








DOES PARTIAL MEDIAL KNEE ARTHROPLATIES HAVE BETTER RESULTS THAN TOTAL ONES?

ARTROPLASTIAS PARCIAIS MEDIAIS DO JOELHO TÊM RESULTADOS MELHORES DO QUE AS TOTAIS?

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ABSTRACT

Objective: Compare the results of medial unicompartmental knee arthroplasty (UKA) using a mobile platform and total knee arthroplasty (TKA) in patients with isolated medial osteoarthritis. **Methods:** Retrospective cross-sectional study. Preoperative radiographs of 602 patients who underwent knee arthroplasty between February 2017 and February 2020 were evaluated. Isolated medial osteoarthritis was found in 125 patients. Of these, 57 underwent UKA and 68 TKA. With chart analysis and telephone interviews, we compared patients' clinical outcomes and degree of satisfaction. The statistical analysis used a confidence level of 5%. **Results:** The group of UKA patients obtained 65.8% of favorable results against 79.1% of those undergoing TKA in the function questionnaire ($p < 0.0001$). The complication rate was statistically similar between the groups ($p > 0.5$). Most patients were satisfied or very satisfied in both groups (88.6% of UKA and 91.2% of TKA) ($p > 0.999$). **Conclusion:** Patients submitted to UKA or TKA have presented the same degree of satisfaction and rate of postoperative complications when comparing patients with isolated medial osteoarthritis. UKA patients had less favorable results on the clinical functional questionnaire than patients undergoing total arthroplasty. **Level Of Evidence III; Retrospective Study.**

Keywords: Knee. Arthroplasty. Osteoarthritis. Arthroplasty, replacement, knee.

RESUMO

Objetivo: Comparar os resultados da artroplastia unicompartmental do joelho (UKA) medial com plataforma móvel e artroplastia total do joelho (TKA) em pacientes com osteoartrose medial isolada. **Métodos:** Estudo transversal retrospectivo. Foram avaliadas radiografias pré-operatórias de 602 pacientes submetidos à artroplastia de joelho entre fevereiro de 2017 e fevereiro de 2020. A osteoartrose medial isolada foi encontrada em 125 pacientes, destes em 57 haviam sido submetidos a UKA e 68 TKA. Com análise de prontuários e entrevistas telefônicas comparamos os resultados clínicos e o grau de satisfação dos pacientes. A análise estatística utilizou nível de confiança de 5%. **Resultados:** O grupo de pacientes com UKA obteve 65,8% de resultados favoráveis contra 79,1% daqueles submetidos à TKA no questionário de função ($p < 0,0001$). A taxa de complicações foi estatisticamente semelhante entre os grupos ($p > 0,5$). A maioria dos pacientes estava satisfeita ou muito satisfeita em ambos os grupos (88,6% de UKA e 91,2% de TKA) ($p > 0,999$). **Conclusão:** Pacientes submetidos a UKA ou TKA apresentaram o mesmo grau de satisfação e taxa de complicações pós-operatórias quando comparados pacientes com osteoartrite medial isolada. Os pacientes da UKA apresentaram resultados menos favoráveis ao questionário clínico funcional do que os pacientes submetidos à artroplastia total. **Nível de Evidência III; Estudo Retrospectivo.**

Descritores: Joelho. Artroplastia. Osteoartrite. Artroplastia do Joelho.

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INTRODUCTION

Unicompartmental Knee Arthroplasty (UKA) is an alternative to total knee arthroplasty (TKA).¹ Studies demonstrated that medial UKA is associated with a shorter hospital stay, lower infection rate and better range of motion, compared to TKA.²⁻⁴

However, some studies have shown that UKA has a higher rate of revisions in up to 10 years compared to TKA.⁴⁻⁶ This higher rate of reoperations relates directly to the surgeon's experience with UKA through the number of surgeries performed annually, as 80% of knee surgeons perform less than 10 UKAs per year.⁷ The TOPKAT

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The study was conducted at the Hospital de Ortopedia Uniort.e Londrina and School of Medicine at PUCPR- Londrina Campus.

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randomized clinical trial found similar rates of surgical revisions in patients undergoing UKA and TKA.⁸ A systematic review of over 8000 patients who underwent Oxford® unicompartmental medial arthroplasty demonstrated that the rate of revisions alone was higher in UKA. However, if considered all surgical reapproaches, this number was higher in TKA.⁶

Some individuals with an indication for unicompartmental medial prosthesis often still undergo total prosthesis in our country because they are still not available in some centers, and some surgeons are still unaware of the indications and techniques.⁹

In this study, we compared the clinical outcomes and degree of satisfaction of patients with isolated medial compartment osteoarthritis of the knee who underwent medial knee replacement with the Oxford Mobile Platform or TKA in the same period with at least six months of postoperative follow-up. We hypothesized that there were better clinical outcomes and a higher degree of satisfaction in patients undergoing UKA.

METHODS

The study was approved by the Ethics and Research Committee of the Institution (CAAE: 31747020.8.0000.0020).

A retrospective cross-sectional study with chart analysis and telephone interviews was conducted to compare the clinical outcomes and degree of satisfaction. Patients who underwent Oxford® mobile bearing medial unicompartmental arthroplasty or total knee arthroplasty by our knee surgery group between February 2017 and February 2020 were selected.

Inclusion criteria were patients with preoperative radiographs that fit the radiographic criteria for medial unicompartmental arthroplasty,¹⁰⁻¹¹ undergoing total or medial unicompartmental arthroplasty with a follow-up of at least six months, with complete medical records and the possibility of phone contact. The analysis of all preoperative radiographs and medical records excluded patients with less than 6 months of follow-up, patients older than 75, and younger than 50 years of age, to form two homogeneous groups concerning age and follow-up time.

The following information was searched in the medical records: name, birth date, date of surgery, side (left or right knee), kind of surgery (UKA or TKA), and complications. After telephone contact, reading and approval of the consent form, the patient answered a questionnaire that consisted of the following questions: degree of satisfaction with the surgery (very dissatisfied, somewhat dissatisfied, somewhat satisfied, satisfied or very satisfied), whether he/she would do the surgery again (yes or no), whether he/she would recommend the same surgery to another patient (yes or no), the length of hospitalization (number of days), if there was a readmission in the first 30 days after surgery, if there was deep vein thrombosis in the first 30 days after surgery, if there was an acute myocardial infarction in the first 30 days after surgery, if there was a stroke in the first 30 days after surgery, if died in the first 30 days after surgery, if had wound problems, if have undergone new surgery (debridement, surgery for arthrofibrosis, peri-prosthetic fracture, or revision surgery), if have had revision surgery, what was the cause (stiffness, infection, aseptic loosening, peri-prosthetic fracture or persistent pain after surgery), and if have any symptoms in the knee (yes or no), if yes what symptoms are present: any walking difficulty (yes or no), can support body weight on the operated leg (yes or no), any difficulty using stairs (yes or no), any difficulty squatting (yes or no), usually have swelling in the knee (yes or no), can bend the knee to 90 degrees of flexion (yes or no), does it bother with any crepitus or "noise" when you move the knee (yes or no).

The Chi-square (χ^2) or Fisher's Exact test were used in statistical analysis to evaluate the qualitative variables. For quantitative variables, Shapiro-Wilk test was firstly applied to analyze normality. Subsequently, the Mann-Whitney test for non-normal data and the t test for variables with Gaussian distribution. The results were analyzed using GraphPad Prism8 software (GraphPad Software Inc., La Jolla, CA, USA), with a 5% confidence level established for all tests applied.

RESULTS

A total of 602 radiographs of patients undergoing TKA (545) and UKA (57) between February 2017 and February 2020 were evaluated. After applying the radiographic criteria,¹⁰⁻¹¹ 477 patients were excluded. Of the 125 included, 57 had been submitted to UKA and 68 to TKA. There were 13 patients of the UKA group that lost follow-up and 14 patients of the TKA group. There were 9 patients in the UKA group and 20 in the TKA outside the limits of maximum and minimum age and follow-up time. (Figure 1)

The two groups were homogeneous in terms of age, sex, and follow-up time. (Table 1)

Regarding the results of the clinical functional questionnaire, 65.8% of the answers from the patients submitted to UKA were favorable, against 79.1% of those submitted to TKA. Such data was statistically significant ($p < 0.0001$). (Table 2)

There was no difference between groups regarding the satisfaction rate ($P > 0.999$) (88.6% in the UKA and 91.2% in the TKA). (Table 3)

Regarding the complications rate there was no statistical difference between groups ($p > 0.5$). (Table 4)

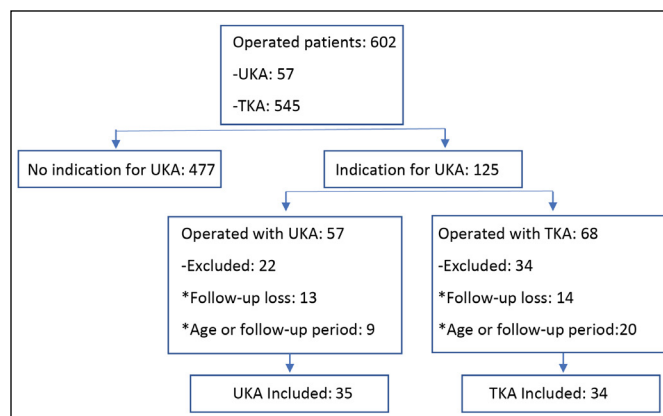


Figure 1. Study flowchart.

Table 1. Demographic data.

	UKA	TKA	P Value
Age (years)	64,1 ± 9,6	64,1 ± 6,9	0,998
Male n (%)	9 (25,7)	9 (26,5)	>0,999
Follow-up time (years)	25,8 ± 10,7	30,2 ± 9,7	0,072

Table 2. Clinical functional questionnaire.

	UKA	TKA	OR (CI 95%)	P Value
Favorable results	65.8%	79.1%	0,51 (0,36 - 0,72)*	<0,0001

* As a reference to the UKA; If the reference is the TKA, the OR is = 1.97 (1.39 - 2.78).

Table 3. Satisfaction rate.

	UKA (n=35)	TKA (n=34)	OR (CI 95%)	P Value
Satisfied or very satisfied	31 (88,6%)	31 (91,2%)	0,75 (0,18 - 3,00)*	>0,999

* Fischer's exact test. OR concerning UKA; if reference is to TKA, it gets OR=1.33 (0.33 - 5.61).

Table 4. Complications.

	UKA	TKA	OR (CI 95%)	P Value
Incidence of complications, n(%)	9 (25,7)	12 (35,3)	0,63 (0,22 - 1,70)	0.440
Superficial and deep infections, n(%)	3 (8,6)	5 (14,7)	0,54 (0,14 - 2,38)*	0.477
Readmission within 30 days, n(%)	1 (2,9)	3 (8,8)	0,30 (0,02 - 2,16)*	0.356
Revision surgery (aseptic loosening), n(%)	3 (8,6)	1 (2,9%)	3,09 (0,43 - 41,23)*	0,613

* Fischer's exact test.

DISCUSSION

This study showed that there was no significant difference between TKA and UKA concerning satisfaction, in patients with medial osteoarthritis.

The "TOPKAT" randomized clinical trial⁸ showed a trend toward patients being more satisfied with the unicompartmental arthroplasty, but no statistical difference between the groups. We found a trend in favor of the total knee arthroplasty but no statistical difference between groups. There was also no statistical difference regarding complications. Literature presents extensive retrospective studies demonstrating fewer complications in medial UKA and a higher number of revisions when compared to the TKA.^{4,5,7} However, these studies compare groups of patients undergoing total and unicompartmental arthroplasty without considering the degree of preoperative impairment. Therefore, in our study, we compared two homogeneous groups (medial focal osteoarthritis). This was possible because the unicompartmental medial prosthesis was not yet routinely performed by all surgeons in the group. Many patients were still unaware of this option, while some health insurances did not authorize this type of implant when the surgeries were performed. Therefore, many patients that would have a precise indication for medial UKA underwent total knee arthroplasty. The "TOPKAT" randomized clinical trial⁸ also compared the results of unicompartmental and total knee arthroplasty in patients who had similar preoperative impairment degrees.

It showed similar number of complications. In the same study,⁸ the authors discuss that the higher numbers of complications shown in previous large retrospective studies³⁻⁵ could be a consequence of the lack of experience of the surgeon where the unicompartmental surgery was performed. The results of our study did not confirm this thesis completely, although there was a higher number, but no statistical difference, of aseptic loosening in the unicompartmental prosthesis group. The follow-up of a higher number of patients may show a statistically significant difference.

The rate of favorable responses found about function and symptoms in the knee was higher in patients submitted to UKA compared to those submitted to TKA. This data differs from that found in the literature⁸ and we believe that it may have been influenced by our team's less experience in performing unicompartmental arthroplasty compared to total arthroplasties at the time of the surgeries. Another fact that may have influenced the answers to the clinical and functional questionnaire is the tendency to create higher patient expectations of clinical and functional results with UKA because it is a less invasive and more preservative surgery when compared to TKA.

We found several limitations in our study. First, the average follow-up time was approximately two years, whereas we predicted durability of more than ten years in most arthroplasty cases. Second, the number of patients is limited for a retrospective cohort on this topic. Third, our patients are from a single center which limits the representativeness of the population. Fourth, we have no preoperative clinical or functional evaluation. Fifth, we did not do any objective functional tests on the patients, just a simplified, non-standardized questionnaire about clinical symptoms and signs. This may make it difficult to compare our results with other studies.

CONCLUSION

Patients with isolated medial osteoarthritis who underwent unicompartmental medial mobile bearing arthroplasty had the same degree of satisfaction and postoperative complication rate as patients who underwent total knee arthroplasty. These patients had less favorable clinical functional questionnaire answers than patients who had undergone TKA.

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REFERENCES

- Crawford DA, Berend KR, Thienpont E. Unicompartmental Knee Arthroplasty: US and Global Perspectives. *Orthop Clin North Am.* 2020;51(2):147-59.
- Brown NM, Sheth NP, Davis K, Berend ME, Lombardi AV, Berend KR, et al. Total knee arthroplasty has higher postoperative morbidity than unicompartmental knee arthroplasty: a multicenter analysis. *J Arthroplasty.* 2012;27(Suppl 8):86-90. doi: 10.1016/j.arth.2012.03.022.
- Little AD, Pandit H, Judge A, Murray DW. Patient-reported outcomes after total and unicompartmental knee arthroplasty: a study of 14,076 matched patients from the National Joint Registry for England and Wales. *Bone Joint J.* 2015;97-B(6):793-801. doi: 10.1302/0301-620X.97B6.35155.
- Wilson HA, Middleton R, Abram SGF, Smith S, Alvand A, Jackson WF, et al. Patient relevant outcomes of unicompartmental versus total knee replacement: systematic review and meta-analysis. *BMJ.* 2019;364:i352. doi: 10.1136/bmj.i352. Erratum in: *BMJ.* 2019;365:i1032.
- Hansen EN, Ong KL, Lau E, Kurtz SM, Lonner JH. Unicompartmental Knee Arthroplasty Has Fewer Complications but Higher Revision Rates Than Total Knee Arthroplasty in a Study of Large United States Databases. *J Arthroplasty.* 2019;34(8):1617-25. doi: 10.1016/j.arth.2019.04.004.
- Mohammad HR, Strickland L, Hamilton TW, Murray DW. Long-term outcomes of over 8,000 medial Oxford Phase 3 Unicompartmental Knees—a systematic review. *Acta Orthop.* 2018;89(1):101-7. doi: 10.1080/17453674.2017.1367577.
- Little AD, Pandit H, Judge A, Murray DW. Optimal usage of unicompartmental knee arthroplasty: a study of 41,986 cases from the National Joint Registry for England and Wales. *Bone Joint J.* 2015;97-B(11):1506-11. doi: 10.1302/0301-620X.97B11.35551.
- Beard DJ, Davies LJ, Cook JA, MacLennan G, Price A, Kent S, et al. The clinical and cost-effectiveness of total versus partial knee replacement in patients with medial compartment osteoarthritis (TOPKAT): 5-year outcomes of a randomised controlled trial. *Lancet.* 2019;394(10200):746-56. doi: 10.1016/S0140-6736(19)31281-4.
- Arliani GG, Júnior JA, Angelini FB, Ferlin F, Hernandez AC, Astur D da C, et al. Unicompartmental knee arthroplasty: current perspectives and trends in Brazil. *Rev Bras Ortop.* 2015;47(6):724-9. doi: 10.1016/S2255-4971(15)30029-X.
- Oosthuizen CR, Burger S, Vermaak DP, Goldschmidt P, Spangenberg R. The X-Ray Knee Instability and Degenerative Score (X-KIDS) to determine the preference for a partial or a total knee arthroplasty (PKA/TKA). *SA Orthop J.* 2015;14(3):61-9.
- Hamilton TW, Pandit HG, Lombardi AV, Adams JB, Oosthuizen CR, Clavé A, et al. Radiological Decision Aid to determine suitability for medial unicompartmental knee arthroplasty: development and preliminary validation. *Bone Joint J.* 2016;98-B(10 Suppl B):3-10. doi: 10.1302/0301-620X.98B10.BJJ-2016-0432.R1.