THE DIAGNOSIS OF PROBLEMS AFTER MENISCECTOMY

D. J. DANDY, LONDON, ENGLAND, and R. W. JACKSON, TORONTO, ONTARIO, CANADA

From the Division of Orthopaedic Surgery, Toronto General Hospital

The causes of persistent symptoms after meniscectomy have been assessed clinically, radiologically and arthroscopically in 174 knees. The commonest finding was early degenerative arthritis (chondromalacia) of the femoral condyle (40 per cent). Retained fragments of meniscus were less common than expected (13 per cent), and lesions of the other meniscus were rare (5 per cent). The clinical diagnosis was altered in 42 per cent by arthroscopic examination. Arthroscopy was found to be a valuable technique in this group of patients with problems of diagnosis.

When a lesion as obvious as a torn meniscus is found and the meniscus excised, the patient is expected to make a good recovery. In practice, however, many patients develop symptoms that vary in severity from mildly inconvenient to disabling. Of patients who had undergone meniscectomy more than ten years before, Huckell (1965) reported that 25 per cent had troublesome symptoms, and Gear (1967) found that, after the same length of time, 30 per cent were disabled by aching, stiffness or swelling of the joint.

Clinical and radiographic examination in these patients may be unhelpful, and the result of a second arthroscopy is often disappointing. This study reports 174 such knees, with particular attention to the diagnosis. All the knees were examined with the arthroscope and the accuracy of diagnosis from clinical and radiographic examination was critically assessed.

PATIENTS AND METHOD OF STUDY

A total of 174 knees was available for study. In 166 cases (95 per cent) meniscectomy had been carried out elsewhere. The main symptoms were pain, instability, swelling, a painful catch on flexion, or a sensation of locking, either singly or in combination. The average age of the patients was thirty-four years. No patient had obvious degenerative arthritis either clinically or radiographically. The details of these patients are set out in Table I. Patients with infrapatellar neuromata or other extra-articular problems were not included.

After a careful history and a thorough clinical and radiographic examination, all patients were examined with the arthroscope (Jackson and Abe 1972; Jackson 1974). The examination was sometimes made difficult by intra-articular adhesions that impeded the free movement of the arthroscope, and examination of the joint from the antero-medial as well as from the antero-lateral approach was often necessary for adequate inspection of both tibio-femoral compartments. These arthroscopic findings were compared with the previous assessment.

To study the effect of the presence or absence of a meniscus, each knee was considered to have two compartments. As a bilateral meniscectomy had been carried out in twenty instances, only 154 of the 348 tibio-femoral compartments contained menisci.

<table>
<thead>
<tr>
<th>Meniscus removed</th>
<th>130 (75 per cent)</th>
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<tbody>
<tr>
<td>Medial only</td>
<td>24 (14 per cent)</td>
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<tr>
<td>Lateral only</td>
<td>20 (11 per cent)</td>
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<tr>
<td>Ages</td>
<td>Range 16–68 years</td>
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<td></td>
<td>Mean 34.1</td>
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<tr>
<td>Interval between meniscectomy and arthroscopy</td>
<td>Range 1 month–23 years</td>
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<td>Mean 3.6 years</td>
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At arthroscopy the meniscus was found to be damaged in eight of these, to leave 146 compartments with an apparently normal meniscus. The presence of degenerative changes in the articular cartilage of the femoral condyle was noted in each compartment and related to the age of the patient. The incidence of patellar chondromalacia and other conditions was also noted.

RESULTS

The original clinical diagnosis was confirmed in 101 cases (58 per cent) and refuted in seventy-three (42 per cent) (Fig. 1).

Retained fragments of meniscus—A retained fragment of meniscus was considered responsible for symptoms in forty-two knees (24 per cent) before arthroscopy. The diagnosis was confirmed in fifteen cases and eight other examples were found unexpectedly, to make a total of
twenty-three cases (13 per cent) with a diagnosis of retained fragment after arthroscopy. Only seventeen of the twenty-three (10 per cent of the total) were typical retained posterior horn fragments (Fig. 2). In four, there was a tear in the rim of regenerated tissue, and in one there was a large anterior horn fragment; the other patient had undergone partial lateral meniscectomy and sustained a tear of the remaining rim after a second injury.

Degenerative changes on femoral condyle—Chondromalacia of the femoral condyle in the compartment from which the meniscus had been removed (Fig. 3) was considered responsible for symptoms in fifty-seven knees (33 per cent) before arthroscopy and in seventy knees (40 per cent) afterwards. It was considered a contributory cause of symptoms in a further twenty-six cases, to make a total of ninety-six (55 per cent). As one would expect, the incidence of chondromalacia of the condyle increased with the age of the patient (Fig. 4). The incidence of degenerative changes in the compartment without a meniscus rose from 40 per cent in patients under the age of thirty years, to 70 per cent in the over-forty age group. The corresponding figures for the compartments with an intact meniscus were 5 per cent and 18 per cent.

Patellar chondromalacia—The diagnosis of chondromalacia patellae was made in twenty-two patients (13 per cent) before operation and confirmed in sixteen. Nine other cases were found at arthroscopy to make a total of twenty-five (14 per cent) in whom chondromalacia patellae was considered to be the main cause of symptoms. Asymptomatic chondromalacia patellae was also seen in a further fifty-four patients to make a total of seventy-nine (45 per cent) with degenerative changes on the patella.

Tears in the opposite meniscus—Although tears of the opposite meniscus were diagnosed before arthroscopy in twenty-four cases (14 per cent), a tear was found in only five of these. Three other tears were found, to give a total of eight (5 per cent).

Ligament injuries—Tears of the anterior cruciate or medial

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**Fig. 1**
Arthroscopic observations compared with the clinical diagnosis.

**Fig. 2**
Retained fragment of the posterior horn of the medial meniscus. The fragment is visible between the femoral condyle and the anterior cruciate ligament. Note the healthy articular cartilage.

**Fig. 3**
Early degenerative change on the femoral condyle of a 47-year-old workman six months after medial meniscectomy.
collateral ligament were diagnosed before arthroscopy in nine cases (5 per cent). An additional eight lesions were detected by the examination under anaesthetic, to give a total of seventeen cases (10 per cent).

Adhesions—Intra-articular adhesions were found in the region of the synovial scar in fifteen (9 per cent), in the suprapatellar pouch in five (3 per cent), and throughout patients, giving a total of ten patients (6 per cent) with negative examinations.

TREATMENT
The patients were managed by conventional methods. Early degenerative arthritis was treated initially with anti-inflammatory drugs, weight reduction and mild analgesics. In eight of the earlier cases high tibial weight transfer osteotomy was performed after progression of the disease. Retained fragments, torn menisci and loose bodies were removed and major ligament injuries were repaired. The outcome of treatment has not been stressed because this paper is concerned with diagnosis rather than with management.

DISCUSSION
We were surprised to find so great a difference between the diagnoses before and after arthroscopy (Fig. 1). Although confident in our clinical decisions before arthroscopy was available, we now accept that arthroscopy is more accurate. Direct visual inspection is more reliable than a deduction based on clinical and radiographic evidence, and the findings at arthroscopy in this series were confirmed whenever the joint was opened. Furthermore, in 800 consecutive arthroscopies, there were only twelve known errors of interpretation (1·4 per cent).
Although it may be possible for some clinicians to attain this degree of accuracy by clinical and radiographic examination alone, we are not able to achieve this ourselves without the help of arthroscopy.

Retained fragments of the posterior horn of meniscus were found in only 10 per cent of the patients, and lesions of the other meniscus in only 5 per cent. These two conditions accounted for 37 per cent of the diagnoses before arthroscopy and were confirmed much less often than expected. Degenerative changes in the articular cartilage of the femoral condyle were considered responsible for symptoms in 40 per cent, and were an additional finding in a further 15 per cent. These changes were far commoner in the compartments from which the meniscus had been removed than those with an intact meniscus, and became more frequent with age (Fig. 4). The incidence of such changes was unaffected by the interval between meniscectomy and arthroscopy, and was the same whether the medial or lateral meniscus had been removed.

This high incidence of early osteoarthritis is in keeping with other reports. Tapper and Hoover (1969) found radiographic evidence of degeneration in 85 per cent of knees after ten years, Gear in 62 per cent and Huckell in 56 per cent. Jackson (1967) found radiographic changes in 23 per cent after five years, but only 5 per cent in the opposite knee with an intact meniscus. Fairbank (1948) concluded that these bony changes might be adaptive rather than degenerative. We are unable to say this of the changes we have seen in the articular cartilage, which we believe represent degenerative arthritis in its earliest stages (Fig. 3). There is strong evidence that meniscectomy is often followed by degenerative arthritis, but we cannot determine from this study its exact incidence, or whether it is the injury that led to the meniscal lesion, the damaged meniscus itself, or its excision that is responsible. Probably all three factors influence the end-result.

This work was supported in part by grants from the Wellcome Trust and the Workmen's Compensation Board of Ontario.