

# How Often are Patient and Surgeon Recovery Expectations for Total Joint Arthroplasty Aligned? Results of a Pilot Study

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**Abstract** *Background* Surgeons strive to set patient expectations for recovery following total hip arthroplasty (THA) and total knee arthroplasty (TKA). However, some patients report dissatisfaction after surgery due to unmet expectations. *Purpose* We compared patients' and surgeon's

recovery expectations prior to primary THA and TKA. *Methods* Sixty eight patients scheduled to undergo primary total hip replacement (THR) or total knee replacement (TKR) surgery were enrolled. Before surgery, patients filled out a validated recovery expectations questionnaire that quantified expectations of postoperative pain relief, function, and well-being with a value from 0 to 100 (higher being more optimistic). The surgeon independently completed the same questionnaire for each patient. Overall score and item-specific comparisons were conducted. Correlations were explored between agreement level, demographics, patient-reported health status measures, and patients' assessments of the risk of complications associated with surgery. *Results* Most patients undergoing THR or TKR had higher expectations for recovery than their surgeon. Applying the clinically meaningful difference in expectations ( $\geq 7$  points), 52.5% of the TKA patients' expectations exceeded those of the surgeon, while 22.5% expected less than their surgeon and 60.7% of THA patients' expectations exceeded those of the surgeon, while 21.4% expected less than their surgeon. THA patients with either lower or higher expectations than their surgeon had lower physical and mental health status scores. TKA patients with lower expectations compared to their surgeon had a higher expectation of complications. *Conclusions* More than 50% of the patients had higher expectations than their surgeon and this was driven by expectations of high-level activities and extreme range of motion. Further investigations are needed to understand these differences so as to enhance patient preoperative education.

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Each author certifies that his or her institution has approved the reporting of these cases, that all investigations were conducted in conformity with the ethical principles of research, and that informed consent for participating in the study was obtained.

Level of evidence: level 1, prognostic study

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## Introduction

The number of total joint arthroplasty (TJA) procedures doubled between 1998 and 2004 and is expected to be even higher over the coming two decades [4, 13, 21]. Both

elderly and active young individuals have high expectations for the outcomes of surgery [3, 6, 7, 9–12]. However, these “preoperative expectations” are not always met, leading to postoperative patient dissatisfaction. For example, in a recent study, 19% of 1,703 patients undergoing primary total knee arthroplasty (TKA) surgery were not satisfied with their outcome, and the strongest predictor of patient dissatisfaction was expectations not met (10.7 times greater risk) [3].

Patient recovery expectations are defined as “anticipations that given events are likely to occur during or as a result of medical care” [17]. In routine clinical care, surgeons and their staff spend a substantial amount of time with the patient discussing the surgery and the achievement of short-term and long-term goals to make sure that patient’s expectations are realistic. In addition, a growing number of hospitals have instituted an educational class that patients can take before surgery. Despite these efforts, the extent to which patients’ expectations align with their surgeon’s expectation as a result of these efforts remains largely unstudied.

Recent surveys have been developed and validated to capture these expectations of the hip (18 items) and the knee (19 items). Utilizing these surveys, we conducted a pilot study to investigate the frequency with which patient and surgeon expectations are aligned and to determine the factors associated with discordance in expectations in a consecutive series of TKA and total hip arthroplasty (THA) patients. We first aimed to compare the patient and surgeon expectations for each item on these surveys. Second, we compared the overall patient and surgeon summary scores. Third, we assessed the relationship between expectations agreement level and patient demographic characteristics as well as preoperative assessments such as the Western Ontario and McMaster Universities (WOMAC) and Short Form 36 (SF-36) scores.

## Materials and Methods

In this prospective study, subjects were participants in the Total Joint Replacement Registry, scheduled for surgery between January and October of 2009, and examined by one adult reconstructive surgeon. The patients were all 18 years of age or older and were scheduled to undergo elective, primary unilateral THA or TKA. The patients had no other major orthopedic factors or comorbidities affecting their quality of life and function.

During the preoperative evaluation visit, the surgeon assessed his expectations on 102 TJA candidate patients. Of those, 19 patients declined enrollment in the registry, 11 patients enrolled but did not complete a baseline expectations survey, and 4 patients completed the expectations survey partially (their information was used in the item-specific analysis below). As a result, data were available for 68 TJA patients (40 THA and 28 TKA patients) in the study. All of these patients completed the education class prior to filling out their expectations survey for consistency and, more importantly, to make sure all patients received all the

necessary information about recovery prior to assessing their expectations. Evidence suggests that the preoperative educational class changes patient expectations [11]. THA patients were 47.5% female with a mean age of 63.9 years (range, 36–84 years). TKA patients were 75% female with a mean age of 65.1 years (range, 52–80 years).

Both surgeon and patient expectations were captured using the validated Hospital for Special Surgery 18-item THA and 19-item TKA expectations surveys [11, 12]. The importance of each item is evaluated on a four-point Likert scale (1=back to normal or complete improvement; 2=not back to normal but complete improvement; 3=not back to normal but a moderate amount of improvement; 4=not back to normal but little improvement) and each item also has a no-expectation option (5=I do not have this expectation or this expectation does not apply to me).

Patients filled out the expectations survey as part of the battery of baseline assessments for the registry that included age, gender and education, and health status questionnaires including the SF-36 [18–20], Hip or Knee Injury Osteoarthritis Outcomes Score (HOOS or KOOS) [14, 15], and Lower Extremity Activity Scale [16]. The baseline assessment also included a question regarding patient’s expectation of risk of complications occurring (categories were 0%, <5%, 5–10%, and >10%). The surgeon expectation survey was separately filled out after the patient was examined and recommended for surgery and includes the same items found in the patient expectation survey. Both patients and surgeon completed the questionnaires independently and were blinded to each other’s responses.

Descriptive statistics were performed using means and standard deviations for continuous variables and frequencies for binary and categorical variables.

An item-specific analysis was first conducted to compare the surgeon’s and the patient’s responses on the four-point Likert scale for each item of the survey. Nonparametric Wilcoxon signed-rank test was used to compare the item responses. A Bonferroni adjustment of the significance level was used in this specific analysis due to the multiple comparisons that were made simultaneously. Therefore, a difference between the patients and surgeon was considered statistically significant with a  $p$  value <0.0026.

A patient and a surgeon expectations overall score were then calculated for each case by summing the scores of all the questions and converting to a 0–100 scale, with 100 being the highest expectation of returning back to normal in all aspects and 0 being most pessimistic, meaning that there are no expectations of improvement after surgery in any aspect [11]. Items for which the respondent does not have an expectation are given no weight (weight=0) in calculating the cumulative score. Agreement between the patient and the surgeon overall scores was determined using two methods. First, a validated definition of clinically meaningful difference in expectations scores was applied to the difference between the scores. Mancuso and colleagues determined that a seven-point difference in the expectations score was clinically meaningful [11]. Based on this definition, three levels of agreement were defined: patient expectations lower than their surgeon, patient expectations

same as their surgeon, or patient expectations higher than their surgeon. In addition, an interclass correlation coefficient (ICC) was calculated for the patient and surgeon scores. The ICC is an assessment of the consistency or reproducibility of measurements made by two different observers measuring the same quantity [8]. Its range varies from 0 (no relationship) to 1 (agreement-perfect linear relationship) or  $-1$  (disagreement-perfect negative linear relationship).

To explore the relationship between expectations agreement level and other baseline variables, we compared the means for continuous variables (using ANOVA) and the frequencies for binary and categorical variables (using the chi-square test) across the three levels of agreement. WOMAC Osteoarthritis Index [1, 2] subscale scores of pain stiffness and function were derived from the HOOS and KOOS instruments and compared across expectations agreement groups. In all comparisons, separate post hoc two-way comparisons were also conducted when needed. A  $p$  value of  $<0.05$  indicated statistical significance. All analyses were conducted using SPSS 15.0. The study was approved by our institutional review board.

## Results

When comparing the surgeon and patient expectations to each item on the survey, THA patients and the surgeon had significant disagreement in 7 of 18 questions. The patients expected more improvement than the surgeon in six items, except for the expectation of elimination of the need for medication where the surgeon's expectations were higher (Table 1). TKA patients and the surgeon had significant

disagreement in 7 of 19 questions, with the patient's expectation being higher than that of the surgeon in 6 items, except for the expectation for "making knee or leg straight" where the surgeon's expectations were higher (Table 2). In both THR and TKR patients, expectations were aligned (i.e., not statistically different) in items related to pain relief and ability to stand and walk comfortably; however, the patients had higher expectations than the surgeon did for more demanding activities as well as activities that involved extreme positions of range of motion.

In the overall expectations score analysis, more than half of the patients (both for hip and knee joints) had clinically higher expectations than their surgeon. The mean THA patient and surgeon overall expectations scores were  $85.9 \pm 14.3$  and  $80.2 \pm 6.4$ , respectively. Patient scores ranged from 40.3 to 100, while surgeon scores ranged from 63.9 to 91.7. When the two scores were compared using the clinically meaningful definition of seven points difference in the expectations score, 52.5% of patients had expectations higher than those of their surgeon, 25% of patients had expectations similar to those of the surgeon, and 22.5% of patients had expectations lower than those of the surgeon. In comparing the overall scores, the two scores had very poor agreement, with the ICC equal to  $-0.073$  (CI  $[-0.370, 0.239]$ ).

The mean patient and surgeon overall expectations scores for TKA were  $79.6 \pm 17.1$  and  $68.9 \pm 9.7$ , respectively. Patient scores ranged from 50 to 100, while surgeon scores ranged from 44.7 to 86.8. Using the clinically meaningful definition, 60.7% of patients had expectations that were higher than their surgeon, 17.9% had similar expectations to their surgeon, and 21.4% had lower expectations than those of their surgeon. In comparing the overall scores, the two

**Table 1** Item-specific expectations agreement level in THA patients

Item-specific analysis	Patient expectations compared to surgeon expectation			Wilcoxon signed-rank test $p$ value
	Lower	Same	Higher	
Hip expectations items				
Relief of daytime pain	6	33	3	0.317
Relief or pain that interferes with sleep	8	33	1	0.021
Improve ability to walk	3	30	9	0.083
Improve ability to stand	4	36	2	0.414
Get rid of limp	3	31	7	0.131
Remove need for a cane or other assistive device	8	24	7	0.748
Improve ability to climb stairs	1	11	29	0.001
Improve ability to get in or out of a bed, chair, or car	7	9	26	0.003
Improve ability to perform daily activities around the home (for example, housework, gardening)	3	12	27	0.001
Improve ability to perform daily activities away from the home (for example, shopping, volunteer work)	6	20	16	0.238
Eliminate need for medications	12	27	2	0.003
Be employed for monetary reimbursement	18	6	15	0.083
Improve sexual activity	14	5	20	0.431
Improve ability to exercise or participate in sports	4	6	31	0.001
Improve ability to participate in social activities or recreation	11	21	10	0.263
Improve ability to put on shoes and socks	2	3	35	0.001
Improve ability to cut toenails	3	0	37	0.001
Improve psychological well-being	9	22	10	0.398

Based on the HSS Total Hip Replacement Expectations Survey

**Table 2** Expectations agreement level in TKA patients

Item-specific analysis	Patient expectations compared to surgeon expectation			Wilcoxon signed-rank test <i>p</i> value
	Lower	Same	Higher	
Knee expectations items				
Relief of pain	5	16	9	0.285
Improve ability to walk short distance (indoors, 1 block)	6	16	8	0.593
Improve ability to walk medium distance (take a walk, <1 mile)	4	13	8	0.675
Improve ability to walk long distance (>1 mile)	7	5	17	0.047
Remove the need for a cane, crutch or walker	8	16	5	0.499
Make knee or leg straight	13	15	1	0.002
Improve ability to go up stairs	0	10	19	0.000
Improve ability to go down stairs	0	7	23	0.000
Improve ability to kneel	1	3	26	0.000
Improve ability to squat	3	1	26	0.000
Improve ability to use public transportation, drive	5	11	13	0.215
Be employed for monetary reimbursement	9	5	13	0.755
Improve ability to participate in recreation (e.g., dancing, pleasure travel)	5	10	13	0.305
Improve ability to perform daily activities (e.g., household chores, daily routine)	4	17	9	0.134
Improve ability to exercise or participate in sports	3	3	24	0.002
Improve ability to change position (e.g., go from sitting to standing or from standing to sitting)	3	20	6	0.317
Improve ability to interact with others (for example, take care of someone, play with children)	8	15	5	0.317
Improve sexual activity	4	8	14	0.007
Improve psychological well-being	5	10	14	0.146

Based on the HSS Total Knee Replacement Expectations Survey

scores had very poor agreement, with the ICC equal to 0.172 (CI [-0.204, 0.505]).

There were several notable differences in demographic and patient-reported outcome measures across the three agreement level groups (lower, concordant, and higher than the surgeon) despite the small sample size (Table 3). Compared to patients who had lower or higher scores than their surgeon, THA patients who agreed with their surgeon had higher SF-36 physical component scores (PCS;  $p=0.02$ ) and mental component scores (MCS;  $p=0.02$ ). There was a trend towards a higher percentage of patients in the two disagreement groups (higher and lower) to have expected no possibility of complications (50.0% for lower and 68.4% for higher) compared to the group in agreement with their surgeon (30.0%;  $p$  value=0.09). In fact, two thirds of the patients who had similar expectations to their surgeon correctly expected that there would be >0% but <5% chance of complications after surgery.

For TKA patients, a significant inverse relationship was observed in the case of expectations of a complication ( $p$  value=0.04). Patients whose expectations were lower than those of their surgeon had the highest proportion of reporting 5% or more chance of a complication compared to the other two groups (50.0% for lower vs. 20.0% for concordant and 5.9% for higher). Inversely, patients whose expectations were higher than those of their surgeon had the highest proportion of reporting 0% chance of a complication compared to the other two groups (52.9% for higher vs. 0.0% for concordant and 33.3% for lower). Other variables did not

seem to differ between the three groups and were not statistically significant.

## Discussion

Surgeons aim to guide expectations for recovery with their patients in order to agree on the goals of surgery, avoiding dissatisfaction with the outcome. Despite these efforts, the extent to which patients' expectations align with their surgeon's expectations remains largely unstudied. In this pilot study, expectations of the patient and the surgeon were aligned in items related to pain relief and ability to stand and walk comfortably, without the need for an assisting device (questions 1 to 5 in the THA and TKA questionnaire). However, patients had higher expectations than their surgeon for more demanding activities as well as activities that involved extreme positions of range of motion such as participating in sports, negotiating stairs, sitting down, standing up, kneeling, squatting, or reaching the foot to put on socks, tie shoelaces, or cut toenails. These expectations drove the overall patient expectations higher compared to their surgeon in at least 50% of patients undergoing elective hip and knee surgery. Higher overall expectations were associated with several variables, most notably an expectation of no complications occurring.

Our study has limitations. First, patient's preoperative expectations are likely to change throughout the process of care from the time of first interaction with the surgeon until the time of surgery. They are, however, likely to stabilize



**Table 3** Factors associated with discordance in TJA patients

Factors	Patient expectations compared to the surgeon's expectations			<i>p</i> value
	Lower	Concordant	Higher	
Total hip arthroplasty	<i>N</i> =9	<i>N</i> =10	<i>N</i> =21	
Mean age, years (SD)	62.89±13.06	60.80±9.64	65.76±12.68	0.55
Female gender, <i>N</i> (%)	6 (66.7%)	4 (40.0%)	9 (42.8%)	0.42
Education level (some college or higher), <i>N</i> (%)	6 (66.7%)	10 (100%)	18 (85.7%)	0.23
Pain (VAS, 0–100)	71.11±20.00	52.30±24.45	65.60±25.82	0.22
WOMAC pain (0–100)	42.64±21.25	55.71±9.76	53.95±21.77	0.32
WOMAC stiffness (0–100)	31.94±26.60	37.50±26.35	44.38±20.06	0.40
WOMAC function (0–100)	39.52±28.01	55.17±11.98	50.79±17.61	0.26
SF-36 PCS (0–100)	29.19±7.90	38.38±4.69	33.08±7.24	0.02
SF-36 MCS (0–100)	40.68±13.80	55.50±8.58	48.95±10.23	0.02
Expectation of a complication (available on 35 patients only)				
0%	3 (50.0%)	3 (30.0%)	13 (68.4%)	0.09
<5%	1 (17.7%)	6 (60.0%)	3 (15.8%)	
≥5%	2 (33.3%)	1 (10.0%)	3 (15.8%)	
Total knee arthroplasty	<i>N</i> =6	<i>N</i> =5	<i>N</i> =17	
Mean age, years (SD)	63.83±8.89	63.40±11.23	66.11±8.51	0.78
Female gender, <i>N</i> (%)	5 (83.3%)	4 (80.0%)	12 (70.6%)	0.79
Education level (some college or higher), <i>N</i> (%)	3 (50%)	4 (80.0%)	14 (82.4%)	0.17
Pain (VAS, 0–100)	66.67±12.63	74.40±19.13	69.31±16.35	0.73
WOMAC pain (0–100)	45.83±6.65	35.00±13.54	43.46±14.89	0.44
WOMAC stiffness (0–100)	37.50±15.81	27.50±5.59	41.18±25.30	0.47
WOMAC function (0–100)	42.35±6.36	46.69±8.17	42.22±15.44	0.84
SF-36 PCS (0–100)	28.75±5.38	28.08±11.69	32.23±7.27	0.48
SF-36 MCS (0–100)	51.92±15.26	50.91±8.70	45.88±13.21	0.55
Expectation of a complication				
0%	2 (33.3%)	0 (0.0%)	9 (52.9%)	0.04
<5%	1 (17.7%)	4 (80.0%)	7 (41.2%)	
≥5%	3 (50.0%)	1 (20.0%)	1 (5.9%)	

after the patient has received all the necessary information provided by the surgeon and the educational class. In this study, expectations for all patients were assessed after they have attended the educational class. Second, this pilot study reports data on a selected group of patients operated on by only one surgeon and in one institution. Although our study shed some light on the disagreement in patient and surgeon expectations; our small cohort does not represent the general total joint replacement population. Similarly, it is conceivable that different surgeons may have different expectations for the same patient. Future efforts will focus on expanding this work to a larger cohort of patients. Finally, our small sample size may have precluded some of the results from being significant. This study should be repeated using a larger number of patients with multiple surgeons to attain definitive differences.

Patients scheduled for surgery had higher expectations for participating in sports, negotiating stairs, sitting down, standing up, kneeling, squatting, or reaching the foot to put on socks, tie shoelaces, or cut toenails. On the other hand, for the expectation of correcting knee malalignment, the expectations of the surgeon were higher than that of the patients. This observation may be due to several factors

including that the extent of malalignment varied in the study population and that the patients may not associate the correction of the angular malalignment with the improvement of pain and function. Our observations on the discrepancies of individual outcomes emphasize the aspects of the preoperative patient–surgeon dialogue that need to be improved upon and suggests these patients need even more detailed preoperative discussions.

Our overall agreement analyses results confirm the notion that patient expectations are higher than their surgeon's expectations for the majority of TJA patients. However, these results are distinctive in showing that there is a subpopulation in the TJA patients whose expectations are lower than those of the surgeon and may thus be unrealistically low. Low expectations may explain variations in patient choice to undergo this elective surgery. Patients who expect more from the surgery may utilize the surgery earlier than those patients who have low preoperative expectations and who may not consider this treatment option or delay it. In either case, the benefit derived from the surgery is suboptimal.

The significant association between the expectation of complications, general health, and agreement level but not

with other variables is noteworthy. Theoretical work on health behavior, such as the well-established health belief model, may guide further research in this area and help understand how patient expectations are formulated and when they are expected to disagree with those of their surgeon [5].

Exploring the nature of discordances between patient and surgeon recovery expectations is necessary to improve patient–physician dialogue prior to surgery and may be useful in improving preoperative educational interventions aimed at aligning physician and patient preoperative expectations thus improving patient satisfaction and outcomes.

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