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ORIGINAL ARTICLE

Impact of anterior cruciate ligament and medial collateral ligament injuries on medial unicompartmental knee arthroplasty outcomes

Impacto de las lesiones del ligamento cruzado anterior y del ligamento colateral medial en los resultados de la artroplastia unicompartimental medial de rodilla

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Abstract

Objective: *The objective of the study is to evaluate clinical outcomes of mobile-bearing Oxford phase III unicompartmental knee arthroplasty (UKA) for medial unicompartmental knee OA with/without anterior cruciate ligament (ACL) and/or medial collateral ligament (MCL) injuries and assess minimum clinically important differences (MCIDs).* **Method:** *A total of 60 patients (70 knees) with anteromedial OA of the knee, treated between March 2020 and June 2022, were included in this retrospective study. Patients were divided into four groups: a no ligament injury group (n = 15; 15 knees), ACL injury group (n = 18; 18 knees), MCL injury group (n = 12; 12 knees), and ACL + MCL injury group (n = 15; 25 knees). All surgeries were performed under general anesthesia using a medial parapatellar approach. The Oxford phase III unicompartmental knee prosthesis was implanted using bone cement. Post-operative rehabilitation included early mobilization, physical therapy, and pain management as part of an Enhanced Recovery After Surgery (ERAS) protocol. Pre-operative and post-operative data, including the Hospital for Special Surgery (HSS) scores and the American Knee Society Score (AKSS), were compared between the groups. Follow-up visits ranged from 15 to 36 months, with a mean of 28.3 months. The MCIDs for both the HSS and AKSS were also calculated and evaluated.* **Results:** *At the final follow-up, significant improvements in the HSS and AKSS scores were observed in all groups compared with pre-operative scores. The mean HSS score increased from 23.3 ± 5.2 preoperatively to 70.7 ± 8.2 postoperatively ($p < 0.001$), and the AKSS increased from 33 ± 5.35 preoperatively to 85.0 ± 5.35 postoperatively ($p < 0.001$). These results indicate significant improvements in knee function following UKA, regardless of ligament injury status.* **Conclusions:** *Oxford phase III UKA demonstrates good short-term efficacy for medial OA with concomitant ligament injuries. Larger multicenter studies with extended follow-up are needed to validate long-term outcomes.*

Keywords: *Unicompartmental knee arthroplasty. Oxford phase III unicompartmental knee prosthesis. Medial unicompartmental knee osteoarthritis. Functional score. Anterior cruciate ligament injury. Medial collateral ligament injury.*

Resumen

Objetivo: *Evaluar los resultados clínicos de la artroplastia unicompartimental de rodilla Oxford fase III con platillo móvil para la artrosis unicompartimental medial de rodilla con o sin lesiones del ligamento cruzado anterior (LCA) o del ligamento colateral medial (LCM), y evaluar las diferencias clínicamente importantes.* **Método:** *Estudio retrospectivo en el que se incluyeron*

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60 pacientes (70 rodillas) con artrosis anteromedial de rodilla, tratados entre marzo de 2020 y junio de 2022. Los pacientes se dividieron en cuatro grupos: sin lesión de ligamentos (n = 15; 15 rodillas), con lesión del LCA (n = 18; 18 rodillas), con lesión del LCM (n = 12; 12 rodillas) y con lesión del LCA y del LCM (n = 15; 25 rodillas). Todas las cirugías se realizaron bajo anestesia general mediante un abordaje pararrotuliano medial. Se implantó una prótesis de rodilla unicompartimental Oxford fase III con cemento óseo. La rehabilitación posoperatoria incluyó movilización temprana, fisioterapia y manejo del dolor como parte del protocolo de recuperación mejorada tras la cirugía (ERAS, Enhanced Recovery After Surgery). Se compararon los datos preoperatorios y posoperatorios entre los grupos, incluyendo las puntuaciones del Hospital for Special Surgery (HSS) y de la American Knee Society (AKSS). Las visitas de seguimiento variaron entre 15 y 36 meses, con una media de 28.3 meses. También se calcularon y evaluaron las diferencias clínicamente importantes en las puntuaciones HSS y AKSS.
Resultados: *En el seguimiento final se observaron mejoras significativas en las puntuaciones HSS y AKSS en todos los grupos, en comparación con las puntuaciones preoperatorias. La puntuación media de la escala HSS aumentó de 23.3 ± 5.2 antes de la operación a 70.7 ± 8.2 después de la operación ($p < 0.001$), y en la escala AKSS aumentó de 33.0 ± 5.35 antes de la operación a 85.0 ± 5.35 después de la operación ($p < 0.001$). Estos resultados indican mejoras significativas en la función de la rodilla tras la artroplastia unicompartimental de rodilla, independientemente del estado de la lesión ligamentosa.*
Conclusiones: *La artroplastia unicompartimental de rodilla Oxford fase III muestra una buena eficacia a corto plazo para la artrosis medial con lesiones ligamentosas concomitantes. Se necesitan estudios multicéntricos más amplios y con un seguimiento prolongado para validar los resultados a largo plazo.*

Palabras clave: *Artroplastia unicompartimental de rodilla. Prótesis de rodilla unicompartimental Oxford fase III. Artrosis unicompartimental medial de rodilla. Puntuación funcional. Lesión del ligamento cruzado anterior. Lesión del ligamento colateral medial.*

Introduction

Osteoarthritis (OA) is a leading cause of disability worldwide, characterized by the progressive degeneration of articular cartilage, leading to pain, stiffness, and loss of functionwith an estimated global prevalence of 3.8% in adults aged 30 years and older and about 8.1% in the Chinese population aged > 65 years, with over 50% of those affected suffering from unicompartmental destruction, which predominantly affects the medial compartment[1]. While total knee arthroplasty (TKA) has been the traditional treatment for end-stage knee OA, Recently, unicompartmental knee arthroplasty (UKA) has gained attention as an effective treatment for knee OA[1-4]. UKA offers several advantages, including less invasive surgery, faster recovery, and better preservation of knee kinematics. Despite its benefits, early-stage UKA has issues related to unclear indications, technological immaturity, and defects in prosthetic design[5-7], which lead to suboptimal therapeutic efficacy. However, with the maturation of surgical techniques and continuous improvements in prosthetic design, UKA has developed rapidly and has become the preferred treatment for unicompartmental knee OA. The advantages of UKA include minimal intraoperative trauma, less bleeding, a smaller osteotomy volume, shorter surgical duration, faster recovery, better joint proprioception, and a greater range of motion[8-10].

Although current UKA techniques focus on minimally invasive approaches and computer-assisted navigation, the procedure requires highly accurate prosthesis placement and skilled surgical techniques. Pre-operative assessment is, therefore, crucial to avoid complications, such as liner dislocation, which may compromise the outcome of re-revision surgeries[11-13]. The Oxford phase III unicompartmental knee prosthesis (Zimmer Biomet, Warsaw, IN, USA) is commonly used in clinical practice. However, the role of co-existent ligament injuries, particularly anterior cruciate ligament (ACL) and medial collateral ligament (MCL) injuries, in UKA outcomes remains a matter of clinical debate.

Conventionally, ACL and MCL injuries have been considered contraindications for UKA, particularly because ACL deficiency is associated with increased anterior tibial translation, altered knee kinematics, and compromised knee stability, which may lead to suboptimal UKA outcomes[11,13]. However, over the past decade, several studies have explored the possibility of expanding UKA indications to include ACL-deficient knees, with some reporting favorable short- and medium-term outcomes[14-16]. These findings challenge the long-standing belief that ACL deficiency is an absolute contraindication for UKA. Despite these promising results, the impact of ACL and MCL injuries on UKA outcomes remains unclear due to the lack of large-scale studies and standardized criteria for assessing ACL/MCL damage. Moreover, although some studies have suggested that mobile-bearing UKA, such as the Oxford phase III prosthesis, may offer satisfactory results in patients with ACL and MCL injuries, a robust understanding of the influence of these injuries on functional recovery and long-term success is still lacking[17]. This study further discusses the intricacies of ACL-deficient knees in the context of UKA and provides the rationale behind the clinical considerations for ACL and MCL injury in knee arthroplasty[18]. The impact of co-existent ACL injury or MCL injury on patients' post-operative recovery has been analyzed using primarily mobile-bearing Oxford unicompartmental knee prostheses and fixed-bearing Zimmer M/G prostheses[14,15].

The role of co-existent ligament injuries, particularly ACL and MCL injuries, in UKA outcomes remains a matter of clinical debate. While traditionally considered contraindications for UKA, recent studies have suggested that UKA may be effective in patients with ACL and/or MCL injuries[14-16]. This study aims to contribute to this debate by evaluating the early functional outcomes of UKA in patients with ACL and MCL injuries.

Method

General data

Between March 2020 and June 2022, 60 patients (70 knees) with medial unicompartmental OA of the knee were recruited for this retrospective study. Ethical approval for this study was obtained from the institutional review board (approval No.: MEC-20240227-001). The patients were divided into four groups: a no ligament injury group (n = 15; 15 knees), ACL injury group (n = 18; 18 knees), MCL injury group (n = 12; 12 knees), and ACL + MCL injury group (n = 15; 25 knees). The no ligament injury group included patients with medial unicompartmental knee OA but without ACL or MCL injuries. The others were further divided based on the type of ligament injury: (1) ACL injury only, confirmed by clinical assessment and magnetic resonance imaging (MRI); (2) MCL injury only, confirmed by clinical examination and MRI; and (3) ACL + MCL injury, confirmed by clinical assessment, MRI imaging, and intraoperative inspection. A clinical examination for ligament integrity was performed first, and only patients with suspected ligament injuries, based on physical examination findings, underwent MRI before surgery (Fig. 1).

In this study, patients with KL grades II and III OA were also considered for UKA if they met the clinical criteria for surgery, such as significant knee pain and dysfunction that failed to respond to conservative treatments. Although UKA is typically indicated for KL grades III and IV OA, patients with KL grade II OA and MCL injuries were included if they exhibited significant knee pain and dysfunction that failed to respond to conservative treatments, as determined by clinical judgment. This reflected the clinical judgment that UKA could be beneficial for patients with early-stage OA but severe symptoms.

The inclusion criteria were as follows: (1) diagnosis of medial unicompartmental knee OA; (2) knee flexion greater than 90°, flexion contracture < 10° and varus deformity < 15° that could be corrected to the neutral position by external force; (3) eligibility for UKA or implantation of the Oxford phase III unicompartmental knee prosthesis; (4) confirmation of ACL and/or MCL injury through clinical assessment and pre-operative imaging (MRI); (5) follow-up of at least 6-month post-surgery; and (6) patients were included if they were aged between 50 and 85 years, had a body mass index (BMI) of < 35 kg/m^2.

The exclusion criteria were as follows: (1) incomplete imaging data; (2) perfect alignment of medial and lateral femoral condyles on a lateral X-ray; and (3) severe underlying diseases or inability to cooperate with treatment. Patient selection strictly followed these criteria. The study included patients with ACL and MCL injuries, which were traditionally considered contraindications for UKA. However, this study aimed to evaluate the outcomes of UKA in patients with these injuries, as the literature on this subject was limited, and this research could offer valuable insights. The control group consisted of 15 patients with no ligament injuries, in line with the traditional indications for UKA.

Patients were screened strictly following the inclusion and exclusion criteria. The diagnostic criteria for ACL injuries included a history of previous trauma, joint instability, a positive anterior drawer test, or Lachman test, MRI showing loss of ACL continuity and abnormalities in alignment and ultimate reliance on intraoperative visual inspection for confirmation of diagnosis. The diagnostic criteria for MCL injuries included a history of previous trauma, medial epicondylar femoral tenderness, a positive lateral stress test, an X-ray of the knee in a stress position showing a

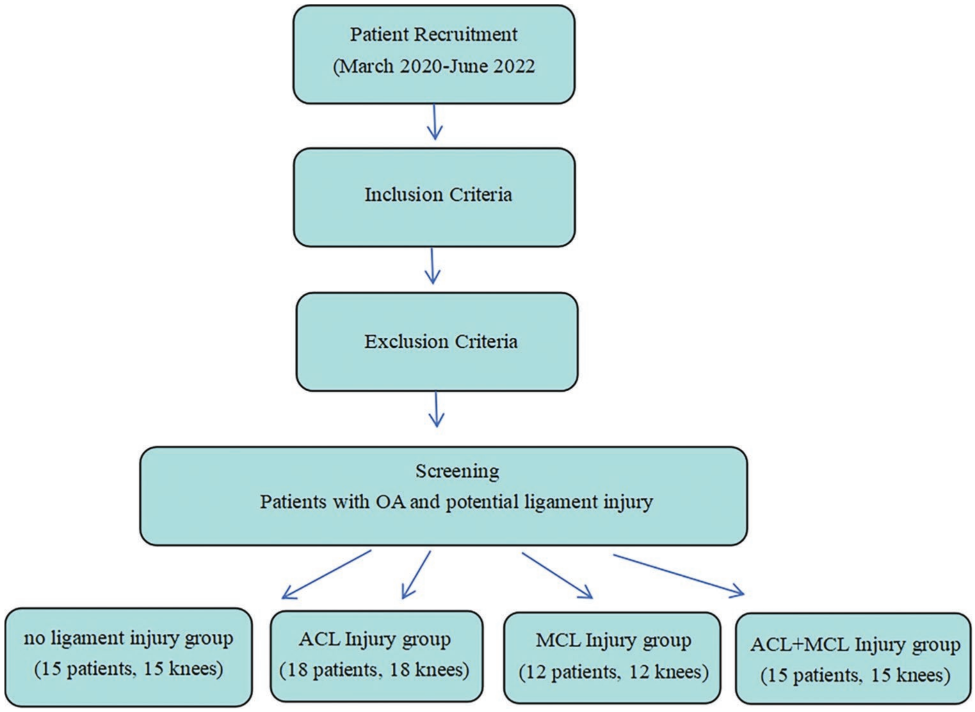

Figure 1. *Flow chart of patient recruitment and grouping.*

medial joint space width of > 6 mm, or an MRI showing a break in the continuity of the ligament, with final reliance on intraoperative visual inspection for confirmation of diagnosis.

Surgical methods

All surgeries were performed under general anesthesia. A medial parapatellar incision of approximately 12 cm was made, and the knee joint was exposed. The damaged cartilage was removed, and the femur and tibia were prepared for the implantation of the Oxford phase III unicompartmental knee prosthesis (Zimmer Biomet, Warsaw, IN, USA). The prosthesis was fixed using bone cement, and the range of motion and stability of the knee joint were verified intraoperatively and all procedures were carried out in compliance with the standard Oxford phase III unicompartmental knee prosthesis operating manual[14].

Post-operative treatment and efficacy evaluation indicators

Post-operative treatment methods in all groups were consistent. Anti-infection, anticoagulation, and other symptomatic therapies were given routinely. Patients were allowed to engage in out-of-bed activities the day of, or the 2nd day after, surgery. Enhanced Recovery After Surgery (ERAS) protocols, which aim to optimize recovery through multimodal perioperative care, were followed. The key components of the ERAS protocols included pre-operative counseling, optimal pain management, early mobilization, and nutritional support. These protocols have been shown to reduce post-operative complications, shorten hospital stays, and improve functional recovery[19]. Enhanced recovery strategies were implemented 1 week before and after surgery, including pre-operative education, use of short-acting anesthesia, and post-operative rehabilitation.

Follow-up strategy

Patients were followed up at multiple time points after surgery, specifically at 6 weeks, 3 months, 6 months, 12 months, 24 months, and 36 months. All single knee joint functional results (including the Hospital for Special Surgery [HSS] and American Knee Society Score [AKSS] scores) were primarily assessed at the 1-year visit to evaluate early functional recovery. However, follow-ups continued beyond 1 year to monitor long-term outcomes and detect any complications, such as prosthesis loosening or functional decline, over a longer period.

Clinical functional evaluation

Knee function among the study participants was evaluated using the HSS[20] and AKSS[21] scoring systems. The HSS scoring system comprised three components: a pain score, a functionality score, and a satisfaction score. There were two components of the AKSS scoring system: a pain score and a functionality score. These scores can be estimated based on the patient's condition to determine their pain, functional status, and satisfaction with treatment. In clinical practice, the evaluation was conducted by two physicians on the team. When there were disagreements in the evaluation, the final decision was made by a third senior physician.

Imaging evaluation

Standard anteroposterior and lateral X-ray images were obtained preoperatively. The lateral X-ray images were assessed for proper alignment, ensuring perfect alignment of the medial and lateral femoral condyles. The radiological evaluation focused on the following key criteria: (1) joint space narrowing, (2) presence of osteophytes, and (3) joint deformity. These features were used to assess the severity of OA and were correlated with clinical findings and MRI results where necessary, and all imaging was performed using a Siemens SOMATOM Definition AS+ CT scanner (Siemens Healthineers, Erlangen, Germany).

Statistical methods

Statistical analysis was conducted using SPSS version 20.0 (IBM Corp, Armonk, NY, USA). Measurement data were expressed as mean ± standard deviation (SD), and the normality of the data distribution was verified using the Kolmogorov-Smirnov test. For intergroup comparisons, an independent sample t-test was used to assess differences between the groups (no ligament injury, ACL injury, MCL injury, and ACL + MCL injury groups). For intra-group comparisons, a paired t-test was used to evaluate changes in functional scores (HSS and AKSS) before and after surgery.

Results

Baseline characteristics

A total of 60 patients (70 knees) with medial unicompartmental osteoarthritis (OA) of the knee treated between March 2020 and June 2022 were included in this retrospective study. Patients were divided into four groups: a no ligament injury group, ACL injury group, MCL injury group, and ACL + MCL injury group, as detailed in table 1.

The no ligament injury group ($n = 15$; 15 knees) consisted of 2 men and 13 women, aged 51–85 years, with a mean age of 67.7 ± 7.5 years and a mean body mass index (BMI) of 28.01 ± 3.3 kg/m^2. The ACL injury group ($n = 18$; 18 knees) had a mean age of 66.1 ± 6.8 years, with a mean BMI of 28.2 ± 3.1 kg/m^2. The MCL injury group ($n = 12$; 12 knees) had a mean age of 64.5 ± 5.2 years, with a mean BMI of 27.5 ± 3.0 kg/m^2. The ACL + MCL injury group ($n = 15$; 25 knees) had a mean age of 66.9 ± 6.0 years, with a mean BMI of 28.3 ± 3.4 kg/m^2.

Preoperative and postoperative score changes

According to the Kellgren–Lawrence (KL) classification of OA, grades II, III, and IV were identified across the groups, assessing the severity of OA in the knee joint as a whole, not specifically in the medial compartment. The mean pre-operative HSS score among participants ranged from 6.80 to 7.12, and the mean pre-operative AKSS was between 25.9 and 33.2 across groups, as shown in table 1. No statistically significant differences were found between the groups in terms of age, gender, BMI, or KL grade, suggesting their comparability ($p > 0.05$).

Complications

All participants received complete 1-year follow-ups, with a range of 15-36 months and a mean duration of 28.3 months. Functional results and clinical outcomes were assessed based on the 1-year follow-up, with additional exploratory data from later follow-up periods included for long-term assessment. During the follow-up, 1 patient in the no ligament injury group continued to experience knee pain and discomfort 3 months after surgery. After re-admission, the patient received traditional Chinese medicine treatment, including acupuncture and herbal medicine formulated to reduce inflammation and promote healing, which resulted in symptom improvement within 2 weeks and no further discomfort thereafter. No complications (e.g., liner detachment or joint failure) were reported in any patient.

Table 1. Demographic characteristics of the control and study groups

Demographic characteristic	No ligament injury group (n = 15)	ACL group (n = 18)	MCL group (n = 12)	ACL + MCL group (n = 15)	p
Age (mean ± SD)	67.7 ± 7.5	66.1 ± 6.8	64.5 ± 5.2	66.9 ± 6.0	0.35
Gender (Male/Female)	2/13	8/10	2/10	1/14	0.07
BMI (mean ± SD)	28.01 ± 3.3	28.2 ± 3.1	27.5 ± 3.0	28.3 ± 3.4	0.89
Pre-operative HSS score (mean ± SD)	7.07 ± 1.5	7.12 ± 1.4	6.83 ± 1.2	6.80 ± 1.3	0.71
Pre-operative AKSS score (mean ± SD)	33.2 ± 4.7	28.5 ± 4.9	26.8 ± 5.1	25.9 ± 5.6	0.09

BMI: body mass index; SD: standard deviation; ACL: anterior cruciate ligament; MCL: medial collateral ligament; HSS: hospital for special surgery; AKSS: American Knee Society Score.

At the final follow-up, no statistically significant differences in the HSS scores were found between the four groups (mean difference range: −0.95 to 1.12; p = 0.21) or in their clinical and functional AKSSs (mean difference range: −1.24 to 1.58; p = 0.82), as shown in table 2. The post-operative HSS score increased from 23.3 ± 5.2 preoperatively to 70.7 ± 8.2 postoperatively in the no ligament injury group (p < 0.001), from 24.0 ± 7.0 to 71.2 ± 6.4 in the ACL injury group (p < 0.001), from 23.5 ± 6.5 to 68.3 ± 8.2 in the MCL injury group (p < 0.001), and from 24.1 ± 5.3 to 68.0 ± 7.3 in the ACL + MCL injury group (p < 0.001). Similarly, the post-operative AKSSs score increased from 33 ± 5.35 preoperatively to 85.0 ± 5.35 postoperatively in the no ligament injury group (p < 0.001), from 28.5 ± 4.9 to 78.2 ± 4.8 in the ACL injury group (p < 0.001), from 26.8 ± 5.1 to 77.5 ± 4.6 in the MCL injury group (p < 0.001), and from 25.9 ± 5.6 to 76.9 ± 4.9 in the ACL + MCL injury group (p < 0.001), as shown in table 3. The changes in the HSS and AKSS scores exceeded the MCID thresholds for knee arthroplasty in all groups, indicating clinically meaningful improvements.

In a correlation analysis, the presence of ACL injury had no significant impact on the treatment of degenerative changes in the medial compartment of the knee with UKA (p > 0.05).

Discussion

This study demonstrated that the presence of ACL and/or MCL injuries did not significantly affect the short-term functional outcomes of mobile-bearing Oxford phase III UKA in patients with medial unicompartmental knee OA. Both the HSS and AKSS scores showed significant improvement following surgery, indicating good short-term functional outcomes regardless of the ligament injury status. These findings suggest that UKA can be effectively performed in patients with medial OA and concomitant ligament injuries, providing valuable insights into the potential for this procedure in a broader patient population.

With the evolution of minimally invasive UKA techniques, the procedure offers advantages such as smaller incisions, shorter surgical duration, less intraoperative bleeding, and faster recovery compared with total knee arthroplasty (TKA)[22]. However, strict pre-operative assessment is essential to identify appropriate candidates and exclude contraindications. Notably, patients with significant lateral compartment cartilage degeneration or joint deformities are typically recommended for TKA rather than UKA[23]. Although we performed a thorough pre-operative assessment of both medial and lateral compartments, the final decision regarding UKA versus TKA was made intraoperatively based on the actual condition of the joint.

Our findings contrast with the classical literature, which has traditionally viewed ACL injury and MCL deficiency as contraindications for UKA. Previous studies have shown that ACL-deficient knees may suffer from increased knee laxity, reduced stability, and compromised function following UKA[24]. However, in this study, we found that ACL injury did not significantly affect the functional outcomes or knee stability in the short and medium term after UKA, which aligned with more recent studies suggesting no major difference in outcomes between ACL-deficient and ACL-intact knees receiving UKA[25–27]. This discrepancy with traditional views could be due to the improved stability provided by the Oxford phase III prosthesis, which compensates for the lack of ligamentous support. In addition, the minimally invasive nature of UKA allows for faster recovery and better preservation of knee kinematics, which may contribute to the favorable outcomes observed in this study. However, ligamentous

Table 2. Comparison of knee functional scores between the two groups at the final follow-up

Item	No ligament injury Group (n = 15)	ACL Group (n = 18)	MCL Group (n = 12)	ACL + MCL Group (n = 15)	p	95% CI
HSS score	2.33 ± 0.82	2.40 ± 0.70	2.35 ± 0.65	2.41 ± 0.73	0.21	−0.95 ～1.12
AKSS score	85.0 ± 5.35	78.2 ± 4.8	77.5 ± 4.6	76.9 ± 4.9	0.82	−1.24 ～1.58

ACL: anterior cruciate ligament; MCL: medial collateral ligament; HSS: hospital for special surgery; AKSS: American Knee Society Score; CI: confidence interval.

Table 3. Intra-group comparison of pre-operative and post-operative scores at the final follow-up

Item	Pre-operative score (mean ± standard deviation)	Score at final follow-up (mean ± standard deviation)	t	p
No ligament injury group (HSS)	23.3 ± 5.2	70.7 ± 8.2	18.45	< 0.001
ACL group (HSS)	24.0 ± 7.0	71.2 ± 6.4	16.78	< 0.001
MCL group (HSS)	23.5 ± 6.5	68.3 ± 8.2	15.92	< 0.001
ACL + MCL group (HSS)	24.1 ± 5.3	68.0 ± 7.3	17.34	< 0.001
No ligament injury group (AKSS)	33 ± 5.35	85.0 ± 5.35	−14.666	< 0.001
ACL group (AKSS)	28.5 ± 4.9	78.2 ± 4.8	25.718	< 0.001
MCL group (HSS)	26.8 ± 5.1	77.5 ± 4.6	24.932	< 0.001
ACL + MCL group (HSS)	25.9 ± 5.6	76.9 ± 4.9	23.845	< 0.001

ACL: anterior cruciate ligament; MCL: medial collateral ligament; HSS: hospital for special surgery; AKSS: American Knee Society Score.

integrity remains a key factor in UKA, and although recent reports, including meta-analyses, suggest that ACL injury may not necessarily preclude successful outcomes in UKA, this issue is still open for debate, as shown in studies with follow-up periods ranging from 5 to 10 years[28,29]. Future studies should continue to explore this issue, especially considering the long-term impact of ACL injury and MCL deficiency on UKA outcomes.

Importantly, there is growing evidence suggesting that ACL reconstruction may improve functional outcomes and overall success rates in patients undergoing UKA. Recent studies have shown that ACL reconstruction can significantly enhance knee stability, reduce knee laxity, and potentially improve the functional results of UKA, particularly in patients with ACL-deficient knees[30]. This approach may help mitigate the adverse effects of ACL deficiency and contribute to more favorable outcomes. As such, ACL reconstruction should be considered as part of the treatment plan for patients with ACL injury undergoing UKA, especially in those with more pronounced ACL damage or instability. Future research should investigate the combined effect of ACL reconstruction and MCL deficiency and UKA to further understand how ACL restoration and MCL deficiency can optimize knee function and improve long-term UKA outcomes.

The absence of a detailed evaluation of the different macroscopic states of ACL injury and MCL deficiency in this study could be a limitation. Although some studies have explored this aspect, we did not specifically assess the macroscopic state of ACL injury during surgery, which could be a subject for future research. Therefore, future studies should focus on determining the exact condition of the ACL and its impact on long-term UKA outcomes.

Another important consideration in UKA is the condition of the lateral compartment cartilage. Lateral compartment OA plays a significant role in UKA failure, as degeneration in the lateral compartment can compromise the overall function of the knee joint. This study specifically focused on patients with intact lateral compartment cartilage. UKA is preferred over TKA in these cases because it is less invasive, and even if surgical failure occurs, a subsequent TKA can still be performed. This approach highlights the importance of maintaining healthy lateral compartment cartilage to improve UKA outcomes and avoid complications.

While our study challenges traditional indications for UKA, it is important to note that these decisions were based on clinical judgment and specific criteria. Further research is needed to validate our findings and determine the long-term outcomes of UKA in patients with MCL injuries and KL Grade 2 OA. One critical limitation of this study is the relatively short follow-up period. Although the study provides valuable insight into short-term functional recovery, the follow-up duration of 15-36 months is considered short in the context of arthroplasty studies, where 5-year follow-ups are often considered the minimum for assessing long-term outcomes. Thus, although our findings provide important data on the early efficacy of UKA in patients with ACL and MCL injuries, further studies with longer follow-up periods are necessary to assess the durability of these outcomes and the risk of complications, such as implant loosening and functional decline, over time.

Conclusions

Oxford phase III unicompartmental knee replacement for medial unicompartmental knee OA complicated by ACL or MCL injury can achieve good short-term efficacy. However, additional supporting evidence from multi-center and large-sample studies is still needed.

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Conflicts of interest

The authors declare no conflicts of interest.

Ethical considerations

Protection of humans and animals. The authors declare that the procedures followed complied with the ethical standards of the responsible human experimentation committee and adhered to the World Medical Association and the Declaration of Helsinki. The procedures were approved by the institutional Ethics Committee.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from patients, and received approval from the Ethics Committee. The studies involving human participants were reviewed and approved by Changji Hui Autonomous Prefecture Hospital of Traditional Chinese Medicine (approval No.: MEC-20240227-001). The SAGER guidelines were followed according to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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