



Patients with isolated lateral osteoarthritis: Unicompartmental or total knee arthroplasty?



J.P. van der List ^{a,*}, H. Chawla ^a, H.A. Zuiderbaan ^b, A.D. Pearle ^a

^a Computer Assisted Surgery Center, Department of Orthopaedic Surgery, Hospital for Special Surgery, Weill Medical College of Cornell University, New York, NY, United States

^b Department of Orthopaedic Surgery, Spaarne Hospital, Hoofddorp, The Netherlands

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ABSTRACT

Background: Lateral unicompartmental knee arthroplasty (UKA) and total knee arthroplasty (TKA) are both reliable treatment options for patients with isolated lateral osteoarthritis (OA). However, studies comparing both procedures are scarce. Aims of this study were to (I) compare short-term functional outcomes following lateral UKA and TKA and (II) assess the role of patient characteristics on outcomes as measured by the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC).

Methods: In this retrospective cohort study, 82 patients (48 undergoing lateral UKA and 34 undergoing TKA) were identified that presented with lateral OA and completed the WOMAC. Independent t-tests were used to compare outcomes following lateral UKA and TKA.

Results: Mean follow-up was 2.8 years (range: 2.0–5.0 years). Preoperatively, no differences between lateral UKA and TKA were seen (50.1 ± 13.5 and 53.3 ± 17.1 , respectively, $p = 0.551$). Postoperatively, lateral UKA patients reported better overall outcomes than TKA (90.5 ± 11.7 vs. 81.8 ± 17.9 , $p = 0.017$). Subgroup analysis showed better outcomes following lateral UKA than TKA in patients younger than 75 years (92.1 ± 9.9 vs. 81.3 ± 19.6 , $p = 0.014$) and in females (91.6 ± 9.9 vs. 81.0 ± 18.2 , $p = 0.014$).

Conclusion: These findings indicate that lateral UKA has superior short-term functional outcomes compared to TKA in patients with isolated lateral OA. Better outcomes were especially seen in younger patients and females. These findings may help orthopedic surgeons choose treatment for patients presenting with lateral OA and optimize treatment for individual patients.

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1. Introduction

Unicompartmental knee arthroplasty (UKA) has gained popularity over the past decade for the treatment of isolated osteoarthritis (OA) [1–4]. Lateral UKA comprises only five to 10% of these procedures [3,5,6], while high-volume centers reportedly perform 17–23% of all UKA at the lateral side [7–9]. This discrepancy can be explained by several factors. Firstly, isolated lateral OA is less frequently encountered than medial OA and as a result, many authors consider lateral UKA to be more technically demanding [10–12]. Secondly, anatomic and kinematic differences exist between both compartments [12–17]. In particular, more laxity at the lateral compartment [13] has historically been associated with high incidence of bearing dislocation following mobile bearing lateral UKA, which further decreased the confidence in lateral UKA [18,19].

These factors suggest that lateral UKA may be an underutilized procedure in the setting of isolated lateral OA [9,20]. This represents a suboptimal situation given the benefits of UKA over total knee arthroplasty (TKA) including faster recovery [21,22], better range of motion [23], better functional outcomes [24,25], less complications [26,27], shorter hospital stay [27–29] and easier revisions [30]. On the other hand, several cohorts and registry data showed that survivorship of TKA is higher compared to that of lateral UKA [1,2,31].

A recent study stressed that lateral UKA leads to better functional outcomes and range of motion compared to TKA in the setting of isolated lateral OA [24]. However, no other studies have confirmed this finding to date. Furthermore, it remains undefined in which patients each option is preferable since distinct advantages exist for both treatment options. Therefore, the primary goal of this retrospective study was to compare short-term patient-reported outcomes following lateral UKA and TKA for the indication of isolated lateral OA. The secondary goal was to assess the role of patient characteristics on outcomes of lateral UKA and TKA in patients with lateral OA. Hypothesis of this study was that lateral UKA patients would report better outcomes than TKA patients, particularly in younger and non-obese patients.

* Corresponding author at: Hospital for Special Surgery, 535 E. 70th Street, New York, NY 10021, United States. Tel.: +1 646 238 4326; fax: +1 646 797 8222.

E-mail addresses: vanderlistj@hss.edu (J.P. van der List),

harshvardhan.chawla@mssm.edu (H. Chawla), hazuiderbaanmd@gmail.com (H.A. Zuiderbaan), pearlea@hss.edu (A.D. Pearle).

2. Methods

2.1. Study design

Following Institutional Review Board (IRB) approval (IRB-number 2013-056), an electronic search was performed in the database of the senior author (ADP) for patients who underwent lateral UKA or TKA surgery for the indication of lateral OA between September 2008 and April 2014. A total of 104 patients underwent lateral UKA ($n = 61$) or TKA ($n = 43$) for the indication of lateral OA. Inclusion criteria for the lateral UKA cohort were (I) primary indication of isolated lateral OA, (II) use of tibial onlay implants and (III) functional outcome scores between two-year and five-year follow-up. Inclusion criteria for the TKA cohort were (I) primary indication of isolated lateral OA, (II) functional outcome scores between two-year and five-year follow-up and (III) intact anterior cruciate ligament.

Included patients of both cohorts were radiographically checked for the primary indication of isolated lateral OA using the Kellgren–Lawrence (KL) score [32] and were excluded from either cohort if (I) there was OA presence of the medial compartment (KL score > 1) or if there was significant OA of the patellofemoral compartment (i.e. KL score > 2). This higher grade for patellofemoral OA was chosen since mild severity patellofemoral OA does not influence outcomes following UKA [33,34] and the patella was resurfaced in all TKA procedures. Finally, a radiographically matched cohort was created with patients that underwent arthroplasty treatment for the same indication of isolated lateral OA (Figure 1) and reported functional outcomes at short-term follow-up (Table 1).

2.2. Surgical technique

The senior author (ADP) performed all UKA and TKA surgeries. In the beginning of this study period, the preference of the senior author was to perform TKA surgery while this later changed to lateral UKA surgery with the publication of encouraging literature on (lateral) UKA outcomes [35–38]. UKA surgery was performed using a robotic-assisted technique (MAKO Surgical Corp, Ft. Lauderdale, FL, USA) [39,40]. All UKA patients received a RESTORIS® MCK Lateral Onlay implant (MAKO Surgical Corp, Ft. Lauderdale, FL, USA). The goal of surgery was a postoperative valgus alignment in order to prevent progression of

Table 1

Patient demographics of patients undergoing lateral UKA and TKA.

	Lateral UKA ($n = 48$)		TKA ($n = 34$)		p-Value
	N	Mean ($\pm$ SD)	N	Mean ($\pm$ SD)	
Age (years)	48	66.2 (± 12.1)	34	66.8 (± 7.9)	0.771
BMI (kg/m^2)	46	26.6 (± 4.7)	33	29.6 (± 5.0)	0.007
Gender (M:F)	48	17:31	34	10:24	0.569
Side (R:L)	48	25:23	34	19:15	0.477
Follow-up (years; range)	48	2.7 (± 1.1 ; 2.0–5.0)	34	2.9 (± 1.3 ; 2.0–5.0)	0.555
OA severity MC	48	0.5 (± 0.6)	34	0.7 (± 0.5)	0.061
OA severity LC	46	2.8 (± 0.7)	34	3.2 (± 0.6)	0.004
OA severity PFC	47	0.7 (± 0.7)	34	0.9 (± 0.7)	0.236
Preoperative valgus	45	6.1 (± 4.1)	27	7.7 (± 5.3)	0.155
Postoperative valgus	46	2.8 (± 2.5)	30	−0.5 (± 2.6)	< 0.001

UKA indicates unicompartmental knee arthroplasty; TKA, total knee arthroplasty; SD, standard deviation; BMI, body mass index; MC, medial compartment; LC, lateral compartment; PFC, patello-femoral compartment.

OA in the medial compartment [41,42]. TKA surgery was performed using image-based computer navigation-assisted technique using the Vanguard® Total Knee (Biomet, Warsaw, IN, USA) [43]. The goal of TKA surgery was neutral alignment [44] and the patella was resurfaced in all TKA procedures. All implants were cemented. None of the cases was converted intraoperatively from lateral UKA to TKA or vice versa.

2.3. Functional outcome measurements

Western Ontario and McMaster Universities Arthritis Index (WOMAC) scores were collected preoperatively and prospectively at routine follow-up. The WOMAC score is a Likert scale-based questionnaire, validated to assess knee joint OA [45,46]. It measures overall outcomes (24 questions in total), pain (five questions), stiffness (two questions) and function (17 questions). All scores were indexed with 0 as the worst possible score and 100 as the best possible score. Outcomes were reported as mean $\pm$ standard deviation (SD).

Forty-eight patients who underwent lateral UKA reported WOMAC scores postoperatively (mean follow-up 2.7 years; range 2.0–5.0 years) of which 18 completed the WOMAC survey preoperatively. Thirty-four patients who underwent TKA completed the WOMAC survey

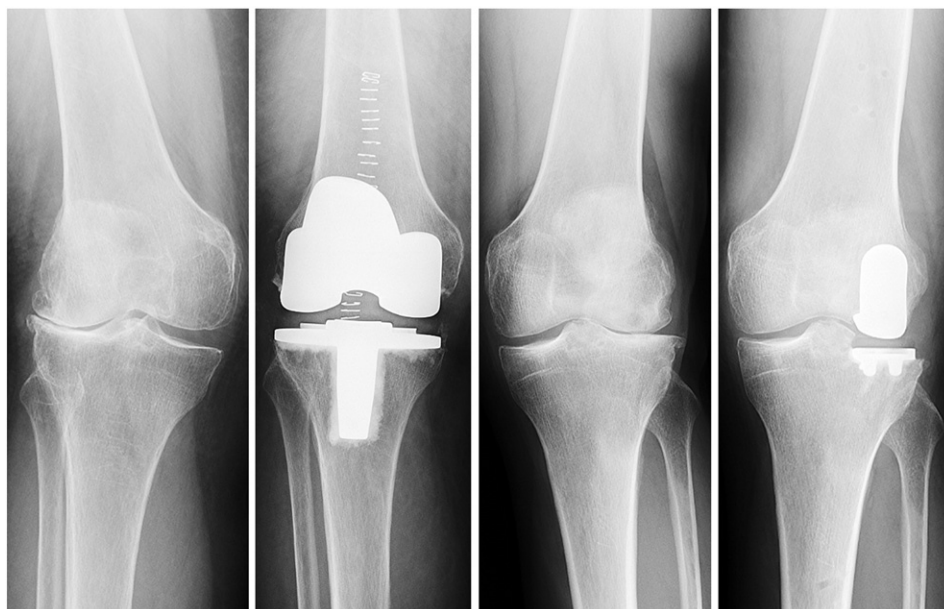


Figure 1. Pre- and postoperative radiographs are shown of two patients with isolated lateral osteoarthritis either treated with total knee arthroplasty (left) or unicompartmental knee arthroplasty (right).

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