THE RESULTS OF PARTIAL ARTHROSCOPIC MENISCECTOMY IN PATIENTS OVER 40 YEARS OF AGE

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The role of arthroscopic meniscectomy in middle-aged patients has not previously been evaluated. This paper reports on 73 knees in 68 patients aged over 40, all of whom were shown arthroscopically to have meniscal tears and who were felt to be suitable candidates for meniscectomy. Many of these patients had typical traumatic meniscal tears, and if no degenerative joint changes were present at the time of meniscectomy, 95 per cent of them had good or excellent results an average of two and a half years later. In those instances where degenerative joint changes were present, removal of the offending segment of torn meniscus produced 80 per cent good or excellent results over the same period of time. These facts seem important now that arthroscopy permits such precise diagnosis of meniscal tears and of joint degeneration.

The role of partial versus total meniscectomy has long been controversial and even today the issue is not completely resolved (Lidge 1970; Smillie 1978). Some argue that partial meniscectomy may leave unrecognised meniscal tears which may later cause symptoms (Andrews, Norwood and Cross 1975; Edmonson and Crenshaw 1980). Others believe that any portion of a meniscus left in situ may become trapped between the tibial and femoral condyles leading to pain and further problems. Still others suggest that a torn meniscus may be well tolerated and often requires no treatment at all (Casscells 1978; Fox, Blazina and Carlson 1979).

Sir Robert Jones (1909) and Donald King (1936) were perhaps the first to suggest partial meniscectomy for meniscal tears, and recent studies may be proving them correct. Many authors have studied the mechanical properties of the meniscus and shown it to have an important functional role (Hall 1969; Kettlekamp and Jacobs 1972; Seedhom, Dowson and Wright 1974; Cox et al. 1975; Walker and Erkman 1975; Krause et al. 1976; Oretorp et al. 1978). Cox and his co-workers (1975) performed both partial and total medial meniscectomies on 24 canine knees. Six months later the dogs were killed and their joints inspected. In all cases the lateral compartments were normal; after partial meniscectomy the changes were slight; but after total meniscectomy degenerative changes were invariable.

The load-bearing function of the menisci was shown by Walker and Erkman (1975) who studied fresh cadaveric knees both at rest and under load. More recently, Burke and Ahmed (1978) reported a significant load-bearing function of the peripheral rim of meniscus alone, and concluded that a more normal pattern of pressure distribution occurs in the knee if the peripheral meniscus can be spared. Malcolm and Daniel (1980), using force transducers to calculate contact stress between articular surfaces, were able to determine what percentage of the total load on the knee was carried by an intact meniscus. They found that when a normal lateral meniscus was present only 29 per cent of the total lateral load was transmitted directly from the lateral femoral condyle to the tibial plateau; the remainder was transmitted through the lateral meniscus. When one-fourth of the meniscus was removed in a shape resembling a bucket-handle tear, they measured a 45 per cent increase in the direct condyle-to-plateau contact stress. Total meniscectomy resulted in a 313 per cent increase in contact stress, more than six times the increase which occurred after partial meniscectomy. Clearly the load-bearing potential of the peripheral rim remaining after partial meniscectomy is considerable.

Several clinical reviews (Huckell 1965; Gear 1967; Tapper and Hoover 1969; Appel 1970; Dandy and Jackson 1975) have reported changes following total meniscectomy similar to those first described by Fairbank (1948). Fox et al. recently reported a retrospective study of over 800 patients after traditional medial meniscectomy in an otherwise normal knee; over 25 per cent had required another operation on their knees within two years of the original procedure. This high incidence of secondary operations strongly suggests that traditional meniscectomy either damages stabilising structures of...
the knee or leads to progressive articular degeneration (Fox et al. 1979).

An untreated meniscal tear may be equally damaging. Thus, Shapiro and Glimcher (1980) have shown that if in mature rabbits a longitudinal meniscal tear is created and left in position it induces degenerative joint changes at about the same rate and intensity as occurs after total meniscectomy. It seems to us that, since total meniscectomy and an untreated tear are both so unsatisfactory, the safest procedure is to remove only the damaged portion of meniscus; moreover we believe that even in patients aged over 40, this limited procedure is well worth while. Although Jones, Smith and Reisch (1978) and Lotke, Lefkoe and Ecker (1981) have described the results of meniscectomy in older patients, we know of no reports of partial arthroscopic meniscectomy in this age group. The advent of arthroscopy has enabled us to study this problem.

Table I. Clinical features before operation

<table>
<thead>
<tr>
<th>Arthroscopic classification</th>
<th>Number of knees/patients</th>
<th>Average age (years)</th>
<th>History of trauma</th>
<th>Pain</th>
<th>Swelling</th>
<th>Locking or feeling of instability</th>
<th>Tenderness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I (without degenerative changes)</td>
<td>20/19</td>
<td>50.2</td>
<td>17</td>
<td>19</td>
<td>8</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Group II (with degenerative changes)</td>
<td>51/47</td>
<td>55.3</td>
<td>33</td>
<td>39</td>
<td>19</td>
<td>14</td>
<td>13</td>
</tr>
</tbody>
</table>

MATERIAL AND METHODS

Between 1975 and 1980 the senior author (RWJ) has, with the aid of arthroscopy, diagnosed meniscal tears in 118 knees of 112 patients over the age of 40. Twelve of these patients required an open surgical procedure either because of associated disorders or because arthroscopic meniscectomy was not technically feasible. Five patients had previously undergone an open meniscectomy and returned with a retained meniscal fragment which was causing symptoms. Twenty-seven meniscal tears occurred in patients who were not felt to be suitable candidates for even partial meniscectomy. Most of these patients had either extensive degenerative joint disease associated with contractures or severe malalignment. Such patients were treated either by joint laveage and chondral debridement, or by tibial osteotomy; they were excluded from this study, as was one patient with pseudogout. We were left with 73 knees in 68 patients with no history of previous operations on the knee nor any evidence of instability. These were treated by partial arthroscopic meniscectomy, and it is this group of patients that our study reviews.

Of these 68 patients, one died (of causes unrelated to his knee) and one could not be traced at the time of this review. The remaining 66 patients (71 knees) were all either examined or at least interviewed by the same surgeon (DWR). These patients, all with meniscal tears, fall into two distinct categories. Group I consisted of 20 knees in 19 patients with no arthroscopic evidence of degenerative articular changes at the time of meniscectomy. Group II consisted of 51 knees in 47 patients with varying degrees of damage of the articular cartilage at meniscectomy. The follow-up ranged from six months to 5.6 years with an average of two and a half years after meniscectomy.

A number of these patients were among the first to undergo arthroscopic meniscectomy and some had come from other countries to have the operation performed. A complete objective follow-up was not possible since some of these patients were unable to return for a routine examination of their knee. However, after examination or else a personal interview, each patient's functional end-result was graded using criteria similar to those described by Tapper and Hoover (1969) in their review of late results after meniscectomy. An "excellent" result meant an asymptomatic patient who had no limitations and believed his knee to be essentially normal. A "good" result meant that the patient was subjectively greatly improved after meniscectomy; he still had symptoms, but no more than occasional ache or effusion after heavy use. A "fair" result meant that the patient was somewhat improved after meniscectomy but that he experienced more frequent symptoms and was somewhat limited in his activities. A "poor" result meant the patient was no better or was worse after meniscectomy and that he continued to experience disabling symptoms; any patient who required subsequent operative procedures was considered to have a poor result.

RESULTS

Group I (20 knees in 19 patients). Of the patients in Group I (without degenerative changes at the time of meniscectomy) the main presenting complaint usually followed a definite injury; this was the case in 17 knees (85 per cent). The duration of symptoms from onset to partial meniscectomy ranged from three days to five years, with an average of 6.3 months. There were 18 men and one woman in this group, and their average age was 50.2 years (Table I). There were 17 medial meniscal tears, two lateral tears, and one knee in which both menisci were torn. The majority (70 per cent) of tears were either longitudinal or radial, typical of the tears also seen in younger age groups. After operation all the patients in this group returned to their previous activities without restriction. The average time off work was 7.3 days, and most people in sedentary occupations returned to work the following day. There were no immediate or late complications, and no patient had required further treatment to his knee up to the time of this review. In 14 knees (13 patients) there had been no recurrence of pain since the operation, while six patients had noticed occasional aching after extreme activity. One patient complained of aching pain in his knee with changes in the weather. There were no complaints of nocturnal pain or of pain at rest. Two patients had experienced a mild effusion after heavy activity which resolved rapidly and was not a recurrent problem (Table II).

Twelve knees in 11 patients were totally asymptomatic; they had no limitations and were rated excellent. Seven patients stated that they were markedly improved after meniscectomy but did experience some discomfort, effusion, or weakness with increased activity. These patients reported no disability and were able to carry on their usual pre-operative activities. One patient felt that
his knee was only slightly improved since he still experienced swelling or pain with extreme exertion. His knee was rated fair as he considered that his fear of pain interfered with his activities. Thus, using strict criteria for grading, 19 out of 20 knees in patients over 40 with no degenerative joint changes at meniscectomy showed a good or excellent result an average of two and a half years after partial meniscectomy.

**Table II. Clinical features after operation**

<table>
<thead>
<tr>
<th>Arthroscopic classification</th>
<th>Pain with exertion</th>
<th>Pain at rest or weather changes</th>
<th>Swelling</th>
<th>Locking</th>
<th>Feeling of instability</th>
<th>Tenderness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Group II</td>
<td>21</td>
<td>10</td>
<td>12</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

**Group II** (51 knees in 47 patients). By contrast, our second group of patients all had some degree of associated degenerative change documented at the time of arthroscopic meniscectomy. There were 35 men and 12 women in this group and their average age was 55.3 years. Thirty-three patients (64.5 per cent of knees) related the onset of their symptoms to either recent or old trauma, but in several the injury was relatively minor (squatting or twisting the knee while walking). The remaining 14 patients had no history of injury; they complained of chronic pain, swelling, tenderness, or intermittent locking (Table I). The average duration of symptoms before meniscectomy was 15.7 months. There were 43 tears of the medial meniscus, nine of the lateral meniscus, and one knee had tears of both menisci. The majority (72.5 per cent) were degenerative flap tears involving the posterior horn. The only immediate or late complication was a single case of suspected calf vein thrombosis which resolved rapidly, and for which medical attention was never sought. Forty-three of this group of patients (91.4 per cent) were able to return to their normal work without restriction in an average of 11.6 days. Two patients had not been able to return to work after meniscectomy at nine months and four years respectively. At the time of review 21 patients had intermittent generalised aching pains with heavy use; four complained of pain at rest or at night, and six others reported occasional discomfort with change in the weather. Only one patient had experienced symptoms of instability, and after operation there were no complaints of "locking". Twelve patients reported occasional transient effusion, usually related to specific activities and resolving after rest (Table II). Four patients had required further operative procedures: one had articular lavage and debridement, one had a loose body removed, and two had tibial osteotomies.

Among the patients with known degenerative changes, 11 knees (21.6 per cent) were asymptomatic and felt normal an average of 2.6 years after meniscectomy; these were rated excellent. Thirty-one knees (60.8 per cent) were much improved but the patients still had some pain or swelling after heavy use. Such symptoms were usually predictable and were neither disabling nor did they interfere with daily activities; these patients were classified as good results.

Four patients reported more frequent knee symptoms which were only partly improved after meniscectomy; they were rated fair. The other five patients were still disabled, were no better after meniscectomy and were rated poor. These five patients included the four who, after meniscectomy, required subsequent operations.

Ten knees at the time of meniscectomy were seen to have mild to moderate degenerative changes involving only a single compartment; nine of these had excellent results, and the tenth a good result. Of the remaining 41 knees with more extensive degenerative changes, there were two excellent results, but, surprisingly, no less than 30 knees were still rated good an average of 2.6 years later. Thus, slightly over 80 per cent of patients with known degenerative joints had knees which were normal or significantly improved two and a half years after partial meniscectomy.

**DISCUSSION**

Our study, like several preceding ones, clearly showed that the patient's age at the time of meniscectomy did not adversely affect the eventual result (Jones 1909; Tapper and Hoover 1969; Lotke et al. 1981) (Table III). What really matters is whether or not there were any degenerative changes at the time of operation. Traumatic meniscal tears were not uncommon in patients over 40 years of age, many of whom were extremely active individuals. When the tear was clearly due to trauma and in an otherwise normal knee, these patients, some of whom had been followed for five years, showed 95 per
cent good or excellent results after partial meniscectomy. These findings correlate very well with those of Lotke et al. (1981) who, in patients with normal radiographs and a short history, reported 90 per cent good or excellent results an average of 10 years after meniscectomy.

The patients in our Group II, who had documented degenerative changes in addition to a torn meniscus, were quite different. Thirty per cent had no history of trauma. In nearly all the patients in whom pain was the presenting complaint, it was either relieved or significantly altered after removal of the damaged meniscal segment (Figs 1 and 2). We conclude that partial meniscectomy in the degenerative knee can reduce the pain arising from a torn meniscus, even though the arthritic symptoms may remain unchanged. But we should emphasise that none of the patients had joint contractures or significant malalignment.

Some of these patients with degenerative joints took a considerable time to obtain their maximal benefit after meniscectomy. Six had symptoms for one to three months, and two for up to six months. One patient required two aspirations within six months but, three years later, remains asymptomatic. Instability was seen in only one patient after partial meniscectomy; it seems that preserving the peripheral rim of the meniscus with its capsular attachments minimises subsequent joint laxity (Oretorp and Gillquist 1978).

Why removal of a fragment of damaged meniscus from a degenerative knee leads to dramatic relief of pain in some patients is not known. Some patients had a relatively large meniscal fragment which was probably capable of producing locking or symptoms of instability and subsequent pain. Smaller mobile segments of meniscus could, by pulling on the joint capsule of synovium, cause intermittent pain and synovitis. Although these theories are unproved, we believe that removal of all mobile meniscal fragments is an important factor in achieving relief of pain after partial meniscectomy.

Our follow-up is relatively short; nevertheless, with some patients now over five and a half years after meniscectomy, it is perhaps one of the longest reviews of arthroscopic meniscectomy available. We again emphasise that none of these patients had significant pre-operative contractures or malalignment of the joint; with such conditions the results of meniscectomy alone might well be unsatisfactory.

In our view arthroscopy has proved extremely helpful in older patients by permitting precise diagnosis and preventing needless meniscectomies (Lotke, Ecker and Alavi 1977). But, equally important, this present series shows that the types of tear associated with trauma in younger patients also occur in those over 40; that the removal of only the torn fragment of a damaged meniscus in these older patients may eliminate pain and mechanical symptoms; and that in this way the protective and stabilising functions of the peripheral rim of the meniscus are usefully preserved.

REFERENCES


