the lower ribs should be carefully followed for signs of injury to the abdominal viscera.

Separation of the costo-chondral junction is a most painful injury and a difficult one to treat. The average period of disability is usually from five to six weeks. The surgical pathology of the repair of cartilage to bone is slow. Patients have been known to complain that he could actually feel the end of his rib slide under the cartilage when he leaned over. Sometimes patients have said that the slipping took place under tight strapping, when they sneezed or coughed. Of course, such a situation causes excruciating pain, and no strapping yet devised has shown that it will hold or prevent such a "slip". Surgical removal of a dislocated costal cartilage is essential when strapping fails.

The principal function of the cardio-respiratory system is to supply oxygen to the tissues and to remove carbon dioxide. All Therapeutic endeavors, therefore, are directed to the management of this vital and fundamental process. Fractured ribs are a problem to cast or strap, because there actually can be no absolute immobilization of a fractured rib, this because the heart as well as the ribs continually cause the rib cage to move in and out, up and down. It is dangerous to completely circle the rib area with tape in case of a fractured rib or torn intercostal muscle (muscle between the ribs); therefore, the strapping of athletic injuries in the chest is restricted

to one-half strapping or the use of some type of elastic adhesive when going completely around the chest. If the ribs are strapped, the athlete is told to let out most of the air he has in his lungs by forced expiration; this is done for each strip of tape placed upon the chest. In strapping the chest it is wise to paint the entire area with benzoine or "tuf-skin" and also cover the breast nipple with a two inch square of gauze. If the chest is bound down with tape, the respiration will be carried on without difficulty, the injured area being given a chance to loaf while someone else works. The normal mechanics of respiration result from the action of the muscles of inspiration. When one unit of muscles cease to function (or is prohibited by tape strapping) the other muscles are able to compensate and this response furnishes a factor of safety. For example, even if the outward and upward movement of the thoracic cage is prevented by adhesive plaster, the diaphragm can carry on the respiratory exchange which not only the rib muscles from normal amplitude (expansion and contraction), but also the diaphragm is restricted in its descent, and this reduces vital capacity; therefore, the trainer never, under any circumstances wraps the entire chest and back areas. This above paragraph, of course, is the opinion of one doctor and through my research on this subject, I have found conflicting opinions from noted sources with regard to complete strapping of the chest.

The spleen, more than any other solid organ of the abdomen, demands the trainer's and coach's attention for many hours following a painful left upper quadrant (upper left chest and side) blow. The spleen can, and more often does, suddenly (many hours after the game or scrimmage) go into a deadly hemorrhage called a delayed hemorrhage by the medical profession. Spleen injuries are common in athletes from falls, crushing blows, and faulty blocking. The spleen is mobile, lacks elastic tissue, and is fairly well protected by the thoracic cage. It lies between the fundus of the stomach and the diaphragm and opposite the 10th rib and it is almost entirely surrounded by peritoneum (which is the serous sac lining the abdominal cavity and covering most of the viscera therein) and is held suspended by two ligaments of the membrane, the Phrenicolienal Ligament and the Gastrosplenic Ligament—it is a suspended organ. The trainer and coach can be of assistance to the physician if they will watch for what is called Kehr's Sign, a referred pain in the left shoulder of the injured individual which runs about one-third of the way down the left arm. This is the dullness to percussion (a diagnostic procedure designed to determine the density of a part by means of tapping the surface with the finger or a plessor) in the upper left shoulder and chest area. Another sign for diagnosis of ruptured spleens is what the physician refers to as Ballance's Sign. The trainer and the coach can also look for the lad's breathing to be thoracic and shallow. According to one physician from 90 to 100 per cent of the patients who do not receive surgical treatment die from a ruptured spleen, and that 51 per cent die if they are not in the hands of a surgeon one hour following the injury. The removal of the spleen does not preclude a lad from further participation in athletics. With a year's rest, he can return safely to the sport of his choice. Splenic rupture should be suspected in any athletic injury involving the lower left rib cage or upper part of the abdomen. Although about one third of these injuries will be associated with fractured ribs, evidence of contusion or fracture may be totally lacking. The diagnosis is dependent upon clinical

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RIB INJURIES

(Continued)

cal findings. Evidence of impending shock, such as sweating, paleness, and a rapid pulse extending beyond the few minutes after cessation of exercise, are indications for the patient's hospitalization. Pain and tenderness may be diffuse or limited to the upper left portion of the abdomen.

The liver is the largest gland of the body lying beneath the diaphragm in the right hypochondrium (which is the upper lateral region of the abdomen, beneath the floating ribs) and the upper part of the epigastrium (which is best described as the center or pit of the stomach). The large size, fixation, pliability and slight elasticity of the liver predisposes it to extensive rupture and tearing with fragmentation. If the dome of the right lobe of the liver is injured, the patient will complain of some pain in the right shoulder. There is an inter-abdominal hemorrhage when blood escapes from the liver.

The predominating force responsible for subcutaneous rupture of the gall bladder is a blow to the right side of the lower chest wall or a squeezing force. This organ is so well protected beneath the liver that the organ must be distended at the time of injury. The diagnosis of traumatic rupture of the gall bladder is very difficult to make. About the only sign that the trainer and coach can look for is a mild jaundice (yellow skin and eyewhites). However, since all athletes invariably insist on emptying their bladders before participation in sports, some doctors believe that it would be rarely, if ever, possible to have a bladder full enough to be traumatized. The symptoms of a ruptured bladder would be those of pain, spasm, and signs of peritonitis or hemoperitoneum. The treatment is surgical.

RELATION OF TRAINER TO TEAM PHYSICIAN

Presented June 24, 1950
(First National Training Clinic)
Kansas City, Mo.

By Elliott S. Stong, M.D.
Adams State College
Alamosa, Colorado

The subject of the program calls for the relation of a trainer to the team physician. I asked out there at the desk this morning how many high school coaches were here—how many real young men were here, not the grandfathers, Eddie Wojecki and men like that. I wanted to get to the young men because I figured like this. It's fine up in the universities where they have everything at their command, but you men who are out in the smaller high schools and smaller colleges, junior colleges and schools like that—that is where we want to stop these injuries if we can, before they get into higher competition. So knowing that many of you are from high schools I am going to direct this talk chiefly to you men, you coaches who are naturally your own trainers through force of necessity. I'll put in some do's and don'ts for the regular trainers.

You young men naturally had to start young. We can't all be big wheels, I know I couldn't. I know when I started delivering babies in northern Iowa twenty miles out in the country, with snow about two feet deep and with horses, I got fifteen dollars for them—nothing extra for twins, just the same old price. So I know just exactly what a helluva spot you fellows are in. We'll take off from there.

continued on page 8

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RELATION OF TRAINER

(Continued)

You don't have all these facilities, as the big wheels have. You don't have a paid staff; you don't have paid doctors; you don't have somebody to trot along behind you carrying a little roll of tape to hand to you so you can go on with your patient. You men have not only the athletic angle to judge. You're out on the bench—there you are, all by yourself when the game starts. Sure, you'd like to get your mind on that game, but you have your mind half on the game and half on the physical condition of your boys.

I give this little advice once a year to the senior physical education class as they are going out. (They tell me there that it entitles me to the title of professor at Adams State. It comes in handy when the coach or trainer comes tearing in about something on which he thinks I have crossed him up. I just point up there and say that I'm not a doctor, but just a professor.) Some of this advice may seem just a bit unorthodox to some of my brother M.D.'s so we'll just kinda call it a bull session instead—you know, one of the Saturday night kind.

Now you young men are all set. You have a nice new diploma and are all ready to go coaching. You have the training angle on your hands too. You're in a strange town; everybody wants a winning team. You have to beat their rival out here or else you're out. You have the mothers and fathers all in to see you, pushing their young football heroes down your throat. You have been overwhelmed with advice about this star and this one, and already they are taking sides; down at the barber shop they're on the fence and are going to look you over. They have checked up your religion and have checked up your coaching ability. They've looked into your car and fingered your clothes to see what kind of clothes you are wearing. They have even looked your wife over, probably. What a deal! You're about ready to pack up and go home. You're looking for a friend and you want a good one. When the first week of practice rolls around and the injuries are beginning to pile up, it's time then to do a little looking around. You inquire around a little cautiously. Now I'm talking to you younger men out in the small towns and the small colleges where you have to have help.

For the first thing, check into his professional ability. You know sometimes the most popular doctor in town is not the best qualified, at least for your particular line of work. (Now don't go home and tell that—at least give me a chance to get back in Colorado before you tell it.) Then, does he get along well with boys and young men? That's very important. Does he know how to handle them when they come in with their ills—some of them real and some of them imaginary? Next, does he really take an interest in sports? Does he know what he's talking about when he goes out? I think one thing is that the medical profession is about as far behind on this athletic training situation right now as the trainers were about fifteen or twenty years ago. I think the time is going to come. I know I have talked several times to the Dean of the University of Colorado, asking why he didn't pick out one or two men who would like to go in for this sort of work and see that he has special training. Now you men know that athletic injuries are altogether different from delivering babies or doing a little surgery or anything else. They are entirely different. You have to figure each one out by itself.

You will want to look up a man who is pretty well established in his practice so he can go out and leave his patients sitting on the bench while he goes with you.

Then there's one more thing, in picking out a doctor or having one shoved at you. Does he have an axe to grind, political or otherwise, or is he in this business because he likes it? Then the last thing of course—is he a good Joe? He has to be one if he's going to be in this kind of work.

Now you have your man spotted. You've figured it out, so call him and ask if you may see him. Don't go down parading into his office in the middle of the afternoon, but tell him you'd like to see him for just a few minutes after office hours and I'll bet you'll be down there until 7:00 talking to him. Or, if you want to call him at his home be sure to tell him that this is not a professional deal but you just want to come and talk to him. All right, talk frankly to him. Lay your troubles right out there in the light—don't be afraid of him. Bring out your injury troubles. Tell him you need advice and help and a lot of it to keep your squad in top condition. You know most doctors are just as human as you coaches are. They all like a little flattery. Tell him your budget and how limited it is, and it won't take him long to appreciate it. Then come out, tell him you can't possibly take a chance on playing a boy with an injury of which you are uncertain, and would he help you out. I know what he will say. Sure, he'll hem and haw around and tell you how busy he is, and look down his nose and light his cigar and tell you to go on.

For the first game you call him up and tell him you're expecting him to be there. Have the school send him a couple of season passes; that would please him. He probably won't need them but will sure take them. Then when he comes in, meet him, take him down to the bench. Put him on a nice seat on the 50-yard line, the worst place in the stadium to see a game from but he thinks it is the best. It's just like a ringside seat to the average person. Take a little time to point out some of the boys and tell him the system you are using. He probably knows about it anyway. Then just sit back and let nature take its course. I'll bet my winning game necktie that he's Johnny-on-the-spot when the first guy comes off the field with an injury. Don't for a minute get the idea that you can pull a sleeper on him, because I can tell you these M.D.'s are smart old coots or they wouldn't be your family doctor for long. He knows what's going on. He knows you are short on supplies and on advice, but here's the thing. His interest has now been attracted to a situation about which he has not had time to think before. You have made a very good friend and a good physical education advisor.

During the week (I'm still going along with you men who are going to be having the tough time this fall) send him your injured boys. Be careful that they go at a time that is convenient for him. It won't be just a short time until you find him dropping into practice. Then he'll be dropping into the gym before game time and helping you with some of your trick bandages. You have him enlisted now for not only your medical advisor but a darn good friend, and he will sure go to bat for you.

The next thing you want to approach him on is the subject of physical examinations. Of course, this is required now in many states. Naturally, a good heart, lungs, blood pressure, hernia and underweight and those things are checked, but have him look at the mouth. Have him check the tonsils and especially their teeth. I remember back in 1938 a basketball coach had what he thought was a championship team. They went into a slump in February. Some of the players were as tired and worn out as they usually are in March. This high school coach had

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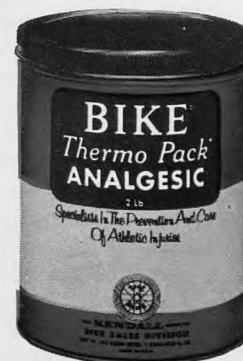


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RELATION OF TRAINER

(Continued)

his eye on the championship and he called me to ask me what I thought about it. I said I'd come down to see him. I drove out to that school that evening, and he had his squad there. We gave them a good checking over. They were in good shape—good heart, lungs and everything was fine. It was a bunch of big huskies. So we looked in their mouths and I can remember I really didn't appreciate the fact that high school kids could have such rotten teeth. I think we found ten badly decayed or ulcerated teeth. Kids in high school can't always afford to go to the dentist, or their folks can't. I called the local dentist—a good basketball fan—and told him what was going on. He volunteered his services gratis—now get that, gratis. That was a good contract. His doctor knows friends here and there and it's not costing your school a thing. It's just a good deal. They went on; in a few weeks they picked up and everything was fine. I never saw kids pick up faster in my life, and I tell you some of those teeth were rotten. And the kids were only 16 and 17 years old.

Your doctor will also have a pretty good insight into the home life of the kids. Are they getting enough to eat, is their home life congenial, are they fighting around home? Some of those things are a bit hard for you coaches and trainers to find out, but very easy for the doctor. That's his job anyway and he has to pick it up here in his practice. That's just another thing that pays off.

Now you have the old boy on your staff and he's having a lot of fun; don't worry about him. You can't repay him. If you offered, he would probably get mad and walk out on you, but there are some things you can do to protect and help him. You can impress on your school authorities the need for good insurance, especially for high schools. That helps that boy in the hospital. I'm not going to get started on that insurance—I mean good insurance!—or brother I'll go wild. You can go to the college president, if you're with a college, and be sure that your hospital or infirmary is equipped with X-ray, because in all fairness to him he should have complete access to X-ray and hospital facilities—not have to guess at an injury; that's bad business. I recommend that all questionable injuries be X-rayed and that every head injury be hospitalized overnight where they are under strict observation. Incidentally, that puts you in the good graces of everyone. The family thinks their boy is well taken care of and that's fine. I'm getting a little old and crabby probably, but I won't treat any private patients in my home. That's my place and I don't want to be bothered while I'm at home. I run them out and tell them to come down to the office. But I tell the trainers and coaches that if they have any problem child to send him down to the house in the evening—any time. Let him come down and talk things over. Maybe he has had a fight with his girlfriend. Maybe it's poor grades. Maybe he is sick. I can't find it out any other way than to get him down there alone and get him started talking. Then I can turn that into the trainer or coach and it will help him and his playing.

Now there are a few other suggestions. Maybe somebody won't like this, but don't go off half-cocked and try to be a licensed M.D. and start treating injuries that you know you shouldn't. You know if you just fumble one, you might as well fumble behind your own goal line—and let your opponents recover because your doctor is jealous, very jealous of his profession. He wants to see his things carried out properly. There's one thing he hates to see, and that's to have some amateur doctoring on a nice juicy sprain for several days, then bring it in to him and dis-

cover that it is a fracture. If you want to lose his respect, and make him madder than hell, just get caught with a few like those. You watch your stock go down like a Colorado thermostat in January.

Another thing, be reasonably sure of your ground before you spring some miraculous cure—all on him or on your boys. You read about and hear a lot of about some of these things. Go talk it over with him, ask his opinion. In this day and age you have to be on your toes. There is so much new stuff coming out all the time, so learn to filter those things out. Discuss them thoroughly, then if they aren't too far-fetched try them out very cautiously. Discuss your equipment with him, even down as far as your first aid kit. He will short-cut you on a lot of stuff, tell you how you can discard this and that and still have the maximum good out of your kit. I think he should be consulted about your equipment too. Be a little considerate of his time; he is usually busy, if he's any good. A little planning will save the coach, the trainer and the doctor a lot of time, and he will repay it with more than you will ask for.

Naturally you should be on the best of terms and friendly with him, but be a little polite. I remember about two years ago I overheard a coaches' conversation after the trainer and I had put one of his stars on the bench for three weeks, and I heard myself referred to as an old S.O.B. I caught him at it and told him to go on with the S.O.B. but cut out the old part—I didn't want that! He was a little red-faced about it, but when we ended up we were good friends.

There's another thing. In many instances your team physician with his standing in the community is often in a good spot to influence school authorities (and we've got to face all those fellows who keep their hands on the money bag) to spend money for protective equipment such as shoulder harness, head gear and medical supplies. I think in high school especially most of these so-called block and shoulder injuries are due to poorly fitted harness, and don't blame that on the coach or trainer because he just simply hasn't enough to choose from. By the time he has his squad half way equipped he has to put stuff on boys who shouldn't be there. That same thing goes for poorly fitted helmets. It just doesn't work.

Don't ever approach a doctor with an unethical proposition. I have had only one training room row, and it was good one. It was one of these push rows, and the other fellow was even a little bigger than I was. He came as a visiting coach and asked me to Novocain the knee of one of his boys, and I saw red. The air was blue, and I took the guy on. I told him, and then we talked it over afterward and I don't believe he used any more Novocain.

Now the care and prevention of the more common injuries, and especially the prevention, you're going to have a lot of trick methods. You'll get them today too. All these boys have their pets. You assimilate all of it; get the things you want, but don't try to cover too much territory. Learn one good method for each injury, and get that down pat so you can put it on quickly and correctly and you know when you put it on that it's going to work. I think you should be able to put it on when you're sound asleep. If there is anything I hate it's a sloppy tape job. If you mess the dressing up or have to cut it off during the game, you lose not only the doctor's confidence but the confidence of your boys and you know it. Believe me, any high school or college is darn quick to sense the fact that you have done a sloppy job, and pretty soon he quits reporting his injuries. The next thing you'll find him and his buddy out behind the locker trying to put his own tape on. That doesn't work.

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INJURIES OF THE KNEE

By Clyde W. Dawson, M.D., F.A.C.S.
Assistant Professor of Orthopedic Surgery
Ohio State University
Columbus, Ohio

To participate in intercollegiate athletics, the athlete must of necessity be sound of body and limb. Because of the basic character of sports, the greatest stress is applied to the lower extremities. At the Ohio State University, intercollegiate teams participate in at least twelve different sports. Each of these entails a specific training program. The potentiality of injury to the participant varies with the degree of physical contact involved. Such sports as tennis, swimming, and golf seldom produce injuries to the knees even though strict training is required to develop stamina and co-ordination of the lower extremities. Football, being a contact sport of major importance, places the greatest stress of all sports on the condition of the knees of the athlete involved.

Last year some three hundred five young men participated in football at Ohio State University. Each in his capacity training to fulfil the requirements of play in intercollegiate football. In addition to those participating in football, five hundred forty seven other athletes competed in the other sports. These statistics do not reflect in any way the number of participants involved on an intermural basis at the university. Members of this organization are particularly interested in injuries to the participating athlete. Therefore, I will discuss today only those problems relating to the injured knee of the athlete and not consider similar problems in other age groups, except as they may be reflected by injuries received while playing football as a young man of college age.

An understanding of the anatomy and function of the knee is necessary to properly handle injuries to this part. The knee is heavily supported by muscles and ligaments. When it is fully extended, very little muscle power is required to preserve that position, even when the person is bearing weight. With action, there is a combination of flexion, extension, and a screw-like function carried out through the knee joint. This function of the knee was first demonstrated by Meyer* of Zurich in 1873. The quadriceps muscles play a great part in carrying out the function of the knee joint, being particularly important in bringing about full extension of the knee. The co-ordinated function of the flexors and extensors through the joint is very important in bringing about extension with weight bearing or bearing weight with the knee in any given position of flexion. This function is aided by the presence of a heavy posterior ligament in the popliteal area, and the stability offered against lateral mobility by the collateral ligaments, and the anteroposterior stability offered by the cruciate ligaments. Within the joint capsule are found the medial and lateral menisci, the cruciate ligaments, and the fat pad. The cruciate ligaments offer stability in the anteroposterior direction. The menisci offer depth to the fossa formed with the tibia, which articulates with the femur. The menisci are crescentic in shape and loosely attached along their margins but are firmly attached at their anterior and posterior extremities to the tibia as well as to each other. The patella is freely moveable in the intercondylar notch of the femur and its presence adds strength to the function of the quadriceps by its fulcrum effect. When the knee is flexed, the collateral ligaments are relaxed. In extension they are taut. The muscle power required to maintain a given position of flexion with weight bearing

increases with the degree of flexion until the knee is fully flexed. This power is supplied primarily by the quadriceps muscle group. Only in complete extension on weight bearing do the flexors; namely, the hamstrings, popliteus, and gastrocnemius, play much part in either maintaining the position of the knee or protecting it against harm. These muscles assist the ligaments in protecting the knee against harmful hyper-extension. The power of locomotion is transmitted through the knee to the foot by the co-ordinated actions of muscles transmitting force through the skeletal system to a fixed point; namely, the ground. The importance of excellent knee function to proper transmission of such power is of prime interest to us at this time. Faulty knee function leads to a delay in such function, the production of pain, and a susceptibility to injury. Such function usually disqualifies the athlete from such sports as football, particularly where his tasks require excessive stress as in sudden changes of pace or direction while running. Again, such a knee is susceptible to re-injury on contact with a blocker. This makes the player feel insecure to such a degree that he may avoid contact rather than experience the possible re-injury.

The mechanism of injury to a definite degree determines either the area injured or the extent of injury to the part. Contusions with synovial irritation may occur from striking the knee on a shoe or hard ground. Twisting injuries may occur without contact and are often associated with injuries to the ankle. Contact injuries, such as occur by a block when the foot is anchored or when the player is struck from two directions at once, may result in injuries to the menisci, ligaments, or both. In young growing players actual bony injury, such as epiphyseal fractures and avulsion fractures, are more common than ligamentous and cartilage injuries. Often the observing trainer or fellow player will see the injury occur. This evaluation of the mechanism of injury is often very helpful in determining the extent of injury received.

What other conditions than the above may contribute to the player receiving an injury? One factor may be inexperience or lack of skill. This may be reflected in the number of injuries received in practice, indicating inexperience. Should a player be constantly pitted against players of greater skill, more injuries should be noted among the players of the weaker team. Again, if a few players have to carry the major load of play, they may be subjected to a greater risk of injury because of fatigue.

It is of great importance to the player to evaluate the extent of his injury as soon as possible. Often this is easier done immediately following the injury. Immediately following the injury, there is a period in which swelling is not present to obscure intra-articular trauma and tests for ligamentous injuries may be carried out without undue pain. When one examines the knee, he recognizes the bony landmarks of the patella, condyles, and joint margins as they are palpated. If these are normal, extension may reveal a block to complete extension. Attempts at increased extension by passive force may produce severe pain. If there is no block to extension, then such pressure exerted to produce hyper-extension may also produce pain. Injuries to the semilunar cartilage are demonstrated by pain on pressure with the knee going into extension, the pressure being applied to the anterior medial fossa of the joint. Lateral stability tests with the knee in extension will evaluate the continuity of the medial or lateral collateral ligaments and the drawer

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INJURIES OF THE KNEE

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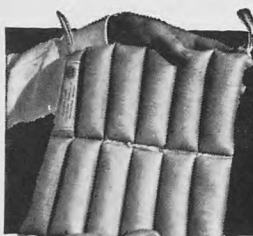
test, as it is named, is made with the knee flexed to 90 degrees. This test determines in part the integrity of the cruciate ligaments. The degree of injury to any of these parts frequently becomes the difficult decision to make.

It is well known that injuries to the menisci or semilunar cartilages do not heal with any degree of success, particularly if the hyaline cartilage is split or fractured. If the injury to the semilunar cartilage is peripheral, healing may be good under a conservative regime of care. In my experience, a cartilage which has been sufficiently injured to result in displacement and appreciable locking of the knee offers a very poor prognosis for healing by conservative therapy. A knee which has suffered previous injury to the meniscus is, in my opinion, not likely to become a stable useful knee with conservative therapy. It is of utmost importance to evaluate the degree of injury to the ligamentous structures. In ligamentous injuries, I am of the opinion that it is of particular importance to obtain a complete evaluation of the injury so that prompt action may be carried out. Cruciate ligamentous injuries cannot be primarily repaired at a late date following injury. Reconstruction must then be employed and such reconstruction is not as satisfactory as is desired, particularly if the athlete is to continue in contact sports. Some collateral ligamentous injuries will improve by conservative care. Others will give very poor results by this method. Stress x-rays, taken with the knee novocainized or under saddle anesthesia if necessary, will assist greatly in determining into which class any given injury should be placed. If such x-rays demonstrate that there has been sufficient injury to disrupt the ligamentous stability of the knee, then the in-

jury should be handled surgically by immediate repair. If there has been a minimal relaxation without evidence of extensive tear or disruption, immobilization in plaster after evacuating the hemarthrosis will give a good prognosis. If there is a question of the degree of the injury sustained, I would rather error towards surgery than towards conservatism, for delayed repair and reconstruction does not offer as good a prognosis as does immediate surgical repair. Unfortunately many young men coming into college after an intensive athletic career in high school, enter with previously damaged knees which were neither treated nor protected after conservative care. This results in a loss of time and often loss of opportunity for the student to participate in his chosen sport while attending college. It is my opinion, and I know that it is the feeling of the Athletic Department at the Ohio State University, that no young man will be allowed to expose himself to injury when he is, by reason of previous injury or a physical handicap recently received, unable to protect himself properly. No player will be played in practice or game until he is considered able to do so by the Medical Department. His prime purpose at being in Ohio State University is to obtain an education. This always come first. His athletic skill will be developed to the fullest as long as it does not interfere with his first purpose. A crippled athlete re-injured because of an insatiable desire to win without regard to the welfare of the participant would not be tolerated at this university.

In 1955, Dr. H. L. Donahue* of Oklahoma City reported on the results obtained with early surgical repair of ligamentous injuries, late surgical repair, and reconstruction. In his series of eighty patients, 55 per cent of them

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INJURIES OF THE KNEE

(Continued)

were treated by early surgical repair, 25 per cent by late surgical repair, and 20 per cent by reconstructive procedures. His end results demonstrated that 82 per cent of the athletes operated upon early had no residual complaints. Only 50 per cent of the non-athletes operated upon early had no complaints. Seventy per cent of those in the early group replied that they had no pain, while only 40 per cent of those in the late group and 50 per cent of those in the reconstruction group replied that they had no pain. Of the early group, 90 per cent of the patients participated in athletics, while only 63 per cent of the late group and 40 per cent of the reconstruction group did so.

Ligamentous injuries require a minimum of at least three weeks for minor ligamentous injuries and six weeks for major ligamentous injuries to heal properly. It is our policy not to tolerate undue stress to any ligamentous injury of the knee for a minimum of four to six weeks. No surgically treated knee will tolerate contact in football until the muscle power has been returned to normal by a rigid program of exercises against resistance, sufficient to obliterate the muscle atrophy. Again, it is necessary to re-establish in the player a supreme confidence in his joint before he will respond in a game according to his ability. This we call mental rehabilitation. Protection of the knee during the early stages of rehabilitation against any possible re-injury improves the prognosis of the previously injured athlete as far as his capacity to return to competitive athletics is concerned. Early in the remobilization stage following ligamentous repair, an elastic knee cage brace may be worn. Later when he begins to develop good function with his quadriceps, the octopus support is worn. This is used particularly when he begins to go into contact sports. Running and undue activity is not allowed on the extremity until the swelling has subsided.

The purpose of all care to the injured knee has to have as its first consideration the re-establishment of as normal function as possible; as its second consideration the avoidance of re-injury; and third the prevention of late sequelae of trauma to the knee. All of us know men now in their forties or fifties who suffer constantly because of unwise or even ignorant handling of an injured knee received while playing football in college or high school. If we feel the injury received by any given player may render him very susceptible to re-injury, or if the injury has at this time caused an irreversible change in his knee, then he may be advised to discontinue that sport. It is much better for the man in his future to have a reasonably good knee which will not undergo degenerative change later, than to have a man with a residual or sufficient trauma to his knee that will always be handicapped throughout his life career.

In summary, I would like to stress the following points:

1. Prevention of injury is the most important phase of the care of an athlete.
2. The knee joint is the most exposed and the most often injured part of a football players body.
3. Knee injuries cause more prolonged disability than injuries to other parts of the body of an athlete.
4. Lack of skill in the sport and fatigue both play a part in the production of knee injuries.
5. Early recognition and adequate care of the injury promptly instituted offer the best avenue of care.
6. Return to participation in sports can occur with safety only if the knowledge of ligamentous and joint healing is understood and applied.

7. The important factor in all injuries is the safety of the person involved. Disregard of the rules of health by those guiding the students activities can only lead to loss and disrespect.

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STRESS

By Gladys Lyndberg

Stress is defined in Dr. Dorland's Medical Dictionary as "Forcibly exerted influence; pressure." A partial list of stress factors, or stressors, named by various medical authorities are:

- Allergies
- Antibiotics (penicillin, aureomycin, etc.)
- Chemical preservatives used in foods
- Competition (for love, social rank, *ATHLETIC*, business success, etc.)
- Dietary deficiencies (especially of vitamins and essential amino acids)
- Disease and infections
- Excesses of sugar, drugs, hormones, alcohol, caffeine, nicotine, fasting to reduce, etc.
- Exposure to extremes of cold or heat
- Injections of toxic agents
- Insecticides ingested with foods
- Intense noise
- Physical injuries
- Surgical operations
- Worry and grief
- X-rays

In connection with this subject of stress, the work of Dr. Hans Selye of the University of Montreal is particularly interesting and significant. Briefly, he demonstrated that in experimental animals the body reacts in the same way to various stressors.

His discovery was made some 15 years ago as the result of certain unexpected findings during experiments on rats. He injected heavy doses (sufficient to cause death in a day or two) of various substances, each entirely different from the others in chemical structure and action. Autopsies of the animals revealed that each substance produced exactly the same result in three of the animals' organs. First, the adrenal glands swelled to twice their usual size and changed in color. Second, the thymus withered away. Third, the stomach lining was spotted with bleeding ulcers.

Selye reasoned that these responses must represent a non-specific reaction to general damage as such, regardless of the specific agent that caused the damage. If this assumption were true, then other types of acute of stress should produce similar results. So he tested his assumption by subjecting the animals to numerous types of nonchemical stress—excessive muscular exercise, cold, fasting, emotional excitement and various other kinds of injuries. And, as he had anticipated, all these nonchemical types of stress elicited in the animals the same unmistakable "*alarm reaction*" (AR), as he called it.

It should be noted that certain characteristic chemical changes in the tissues and body fluids always accompanied the alarm reaction. For instance, during the first few hours of exposure to stress—called the "*shock phase*"—the sugar and the chloride ions of the blood fell to subnormal

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concentrations. After a few more hours—called the “counter-shock phase” of the alarm reaction, they (the blood sugar and chloride ions) rose above normal levels.

Selye continued his experiments to ascertain the animals’ long range responses to stress. He wanted to know what would happen if the organism were exposed to continuous, prolonged stress strong enough to strain the defenses almost to their limits, but not of sufficient intensity to overwhelm them in a relatively short time. So the animals were subjected to sublethal daily stress for several weeks.

During the first few days, the organism responded with the usual AR. It showed the typical organic and chemical changes; growth and sex functions ceased, and all the signs of an intense tissue breakdown were present. As the stress continued unabated, the animals that survived the AR began to recover. The adrenals started to refill their empty stores with lipids and reverted to normal size; the thymus began to regain its mass, and such substances as sugar and chlorides in the blood rose to normal or even higher levels.

At the height of that state the organism had in some way accomplished an adaptability to the continuing stress. Its organs and their functions were apparently returning to normal. In some instances it was difficult to distinguish such animals from control animals not under stress. This stage, lasting from a few weeks to a month or more, was called the “stage of resistance.”

It should be noted, however, that resistance increased only against the one type of stress employed from the beginning. If, in the middle of this recovery period, the stress against which adaptation developed was replaced by a different one, the animals succumbed immediately! Quantitative experiments with graded amounts of stress showed that while the animals specific resistance to the initial agent increased, its resistance to any other stress decreased.

Moreover, the adaptation to the original stress was not permanent. As the strain continued after the recovery period, the animals became progressively weaker; the adrenals enlarged again and discharged their lipids; the thymus lost the mass it had recovered; sugar and chlorides fell to dangerous levels after a few weeks all defenses collapsed and life ceased. This last “stage of exhaustion” was similar to the initial alarm reaction. The end was like the beginning.

Thus Selye found that the struggle of life against stress consisted of three successive acts, all aiming at a balance which was not quite attained during the alarm reaction, was achieved during the stage of resistance but was lost again during the stage of exhaustion.

Evidently the war of the organism against damage was waged at the expense of a limited capital of “adaptation energy.” When the bank of adaptation energy is exhausted, life ceases. The whole battle was named the “general adaptation syndrome” (GAS).

“Syndrome” is defined in Dr. Dorland’s Medical Dictionary as “A set of symptoms which occur together; the sum of signs of any morbid state; a symptom complex”. And Selye’s “general adaptation syndrome” is “The total of all nonspecific systemic reactions of the body to long-continued exposure to systemic stress.”

The foregoing is probably an oversimplified explanation of Selye’s findings. However, it does provide us with food for thought—as it has so many others in the field of nutrition.

Of course, the best solution to this problem of stress is to eliminate the stressors! But this cannot be done in all instances. Therefore, it seems wise to provide ourselves with the means to help fight the battle constantly being waged against the stresses of modern living. One weapon at our command is adequate nutrition—as shown by the studies and experiments of many scientists.

Their findings indicate that a person whose nutrition has been inadequate for a long period is in a vulnerable position. For instance, he is a prime target for infections. If parasites invade his body, they reproduce and multiply very rapidly. These enemies need the same nutritional elements the human body requires. So they rob his body cells of their essential substances, threatening his survival. To meet this threat, his body must be well fortified nutritionally.

Similarly, a malnourished person is also in a vulnerable position when involved in an accident. Immediately the body calls upon its reserves. If these are lacking, it cannot respond. A poorly nourished person might expire before emergency treatment could be summoned and administered, whereas he could have survived if his reserves were at or near par. It is not unlikely that an accident that results in loss of life—or a long and costly stay in a hospital—for a malnourished individual might be endured without such serious effects by a well nourished person.

Following are case histories or findings reported by several workers which appear to support the view that adequate nutrition plays an important role in combating stress. And let’s not overlook the fact that really good nutrition does directly eliminate some of the stressors, such as dietary deficiencies, excessive intake of sugar, and so forth.

1. Joseph C. Risser, M.D., noted orthopaedist of Pasadena, has found that in all cases of bone repair, consideration should be given to the availability and absorbability of food essentials, as in a primitive diet of non-processed food. The presence of gastric acidity is important for the absorption of these foods. Hydrochloric acid secretion seems to be related to vitamin intake, especially niacin amide. Gastric acidity decreases with fevers and infections.
2. Benjamin H. Ershoff, Ph.D., of Thurston Laboratories, Los Angeles, has reported on research undertaken in cooperation with the Quartermaster Food and Container Institute for the Armed Forces. His findings indicate that in addition to the known nutrients other substances may be required in increased amounts during conditions of stress. He demonstrated that whole liver contains a factor, apparently distinct from any of the known B vitamins, which significantly increased the capacity of rats to withstand the stress of swimming in cold water. Other of Ershoff’s experiments indicate that many of the effects of hyperthyroidism are due primarily not to excessive amounts of thyroid hormone but to resulting nutritional deficiencies.
3. This is a case history cited by Milton Tobias, M.D., of Beverly Hills: W. B. was admitted to the contagious service (in the Los Angeles Communicable Disease Hospital) on June 25, 1933. He was two years of age, had measles, and was subsequently discharged from the hospital. Ten days later he was readmitted with a severe cough, marked breathing distress, severe vomiting, a positive diphtheria culture, pulse of 160, and temperature of 104.6. He re-

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ceived 20,000 units of antitoxin. Until Sept. 20, 1933 there were four severe episodes which were so critical that his wind pipe was opened from the outside and a tube was inserted to make it possible for him to breathe. Oxygen and stimulants were necessary to keep him alive. On Sept. 20 all previous treatment was discontinued and he was given, in addition to the regular diet, fresh liver in large amount, raw egg yolks, lecithin intra-muscularly, and a high intake of the essential vitamins. He was clinically well from Sept. 24 until Nov. 13, when he was discharged.

(Remember this occurred 20 years ago—so nutrition is not a new fad!)

4. The late Dr. Alexis Carrel, in "Man the Unknown" published in 1935—nearly 20 years ago—states that some diets increase the susceptibility of mice to experimental typhoid fever, and that the frequency of pneumonia may also be modified by food. He also says that 52 per cent of mice of a certain strain died of pneumonia while subjected to the standard diet. Several groups of these animals were given different diets, with the result that the mortality fell to 32 per cent, 14 per cent and even to zero, according to the food.
5. Benjamin P. Sandler, M.D., in his book "Diet prevents Polio" gives several instances reported by Dr. Sabin where polio occurred among American troops in China, Japan, and in the Philippines, in spite of the fact that there were no outbreaks of polio at the time among the native children and adults in those areas in which the troops were located. Dr. Sandler then states:
 "I offer the following explanation for the occurrence of polio among American troops in China and the Philippines: The Americans took their dietary habits with them overseas. All during the war, as soon as local combat conditions permitted, ice cream, candies, soft drinks, cakes, and the like, became available to American troops. Ice cream manufacturing equipment followed soon after combat equipment. I saw American troops consume great quantities of candy bars when they lost their appetites for the monotonous K and C rations. It was felt that our men would feel at home, not get homesick, and have better morale if sweets were available. Thus, I submit, polio occurred among the Americans and not among the natives because the natives did not consume the amount of sugar that the Americans did."

Many, many reports such as the above could be quoted. So let's remember and APPLY the points brought out in "PROTEINS AND AMINO ACIDS" and "PROPER BLOOD SUGAR LEVELS," the first two lectures in this series. In the succeeding discussions attention will be given to vitamins and minerals and how they too are important in eliminating or combating stress.

A METHOD OF MOBILIZATION FOR TRAUMATIC SHOULDER INJURIES

By Max L. Morton, R.P.T.
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In Athletic injuries involving the shoulder, the picture is usually as follows:

The pain is severe, not only in the joint, but also throughout the arm, particularly about the area of the insertion of the deltoid. Motions, such as abduction and external rotation, increase the pain. The athlete will insist upon holding the arm against his side with as little movement as possible. If he continues this, a vicious circle results. Adhesions, contractures, atrophy, and intensified pain results.

Our problem is, how best to handle the mobilization of this joint. I shall not attempt to tell you what type of heat is best, but just that heat is necessary. A short period of rest may be needed, but I repeat, short. The heat should be followed by massage of the upper arm, point of the shoulder and over to the neck.

The early exercises should be passive relaxed, that is with the trainer doing the movements for the boy. Position the boy supine and require him to relax. Now with the elbow extended, palm down, flex the shoulder as far as possible within pain tolerance. Next, abduct the arm, being sure that it externally rotates in a natural motion. Now flex the elbow to 90° and abduct the shoulder to 90° and slowly externally rotate the arm and then internally rotate it. All movements should be done slowly. Do each at least three times.

After the pain decreases, active assistive exercise should begin. Here I use a rope and pulley system. Hang a small pulley overhead in your training room. Use a six foot length of rope. Have the injured athlete grasp the rope high up with his normal arm and slowly pull the other into flexion at the shoulder. Then follow with abduction. Next, have the boy grasp the rope behind his back with the injured arm, now pull the arm into flexion at the elbow (arm in position of an arm lock). A slow stretch should be applied with each movement.

The boy should now attempt active anti-gravity exercises. Sitting or standing, have him flex the shoulder as far as possible, then abduct, letting it externally rotate. Next, have him place the hand behind his head and then the back of his hand in the small of his back. This movement is external and internal rotation.

The above should just about have the boy back in action, but if atrophy has set in, the boy should be given resistive exercises. I prefer wall weights working the motions of flexion, abduction, internal and external rotation, abduction and horizontal abduction and adduction. Bar bell exercise may be substituted for wall weights.

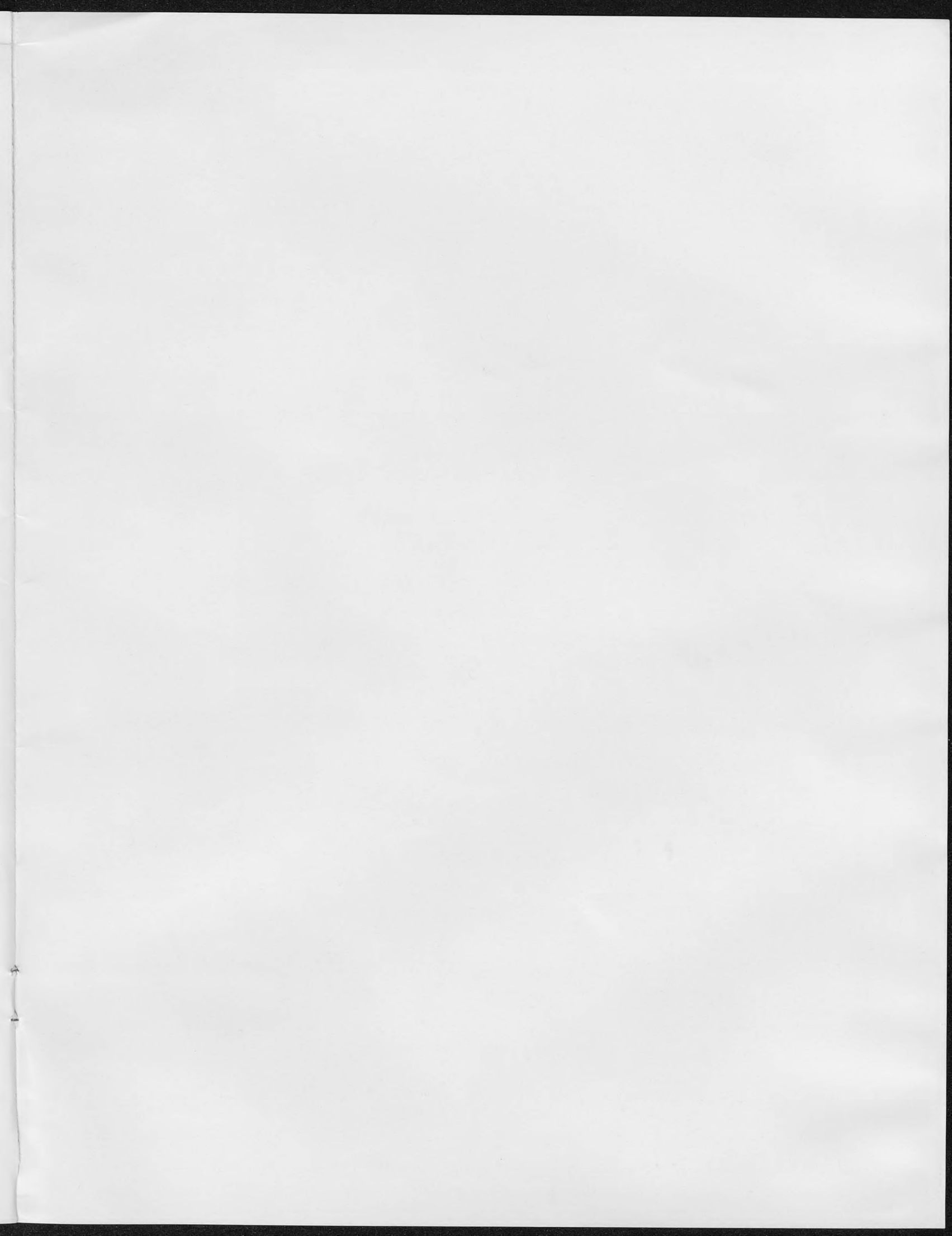
When the athlete returns to competition, we like to use some extra padding in the area of the shoulder. I like to use two layers of sponge strapped to the shoulder and not to the shoulder pads. I feel, in this way, the pad is always in the correct place.

Let me summarize the total treatment of the shoulder:

1. Apply heat.
2. Massage both below and above the joint.
3. Depending upon the pain, follow heat and massage with exercises of choice.
 - a. passive relaxed
 - b. active assistive
 - c. active
 - d. resistive

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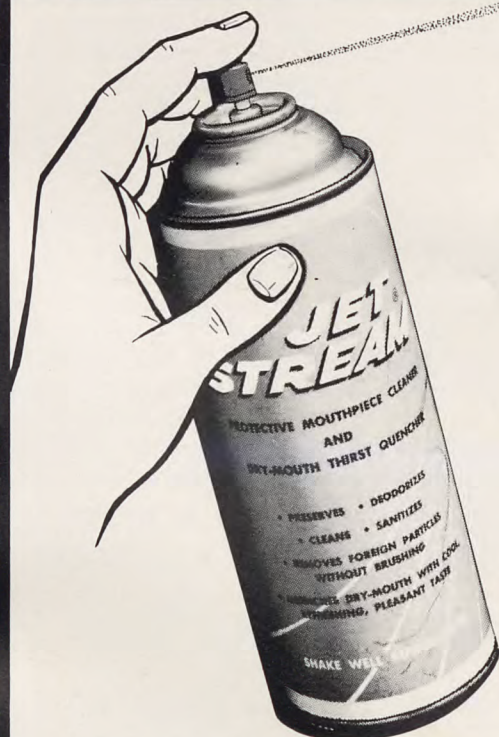
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