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## SPORTS and ATHLETIC INJURIES:

### A PHYSIOTHERAPIST'S APPROACH

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Injury is acknowledged to be the occupational hazard of sport, and is a constant threat to all sportsmen and athletes. A high proportion of these injuries are minor, but all prevent the sportsman from taking part in his particular sport or greatly reduce his ability, and if neglected or ill-treated may easily become major disabilities.

It is well known that a great number of sportsmen lack confidence in the medical profession and turn to quack treatment in search of a rapid cure. This, I feel, is due mainly to the fact that few doctors or physiotherapists realize that even a minor injury to a keen sportsman assumes the proportions of a major disaster, threatening his hard-won fitness, sporting prowess, and possibly his position in a team. Too frequently, his reaction to injury is considered to be somewhat neurotic, and he is sent off to rest at home, with little or no instruction as to the length of rest required, what steps he should take to hasten his recovery, and when or how to resume exercise. Consequently, either he is afraid to use the limb at all, or he walks too soon on an already-damaged muscle or joint, thereby putting further strain on it. In either case he tends to return to sport before he is fit, once his pain is alleviated, and the lesion recurs or he suffers a secondary injury, with resultant lowering of morale and further loss of confidence in medical advice.

In order to get the best results from the treatment of this type of patient, it is necessary to recognize the fact that he needs a sympathetic and positive approach to the handling of his injury; demands 100 per cent recovery in the shortest possible time; and has no use at all for the widespread prescription of 'rest'. There is no doubt that lay-off periods, with the concomitant drawbacks of loss of form and fitness, are greatly reduced by the early initiation of active intensive treatment, with the ideal balance of rest and gentle exercises, graded according to the severity of the injury.

Because so many injuries occur on a Saturday, when hospital and other medical and physiotherapy departments are closed, the average sportsman has to rely on inadequate home remedies before he is able to obtain professional assistance. Valuable time is thereby lost, and the injury is already subacute or chronic before being seen. To overcome this time-lag it would be of great value if regular Sunday-morning injury clinics were available which sportsmen could attend.

#### SPORTS INJURY CLINICS

In large centres in such countries as Great Britain, Australia and the U.S.A., Sports Injury Clinics are attended by large numbers of sportsmen. Sports enthusiasts like W. E. Tucker, Williams and Don O'Donoghue consult in these, and intensive active treatment is carried out along the lines of high-pressure rehabilitation units, the patients attending several times a day in the acute stage of the injury.

In a sport-loving country like South Africa there is a great need for this type of centre, especially if interested orthopaedic consultants would be prepared to run them and be available to diagnose and prescribe for the injuries at the earliest possible moment.

Such centres would, I feel sure, attract the interest of coaches and sportsmen alike, and would gain recognition and support from the various sporting and athletics bodies. The essential team-work on behalf of the sportsman from doctor, physiotherapist and coach or trainer could be obtained, the importance of early treatment explained, and the necessity of full recovery and the regaining of fitness before the resumption of full training or return to competitive sport stressed.

The co-operation of the coach, which is at present only obtainable among professional athletic and sports clubs (apart from the occasional doctor who coaches in his spare time, and some school coaches), is in any case essential in order to get the best results with this type of case. Too often the amateur sportsman disregards medical advice, or attempts to hide an injury, because his coach insists on his taking part in training sessions, with the threat that he will not be considered for the team unless he does so.

Should recognized Sports Injury Clinics be established, the vital co-operation of the coaches would be far more easily obtained; harmful practices such as making the sportsman try to 'run out' a muscle pull, in spite of pain and spasm, could be stopped, and the chronic injuries (resulting from neglect of minor tears and strains) could be reduced, both in severity and number.

#### PHYSICAL FITNESS AND TRAINING

The average sportsman needs about 6-8 weeks' pre-season and 4 or more weeks' 'during season' training in order to reach a sufficiently high standard of fitness to enable him to avoid the less serious type of injury. Even if pre-season training has been carried out for many weeks, soft-tissue and other injuries are most common in the first month or 6 weeks of the season, although naturally, the better the player has prepared himself, the less liable he is to sustain an injury. As the players get fitter and more hardened, especially in body-contact sports like rugby, the injury rate drops; then, towards the end of the season, when fatigue and staleness set in, and chronic injuries begin to need not only treatment but also rest, a second peak of injuries occurs.

There are several types of training, and the sportsman or athlete will choose the kind most suited to his needs. In every case it is important to include graduated progressive resistance exercises, to increase the tone and strength of muscles sufficiently to protect the joints over which they work, thus reducing the likelihood of injury. As it has been found that fully extensible muscles are less prone to tears on sudden exertion and fast movements, daily exercises to put the muscles, especially those of the legs, through their full range (plus a little overstretch) are also important. Bertie Mee, physiotherapist with the Arsenal Football Club, states that the incidence of pulled muscles has been reduced considerably since this practice was introduced as a routine in training, and before participation in any game.

Other points which are invaluable in pre-season training are: practice in falling, ending in a roll or somersault; attempting to land on the more heavily-padded parts of the

body in a fall, thus reducing the point of impact; learning to 'give' when receiving the impact of, say, a cricket ball; and, of the greatest importance, learning to relax unneeded muscles, in order to conserve energy for the task in hand and so reduce the onset of fatigue. (A great deal of information on this subject can be found in Wells's book on *Kinesiology*.)

Adequate warming-up exercises before participation in strenuous games or athletic events are important as a safeguard against soft-tissue injuries, as — especially when cold — sudden exertion is a frequent cause of pulls and tears. Accidents also occur when a sportsman is too tired to be alert, and the muscles are fatigued, which underlines the necessity of complete fitness before competing in an event or playing in a match.

I am well aware that a great deal of this is outside the province or control of the physiotherapist, but it is of interest to know, and it may be of help in advising sportsmen as to the value of these procedures.

#### TYPES OF INJURY FOUND IN SOME DIFFERENT SPORTS

The main injuries occurring in sport and athletics are muscular strains or tears; contusions and haematomas; joint injuries, with cartilage, capsule and ligament involvement; and bony injuries, including fractures and bony haematomata.

In rugby, it is the backs who suffer the most leg injuries of all kinds. Hamstring injuries are most common among the wings, possibly because they are frequently called upon to make a sudden sprint, or swerve at speed after a period of reduced activity, when the muscles have lost some of their warmth and are unable to take the load without some fibres being stretched or torn. These tears also tend to occur towards the end of the game, when the player is fatigued or loses concentration.

The backs also suffer shoulder injuries from tackles and falls. Scrum-halves get acromioclavicular strains and contusions from dive-passing, as well as being subjected to face and hand injuries.

Among the forwards, back-strain is common, and face, head, ear and neck injuries prevail, with the constant danger of a cervical fracture-dislocation if the scrum collapses. Consequently it is particularly important for them to strengthen neck and back muscles.

All players are liable to get contusions and haematomas, and it is amazing that a far greater number of more serious injuries do not occur following hard tackles, or rucks and loose mauls; in fact, one frequently wonders how the chaps at the bottom of a struggling, hacking mass of bodies ever get up at all, let alone in one piece!

In cricket, bowlers are the most injury-prone as, in addition to leg-injuries, they tend to stretch and strain back muscles and frequently develop supraspinatus tendinitis. Fast-bowlers often pull their external oblique muscles (found on the left in right-handed bowlers), and spin-bowlers develop soreness of the spinning finger.

Among batsmen one sees contusions of fingers, thighs, ankles, feet and knees; pulled medial ligaments or menisci; sprained ankles; pulled leg muscles; and sometimes strained backs.

Fielders, too, pull leg muscles and tendons, but suffer more finger and hand injuries, as well as straining acromioclavicular joints, or shoulder tendons from dive-catches and throw-ins.

Among athletes, hurdlers pull adductors and hamstrings; get contusions and haematomas from hitting high hurdles, and sometimes strain their mid-tarsal joints. High-jumpers get ankle injuries, shoulder or elbow injuries from falling, and contusions to the thigh from hitting the bar; long-jumpers develop bruised heels, and often get backache or

sacro-iliac strain due to the jerk of landing. Sprinters mainly pull leg muscles.

Discus-throwers tend to develop a triceps extensor strain, and javelin-throwers a type of tennis-elbow, known as 'javelin elbow', and sometimes strain of the deep muscles of the back.

I, personally, have little experience of soccer injuries, mainly because my practice is in a rugby-playing centre, but Donald Featherstone's book on *Sports Injuries* deals specifically with these.

As a matter of general interest, Tucker gives the following ages as those at which a sportsman reaches his prime in his particular sport: in athletics, at about 25; in tennis and similar games, a couple of years later; in football, at an average of 28; and in cricket and golf, at 30 or over.

#### PATHOLOGY

Before discussing treatment it will be useful to outline briefly the body's reaction to injury, in which, incidentally, reparative measures far in excess of those required to restore and repair damage are produced. The normal tissue reaction includes inflammation and haemorrhage from ruptured blood-vessels; serum plus fibrin and white cells exude from the surrounding blood-vessels, and adjacent structures are torn or stretched. The part becomes swollen and painful on pressure, and movements become limited.

In the next, or repair stage, the phagocytes try to absorb the break-down products and later fibroblasts grow in to repair the damage.

The repair of muscle fibres, and even of tendinous lesions, is good, especially in youth, when the tissues are so versatile that they can repair, replace and even grow after injury.

If absorption of effusion and space-occupying haematomata is delayed, or does not take place, the lymph becomes organized and forms adhesions. Therefore, the more rapidly one can disperse the swelling, and the sooner gentle stretching of the reparative tissue to prevent it from contracting can be started, the better, and the less likely the sportsman will be to develop a chronic condition.

It may be worth stressing at this stage that the treatment for inflammatory conditions due to trauma is opposite to that for those due to bacterial infection.

#### TREATMENT

According to most authorities on the subject, complete rest is only required in a few sports injuries, such as complete rupture of muscle or tendon; in fractures; after dislocations, especially of the elbow; in the presence of myositis ossificans, and in some cases of tenosynovitis. The value of accurate diagnosis, the prescription of Tanderil, Varidase, or similar drugs, early first-aid treatment, and immediate steps to combat the injury and start rehabilitation in all other sports injuries cannot be overstressed.

The management of the less serious type of injury can be varied according to whether the sportsman is hurt at the end of the season or near the beginning of it. If the former, he may be patched up sufficiently to continue playing if he wishes, and can then rest in the closed season. If, however, the injury occurs at the start of the season, he should be made to wait until recovery is complete before being allowed to return to sport.

For the initial first-aid treatment of all these injuries (and by this I mean medical and physiotherapeutic first-aid) the key-word is I C E. That is (i) *ice*-cold water compresses or ice packs over the site of injury, which lessens the bleeding into the tissues by axon reflex and so prevents, or reduces, the size of the haematoma; (ii) *compression* bandage over the area, or the application of a Sorbo-rubber or felt pad, held in place by a crêpe bandage; and (iii)

elevation of the limb, to prevent the spread of swelling. This should be done as a routine for the first 24-72 hours, depending on the severity of the injury, and the muscle or joint should be rested in its most comfortable position. At the same time the sportsman should be instructed to apply ice or cold packs at home, and to persist with gentle non-weight-bearing exercises hourly, in order to keep up muscle tone, assist absorption, and prevent the formation of adhesions.

Physiotherapy is started immediately, if possible, and done 2 or even 3 times a day in the acute phase, so that the swelling does not have time to become consolidated, and the repair and recovery stage is speeded up. Massage over the area should be avoided at first, but I find that very gentle effleurage around and above the injury helps to disperse effusion and relieves pain. Heat is contraindicated for an average of 48 hours, because of the bleeding into the tissues, but is needed after that in order to promote absorption.

Diathermy of any kind may further engorge an already-distended part if it is used too early, so that it is best to start with infrared, or a moist heat such as Hydropak, or hot wet towels to reduce muscle spasm.

As the condition improves, short-wave or microwave can be substituted, the sportman's home treatment can be changed to hot packs or contrast bathing, and all active exercises can gradually be increased — graded progressive resistance exercises being added as soon as possible, and, later, gentle graduated training.

Opinions vary as to the use of ultrasound, but I personally find it invaluable, particularly for reducing effusions and haematomas. Combined with massage and other physiotherapy modalities, I use it from the outset, starting with a very low dosage for a few minutes around and above the lesion, gradually including the whole area of injury.

Tucker prefers the use of short-wave, galvanism, faradism or interferential currents. He believed that the claims made for ultrasound were exaggerated and that it was of very limited use. Since the publication of his book *Injury in Sport*, however, I find that he has been 'converted' and it is now used a great deal in his clinic.

Williams approves of ultrasound, and states that 'faradism and galvanism are of no value in the treatment of muscle injuries in athletes'; Cerney advocates moist heat, such as whirlpool baths or infrared through wet towels and stimulating currents and massage; and also describes the use of ethyl chloride or similar spray for sprains and even muscle lesions. I have found this quite a useful variation in many cases, especially for those patients whose time available for treatment is limited (such as in visiting teams). For those unfamiliar with the technique, I shall describe it briefly:

Surface anaesthesia produces relaxation and relieves muscle spasm. If complete relief is obtained, for instance in a sprained ankle, a simple sprain is indicated; if, however, continued deep pain persists, the damage is of a more serious nature.

The skin must be unbroken for this treatment, and a thin layer of Vaseline should be spread over the area to protect the skin. A fine spray of anaesthetic is directed at the part for about 45 seconds, or until the skin blanches, and then the physiotherapist's hand is placed over the area. This is repeated and then tests are done to localize the points of pain. Repeat again on trigger points and re-test, doing active movements and gentle passive stretchings or manipulations.

The limb or joint should then be bandaged so as to give rest and support to the injured part, and the patient is instructed to apply cold packs and do gentle non-weight-bearing exercises at home, in addition to reporting for daily physiotherapy. After that, the routine progresses as it does

for the other types of treatment, with contrast bathing at home replacing cold packs, and so on.

Physical fitness, which takes many weeks of training to obtain, is only maintained through physical activity; this level of fitness falls off rapidly when training is discontinued, even for a few weeks. The enthusiastic sportsman needs no encouragement to take an active part in his own rehabilitation, and the moralebuilding effect of intensive active treatment, together with the use of modified, graded progressive resistance and training during his recovery period, is of enormous physical and psychological benefit.

Featherstone, of the Southampton Football Club; Mee, of the Arsenal Football Club; and Pye, who accompanied one of the West Indies cricket tours — all of whom are Chartered Physiotherapists — advocate immediate intensive active treatment along the lines I have mentioned, and obtain greatly reduced periods of disability thereby.

The main problem one encounters with the average sportsman is, in my experience, that of dissuading him from returning to sport too soon. My composite mental picture of someone suffering from a sports injury is that of a patient, with an expression of mixed agony and apprehension, plus a touching dash of faith, who hobbles in hardly able to put his foot to the ground, and turns out to have a severely sprained ankle; a partial tear of hamstring or quadriceps; or a pulled medial ligament with effusion of the knee; saying hopefully, 'I will be able to play on Saturday, won't I?'

Generally speaking, it is useless to warn a young sportsman that if he does not wait until his injury is healed before returning to sport, he may, for example, injure a strained joint sufficiently badly to cause a traumatic arthritis and damage himself for life. To teenagers and those in their twenties, middle age is so far off that they cannot even envisage it, and they are quite prepared to risk a hypothetical permanent disability in their anxiety to resume playing. Consequently I usually find that the only way to restrain them is to stress the fact that they will let down their teams if they are not completely match-fit, or if they have to leave the field, or complete the game as a passenger if the injury breaks down.

## SPECIFIC INJURIES

### 1. Muscle Lesions

Among athletes and sportsmen, muscle lesions occur in the following order of frequency: hamstrings, quadriceps, calf, adductors, external obliques, dorsal and intercostal muscles. Tendon pulls, which usually occur at the teno-periosteal junction, are most common in the tendo-calcaneus, and then the supraspinatus.

*Causes.* There are many theories put forward to explain the incidence of muscle tears, but the exact cause is not yet known.

Tucker believes they are due to a postural fault; Williams thinks that a breakdown occurs in the co-ordination of the 'two-span' muscles (i.e. in the hamstrings, quadriceps and calf muscles, each of which performs two actions), so that both prime mover and antagonist contract together, instead of one giving way to the other. Travers considers that faulty technique (of which 'overstriding' is a symptom, and which he blames for hamstring tears) is the cause; and both Lloyd and Archer believe that frictional resistance is to blame, the former considering it occurs in a fully stretched muscle, and the latter in the relaxation phase.

*Signs and symptoms.* A 'pulled', partially torn or ruptured muscle presents with loss of function, tenderness localized to the injured muscle, and pain (dull or acute, according to the severity of the lesion) which is produced on active movement or passive stretching, and, in my experience, always provoked by resisted active movement. There may be protective muscle spasm, and there is often marked

swelling; in the case of a rupture, a gap can be felt in the muscle fibres.

*Treatment.* Tucker stresses that rest and strapping only, even for 2 weeks, will not cure muscle tears, which are likely to recur as soon as any strain is put on them, but with proper treatment they should be at least 80 per cent recovered in that time. Full function will have been regained and there should be no pain on ordinary normal movement, but the muscles need at least 1-2 more weeks, in which time strengthening and stretching exercises should progress and training be gradually increased, before they will be fully fit to return to sport.

Routine physiotherapy and home treatment are carried out, with the emphasis on obtaining a full pain-free stretch of the affected muscle. Labile faradism can be given, as long as the fibres are not over-tired, and some authorities advocate deep frictions as the condition improves, to overcome the formation of adhesions. This I have not usually found necessary, except in the chronic 'knotty' type of muscle, as long as active exercises and gentle passive stretchings have been done from the commencement of treatment.

In the case of a hamstring or gastrocnemius pull, I find that a Sorbo-rubber heel-lift, worn in the shoe or boot, is a great help in reducing the strain on the injured muscle fibres and in relieving pain.

In strains resistant to treatment it is always wise to have the patient, however young, checked for a toxic focus — a fact stressed by Sir Adolphe Abrahams.

## 2. Contusions and Haematomata

The symptoms of a haematoma are very similar to those of a muscle lesion, but there is usually a history of a definite blow or fall. The swelling may be more diffuse, the tissues being very tender, and often function is lost. If these are not treated early, shortening of muscles and tendons may develop and the swelling become consolidated, recovery being retarded by the clot.

*Treatment.* It is the opinion of a great many authorities that the best way to deal with large haematomas in the thigh or buttock, which will take weeks to disperse, or with those which form a fluctuant swelling on the surface of muscles, is to aspirate or express them through a small incision.

For those not requiring aspiration, the routine first-aid and physiotherapy are given. Ice should not be used for more than 2 days, as once the clotting has been controlled the further use of ice will make the congealed blood into a hard indissoluble mass. I find it a good idea to keep the muscle stretched, within the limit of pain, while applying ice and ultrasound in order to help prevent contractures.

It is important to note here that in the case of a haematoma of the thigh, if there is any reduction in the range of movement, or little or no relief of pain after a couple of treatments, the commencement of myositis ossificans should be suspected, and the patient immediately referred back to the doctor, as physiotherapy or even active movement can encourage this condition.

The period of disability following a haematoma may be anything from a few days to 3 weeks or more, depending on the severity of the condition and the speed with which treatment has been commenced.

A point to remember when treating a contusion over the patella is that this may be followed by chondromalacia patella, because of the undersurface suffering a contre-coup injury.

## 3. Joint Injuries

The most common of these among sportsmen and athletes are knee and ankle injuries, followed by those to the acromio-

clavicular joint. Pain and tenderness are usually less localized in a joint injury than in a muscle lesion, unless a ligament only is affected. Movement is painful or there is a painful arc of movement, and there may be protective spasm of a group of muscles.

(a) *The knee joint.* Particularly in rugby, the knee is the most often injured, by either direct or indirect means. Every variation is seen, including acute flexion injuries, which sprain the joint; abduction injuries, which involve medial and lateral ligaments; and rotation injuries, with displacement or tearing of menisci and ligaments.

Traumatic synovitis is concurrent with nearly every acute knee injury, and the effusion occurs within 6 hours or thereabouts. A more rapid or immediate swelling may indicate an acute traumatic haemarthrosis, which needs medical attention and aspiration at the earliest possible moment.

It is not usually necessary to aspirate traumatic effusion if the first-aid routine of ice packs, compression bandage and rest in elevation has been carried out.

Added to routine treatment, faradism under pressure is helpful in reducing effusion, as well as for stimulating the vital quadriceps which should, if at all possible, be made stronger than they were before the injury, so as to protect the knee joint.

Fortunately the sportsman usually has a very well-developed quadriceps, so that he regains tone and strength rapidly, but when treating a knee it is important to pay attention to the hamstrings as well. Too often they are neglected and become shortened during the time the sportsman walks with a bent knee; consequently, after the knee injury has apparently fully recovered, the sportsman frequently suffers a hamstring tear.

Complications to watch out for are Pellegrini's disease, which is ossification at the femoral attachment of the medial ligament, and chondromalacia patella, in which localized tenderness develops on both sides of the patellar tendon, and marked grating is present. If either condition is suspected, treatment should be stopped and the patient referred back to the doctor.

*Specific exercises for knee injuries.* Beware of allowing too-early weight-bearing, weight-lifting or strenuous mobilization on an injured knee, or there will be a recurrence of effusion. The progression of exercises should be gradual, and the patient should be able to do a full knee-bend without pain before being allowed to return to sport.

Useful strengthening exercises for the sportsman include the use of a weighted boot, starting at 5 lb and building up in patterns of 10 lifts before a rest period, and progressing both in weight and number of lifts; resisted flexion and extension against a spring, or self-resisted; stepping-up activities onto a bench, carrying a progression of weights in the hands, or across the shoulders on a bar-bell (Mee); knee-bend and stretch, carrying a gradual increase of weights on a bar-bell across the shoulders (Featherstone); swimming and bicycling, of course, and Thorndike's exercise of raising the body from and lowering it to a chair, with the feet together and the arms folded across the chest.

O'Donoghue, incidentally, prefers three-quarter knee-bends to full, as he feels that in deep knee-bends and 'duck waddle', where the heel is jammed against the buttock, there is danger of a posterior tear of the medial or lateral meniscus.

(b) *The ankle joint.* In the ankle, the lateral ligament is the most commonly torn, due to sudden inversion strains.

Many cases of chronic sprain and 'weak ankle' are due to neglect of tears, or ill-treated original injuries, and routine early first-aid and progressive treatment, including a slow build-up of mobility and strengthening exercises, is most important.

Table I. Details of sports and athletic injuries treated

Injury	Cricket										Total	
	Rugby	Bowler	Batter or fielder	Athletics	Hockey	Diving	Water-skiing	Swimming	Surfing	Squash		Tennis
Muscle lesions												
Hamstrings	22	2	1	12	2	—	—	—	—	1	—	40*
Quadriceps	14	1	—	6	1	—	—	—	—	—	—	22*
Adductors	6	3	—	5	—	—	—	—	1	—	—	15*
Calf	5	—	2	—	—	—	—	—	—	1	2	10
External obliques	—	6	—	2	—	—	1	—	—	—	—	9
Scapular muscles	5	1	—	2	—	—	—	—	—	—	—	8
Knee injuries												
Medial ligaments	10	4	3	2	3	—	2	—	1	4	2	31†
Medial meniscus	12	3	2	2	2	—	2	—	2	1	3	29
Lateral ligaments	6	2	1	2	2	—	2	—	2	1	—	18
Lateral meniscus	5	1	—	1	1	—	1	—	3	—	1	13
Capsular and synovitis	11	2	4	2	1	—	2	—	3	—	1	26
Haematomas	62	4	12	7	8	—	2	—	3	—	—	98‡
Back and neck strains	24	13	3	4	3	5	5	—	4	—	1	64
Sprained ankles	26	3	7	7	5	—	—	—	—	4	3	55
Shoulder injuries	11	7	3	5	—	—	1	4	—	—	—	31
Including strains and sprains	3	—	—	7	—	—	—	3	—	—	7	20
Arm injuries	—	—	—	—	3	—	—	—	—	—	2	20
Achilles tendon pulls	6	1	2	—	—	—	—	—	—	6	—	—
Total cases	228	53	40	66	31	5	18	7	19	20	22	509

\*Recurrences: hamstrings, 9; adductors, 2; rectus femoris, 3.

†Complications: chondromalacia patella, 3; Pellegrini's disease, 2.

‡Complication: myositis ossificans, 1 case.

All ankle injuries of any severity should be X-rayed to eliminate fractures, and this is one joint in which strapping for up to several months should be applied when the sportsman returns to sport, because of the frequency of recurrences of sprain.

In the treatment of these injuries, because of the frequency of adhesion formation, active flexion and extension exercises, modified weight-bearing and early walking are encouraged. Except in severe cases, the use of crutches is not desirable.

A Sorbo-rubber heel-lift in the shoe, to keep the ligament in its shortest position, and a not-too-elastic crêpe bandage, correctly applied, are great aids in returning the patient to walking without a limp at the earliest possible moment.

**Complications.** The following should be watched for and dealt with during treatment: concurrent strains of the longitudinal arch; tenosynovitis in front of the ankle and along the dorsum of the foot; thickenings, which may form on either side of the Achilles tendon, due to bleeding from the strained ligament, and occasionally wasting of the quadriceps, due to early tip-toe gait. To avoid adhesions, full-range ankle exercises against resistance, with particular emphasis on obtaining full plantar flexion (especially in the case of footballers, as the foot is forced into plantar flexion when kicking a ball with power), and gentle passive manipulations at every treatment are necessary.

If pain and stiffness persist after about 8 weeks, adhesions have probably formed, and a manipulation under anaesthesia will be indicated. As adhesions take at least 2 months or longer to become avascular, however, a too-vigorous manipulation before this time will tear fleshy vascular tissues, resulting in haemorrhage, fibrin and serum exudate and so on, and the patient will be back to square one!

**Specific exercises for ankle injuries.** Added to routine exercises are tip-toe walking; heel raising and lowering while standing on a brick to increase dorsiflexion; progressed to the same exercise carrying a weight across the shoulders;

bicycling; walking up and down an incline board (the greater the incline, the greater the stress on the ligaments); heel raise and lower, followed by deep knee-bends; pushing balls of varying weights and sizes with the foot in soft sand or water; and the normal progression from walking to jogging, skipping, stop-start running, and finally sprinting and swerving at speed.

In the treatment of the sprained ankle, there is a marked improvement for the first few days, which is followed by a static period of 3-4 days — about which the sportsman should be warned — after which there is a second rapid-recovery stage (Featherstone).

The best way of strapping an ankle for sport is to use a stirrup of 3-in. extension plaster, fixed, with the pull towards the side of the injured ligament, by a figure-of-eight in 3-in. Elastoplast. This will limit inversion and eversion as well as extreme plantar flexion, but if it is too firmly applied a mid-tarsal strain may be produced when a football is kicked.

(c) **Other injuries.** I shall not discuss any other injuries, except to mention that — again because of the danger of adhesion formation — all shoulder injuries should be given modified active exercises from the outset, starting with pendulum movements, but no forcible movements or manipulations should be attempted until all pain, especially pain at night, has ceased.

It is also worth noting that in a sprained shoulder, with local swelling and pain on movement, if movements decrease in spite of treatment or the muscles fibrillate on initiation of movement, the patient should be referred back to be checked for a toxic focus.

## PERSONAL FINDINGS

On going through my case cards for the last 6 years, I find that I have treated 585 sports and athletic injuries, of which

males make up at least 80 per cent. Seventy-six of these cases comprised fractures, subluxations, bursitis, tenosynovitis, and postoperative patients, and the remaining 509 cases are analysed in Table I.

The treatments I use as routine are those I have already outlined, and once the acute phase has passed I am a great believer in the 'treat and train' method as advocated by Featherstone. Early intensive treatment reduces disability time greatly, the risk of minor injuries becoming chronic due to neglect is lessened, and general fitness and morale are kept high. In Table II I have compared the average disability times of patients who were referred immediately or within 48 hours of injury for treatment, and those who reported after varying periods of rest. When compiling this table I did not differentiate between mild and moderate or severe cases, so that these are over-all averages for the specific injuries mentioned.

Table II

Disability Time in Relation to Delay in Receiving Treatment

Injury	Treatment commenced within:	Average time off training
Muscle lesions	48 hours	6 days
	3-24 days	18 days
Injured knee ligaments	48 hours	10 days
	3-21 days	32 days
Sprained ankles	48 hours	5 days
	3-21 days	15 days
Haematomas	48 hours	5 days
	3-22 days	24 days

As will be seen, the time spent off training was reduced to one-third in the cases of muscle lesions, knee-ligament injuries and sprained ankles, and to less than one-quarter in the case of haematomas. I have been pleasantly surprised by these figures, but have, of course, no way of comparing them with results achieved by other methods.

Rehabilitation after injury is extremely important, and a full physical fitness test should always precede the sportsman's return to full participation in his particular sport. Thus the recurrences of muscle lesions and sprained ankles, so often seen, would be reduced, and aggravation of existing injuries lessened. This is, of course, the ideal condition, seldom attained with amateurs, except perhaps among schoolchildren, who are more strictly controlled by coaches on the staff, or top-flight athletes, whose trainers guard and nurse them. For the rest, it is usually left to the individual to make a decision as to when he is fit to return to sport, and the best advice one can give them is 'When in doubt, don't!'

To carry out the intensive active treatment outlined, and to return the sportsman to his particular sport as soon and in as fit a condition as possible, one needs early diagnosis and prescription of the required drugs and treatment by a sports-minded doctor; intensive but carefully graded treatment by the physiotherapist; the carrying-out of home treatment and the perseverance with active exercises by the patient, and, ideally, co-operation of coach or trainer. This type of work is most rewarding, and the co-operation, enthusiasm and gratitude of the sportsman or athlete for any assistance in his battle for recovery from injury makes him a pleasure to treat.

SUMMARY

The soft-tissue injuries most frequently occurring in sports and athletics are briefly discussed, and the routine active

treatments found most successful are outlined. The incidence of these injuries sustained in different sporting and athletic activities among 509 cases treated in a 6-year period is recorded, and some statistics of relative disability periods are given.

There remains little doubt that the essence of handling sports and athletic injuries is prompt diagnosis and the initiation of early intensive active treatment, followed by a planned campaign of rehabilitation. This could be the most easily obtained if recognized sports injury clinics were established, with the stress on full co-operation between patient, doctor, physiotherapist and coach or trainer.

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