

Arthroscopic repair of the bucket-handle meniscus

10 failures in 27 stable knees followed for 3 years

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In a total of 535 meniscal lesions diagnosed by arthroscopy, 54 patients had their meniscus sutured arthroscopically. 25 cases were excluded from the study due to concomitant ligamentous injury, while 2 were lost to follow-up, leaving 27 cases of arthroscopic repair of isolated bucket-handle meniscal tears for review. 8 cases had the repaired meniscus partially resected later due to recurring symptoms. The remaining 19 cases were scored for knee func-

tion and activity after a median observation time of 36 (18-52) months. 15 of 19 patients with a supposedly healed meniscus had normal knee function, i.e., unchanged compared to preinjury levels, but a slight drop in median activity score. With 8 re-ruptures and 2 patients who stated result as poor, the 10/27 failure rate was rather high. Our results are not as good as most reported previously.

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While several studies have shown that partial meniscectomy is superior to total meniscectomy (Cox et al. 1975, McGinty et al. 1977, Seedhom and Hargreaves 1979), only a few studies (Sommerlath 1989, 1991) have dealt with long-term morbidity after partial resection versus meniscus fixation in patients with bucket-handle lesions. We report our results of arthroscopic meniscus suture for bucket-handle lesions in knees without concomitant ligamentous instability.

Patients and methods

From October 1987 till August 1991 we diagnosed a total of 535 meniscal lesions by arthroscopy. Of 54 cases of arthroscopic meniscus suture, 25 had substantial associated lesions, mostly ruptures of the anterior cruciate ligament. The remaining 29 cases, median age 28 (13-55) years, had isolated, peripheral bucket-handle tears, technically suitable for arthroscopic suture, and repair was performed with no regard to age of lesion (median 3 weeks, oldest 12 years). 2 cases were lost, leaving 27 for follow-up. 12 patients sustained their injury during sports activities. 12 tears were medial, 14 were lateral, and 1 knee had lesions of both menisci. 20 lesions were localized to the peripheral 1/3 of the meniscus.

Technique

Arthroscopy was performed under epidural or general anesthesia, using a Storz 5.5-mm instrument. The lesion was identified and replaced. Repair of the lesion was done with resorbable suture (Maxon®-0) through a double barrel (Acufex®), using the inside-out technique (Cannon 1991). The capsule was exposed before tying the sutures to prevent neurovascular entrapment. The average number of sutures used was 2 (1-8). Neither rasping nor the blood-clot technique (Henning et al. 1990, Cannon 1991) was used to enhance meniscus healing.

Postoperative treatment

During the observation period, different postoperative regimes were used. 4 knees were immobilized in a plaster of Paris cast, 9 had a dynamic orthosis with medial and lateral support, and the remaining 14 were treated without a bandage. 17 cases were allowed partial or full weight bearing, while 10 were without weight bearing for 6 (3-9) weeks.

Follow-up study

8 patients were not reexamined clinically due to later resection of the repaired meniscus, but they are included in the overall results. The remaining 19 were scored for knee function, using the Lysholm scoring scale (Lysholm and Gillquist 1982), and asked to give

a subjective assessment of their knee function after a median observation time of 3 (1.5-4) years. The activity level was recorded using an established scoring scale (Tegner and Lysholm 1985) and a new scoring scale recommended in the ESKA consensus 1990 (Table 2). Whereas the Tegner scale is numerical with points from 1 to 10, the ESKA scale has only 4 categories, from 0 to 25 points with uneven intervals, giving special credit to cutting sports.

Chi-square test was used with a level of significance at 95 percent.

Results

In 8 out of 27 patients the repaired meniscus was excised after a median of 18 months (5-43). 4 patients had a relevant injury, whereas symptoms recurred spontaneously in the rest. A rupture was found in 6 of 12 repaired medial menisci and in 2 of 14 lateral menisci (P 0.06). Neither the size nor the age of the primary lesion was correlated to secondary excision. Nor could the distance of the rupture from the capsule, the number of sutures used or the postoperative regime be correlated to the frequency of re-ruptures.

The median functional score of the remaining 19 patients was 100 points, and 16 had a good to excellent result (Table 1). At the time of operation both patients in the poor group had a remarkably low preinjury functional score which, though even lower preoperatively, was not appreciably improved by the operation. Both knees had slight chondral damage.

Most patients maintained their activity level, although there was a slight tendency to give up cutting sports, which is reflected in both scoring systems (Table 2). For the 19 patients the median recovery period was 3 (0-10) months. When asked to give a subjective evaluation of their knee status, 17 patients assessed their knee function as excellent or good, while 2 patients assessed their result as poor. The latter 2 patients were identical with the poor group in the Lysholm scoring scale. By adding these 2 patients to the failure group, the operation failed in 10/27 (Table 3).

Discussion

In 8 patients a rupture of the repaired meniscus was verified by arthroscopy. The documented re-rupture rate of 0.3 (8/27) is higher than that reported in some studies with a shorter follow-up time (Keller et al. 1987, DeHaven et al. 1989). Moreover, the absence of

Table 1. Knee function measured by Lysholm-score before injury and at follow-up

Lysholm-score	Preinjury	Preoperative	Follow-up
Excellent (92-100)	14	0	15
Good (77-91)	3	3	1
Fair (62-76)	0	2	1
Poor (< 62)	2	14	2

Table 2. Median values of activity level expressed in the ESKA-score^a and the Tegner-score before injury and at follow-up (n 19)

ESKA		Tegner	
Preinjury	Follow-up	Preinjury	Follow-up
25 (0-25)	15 (0-25)	6 (3-9)	5 (3-9)

^aActivity score ESKA Consensus 1990, level:

- 1 0 point. Activities of daily living.
- 2 5 points. Manual labor involving lifting. Straight running and sports that do not involve lower limb agility activities.
- 3 15 points. Sports involving lower limb agility activities but not involving jumping, hard cutting or pivoting.
- 4 25 points. Sports involving jumping, hard cutting or pivoting.

Table 3. Re-ruptures and poor subjective knee function related to compartmental localization of the tear

	Medial	Lateral	Total
Number repaired	12	14	26 ^a
Re-ruptures	6	2	8
Failures ^b	6	4	10

^a One patient with bucket-handle lesions of both menisci is omitted.

^b Patients with re-rupture of the repaired meniscus or giving the subjective assessment "poor" are regarded as failures.

intermittent locking or deficiency in knee extension does not rule out non-healing and partial healing or even re-ruptures (Cannon 1991). It therefore seems more reliable to regard even unsatisfactory results as failures. By including patients with a subjective fair or poor assessment we end up with a failure rate of 0.4, which is definitely higher than in the majority of studies. Most studies, however, include a high number of patients with cruciate ligament ruptures which, in turn, underwent surgical reconstruction (Morgan et al. 1991). Cannon (1991) in his study of 88 patients found

an overall satisfactory healing in 81 percent of the cases (verified by an arthrogram or second-look arthroscopy), whereas only 54 percent of isolated meniscus repairs in stable knees healed satisfactorily. Whether these poorer results may be attributed to a predisposition to meniscal tears in this group of patients is unknown.

Rasping of the meniscus rim and introduction of a blood clot in the meniscus rupture were not used in our patients. These procedures seem to enhance healing of the meniscus (Henning et al. 1990) and might have improved meniscal survival in our study. Some authors recommend a more restrictive rehabilitation regime to prevent re-ruptures (Henning 1990, Cannon 1991), but the optimal period of no weight-bear is still unknown. As reported by others (Cannon 1991, Morgan et al. 1991) there was a tendency in our study towards a higher frequency of failures in the medial than in the lateral meniscus.

Few authors (Keller et al. 1987, Sommerlath 1989, 1991) have described knee function and activity levels in patients with survival of the meniscus. In our study 16 of 19 had a good-to-excellent knee function at follow-up which is comparable to the results of Sommerlath (1991); the tendency to a decline in the activity level is also comparable to her results. We used 2 different activity scoring systems. Whereas the ESKA scoring system clearly separates patients in activities with different demands on the knee and gives special credit to jumping, cutting and pivoting sports, known to place the meniscus and the ligaments at the highest risks, the Tegner scale is somewhat less precise. However, there were no differences in the score changes between the 2 systems.

As yet, no prospective randomized study of bucket-handle excision versus fixation of the meniscus, including measures to verify healing, has been undertaken. Whether the long-term advantages of meniscus fixation in stable knees warrants the longer rehabilitation period and higher failure risk remains to be seen.

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