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## Short-term benefit of arthroscopic washout in degenerative arthritis of the knee

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**Abstract** Over a 4-year period, 55 consecutive knee arthroscopies were performed on 54 patients with symptomatic mild to moderate osteoarthritis. There were 30 female patients and the average patient age was 60.9 years. The average follow-up period was 29.6 months. All patients underwent diagnostic arthroscopy and washout. Further procedures including removal of loose bodies and partial meniscal resection were necessary in 19 patients. There were no significant postoperative complications. Thirty-seven patients had subjective improvement in symptoms. The average duration of benefit was 25.5 months. Arthroscopy and appropriate debridement of the degenerative knee results in significant subjective improvement. This relatively minor procedure can delay or indeed obviate the need for reconstructive surgery.

**Résumé** 54 patients souffrant de gonarthrose peu évoluée ont été opérés par lavage arthroscopique, consécutivement sur une période de 4 ans. 30 patients étaient de sexe féminin, l'âge moyen était de 60.9 ans et la durée de suivi était en moyenne de 29.6 mois. Tous les patients subirent un diagnostic par arthroscopie et un lavage. Dix-neuf patients eurent besoin de gestes complémentaires, comme le retrait de corps libres ou la résection partielle d'un ménisque. Il n'y eut pas de complications post-opératoires significatives. On mesura une amélioration subjective des symptômes chez 37 patients. La durée moyenne de cette amélioration fut de 25.5 mois. Nous concluons que de bons résultats subjectifs sont obtenus par une arthroscopie et un lavage du genou affecté. Cette

intervention relativement mineure peut repousser ou même éviter le besoin d'une chirurgie reconstructrice.

### Introduction

Osteoarthritis is a common non-inflammatory condition, which can be found radiographically in over 80% of patients over 40 years of age. The knee is the most frequently affected joint, and the primary and often disabling complaint is pain. Arthroscopic lavage with or without limited joint debridement is frequently advocated as a treatment option to relieve the symptoms of a painful degenerative knee [6]. Our aim was to investigate the results of arthroscopic lavage with limited joint debridement in patients with symptomatic mild to moderate osteoarthritis of the knee by using a standard scoring system, and to establish the duration of any symptom relief obtained. In addition, we sought to determine whether certain preoperative variables were predictive of outcome.

### Patients and methods

We reviewed all patients who had an arthroscopic lavage and/or debridement of their knee joint over a 4-year period. Patients selected for this procedure were those with osteoarthritis whose symptoms were not severe enough to warrant joint replacement but in whom conservative treatment alone had failed and patients with osteoarthritis complaining of non-specific mechanical symptoms out of proportion to their clinical and radiological findings. Specifically, we excluded patients with a preoperative clinical/radiological diagnosis of a meniscal tear or loose body. Fifty-five knees in 54 patients were studied.

The clinical records and operative notes of all cases were reviewed. Radiographs were unavailable for review, as a significant number had been destroyed. We collected data on patient age, sex, weight, symptoms at presentation, duration of symptoms, and history of trauma or previous surgery. All surgery was performed with the direct participation of one of four consultant surgeons.

There were 30 female and 24 male patients ranging in age from 48 to 83 years (mean 60.9 years). The mean weight of all patients was 76.6 kg (range 54–100 kg; male average 81.5 kg, female average 72.3 kg). Patients were followed up for an average of 29.6 months (range 9–51 months).

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Patients were grouped into three categories based on the duration of preoperative symptoms: less than 3 months, 3 to 12 months and more than 1 year. Following their first outpatient appointment, all patients commenced a trial of non-surgical management of their symptoms, with physiotherapy, non-steroidal anti-inflammatories and weight loss (when appropriate). None of the patients responded to these conservative measures.

Knee arthroscopy was performed under general anesthesia in all cases. A tourniquet inflated to 300 mmHg was placed mid-thigh, a 4 mm 30° arthroscope and standard anteromedial and anterolateral portals were used. Intra-articular bupivacaine (10 ml 0.5% Marcaine) was used in 27 knees according to the surgeon's preference. All patients were seen by a physiotherapist postoperatively and were discharged home with crutches until their subsequent outpatient review within 7 days.

All operative findings were recorded: condition of articular cartilage and menisci, ligament integrity, plicae and presence of loose bodies. Articular cartilage degeneration was graded at the time of surgery according to the Outerbridge scale from I to IV. Grade I is softening or blistering of the articular cartilage, grade II indicates fragmentation or fissuring in an area less than 1 cm, grade III if that area is greater than 1 cm, and grade IV changes represent cartilage erosion down to bone. Five separate joint surfaces were considered: medial tibial plateau, lateral tibial plateau, medial femoral condyle, lateral femoral condyle and patello-femoral joint. The knee joint was graded based on the worst joint surface for outcome correlation.

Pre- and postoperative symptoms were obtained from patients' clinical records. In addition, all patients were reviewed in the outpatient clinic or contacted by telephone and interviewed using a standardized questionnaire. The calculation of their postoperative score was based on symptoms at 1 month following the procedure. The duration of pain relief was obtained from the clinical records. All 54 patients were assessed by using the Duke arthroscopy score [16]. This numerical rating system is based on pain and functional activity both pre- and postoperatively. A score of zero indicated no change following the procedure; a score between 1 and 20 was rated as a fair result, 21 to 40 – a good result and 41 to 60 – an excellent result. In addition, patients were asked for a subjective assessment of symptom improvement or deterioration following the procedure. If improvement was reported, the duration of relief was recorded.

The chi-square test was used for comparison of independent proportions. The Students' *t*-test and Wilcoxon rank sum tests were used as appropriate for comparison of independent means. The paired difference *t*-test was used to determine pre- and postoperative score differences. The median duration of pain relief

was determined using the Kaplan Meier method. Statistical analysis was performed using the SAS system. Preoperative variables were correlated with the change in knee score to investigate their value in predicting outcome. A probability value of less than 0.05 was considered statistically significant.

## Results

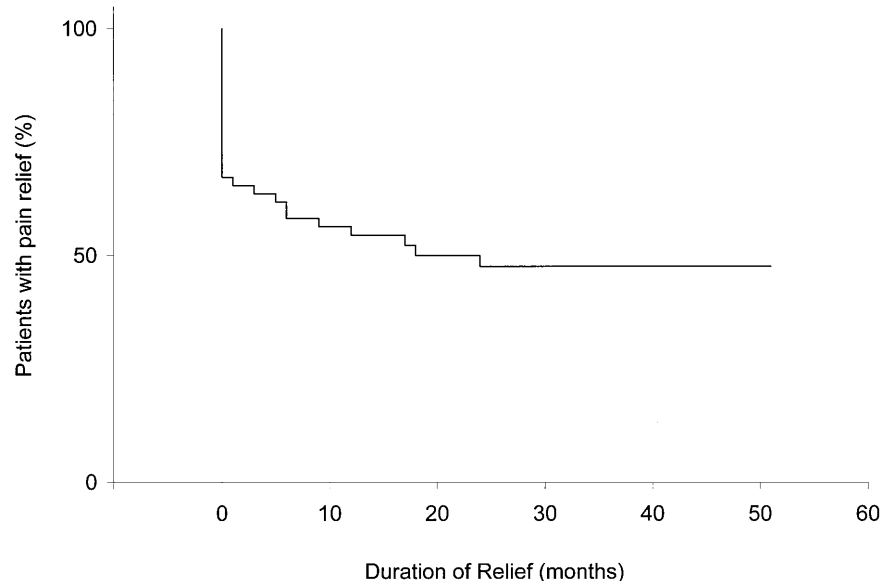
At presentation, 19 patients recalled a history of trauma to the affected knee. Pain was the most frequent complaint (54 knees) followed by swelling ( $n=26$ ), a history of locking ( $n=13$ ) and a feeling of instability ( $n=12$ ). Symptom duration was less than 12 months in almost two thirds of cases ( $n=34$ ).

At arthroscopy, washout was performed in all patients while 19 patients required an additional procedure: removal of loose body (7 patients); debridement of degenerative meniscus (10 patients); partial meniscectomy (2 patients). Intraoperative findings demonstrated multi-compartmental disease in 42 knees. Isolated medial compartment disease was found in 7 patients, patello-femoral joint in 4 knees and lateral compartment in two knees. Meniscal pathology was more marked medially with 5 degenerative and 2 torn menisci compared with 5 degenerative lateral menisci.

Thirty-seven patients reported that their knees had improved following the surgery. The remaining 18 patients reported no change in their symptoms and no patient felt worse following the procedure. Of those patients who subjectively improved, 26 were rated as a good or excellent result according to the knee scoring system, the remainder with only a fair result. Of the 19 patients who had an additional procedure performed at arthroscopy, 13 patients improved. Improvement was reported in a similar proportion of the patients who had washout only performed, 24 of the 36 patients.

The average duration of symptom relief was 25.5 months (range 1–51 months). For all patients the

**Fig. 1** Survival curve showing the duration of relief post-arthroscopy for all cases ( $n=55$ )



**Table 1** Comparison of patients whose symptoms improved with those whose symptoms did not improve

Variable	Improved	Did not improve	P-value
Sex			
Male	18	7	0.49
Female	19	11	
Age			
Mean	61	61	0.82
Range	(50–80)	(48–83)	
Weight			
Mean	77	76	0.72
Range	(64–100)	(54–95)	
Preoperative score			
Mean	22.97	25.94	0.33
Range	(0–50)	(4–38)	
Duration of symptoms			
Less than 3 months	5 (13.5%)	6 (33.3%)	0.16
3 to 12 months	18 (48.7%)	5 (27.8%)	
More than 12 months	14 (37.8%)	7 (38.9%)	
Postoperative score			
Mean	53.38	26.17	0.0001
Range	(24–60)	(4–38)	
Duration of hospital stay			
Mean	1.6	2.7	0.19
Range	(1–4)	(1–16)	

median duration of pain relief was 18 months. The survival analysis (Fig. 1) suggests that patients whose symptoms improve and do not have recurrence by 24 months continue to have improved pain relief indefinitely.

There was no significant difference in age, sex or weight between those who improved and those who did not (Table 1). There was no significant difference in the mean preoperative score between those who improved and those who did not (Table 1). There was a highly significant difference in the mean postoperative score of those who improved and those who did not.

For those whose symptoms improved ( $n=37$ ) there was a highly significant difference in the symptom score pre- and postoperatively (mean difference=30.4; range 3–60;  $t=13.3$ ;  $P=0.0001$ ).

We compared the degree of articular wear observed at arthroscopy to patient outcome. Eighty-five percent of patients with overall Outerbridge scale I or II improved with arthroscopy, 82% of those rated good/excellent, compared with an overall 57% improvement in patients with grades III or IV.

Overall, the average duration of inpatient stay was 1.9 days. The duration of stay was significantly longer in those patients who did not improve following surgery (average 2.7 days) than in those who reported improvement (average 1.6 days); ( $P<0.05$ : ANOVA).

At follow-up, 14 patients had undergone further surgery on their knee after an average of 14.4 months (range 3–21). Eleven of this group had not improved following their arthroscopy. Four patients had a further

knee arthroscopy and washout. The 10 remaining patients underwent a total knee arthroplasty (TKA) after an average of 9.7 months.

Eighteen patients were working prior to arthroscopy. All except one returned to the same job postoperatively. This patient had taken legal action against his place of work. Two patients, who were unable to work preoperatively because of knee pain, had substantial relief from the procedure and were able to rejoin the workforce.

The duration of symptoms at presentation was not predictive of outcome. There were no postoperative complications.

## Discussion

It is accepted that our elderly population is steadily increasing primarily because of improved health care. Osteoarthritis is a disease of this population and consequently we as physicians/surgeons are managing this condition with increasing frequency. When treating symptoms, we commonly follow a logical ladder. Conservative measures, including weight loss, analgesia and physiotherapy have a proven benefit in symptom relief. At the other end of the scale, joint arthroplasty has become readily available for patients with severe disease and joint destruction. There remains a third group of patients whose symptoms do not respond to conservative measures and in whom joint replacement is not warranted. Arthroscopic debridement is a well-documented technique used in the knee joint of such patients, and substantial evidence is available in the literature to support its selective use.

In 1934 Burman et al. [4] advocated joint lavage as a treatment option in painful arthritic knees. The mechanisms by which symptoms are relieved by this procedure are not understood. Removal or reduced concentrations of cartilage debris, loose bodies, crystals, hydrolytic enzymes and inflammatory factors may play a part.

It is unclear whether this treatment alters the natural history of the disease process symptomatically or structurally. Hernberg and Nilsson [9] followed 94 knees with untreated osteoarthritis for 10–18 years. Only 17% of knees improved, 27% remained unchanged, and 56% became worse. The follow-up data to date on patients treated with arthroscopic debridement falls short of 5 years in almost all cases, and there is strong evidence suggesting only short-term benefit from this procedure. In 1978, Bird and Ring [2] reported that arthroscopic lavage resulted in improvement in 93% of patients at 1 week, but only 50% of patients maintained their improvement at 1 month. More recently, Timoney et al. [14] published a long-term follow up of arthroscopically treated knees with advanced osteoarthritis. They reported a 63% success rate but noted a deterioration of results over time. We found that 37 of our 55 cases felt improvement following the procedure for an average of 25.5 months.

Chang et al. [5] felt that arthroscopy was not necessary in patients with early osteoarthritis who did not re-

spond to conservative measures, instead suggesting closed needle joint lavage. However, numbers were small and follow-up short-term. The relief afforded by simple flushing of the knee has also been reported by Watanabe et al. [15], Jackson and McCarthy [11], Jackson and Abe [10] and Dandy [7].

The Duke arthroscopy score is a modification of the Hospital for Special Surgery Knee score devised by Wouters et al. [16]. Their retrospective study of 57 patients showed a high correlation between the knee rating score and patients subjective assessment of improvement. Preoperative variables were correlated with outcome. Pain of less than 3 months' duration, history of twisting injury, locking, and minimal radiographic change predicted a beneficial effect on subjective outcome. The value of preoperative variables in predicting outcome from this procedure has received conflicting reports. However, certain variables have been proven more useful in this respect. Burks [3] summarized that degenerative changes on radiographs are associated with poorer results. Short duration of symptoms and a history of trauma are associated with better results. And finally, non-degenerative meniscal tears have better results than degenerative ones. Baumgaertner et al. [1] demonstrated improved results in patients with a short duration of symptoms, mechanical symptoms, and those with minimal radiographic changes. In contrast, McLaren et al. [13] could find no specific factors that correlated with outcome in his series when he reported 65% improvement.

Overall, reports on arthroscopic treatment of the osteoarthritic knee are difficult to compare. The aggressiveness of the procedure performed through the arthroscope can differ substantially between centers. In general, results of this procedure range from a success rate of 52–72% [1, 8, 12, 13, 16].

In conclusion, we support the use of arthroscopic washout and limited joint debridement in patients with mild to moderate osteoarthritis of the knee whose symptoms are out of proportion to their clinical and radiological findings. Incidental findings such as degenerative meniscal tears and small loose bodies are not unusual. While our observations are of interest, they should be interpreted with caution. Improvements in two-thirds of patients can occur due to a placebo effect. The primary

limitations of this study are that it was retrospective and our numbers were relatively small. We demonstrated that a significant number of our patients benefited from this procedure for a period exceeding 2 years, while a subgroup may benefit indefinitely. Moreover, this is low-risk procedure, which can delay or indeed obviate the need for reconstructive surgery.

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