



## Arthroscopy of the knee in elderly patients : Cartilage lesions and their influence on short term outcome *A retrospective follow-up of 183 patients*

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We reviewed all patients of 65 years and older (n = 183), who underwent a knee arthroscopy between 2004 and 2005. The purpose of our study was to determine the frequency and severity of cartilage lesions and their influence on short-term clinical outcome. Signs of osteoarthritis (OA) were absent or minor on pre operative plain radiographs in 30.5% of patients, but only 5.3% of patients were found during arthroscopy to have no obvious cartilage lesions. WOMAC and KOOS scores did not clearly correlate with severity of cartilage damage, but some WOMAC and KOOS subscales scored significantly lower when cartilage lesions were located on the lateral side. Forty-one patients eventually underwent TKA after a mean period of 14 months.

In conclusion, cartilage lesions were visualized in almost every case even when pre-operative radiographs suggested differently. The higher the Kellgren-Lawrence grade of cartilage lesions on pre-operative radiographs, the higher the risk for a TKA in the short term. Forty-seven percent of patients with Kellgren-Lawrence grade 4 lesions needed a TKA during the time period of the study.

**Keywords :** arthroscopy : knee : cartilage lesions : elderly.

### INTRODUCTION

Questions have been raised in the past years about the benefit of arthroscopy in elderly patients, especially in the presence of cartilage lesions. Two

recently published randomised controlled trials concluded that patients with osteoarthritis of the knee do not benefit from arthroscopic debridement (8,9).

We reviewed all patients 65 years and older who presented with painful mechanical symptoms caused by degenerative meniscal and cartilage lesions and underwent during the years 2004 and 2005, an arthroscopy of the knee in an attempt to postpone total knee arthroplasty (TKA). The purpose of our study was to evaluate the occurrence and severity of cartilage lesions in this group of elderly patients. We also wanted to determine the effect of these lesions on the short term outcome.

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Table I. — Patient distribution

1410 arthroscopies in 2004 and 2005								
183 patients 65 years or older								
38 re-operations at our institution			145 no re-operation : received a questionnaire by mail					
36 TKA	1 UKA	1 arthroscopy	106 patients replied			39 questioned by telephone		
			2 TKA	2 died	102 KOOS / WOMAC	2 TKA	2 died	28 no surgery   7 lost to FU

## MATERIAL AND METHODS

We retrospectively reviewed all patients 65 years and older at the time of surgery, who underwent in 2004 and 2005 an arthroscopic meniscectomy, debridement or chondroplasty at the knee joint. Approval was obtained from the ethics committee. Between January 2004 and December 2005 a total of 1410 arthroscopies were performed for meniscectomy, chondroplasty or debridement in our department. Of these patients, 183 (12.9%) were 65 years old or older at the time of operation (table I). Their mean age was 71.2 years, ranging from 65 to 85 years. The male/female ratio was 68 to 115. The mean follow-up was 38.4 months (range : 26.1 to 49.8 months). The study included review of the patients' files completed with a questionnaire or telephone contact. Four patients had died during follow-up from causes not related to the arthroscopic intervention. These patients were not excluded for statistical analysis as the objective of this study was to determine the frequency and severity of cartilage lesions during arthroscopic surgery.

We were particularly interested to know if any further surgery was performed after the first arthroscopy. Those who did not undergo subsequent knee surgery in our institution (n = 145) were contacted by mail and were asked to fill in a self administered Dutch version of the WOMAC / KOOS and a questionnaire on subsequent surgical intervention at another institution. All patients that did not reply were contacted by phone to establish whether they underwent a second surgical intervention elsewhere. All patients that underwent subsequent knee surgery were excluded for evaluation by KOOS – WOMAC score but were included to determine the severity and frequency of cartilage lesions on pre-operative radiographs and during arthroscopy.

Cartilage lesions were evaluated on pre-operative plain weight bearing radiographs of the knee using the Kellgren-Lawrence (KL) score (6). The KL score was designed to evaluate the severity of osteoarthritis (OA) on plain radiographs. The score ranges from 0 (no OA) to 4 (severe OA). Worst score and location of the worst

cartilage lesion were noted (medial, lateral, patello-femoral or tri-compartmental). Intra operatively, cartilage lesions were scored using the Outerbridge classification (10). The Outerbridge classification ranges from 0 (no cartilage lesions) to 4 (severe cartilage lesions). The worst grade and location (medial, lateral, patello-femoral or tri-compartmental) noted during arthroscopy were noted. The presence of degenerative tears of the medial or lateral meniscus was noted as encountered during arthroscopy.

Short-term results were evaluated using two self-administered questionnaires : the WOMAC Osteoarthritis Index (Western Ontario and Mc Master Universities Osteoarthritis Index) and the KOOS (Knee Osteoarthritis Outcome Score).

The WOMAC Osteoarthritis Index is a scoring system designed to evaluate function in patients with osteoarthritis of the hip or knee (3). The WOMAC uses 24 questions to evaluate 3 subscales (pain, joint stiffness and disability) of the hip or knee function. Each subscale ranges from 0 (poorest score) to 100 (best score). The KOOS is an extension of the WOMAC – it includes the original questions of the WOMAC Osteoarthritis Index and is a knee-specific scoring system (11,12). The KOOS includes 42 items separately scored in five subscales (Pain ; Symptoms ; Activities in daily living (ADL) ; Function in sport and recreation (FSR) and knee related Quality of life (QOL)). Each subscale is scored from 0 (worst) to 100 (best). The Dutch version of the KOOS has been validated for osteoarthritis and TKA (4).

All arthroscopies were performed by, or under supervision of one of the three senior authors (JVL, HVDN, JB). The procedure was performed in day care under general or epidural anaesthesia and under tourniquet exsanguination. We used a 4mm 30° arthroscope, standard arthroscopic working instruments and a shaver. Standard anteromedial and anterolateral portals were made. First, menisci and cartilage lesions in the three compartments were evaluated. Loose, degenerative meniscal flaps were removed and a stable rim was re-established. Loose and unstable cartilage flaps were removed with a shaver in order to obtain a stable

chondral layer. Hypertrophic synovium was removed with a shaver. Microfracturing was not used in this group. Any remaining debris in the joint was washed out with one litre of saline. Crutches were used when needed during the first week. Follow-up was scheduled at 2 and 6 weeks and further as necessary.

### Statistic analysis

Statistical analysis was performed by the centre of biostatistics at the School of Public Health. Using Kaplan-Meier estimates, a curve was constructed to illustrate the cumulative percentage of patients with a TKA as a function of time since arthroscopy. Kaplan-Meier curves were compared between the different Outerbridge and Kellgren Lawrence grades using a log-rank test. A Cox regression model was used to obtain estimates for hazard ratios and to combine the effects of the maximal grade and the location (medial, lateral, patello-femoral or tricompartmental) of the highest Outerbridge grade and KL score. Mann-Whitney U and Kruskal-Wallis tests were used to compare the three WOMAC and five KOOS subscales between respectively two and more than two groups. All reported p-values are two-sided and considered significant if  $p < 0.05$ . If more than two groups were compared, a Kruskal-Wallis test was performed, followed by all pair wise Mann-Whitney U tests.

## RESULTS

The location and severity of the maximal cartilage lesions demonstrated on pre-operative radiographs and observed during arthroscopy are shown in table II and III. Ninety-six patients had a degenerative tear of the medial meniscus, 9 patients had a degenerative tear of the lateral meniscus and 54 patients had a degenerative tear of both menisci.

Cartilage damage was worse on intra-operative evaluation than was suspected on pre-operative radiographs (table III). Pre operative plain radiographs showed no or minor signs of OA (KL grade 0 and 1) in 30.5% of our patients ; however during arthroscopy only 5.3% of patients remained without obvious cartilage lesions (Outerbridge 0 and 1).

The total number of patients who eventually underwent knee arthroplasty was 41 (22.9%), including 40 TKA's (36 performed at our department and 4 elsewhere) and one unicompartmental

Table II. — Location of cartilage lesion on pre-operative radiograph and during arthroscopy

	Radiographs	Arthroscopy
No cartilage lesion	13.0%	4.7%
Lateral	10.4%	7.1%
Medial	60.4%	55.9%
Patello-femoral	11.0%	6.5%
Tricompartmental	5.2%	25.9%

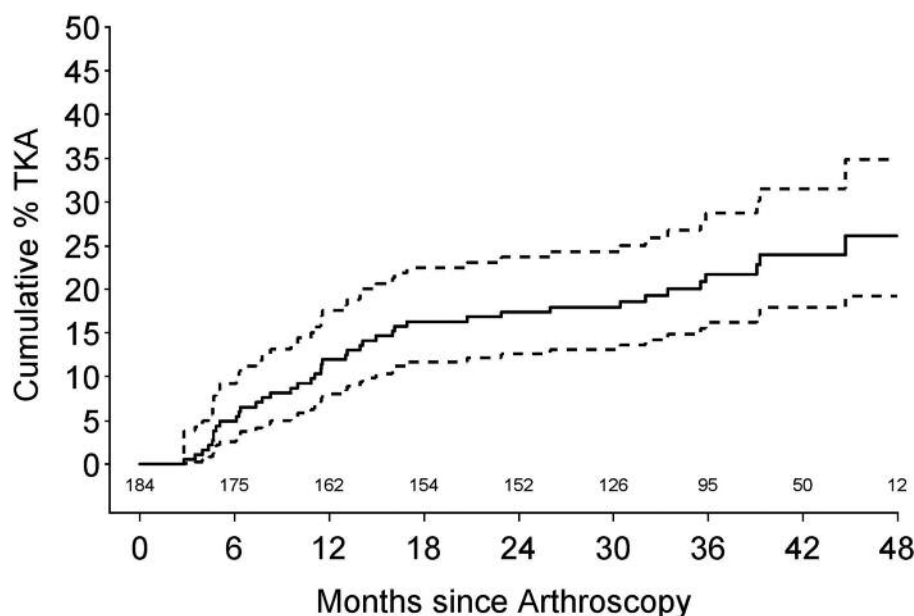
Table III. — Maximal grade of cartilage lesion on pre-operative radiograph and during arthroscopy

	K/L	Outerbridge
0	13.0%	4.7%
1	17.5%	0.6%
2	18.8%	19.4%
3	35.7%	31.2%
4	14.9%	44.1%

knee arthroplasty. One patient underwent a revision arthroscopy. The mean time between arthroscopy and arthroplasty was 14 months (range 3-39 months). The Kaplan-Meier estimate of the cumulative percentage of patients with a TKA as a function of the time since the arthroscopy is shown in figure 1. The percentage of patients that had a TKA and the cartilage condition (KL and Outerbridge) are compared in table IV.

A Cox regression distinguishing between the 5 KL degrees (0 – 4) of OA (fig 2) demonstrates that the risk for a TKA significantly increases with an increasing KL grade. This correlation was not found for the Outerbridge grade of intra-operative observed cartilage lesions (fig 2). A Cox regression model with the effect of location of maximal cartilage damage on pre-operative radiographs as well as during arthroscopy showed no effect on the risk for a TKA .

A self administered Dutch WOMAC - KOOS form was sent to 145 patients and returned by 106 (73.1% response rate). Two of these reported having had a TKA elsewhere on their form, and two questionnaires were returned by family of the patient, reporting the patient died. More than 50% of patients did not fill in the subscale of sports



**Fig. 1.** — Kaplan-Meier estimate of the cumulative percentage of patients with a TKA as a function of the time since the arthroscopy. The dotted lines represent the 95% confidence interval for the percentage. The numbers at the bottom of the figure denote the number of patients the curve is based on at specific points in time. For example, the cumulative percentage of TKA after 6 months equals 4.9% (CI : 2.6%-9.2%), after 1 year 12% (CI : 8.0%-17.6%), after 2 years 17.4% (CI : 12.6%-23.7%), after 3 years 21.7% (CI : 16.2%-28.7%) and after 4 years 26.1% (CI : 19.2%-34.9%).

**Table IV.** — Percentage of patients that received a TKA for the different degrees of cartilages lesions on pre operative radiograph (KL grade) or during arthroscopy (Outerbridge grade)

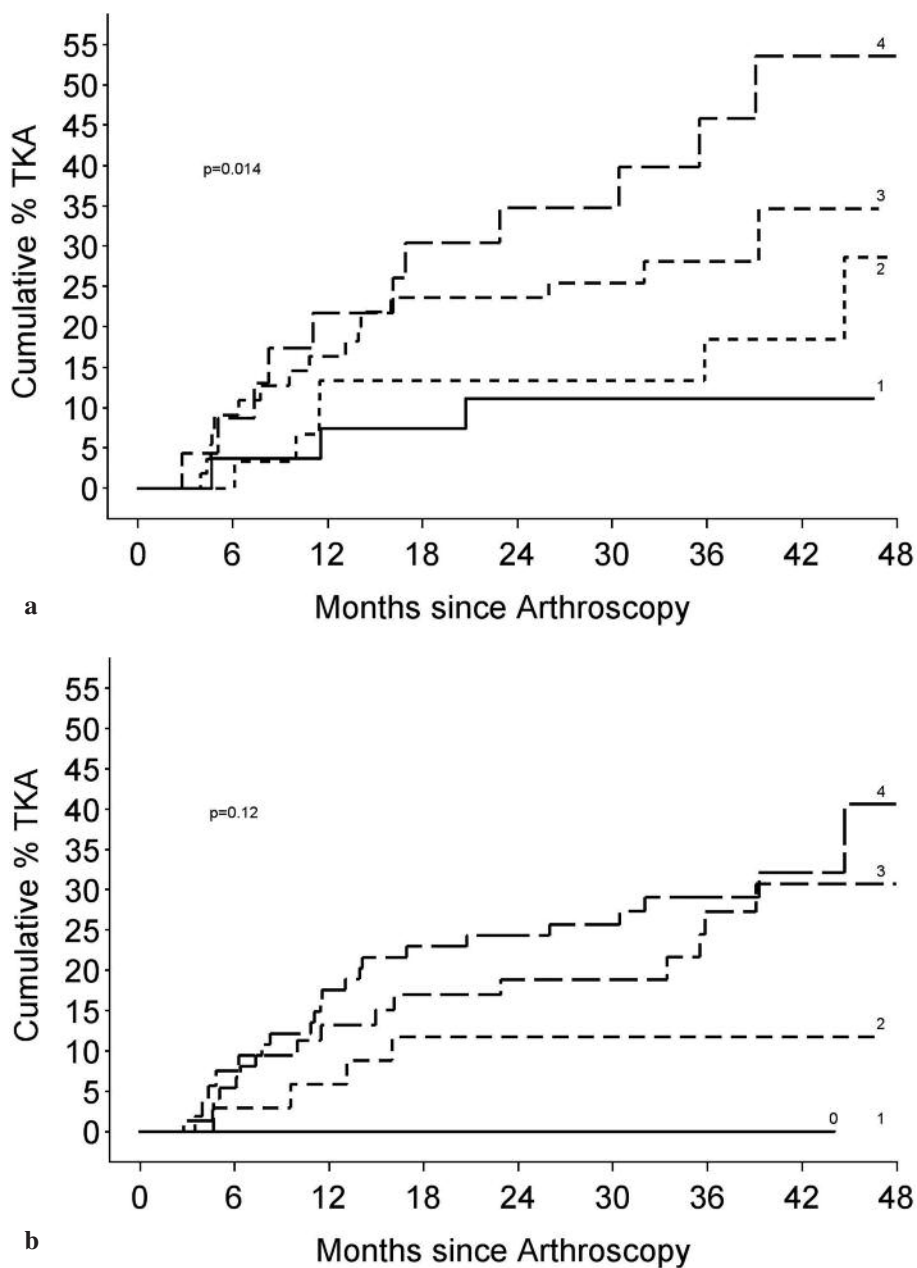
	KL grade	Outerbridge grade
Gr 0	10.0%	0.0%
Gr 1	11.1%	0.0%
Gr 2	20.7%	12.5%
Gr 3	29.1%	26.4%
Gr 4	47.8%	30.7%

activity score in the Dutch KOOS form. This part of the KOOS was left out for further evaluation. All patients who did not return their WOMAC - KOOS form (39 patients) were contacted by phone and asked whether they underwent any subsequent surgical intervention elsewhere. Of these, two died from causes not related to the surgery. Twenty-eight patients did not have any revision surgery, two patients had a total knee arthroplasty elsewhere and seven were lost to follow-up (3.8%).

The mean WOMAC and KOOS scores for the group of 106 patients are shown in table V. Statistical analysis was performed to detect differences in WOMAC and KOOS, between the different KL and Outerbridge grades and locations of maximal cartilage lesions. We found no significant correlation of post-operative WOMAC at evaluation and KL grades or Outerbridge grades. Similarly, we found no significant correlation of post-operative KOOS at evaluation and KL grades. However, when the maximal cartilage lesion was located in the lateral compartment on pre-operative radiographs, patients scored significantly lower on the WOMAC disability subscale and the KOOS ADL score. A significant decrease was seen in KOOS symptoms and QOL scores when the Outerbridge grade raised.

## DISCUSSION

We studied a specific group of patients 65 years old or older with a painful knee and variable



**Fig. 2.** — Kaplan-Meier estimate of the cumulative percentage of patients with a TKA as a function of the maximal Kellgren Lawrence grade (fig 2a) or maximal Outerbridge grade (fig 2b). The p-values refer to the log-rank test comparing the five groups of patients.

cartilage lesions on radiographs. They received a routine trial of conservative treatment including NSAID's, weight reduction, physical therapy, chondro-supplementation, infiltration with hyaluronic acid or corticoids. When conservative treatment

failed, operative treatment was proposed (arthroscopy or arthroplasty).

The decision to perform a TKA under these circumstances depends on the severity of clinical symptoms and the radiographic stage of OA. We



Table V. — Mean KOOS and WOMAC scores of the 106 patients that did not undergo any further surgery and returned the questionnaire

	mean	SD	min	max
KOOS pain	75.0	22.9	19.4	100.0
KOOS symptoms	77.5	20.3	28.5	100.0
KOOS ADL	72.7	24.5	13.2	100.0
KOOS QOL	59.3	28.4	0.0	100.0
WOMAC pain	78.4	21.6	30.0	100.0
WOMAC stiffness	69.4	27.1	0.0	100.0
WOMAC disability	72.2	24.6	13.2	100.0

found that 30.5% of our patients presenting with none or minimal cartilage lesions (KL grade 0 or 1) on preoperative radiographs did not warrant a TKA. Approximately 10% of these patients, however, had Outerbridge grade 3 or 4 lesions during arthroscopy and TKA eventually appeared as a reasonable therapeutic option. Magnetic resonance imaging can detect cartilage lesions but, as described by Friemert *et al* (7), arthroscopy of the knee is still more reliable.

Arthroscopic debridement is often performed in elderly patients, when all conservative treatment options have failed and both patient and physician attempts to postpone TKA. In our study 41 patients (22.9%) underwent a knee arthroplasty with a mean delay of 14 months after arthroscopy, for persisting symptoms. They were considered as treatment failures. Kelly (7) stated that patient selection probably remains one of the most important criteria to obtain good results with arthroscopy of the knee in elderly patients. Our data suggest that patients with severe cartilage lesions noted at arthroscopy have a higher probability for a TKA. However more than 50% of KL grade 4 lesions did not need a total knee arthroplasty and we were not able to predict which patients within this group were more likely to eventually undergo a TKA. Some authors have reported a lower failure rate of arthroscopy and a lower conversion percentage to TKA, such as Aaron *et al* (1) 15% and Wai *et al* (13): 18.4%, –, but their study group was either younger (1,13) or the cartilage stage was better (1) or the grade and location of the cartilage damage were not reported (13).

Several studies were performed to examine the benefit of arthroscopic debridement of the knee. Moseley *et al* (9) found no benefit of arthroscopic debridement as compared with sham further surgery in a specific group of primarily male veterans. They made no distinction between the different grades of cartilage lesions. We agree with Aaron *et al* (1) that arthroscopic debridement has a positive effect in patients with mild arthritis, but not in severe arthritis. When KL grade 4 lesions were shown, 47.8% of our patients finally had a TKA.

Widuchowski *et al* (14) reported cartilage lesions in 60% of patients with a mean age of 39 years in a group of 25 124 knees. Aroen *et al* (2) report a similar prevalence of 66% in their group of 993 consecutive arthroscopies with a mean age of 35 years. Both authors found a predisposition of the medial compartment, as was found in our study. Since our study group was older – 65 and older (mean age of 71.2) – we found a considerably higher percentage of cartilage lesions (94.7%).

Evaluation of pre-operative plain radiographs using the Kellgren Lawrence score was useful in predicting the risk for early conversion to a TKA. We have chosen to use the grade and location of maximal chondral lesion to compare our patients as this seemed clinically more relevant than the method used by Moseley *et al* (9). With his method a patient with KL grade 1 lesions on the three compartments would be scored the same as a patient with a KL grade 3 lesion on the e.g. the medial compartment only. These two patients however most probably are clinically completely different entities.

No clear relation was found between the Outerbridge grade and the risk for a TKA. However patients with moderate and severe cartilage lesions (Outerbridge grade 3 and 4) tended to score worse on KOOS symptoms and quality of life scores when compared with patients with Outerbridge grade 1 and 2 lesions. Although scores for these two subscales were significantly lower they did not lead to a higher risk for a TKA.

The Dutch version of the KOOS (5) we used has been proven valuable to evaluate patients with moderately osteoarthritic knees ; it was less valuable to score patients with severe osteoarthritis. The subscale for function in sports and recreation (FSR) seems irrelevant for scoring the functional status of the knee in this specific group of elderly patients : it was not completed in more than 50% of the cases. The FSR subscale includes five sport-related questions. The patient is questioned about the degree of difficulty (none to severe) he experiences while squatting, running, jumping, twisting or kneeling. The general comment of our patients was that they did not perform the questioned activities and so could not answer this question. In this specific group of elderly patients with cartilage lesions the WOMAC might be a better instrument to evaluate the function.

Due to the retrospective character of our study no pre operative WOMAC and KOOS scores were available to compare with the post operative outcomes. Any conclusion about a possible beneficial effect of arthroscopic debridement cannot therefore be drawn from this study.

## CONCLUSION

In this study, cartilage lesions were found at arthroscopy of the knee joint in almost every one of 183 patients 65 years old or older, although this could not be anticipated, based on pre-operative radiographs. The degree of cartilage damage noted intra operatively was not found to be predictive of the risk for having to undergo TKA. However, the higher the KL grade of cartilage lesions on preoperative radiographs, the higher was the risk that the patient would need a TKA in the near future.

Almost 50% of patients with KL grade 4 had a TKA within a few years. Surgeons and patients should be aware of this risk.

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