

ENDOSCOPIC PARTIAL AND TOTAL MENISCECTOMY

A Comparative Study with a Short Term Follow Up

JAN GILLQUIST, PER HAMBERG & JACK LYSHOLM

Department of Orthopedic Surgery, University Hospital, Linköping, Sweden

The results of partial endoscopic meniscectomy in 89 patients were compared with the results of total endoscopic meniscectomy in 78 patients. Total meniscectomy was the more time consuming and there were intraoperative technical problems in 16 patients, the most common being rupture of the meniscus during extraction. All complications were, however, successfully handled and did not affect the end result. There were nine reoperations after partial and only one after total meniscectomy. The patients were followed up on the average 16 months after operation with a special knee function questionnaire. There was no difference between the groups in score distribution, indicating similar knee function. However, patients in the total meniscectomy group with a follow up longer than 1 year had significantly higher scores than those with a shorter follow up. No such difference was noted in the partial group, possibly indicating that the final level of knee function is reached earlier after partial than after total meniscectomy.

Key words: arthroscopy; endoscopic operation; knee; meniscus

Accepted 8.v.82

The goal of endoscopic meniscectomy is to remove all ruptured and offending meniscus tissue. Usually the aim is to save as much functioning meniscus tissue as possible and to leave a balanced rim along the periphery (O'Connor 1977, Johnson 1981).

The results of partial meniscectomy have been said to be superior to total meniscectomy (Cargill & Jackson 1976, Jackson & Dandy 1976, McGinty et al. 1977), but total meniscectomy may become necessary where no normal meniscus tissue exists. In the severely degenerated meniscus, total meniscectomy may be unavoidable. No comparison between endoscopic partial and total meniscectomy appears to have been published.

Endoscopic total meniscectomy is usually carried out by piecemeal excision with a basket forceps. This method is time consuming and it may be difficult to remove all degenerated tissue.

Therefore a technique for total endoscopic meniscectomy has been developed using principles similar to the open operation. The original technique was described by Oretorp & Gillquist (1979). Some problems inherent in this technique led to a later modification (Gillquist 1980). This report presents the modified technique, its indications and early results, in 78 patients compared with the results of partial meniscectomy in 89 patients.

MATERIAL AND METHODS

Patients. Only physically active patients with no clinical signs of osteoarthritis were included. The symptoms were mainly locking, catching or pain after a twisting accident. Joint line tenderness was common and the McMurray test was often positive. All patients were operated on in the same time period.

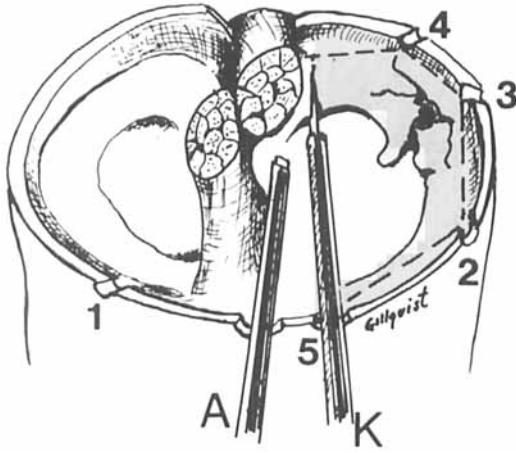


Figure 1. Total endoscopic excision of the medial meniscus. The periphery of the meniscus was incised along the lines marked with ----.

A = arthroscope. K = knife cutting the posterior attachment.

Total meniscectomy. Total meniscectomy was carried out in 78 patients, 63 men and 15 women, mean age 39.7 years (range 18–78), with such severely degenerated menisci that no normal meniscus tissue could be saved. Only six patients were over the age of 60. Fifty-five per cent had an active job and 24 per cent a sedentary job. Twenty-two patients participated actively in sports.

Partial meniscectomy. Partial meniscectomy was carried out in 89 patients, 77 men and 12 women, mean age 39.0 years (16–75), where it was judged possible to leave a sound portion of the meniscus. Eight patients were over 60 years of age. Fifty-three per cent had an active job and 16 per cent a sedentary job. Fifty-eight patients participated actively in sports.

The ratio lateral/medial meniscus involvement was 1:10 in the total meniscectomy group and 1:1.6 in the partial meniscectomy group. One patient had a tear in both lateral and medial menisci which was treated at the same session.

Instability was present in 20 per cent in the total meniscectomy group and in 22 per cent in the partial meniscectomy group, early degeneration of the cartilage in 87 and 73 per cent and chondromalacia in 56 and 58 per cent, respectively. These changes were usually confined to the same compartment as the torn meniscus.

Surgical technique

A central approach, as described by Gillquist & Hagberg (1976) and Gillquist et al. (1978, 1979) is used for diagnostic arthroscopy. The whole joint is always examined. A pump system (Sarns model 5500) is used

to flush the joint. This makes it possible to vary fluid pressure and flow independently during the operation. A tourniquet is used only during therapy. When a meniscus tear is found the endoscopic operation is carried out at the same session. A probe is used to identify the type of tear and to test remaining tissue for stability. The arthroscope is not moved from its central position and the instruments are introduced into the joint via separate stab wounds on both sides according to the type of meniscus tear.

Instruments. For endoscopic meniscectomy we normally use very few instruments. The same instrument set is used for all endoscopic operations. The set consists of a probe and a special meniscus knife with a retractable blade (Stille Werner Inc., Stockholm, Sweden). A 4 mm or 3 mm grasping forceps and a 3.4 mm basket forceps are also used. Small pieces of meniscus and debris inside the joint are removed with a suction device (Stille Werner, Stockholm, Sweden). A leg holder (Stille Werner, Stockholm, Sweden) is used in most operations.

Total meniscectomy. The technique has previously been described (Gillquist 1980). The meniscus is excised with the meniscus knife using five incisions through four to five insertions along the periphery of the meniscus (Figure 1). The arthroscope is held in the central position. During excision of the anterior part and middle portion the 30° telescope is used; for the posterior horn the 70° telescope is necessary. Fluid pressure in the joint is kept high during the excision of the middle and posterior part of the meniscus in order to force the meniscus out of the joint. This makes it easier to place the incisions within the meniscus substance. After extraction of the excised meniscus the rim is carefully checked with the probe for any remaining diseased tissue, which is removed with a basket forceps.

Partial meniscectomy. Flaps are usually treated by division of the base and extraction. If the remaining portion of the meniscus is damaged or if there is a complex tear, the torn part of the meniscus is removed with a basket forceps. In cases with radial tears the basket forceps is used to trim off the anterior and posterior part of the meniscus on either side of the tear in order to leave an even rim. Horizontal cleavage tears are removed with the basket forceps. At the end of operation the suction device is used to evacuate the joint.

FOLLOW UP

All patients were regularly followed for up to 2 months.

As most patients lived in an area with no other hospital they returned to us if they had any problem with the knee. The indication for reoperation

was continuing swelling with synovitis after 2 months postoperatively. Locking or catching was also an indication for repeat arthroscopy. In such cases a diagnostic arthroscopy under local anaesthesia was usually performed. If a tear was found another endoscopic operation was done under general anaesthesia.

A special follow up was done for the total meniscectomy group 16.4 (3–30) months and for the partial meniscectomy group 16.1 (2–52) months after the operation. Only three and eight patients respectively had a follow up shorter than 6 months. A questionnaire was used to determine a knee function score with a maximum of 95 points (Lysholm & Gillquist 1982). The score consists of seven items: limp (5 points), support (5), instability (30), pain (30), swelling (10), climbing stairs (10), and squatting (5). Score values below 77 points were regarded as fair or poor and re-operations were recorded as poor result (Lysholm & Gillquist 1981). Of the patients in the total meniscectomy group, 73 could be traced at follow up, 94 per cent of the total. Out of 89 patients with partial meniscectomy, 80 could be traced (90 per cent).

RESULTS

Total meniscectomy was performed mostly for horizontal cleavage tears (36 per cent) and longitudinal tears (33 per cent) and partial meniscectomy mostly for flap tears (56 per cent) (Table 1); 44 and 43 per cent of patients, respectively, were treated as in patients. The mean stay in hospital was 3.8 ± 0.4 days for the total group and 3.8 ± 0.3 for the partial. Operation time including diagnostic arthroscopy was significantly longer in the total meniscectomy group ($P < 0.001$) with 53 per cent of the operations lasting more than 60 min. In the partial meniscectomy group the majority of the operations (72 per cent) lasted less than 60 min.

The most frequent technical problem in the group with total meniscectomy was rupture of the meniscus in the posterior horn during extraction (9 cases). In another 5 patients the excision of the posterior horn was initially incomplete. The remaining part of the posterior horn was removed

Table 1. Frequency of different types of meniscus tears in 89 patients subjected to partial and 78 patients to total endoscopic meniscectomy (%)

Type of tear	Operation	
	Partial	Total
Horizontal	17	36
Longitudinal	10	33
Flap	56	18
Radial	17	13

with a basket forceps. A broken grasping forceps resulted in loss of the excised meniscus during extraction in two cases. In both, the fragment was found after extensive search and successfully extracted. In 10 per cent of the patients aspiration due to haemarthrosis was necessary 1 week after total meniscectomy. Only two out of 89 patients with partial meniscectomy required aspiration.

Score distribution

The score distribution was almost identical in both groups (Figure 2). The mean score in the total meniscectomy group was 83.4 ± 1.3 . The score after partial meniscectomy was almost the same, 82.2 ± 1.7 . Patients with instability had a similar score in both groups (80.5 ± 3.4 , 82.7 ± 2.3). After total meniscectomy patients with a follow up longer than 1 year had a significantly higher score than those with a shorter follow up (85.7 ± 1.3 versus 76.5 ± 3.4 , $P < 0.01$) (Figure 3). In the partial meniscectomy group no such

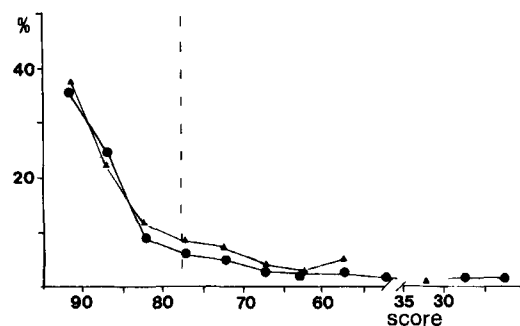


Figure 2. Distribution of scores in patients with partial (▲) and total (●) meniscectomy at follow up. The vertical line indicates 77 points, the border line between excellent/good and fair/poor.

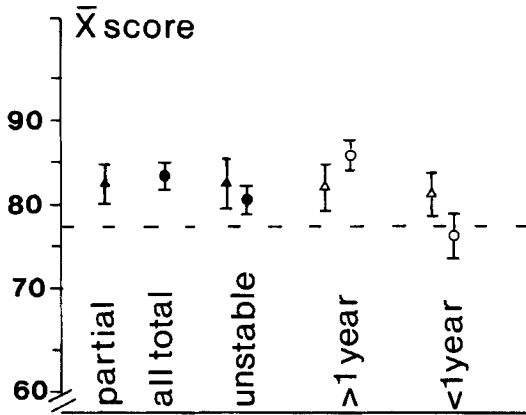


Figure 3. Mean scores at follow up in patients subjected to partial (\blacktriangle) or total meniscectomy (\bullet , \circ). The scores for unstable patients as well as patients with a follow up shorter than 1 year are given.

difference was seen (82.6 ± 2.5 versus 81.5 ± 2.1). The scores of the 14 oldest patients (>60 years) were similar to the rest with no apparent difference between the partial and total meniscectomy groups (85.4 ± 4.2 and 84.7 ± 2.7 , respectively). The two oldest patients had scores of 85 and 86.

The number of patients in the group fair/poor was the same after both types of operations. There were fewer reoperations, however, in the total meniscectomy group (1/78 versus 9/89). Low scores were due to occasional slight pain on physical exertion and difficulty in kneeling down. Sixty-seven per cent of patients with a low score in the total meniscectomy group complained of pain and 61 per cent of problems on kneeling down; in the partial group the percentages were 50 and 85, respectively.

Sick-leave and return to sports (Figure 4)

There were no significant differences between total and partial meniscectomy in sick leave or return to sports. After total meniscectomy 42 per cent took no sick leave; 98 per cent were back at work within 4 weeks. Return to sports was slower, 23 per cent returned within the first week and 87 per cent after 4 weeks.

After partial meniscectomy 50 per cent took no

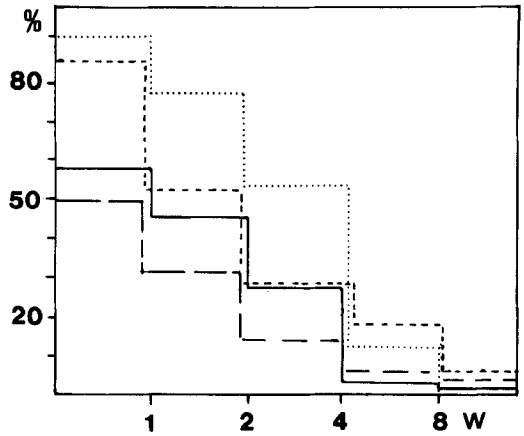


Figure 4. Sick leave in patients with partial (---) and total meniscectomy (---). Return to sports is also shown. Partial group (---), total group (....). There were no significant differences between the groups. W = weeks.

sick leave; 87 per cent were back at work again within 4 weeks. Sixteen per cent returned to sports within 1 week and 71 per cent within 4 weeks.

DISCUSSION

In the present study the results of endoscopic partial and total meniscectomy did not differ in any significant way in a short term follow up. However total meniscectomy did seem to represent a greater trauma since there was improvement of knee function 1 year after the operation compared with the period before. The final level of knee function seemed to be reached earlier after partial meniscectomy. There were some intraoperative complications in total meniscectomy but they did not seem to influence the end result. Another difference was that there were fewer reoperations after total than after partial meniscectomy. This might be explained by the difficulty in determining the quality of the remaining rim in partial meniscectomy. Diseased tissue may thus be left behind leading to a second tear. With rupture of the lateral meniscus partial meniscectomy is usually sufficient. This explains the difference in the ratio medial/lateral meniscus ruptures in the two groups.

Earlier studies of total meniscectomy have pointed out the poor end results compared to partial meniscectomy (Cargill & Jackson 1976, McGinty 1977, Jackson & Dandy 1976, Jones et al. 1978). The increased laxity described by some authors (Johnson et al. 1974, Oretorp et al. 1978, Jocum et al. 1979, Markolf et al. 1981) was not seen in our study. It could be argued that these patients might have been better off without an operation, keeping the ruptured meniscus inside the knee. Our results, however, indicate that a significant number of patients in both groups attained almost normal knee function after operation and that even those with low post-operative scores showed significant improvement. The complaints leading to a low score were usually minor, occurring only with heavy physical exercise. Therefore we feel that removal of damaged meniscus is indicated in this group of patients if the symptoms are of a mechanical nature and the patient is active and in good physical health. The endoscopic operation is less traumatic than the open operation (Lysholm & Gillquist 1981, Dandy 1978) and may therefore be used in elderly people. The knee function of the patients over 60 years in this study was generally within the good/excellent category at follow-up.

It is also remarkable that almost half of the patients took no sick leave even after total meniscectomy. Thus endoscopic total meniscectomy may be done with a good primary result in meniscus lesions where no sound meniscus tissue can be saved. The long term results with regard to osteoarthritis are not known and will have to be studied further. The primary results of partial meniscectomy were equally good apart from the higher frequency of reoperations. However we prefer partial meniscectomy in all cases where sound meniscus tissue can be saved mainly because it is an easier operation. The operation also takes less time. Whether there will be less osteoarthritis in these cases in the future remains to be seen.

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