

Education and debate

Ligament injuries of the knee—limping forward?

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Ligament injuries of the knee are a common occurrence in any sport that involves a change of direction at speed, jumping or twisting, or direct contact between competitors. It is not often appreciated that ligament injuries are over three times as common as meniscal tears¹ (fig 1).

The most commonly injured ligament is the anterior cruciate, accounting for about 50% of all ligament injuries (fig 2), and has an incidence of about 30 per 100 000 head of population per year. As the consequence of this common injury is often severe functional instability, it is perhaps not surprising that so much attention has been focused on this short length of collagen.

Perhaps the most important fact for both sportsmen and women, and those physicians and surgeons treating them, is that injuries to the knee are the most common cause of permanent disability following an injury sustained during sporting activity.² An anterior cruciate ligament injury to a professional footballer can mean a season out of competition, a dramatic loss in potential value on the transfer market, and, if complications of surgery or further injury occur, an end to a sporting career.

It was the great British surgeon Hey-Groves who said in 1917 "injuries to the crucial ligaments are now more frequently recognised than formerly" and described a method of intra-articular reconstruction using the iliotibial band.³ Despite sporadic reports, it was not until the late 1970s and early 1980s that a series of papers kick started the deluge of literature about anterior cruciate ligament injuries.

Frank Noyes of Cincinnati published a seminal work on the subject in 1983.⁴ He found that the diagnosis of this injury was made by the original treating physician in only 6.8% of cases. He also founded "the rule of thirds" observing that roughly one third of patients improved with physiotherapy and behaviour modification, one third stayed the same, and one third deteriorated. Despite enormous research effort, we still have not discovered a way of predicting which patients will fall into which group.

Advances in the understanding of biomechanics, hand in hand with advances in arthroscopic surgery and rehabilitation, have meant a markedly decreased morbidity after ligament reconstruction, but we are still far from having achieved perfection.

Current grafts are usually harvested from the patients own tissues and so have few of the problems caused by synthetic materials such as the Goretex ligament which, after a brief vogue in worldwide use, has now been reported as producing a high incidence of chronic synovitis and osteolysis around bony tunnels.⁵ Although autografts do not cause long term biological problems, there is still a small incidence of donor site morbidity, and grafts such as the middle third of the patella tendon are biomechanically and anatomically different from a normal anterior cruciate.

Current techniques for anterior cruciate reconstruction do not restore normal kinematics of the knee and have not been shown to prevent the occurrence of degenerative change in the knee.⁶ They can, however, successfully restore stability to the symptomatically unstable knee and allow return to even elite level sport. Symptomatic instability must remain the major criterion for offering surgical reconstruction to most of the population, as careful patient selection can produce acceptable results with non-operative rehabilitation.⁷

One of the major problems in the United Kingdom is that knee injuries are often badly dealt with. Because soft tissue trauma does not show up on radiographs and casualty doctors and general practitioners are poorly trained in the recognition of knee injuries and their significance, sportsmen and women are often dismissed with an elasticated bandage and the diagnosis of a "sprain".

In a study published in 1996, although 90% of patients had a classical history of the injury, the diagnosis of an anterior cruciate rupture had only been made by the original treating physician in 9.8% of cases,⁸ little improvement in the 13 years since Frank Noyes' study. The average delay from injury to diagnosis was 22 months, despite one third of the cases having been seen by a consultant orthopaedic surgeon. Perhaps most worrying of all was that 28% had had an arthrotomy or arthroscopy and still had not had the diagnosis made.

If even orthopaedic surgeons are failing to recognise an injury this common, one can only imagine what is happening to patients with the more unusual or multiple ligament injuries, where signs can often be subtle and the full complexity of the problem not appreciated. The cost to society of the delay in diagnosis and treatment and from ensuing chronic knee problems in this population of predominantly

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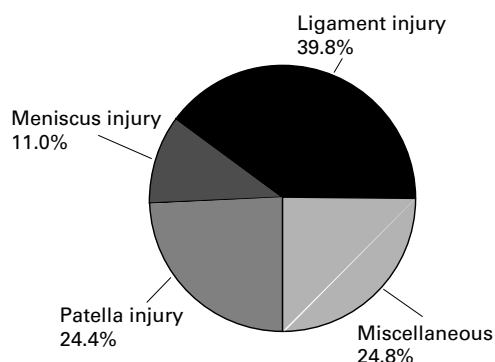


Figure 1 Classification of 1833 knee injuries.¹

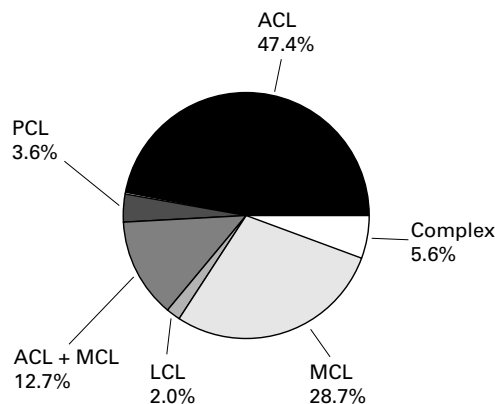


Figure 2 Classification of 500 ligament injuries. ACL, anterior cruciate ligament; PCL, posterior cruciate ligament; MCL, medial collateral ligament; LCL, lateral collateral ligament.

young working men and women can only be guessed at.

It may be argued that magnetic resonance imaging scanning may eradicate these problems, but certainly in the United Kingdom at the present time, it is not universally and readily available for acute, let alone chronic, injuries. Studies have shown magnetic resonance imaging to be less reliable than clinical assessment for diagnosing injuries such as a torn anterior cruciate ligament (this assumes the examiner to be an experienced knee surgeon).^{9,10} Even though a magnetic resonance image may indicate which structures have been damaged, injuries still need careful clinical assessment by an experienced clinician to ascertain whether the damage has produced significant laxity.

Even if the correct diagnosis is made, the patient may then be subjected to inadequate or inappropriate surgery. In the United States, Chris Harner published a series of revision anterior cruciate ligament reconstructions in which the cause of original graft failure was "surgical error" in 60%. In my own small series of patients referred to me with a failed anterior cruciate ligament reconstruction, other than GoreTex ligaments removed for chronic synovitis and osteolysis, the cause of failure has been error in surgical technique in 100% of cases. Discussion with colleagues with a special interest in knee reconstruction has shown this picture to be mirrored elsewhere in the United Kingdom.

A small working party of orthopaedic surgeons has been looking at how we can try to address these problems. At the British Orthopaedic Association meeting in 1996 a wider selection of opinions was sought and a small questionnaire was distributed. Sixty replies were received and it is perhaps interesting to look at the answers to the questions posed.

There was a unanimous agreement that there should be a more focused approach to the patient with a knee injury. Cross referral was felt to be desirable or essential by 98%. When asked "how many procedures would you want the surgeon to be performing if you had to undergo arthroscopic surgery?", 85% said five or more cases per week. In reply to "how many procedures would you want the surgeon to be performing if your son had to undergo an anterior cruciate ligament reconstruction?", 35% said at least one case a fortnight and 54% said at least one case a week. When asked who would they want to manage a complex ligament injury in a relative, two thirds said a regional centre with a specialist interest in complex knee injuries.

It can be argued that the mere number of a particular procedure a surgeon is performing is no guarantee that it is being performed competently, but certainly most orthopaedic surgeons would seek out someone doing more rather than less. Common sense would seem to suggest that this is likely to be the most sensible course of action, yet this is far from what many patients can expect.

How can we improve the outcome for this considerable body of significantly affected sportsmen and women? Perhaps one way forward is to push for the adoption of minimum quality standards. The working party felt that the following list would be a good starting point.

- (1) All patients with an acute knee injury should be seen within 72 hours by an orthopaedic surgeon or sports injury physician with a special interest in knee injuries.
- (2) All hospitals with a sufficiently large catchment area should have a dedicated weekly acute knee list staffed by a surgeon trained in arthroscopic surgery.
- (3) Patients with ligament injuries should receive:
 - (a) early accurate diagnosis;
 - (b) accurate counselling;
 - (c) appropriate rehabilitation;
 - (d) if necessary, reconstruction by a surgeon with suitable training, performing the procedure to a high standard on a regular basis.

Although these may not be immediately achievable, this does not mean they are not worth working towards. As surgeons, team doctors, physiotherapists, and general practitioners looking after injured sportsmen, the onus is on all of us to ensure that the outcome of a knee injury is optimised.

This means making sure that we are all familiar with the history of the various types of knee injury (this is the most vital aspect of diagnosis) and be able to elicit and recognise

the appropriate physical signs. We must make sure that if surgery is contemplated, appropriate referral is made to a surgeon who is familiar with, and regularly performs to a high standard, the various reconstruction techniques that may be required. Only if we follow this path is the outcome for the knee injured athlete likely to improve.

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What athletes often ask

Should I train when I have a cold and if not when can I return?

The extent of the illness alerts us to the possible harmful effects of exercise and determines when the athlete should return to sport. An assessment must include a history and examination and further investigations such as blood tests and swabs if indicated. The history should include symptoms, sporting aspirations, contact with infectious diseases, and medical problems that may be affected by exercise—for example, asthma. The examination should focus on the athlete's pulse rate, temperature, upper and lower respiratory tracts, and lymphatic systems. One can then determine whether the cold is localised to the upper respiratory tract (with rhinorrhoea, nasal congestion, and sore throat) or whether systemic illness is present as suggested by fever, relative tachycardia (more than 20% above resting heart rate), lymphadenopathy, myalgia, and fatigue. If the illness is localised to above the neck, light to moderate training can continue until all symptoms have disappeared, at which point full training can resume. There is evidence that light to moderate training can be beneficial during recovery from a viral upper respiratory tract infection.¹

If more generalised signs and symptoms are present all training should cease until these resolve. The athlete could have been infected with a cardiomyopathic virus—for example, Coxsackie—which can lead to myocarditis and sudden death. Exercise may also be contraindicated in infectious mononucleosis (glandular fever) as this is associated with splenomegaly, and splenic rupture has been recorded in contact sports up to three weeks after the illness developed. If the diagnosis is confirmed by blood tests, all contact sports should be avoided for about one month² (unless splenomegaly has been excluded by ultrasound examination). If there is no evidence of myocarditis or infectious mononucleosis, the athlete can commence training on cessation of systemic symptoms. Current practice dictates that training should initially be of low intensity and short duration and be built up slowly over one to two weeks.

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