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INTENSIVE PHYSICAL THERAPY AFTER MENISCECTOMY

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ABSTRACT

Fifty six meniscectomy patients were divided into 2 groups. One group (27 patients) was given the standard postoperative physiotherapy and the remainder (29 patients) received intensive physiotherapy. Clinical examination of the knee joint was performed preoperatively and 1, 2 and 4 weeks postoperatively. The patients' age was 36.26 ± 12.34 and 34.00 ± 9.21 years in the two groups respectively. The medial meniscus was removed from 47 patients, the lateral meniscus from 8 patients and bilateral meniscectomy was performed on one patient; no tear was seen in the excised meniscus in 8 cases. The clinical findings for the patient groups did not differ significantly either before or after the operation. The flexion strength of the knee of patients given intensive physiotherapy increased less in these 4 weeks than the flexion strength of the routine therapy group. The range of knee movement of the patients given intensive therapy was still below the preoperative value 4 weeks after the operation. Knee punctures were made more frequently on patients given intensive physiotherapy. Their walking capacity 2 weeks postoperatively was inferior to that of patients given routine physiotherapy, but this difference had disappeared at the 4-week examination.

The isometric quadriceps strength and isotonic strength correlated well. The thigh girth gave no evidence of quadriceps atrophy.

It can be concluded that intensified physiotherapy in meniscectomy patients does not shorten the rehabilitation period.

KEY WORDS: PHYSICAL THERAPY; MENISCECTOMY

Physiotherapy is given routinely as postoperative management in meniscectomy patients. Its aim is to strengthen the thigh muscles and normalise the range of knee movements (6, 10, 12, 15). However, it has also been claimed that intensive physical therapy does not improve the patient's recovery (3, 11). There are few controlled studies on the postoperative rehabilitation of the knee (11). The present investigation was planned to compare the effect of routine and intensified physiotherapy on the recovery of meniscectomised patients.

PATIENTS AND METHODS

The study was conducted at the Department of Orthopaedics and Traumatology, Helsinki University Central Hospital, between May 1, 1973, and October 30, 1974. Of the patients accepted for the study in the course of 12 months, 64 were meniscectomised and 9 were patients on whom arthrotomy was performed for osteochondritis dissecans. The operations were performed by 9 surgeons of the department. Total meniscectomy was carried out on all the patients. Eight meniscectomy cases (5 re-operations for meniscus, one immobilisation in a plaster cast and 2 patients with inadequate clinical information) were excluded from the study, as were the patients with osteochondritis dissecans because of their small number as a group.

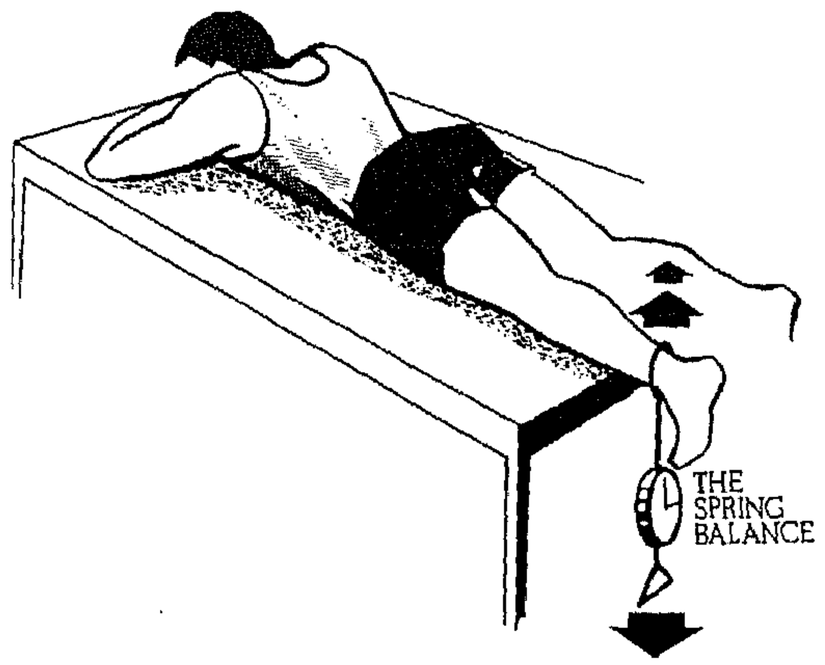
The patients were divided preoperatively into 2 groups by random sampling. The patient was first accepted for the study, and then placed in one of the groups by using random numbers.

Group A: 27 patients (4 women, 23 men) were given the routine physiotherapy of the department once every day.

Standard physiotherapy regimen after knee operations:

1. As far as possible patients with meniscus injury were taught quadriceps muscle setting before the operation;
2. From the first postoperative day onwards, quadriceps setting exercises, active straight leg raising exercises and walking on crutches were practised;
3. Active flexion exercises were performed from day 2—3 onwards;
4. After approximately 2 weeks, or when flexion of the knee joint is at 90 degrees, the crutches were abandoned;
5. Training in walking on stairs, if possible.

The active physiotherapy session is of 15 minutes' duration. Criteria limiting therapy are pain or swelling of the knee. The training programme is stepped up according to the patients'



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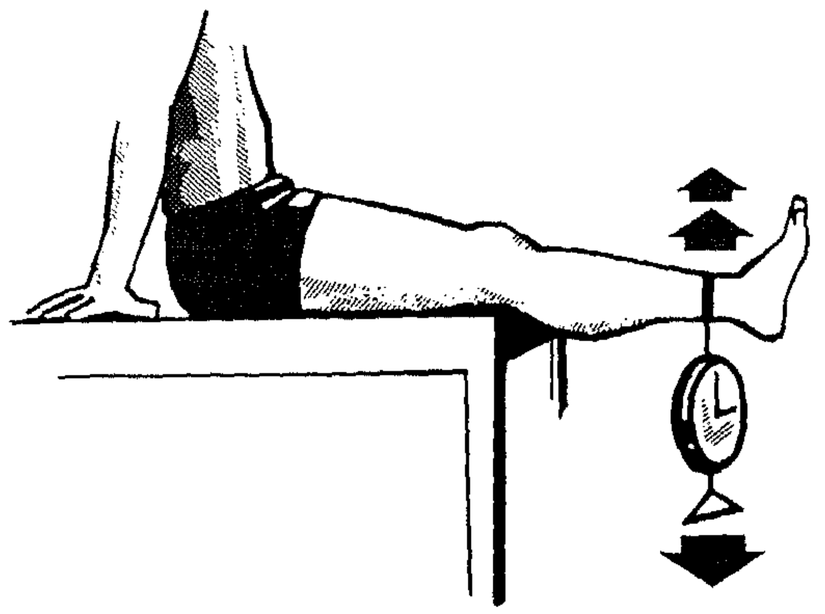

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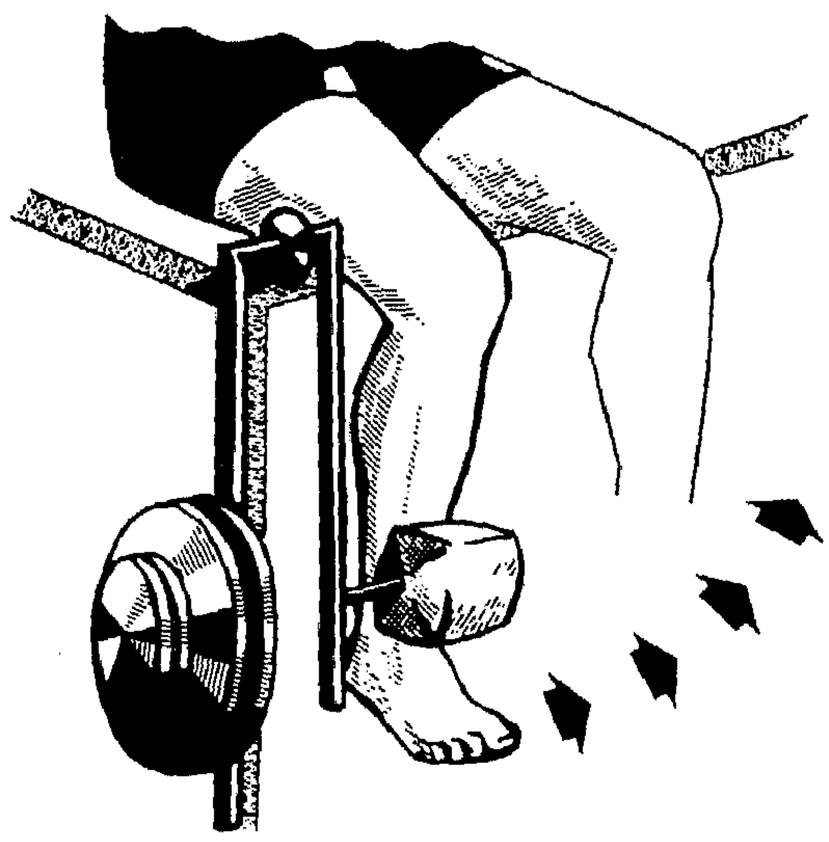

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Fig. 1. The measurements of flexion strength (1 a), isometric quadriceps strength (1 b) and 10-Repetition maximum of the knee (1 c).

1 a. The patient tries to flex the knee against the investigators' counterpull. A spring balance (Salter Model 235, 100 kg × 500 g) is used to measure the strength of flexion.

1 b. The patient keeps his knee in extension against the investigators' counter pull. The same spring balance is used to measure the strength of extension.

1 c. As 10-Repetition maximum is taken the maximum weight that the patient is able to lift 10 times in succession from 90 degrees of knee flexion to full extension. The quadriceps training table (Model Olle Blomqvist 1968) is used for the measurement.

condition and they are advised to continue the same training schedule at home.

Group B: 29 patients (5 women, 24 men) underwent in addition to the above routine programme the same schedule a second time daily under the guidance of a physiotherapist participating in the investigation.

Physiotherapy commenced on the first postoperative day (Group A 1.26 ± 0.75, Group B 1.00 ± 0.00; mean ± S.D.) and continued for 7 days. In addition to the clinical investigation, ergometric studies were made preoperatively on 26 patients (Group A 13, Group B 13) and on all patients 1, 2 and 4 weeks postoperatively. The preoperative values were compared with the postoperative values of the same patients and with all the postoperative values. Needle biopsies were taken from the vastus medialis of the quadriceps muscle before and 4 weeks after the operation from 8 patients in each group.

The healthy and operated limb were measured.

The angle of active and passive extension and flexion angle of the knee were determined.

The girth of the thigh was measured 15 cm above the upper pole of the patella. The knee girth at the level of the upper pole of the patella was used as a measure of the swelling of the knee.

The power of knee flexion was determined with the patient lying prone on a high examination table with his knee in extension and supported with ankle and foot free. When the patient flexed his knee the investigators counterpull was at an angle of 90 degrees to the limb under examination (Fig. 1 a) (4, 16).

The isometric quadriceps strength was determined with the patient sitting on the same examination table with his thigh supported, his leg free and knee extended. The patient kept his knee in extension while the investigator pulled the measuring gauge downwards perpendicularly (Fig. 1 b) (4, 16). A spring balance (Salter Model 235, 100 kg × 500 g) strapped around the patient's ankle was used for the strength measurement.

The 10-Repetition maximum (10-RM) was used to measure the dynamic (isotonic) force using the quadriceps training table (Model Olle Blomqvist 1968; Fig. 1 c). The maximum weight that the patient was able to lift 10 times was taken as the ten-repetition maximum (6).

The patient was also asked for his subjective opinion about the condition of the knee at the time of examination and a note was made of any sensation of pain during the strength measurements.

Ability to walk on the level and on stairs was examined. The working capacity at the time of the examination was recorded.

TABLE 1

Clinical data of meniscectomy patients.

	Group A	Group B
No. of patients	27	29
Age (years; mean ± SD)	36.26 ± 12.34	34.00 ± 9.21
Duration of hospital stay (mean ± SD)	12.04 ± 3.28	13.38 ± 5.87
Duration of sick leave (days; mean ± SD)	67.83 ± 31.49	71.67 ± 48.59
Occupation:		
Manual work	16	13
Sedentary work	11	16

TABLE 2

Cause of injury and type of tear in Group A (routine physical therapy) and Group B (intensive physical therapy) patients.

	Group A	Group B	All patients
Cause of injury:			
1. Work	10	14	24
2. Traffic	3	—	3
3. Sports	5	5	10
4. Other causes	6	6	12
5. No known injury	3	4	7
Side of excised meniscus:			
1. Medial	23	24	47
2. Lateral	4	4	8
3. Bilateral	—	1	1
Intact meniscus	3	5	8
Total number of patients	27	29	56

TABLE 3

Complications in meniscectomy patients. Group A (routine physical therapy) and Group B (intensive physical therapy).

	Group A	Group B	All patients
Haemarthrosis	6	6	12
Superficial wound infection	1	1	2
Joint infection	2	3	5
Phlebothrombosis	1	—	1
Total number of complications	10/27	10/29	20/56

On completion of the entire investigation the appropriate clinical data were analysed using Student's t-test, correlation analysis and the Chi-squared test.

Clinical data on the patients are shown in Tables 1—2. About half of the patients were blue-collar workers. Occupational and traffic accidents were the cause of the meniscus tear in 27 of the 56 cases. 30 patients obtained compensation from an occupational accident insurance, 23 patients were covered by sickness insurance, 1 by traffic accident insurance, 1 by private accident insurance and 1 patient had no insurance security.

The medial meniscus was removed from 47 patients (23 in group A, 24 in group B). There was no tear in 8 cases, 11 patients had a bucket-handle tear. Osteoarthrosis in the knee joint was found radiologically or at the operation in 8 of the 56 patients (4 patients in each group). The interval between the trauma and surgery was of the same order for both groups, the median values being 5 months for both groups (2 days—4 years in group A and 2 days—5 years in group B).

The complications, which were equally frequent in group A and B cases, are listed in Table 3. Infection occurred in 12.5 %. Knee punctures were performed on 8 patients in group A and 15 patients in the intensive physiotherapy group.

RESULTS

The clinical data on the patients presented in Tables 1—2 show no difference between the physiotherapy groups.

Preoperatively the extension range of the affected knee was lower than that of the healthy knee in the patients of Group A ($p < 0.05$). One week after the operation the range of active knee movement was diminished (Figs. 2—3). Four weeks postoperatively the range of knee movement was larger than immediately after the operation, but still significantly smaller than the movement of the healthy knee ($p < 0.01$ in group A, $p < 0.001$ in Group B; Fig. 2 and 3). At 4 weeks the limitation of the range of knee movement of the patients given intensive physiotherapy was still greater ($p < 0.001$) than the preoperative value.

Preoperatively the flexion strength of the affected knee was lower than in the healthy knee in both groups (Fig. 4). One week after the operation the flexion strength decreased especially in group A ($p < 0.05$). Four weeks postoperatively the flexion strength of the operated knee had improved to the level of the healthy limb in group A but in group B the difference from the healthy limb was still significant ($p < 0.001$; Fig. 4). The improvement of flexion power was slightly better in group A than in B ($p < 0.05$).

Preoperatively the 10-RM for the affected knee was lower than in the healthy knee in Group A patients ($p < 0.05$). The isometric

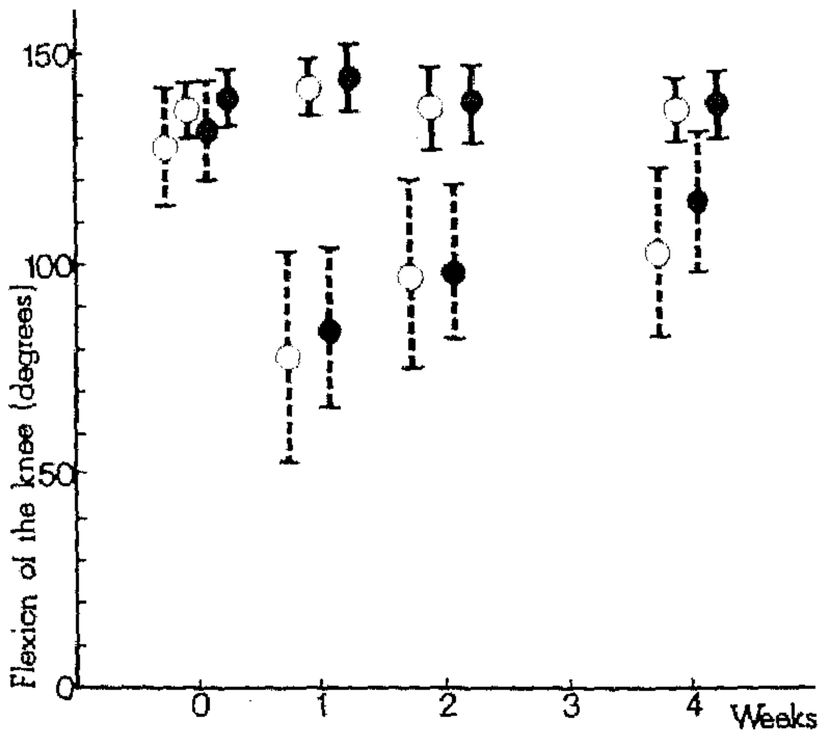

Fig. 2. Flexion of the knees preoperatively (26 patients) and postoperatively (all patients) (○ = Group A patients, ● = Group B patients, - - - operated leg, —— healthy leg, mean values ± S.D.).

Preoperatively the difference between the operated and healthy leg was not significant; it was significant 1 week postoperatively ($p < 0.001$) and also at 4 weeks postoperatively ($p < 0.001$).

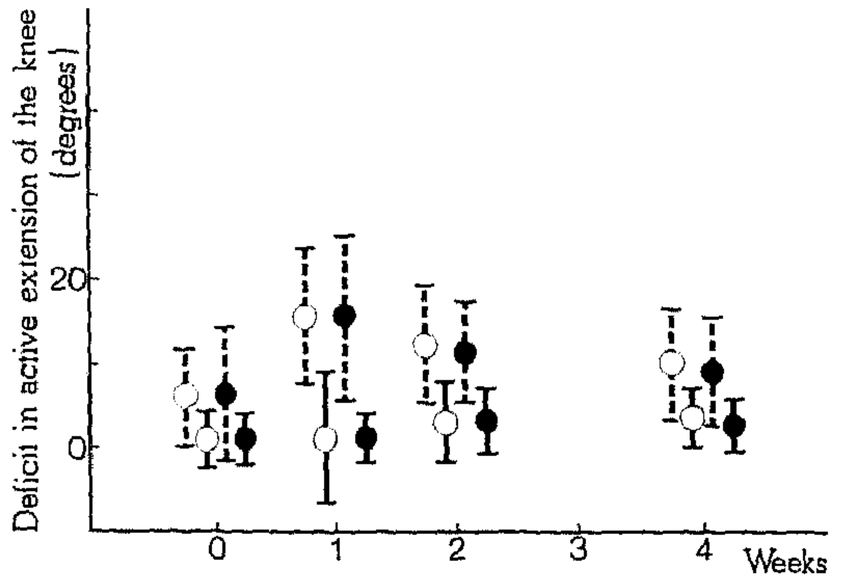

Fig. 3. The deficit in active extension of the knees preoperatively (26 patients) and postoperatively (all patients), (○ = Group A patients, ● = Group B patients, - - - operated leg, —— healthy leg, mean values ± S.D.).

Preoperatively the difference between the operated and healthy leg was just significant ($p < 0.05$) for Group A patients. It was significant for both groups 1 week postoperatively ($p < 0.001$) and also 4 weeks postoperatively ($p < 0.01$ for Group A and < 0.001 for Group B).

quadriceps strength did not differ from the value of the healthy limb in either group preoperatively. One week after the operation the extension strength of the operated limb had decreased especially in group B ($p < 0.05$). Four weeks postoperatively the isometric quadriceps strength of the operated knee increased to the preoperative level, but was still below the healthy limb values. This was seen both when the preoperative measurements were compared with the same group of patients' postoperative values and when the preoperative values were compared with the combined postoperative values (Fig. 5). In the group given intensive physiotherapy the isometric quadriceps strength of the healthy limb increased and was higher than in group A 4 weeks after the operation ($p < 0.025$; Fig. 5). The 10-RM was also lower ($p < 0.001$) in the operated than in the healthy limb 4 weeks postoperatively. The decrease from the preoperative value was just signifi-

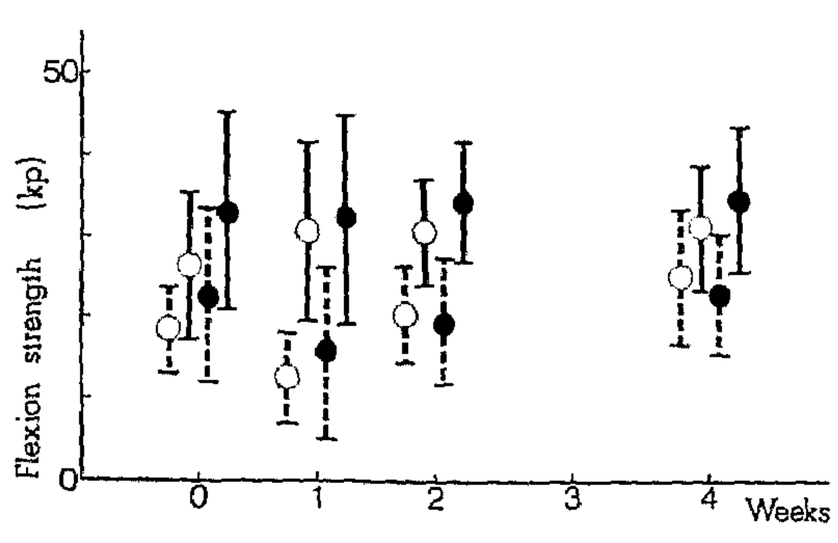

Fig. 4. Strength of the flexor muscles preoperatively (26 patients) and postoperatively (all patients) (○ = Group A patients, ● = Group B patients, - - - operated leg, —— healthy leg; mean values ± S.D.).

The difference between the operated and healthy leg preoperatively was just significant ($p < 0.05$); at 1 week postoperatively it was significant ($p < 0.001$), and 4 weeks postoperatively significant in the Group B patients ($p < 0.001$) and just significant in the Group A patients ($p < 0.05$).

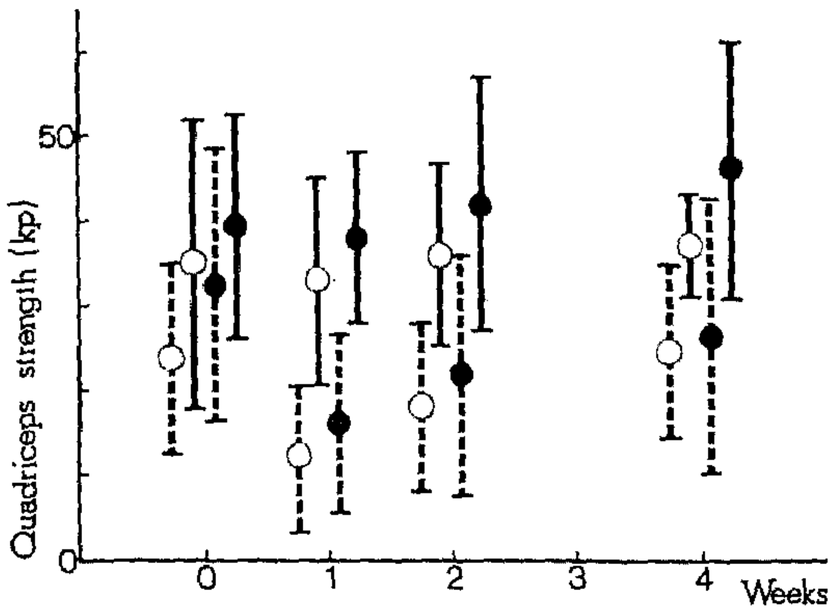

Fig. 5. The isometric quadriceps strength preoperatively = O weeks (26 patients) and postoperatively (all patients). (○ = Group A patients, ● = Group B patients, - - - operated leg, —— healthy leg; mean values ± SD).

Preoperatively the difference between the operated and healthy leg was not significant. One and 4 weeks postoperatively the difference was significant ($p < 0.001$).

cant ($p < 0.05$) in Group B. A strong positive correlation ($r = 0.85$) was established between the isometric quadriceps strength and 10-RM.

One week after the operation the knee girth had increased ($p < 0.05$) indicating an effusion. At the last measurement the knee girth no longer differed significantly from the values of the healthy limb. No differences were seen in the thigh girth compared with the healthy limb either pre- or postoperatively in either group.

Two weeks after the operation 23 of 52 patients could move about without aid; however, 14 of the Group B patients (28) were still using two crutches. The difference from Group A was just significant (X^2-test, $p < 0.025$). Correspondingly one patient of Group A and 8 patients of Group B were still on partial weight bearing after two weeks. Four weeks postoperatively 44 patients out of 53 could get about unaided. Both groups of patients could climb stairs equally well.

48 (22 Group A and 26 Group B) regarded the condition of their knee as good or satisfactory, but 31 patients (9 Group A and 12 Group B) stated that they still felt pain in the operated knee during the strength measurements.

The duration of hospitalisation and sick leave did not differ in the 2 groups. One patient in Group A was placed in lighter work at the end of his sick leave. Two patients in Group A and 4 in Group B received supplementary postoperative physiotherapy after the 7-day regimen.

DISCUSSION

Meniscectomy is one of the commonest orthopedic operations on young persons of working age. At the Department of Orthopaedics and Traumatology, Helsinki University Central Hospital, it is performed on 4 % of the orthopaedic admissions. Physiotherapy has generally been considered to speed up the rehabilitation of the patients (6, 10, 12, 15), but there is not full agreement at this (3, 11). As the supply of physiotherapists is limited, a study of the extent to which physiotherapy should be ordered for the postoperative treatment of meniscectomy patients was felt to be appropriate.

The results for the groups given routine and intensive physiotherapy did not differ significantly either pre- or postoperatively. The postoperative isometric quadriceps strength of the healthy limb of the patients receiving intensive physiotherapy increased in 4 weeks more than that of the patients receiving routine therapy. This may be taken as indicative of the effectiveness of physical therapy. The deficit in knee flexion of the intensive therapy group was still greater 4 weeks postoperatively than the preoperative value, and the flexion strength lower than that of the healthy limb. Two weeks postoperatively these patients also walked less well than the patients receiving routine physiotherapy, but this difference had disappeared after 4 weeks.

In the present series numerous knee punctures were performed. Swelling has previously been reported in 13—30 % of operated knees (6, 7, 14). It was commoner among the intensive therapy patients, which concurs with earlier investigations. The 12.5 % incidence of infections was distinctly higher than the figures reported in previous studies (Appel 4.8 %, Smillie 2/165, Mittelmeier 1/700). According to Appel, postoperative complications do not impair the long-term results of meniscectomies.

The duration of the patients' sick leave was 10 weeks on average. It was 30—60 days in 29 of 53 cases. Sick leave has ranged from 4 to 12 weeks in earlier studies (1, 11, 14). Occupation was not found in the present study to affect the duration of sick leave, but the type of insurance coverage did. Nine of 30 patients with an occupational trauma insurance had sick leave of over 90 days, whereas 2 of 23 patients covered by sickness insurance had a sick leave as long as this. The difference is just significant (χ^2-test, $p < 0.05$). A similar observation has been made regarding patients with burn injuries (9).

The proportion of tears affecting the medial meniscus corresponds to that reported in the literature (1, 7, 13, 14). In spite of a distinct clinical history and arthrography an intact meniscus was removed from 8 patients (14 %). Earlier studies have reported a frequency of 4—15 % (12, 13, 15). The long-term results have been found to be poorer after removal of an intact meniscus (13). According to Appel (1970), postoperative physiotherapy was not found to affect the long-term results after meniscectomy in unselected patients, but if patients with osteoarthrosis were excluded poor results were fewer among the patients given physiotherapy. In the present study osteoarthrosis

was encountered in both groups of patients with equal frequency.

The present study supports Seymour's view that special postoperative physiotherapy does not accelerate the recovery of the patients. Excessive exercize may lead to swelling of the knee and thus to reflex inhibition of the muscles (2, 3, 5). Meniscectomy patients are generally young and active persons who seek themselves to mobilise their knee. Routine intensified physiotherapy does not appear to be indicated for this group of patients.

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