capsule and ligament is established the patient should be subjected to immediate operative repair. The potential disability is one for which no solution is immediately evident.

Rupture of Anterior Cruciate Ligament
In the various football games, rupture of the anterior cruciate ligament as an isolated ligamentous injury is associated with the complete longitudinal or bucket-handle tear of the medial meniscus (*see below*). There is one circumstance in which it exists as the sole lesion in the joint, and once again the mechanism of injury should put the surgeon on guard: the player is in mid-air as in basketball, heading the ball in soccer, or in the line-out in Rugby, when he is knocked off balance and falls with his leg doubled under him; the anterior cruciate ligament ruptures because flexion is not accompanied by internal rotation of the tibia; the meniscus is not torn because the patient is not weight-bearing on a fixed tibia. The uninitiated make a diagnosis of a torn meniscus but find at operation the anterior cruciate ligament is ruptured and that a normal meniscus has been removed in error.

Medial Meniscus
The classical injury of the football player is the bucket-handle tear of the medial meniscus. If the joint locks when the player is in action, the anterior cruciate ligament is ruptured. If, in other circumstances, it is missed or misdiagnosed, or a false reduction achieved under anæsthesia as so frequently happens in casualty departments, irreparable damage may be done if the patient is permitted to return to weight-bearing. In the first place, because of the block to the screw-home movement, the anterior cruciate ligament is stretched, undergoes attenuation and eventually ruptures. In addition, the weight-bearing pressure on the medial femoral condyle produces split lines and eventually a local arthrosis. The correct treatment is well established: once the meniscus is torn and the knee locked or liable to lock, the sooner meniscectomy is performed the better will be the result.

It is seldom that the isolated rupture of the anterior cruciate ligament associated with meniscus tears can be repaired; but the blood supply enters the femoral attachment and even when repair is technically possible the end-result is not demonstrably worth while. In any event, more importance has been attached to isolated rupture than the situation merits. A return to football following this injury correctly treated is the rule rather than the exception, provided the other components of the joint are intact and compensatory quadriceps development is achieved. It may be important that the patient is not informed that the ligament is absent.

Ski-ing Injuries of the Knee-joint
If injuries of the knee are the commonest of all ski-ing accidents, it is important to appreciate that the minor injury-producing incidents are not weightbearing. When the common rotation mechanism is transmitted by the ski it does not damage in any material degree the weight-bearing components but the upper femoral attachment of the medial ligament. Meniscus injuries are thus unusual and when they occur it is often possible to extract a previous history. Caution in diagnosis should be exercised by those unfamiliar with the effects of simple ski-ing accidents on the knee, in the knowledge that the substance of the fibrocartilage is seldom torn, lest the patient be subjected to an unnecessary and undesirable operation which excises an innocent meniscus from the joint.

Mr P H Newman, Mr J P S Thomson, Dr J M Barnes and Dr T M C Moore
(*Department of Orthopædic Surgery, Middlesex Hospital, London*)

A Clinic for Athletic Injuries

A clinic for athletic injuries was started at the Middlesex Hospital twenty-one years ago. Dr Ben Woodard was the first post-war accident officer and, having a special connexion with the AAA, became involved in the treatment of athletic injuries at the time of training for the Olympic Games held in London in 1948. He quickly built up a personal reputation by his dedication to the welfare of athletes and his understanding of their temperament and requirements.

When he left it was difficult to foresee how such an arrangement could continue, but the new accident officer was asked to make himself available three mornings a week to see athletes. That the clinic has continued demonstrates its potential value in this special sphere of accident work.

A general hospital is not an ideal place for seeing athletic and other sporting injuries, in fact it is a most inappropriate place if the athlete is to maintain the tempo and the competitive motivation of peak achievement. An accident

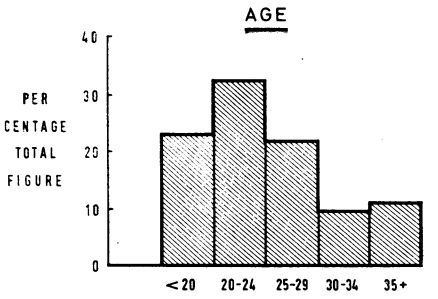

Fig 1 *Age distribution of the series*

or casualty department cannot afford to give priority or special understanding to the athlete, and in the orthopædic departments the waiting time for consultation often runs into several weeks. Proper treatment of an athlete among the acutely ill, the chronically sick, and the geriatric is not practical.

Since Dr Woodard left the Middlesex Hospital, there has been no attempt to attract, in any way, the acute injury. The hospital is neither geographically nor temperamentally disposed to work as a field unit. But there is a permanent arrangement whereby an athlete can have comparatively prompt advice and attention by a medical officer of registrar status who understands what is required. If special advice or in-patient treatment is necessary, the patient can be referred to the next clinic conducted by one of the supervising consultant orthopædic surgeons.

Some recent figures of patients who have attended the clinic may be of interest. It was decided to carry out a retrospective survey of the notes of all new patients attending the clinic during the years 1958, 1959, 1967 and 1968 (until September 30). The yearly figures were 397, 610, 410 and 430 respectively, and these made a series total of 1,847 new patients. From this total figure we derived the following information:

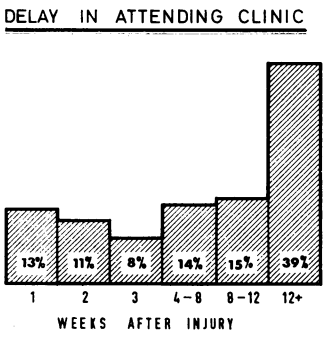

Fig 2 *Delay in attending the clinic after injury or onset of symptoms*

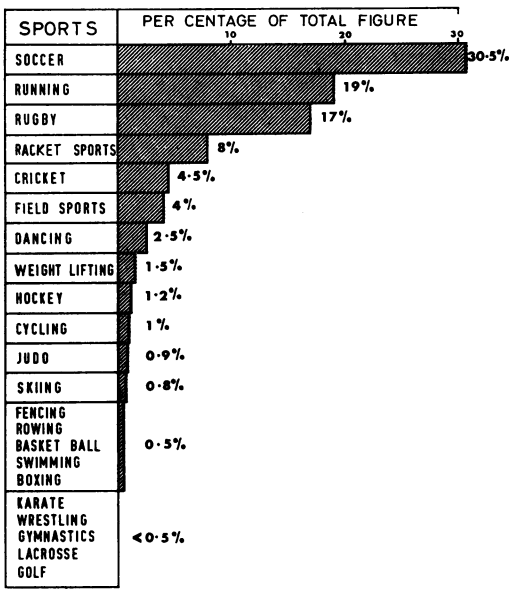

Fig 3 *Sports*

Age (Fig 1): The majority of the patients were, as expected, under 30 years of age, but it is interesting to note that the youngest patient in the series was a boy swimmer of 9 who had a rotator cuff lesion, and the oldest patient was a runner of 75 who had pulled his left hamstring muscles.

Delay in attendance (Fig 2): 68% of the patients attended the clinic three or more weeks after their injury or the onset of their symptoms. That only 13% of the patients came to the clinic within seven days of injury clearly demonstrates its function as a clinic for persistent and difficult problems, and not for the routine first-aid treatment of injury.

Sports (Fig 3): Patients injured while involved in soccer, running, Rugby, and racket sports account for almost 75% of the total series.

Injuries: Table 1 shows the anatomical distribution of the injuries. Corrigan (1968) classified

Table 1
Injuries in 1,847 new patients: Middlesex Hospital Clinic for athletic injuries

	%
Knee	31
Ankle	14
Muscle	14
Back and neck	9
Shoulder	5
Foot	5
Tendocalcaneus	3
Elbow	3
Stress fractures	2
Hand	2
Others	12

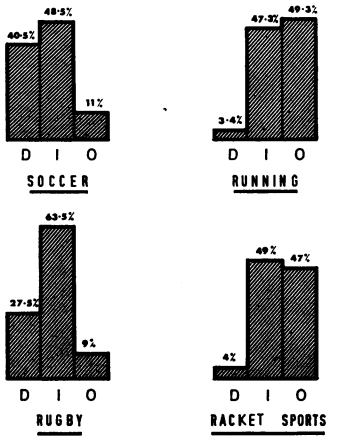

Fig 4 *Injuries in the four most common sports classified. D=direct injury. I=indirect injury. O=over-use syndromes*

athletic injuries into three groups: direct injuries, where the part is injured by a direct knock or blow; indirect injuries, where the cause is other than direct external violence; over-use syndromes, where the only predisposing cause is the patient's athletic activity. This series has been classified into these three groups: 15% had direct injuries, 57% indirect injuries, and 28% had over-use syndromes. As would be expected, the proportions of these three groups varied with different sports. Fig 4 illustrates the findings in the four most common sports of the series.

Table 2
Treatments for athletic injuries (Middlesex Hospital)

	%
Physiotherapy (heat, ice, exercises, frictions, balance boards)	67
Injection (with hydrocortisone and 1% lignocaine hydrochloride)	18
Immobilization (crepe bandage, elastoplast strapping, pressure bandage, plastic splints, plaster of paris, &c.)	15
Reassurance and advice	10
Operative	2
Others (including rest and manipulative treatment)	5

The total exceeds 100%, as some patients received more than one form of treatment

Treatment: Table 2 shows the treatment given. In studying the different ways of treating patients in this clinic, it must be remembered that they are late cases which have frequently not responded to the usual first-line methods. The majority of the patients had physiotherapy in some form. The Department of Physiotherapy is a training school, and this has the advantage of providing sufficient senior students to take special small classes at certain times exclusively for rehabilitation of athletes.

REFERENCE
Corrigan A B (1968) *Hosp. Med.* **2**, 1328

Panel Discussion

Chairman Mr Norman Capener
(Institute of Sports Medicine, London)

In opening the discussion the Chairman suggested that there would be the opportunity of further discussion of the papers which had been presented in the three sessions as well as of answering the questions which had been submitted to the panel.

Mr F C Dwyer asked Professor Smillie how frequently posterior capsular and cruciate ruptures requiring repair were associated with tears of the internal lateral ligament.

Professor I S Smillie said that the posterior capsule was inevitably torn if the medial ligament was torn in an acute injury. Because the posterior cruciate ligament and the capsule were so closely associated, the extent of the tear and how far the posterior cruciate ligament was involved depended on how much the knee had been opened up at the moment of impact. He believed it essential that the posterior capsule should be routinely repaired during a repair of the medial ligaments. It could be approached through an extensive medial incision while repairing the medial ligament.

Mr Dwyer asked Professor Smillie what physical sign could be relied on in the diagnosis of a tear of the posterior cruciate ligaments.

Professor Smillie replied that the diagnosis depended on the history of some body falling on the front of the patient's leg with the tibia being driven backwards. There was little to be seen but there was deep tenderness. If there was doubt about the diagnosis the examination should be made under an anæsthetic. If the knee hyperextended, the knee should be opened and the ligament repaired. This was an important injury because the quadriceps muscles could compensate for a ruptured anterior ligament but not for an injury of the posterior cruciate ligament.

Group Captain C B Wynn-Parry asked about the causation and management of chondromalacia patellæ.

Professor Smillie thought that this condition was over-diagnosed. It was not common in young adult males although a hereditary variety had been described in America. The mechanism was obscure. It was more common among long-distance cyclists than in other sportsmen. The diagnosis needed care and should only be made infrequently. It should not be operated upon

until it was essential. The patella was not expendable. The most athletic sport which anyone without a patella could take part in was golf.

Dr I Curwen asked how many times hydrocortisone should be injected into one lesion and how frequently the injection should be given.

Dr John Williams said that there was no need to repeat a hydrocortisone injection if the right patient had been treated at the right time. From the practical point of view he would not like to make regular intra-articular cortisone injections. In soft tissues he would allow three attempts on the basis that the first attempt might not reach the right area, the second attempt might not give the required effect, therefore a third attempt was justifiable.

Dr A L Bass felt that hydrocortisone should rarely be used intra-articularly in sports injuries. There was evidence that it could cause irreparable damage to the cartilage within a knee-joint. It should never be used before competitive events because it removed the muscle spasm which provides the body's natural protection against further trauma. In soft tissue, if the lesion was properly localized, then only one injection should be needed.

Dr H C Burry could see no biological reason why the injection of hydrocortisone should cause irreparable damage to the knee-joint.

Professor Smillie said that Helfet described the condition called hydrocortisone osteochondritis dissecans, in which most of the articular cartilage of the femoral condyle was discharged into the joint. He would never put hydrocortisone into a joint.

REFERENCE Helfet A J (1963) Management of Internal Derangements of the Knee. Philadelphia

Dr Burry commented that osteochondritis dissecans was described long before cortisone was invented.

Professor Smillie replied that for want of a better name the condition was called hydrocortisone osteochondritis dissecans. It must be distinguished from true osteochondritis dissecans as generally understood.

Mr H B Lee asked whether there was a risk of rupture of the Achilles tendon with repeated injections of hydrocortisone.

Dr C R Woodard asked what was the incidence of and treatment of calcification of the Achilles tendon and whether myositis ossificans could be prevented.

Mr P H Newman said that calcification in a tendon was rare. Injections of hydrocortisone should not be made into the Achilles tendon. However, there was nothing immoral in injecting novocaine into an acute muscle injury during a game.

The Chairman said that injections should not be made into the tendon but a damping effect could be obtained by injecting onto or around the tendon.

Mr W E Tucker said that he used a urea and salicylic acid solution and 1% xylocaine for muscle injuries. Tennis elbow could be injected with hydrocortisone but it should not be used in tendons because ruptures could ensue whereas xylocaine and urea and salicylic acid solution did not produce ruptures. The condition improved if it was combined with other therapy.

Mr M B Devas said that many patients with rheumatoid arthritis had had hydrocortisone injected at regular intervals without trouble. However, it was seldom necessary to use hydrocortisone in an athlete's joint because traumatic synovitis was not an indication for hydrocortisone.

Mr Tucker, replying to a written question to whether a sports injury clinic should be organized in every large hospital centre and if so how often should it be held, felt that as in America there should be an orthopædic surgeon in each town who had the privilege of looking after the football team and took an interest in sports injuries in general. One hospital in the district should hold special sports injuries clinics at least twice a week.

The Chairman commented that an orthopædic principle is to see an injury soon after it appears, therefore sports injuries clinics should be held on Saturday afternoons and Sundays.

Dr R A Trevethick said that, as an industrial medical officer, he spent much time every Monday morning treating sports injuries. While he agreed that in some respects sports injuries required special treatment, he was depressed at the general standard of all treatment of injuries, both in the initial stages and between the end of definitive treatment and the time of return to work. The provision of athletics injuries centres would, in his view, be too specialized and would not help to improve facilities required by injuries generally.

Dr J H Margerison thought that knowledge of the early treatment of injuries should be more widespread in the profession. Treatment should be more related to the type of sport the patient wished to resume.

Mr Newman felt that breadwinners should be given priority of treatment whether their injuries were sports injuries or factory injuries. The important aim was, for economic reasons, to get the man back to work.

Dr Williams reported that, from the crude results of a pilot study he had done with Dr H E Robson on the incidence of sports injuries, they had estimated that there were 1½ million such injuries each year which resulted in inability to continue with the sport. Ten per cent of the injuries caused absence from work.

Dr P O M McGirr said that many of the sports injuries frequently seen at work on a Monday morning would have benefited by treatment on the Saturday afternoon when the injuries had occurred. Treatment facilities at the week-end should be improved.

Lieutenant Colonel J P Crowdy said that the Institute of Sports Medicine should investigate the allegations that sports injuries received insufficient treatment and estimate the need for specialized early treatment for these injuries. The Services were in an enviable position because early treatment could be organized.

Mr G M Müller asked why stress fractures in a country in south-east Asia were only a fraction of those seen in the United Kingdom.

Mr Devas replied that in fact stress fractures were common in India. On the other hand, Professor A R Hodgson had told him that stress fractures were not seen in Hong Kong.

Mr Devas, in reply to a question whether ultrasound was of value in the diagnosis of stress fractures, said that there was insufficient evidence on its value. Radiography did not reveal the diagnosis for three or four weeks. Clinical diagnosis was important in the early stages.

A speaker said that Dr C J Hodson of University College Hospital had shown that soft tissue radiography demonstrated stress fractures in 80% of cases even where the bone appeared normal. At his football club they had diagnosed stress fractures in six fibulæ and two tibiæ by ultrasound before radiological changes appeared. Even a small stress fracture would produce pain at the site as the ultrasound head was passed over it.

The Chairman said that stress fractures were important in the whole field of sports injuries and probably also in such conditions as Perthes' disease of children's hips. Femurs removed at post-mortem bent remarkably when a static weight of 100 kg was applied. The bending of bones must be important in the violent pursuits of so many activities in sport. That the bone cracked occasionally was rather to be expected.

In reply to a question whether the post of medical officer to a club, especially a professional club, should be remunerative rather than honorary, several speakers pointed out the demand made on a doctor's time by professional clubs and thought that they should pay their medical officers, since they could well afford to do so. However, there were many more amateur clubs which could not afford to pay a doctor but needed his services. There was a need for doctors to give their time to help people who engaged in sport.

Dr Suzette Gauvain asked, in view of the expense and limited need of complicated apparatus, what equipment the industrial medical officer should have in his physiotherapy department.

Dr Williams replied that it depended on the skill, training and capability of the industrial medical officer, who should attend study courses such as those run by the Institute of Sports Medicine and the British Association of Sport and Medicine.

Mr J A Ryan asked whether there could be any association between stress fracture of the tibia and the so-called anterior tibial compartment syndrome.

Mr Devas said that an acute anterior tibial syndrome was a surgical emergency caused by interruption of the blood supply to the muscle in the compartment, probably caused by over-use and necessitating decompression at first sight because otherwise the muscle would die. A chronic so-called anterior tibial syndrome was an ill-defined form of tenosynovitis which could possibly be triggered off by the callus formation from a stress fracture. He did not believe that the chronic condition existed as a form of partial avascularity of the muscle in the anterior compartment.

The Chairman said he had been asked whether the mechanism of 'traumatic synovitis' could be explained in pathological terms.

Professor Smillie of the panel replied that little was known about synovial membranes and synovial fluid so the question could not be answered in pathological terms. From the point of view of injury to the knee-joint it was obvious that a synovial effusion was due to mechanical or chemical irritation of the synovial membranes. However, a number of things which happened to the knee-joint did not involve the blood supply or irritate the synovial membranes. Hence the difficulty of diagnosis in a horizontal tear of the meniscus which did not involve the synovial membrane or the synovial attachments.

Mr Newman said he had been asked what types of physiotherapy were used in the Sports Injuries Clinic at the Middlesex Hospital. Much of the treatment was by physiotherapy. There were knee classes in which the young and athletic were separated from those with osteoarthritis. The Freeman 'wobble' board was a great help for sprained ankles where the ligamentous afferent nerves had been injured, causing altered proprioception which resulted in false impressions of instability. Back classes were held, but there was nothing mystical about the exercises. In some cases heat and massage were used.

The Chairman, in reply to a question how the Institute of Sports Medicine intended to coordinate the present work and to establish a central clearing house for sports medical information, said that there were two important bodies in sports medicine which had harmonious relations. The British Association of Sport and Medicine had a large membership of doctors, sportsmen and gymnasts who were doing good work in propagating information. The Institute of Sports Medicine was a small body which hoped eventually to establish a department, possibly a University department, and which concerned itself with pure and applied research in sports medicine.