Patient satisfaction after primary total and unicompartmental knee arthroplasty: An age-dependent analysis

A Von Keudell *, S Sodha, J Collins, T Minas, W Fitz, AH Gomoll

Department of Orthopaedic Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, United States
Orthopedic and Arthritis Center for Outcomes Research, Brigham and Women's Hospital, Harvard Medical School, Boston, United States

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ABSTRACT

Background: Patient-related outcomes have become the focus of increased attention when assessing knee arthroplasty.

Methods: We retrieved questionnaires from 485 (584 knees) patients at a minimum of 3 years after undergoing primary knee arthroplasty. We excluded bilateral knee arthroplasty, leaving 141 UKA and 245 TKA who rated their satisfaction and expectation regarding pain, range of motion (ROM), daily living function (DLF), return to recreational activity (RRA) and ability to kneel (ATK) on a scale of 0 (worst) to 10 (best). We further collected data on pain level and the modified Cincinnati rating scale. Range of motion was documented pre- and postoperatively at a minimum of six months. The cohort was subdivided into three age groups and compared with each other (Group 1: <55, n = 113; Group 2: 55–64, n = 117; Group 3: 65+, n = 155).

Results: Average satisfaction with pain, ROM and ATK for patients under 55 was higher for UKA than for TKA. Patients >65 with TKA were on average more satisfied than patients with UKA in these three items. However, patients under 55 with UKA were up to 2.9 times more likely to have their expectations met when compared to patients receiving TKA. Patients with UKA under 55 rated their joint as good/excellent in 96.0% versus patients in the same age group with TKA in 81.0%.

Conclusions: We found that overall, younger patients who were treated with UKA demonstrated higher satisfaction scores in most subsets when compared with the patients of the same age group who received TKA.

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1. Introduction

There still remains controversy regarding the best treatment options for patients with knee osteoarthritis [1]. Some authors suggest that the long-term survival rate of unicompartmental knee arthroplasty (UKA) is not comparable with total knee arthroplasty (TKA) and revision surgery after UKA has a similar complexity to revision procedures after primary TKA [2]. Although recent studies have shown excellent long-term results using a minimally invasive technique for UKA implantation [3], many orthopedic surgeons favor primary TKA for its easier surgical technique and alleged similar outcome.

Most studies use revision surgery as an endpoint or evaluate the functional outcome whereas the subjective component of patients is usually neglected [4–8]. Literature has demonstrated a discrepancy between clinician and patient ratings of quality of life [9]. Subjective patient satisfaction is the ultimate goal of each orthopedic surgeon performing a procedure for osteoarthritis in the knee.

Studies have documented a patient satisfaction rate with pain relief between 72% and 86% after primary TKA with a recent implant design,

pertinent patient selection and surgical technique [10–12]. Conversely, it has been reported that up to 93% of patients receiving a UKA were satisfied with their outcome [13–15]. However, there is scarce data comparing the two procedures that investigated subjective pain and function, especially when subdivided into different age groups. Patient satisfaction and revision surgery appear to be among the most important key factors for successful management of patients with osteoarthritis in the knee.

This study tries to compare comprehensive subjective and functional outcomes of patients who underwent knee arthroplasties in our institution at different age groups after a minimum of 3 years. We hypothesized that there was no age dependent satisfaction rates in patients undergoing UKA or TKA.

2. Material and methods

2.1. Participants

We reviewed all 735 patients (779 knees) who underwent medial UKA or TKA at our institution for the treatment of symptomatic knee osteoarthritis between January 2002 and January 2007 by two of the authors (T.M., W.F.). The study was approved by the Institutional Review Board.

* Corresponding author at: Brigham and Women's Hospital, 75 Francis Street, 02115 Boston, United States. Tel.: +1 617 732 9812.
E-mail address: avonkeudell@partners.org (A. Von Keudell).

We excluded patients with less than a 3 year follow-up, with language barriers, and non-primary TKA/UKA, as well as patients who had a cerebrovascular event, Alzheimer's or were deceased. Further exclusion criteria, such as bilateral (simultaneously or staged) procedures, and TKA and contralateral UKA were applied to establish a homogenous group. The group was then divided into TKA and UKA patients (Fig. 1).

The two surgeons (T.M., W.F.) implanted 141 UKA, (52 Miller Galante unicompartmental knee replacement (Zimmer, Warsaw, IN), 72 Oxford Knee Phase III (Biomet Ltd., Bridgend, UK), and 14 Sigma HP Replacement Knee System (DePuy, Leeds, UK)) and 245 received TKA (PFC Sigma, DePuy, Leeds, UK). All unicompartmental knee replacements were PCL retaining implants using either measured resection, gap balancing technique or both together.

2.2. Questionnaire

Every patient was contacted either by phone or mail to complete a questionnaire consisting of a Visual Analogue Pain scale, the modified Cincinnati score [16], as well as questions regarding their satisfaction in respect to pain, motion, daily living function, return to sport activities and ability to kneel on a scale from 0 to 10 (0 = not satisfied, 10 = very satisfied). Furthermore, patients were asked to comment on the current status of their affected joint in comparison to before the surgery, whether they would choose to have the surgery again and how they rated the result of the surgery. Lastly, the participants responded with a binary answer option (yes/no) whether their expectations had been met in regards to pain, motion, daily living function, return to recreational activities and their ability to kneel on the operated knee.

Data was retrieved from the medical record regarding their pre- and postoperative range of motion (ROM) at a minimum of 3 years after the index surgery.

2.3. Statistics

We investigated the association between each outcome and procedure (UKA vs. TKA) first in an unadjusted analysis. For continuous outcomes (satisfaction, pain in joint, modified Cincinnati Health Survey, difference in ROM) we calculated the mean in each group and conducted an independent samples t-test to test for a difference between groups. For categorical outcomes (expectation and satisfaction cut-offs) we calculated percentages for each group and performed chi-square tests of independence. A p-value of <0.05 was accepted as statistically significant.

We then used multivariable regression to adjust for potential confounding of the relationship between procedure and outcome. For continuous outcomes we used linear regression and for dichotomous outcomes we used logistic regression. We adjusted for age group, sex, surgeon, and time since surgery. We formally tested whether the relationship between outcome and procedure depended on age group with an interaction term using a significance cut-off of p = 0.1 for interaction. For outcomes without statistically significant interaction we reran the multivariable model removing the interaction term. Statistics were performed using SPSS version 15.0 (SPSS Science Inc., Chicago, Illinois).

2.4. Source of funding

3. Results

Out of the total of 609 UKA and TKA patients, 485 questionnaires (79.6%) were retrieved. We excluded 99 patients who had a bilateral procedure, leaving 245 TKA and 141 UKA for analysis (Fig. 1). The mean age at surgery was 61.8 years (SD = 11.2); 65% of the population was female and 35% was male. Baseline covariates by procedure are given in Table 1.

3.1. Satisfaction

Overall, 94.7% of TKA patients rated their joints as much or somewhat better, whereas 96.4% of the UKA group reported this. Of all TKA patients, 91.4% would choose to undergo the surgery again in comparison to 95.0% in the UKA group. Furthermore, 88.1% of TKA patients rated their results as good/excellent in contrast to 94.3% of patients who underwent UKA (p = 0.046).

For patients with a TKA under the age of 55, 81.0% rated their joints as good/excellent versus 96.0% of patients with a UKA in the same age group. Between 55 and 64 years, 89.0% of TKA patients rated their joint as good/excellent versus 93.3% of patients with a UKA. Beyond 65, 91.0% of TKA patients rated their joint as good/excellent in comparison to 93.6% of UKA patients (Table 2).

3.2. Satisfaction scores

The general unadjusted comparison between TKA and UKA did not yield any statistically significant differences in the satisfaction scores.

We used multivariable regression models to estimate the relative contribution of demographic and clinical factors to patient reported outcomes. We included procedure (TKA vs UKA), age group, sex, surgeon, and time since surgery and the interaction between procedure and age group. We found a significant interaction between age group and procedure for satisfaction with pain (p = 0.10), motion (p = 0.10) and ability to kneel (p = 0.04), indicating that the relationship between procedure and outcome depends on age group. For all three measures satisfaction was higher for UKA vs TKA in patients <55 and lower in UKA vs TKA for patients 65+ (Table 3).
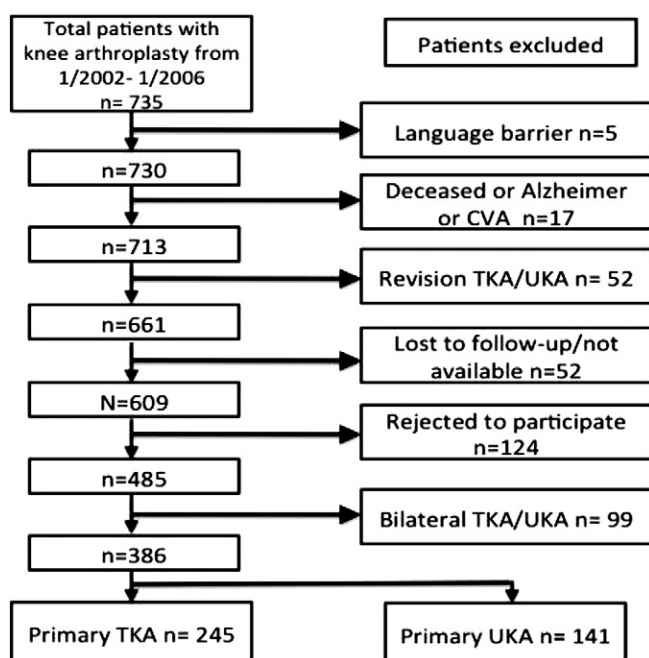

Fig. 1. Description of the selection procedure.

Table 1
Patient demographics for UKA and TKA patients.

	TKA	UKA	p-Value
Age (mean (sd))	62.6 (11.1)	60.2 (11.2)	0.042
Age group			0.128
<55	64 (56.6%)	49 (43.4%)	
55–64	72 (61.5%)	45 (38.5%)	
65 +	108 (69.7%)	47 (30.3%)	
Sex			0.162
Males	80 (58.8%)	56 (41.2%)	
Females	165 (66.0%)	85 (34.0%)	
Time from surgery to questionnaire (years)	6.4 (0.9)	6.1 (1.5)	0.010