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**Original Research Article**

# Patient satisfaction after total knee arthroplasty with and without open lateral release in Jordan: a retrospective analysis

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## ABSTRACT

**Background:** Total knee arthroplasty (TKA) is an effective treatment for advanced knee osteoarthritis, providing substantial pain relief and functional improvement. Patellar maltracking remains a frequent postoperative challenge, and open lateral release (OLR) is often employed to correct abnormal patellar tilt intraoperatively. However, evidence on the impact of OLR on patient satisfaction is limited, particularly in Middle Eastern populations.
**Methods:** We conducted a retrospective analysis of patients who underwent primary TKA with or without OLR at a tertiary hospital in Jordan between 2016 and 2023. Eligible patients had at least six months of postoperative follow-up and were contacted by telephone to complete the Goodman satisfaction scale, which assessed pain relief, function, overall satisfaction, and quality of life (QoL). Mean satisfaction and QoL scores were compared between groups using independent t-tests.
**Results:** A total of 156 patients were included (77 TKA alone; 79 TKA+OLR), with a mean age of 67.7±8.6 years; 80.8% were female. More than 80% of patients in both groups reported being fully or somewhat satisfied with their surgery. Patients undergoing TKA+OLR demonstrated a significantly higher mean satisfaction score compared with TKA alone (85.1 vs. 78.2; p=0.049; 95% CI, 0.04-13.93). Differences in QoL improvement between the groups were not statistically significant (5.09 vs. 4.82; p=0.16).
**Conclusions:** TKA combined with OLR was associated with higher patient satisfaction compared with TKA alone, although QoL improvement was similar between groups. These findings suggest that adjunctive OLR may provide additional benefit in patient-perceived outcomes without compromising overall QoL. Further prospective studies with larger cohorts are warranted to validate these results.

**Keywords:** Total knee arthroplasty, Open lateral release, Patient satisfaction, Quality of life, Retrospective study, Jordan

## INTRODUCTION

Total knee arthroplasty (TKA) is a widely accepted surgical intervention for patients with end-stage knee osteoarthritis (OA).[1-3] It provides substantial pain relief, corrects deformity, and improves joint function, making it one of the most successful orthopedic procedures worldwide.[4,5] Over the past three decades, the burden of knee OA in the Middle East has increased almost threefold, from 6.16 million to 17.75 million cases, leading to a parallel rise in the number of the TKAs performed annually.[6]

Despite its overall success, TKA is not free of complications. One of the more frequent and clinically significant postoperative challenges is patellar maltracking, which refers to the abnormal movement or misalignment of the patella as it glides within the femoral trochlea during knee motion.[7-9] This condition may present as lateral displacement, excessive tilt, or subluxation of the patella, often resulting in anterior knee pain, instability, reduced function, and dissatisfaction after surgery.[10]

Correction of patellar maltracking during TKA often necessitates additional soft-tissue balancing procedures. One commonly described approach involves surgical incision of the lateral retinaculum, a fibrous structure that exerts excessive lateral traction on the patella.[11,12] Releasing this constraint reduces abnormal tilt, facilitates central alignment, and optimizes patellofemoral tracking.[13,14] The maneuver is technically straightforward and can be performed concomitantly with TKA when intraoperative assessment indicates maltracking.

The evidence supporting open lateral release (OLR) in TKA remains mixed. Some studies have suggested that patients undergoing TKA with OLR achieve greater improvements in functional outcomes and pain relief, whereas others have found no significant differences in complication rates or long-term results compared with TKA alone.[15,16] This variability highlights the ongoing debate about the necessity and effectiveness of OLR as adjunct procedure.

Notably, most previous research has focused on clinical or radiographic outcomes, with limited attention given to patient satisfaction-an equally important metric of surgical success. Patient satisfaction reflects not only the technical success of the procedure but also the patient's perception of pain relief, functional recovery, and QoL. Instruments such as the Goodman scale, WOMAC, and SF-36 have been validated to assess these aspects in arthroplasty patients.[17,18] However, studies specifically evaluating satisfaction after TKA with and without OLR remain scarce, particularly in Middle Eastern populations where cultural, social, and functional expectations may differ from Western cohorts.

The present study seeks to bridge this gap by assessing and comparing patient satisfaction following TKA with and without OLR in Jordan. By evaluating patient-reported outcomes such as pain relief, functional capacity, and overall satisfaction, this study aims to clarify the impact of OLR on the patient experience. Findings from this research may help guide surgical decision-making, refine operative strategies, and ultimately enhance the quality of care for patients undergoing TKA.

## METHODS

### *Study design and reporting*

This investigation was designed as a retrospective comparative cohort study and is reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational studies.[19] The study compared patient satisfaction following TKA performed with or without concomitant lateral retinacular release.

### *Study setting and participants*

The study was conducted at a leading teaching hospital and major tertiary referral center in Amman, Jordan. Patients were identified through the orthopedic surgical registry covering the period between November 2016 and August 2023. The cohort included adults aged 50 years and older who underwent primary TKA, either with or without concomitant lateral retinacular release, and who had at least six months of postoperative follow-up available.

To minimize confounding factors, patients were excluded if they had inflammatory or rheumatologic joint disease such as rheumatoid arthritis, psoriatic arthritis, or ankylosing spondylitis; a history of prior knee or patellar surgery; significant pre-existing malalignment or patellar instability; active or previous joint infection; neuromuscular conditions likely to affect function; or incomplete clinical records that precluded reliable assessment.

### *Data collection*

Data collection was performed between September and December 2023 a trained team who are professionals in clinical research methodology. A structured protocol was used to ensure consistency and reliability. Demographic and operative data (age, sex, surgical technique, and adjunct procedure) were extracted from electronic medical records.

Postoperative satisfaction outcomes were collected through standardized telephone interviews in which patients were contacted directly. During each interview, the Goodman satisfaction scale was administered. This validated instrument, widely used in the assessment of outcomes following total joint arthroplasty, evaluates patient-reported experiences in the areas of pain relief, performance of household activities, participation in recreational activities, and overall satisfaction with surgery. In addition, the questionnaire included a separate item specifically designed to capture the patient's perceived change in overall QoL.

### *Outcome measures*

The Goodman satisfaction scale (Figure 1) was used to evaluate postoperative outcomes across the domains of pain relief, household activity, recreational activity, and overall satisfaction. Each domain was assessed using a 5-point Likert scale ranging from very satisfied to very dissatisfied. For analysis, these responses were transformed into a numerical scale, with values of 100, 75, 50, 25, and 0 assigned respectively. A composite mean

satisfaction score was then calculated by averaging the domain scores, with higher values reflecting greater overall satisfaction with surgery.

Perceived change in QoL was assessed separately using a 6-point ordinal scale, in which patients rated their outcome from more than I ever dreamed possible (score=6) to my QoL is worse (score=1). These responses were also converted into numerical values, with higher scores denoting greater perceived improvement. For statistical purposes, both satisfaction and quality-of-life scores were treated as continuous variables.

| | Very Satisfied | Somewhat Satisfied | Neither Satisfied nor Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|
| a. For relieving pain? | ☐ | ☐ | ☐ | ☐ | ☐ |
| b. For improving your ability to do housework or yard work? | ☐ | ☐ | ☐ | ☐ | ☐ |
| c. For improving your ability to do recreational activities? | ☐ | ☐ | ☐ | ☐ | ☐ |
| d. Overall, how satisfied are you with the results of your knee surgery? | ☐ | ☐ | ☐ | ☐ | |

2) Quality of Life Question:
How much did your knee surgery improve the quality of your life?

| More improvement than I ever dreamed possible | Great improvement | Moderate improvement | A little improvement | No improvement | The quality of my life is worse |
|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Figure 1: Goodman satisfaction scale and QoL assessment used in this study.[17]**

The satisfaction scale evaluates pain relief, ability to perform household and recreational activities, and overall satisfaction following surgery. Responses are rated on a 5-point Likert scale and converted to numerical scores ranging from 0 (very dissatisfied) to 100 (very satisfied). QoL is assessed using a 6-point ordinal scale, ranging from 1 (QoL is worse) to 6 (more improvement than ever dreamed possible).

### *Statistical analysis*

All statistical analyses were performed using R® software, version 4.3.1 (R Foundation for statistical computing, Vienna, Austria). Continuous variables (age, satisfaction score, QoL score) were summarized as mean±standard deviation (SD) and compared between groups using independent-sample t tests. Categorical variables (sex, satisfaction categories) were summarized as frequencies and percentages. Statistical significance was defined as a two-tailed $p<0.05$. Ninety-five percent confidence intervals (95% CIs) were reported for mean differences.

### *Ethical considerations*

The study protocol was reviewed and approved by the institutional review board of the university of Jordan Hospital (IRB Approval No. 23099). All participants were contacted directly, informed about the study objectives, and provided verbal informed consent prior to data collection. Confidentiality of patient information was strictly maintained throughout the study.

## RESULTS

The demographic characteristics of the study population were broadly comparable between patients who underwent TKA alone and those who had TKA with concomitant OLR. The mean age was similar in both groups, averaging 67.4 years in the TKA group and 67.9 years in the TKA+OLR group, with overlapping ranges spanning the sixth to eighth decades of life. Both cohorts were predominantly female, accounting for nearly four-fifths of the study population in each group, reflecting the higher prevalence of advanced knee osteoarthritis among women in this age group (Table 1).

In terms of patient-reported outcomes, notable differences were observed between the groups. The mean satisfaction score, measured on a scale of 0 to 100, was higher among patients who underwent TKA+OLR (85.1) compared with those who underwent TKA alone (78.2). Similarly, the reported improvement in QoL, assessed on a 6-point

ordinal scale, was slightly greater in the TKA+OLR group (mean 5.1) than in the TKA-alone group (mean 4.8). These findings suggest that the addition of OLR may contribute to improved patient satisfaction and perceived functional benefit, although the magnitude of difference in QoL scores was relatively modest (Table 1).

**Table 1: Baseline characteristics of patients undergoing TKA with and without open lateral release.**

| Characteristics | | TKA alone, (n=77) | Total knee replacement with OLR, (n=79) |
|---|---|---|---|
| **Mean age (in years±SD)** | | 67.4±8.7 | 67.9±8.5 |
| **Age range (in years)** | | 51-85 | 52-86 |
| **Gender** | Female | 61 (79.2%) | 65 (82.3%) |
| | Male | 16 (20.8%) | 14 (17.7%) |
| **Satisfaction (/100) (mean)** | | 85.1 | 78.2 |
| **QoL improvement (/6) (mean)** | | 5.1 | 4.8 |

**Table 2: Comparison of patient-reported outcomes between TKA alone and TKA with open lateral release (TKA with OLR).**

| Outcomes | TKA alone (mean±SD) | TKA with OLR (mean±SD) | Mean difference (95% CI) | P value |
|---|---|---|---|---|
| **Satisfaction score (/100)** | 78.2±SD | 85.1±SD | +6.9 (0.04-13.93) | 0.049 |
| **QoL score (/6)** | 4.8±SD | 5.1±SD | +0.3 (-0.11-0.65) | 0.16 |

Majority of patients in both groups reported being either fully or somewhat satisfied with their surgical outcomes, corresponding to a total satisfaction score of 75% or higher. Across the individual domains of the Goodman scale, patients undergoing TKA alone demonstrated lower satisfaction than those undergoing TKA with OLR, particularly in pain relief (82.5% vs. 88.3%), ability to perform household tasks (83.8% vs. 85.8%), and recreational activities (80.2% vs. 82.9%), while overall satisfaction was slightly higher in the TKA-alone group (84.0% vs. 83.5%). As illustrated in Figure 2, these trends were consistent across domains. When combined into a composite score, satisfaction was significantly higher in the TKA+OLR group compared with the TKA-alone group (85.1 vs. 78.2, p=0.049, 95% CI: 0.04-13.93), as shown in (Table 2) (Figure 4).

QoL improvement, measured on a six-point scale, was modestly higher in the TKA+OLR group (5.1) compared with the TKA-alone group (4.8). This difference did not reach statistical significance (p=0.16, 95% CI: -0.11 to 0.65). These findings are summarized in Table 2 and depicted in Figure 3 and 4, demonstrating broadly similar QoL improvements between the two groups. Baseline demographic characteristics for both cohorts are provided in Table 1.

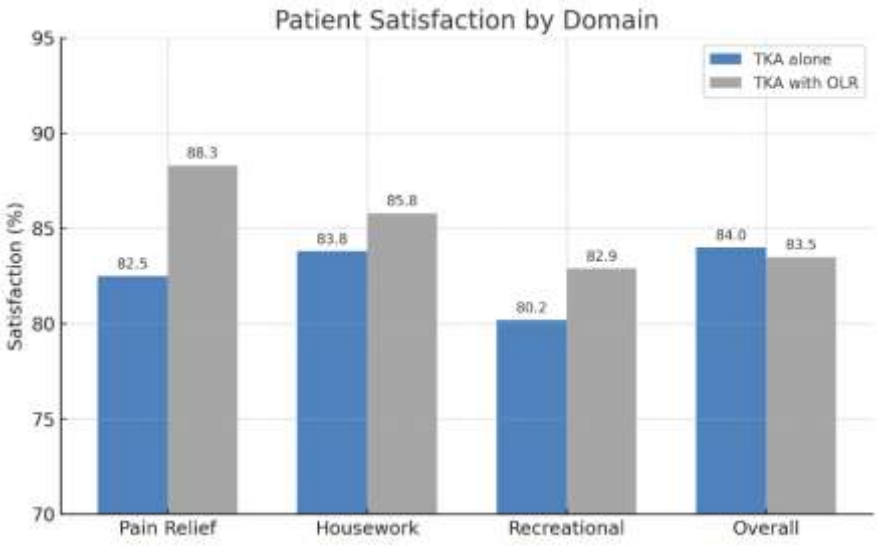


**Figure 2: Comparison of patient satisfaction domains between TKA alone and TKA with open lateral release (TKA with OLR).**

*The analysis demonstrates higher satisfaction with pain relief, household activities, and recreational activities among patients who underwent TKA with OLR, while overall satisfaction scores were comparable between the two groups.

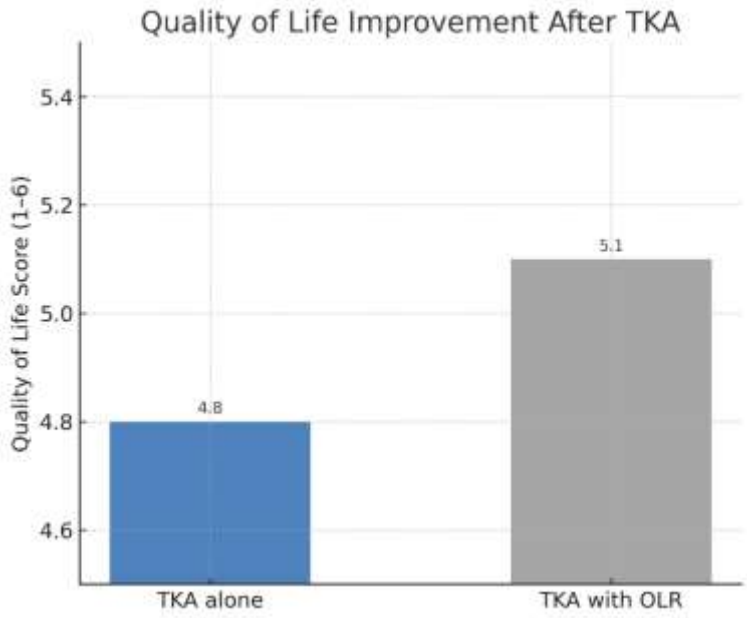


**Figure 3: Comparison of QoL improvement following TKA alone versus TKA with open lateral release (TKA with OLR).**

*Mean QoL scores were 4.8 for TKA alone and 5.1 for TKA with OLR on a 6-point scale, indicating a modest but consistent improvement in the group that received the adjunct procedure.

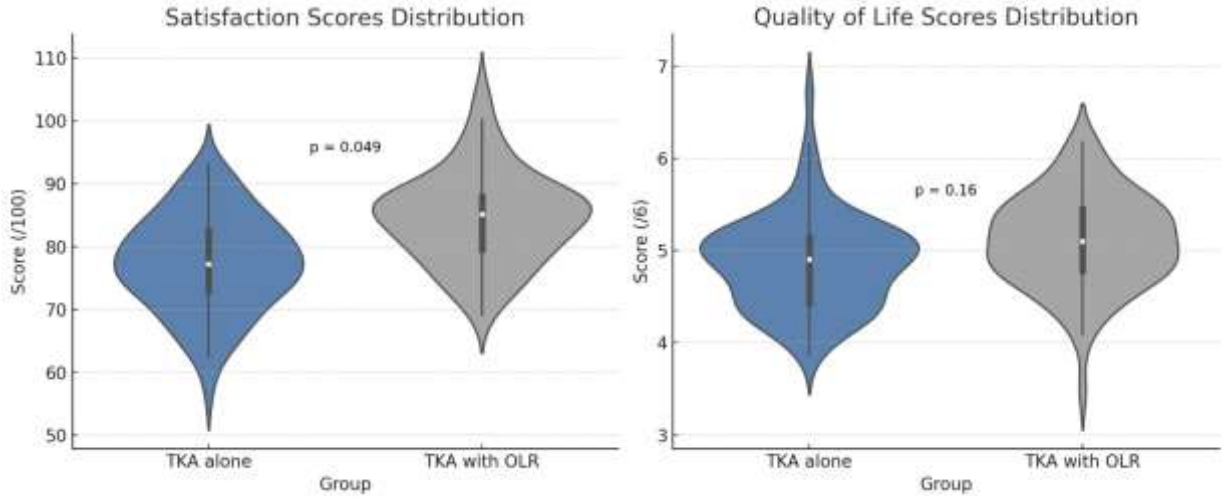


**Figure 4: Distribution of satisfaction scores (left) and QoL scores (right) in patients undergoing TKA alone versus TKA with OLR.**

*Violin plots with embedded boxplots illustrate medians, interquartile ranges, and overall score distributions. The annotated p values indicate the results of independent-sample t tests, showing a significant difference in satisfaction (p=0.049) but no significant difference in QoL improvement (p=0.16).

## DISCUSSION

This retrospective study evaluated patient satisfaction and QoL outcomes after TKA, comparing procedures performed with and without concomitant OLR. Using the Goodman satisfaction scale, our analysis demonstrated that patients in the TKA+OLR group reported significantly higher overall satisfaction scores compared with those who underwent TKA alone. Importantly, however, the two groups did not differ significantly in their reported improvement in QoL, suggesting that while adjunctive OLR may enhance specific aspects of patient-perceived surgical success, its impact on broader health-related QoL is less pronounced.

The observation that satisfaction improved with the addition of OLR, while QoL remained unchanged, may be explained by differences in what these measures capture. Satisfaction scores are procedure-specific and reflect immediate perceptions of surgical success in domains such as pain relief, patellar tracking, and functional activities directly related to the operated knee. In contrast, QoL

instruments assess broader aspects of health and well-being, which are influenced not only by the operated joint but also by comorbidities, psychosocial status, lifestyle factors, and limitations in other joints. Thus, while OLR may enhance local knee-related outcomes by improving alignment and reducing maltracking, these gains may not translate into a measurable difference in overall QoL, particularly in older populations with multiple health issues or limited activity expectations. This discrepancy highlights the complexity of patient-reported outcomes and underscores importance of using both joint-specific and global measures when evaluating surgical success.

To the best of our knowledge, no prior studies in the Middle East have directly compared patient satisfaction between TKA with and without OLR, making our findings among the first in the regional context. One relevant international study by Barahona et al evaluated patient satisfaction and perceived QoL following TKA using the Goodman scale; they included 131 TKA patients and reported very high satisfaction rates in domains of pain relief, ability to perform house/yard work, and overall satisfaction, with more than 90% of patients rated as satisfied.[20] That work underscores the ceiling effect often encountered with joint-replacement satisfaction metrics. In our cohort, we observed somewhat lower domain-specific satisfaction (e.g. household and recreational activities), which may reflect differences in patient expectations, surgical technique, or population characteristics. Importantly, Barahona's work did not address OLR vs non-OLR comparisons, so while our pattern of high satisfaction is consistent with theirs, its applicability to our intervention contrast is limited

The role of lateral release in TKA remains debated.[21-23] Gerbino et al conducted a long-term observational study of 140 patients, using the Cincinnati and Lysholm scales to assess outcomes after lateral release, and reported favorable functional results with sustained patient satisfaction over follow-up periods extending up to 22 years.[24] Although our study employed the Goodman scale rather than the functional indices used by Gerbino and colleagues, both investigations converge on the finding that lateral release can be performed safely and is associated with positive long-term patient-reported outcomes. The consistency of findings across different measurement tools reinforces the potential utility of OLR as a complementary intervention in select patients undergoing TKA.

In addition, our findings align with those of Al Thaher et al who evaluated 118 Jordanian patients undergoing TKA using the WOMAC and SF-36 scales.[18] That study demonstrated substantial postoperative improvements in pain, stiffness, and physical function, thereby underscoring the transformative role of TKA in improving health-related QoL. While our study focused more narrowly on patient satisfaction using the Goodman scale, the similarities in trends between the two investigations suggest that improvements in both satisfaction and QoL are reliably achieved across different assessment instruments, even though our study did not find a statistically significant difference in QoL improvement between surgical groups.

Despite the valuable insights offered, certain limitations must be acknowledged. The reliance on patient self-report through telephone-administered questionnaires introduces the potential for recall bias and subjective variability in responses. Furthermore, the retrospective design precludes causal inference, and unmeasured confounders, such as preoperative functional status, degree of maltracking, or intraoperative surgical decisions, may have influenced outcomes. Our sample size, although sufficient to detect a significant difference in satisfaction scores, may not have been large enough to identify more subtle differences in QoL. In addition, the follow-up duration, limited to a minimum of six months, may not capture longer-term satisfaction or potential late complications.

Taken together, our results suggest that OLR, when performed alongside TKA, may enhance patient satisfaction without introducing additional detriment to overall QoL. Future prospective, multicenter studies with larger sample sizes and standardized follow-up intervals are warranted to confirm these findings, explore the long-term impact of OLR on functional outcomes, and clarify which patient subgroups may benefit most from this adjunctive procedure.

## CONCLUSION

This study evaluated the impact of adding OLR to TKA on patient-reported outcomes. The findings demonstrated that patients who underwent TKA with OLR achieved significantly higher satisfaction scores compared with those who underwent TKA alone. However, no statistically significant difference was observed between the groups in terms of improvement in QoL. These results suggest that while OLR may enhance patient satisfaction in the medium term, its effect on broader quality-of-life measures appears limited. Further prospective studies with larger cohorts and longer follow-up are warranted to confirm these findings and to better define the role of OLR in optimizing outcomes after TKA.

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