

RESEARCH ARTICLE

Patient Satisfaction Following Total Knee Arthroplasty: Comparison of Short-Term Results in Rheumatoid Arthritis and Osteoarthritis

Mohammadreza Minator Sajjadi, MD; Sohrab Keyhani, MD; Seyyed Morteza Kazemi, MD; Behzad Hanafizadeh, MD; Adel Ebrahimpour, MD; Mohammad Banasiri, MD

Research performed at Taleghani hospital, Tehran, Iran

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Abstract

Background: Due to the obvious differences in the natural course of rheumatoid arthritis (RA) and osteoarthritis (OA), different functional outcomes might be expected after Total Knee Arthroplasty (TKA) in these distinct patients. Although several studies have reported the objective outcome of TKA in RA and OA patients, few studies have compared post-operative patient-satisfaction levels.

Methods: In this clinical cohort study 171 patients (RA: n=33, OA: n=138) who underwent TKA with posterior stabilizing knee prosthesis were included. The Knee Injury and Osteoarthritis Outcome Score (KOOS) and Oxford Knee Score (OKS) were used to evaluate and compare patients' satisfaction 6 and 12 months after TKA relative to their preoperative state and to make an assessment between two groups.

Results: Both of patient-reported scoring systems showed a statistically significant improvement for OA and RA patients at 6 and 12 months after surgery, relative to their preoperative scores. The results of the OKS and KOOS did not show statistically significant improvement from 6 to 12 months in RA patients. Unlike RA group, OKS and KOOS revealed further improvement between 6 and 12 months for the osteoarthritic patients.

Conclusion: OA patients had continuous improvement in their satisfaction in the first year after TKA with a gentle upward curve. In contrast, in RA patients, recovery was faster and greater in the first six months after surgery and slowed down in the second six months. Patient-reported outcome scores were not significantly different between two groups at the end of the first year.

Level of evidence: II

Keywords: Knee injury and osteoarthritis outcome score, Osteoarthritis, Oxford knee score, Rheumatoid arthritis, Satisfaction

Introduction

Total Knee Arthroplasty (TKA) performed for patients with Osteoarthritis (OA) as well as Rheumatoid Arthritis (RA) generally results in good long-term outcome and improvement in functional outcome (1-3). Numerous studies have investigated on the required

time for restoration of the physical function after TKA. When assessing the outcomes, the time elapsed from surgery is an influencing factor in determining if the physical function has been restored sufficiently. Most investigations that deal with TKA rehabilitation

Corresponding Author: Seyyed Morteza Kazemi, Akhtar Hospital, Shahid Beheshti University of Medical Science, Chief of Bone, Joint and Related Tissue Research Center (BJRTrc), Tehran, Iran
Email: Behzadhanafi@yahoo.com



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measures, proposed that one year after the index surgery is the most appropriate time to evaluate the functional outcome (4, 5).

Traditionally, objective indicators such as survival of the prosthesis and revision rates have been used as standard measurements to evaluate the result of TKA (6, 7). However, in recent years, Patient-Reported Outcome Measures (PROMs) have gained increased attention when assessing outcomes of TKA. Joint-specific PROMs allow the assessment of the outcome from the perspective of the patient, including the level of pain and function of the specific joint (8, 9).

We hypothesized that there is no difference in PROM between OA and RA patients six months after TKA. Our secondary hypothesis was that there is no difference between RA and OA at 12 months after TKA. We also assessed the rate of complication in OA and RA, separately.

Materials and Methods

In this prospective cohort study (Performed from March 2013 to July 2014), 171 consecutive patients, undergone primary TKA in a university-based hospital, were included. Indications for total joint replacement was given due to advanced articular damage (Kellgren IV), and failure of conservative therapies without any known contraindication for joint replacement (10). RA patients were those who have been under anti-rheumatoid medication or had documented diagnosis by a rheumatologist. Exclusion criteria were inflammatory rheumatic diseases other than RA (seronegative spondyloarthritis, post-infectious arthroses, etc.), history of fracture around the index knee and high-grade instability or severe coronal plane deformities.

Preoperative data (T_0) from a total of 171 patients (138 OA patients and 33 RA patients) were collected. The RA cohort had a lower mean age and body mass index than patients in the OA group [Table 1].

All operations were performed by one knee surgeon (M. R. M. S). NexGen Legacy Posterior Stabilized (Zimmer Biomet Corporation) or Scorpio NRG knee prostheses (Stryker Orthopedics) have been implanted randomly. The approach was made through anterior midline incision, and medial parapatellar arthrotomy was performed in all patients. Cement was used for the fixation of the components. No major change in the arthroplasty procedure, or difficulty through operations due to sequels of RA or OA was encountered. Postoperative care and rehabilitation program was

similar for all patients as follows. Weight bearing and ambulation began with partial load (5-10% of body weight), and the use of walking aid devices started the day after the surgery, preceded to full-weight ambulation at sixth week.

Functional scores were measured preoperatively (T_0), at six months (T_6), and 12 months (T_{12}) after the operation. (11, 12). To achieve this purpose, two questionnaires were employed including the Knee Injury and Osteoarthritis Outcome Score (13) and the Oxford Knee Score (OKS) (14, 15). Patients were asked to fill these two questionnaires completely at T_0 , T_6 and T_{12} visits. Data of 167 patients (135 OA patients and 32 RA patients) six months postoperatively (T_6), as well as, data of 161 patients (130 OA patients and 31 RA patients) after 12 months (T_{12}) were available. Four patients died and two patients were lost to follow-up. Two patients did not agree to participate in T_{12} visit.

Statistical Analysis

The calculation of the mean values and standard deviation of the results, as well as the statistical analysis was carried out with SPSS version 20.0 software. Paired t-test was used for comparing before and after the treatment for RA and OA, separately. Student t-test was used to compare the results between OA and RA. Repeated measure ANOVA and Tukey tests were used to compare the results for T_0 , T_6 , and T_{12} . The *P*-values < 0.05 were considered statistically significant.

Results

There were significant differences in both KOOS and OKS values between RA and OA groups six months after TKA. However, there were no significant difference in these values between RA and OA groups at T_0 , and one year after the operation.

Oxford Knee Score (OKS): In two groups ANOVA revealed a significant difference between serial measurements of OKS ($P=0.001$ for OA and RA groups). In the OA group, OKS was 19.6 ± 6.2 , preoperatively. After 6 and 12 months (when each one compared to T_0), statistically significant improvements of the OKS were detected. 25.4 ± 8.3 points and 32.3 ± 10.1 points, for T_6 and T_{12} respectively ($P=0.012$ and $P=0.001$). Comparison of T_{12} to T_6 in this group showed statistically significant difference ($P=0.037$). The OKS score of the RA patients was 17.8 ± 7.0 at the time T_0 ; it improved after 6 months (T_6) to 31.8 ± 11.4 points and after 12 months (T_{12}) to 34.4 ± 10.3 points. This improvement at time T_6 compared to T_0 was statistically significant ($P=0.002$); this was also true for improvement in T_{12} compared to T_0 ($P=0.001$). There were not statistically significant differences between T_6 and T_{12} scores ($P=0.589$) [Figure1].

Knee Injury and Osteoarthritis Outcome Score (KOOS): In two groups ANOVA test revealed a significant difference between serial measurements of KOOS ($P=0.001$ for both OA and RA groups). In the OA group, the following values submitted for the KOOS total score: 32.4 ± 14.3 (T_0), 55.7 ± 19.2 (T_6) and 68.3 ± 12.6 (T_{12}). In this cohort, there were significant differences comparing T_0 values to T_6 ($P=0.001$) and T_{12} ($P=0.001$). Also, the difference between

Table 1. Demographic data of patients participated in the study. Body Mass Index (BMI)

	OA	RA	<i>P</i> value
QUANTITY	138 (80.7%)	33 (19.3%)	-
FEMALE	114 (82.6%)	30 (90.9%)	< 0.05
AGE (mean)	69.4 ± 7.3	58.1 ± 9.3	< 0.05
BMI	29.36 ± 3.3	28.14 ± 3.21	> 0.05

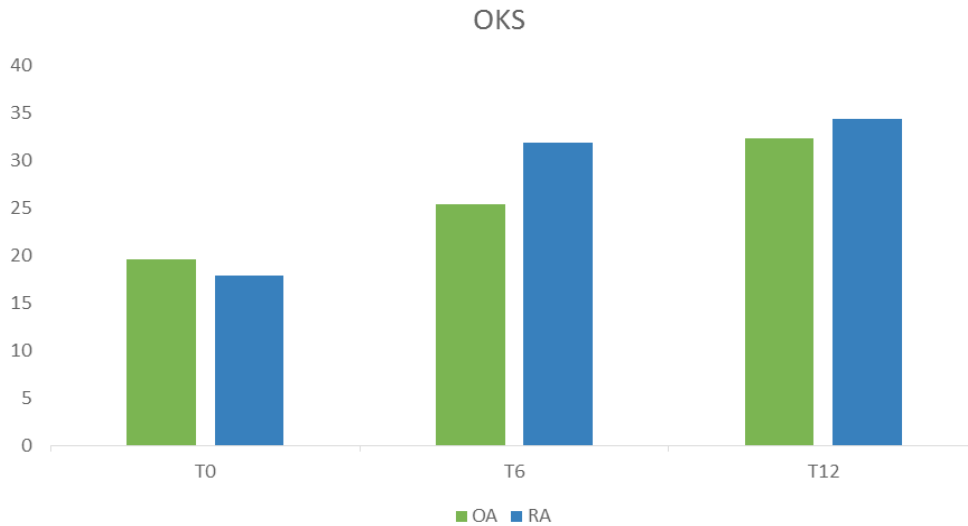


Figure 1. Oxford Knee Score (OKS) improvement after Total Knee Arthroplasty for the subgroups of patients with osteoarthritis (OA) and rheumatoid arthritis (RA); preoperatively (T₀), 6 months postoperatively (T₆) and 12 months postoperatively (T₁₂).

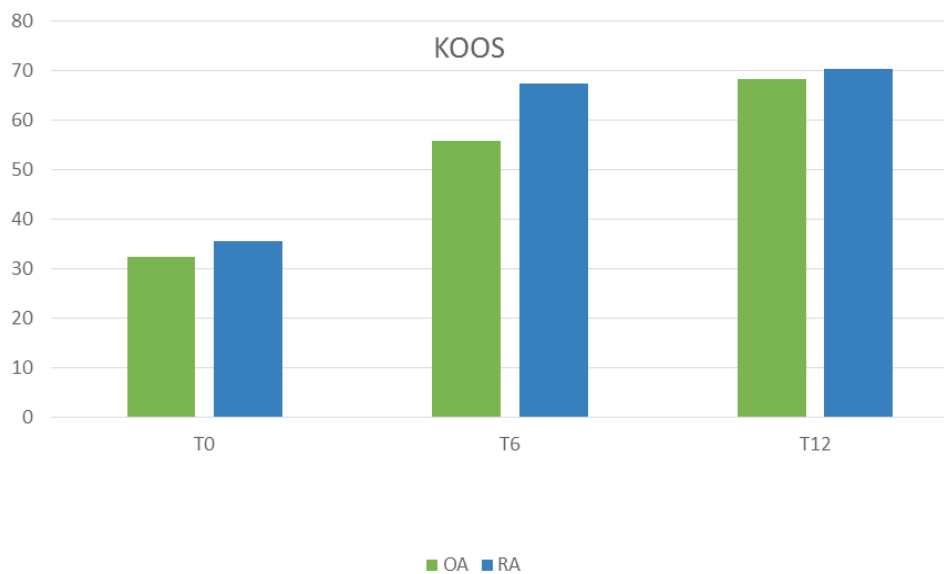


Figure 2. Knee Injury and Osteoarthritis Outcome Score (KOOS) improvement after Total Knee Arthroplasty for the subgroups of patients with osteoarthritis (OA) and rheumatoid arthritis (RA); preoperatively (T₀), 6 months postoperatively (T₆) and 12 months postoperatively (T₁₂).

T₆ and T₁₂ was statistically significant ($P=0.031$). In the RA group, analysis of collected data showed the mean total score at the time of T₀, T₆, and T₁₂ were 35.5 ± 13.1 , 67.3 ± 13.5 and 70.4 ± 11.5 , respectively. Thus, the Tukey test revealed that the scores of KOOS for T₆ and T₁₂ were significantly more than T₀ ($P=0.003$ and $P=0.001$, respectively). In contrast to the OA group, statistical

analysis showed non-significant difference between T₆ and T₁₂ ($P=0.097$), [Figure 2].

The differences of T0 scores of OKS and KOOS between two groups were not statistically significant ($P=0.11$ for OKS and $P=0.13$ for KOOS); also OKS and KOOS scores at T₁₂ did not show significant differences ($P=0.08$ and $P=0.12$ respectively), even though these

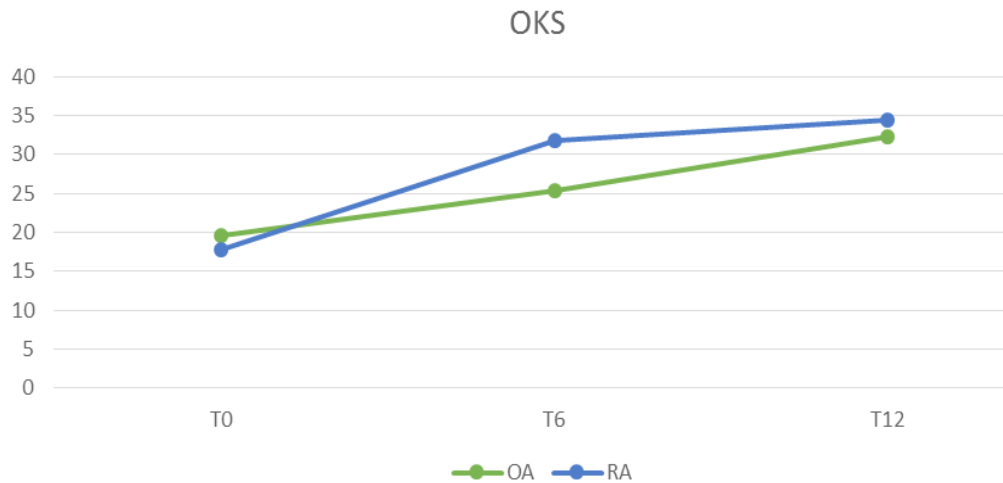


Figure 3. Comparison of mean values of Oxford Knee Score (OKS). The difference of these values between two groups was significant only 6 months after surgery (T_6) ($P = 0.02$). OA: osteoarthritis, RA: rheumatoid arthritis.



Figure 4. Comparison of mean values of Knee Injury and Osteoarthritis Outcome Score (KOOS). The difference of these values between two groups was significant only 6 months after surgery (T_6) ($P = 0.03$). OA: osteoarthritis, RA: rheumatoid arthritis.

scores was slightly higher in RA group one year after operation. The difference of these values six months after surgery between two groups was significant ($P=0.02$ for OKS and $P=0.03$ for KOOS), [Figure 3; 4].

Four patients died (three patients from OA group and one from RA group) and two patients were lost to follow-up (both were from OA group). The main cause of death was not directly related to TKA for the four patients. Two patients did not agree to participate in T_{12} visit (one from OA and one from RA group).

No any major operation-related complication was

observed in both groups in the postoperative course except one PJI in RA group who lead to revision. Two-stage revision was performed for her four months after index TKA. There was not any case of aseptic loosening in this cohort study.

Discussion

The aim of this study is to evaluate the subjective outcome of TKA surgery in RA patients compared to OA patients. In the evaluation of functional outcome of TKA, subjective assessment of the patients (not just

the physician-based assessment) is of importance. This method of assessment is called PROMs "Patient-Related Outcome Measurements". Furthermore, patient-based outcome scores made it possible to evaluate and detect a minute change of knee pain and quality of life in TKA patients (16). Majority of the previous studies focused on the analysis of the operated joint function using objective parameters such as muscle strength and the range of motion, which are usually evaluated by someone else, rather than the patient (17, 18). One of the advantages of the current study is that it was designed based on patient-reported assessment.

The current study suffered from several limitations. The age and the gender of patients were not matched in two groups, which is due to different natural distribution of the disease. RA tends to be more prevalent in young people and females. It would be better to design the future studies in such a way that the demographic characteristics of patients are balanced between the two groups. In current study, two different brands of available prosthesis were used that may lead to the creation of bias in the study results. Also, only two knee-specific questionnaires for patient-reported assessment of the operation result were recorded. Also in this study comparison of both questionnaires was not performed. Another limitation is about the nature of RA. It is obvious that rheumatoid arthritis is a systemic disease with multiple joints involvement, in which the condition of other joints (rather than replaced joint) certainly influences the perceived quality of life as well. Furthermore, RA is a chronic disease with intermittent flaring up and subsidence course. This study was carried out over a relative short follow-up period (12 months). Thus, we did not care about active or silent state of the disease and this is another limitation of this study.

The results of the current study showed a significant improvement for OA and RA patients' outcome not only at 6th, but also at 12th months after TKA in comparison to the preoperative status. The OKS scores were consistent with the KOOS scores at all three index times in both groups. The OA cohort showed major improvement in OKS and KOOS scores (that is conclusion of following items: "pain", "activities of daily life", "symptoms/rigidity" and "quality of life by the affected knee") six months after surgery with further progressive improvement in the second 6-month period, postoperatively. In the other words, OA patients could expect more satisfying results, closer to desired daily activity level at the second 6-month period after knee replacement. In contrast in RA patients, the results of the current study showed a significant difference between T_0 and T_6 accompanied with a slight difference between T_6 and T_{12} values that was statistically non-significant. Therefore, it could be concluded that in RA patients, maximum functional improvement was held in the first 6 months and major substantial progress should not be expected after 6 month.

Some of the previous studies suggested that patients with RA are at higher rate of complications following TKA relative to those with OA (7, 19). Viganò et al. reported a survival rate of 82% for TKA in RA patients in a 12-year

follow-up (3). Another study performed by Bisschop et al. on OA and RA patients described high level of patient satisfaction and implant survival of almost 90% after 13 years, regardless of the underlying disease (4). Stundner et al. reported that the unadjusted rates of mortality and most major perioperative adverse events were similar in both groups, with the exception of infection meaning that RA was not associated with increased adjusted odds for combined adverse events (5). This is also indicated by another study by Ravi et al. (20) in which OA patients achieved better results in everyday activity compared to RA patients. In contrast, there are numerous investigations revealing that patients with RA have similar excellent outcomes after knee replacement compared with patients with OA (1-3). Bullens et al. reported prosthesis survival rate of 90% at 10 years follow-up in both OA and RA knees (21). Gill et al. compared the clinical results of TKA between RA and OA patients with an average follow-up period of 9.9 years, and the reported results were good to excellent in all knees in terms of pain relief, range of motion, and knee stability; however, because of polyarticular involvement, the functional results were inferior in RA patients (22).

In summary, this study proposed that 12 months is more suitable than 6 months after TKA to evaluate the functional outcome of the operation using patient-based assessment measures. Osteoarthritic patients showed even more progress between 6 and 12 months postoperatively, compared to RA patients. Patients with RA undergoing primary TKA would have good to excellent outcomes, comparable with OA, in the spite of worse preoperative pain and function. The observed differences in the postoperative course of OA and RA patients should be considered preoperatively to avoid unrealistic expectations on the part of physicians and patients.

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this paper.

Mohammadreza Minator Sajjadi MD
Adel Ebrahimpour MD
Taleghani Hospital, Shahid Beheshti University of
Medical Sciences, Tehran, Iran

Seyyed Morteza Kazemi MD
Sohrab Keyhani MD
Akhtar Hospital, Shahid Beheshti University of Medical
Sciences, Tehran, Iran

Behzad Hanafizadeh MD
Mohammad Banasiri MD
Shahid Beheshti University of Medical Sciences, Tehran,
Iran

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