

# The effect of previous arthroscopic surgery on total knee arthroplasty outcomes and complication rates

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## Abstract

**Aim:** This study aimed to evaluate the effect of previous arthroscopic surgery on total knee arthroplasty outcomes and complication rates.

**Material and Methods:** This retrospective study included patients who underwent total knee arthroplasty due to grade 4 osteoarthritis, according to the Kellgren-Lawrance classification system in a tertiary hospital, between January 2012 and December 2016. The patients were divided into two groups according to whether or not they had undergone previous knee arthroscopy. The arthroscopic procedure included degenerative meniscus tear subtotal excision and synovectomy. The data of the two groups were compared. Outcome measures were the visual analog scale, McMaster Universities Osteoarthritis Index, Knee Society scoring system and knee range of motion.

**Results:** The previous arthroscopy-free group comprised 94 patients (35 males, 59 females), and the previous undergoing arthroscopy group included 73 patients (23 males, 50 females). The mean age of previous arthroscopy-free group was  $63.12 \pm 2.8$  years (range, 57 to 68), and the mean age of previous undergoing arthroscopy group was  $62.42 \pm 3.9$  years (range, 55 to 73). The groups were similar in terms of age, gender, body mass index, follow-up periods, sides, and complications ( $p > 0.05$  for all). In assessments at the end of 4 years, the groups were similar in respect of visual analog scale, McMaster Universities Osteoarthritis Index, Knee Society scoring system and knee range of motion.

**Conclusions:** The results of this study showed that clinical outcomes and complications were similar in patients with primary total knee arthroplasty and no previous procedure and those who had previously undergone knee arthroscopy. In the light of these preliminary results, previous knee arthroscopy has no negative effect on the outcomes of total knee arthroplasty and complication rates.

**Keywords:** Arthroscopic knee surgery; clinical outcomes; primary total knee arthroplasty

## INTRODUCTION

Total knee arthroplasty (TKA) is the mainstay of surgical treatment for osteoarthritis of the knee (1). TKA surgery decreases the negative symptoms of osteoarthritis and pain, increases range of motion (ROM), and improves independent movement and quality of life (2, 3). Arthroscopy is another surgical procedure, which is a valuable tool to treat mechanical symptoms associated with earlier stages of knee osteoarthritis and to achieve good clinical results (3). Furthermore, arthroscopy is a minimally invasive operation performed for minor surgical trauma, which reduces morbidity and shortens hospitalization compared to other surgical procedures (3). The main question is, will the knee arthroscopy procedure applied affect future knee arthroplasty results? In previous studies, it has been reported that if the knee procedure is applied before TKA, it may cause poor results. (3-5). Contrary to this view, there are also studies reporting no

negative effects (6, 7). There are also studies reporting that negative effects are seen when there is a short time interval between the two procedures, but no negative effects appear as the time interval is extended (3, 8). Another reported advantage is that arthroscopic methods improve clinical symptoms and postpone the intervention of TKA. (9-11). However, this issue is still controversial (3, 6-8). The hypothesis of this study was that previous knee arthroscopy would not adversely affect TKA clinical and functional outcomes as well as complication rates. Therefore, it was aimed to evaluate the effect of previous arthroscopic surgery on TKA outcomes and complication rates.

## MATERIAL and METHODS

### Study design and participants

Approval for this retrospective study was granted by the Local Ethics Committee (58-910 / 06.2020). Patients who

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underwent TKA due to grade 4 osteoarthritis according to the Kellgren-Lawrance classification system (12) in a tertiary hospital between January 2012 and December 2016, were enrolled. Inclusion criteria were patients whose data at the end of follow-up were not missing; and had primary TKA operation. Exclusion criteria were TKA due to malign and local aggressive cancers, cartilage lesions, osteonecrosis, previous ligamentous or osseous injury, other arthroscopic or open surgery, knee disease secondary to infectious or rheumatological disorders and cruciate retaining prosthesis to obtain more homogeneous group. The patients who underwent TKA were divided into two groups as those who had mechanical symptoms due to degenerative meniscus tear and had knee arthroscopy and those who had not. The arthroscopic procedure included degenerative meniscus tear subtotal excision and synovectomy.

#### Data collection and assessment tools

The data were obtained from the patient files. Clinical and demographic properties (age, gender, body mass index [BMI], follow-up period, and complications) were recorded. Outcome measures were the visual analog scale (VAS) (13), McMaster Universities Osteoarthritis Index (WOMAC) (14), Knee Society scoring system (KSS) (15) and knee range of motion (ROM) and were measured at preoperatively and last follow-up after the 4th year. Records of VAS scores for pain were collected and compared between the groups. VAS is a well-known, validated instrument which allows patients to score their daily pain. The WOMAC scale has been extensively tested for validity, reliability, viability and reactivity to change over time. KSS covers motion range, alignment, stability and pain. With the patients in a supine position, a long-arm goniometer was used to assess active-assisted knee extension and flexion range of motion. Outcome measurements were performed by a senior orthopedic surgeon, who was blinded to the study.

#### Surgical method

The procedures were administered under spinal or epidural anesthesia with a standard medial para-patellar surgical approach by the same surgical team (the same senior surgeon) with the patient in a supine position. A cemented and posterior-stabilized (PS) (Smith and Nephew ®) TKA prosthesis was used in both groups. In the surgical procedure, the femur was cut using an intra-medullary guide with the goal of cutting the bone at 5-7 ° valgus and 3 ° external rotation. The proximal tibia was cut using an extra-medullary guide with the goal of cutting the bone perpendicular to the tibia axis. Osteophyte excision was applied to the patella. All patients were encouraged to be mobilized one day after the surgery. Crutches were recommended, and weight-bearing was permitted as tolerated. All patients were clinically evaluated every 2 weeks, and radiologically evaluated every 4 weeks for 12 weeks. Follow-up was then continued every 6 months, up to 4 years.

#### Statistical analysis

Data obtained in the study were analysed statistically using SPSS vn. 16 software (SPSS Inc., Chicago, IL, USA). The normal distribution of the data was checked using

the Kolmogorov Smirnov test and histograms. Descriptive data were stated as mean, standard deviation, median, number, or percentage. Baseline and postoperative data were compared using the Paired t test or Wilcoxon signed-rank test. Between-group comparisons were made using the Student's t test or Mann Whitney U test. Categorical variables were compared using the Chi Square Test or Fischer's Exact Test. A value of  $p < 0.05$  was accepted as statistically significant. In the calculation of the post hoc sample size, the power of the study with 0.05 alpha value was found to be over 80 %. The standard effect size for quantitative data was set at 0.81 % and the power of the study was 99 %.

## RESULTS

Table 1. Demographical features of the groups

Variables	previous arthroscopy-free group (N=94)	previous undergoing arthroscopy group (N=73)	P value
Age (year)	63.12 ± 2.8	62.42 ± 3.9	0.193
Gender			
Male	35 (37.2)	23 (31.5)	0.441
Female	59 (62.8)	50 (68.5)	
BMI (kg/m <sup>2</sup> )	26.94 ± 3.2	27.69 ± 2.0	0.070
Follow-up period (months)	50.87 ± 2.4	51.12 ± 2.5	0.521
Side			
Right	38 (40.4)	29 (39.7)	0.927
Left	56 (59.6)	44 (60.3)	

Data are given as mean ± standard deviation or n, (%)  
BMI: Body mass index

Table 2. Comparison of the groups in terms of clinical and functional parameters

Variables	previous arthroscopy-free group (N=94)	previous undergoing arthroscopy group (N=73)	P value
VAS			
Preoperative	8.22 ± 0.8	8.53 ± 0.9	0.077
4 <sup>th</sup> -year control	1.37 ± 0.9	1.52 ± 1.0	0.336
WOMAC			
Preoperative	76.76±5.8	77.79 ± 6.1	0.264
4 <sup>th</sup> -year control	14.48± 7.0	15.11 ± 8.2	0.595
KSS			
Preoperative	35.65± 9.8	35.73 ± 9.6	0.959
4 <sup>th</sup> -year control	85.72± 7.0	84.92 ± 7.0	0.466
Knee ROM (°)			
Preoperative	109.66± 7.3	109.19 ± 7.3	0.683
4 <sup>th</sup> -year control	117.27± 7.2	115.25 ± 7.5	0.080

The data are given as mean ± standard deviation or n, (%); Bold p values are significant VAS: Visual analog scale; WOMAC: McMaster Universities Osteoarthritis Index; KSS: Knee Society scoring system; ROM: Range of motion;

The previous arthroscopy-free group comprised 94 patients (35 males, 59 females) with a mean age of  $63.12 \pm 2.8$  years (range, 57 to 68 years). The previous undergoing arthroscopy group included 73 patients (23 males, 50 females) with a mean age of  $62.42 \pm 3.9$  years (range, 55 to 73 years). The groups were similar in terms of age, gender, BMI, follow-up periods, sides, and complications ( $p > 0.05$  for all) (Table 1 and 3).

Compared with baseline; the VAS, WOMAC, KSS, and knee ROM values improved significantly in both groups ( $p < 0.001$  for all). In the assessments made at the end of 4 years, the groups were similar in respect of VAS, WOMAC, KSS values, and knee ROM (Table 2).

**Table 3. Complications of the groups**

Variables	previous arthroscopy-free group (N=94)	previous undergoing arthroscopy group (N=73)	P value
Deep infection	2 (2.1)	1 (1.4)	0.594
Contracture	0 (0.0)	1 (1.4)	0.437
Revision	2 (2.1)	2 (2.7)	0.589
Patellar tendon avulsion	0 (0.0)	0 (0.0)	N/A
Periprosthetic fracture	1 (1.1)	0 (0.0)	0.563

Data are given as mean  $\pm$  standard deviation or n, (%)

## DISCUSSION

The purpose of this study was to evaluate the effect of previous arthroscopic surgery on TKA outcomes and complication rates. Two main findings emerged from this study. First, clinical outcomes and complication rates were similar between both the primary TKA group and the group that had undergone previous arthroscopy. Second, TKA surgery showed satisfactory clinical and functional outcomes. It was seen that while both VAS and WOMAC values decreased significantly, KSS and knee ROM values increased.

In previous studies, it has been reported that if a knee procedure is applied before TKA, it may cause poor results (3-5). It has been suggested that prior knee surgery leads to inferior postoperative clinical and functional outcomes as well as postoperative primary TKA complications (3). Contrary to these views, there are also studies reporting that there are no negative effects (6,7). In a retrospective review of 60 patients who had at least two previous arthroscopic operations was reported that, KSS pain and function improved to 92 and 89, respectively, with no difference from the control group (5). However, that study had a relatively short follow-up duration of 3 years.

In a study was found that, previous arthroscopic patients had a mean postoperative KSS of 88 points with an 8% complication rate (16). For patients with TKA on a native knee, the mean postoperative KSS was 85 points, with a complication rate of 7%. The authors concluded that the clinical outcomes or complication rates of patients

in the two groups were not significantly different. There are also studies reporting that negative effects are seen when there is a short time interval between the two procedures, but no negative effects appear as the time interval becomes longer (3,8). Piedade et al. (3) found no correlation between the interval between arthroscopy and TKA and complications or failures with a mean interval of 4 years. In another study was reported that, when TKA was performed within six months of ipsilateral knee arthroscopy, there were increased rates of postoperative infection, stiffness, and venous thromboembolism, but this effect was time-dependent (8). In this study, the results were similar between the groups after six months. In the literature the most common previous surgery in these TKR was AKS (86 %) (17). But there are a limited number of studies in the literature on whether previous arthroscopic surgery has a negative effect on the results of total knee arthroplasty, and this issue is still controversial. In the current study, clinical outcomes were similar between the two groups with a follow-up of 4 years. A. Gu et al. (18) was reported that prior knee arthroscopy is significantly associated with increased 2-year TKA revision rate. In our study, the revision rates at the end of 4-year follow-up were similar between the two groups. Additionally, there was no significant difference in respect of complications between the previous undergoing arthroscopy group and the previous arthroscopy-free group.

TKA has been well documented to provide significant pain relief and functional improvement (2,19). Cho et al. (20) also stated in their study that there was no significant difference between the clinical results of these two methods. As can be seen, there are numerous studies in the literature reporting successful results related to TKA with long follow-up periods (21-24). In the current study, a significant improvement was determined in all the clinical and functional evaluations in line with the literature.

## LIMITATIONS

The retrospective design was the main limitation of this study. Although the follow-up period of 4 years is acceptable compared with previous studies, it could have been longer. Other limitations were the absence of early and mid-term results of patients and the lack of radiological parameters.

## CONCLUSION

In conclusion, the results of this study demonstrated that clinical outcomes and complications were similar in patients with primary TKA only and in those who had previously undergone knee arthroscopy. In the light of these preliminary results, previous knee arthroscopy does not negatively affect the outcomes of TKA and complication rates.

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