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COMPARING PATELLAR RESURFACING VERSUS NON-RESURFACING TOTAL KNEE ARTHROPLASTY OUTCOMES: A PROSPECTIVE STUDY.

Kanhaiya Lal Gupta
Assistant Professor, Department of Orthopaedic, J. L. N. M. C. H., Bhagalpur, Bihar, India.

ABSTRACT

Background

The use of patellar resurfacing in total knee arthroplasty (TKA) is still contentious. The study has sought to elucidate the differences in outcomes between patellar resurfacing and patellar non-resurfacing total knee arthroplasty procedures in individuals undergoing knee replacement surgery.

Methods

This prospective observational study conducted from July 2021 to July 2023, enrolled 140 patients aged over 50 years undergoing primary TKA for knee osteoarthritis. Based on predetermined criteria, patients were categorized into two groups: those undergoing patellar resurfacing and those not. Validated scoring systems were utilized to assess clinical outcomes, functional gains, and patient satisfaction. The visual analog scale (VAS) was employed to measure pain intensity. Version 21.0 of the SPSS program was used to conduct the statistical analysis.

Results

Following surgery, both groups (n = 70) showed a considerable increase in functional results, pain relief, and clinical outcomes. Additionally, both groups had high patient satisfaction rates—above 90%. On the other hand, neither the clinical nor functional Knee Society scores (p = 0.185) significantly differed between the two groups. In a similar vein, there was no discernible variation between the two groups' rates of pain relief (p = 0.215) or patient satisfaction (p = 0.467). The frequency of minor problems was similar in each group.

Conclusion

Both patellar resurfacing and non-resurfacing techniques yielded favorable outcomes in terms of clinical improvement, functionality, patient satisfaction, and pain reduction in individuals undergoing TKA for knee osteoarthritis. Resurfacing the patella should be decided individually, taking the patient's preferences and circumstances into account.

Recommendations

Further research is warranted to identify specific patient populations that may benefit most from patellar resurfacing or non-resurfacing techniques. Surgeons should weigh the potential benefits and drawbacks of each approach and tailor the treatment strategy accordingly.

Keywords: *Total Knee Arthroplasty, Patellar Resurfacing, Patellar Non-Resurfacing, Clinical Outcomes, Patient Satisfaction.*
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Corresponding Author: *Kanhaiya Lal Gupta**
Email: drklgpt@gmail.com
Assistant Professor, Department of Orthopaedic, J. L. N. M. C. H., Bhagalpur, Bihar, India.

INTRODUCTION

Among orthopedic surgeons, patellar resurfacing in total knee arthroplasty (TKA) is still an issue of contention. Resurfacing the patella during TKA is determined by several factors, including clinical outcomes, surgeon preference, and patient-specific concerns. When treating end-stage knee osteoarthritis, TKA is a popular and successful procedure that significantly enhances function, pain management, and quality of life. The question of whether patellar resurfacing during TKA improves results and reduces revision rates when compared to non-resurfacing is at the heart of the disagreement. Proponents of patellar resurfacing argue that it reduces patellofemoral pain and complications, leading to improved patient satisfaction and functional outcomes [1]. Conversely, advocates for non-resurfacing highlight the potential for reduced surgical time, lower cost, and avoidance of patella-related complications such as fracture, dislocation, and wear [2].

Recent meta-analyses and randomized controlled trials have sought to provide more definitive evidence on this issue. For instance, a comprehensive meta-analysis compared the results of patellar resurfacing and non-resurfacing in over 10,000 patients from randomized controlled trials. The study found that patellar resurfacing was related to a slightly lower rate of reoperation due to patellofemoral complications but did not significantly affect overall revision rates, pain scores, or functional outcomes [3]. These findings suggest that while patellar

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resurfacing may offer some benefits in reducing specific patellofemoral complications, the overall impact on patient outcomes may be limited.

Furthermore, patient-specific factors such as preoperative patellofemoral pain, patellar cartilage wear, and alignment issues play a crucial role in the decision-making process. A study emphasized the importance of individualized patient assessment, noting that certain subgroups of patients might benefit more from patellar resurfacing, particularly those with significant preoperative patellofemoral symptoms or severe patellar cartilage damage [4].

The study aims to assess and compare the clinical outcomes, functional improvements, and patient satisfaction between patellar resurfacing and patellar non-resurfacing total knee arthroplasty procedures in individuals undergoing knee replacement surgery.

METHODOLOGY

Study Design

A prospective observational study.

Study Setting

The study was conducted at Jawahar Lal Nehru Medical College (JLNMCH) Bhagalpur, Bihar, India, from July 2021 to July 2023.

Participants

A total of 140 individuals were enrolled in the study.

Inclusion and exclusion criteria

Undertaking primary TKA and over 50 years of age with knee osteoarthritis, less than 30° varus and flexion deformity, and substantial patellofemoral joint pathology were included. Patients undergoing knee revision surgery, ankylosis, valgus deformities, extra-articular abnormalities, and those with metal hardware still in place around the knee were among the exclusion criteria.

Bias

To minimize bias, patients were selected based on specific inclusion and exclusion criteria, and efforts were made to ensure uniformity in the assessment and treatment protocols.

Variables

The primary variables include clinical outcomes, functional improvements, and patient satisfaction measured through Knee Society clinical scores, functional scores, and visual analog scale (VAS) for pain intensity, respectively.

Data Collection

Preoperative and one-year postoperative assessments were conducted to compare the results. Physical evaluations and validated scoring methods were used to assess clinical progress and functionality. VAS was used to measure the intensity of pain.

Statistical Analysis

Numbers, percentages, and mean ± standard deviation were used to represent variables. Paired t-tests were used to compare groups within an intervention before and after it. At $p < 0.05$, statistical significance was taken into account. Version 21.0 of the SPSS program was used to analyze the data.

RESULT

Out of the initial 140 participants, 70 were assigned to the patellar resurfacing group and 70 to the patellar non-resurfacing group. The mean age of the participants was 65 years (± 5), with a majority being female (60%).

Table 1: Demographic features

Characteristic	Patellar Resurfacing Group	Patellar Non-resurfacing Group
Total Participants	70	70
Age (years), Mean	65 ± 5	65 ± 5
Gender		
- Male	28	31
- Female	42	39
Body Mass Index (BMI), Mean	28.5 ± 3.2	28.3 ± 3.5
Comorbidities		
- Hypertension	20%	22%
- Diabetes	15%	18%
- Others	10%	12%

Both groups' clinical results at the 2-year follow-up were significantly better than their preoperative conditions. In contrast, there was not a significant variation in the clinical ($p = 0.321$) or functional ($p = 0.185$) Knee Society scores between the two groups.

In terms of functional gains, both groups showed improved functionality following surgery. In the patellar resurfacing group, the mean functional scores went from 40 (± 10) preoperatively to 80 (± 15) postoperatively, while in the patellar non-resurfacing group, they increased from 38 (± 12) to 78 (± 14).

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90% of patients in both groups expressed satisfaction with the surgical results, indicating good patient satisfaction ratings. The satisfaction rates of the two groups did not, however, differ significantly (p = 0.467).

After surgery, there was a considerable reduction in pain intensity in both groups as determined by the VAS. In the patellar resurfacing group, the average VAS score dropped from 7.5 (± 1.2) preoperatively to 2.5 (± 0.8) postoperatively, while in the patellar non-resurfacing group, it reduced from 7.8 (± 1.0) to 2.7 (± 0.9). Between both groups, there was no statistically relevant variation in pain reduction (p = 0.215).

Table 2: Comparative Outcomes of Patellar Resurfacing and Non-Resurfacing Groups in Knee Surgery

Outcome	Patellar Resurfacing Group	Patellar Non-Resurfacing Group
Clinical Scores		
- Pre	65 (± 5)	63 (± 6)
- Post	85 (± 7)	83 (± 8)
Functional Scores		
- Pre	40 (± 10)	38 (± 12)
- Post	80 (± 15)	78 (± 14)
Pain Reduction (VAS)		
- Pre	7.5 (± 1.2)	7.8 (± 1.0)
- Post	2.5 (± 0.8)	2.7 (± 0.9)
Complications		
Wound infection	2%	1%
Neurovascular issues	3%	4%

During the trial period, no significant problems were recorded in either group. In less than 5% of the individuals in both groups, minor problems such as wound infection and temporary postoperative neurovascular impairments occurred.

Overall, functional improvement, pain relief, patient satisfaction, and clinical improvement were all achieved with both group's procedures. Nevertheless, no discernible variations were found in any of the assessed parameters between the two groups.

DISCUSSION

The study compared the outcomes of patellar resurfacing and non-resurfacing groups in knee surgery, involving 140 participants with a mean age of 65 years and a majority being female. Both groups demonstrated significantly improved clinical and functional scores at the 2-year follow-up compared to preoperative conditions. Specifically, patients in the patellar resurfacing group showed mean clinical scores of 85 (± 7) postoperatively compared to 65 (± 5) preoperatively, while those in the non-resurfacing group had scores of 83 (± 8) postoperatively compared to 63 (± 6) preoperatively.

Functional gains were observed in both groups, with the patellar resurfacing group increasing from a mean score of 40 (± 10) preoperatively to 80 (± 15) postoperatively, and the non-resurfacing group increasing from 38 (± 12) to 78 (± 14). Pain reduction, measured by the Visual Analog Scale (VAS), was notable in both groups, with average VAS scores dropping from 7.5 (± 1.2) to 2.5 (± 0.8) in the patellar resurfacing group and from 7.8 (± 1.0) to 2.7 (± 0.9) in the non-resurfacing group postoperatively.

Complication rates, including wound infections and neurovascular issues, were low and comparable between the groups, with wound infection rates at 2% in the resurfacing group and 1% in the non-resurfacing group, and neurovascular issues at 3% and 4%, respectively. Overall, both procedures led to notable improvements in functional outcomes, pain relief, patient satisfaction, and clinical scores, with no apparent differences in outcomes between the two groups.

The comparative outcomes of patellar resurfacing vs. non-resurfacing in TKA have been extensively studied, yielding varied results. A prospective comparative study highlighted that patellar resurfacing offers better clinical and functional outcomes, including relief from anterior knee pain, compared to non-resurfacing [5]. Contrarily, an observational study in a South Indian population found no significant differences in knee-related readmissions, subsequent patella-related surgeries, or overall patient satisfaction between the two groups, suggesting a more selective approach to patellar resurfacing [6].

Another study focusing on a subpopulation in Western India reported significant improvements in Knee Society Score (KSS) and VAS postoperatively for non-patella resurfacing techniques, indicating effective outcomes without resurfacing [7]. These findings are complemented by research indicating that while patellar resurfacing may reduce specific patellofemoral complications, its overall impact on patient outcomes, including revision rates and functional scores, may be limited [8, 9, 10]. Collectively, these studies underscore the complexity of decision-making in patellar treatment during TKA and the importance of considering patient-specific factors and regional clinical outcomes.

Generalizability

The study comparing patellar resurfacing and non-resurfacing techniques in knee replacement surgery informs broader clinical practice and policy development. It demonstrates comparable outcomes between the two techniques, aiding surgeons in evidence-based decision-making for total knee arthroplasty. While both approaches show similar improvements in clinical scores, functionality, patient satisfaction, and pain reduction, further research is needed to identify specific patient subgroups that may benefit more from one technique over the other, facilitating personalized care and optimizing surgical outcomes.

CONCLUSION

There were no discernible changes between the two groups' functional abilities, pain relief, patient satisfaction, or clinical results. Both methods had excellent outcomes with low incidence of complications and high patient satisfaction. The results indicate that a patient's preferences and unique circumstances should be taken into consideration when deciding whether to resurface the patella. To determine the precise patient populations that would profit most from each method, more investigation is required.

Limitations

The limitations of the study include a small sample size, potential selection bias from its observational design, limited two-year follow-up, subjective self-reported measures, and a single-center design, all of which may impact the generalizability and robustness of the findings.

Recommendations

The study recommends further research to identify specific patient populations that may benefit most from patellar resurfacing or non-resurfacing techniques. Surgeons are advised to carefully consider the potential benefits and drawbacks of each approach and tailor the treatment strategy accordingly.

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List of abbreviations

TKA - Total Knee Arthroplasty
VAS - Visual Analog Scale

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Conflict of interest

The authors have no competing interests to declare.

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