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Lateral unicompartmental knee arthroplasty is an effective procedure for lateral post-meniscectomy knee osteoarthritis: a case–control study at a mean 7-year follow-up

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Abstract

Background Meniscectomy is a common knee surgery for meniscal tear, and is associated with progressive osteoarthritis (OA). There are few literatures focus on the use of lateral unicompartmental knee arthroplasty (UKA) for lateral post-meniscectomy knee osteoarthritis (PMKO). Therefore, the purpose of this study is to compare the outcomes of lateral UKA performed for lateral PMKO and primary lateral compartment knee osteoarthritis (LCKO).

Methods A total of 38 consecutive patients (38 knees) who received lateral UKAs for isolated lateral PMKO between September 2013 and September 2019 were retrospectively analyzed. Other thirty-eight patients (38 knees) with primary LCKO were allocated into control group by 1:1 matching according to age, gender, and body mass index. The clinical outcomes were evaluated using the American Knee Society Score, range of motion, Forgotten Joint Score, and EuroQol-5D (EQ-5D) Score. The radiographic assessments included hip–knee–ankle (HKA) angle, mechanical lateral distal femoral angle (mLDFA), mechanical medial proximal tibial angle (mMPTA), and posterior tibial slope angle (PTSA).

Results With a mean 7 years follow-up, there was no significant difference in functional and radiographic outcomes between groups. However, the PMKO group showed severe lateral OA ($p=0.02$) preoperatively and less OA progression in the medial compartment postoperatively ($p=0.046$). The preoperative mLDFA was significantly more valgus in the LCKO group ($p<0.001$). No case of revision occurred in either group.

Conclusion Lateral UKA is a valid procedure for lateral PMKO. The clinical and radiographic results are similar in patients underwent lateral UKA for lateral PMKO and for LCKO. Patients with lateral PMKO exhibited severe lateral OA preoperatively and less OA progression in the medial compartment compared to those with LCKO. It is crucial to prevent ascension of the lateral femoral joint-line and maintain proper valgus alignment during lateral UKA.

Keywords Post-meniscectomy knee osteoarthritis, Lateral unicompartmental knee arthroplasty, Osteoarthritis, Alignment

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Introduction

Meniscal tears are a prevalent knee injury that can be treated by arthroscopic surgery. Regardless of whether it is total or partial, meniscectomy can frequently lead to progressive degeneration in the affected compartment over the years, which is known as post-meniscectomy knee osteoarthritis (PMKO) [1, 2]. The incidence of arthroscopic partial meniscectomy for traumatic meniscal tears has increased by 375% over the past twenty years [3]. More than 50% of patients will suffer from osteoarthritis (OA) and more than 13% of patients will undergo knee arthroplasty within 10–20 years of meniscectomy [4, 5]. Those who have a history of meniscectomy are ten-times more likely to receive knee arthroplasty annually than the general population [5].

Lateral meniscus played a crucial role in stabilizing the knee, and 70% of compartment load was carried by the lateral meniscus in extension, while increasing by 90% during flexion [6, 7]. After lateral meniscectomy, the tibiofemoral contact surface was statistically decreased, and the contact pressure was increased by 200–350%, whereas it increased by 100% following medial meniscectomy [8–11]. The progression of OA is more prevalent and severe after lateral meniscectomy than medial meniscectomy [10].

Lateral UKA, accounting for approximately one tenth of all UKAs, demonstrates a distinct advantage over TKA for the treatment of primary lateral compartment knee osteoarthritis (LCKO) [12, 13]. The survival rate for lateral UKA are reported at 98.0% at 5 years, 96.0% at 10 years, and 94.5% at 15 years [14]. Moreover, recent researches have shown that lateral UKA presents as a valid option for post-traumatic osteoarthritis due to its excellent functional outcomes and long-term survival [15, 16].

Despite the use of TKA in treating lateral PMKO [17], it is associated with higher postoperative local complication rates and worse outcomes than TKA for primary OA [18–20]. Previous investigations have indicated higher rates of postoperative complication, revision, periprosthetic knee infections, stiffness [21–23], and venous thromboembolism, aseptic loosening, lower functional scores [19, 23, 24] after TKA in patients with a prior surgery. However, other studies have not found such an association [25, 26].

To date, there are few literatures on the surgical management of PMKO, and a lack of data on lateral UKA for lateral PMKO. Therefore, the aim of this study was to (1) assess the clinical and radiographic outcomes, OA progression in patients following lateral UKA for isolated lateral PMKO, (2) compare these results to those who had lateral UKA for primary OA, (3) analyse the differences in radiographic characteristics between PMKO and LCKO.

Materials and methods

Patients

Between September 2013 and September 2019, a total of 338 consecutive patients who underwent lateral UKA at our institution were retrospectively analyzed. 42 patients (42 knees) had a history of lateral meniscectomy, of which, 38 patients (38 knees) were finally included in the PMKO group except for four patients who were lost to follow-up. Other thirty-eight patients (38 knees) with LCKO were allocated into control group by 1:1 propensity score matching according to age, gender, and body mass indexduring the same period. The study was approved by the Ethics Committee of Yangpu Hospital affiliated to Tongji University School of Medicine (Approval NO. LL-2024-SCI-009). Informed consents were signed by all participants.

The criteria for the index procedure included symptomatic (pain outside of knee), isolated lateral OA (Kellgren-Lawrence [KL] grade 2 or greater) primarily or secondary to meniscectomy; normal in the other knee compartments; an intact anterior cruciate ligament (ACL) (confirmed by magnetic resonance imaging [MRI] for all patients); correctability of valgus deformity under varus stress; preoperative range of knee flexion > 90°and valgus deformity of the lower limb < 15°. The exclusion criteria were bicompartmental OA; infectious arthritis; a fixed valgus deformity.

The overall mean follow-up was (7.0 ± 1.0) years (range, 5.0 to 9.4). No patients were lost during follow-up. Of all the patients in the PMKO group, previous trauma was the predominant cause of all meniscus tears (36 patients, 94.7%).

Surgical technique and post-operative rehabilitation

All procedures were performed through a short lateral parapatellar skin incision, allowing access to the joint with minimal disturbance of the extensor mechanism and without dislocating the patella. Once tibial saw guide had been placed well, the vertical cutting was performed with an internal rotation of approximately 10° to 15°, the horizontal cutting with a posterior inclination of 3° to 5°, 2 to 3 mm below the lowest point of tibial plateau wear. Test knee flexion and extension to ensure no impingement between prosthesis and the patella during the movement and flexion gap was 2 mm larger than extension gap. Before cementing the prosthesis inject periarticular cocktail throughout various tissues of the knee to decrease postoperative pain. All procedures were performed by one senior surgeon (TYH) using the LINK-Sled fixed bearing UKA (Waldemar Link, Hamburg, Germany).

All patients received prophylactic antibiotics (cefuroxime sodium) for half an hour prior to surgery and for the first 24 post-operative hours. Routine multimodal analgesia, and anticoagulant drugs for venous

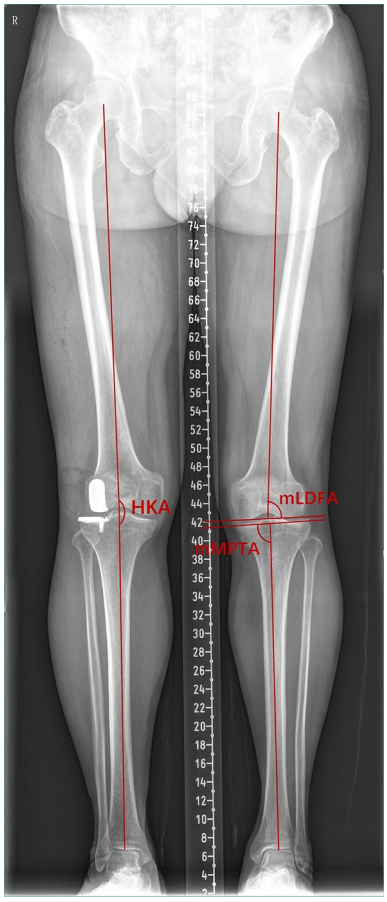

Fig. 1 A full weight bearing long leg standing radiograph of lateral UKA on the right leg: HKA, hip–knee–ankle angle. Angle between the line passing through the hip center and the knee center, and the line passing through the knee center and the ankle center; mLDFA, mechanical lateral distal femoral angle. The lateral angle between the femoral mechanical axis and the distal femoral joint line in the coronal plane; mMPTA, mechanical medial proximal tibial angle. The medial angle between the tibial mechanical axis and the tibial proximal joint line in the coronal plane

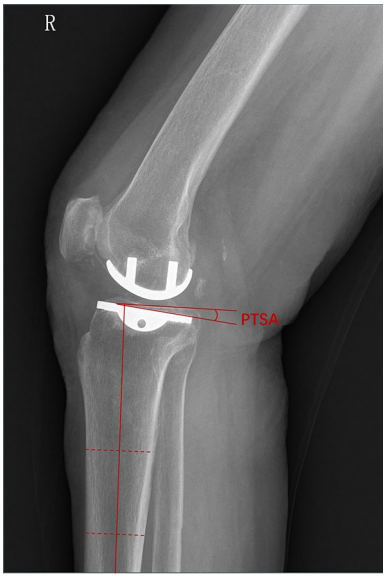

Fig. 2 A lateral view of lateral UKA on the right leg: PTSA, posterior tibial slope angle. Angle between a line drawn through the tibial prosthesis and a line orthogonal to the tibial anatomical axis on lateral view

thromboembolism (VTE) prophylaxis were used perioperatively. Postoperative rehabilitation protocols included progressive full weight-bearing walking with the assistance of walking aid on the first postoperative days. Passive and active range-of-motion exercises were initiated within 24 h of surgery. Patients were usually discharged from the hospital around post-operative day four when the knee flexion was greater than 90°.

Clinical and radiographic evaluation

Postoperative clinical and radiographic follow-up exams were carried out at 3 months, 1 year, 2 years, and last follow-up. The patient's demographics were noted from the medical records, which included mean age at lateral UKA, gender, body mass index (BMI) and duration of symptoms, follow-up (years), history of knee joint trauma. All patients were assessed using American Knee Society Score (AKSS) [27], range of motion (ROM), forgotten joint score (FJS) [28] and EuroQol (Quality of life) – 5 Dimensions (EQ-5D) questionnaire [29]. The timing of conversion to lateral UKA was evaluated based on the gender. Surveys were completed during the clinic visit via paper, or by phone. Any complications were investigated.

The radiographic assessments were performed preoperatively, postoperatively, and at the last follow-up by two independent senior residents. It included standing anteroposterior (AP) and lateral radiographs. The postoperative AP radiographs were taken orthogonal to the tibial component as much as possible. Radiographic measurements included the hip–knee–ankle (HKA) angle, mechanical lateral distal femoral angle (mLDFA), mechanical medial proximal tibial angle (mMPTA) and posterior tibial slope angle (PTSA). Graphical depictions of these angles are presented in Figs. 1 and 2. All the angles were measured twice by each observer with a time interval of 14 days. All radiographs were evaluated on the medical image system (Winning Health TView v6.1.0). The incidence of revisions related to implants or any reason was investigated.

Statistical analysis

Propensity score matching was performed using nearest neighbor matching algorithm. We used SPSS software for 1:1 propensity score matching based on age, sex, BMI, and with a caliper of 0.02 to balance the baseline characteristics of patients grouped by PMKO and LCKO. The statistical analyses were performed using SPSS (Version 27.0, SPSS Inc., Chicago, IL, USA). The data were shown in terms of number (percentage) or mean ± standard

deviation (range). All parameters were tested using the Shapiro—Wilk test for normality. Student's t-tests were used to compare the continuous variables, while the categorical data were compared using chi-squared analysis. The unpaired Student's t tests were used to evaluate the differences while the differences in sex and K-L grade distribution were evaluated with the chi-square test. Pearson correlation was used to identify a potential relationship between age at the time of lateral meniscectomy and the time interval for conversion to lateral UKA. Mann-Whitney U test were used to conduct nonparametric univariate analyses for comparison of variables that were not normally distributed. Inter- and intra-rater reliability was determined by the intraclass correlation coefficient and Pearson's correlation coefficient, respectively.

Kaplan–Meier analysis was used to compare survival of conversion to lateral UKA for patients after meniscectomy in the PMKO group. The differences were evaluated with the clustered log-rank test. A p-value < 0.05 was considered statistically significant.

Table 1 Baseline characteristics of the patients between the two groups

Variable	PMKO group($n=38$)	LCKO group($n=38$)	*P* value
Mean age at lateral UKA (years)	67.0 ± 6.8 (52–82)	68.3 ± 5.8 (55–78)	0.394
Sex			1
Men (number, [%])	9 (23.68)	9 (23.68)	
Women (number, [%])	29 (76.32)	29 (76.32)	
BMI (kg/m^2)	23.7 ± 3.1 (19.2–34.2)	23.3 ± 2.8 (18.4–31.6)	0.590
Left / right (number, [%])	18 (47.4) / 20 (52.6)	18 (47.4) / 20 (52.6)	1
Duration of knee symptoms (years) (range)	9.2 ± 10.3 (0.2–40)	8.1 ± 5.5 (0.5–22)	0.541
Follow-up (years) (range)	7.1 ± 1.0 (5.1–9.2)	6.9 ± 0.9 (5.0-9.4)	0.411
History of knee joint trauma (number, [%])			<0.001
Yes	36 (94.74)	0	
No	2 (5.26)	38 (100)	
Mean age at lateral meniscectomy (years) (range)	37.4 ± 10.9 (18.0–60.0)	N/A	-
Time from lateral meniscectomy to UKA (years) (range)	29.4 ± 12.8 (2.5–50.0)	N/A	-
K-L grade of pre-operative lateral OA (number, [%])			0.020
Grade 1	0	0	
Grade 2	1 (2.63)	3 (7.89)	
Grade 3	13 (34.21)	21 (55.26)	
Grade 4	24 (63.16)	14 (36.84)	

The data were presented as number (percentage) or mean ± standard deviation (range). PMKO, post-meniscectomy knee osteoarthritis; LCKO, lateral compartment knee osteoarthritis; BMI, body mass index; UKA, unicompartmental knee arthroplasty; K-L, Kellgren-Lawrence; OA, osteoarthritis

Results

The patient's baseline characteristics were provided in detail (Table 1). Most patients in the PMKO group had a history of knee trauma (94.74%). No significant difference was found in mean age, gender, BMI, and length of follow-up between two groups ($p > 0.05$). However, the severity of preoperative lateral OA (K-L grade) was significantly higher in the PMKO group compared to the LCKO group ($p = 0.02$).

Through comparing functional outcomes between two groups, there were no significant differences in AKSS, ROM, FJS and EQ-5D. Compared with preoperative values, both groups showed significant improvements in AKSS-O, AKSS-F and ROM at the latest follow-up. However, the average preoperative ROM was greater for the PMKO group ($p = 0.043$) (Table 2).

Radiographic data are summarized in Table 3. There were no significant differences in HKA, mMPTA, and PTSA. However, the preoperative mLDFA was significantly more valgus in LCKO group ($p < 0.001$), and the PMKO group showed less OA progression (K-L grade) in the medial compartment postoperatively ($p = 0.046$) (Table 3, Fig. 3). Overall, an excellent inter- and intra-rater reliability was found due to all ICC values being over 0.90 (Table 4).

In PMKO group, with increasing age at the time of lateral meniscectomy, the time interval for conversion to lateral UKA decreased (Fig. 4). There was a significant correlation between age at the time of lateral meniscectomy and the time interval for conversion to lateral UKA (r= -0.850, $p < 0.001$), especially in women (r = -0.891, $p < 0.001$), but no correlation was found in men (r= -0.020, $p = 0.963$). Kaplan-Meier survival analysis showed women had a significantly lower cumulative survival rate of conversion to lateral UKA than men ($p < 0.05$, log rank). Approximately 50% of women required surgical treatment of lateral UKA within 30 years after meniscectomy (Fig. 5).

One case in the LCKO group was found with superficial skin infection at 1 week postoperatively, and resolved after being treated by intravenous antibiotic administration. No case of prosthesis loosening, subsidence, periprosthetic infection, and revision occurred in either group.

Discussion

The main finding of this study was that patients who underwent lateral UKA for isolated lateral PMKO demonstrated excellent clinical and radiographic results that similar to those who underwent lateral UKA for LCKO. Previous lateral meniscectomy did not negatively affect the functional outcomes of lateral UKA for lateral PMKO. Moreover, patients with PMKO demonstrated severe lateral OA preoperatively and less OA progression

Table 2 Functional outcomes of the patients between the two groups

Variable	PMKO group($n=38$)	LCKO group($n=38$)	*P* value
AKSS-O (0-100)			
Pre-operative	54.6 ± 5.6 (40–65)	55.2 ± 4.9 (42–64)	0.616
Last follow-up	86.6 ± 4.3 (66–91)	85.4 ± 5.8 (66–93)	0.411
AKSS-F (0-100)			
Pre-operative	41.2 ± 13.4 (15–76)	42.5 ± 11.5 (22–67)	0.668
Last follow-up	78.4 ± 6.5 (71–94)	76.8 ± 9.4 (42–93)	0.827
ROM (°)			
Pre-operative	117.1 ± 8.8 (95–135)	112.8 ± 9.7 (90–130)	0.043
Last follow-up	123.4 ± 7.3 (105–135)	120.1 ± 9.3 (100–135)	0.089
Time to return to full weightbearing activity (d)	17.6 ± 3.9 (9–26)	18.3 ± 3.6 (9–25)	0.381
EQ-5D (0–1)			
Last follow-up	0.78 ± 0.09(0.65–0.95)	0.76 ± 0.08(0.61–0.94)	0.188
FJS (0-100)			
Last follow-up	71.7 ± 4.4 (63–79)	70.8 ± 4.2 (63–78)	0.354

The data were shown in mean ± standard deviation (range). AKSS-O, American Knee Society Objective Score; AKSS-F, American Knee Society Functional Score; ROM, range of motion; EQ-5D, EuroQol (Quality of life) – 5 Dimensions questionnaire; FJS, Forgotten Joint Score

Table 3 Radiographic data of the patients between the two groups

Variable	PMKO group($n=38$)	LCKO group($n=38$)	*P* value
HKA (°)			
Pre-operative	187.7 ± 2.5 (182.3-193.2)	186.9 ± 3.7 (180.3-196.13)	0.288
Last follow-up	183.5 ± 1.7 (180.4-187.8)	184.3 ± 2.0 (181.4-189.3)	0.069
mLDFA (°)			
Pre-operative	86.2 ± 1.5 (81.9–89.3)	84.1 ± 1.5 (80.6–87.1)	<0.001
Last follow-up	86.5 ± 1.5 (82.1–89.2)	85.9 ± 1.2 (83.6–88.3)	0.066
mMPTA (°)			
Pre-operative	87.6 ± 1.5 (85.2–90.8)	88.0 ± 1.4 (85.3–90.7)	0.329
Last follow-up	84.6 ± 1.3 (82.2–87.0)	84.1 ± 1.2 (81.9–86.5)	0.104
PTSA (°)			
Pre-operative	5.9 ± 0.7 (4.4–7.1)	5.7 ± 0.8 (4.3-7.0)	0.474
Last follow-up	5.5 ± 1.2 (3.4–8.5)	5.1 ± 1.4 (3.2–8.58)	0.261
K-L grade of pre-operative medial OA (number, [%])			0.016
Grade 0	20 (52.6)	8 (21.0)	
Grade 1	15 (39.5)	24 (63.2)	
Grade 2	3 (7.9)	6 (15.8)	
Grade 3	0	0	
Grade 4	0	0	
K-L grade of post-operative medial OA (number, [%])			0.046
Grade 0	2 (5.3)	0	
Grade 1	26 (68.4)	17 (44.7)	
Grade 2	10 (26.3)	19 (50)	
Grade 3	0	2 (5.3)	
Grade 4	0	0	

The data were shown in terms of mean ± standard deviation (range) or number (percentage). HKA, hip–knee–ankle; mLDFA, mechanical lateral distal femoral angle; mMPTA, mechanical medial proximal tibial angle; PTSA, posterior tibial slope angle

in the medial compartment during the follow up. Lastly, hypoplasia of the lateral condyles was common in LCKO.

UKA demonstrated better clinical outcomes and longer implant survivorship than open-wedge high tibial osteotomy (HTO) in patients with advanced compartmental OA [30]. A recent systematic review reveals that both mobile-bearing (MB) and fixed-bearing (FB) implants can provide excellent outcomes in UKA [31]. However, the FB design is preferable for the lateral UKA, which is an effective surgical treatment for lateral OA [32–34], even in obese patients (BMI > 30 kg/m^2) [35]. Initial studies have shown an inferior survival rate for lateral UKA [36, 37], but with better understanding of the biomechanics of lateral UKA and newly designed implants, it has progressively improved. A recent systematic review of 26 studies involving 5470 lateral UKAs indicated excellent functional results and implant survival, with 5-, 10- and 20-year survivorships of 94%, 88% and 78% respectively [38]. Also, our group had conducted several studies on lateral UKA and demonstrated excellent clinical outcomes and 99.5% survivorship at 5 years [39, 40]. There remains controversy regarding the optimal procedure for PMKO. Recent evidences demonstrated TKA for post-meniscectomy OA was associated with worse functional outcomes and increased complication rates [20, 23]. Sérgio Rocha Piedade et al. [19] demonstrated a higher rate of postoperative local complications and lower knee functional scores in patients with prior arthroscopy or menisectomy. In addition, a higher rate of revision, periprosthetic joint infection, aseptic loosening, stiffness [24–41] and venous thromboembolism [23] after TKA were reported in patients with prior knee arthroscopy or soft tissue procedure. However, Tarun Goyal et al. [41] performed a systematic review of studies and showed no significant differences in patient-reported functional outcomes and range of joint motion after TKA in patients with a prior knee arthroscopy. Marcus A. Rothermich et al. [26] found that patients with previous arthroscopy with or without meniscectomy could obtain similar postoperative functional outcome scores after TKA. Similarly, Anthony Viste et al. [25] performed a retrospective review of 1315 TKAs and found the 10-year Knee Society

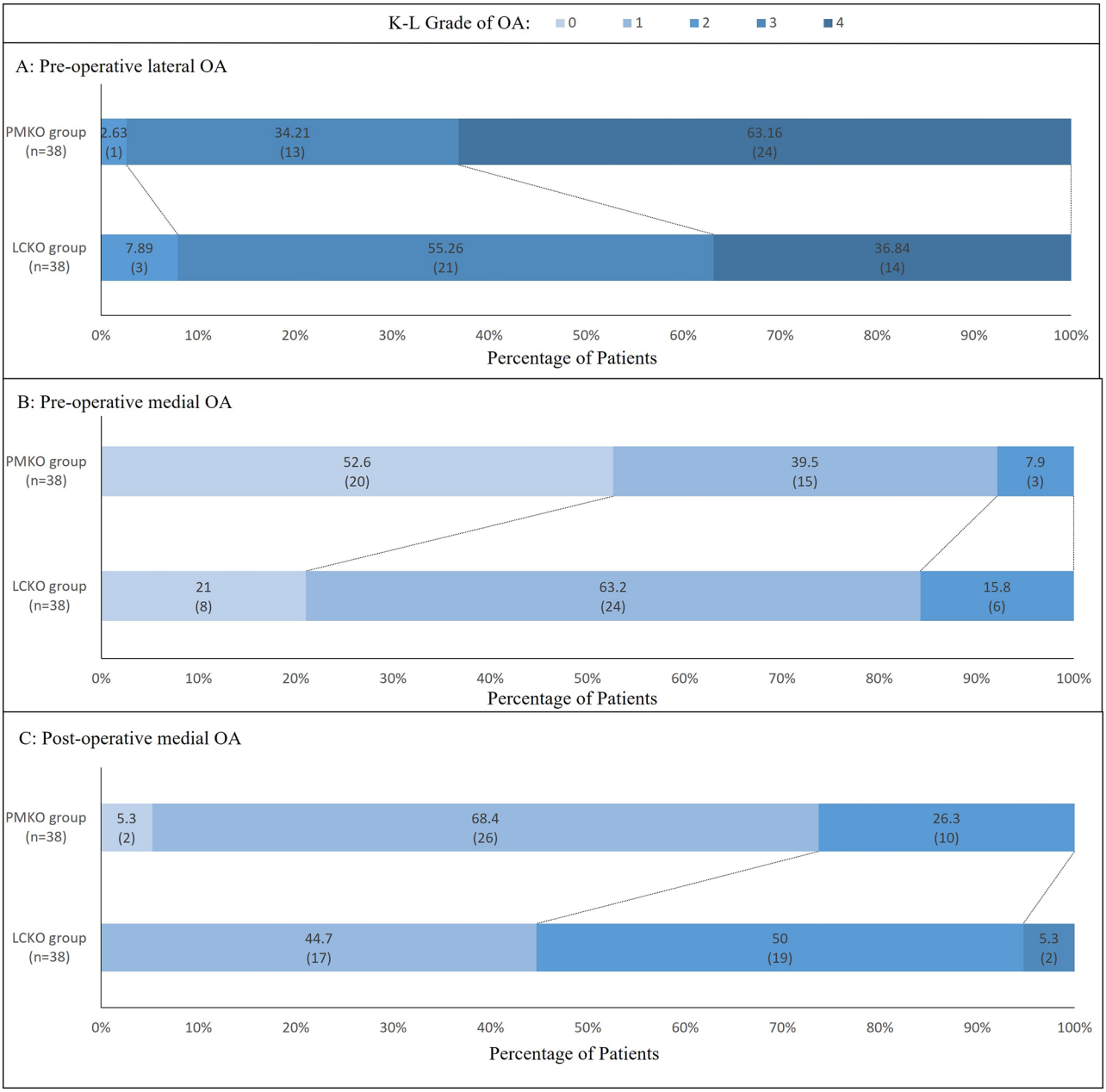

Fig. 3 Distribution of Pre-operative and Post-operative Knee OA (K-L grade)

Score (KSS), survivorship, and complications of TKA in patients who had a previous knee arthroscopy did not significantly differ from a control cohort without prior surgery.

With respect to UKA, there are limited researches on the influence of prior procedures on the outcomes of UKA. It has been previously suggested that the time interval between arthroscopy and knee arthroplasty play a role in complication rates [42–43]. Safa C. Fassihi, MD et al. [43] demonstrated knee arthroscopy within two years of UKA is associated with higher rates of revision and aseptic loosening. In their cohort, the average time from knee arthroscopy to UKA was 247 days. However, in our study, the mean time between lateral meniscectomy and lateral UKA was 29.4 (2.5–50.0) years. We identified no increased risk of prosthesis loosening, or other complications, and revisions in these patients. Meanwhile, Michael Schlumberger et al. [44] showed that prior failed bone procedures (HTO) do not influence the clinical outcome or complications of following UKA. Not only did prior open knee surgery have no negative effect on UKA, so did prior soft tissue procedure. Matteo Marullo et al. [45] found no significant differences in clinical and functional scores after lateral UKA between patients with

Table 4 Intra-rater and inter-rater reliability for all radiographic measurements

	Intrarater reliability		Interrater reliability
	Rater 1	Rater 2	
HKA			
Pre-operative	0.98	0.98	0.97
Last follow-up	0.98	0.98	0.98
mLDFA			
Pre-operative	0.97	0.96	0.94
Last follow-up	0.98	0.97	0.96
mMPTA			
Pre-operative	0.95	0.93	0.90
Last follow-up	0.96	0.95	0.93
PTSA			
Pre-operative	0.97	0.96	0.95
Last follow-up	0.99	0.98	0.98

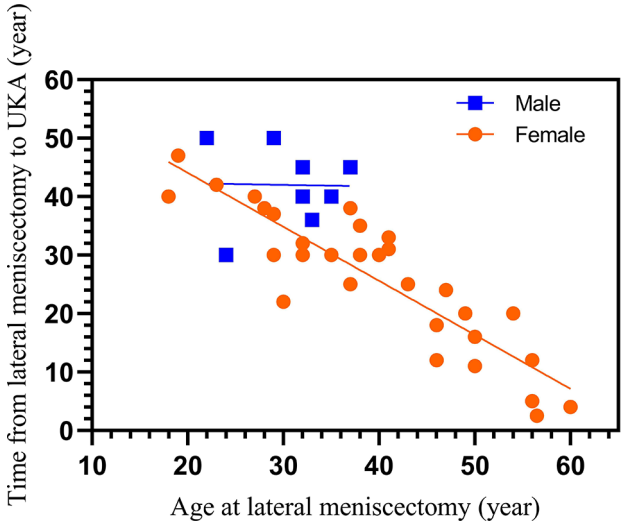

Fig. 4 Relationship between age at lateral meniscectomy and time progressing to lateral UKA

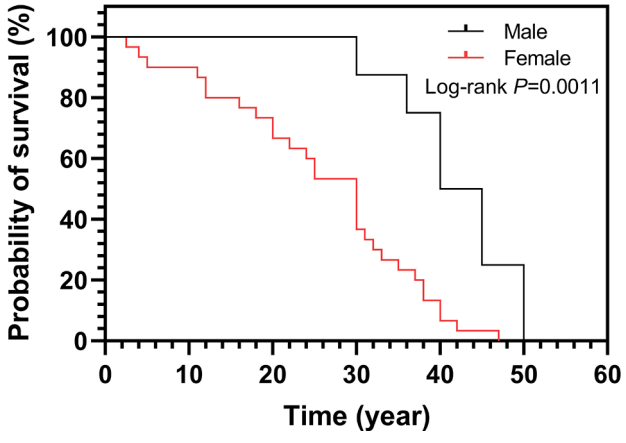

Fig. 5 Kaplan-Meier curve of conversion to lateral UKA for patients after meniscectomy

post-meniscectomy OA and those with primary lateral OA. They also found patients with post-meniscectomy OA had higher 10-year implant survival than primary lateral OA (97.6% versus 83.3%). This is consistent with the results of our study, which shows that patients underwent lateral UKA for PMKO achieved comparable clinical and radiographic outcomes to LCKO. No revisions occurred.

Interestingly, we observed that the preoperative mLDFA was significantly more valgus in LCKO than PMKO ($p < 0.001$). This may be due to the distinctions in the pathological features of LCKO and PMKO. Hypoplasia of the lateral condyles and a deficiency in internal derotation are common causes of valgus morphology in LCKO [46]. However, in PMKO, the condyle and mechanical angle often tend to be normal. Therefore, to prevent ascension of the lateral femoral joint-line and maintain proper valgus alignment, the distal and posterior surface of the femoral condyle should be cut conservatively during the lateral UKA for LCKO. Furthermore, cartilage wear in LCKO was more pronounced in the posterior region where tibiofemoral contacts appear in flexion [47]. While lateral meniscal deficiency could result in increasing load-bearing stress, greater extent of cartilage lesion and radiographic joint narrowing in lateral compartmental. Thus, these might explain the significant difference in preoperative K-L grade of lateral, but it is comparable in HKA between the two groups.

A retrospective study, which included 834,393 patients with a history of partial meniscectomy, demonstrated women have twice the risk of progressing to knee arthroplasty as men [5]. It is similar to our findings that women had a significantly lower cumulative survival rate of conversion to lateral UKA than men after lateral meniscectomy. Additionally, we also found the time interval for conversion to lateral UKA becomes shorter as the age at lateral meniscectomy increases. It may implicate older people will experience worse postoperative functional outcomes after lateral meniscectomy. Thus, elderly patients should be advised about the benefits and risks of undergoing meniscectomy.

There are several limitations to this study. Most importantly, this was a retrospective study design. Secondly, the sample size was relatively small because of a low incidence of OA secondary to lateral meniscectomy requiring lateral UKA. Thirdly, the evaluation of cartilage status at the time of arthroscopy is lacking. It is reported that many patients undergoing arthroscopy for meniscal tears may present with chondral lesions and synovial inflammation [48], which are believed to accelerate the progression to OA [49]. It would have been interesting to assess the condition of cartilage intraoperatively to determine the extent to which this affects the development of OA. However, for lateral UKA, whether moderate or severe lateral OA, clinical outcomes were comparable

between groups when proper valgus lower limb alignment was achieved. This is in accordance with a recent report that found moderate valgus alignment following lateral UKA is associated with better results and survivorship [50]. Moreover, the inclusion patient age at lateral UKA was wide. Some patients were now elderly with reduced mobility, and their expectations were low. Lastly, the procedures were performed by a single surgeon and only one specific implant was used in this study. Therefore, the results may limit generalizability and cannot be applicable to other lateral UKAs performed with different implant designs.

Conclusion

Patients with lateral PMKO demonstrated comparable clinical and radiographic outcomes, and less OA progression in the medial compartment after lateral UKA compared to those who with LCKO. Prior lateral meniscectomy did not exert a significant negative effect on the outcomes or increase complications. Additionally, lateral PMKO often exhibit severe lateral OA, while LCKO experiences hypoplasia of the lateral condyles and pronounced cartilage wear in the posterior region of lateral condyles. It is crucial to prevent ascension of the lateral femoral joint-line and maintain proper valgus alignment during lateral UKA.

Abbreviations

OA	Osteoarthritis
K-L	Kellgren-Lawrence
UKA	Unicompartmental knee arthroplasty
TKA	Total knee arthroplasty
PMKO	Post-meniscectomy knee osteoarthritis
LCKO	Lateral compartment knee osteoarthritis
BMI	Body mass index
AKSS	American Knee Society Score
AKSS-O	American Knee Society Objective Score
AKSS-F	American Knee Society Functional Score
ROM	Range of motion
FJS	Forgotten Joint Score
EQ-5D	EuroQol (Quality of life) – 5 Dimensions questionnaire
HKA	Hip-knee-ankle angle
mLDFA	Mechanical lateral distal femoral angle
mMPTA	Mechanical medial proximal tibial angle
PTSA	Posterior tibial slope angle

Author contributions

Tang Yang: Study design; data collection; x-rays measurements; statistical analysis and manuscript writing.Yihui Tu: Study design, manuscript editing and supervision.Huaming Xue: Manuscript editing.Tao Wen: Data collection. Tong Ma: Literature review.Long Xue: Data collection; x-rays measurements; All authors read and approved the final manuscript.

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Data availability

No datasets were generated or analysed during the current study.

Declarations

Ethical approval

This is a retrospective study that was approved by the Ethics Committee of Yangpu Hospital affiliated to Tongji University School of Medicine (Approval NO. LL-2024-SCI-009).

Consent to participate

Informed consent was obtained from all participants involved in the study.

Consent for publication

The authors affirm that human research participants provided informed consent for publication of all the images included in the paper.

Competing interests

The authors declare no competing interests.

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