

# Patients' preoperative perspectives concerning the decision to undergo total knee arthroplasty and comparison of their clinical assessments

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**Abstract.** [Purpose] The aims of our study were, 1. to assess pain, limitation of movement ability, and functionality in osteoarthritis patients scheduled to undergo total knee arthroplasty, 2. to determine if pain (Group 1) or function loss (Group 2) has a greater influence on the decision of patients to have surgery, and 3. to compare results between Group 1 and Group 2. [Subject and Methods] Fifty-five osteoarthritis patients classified as grades 3 and 4 according to the Kellgren-Lawrence system of classification were evaluated for preoperative pain intensity with the Visual Analogue Scale, knee flexion/extension range of movement with a clinical goniometer, and function with the Western Ontario and McMaster Universities Osteoarthritis Index. Patients were examined to reveal their reasons regarding the decision to undergo total knee arthroplasty (pain or function loss). [Results] The Visual Analog Scale scores at rest and during activity were 5.62 and 7.42, the knee flexion range of movement and extension limitation were 93.17° and -7.04°, and the Western Ontario and McMaster Universities Osteoarthritis Index value was 82.09. Regarding the decision to undergo surgery, 47.3% (n=26) of the knees were in Group 1, and 52.7% were in Group 2; the two groups were not significantly different. There were also no significant differences between the groups in Visual Analog Scale score during activity, the Western Ontario and McMaster Universities Osteoarthritis Index value, and knee flexion range of movement and extension limitation. The only statistically significant difference was found in the Visual Analog Scale score at rest in Group 1, which was significantly higher than that in Group 2. [Conclusion] Our results showed that osteoarthritis patients decided to undergo surgery only if all of the parameters were impaired significantly. Both pain and function loss have a similar impact on a patient's decision to undergo surgery. We observed no significant difference in clinical and self-reported outcomes between patients who decided to undergo surgery due to pain or function loss.

**Key words:** Osteoarthritis, Functionality, Range of movement

(This article was submitted Mar. 11, 2015, and was accepted May 15, 2015)

## INTRODUCTION

Osteoarthritis (OA) of the knee is the second most common type of OA, and the most common cause of disability, and almost 59% of the population over 65 years old suffer from this disorder. OA is a progressive disease that is characterized by serious arthralgia at rest and during activity, muscle weakness leading to dysfunction, and reduced quality of life (QoL). Treatment is directed at pain relief and improvement of function<sup>1-5)</sup>. OA is initially conservative according to global and evidence-based consensus and consists

of non-pharmacological and pharmacological treatments. Conservative treatment includes physiotherapy and exercise training (strength, balance, proprioception), treatments aimed at correction of alignment (brace, sole plate, tape), weight loss, pain killers, anti-inflammatories, hyaluronic acid injection, corticoid injection and glucosamine and sulfate supplements<sup>5)</sup>. OA surgery includes arthroscopy, cartilage restoration, osteotomy, and knee arthroplasty<sup>6)</sup>.

If conservative treatment of knee OA is not remarkably sufficient, pain is prolonged, or QoL decreases, surgery is being considered<sup>1, 7)</sup>. Total knee arthroplasty (TKA) is a possible treatment for advanced knee OA<sup>8, 9)</sup>. It has been reported that patients benefit a lot from surgery; QoL increases by 90%, and pain and movement are favorably improved<sup>8-10)</sup>.

Patients with OA learn to manage their pain as their disease progresses, and they adapt their lifestyles. Most patients think they need surgery if their pain increases or if they cannot move<sup>11)</sup>. For patients, the decision to undergo knee arthroplasty surgery is difficult. In many cases, they try

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all the different methods of treatment and wait until the pain worsens and is severe enough to affect their QoL. Therefore, pain, limited range of movement (ROM) and dysfunction should be assessed before surgery.

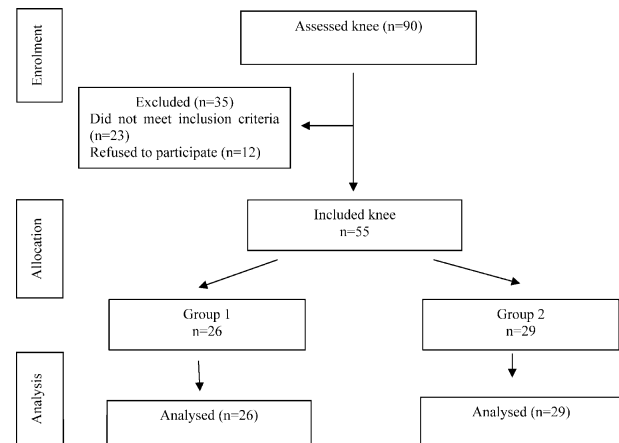
In the literature, there are a few studies about patients' perspectives<sup>1, 12</sup>. In our study, we tried to focus on this issue and aimed to evaluate the views of patients regarding the decision to undergo TKA in the future. Therefore, we planned our study to evaluate pain, limitation of movement, and dysfunction of OA patients planning to undergo TKA in order to identify the reason (either pain, Group 1, or dysfunction, Group 2) with the most effect on the decision to undergo surgery and compare results between the two groups. We investigated which reasons, pain, limitation of movement, and dysfunction, have an effect on the decision of a patient to undergo the surgery.

## SUBJECTS AND METHODS

Ninety knees (35 bilateral knees) of 55 OA patients referred from the Department of Orthopaedics and Traumatology, Cerrahpasa Medical Faculty, Istanbul University TKA were included in the study between October 2010 and January 2012. The exclusion criteria were as follows: refusal to participate in the study and rheumatological, neurologic, or orthopedic problems that require treatment. Information was given to all patients about the study, and all provided written informed consent. In total, 35 knees were excluded from the study because they failed to meet the inclusion criteria or the patients refused to take part in the study (Fig. 1).

The patients ranged from 50 to 88 years old; and 46 of them were female, and 9 were male. The patients, who were all scheduled for surgery, were evaluated one day before surgery. Demographic features; pain at rest (R) and during activity (A), as assessed with the Visual Analog Scale (VAS) (0–10); and knee joint flexion and extension range of movement range (ROM), as measured by clinical goniometry in the prone position, were recorded. We preferred a numeric scale for the VAS. The VAS was explained to the patients, and then we asked them to rate their pain on a scale of 0 to 10. Functional and daily activities were assessed with the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC). The WOMAC is self-reported. All evaluations were performed in a clinic. In addition, the patients were asked whether they requested surgery due to pain or dysfunction. Patients who answered "pain" were assigned to Group 1. Those who answered "dysfunction" were assigned to Group 2. The association between their responses and VAS values, knee joint ROM, and total WOMAC score was evaluated. In our study, another physiotherapist evaluated the severity of pain over the last 24 hours, and physical function with the Turkish version of the WOMAC, which has previously been validated<sup>13</sup>. Each question was scored on a Likert scale (0, none; 1, mild; 2, moderate; 3, severe; 4, very severe). The severity of pain, limitation of movement, and physical function worsen as the scale increases from 0 to 4. The maximum raw score for the WOMAC is 96. Higher scores are associated with more or severe symptoms, maximum limitation, and poor health.

The evaluation period was approximately 45 minutes. In



**Fig. 1.** Flow diagram of the study

the same sessions as the assessments a physiotherapist provided instructions to the patients regarding a postoperative exercise program.

Data were evaluated using SPSS Statistics for Windows, Version 15.0, and by analyzing descriptive statistics (frequency, mean, and standard deviation). An independent samples t-test was used to determine the differences in the subjects' demographic and clinical features because the data were distributed normally. P values less than <math><0.05</math> were considered statistically significant.

## RESULTS

Initially, we planned to evaluate 90 knees, but 23 knees were excluded due to the exclusion criteria. Additionally, 12 knees were excluded because the patients refused to take part in the study. Consequently, the study was completed with 26 knees in Group 1 and 29 knees in Group 2.

Female patients accounted for 83.6% of the subjects, whereas 16.4% were male. The mean age was  $69.44 \pm 7.93$  years. The mean age was  $68.78 \pm 7.29$  years in Group 1 and  $70.04 \pm 7.21$  in Group 2. The average duration of disease was 12.3 years. The patients in Group 1 and Group 2 were overweight, and their BMIs were  $28.6 \text{ kg/m}^2$  and  $26.4 \text{ kg/m}^2$ , respectively. No statistically significant differences in BMI were found between the two groups.

Regarding the decision to undergo surgery, 47.3% ( $n=26$ ) of the knees were in Group 1, and 52.7% were in Group 2; the two groups were not significantly different.

The R and A VAS, knee flexion angle, knee extension limitation, and total WOMAC scores of Group 1 and Group 2 are presented in Table 1. Only the R VAS score of Group 1 showed a statistically significant difference; it was significantly higher than that of Group 2 ( $p < 0.001$ ).

## DISCUSSION

Our results showed that OA patients decided to undergo surgery only if all of the parameters were impaired significantly. Having only one of the symptoms or clinical complaints (pain, limitation of movement, or dysfunction) did

**Table 1.** Mean values of all patients, Group 1 and Group 2

Parameters	All patients mean± SD	Group 1 mean± SD	Group 2 mean± SD	p value (Group1/2)
VAS-rest	5.62±3.63	7.05±2.65	4.43±3.93	p<0.001
VAS-activity	7.42±2.57	8.00±2.60	6.94±2.46	p=0.0501
Knee flexion (°)	93.17°±17.49	99.27°±11.43	88.06°±20.00	p=0.8829
Knee extension limitation (°)	7.04°±9.38	4.12°±6.94	9.49°±10.47	p=0.7927
WOMAC	82.09±29	83.68±10.99	80.76±13.24	p=0.2626

not lead them to decide to undergo surgery. Dysfunction and pain had similar effects on their decisions to undergo TKA surgery. Even though their decisions to undergo surgery were made for different reasons, apart from the resting level of pain, the clinical results of the patients were similar.

OA pain is an important symptom that affects daily activities. In the earlier phases of the disease, it causes pain during walking, but in later phases, it also causes pain while at rest<sup>9, 14</sup>. Therefore, it is important to evaluate pain at rest and during activity. Heiberg et al.<sup>9</sup> identified the daily mean VAS scores of values patients who would undergo TKA surgery as 49 (0–100), and Vuorenmaa et al. reported that it was 56 (0–100)<sup>15</sup>. We found VAS scores at rest and during activity of 5.62±3.63 and 7.42±2.57, respectively. Our results for pain at rest and during activity were higher as compared with those of Heiberg et al. but similar to those of Vuorenmaa et al. In our study, the pain of the OA patients, who were planning to TKA surgery, was moderate while at rest, but severe during activities.

ROM limitations have a determinant role for functionality in OA patients. Heiberg et al. reported active knee flexion of 124° and a knee extension limitation of 4°<sup>15</sup>. Bade et al. reported active knee flexion of 120.0°±13.6 and an extension limitation of 3.7°±5.6 during the preoperative period<sup>10</sup>. O'Neill<sup>11</sup> and Beaupre et al.<sup>16</sup> reported a preoperative knee flexion angle of 105°. Choy et al. reported a preoperative mean knee flexion angle of 135° and extension limitation of 6.5°<sup>17</sup>. In our study, the knee flexion ROM was 93.17°±17.49, and the extension limitation was 7.04°±9.38. Regarding limitation of movement, the knee flexion angle was near the limit value of 95°. However, the extension limitation was significant. Our results showed that if patients have severe dysfunction, this complaint has an important role in the surgery decision. In our study, the flexion ROM was lower than in other studies. When the extension limitations were compared among studies, there were differences. In our study, the extension limitation angle was similar to that of Choy et al. but higher than that of Bade and Heiberg et al.

Patient-reported outcomes are important for the WOMAC, and it is a reliable index that is frequently used to evaluate the daily activities in knee OA. It is a self-reported index for physical function. In the arthroplasty literature, there are few studies on self-reported indexes<sup>8, 18</sup>. Performance measurements are more informative about actual physical ability; however, use of them with self-reported measurements provides more comprehensive knowledge about the clinical status of patients.

Coulter et al. performed a study to evaluate the effectiveness of group and home exercise programs and randomized their patients into 2 groups. They reported total WOMAC (0–100) scores of 52.5±19 and 56.2±20<sup>19</sup>. In a study performed by Parent et al. to compare movement ability between before and 2 months after surgery, the WOMAC score was 52.0±18.07<sup>20</sup>. In our study, the total WOMAC score 82.09±29 was substantially higher than those of previous studies. The WOMAC scores showed that patients decide to undergo surgery only if dysfunction is severe.

In our study, we could not find any differences among the groups in terms of surgery decision (Group 1 47.3%, Group 2 52.7%), supporting the view that severe OA causes severe pain and limits daily activities. Dysfunction and pain had similar effects on their decisions to undergo TKA surgery. Even though the decisions to undergo surgery were made for different reasons, apart from the resting pain, the clinical results of the patients were similar.

Our study has a few strengths in terms of interpretation of the results. Firstly, it was undertaken in one center at a university hospital. Thus, diagnosis and assessment were both homogeneous. Secondly, outcomes for activity and participation were used in our study.

There are some limitations to this study. One of them is the fact that this was a single-center study, so our sample centre size was small. Although assessments by a physical therapist increase the reliability of outcomes, our results would have been much more definitive if we had utilized a multicentre study. Secondly, since we have no long-term follow-up results, we do not know the extent of the benefits of TKA surgery in people with knee OA. Lastly, if we could assess our patients with quantitative methods, we would have an opportunity to investigate the relationship between self-reported outcomes and objective clinical measurement.

In conclusion, our results showed that the OA patients decided to undergo surgery only if all of their clinical complaints or symptoms were severe. The clinical features of patients who decided to undergo surgery due to pain or dysfunction were similar. The fact that there was no significant difference between patients who decided to have surgery due to pain or dysfunction could be the results of the outcome measures used for assessment being based on self-reporting. Only the pain level at rest was high in the patients who decided to have surgery due to pain.

We believe that we have provided a new perspective that may be helpful to patients deciding whether or not to have surgery. In the future, more studies are required to examine the perspectives of patients regarding the long-term results

of TKA surgery in knee OA.

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