# Are There Differences in Patient-Reported Outcomes Based on Patellofemoral Resurfacing in Primary Total Knee Arthroplasty? A Propensity Matching Study

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INTRODUCTION:

Patella resurfacing has been reported to be performed in up to 94% of total knee arthroplasties (TKA) in the United States. However, there are no established best practices for its use in primary TKA, given the lack of consensus data surrounding resurfacing. While a theoretical benefit is the reduction of anterior knee pain and implant longevity, the influence of patella resurfacing on anterior knee pain remains controversial. While studies have demonstrated up to a five-fold reduction in its prevalence among patients with resurfaced knees, more recent studies report equivalent rates of anterior knee pain after TKA among those with a resurfaced or unresurfaced patella. Patella resurfacing is also associated with complications, including patella fracture, instability, and extensor mechanism disruption. A previous study demonstrated that patients with resurfaced patella have over a ten-fold increase in patellar fracture. These benefits and risks greatly influence patient reported outcomes after TKA. Previous studies have investigated patient-reported outcome measures (PROMs) between the two cohorts; however, these studies were limited by a relatively small sample size and/or lack of propensity matching. Therefore, this study aims to compare PROM scores in propensity matched patients who underwent TKA with and without patella resurfacing using thresholds of clinical significance.

METHODS: A total of 11,210 consecutive patients who underwent primary TKA at a single tertiary institution were screened. Inclusion required the completion of at least one pre- and post-operative PROM survey. Patients were categorized based on whether they underwent patellar resurfacing with TKA. Patients were propensity matched in a 1:2 ratio by age, gender, body mass index, Charlson comorbidity score, and American Society of Anesthesiologists classification. The following PROM surveys were included: Physical Function Short Form (SF-10a), Patient Reported Outcome Measuring Information Systems (PROMIS) Global Mental and Global Physical Forms, and the Knee disability and Osteoarthritis Outcome Score – Physical Function Short Form (KOOS-PS). The mean PROM score for each survey was recorded for each cohort. The difference between the mean pre- and post-operative PROM scores for each cohort was calculated as delta. The delta score was then used to determine the threshold of minimal clinically important difference (MCID-I) with improvement and worsening (MCID-W). Post-operative complications and hospital utilization rates were documented.

RESULTS:

Of the 2,799 eligible patients, 1,242 patients who underwent patellar resurfacing TKA were matched to 621 patients who underwent TKA without resurfacing. There was no difference in mean age, BMI, and length of stay from time of admission to discharge between the two cohorts. Both cohorts had comparable readmission, reoperation, and revision rates after surgery. Patients without resurfacing had a lower preoperative SF-10a score compared to the resurfacing cohort (p=0.0263). No differences in PROMIS Mental, PROMIS Physical, and KOOS-PS surveys were seen in terms of mean preoperative, postoperative, and delta scores. A larger percentage of those with a non-resurfaced patella achieved MCID-I (70 vs. 63%; p=0.0083), and fewer reached the MCID-W threshold (10 vs. 14%; p=0.0344) after surgery compared to the resurfacing cohort. In contrast, a greater proportion of patients in the no resurfacing cohort showed no clinically meaningful change in their PROMIS Physical scores after undergoing primary TKA. All other PROM surveys demonstrated similar rates of MCID-I and MCID-W, with no change in either cohort.

DISCUSSION AND CONCLUSION:

This study is one of the first to compare clinically meaningful differences in PROMs following TKA in propensity matched patients with and without patella resurfacing. All PROMs except for SF-10a demonstrated no difference in the proportion of patients who achieved MCID in both cohorts. Compared to the unresurfaced cohort, patients in the resurfaced cohort were less likely to achieve MCID-I with the SF-10a, a non-specific assessment of a patient's general physical function that is not limited to the knee. The comparable rate of patients who achieve MCID-I with the KOOS-PS suggests that the decision to undergo patella resurfacing does not impact patients' perception of their knee function after TKA. The findings from this study can be used for preoperative counselling in patients inquiring about patella resurfacing.

**Table 1.** Baseline demographics were compared among propensity score-matched patients who underwent total knee arthroplasty with and without patellar resurfacing.

| Variable | Resurfacing (N=1,242) | No Resurfacing (N=621) | P Value |
|---|---|---|---|
| **Age** | 67.5 ± 8.9 | 67.4 ± 9.3 | 0.892 |
| **BMI** | 30.5 ± 5.8 | 30.5 ± 5.9 | 0.835 |
| **Gender** | 536 (43.2%) | 267 (43.0%) | 0.987 |
| Male | 706 (56.8%) | 354 (57.0%) | |
| Female | | | |
| **Race** | 1108 (89.2%) | 558 (89.9%) | 0.416 |
| White | 49 (3.9%) | 16 (2.6%) | |
| Black or African American | 25 (2.0%) | 16 (2.6%) | |
| Asian | 2 (0.2%) | 0 (0.0%) | |
| Other | 58 (4.7%) | 31 (5.0%) | |
| **Discharge Disposition** | | | 0.102 |
| Home | 1114 (89.7%) | 538 (86.6%) | |
| Care Provided after Hospitalization | 127 (10.2%) | 83 (13.4%) | |
| Other | 1 (0.1%) | 0 (0.0%) | |
| **Length of Stay (hours)** | 43.2 ± 32.0 | 44.3 ± 28.5 | 0.469 |
| **Readmission** | 95 (7.6%) | 38 (6.1%) | 0.266 |
| **Reoperation** | 91 (7.3%) | 38 (6.1%) | 0.384 |
| **Revision** | 68 (5.5%) | 21 (3.4%) | 0.060 |

*BMI= body mass index*

**Table 2.** Comparison of patient-reported outcome measure surveys among cohorts who underwent primary total knee arthroplasty with and without patellar resurfacing.

| PROM Survey | Resurfacing (N=1,242) | No Resurfacing (N=621) | P Value |
|---|---|---|---|
| **SF10-a** | N = 1149 | N = 581 | |
| Preoperative Score | 37.20 ± 5.33 | 36.71 ± 5.42 | **0.0263** |
| Postoperative Score | 42.88 ± 7.68 | 42.87 ± 7.73 | 0.8471 |
| Delta Score | 5.69 ± 6.96 | 6.16 ± 6.64 | 0.0754 |
| MCID-I | 726 (63%) | 405 (70%) | **0.0083** |
| No Change | 266 (23%) | 118 (20%) | 0.2 |
| MCID-W | 157 (14%) | 58 (10%) | **0.0344** |
| **PROMIS Mental** | N = 1168 | N = 583 | |
| Preoperative Score | 50.93 ± 8.76 | 50.24 ± 9.14 | 0.1074 |
| Postoperative Score | 52.47 ± 8.88 | 52.02 ± 9.04 | 0.3127 |
| Delta Score | 1.54 ± 6.74 | 1.79 ± 6.62 | 0.425 |
| MCID-I | 536 (46%) | 289 (50%) | 0.1605 |
| No Change | 274 (23%) | 126 (22%) | 0.4197 |
| MCID-W | 358 (31%) | 168 (29%) | 0.4631 |
| **PROMIS Physical** | N = 1169 | N = 583 | |
| Preoperative Score | 41.67 ± 7.28 | 41.32 ± 7.39 | 0.2747 |
| Postoperative Score | 47.24 ± 8.49 | 47.28 ± 8.69 | 0.8849 |
| Delta Score | 5.57 ± 7.27 | 5.96 ± 7.21 | 0.4963 |
| MCID-I | 765 (65%) | 362 (62%) | 0.185 |
| No Change | 237 (20%) | 144 (25%) | **0.0399** |
| MCID-W | 167 (14%) | 77 (13%) | 0.5885 |
| **KOOS-PS** | N = 920 | N = 492 | |
| Preoperative Score | 55.40 ± 14.24 | 55.83 ± 13.36 | 0.8961 |
| Postoperative Score | 69.82 ± 15.27 | 70.42 ± 15.67 | 0.4414 |
| Delta Score | 14.42 ± 16.13 | 14.60 ± 16.19 | 0.9453 |
| MCID-I | 645 (70%) | 341 (69%) | 0.8017 |
| No Change | 190 (21%) | 118 (24%) | 0.1686 |
| MCID-W | 85 (9%) | 33 (7%) | 0.1243 |

*Bolded values demonstrate a significant P-value < 0.05.*
*SF10-a= Physical Function Short Form; PROMIS= patient reported outcome measuring information systems; KOOS-PS= Knee disability and Osteoarthritis Outcome Score – Physical Function Shortform; MCID-I=minimal clinically important difference-improvement; MCID-W= minimal clinically important difference- worsening*