KNEE PAIN IN SPORTS PEOPLE — A PROSPECTIVE STUDY

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ABSTRACT

Knee pain caused by sport is a common cause of rheumatic symptoms. Clinical diagnosis is frequently difficult and an attempt was therefore made to determine whether particular symptoms and signs were sufficiently characteristic in 129 patients to enable easier recognition of knee disorders. Strict criteria for arthrography and arthroscopy included classical features of internal derangement or disabling pain. Arthrograms were performed in 39 and arthroscopy in 30, revealing good concordance for meniscal tears but none for cruciate tears. Classical histories and signs were often absent from patients with meniscal and cruciate tears. Patellar pain was a prominent symptom of 58 (45%). Questionnaires one year after assessment were returned by 91 (70%). Many patients had persistent symptoms or were unable to resume their sports. The unreliability of clinical diagnosis suggests that more frequent arthroscopic examinations could have increased the recognition of meniscal and cruciate tears.

Key words: Arthroscopy, Arthrography, Meniscal tears, Cruciate tears, Patellar pain, Disability

INTRODUCTION

Management of knee pain amongst sports people may be handicapped by difficulty in establishing a clinical diagnosis and resources do not always permit prompt access to arthroscopy. We therefore attempted to determine whether we could improve clinical diagnosis by documenting the history and signs of patients with knee pain according to a strict protocol and comparing these observations with the results of subsequent investigations and patients' outcomes after one year.

PATIENTS AND METHODS

Subjects with knee pain referred to a sports injury clinic were evaluated over 9 months. All had symptoms for at least 8 weeks. They were interviewed and examined by one or other of three authors in the same clinic. Patients were asked about their symptoms. Sites of maximal tenderness or pain were marked on a diagram of the knee. Muscle wasting and restricted joint movement were noted. Patellar compression pain was elicited by pushing the patellar downward with the quadriceps contracted and by sideways manipulation with the quadriceps relaxed. Those with histories of joint locking, (a positive McMurray or anterior drawer sign) underwent arthrography. Those with abnormal arthrograms subsequently had arthroscopy as did patients whose arthrograms were normal but whose clinical picture suggested internal derangement. These investigations were also performed whenever pain was severe enough to interfere with daily activities. Physiotherapy, corticosteroid injections and surgery were recommended as thought appropriate. One year after initial attendance, patients were sent a questionnaire about their clinical status. The data were compiled on punch cards and comprehensive computer cross-tabulations performed for all variables. Statistical comparisons were made by the chi-squared test with Yates continuity correction.

RESULTS

During the study period there were 551 new referrals of whom 129 (24%) had knee pain. These comprised 114

males and 15 females, median age 20 years (range 13-56 years) and median duration of pain 4 months (range 2 weeks-18 months). Symptoms were attributed to 22 different sports of which the most frequent were soccer 48 (37%); running (jogging, track or cross-country) 23 (18%) and rugby 16 (12%).

Standard knee radiographs revealed no osteoarthritis. Arthrograms in 39 (30%) revealed meniscal tears in 13 and loose bodies in one and these were confirmed at arthroscopy. The latter procedure was performed on 17 with normal arthrograms because of suspected internal derangement or severe pain. A further two meniscal tears and one case of loose bodies were identified. Eight partial or complete anterior cruciate tears were also recognised at arthroscopy. None of these was seen on arthrography although four had concomitant meniscal tears previously identified. Ten arthroscopies were normal. Minor surface irregularity of the patella in two and plicae in two were not thought to be clinically relevant. Meniscal tears were seen at arthrotomy in 2 patients at other hospitals.

The constellation of ligament or patellar laxity, tenderness or swelling allowed a diagnosis of Osgood Schlatter's disease in 3, collateral ligamentous strain or tear in 11, pre- or infra-patellar bursitis in 7 and patellar subluxation in 2. Including 9 patients with normal arthrograms who did not have arthroscopy and 10 with a normal arthroscopy, there were 83 (64%) of uncertain diagnosis, although, 58 (45%) had prominent patellar pain.

Those with proven meniscal or anterior cruciate tears were compared with the remainder (Tables 1a and b). Soccer was most frequently associated with meniscal and anterior cruciate tears but was less often cited as a cause of symptoms in the other two groups. Running was blamed as often as soccer by those with patellar pain and by those without a firm diagnosis. Discomfort of insidious onset was significantly more common with patellar pain than meniscal tears ($\chi^2 = 12.8$; $p < 0.0005$). Most of those with cruciate tears recalled an acute injury, whereas only 59% of those with meniscal tears did so. Pain induced by walking was significantly less common with patellar pain than with cruciate tears ($\chi^2 = 3.35$; $p < 0.05$) but not meniscal tears ($\chi^2 = 1.1$; N.S.). Walking up or down stairs caused pain with similar frequency in meniscal tears, and patellar pain but was less common with cruciate tears, ($\chi^2 = 0.5$; N.S.). Stiffness and clicking were more common with patellar pain and locking was often associated with meniscal and

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TABLE Ia
Distribution of symptoms (percentages in brackets)

	No. Patients	Major Sports	Pain						Other symptoms				
			Onset:			Induced by:			Stiffness	Clicking	Locking	Something moving in joint	Swelling
			Insidious	Acute	Unsure	Walking	Running	Stairs					
Meniscal tear	17	Soccer (41%) Running (6%)	5 (29)	10 (59)	2 (12)	7 (41)	11 (65)	6 (35)	4 (23)	6 (35)	4 (23)	1 (5)	7 (41)
Cruciate tear	8	Soccer (50%)	0	7 (87)	1 (13)	5 (62)	4 (50)	1 (12)	1 (12)	2 (25)	2 (25)	1 (12)	3 (37)
Patellar pain	58	Soccer (25%) Running (25%)	46 (79)	8 (14)	4 (7)	14 (24)	28 (48)	20 (34)	27 (40)	34 (58)	4 (7)	5 (9)	19 (32)
No Diagnosis	25	Soccer (25%) Running (25%)	4 (16)	11 (44)	10 (40)	11 (44)	8 (32)	6 (24)	7 (28)	12 (48)	2 (8)	3 (12)	11 (44)

TABLE Ib
Distribution of physical signs (percentages in brackets)

Sites of maximal pain or tenderness															
No.	Diffuse Medial Lateral			Patellar:			Quads wasting	Restricted movement	Pos. McMurray sign	PF crep.	PF crep. both knees	PF comp. pain	PF comp. pain both knees	Joint effusion	Pos. ant. drawer sign
				Superior margin	Inferior margin	Retro									
Meniscal tear	17	4 (24)	5 (29)	4 (23)	1 (5)	0 (17)	10 (58)	5 (29)	2 (12)	2 (12)	0	3 (17)	0	5 (29)	1 (6)
Cruciate tear	8	4 (50)	2 (25)	0	0	2 (25)	6 (75)	1 (12)	2 (25)	1 (12)	1 (12)	0	0	3 (37)	4 (50)
Patellar pain	58	0	0	0	14* (24)	24 (41)	11 (19)	5 (8)	1 (2)	39 (67)	26 (49)	31 (53)	15 (26)	9 (15)	5 (8)
No diagnosis	25	1 (4)	10 (40)	14 (56)	0	0	11 (44)	2 (8)	0	2 (8)	4 (16)	0	0	4 (16)	5 (20)

* 13 patients had patellar pain of similar intensity at more than one site

PF crep. = patello-femoral crepitus

PF comp. pain = pain on patello-femoral compression

cruciate tears but none of these differences was significant. Histories of something loose in the joint and swelling were recorded with similar frequency in all groups.

Sites of maximal tenderness or pain, were widely distributed. Joint margin tenderness characterised one half of meniscal tear cases but was more often seen in the absence of a firm diagnosis. Retropatellar pain was a feature of 17% and 25% of meniscal and cruciate tears respectively and was the most frequent site of discomfort in those who had patellar pain without an alternative diagnosis.

Quadriceps wasting was significantly more common in meniscal and cruciate tears than patellar pain ($\chi^2 = 8.5$, $p < 0.0005$; $\chi^2 = 9.9$, $p < 0.005$). Restricted movement was most often seen with meniscal tears but not significantly. A positive McMurray sign was apparent in only two (12%) with meniscal tears and was also documented in two patients with anterior cruciate tears unassociated with meniscal damage. Patello-femoral crepitus of one joint was significantly more common in those with patellar pain than in those with meniscal or cruciate tears ($\chi^2 = 14.1$, $p < 0.0005$; $\chi^2 = 6.7$, $p < 0.01$). Crepitus of both knees was also much more common in those with patellar pain; being a feature of none of those with meniscal tears and of only one with a cruciate tear. In the patellar pain group, only 4 had

symptoms affecting both knees simultaneously. Pain was induced by patello-femoral compression more often in those with patellar pain and in 26% of the contralateral asymptomatic knees in these patients. Joint effusions were more common in those with meniscal and cruciate tears but not significantly. A positive anterior drawer sign was a finding in only 50% of those with anterior cruciate tears and was noted in 5 (8%) of those with patellar pain, all of whom had a normal arthroscopy.

Patients with patellar pain were sub-divided on the basis of their sites of pain or tenderness, namely the superior (14 patients) or inferior patellar margins (24 patients) or the retropatellar region (46 patients). Thirteen had discomfort of equal intensity at two or more sites. The frequency of clinical features was compared according to the sites of pain and no significant differences were apparent. Of the 129 patients, 81 (62%) received miscellaneous physiotherapy, 11 (8%) were given injections of corticosteroid, 45 (35%) had no treatment and 23 (17%) eventually underwent surgery. All those with meniscal or cruciate tears had some operative procedure. Follow-up questionnaires were returned by 91 (70%) subjects. Of those who replied 55 (60%) were symptom free, 17 (19%) were improved with some symptoms, 19 (21%) were unchanged, but only 52 (57%) were able to play their usual sport. Fifteen (88%) of

those with meniscal tears responded. Of these, four (27%) still had symptoms and five (46%) were unable to participate in sport. Six (75%) of the patients with cruciate tears returned questionnaires and all were improved although three (30%) stated that they were unable to resume their sport. Seven out of ten patients with a normal arthroscopy replied and four (40%) were still symptomatic and unable to resume normal sporting activities. Analysis of the group with patellar pain revealed no relationship between outcome and the sites of pain.

DISCUSSION

The results of this study emphasised the frequency of knee pain amongst injured sports people and illustrated the diagnostic difficulties. An unequivocal diagnosis was possible in 46 (35%) cases. It is noteworthy that of those with histories of knee locking, anterior drawer sign, a positive McMurray test or disabling pain, only one-third had an abnormal arthrogram and two-thirds an abnormal arthroscopy. Classical features of internal derangement were absent more often than not from patients with proven meniscal tears if we had employed Lachmann's modification of the drawer sign but interpretation of this test is not simple (Frank, 1986) and pre-anaesthetic diagnosis of this condition remains difficult (Monaco et al, 1982). Acute injury was often absent in meniscal tears. Joint locking occurred in only about one-quarter of cruciate and meniscal tears and partial or complete anterior cruciate tears. It is possible that we would have recognised more anterior cruciate tears if we had employed Lachman's lateral discomfort. Quadriceps wasting and joint effusions were imperfect but better discriminators of cruciate and meniscal tears than most other physical findings.

The absence of consistent historical and examination features in the population of patients with major mechanical lesions implies that investigations are of paramount importance. We found concordance between arthrographic and arthroscopic demonstration of meniscal tears but arthrograms were unhelpful in revealing anterior cruciate tears. The discordance between clinical and arthroscopic diagnosis has been noted previously (Schweitzer, 1981; Older et al, 1983), and it could be argued that arthrography is an unnecessary investigation.

However, in our hospital it is not logistically possible to arthroscope every patient. The foregoing suggests that such a policy in our study would have yielded additional patients with meniscal or cruciate tears. We would suggest that any patient with sports-related knee pain of six months duration, should wherever possible undergo arthroscopy.

Many with patellar pain shared sufficient clinical features to suggest a degree of homogeneity. The site of patellar pain did not correlate with any other clinical variables. Amongst the questionnaire respondents, 40% still had symptoms after one year and a high percentage were unable to resume their sport. All of the meniscal and cruciate tear subjects had undergone surgery and it is possible that since the questionnaires were returned only a few months post-operatively many would have eventually resumed normal activities. There is evidence that as many as 25% of athletes who undergo knee surgery are thereafter unable to play sport (Pritchett, 1982).

This study exemplified the spectrum of joint symptoms and signs of knee pain in people who engage in sport; it illustrated that although some clinical features may suggest a particular disorder, their lack of specificity makes clinical diagnosis an imprecise exercise. The study confirmed that many remain disabled despite treatment. It is possible that less stringent criteria for arthroscopy and recognition of additional patients with meniscal and cruciate tears may have reduced ultimate morbidity. Easy access to arthroscopy and orthopaedic services is essential for the efficient management of such patients. Regrettably this is a scarce resource in our own hospital as it is elsewhere (Lightowler, 1983).

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BOOK REVIEW

Title: DRUGS AND PERFORMANCE IN SPORT
Author: R. H. Strauss
Publisher: W. B. Saunders. UK Agents: Harcourt, Brace and Jovanovitch, London
Price: £15 **Soft cover** **221 pages** **Index, figures and Tables** **ISBN 0 7216 1865 0**

The contents of this book are more extensive than the title indicated to this reviewer who mistakenly thought the book would be largely about the effects of drugs on performance. In addition to these there are chapters on nutrition and physical performance; blood doping, oxygen breathing and altitude training; psychological aids to performance and a very stimulating review by Åstrand and Bergström on "Why are sports records improving?". The anticipated sections cover stimulants, depressants and anabolic steroids. A useful appendix to the book contains the American College of Sports Medicine position stand on the use of these latter drugs with 115 references. A list of references is given at the end of all the sections and includes some for 1985.

This is an interesting book which covers a lot of topics and being well referenced will allow further reading if required. Its readership should come from doctors, coaches, competitors and others who wish to obtain both a background and some detailed knowledge of this field. I can recommend it.

J. Howel Jones