Does Bearing Design Influence Midterm Survivorship of Unicompartamental Arthroplasty?

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Abstract Medial unicompartamental arthroplasties (UKA) are available with mobile- and fixed-bearing designs, with the advantages of one bearing over another unproven. We questioned whether the bearing design influenced clinical outcome, survivorship, the reason for revision, or the timing of failures. We retrospectively reviewed 179 patients (229 knees) who had medial unicompartamental knee arthroplasties between 1990 and 2007; of these 79 knees had a mobile-bearing design and 150 knees a fixed-bearing design. Patients with mobile-bearing UKA had a minimum followup of 1 year (mean, 3.6 years; range, 1–11.3 years); those with fixed-bearing UKA a minimum followup of 1 year (mean, 8.1 years; range, 1–17.8 years). Patients were evaluated with clinical outcome scores and radiographically using the Knee Society rating system. Seven of 79 (9%) mobile-bearing knees underwent revision at a

mean of 2.6 years, and 22 of 150 (15%) fixed-bearing knees underwent revision at a mean of 6.9 years. The 5-year cumulative survival rates were 88% (SE $\pm$ 0.47, 95% CI 0.7229–1) and 96% (SE $\pm$ 0.16, 95% CI 0.93–0.9979) for the mobile- and fixed-bearing designs respectively using the endpoint of revision surgery. We observed no differences in the indications or complexity of revision surgery between the groups and none in midterm survivorship.

Level of Evidence: Level III, comparative study. See Guidelines for Authors for a complete description of levels of evidence.

Introduction

There are a variety of surgical treatment options for isolated medial compartment arthritis of the knee, including high tibial osteotomy, unicompartamental arthroplasty (UKA), or total knee arthroplasty (TKA). Early published outcomes of medial UKA were unfavorable with midterm revision rates of 15% to 28% [20, 32, 39] for aseptic loosening, polyethylene wear, and progression of arthritis to the remaining compartments. Although TKA remains the gold standard, with survivorship figures of 92% to 100% [3, 15, 16, 25, 30], more recent reports demonstrate UKA survivorship of 84% to 98% over the mid- to long term [14, 16, 34, 35, 37, 44, 54–57, 59]. Proposed advantages of UKA over TKA include the comparative ease of revision [12, 24, 28, 33, 50] and patient preference for improved knee kinematics [1, 18, 22, 40, 42, 43] and function [19, 36], and with less blood loss [23] and shorter inpatient stay [46].

Unicompartamental prostheses are available in mobile- and fixed-bearing designs, with midterm survivorship

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Each author certifies that his or her institution has approved the human protocol for this investigation and that all investigations were conducted in conformity with ethical principles of research, and that informed consent for participation in the study was obtained.

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reported between 81% and 99% for the mobile-bearing [14, 34, 45, 56, 59] and 79% to 93% for the fixed-bearing [14, 35, 54, 55, 58] designs. Advocates of the mobile-bearing design cite the potential advantages of a congruent bearing with lower polyethylene stresses [52] and polyethylene wear rates [5, 47] compared to a fixed-bearing design. Arthroplasty registries [26, 29, 49] and several studies comparing these bearing designs [11, 13, 17, 31] suggest no conclusive advantage of one bearing design over another, with some authors citing differing reasons for the failure of each design [13, 17]. The complexity of revision surgery for unicompartmental failure has been variably reported from relatively simple [10, 12, 27, 28, 33, 50] to complex [2, 6, 9, 38, 53].

We therefore asked whether mobile- and fixed-bearing design UKAs differed in (1) clinical outcome; (2) survivorship; (3) the reasons for revision; (4) timing of failures; and (5) the complexity of revision surgery.

Patients and Methods

We retrospectively reviewed all 179 patients (229 knees) having unicompartmental knee replacements of either a fixed-bearing (Miller-Galante; Zimmer, Warsaw, IN) or mobile-bearing design (Oxford meniscal-bearing; Biomet, Warsaw, IN) between the years 1990 and 2007. One hundred seventeen patients (150 knees) had a Miller-Galante fixed-bearing prosthesis and 62 patients (79 knees) an Oxford mobile-bearing prosthesis between 1993 and 2007. Patient demographics for the two groups were similar for the proportion of bilateral procedures, median age, and gender and body mass index (Table 1). The preoperative diagnosis was osteoarthritis in 221 and avascular necrosis

in eight arthroplasties. Previous operations included 39 arthroscopies and four high tibial osteotomies. This patient cohort of medial unicompartmental arthroplasties represents 5% of all primary knee arthroplasty procedures performed during this time period, as suitable candidates for the procedure involved careful patient selection. Both prostheses used cemented fixation (Simplex) for both femoral and tibial components. The fixed-bearing design used was the Miller-Galante prosthesis with a biconvex cobalt chrome femoral component. The tibial component is titanium alloy with a modular polyethylene insert. The only mobile-bearing design used was the Oxford prosthesis with a cobalt chrome femoral component with a spherical articular surface. The tibial component is cobalt chrome with a highly polished flat surface for articulation with the polyethylene meniscal bearing. Stability of the dual surface articulation is provided by the fully congruent bearing geometry and soft tissue tension. To demonstrate early complications for both groups, patients with minimum followup of 1 year were included. Patients with mobile-bearing UKA had a minimum followup of 1 year (mean, 3.6 years; range, 1–11.3 years) and those with fixed-bearing UKA a minimum followup of 1 year (mean, 8.1 years; range, 1–17.8 years). One patient with one mobile-bearing knee was lost to followup and five with a fixed-bearing knee were lost to followup. Thirty-eight patients died at a mean 12.7 years after the index arthroplasty. Approval for this study was obtained from our local research and ethics committee.

Indications included disabling medial compartment pain, an intact anterior cruciate ligament, a fixed flexion deformity of less than 10°, a correctable varus deformity of less than 10°, and intact healthy articular cartilage in the lateral compartment. Contraindications included night pain and synovitis. Age and weight did not influence patient selection, although the procedure was generally not recommended in morbidly obese or high-demand activity patients. Patellofemoral pain was considered a contraindication to a unicompartmental arthroplasty, but radiographic findings of patellofemoral osteoarthritis in the absence of patellofemoral pain were not considered a contraindication. We considered patellofemoral pain as anterior knee pain typically aggravated by flexion activities, distinct from the well-localized medial joint pain resulting from medial compartment osteoarthritis of the knee. Only patients with well-localized medial compartment symptoms were considered candidates for UKA. Ultimately, the final decision to proceed with unicompartmental arthroplasty was made intraoperatively following inspection of the lateral compartment, the patellofemoral joint, and anterior cruciate ligament; if there was eburnated bone present in these compartments or a deficient ACL, a total knee arthroplasty was performed. Surgeon preference was the major

Table 1. Patient demographics

Demographic	Miller Galante	Oxford
Total number UKA	150	79
Surgical date	1990–2007	1993–2007
Bilateral procedures	28%	27%
Median age (years)	68	63
Age range (years)	45–79	49–87
Gender (male:female)	71:79	41:38
BMI	28.7 (16.8–44)	30.7 (19.3–43.1)
Etiology OA: AVN	143:7	78:1
Followup in years, mean (range)	8.1 (1–17.8)	3.6 (1–11.3)
Lost to followup	5	1
Deaths	35	3

UKA = unicompartmental knee arthroplasty; BMI = body mass index; OA = osteoarthritis; AVN = avascular necrosis.

determinant of which implant was used with surgeons predominating in either a fixed or mobile bearing.

The mean preoperative Knee Society scores were similar ($p = 0.33$) in the two groups 101 (range, 57–175) and 98 (range, 59–145) for the fixed- (MG) and mobile-bearing (Oxford) prostheses, respectively. The mean preoperative WOMAC scores were also similar ($p = 0.33$): 46 (range, 24.5–86) and 49.2 (range, 10.1–82) for the fixed- (MG) and mobile-bearing (Oxford) prostheses, respectively.

Surgery was performed by or under the direct supervision of five consultants (CHR, RBB, SJM, RWM, DDRN). One surgeon inserted the mobile-bearing design (Oxford) only and two surgeons used only the fixed-bearing design (MG). Two surgeons used both bearing designs in similar proportions, initially using a fixed-bearing (MG) design and later using the mobile-bearing (Oxford) design. With all surgeons, the learning curve of first patients to receive each prosthesis is included in our study. A standard surgical technique and postoperative protocol was employed using a median parapatellar operative approach in all cases. The patella was everted in all cases to allow for inspection of the cruciate ligaments and the lateral compartment. If the anterior or posterior cruciate ligament had longitudinal fissures or complete rupture at the time of surgery, a tri-compartmental knee arthroplasty was performed. The appropriate surgical instrumentation and technique described for each prosthesis was followed and included either an intramedullary or extramedullary cutting jig for the femur (dependent on surgeon preference), and an extramedullary cutting jig for the tibia. For the fixed-bearing design (MG), soft tissue releases were performed to partially correct deformity and to allow for a tibial resection that could incorporate a minimum of 8-mm polyethylene. For the mobile-bearing prosthesis (Oxford), no soft tissue release was performed with balance of flexion and extension gaps achieved with bone resection. All femoral and tibial components were inserted with modern cementing techniques, including vacuum centrifuge mixing and pressurization. All patients received warfarin for prophylaxis against deep-vein thrombosis. All patients also received a second-generation cephalosporin for prophylaxis against infection for the first 24 hours after the procedure.

Patients were reviewed at 6 weeks, 3 months, and on an annual basis thereafter with prospective collection of outcome scores (Knee Society [21], WOMAC [7], and SF-12 [60]) and radiographic data collected on standardized Knee Society rating forms and recorded in our database. The data were collected by a number of observers in the clinic setting including consultants, fellows, and residents. We did not perform further analysis of the radiographs with blinded multiple observers as there was no suggestion of

progressive radiolucent lines or loosening in the nonrevised cases.

We recorded the timing, cause, and complexity of any revision surgery. The complexity of knee revision is related to the bony defects from the original surgery, removal of components, and the revision components needed for reconstruction including augments, structural bone grafts, and stemmed or constrained implants. Complexity was based on the objective criteria of polyethylene liner thickness, the use of modular augmentation, stems, and bone graft as described in previous publications [12].

We determined any differences in the outcome scores (Knee Society clinical rating score, WOMAC, and SF-12) between preoperative and latest followup using a Student's *t*-test or a nonparametric Mann-Whitney *U* test. Some data was non-normal using a one-sample Kolmogorov-Smirnov *Z* test. For normally distributed data, we found equal variances for all of the Knee Society, WOMAC and SF-12 data analysis except for preoperatively the Knee society Knee domain score, knee society total score and the postoperative SF-12 Mental and Physical component scores. The cumulative survival rates for the fixed- and mobile-bearing designs were determined using a Kaplan-Meier analysis with an endpoint of revision surgery with a further worst-case analysis performed to include patients lost to followup as failures. Reasons for revision were analyzed by comparing the frequency of the common failure modes in each group using the Chi square test with the timing of failures in each group using the Breslow statistical test.

Results

At last followup there were no differences between the two groups according to the Knee Society clinical rating score or WOMAC index (Table 2). Postoperatively we observed higher scores in both groups in the SF-12 scores at latest followup for both mental ($p = 0.04$) and physical ($p = 0.04$) components. The mean postoperative Knee Society scores at the latest followup were similar ($p = 0.3$): 172 (range, 83–200) and 178 (range, 110–200) for the fixed- (MG) and mobile-bearing (Oxford) groups respectively. The mean postoperative WOMAC scores at last followup were also similar ($p = 0.3$): 73.7 (range, 26.2–98.9) and 72.3 (range, 24.6–97.4) for the fixed- (MG) and mobile-bearing (Oxford) groups respectively.

At last assessment two tibial components (one fixed bearing [MG], one mobile bearing [Oxford]), and one femoral component (fixed bearing [MG]) demonstrated nonprogressive radiolucent lines. Despite the radiological features, these patients continue to function at a high level without symptoms. None of the surviving implants from either group showed signs of subsidence.

Table 2. Outcome scores for both groups, preoperatively and at the latest followup

Outcome score	Group	Mean	Standard deviation	p Value
Preoperative KSCRS	Mobile	98.81	18.113	0.331
	Fixed	101.69	24.693	
Latest KSCRS	Mobile	173.98	30.7	0.299
	Fixed	169.51	29.953	
Preoperative SF12 MCS	Mobile	54.52	10.424	0.751
	Fixed	53.91	9.36	
Latest SF12 MCS	Mobile	54.84	8.849	0.041
	Fixed	51.62	13.096	
Preoperative SF12 PCS	Mobile	33.05	9.116	0.136
	Fixed	30.58	7.871	
Latest SF12 PCS	Mobile	41.34	9.922	0.04
	Fixed	36.48	13.665	
Preoperative WOMAC	Mobile	49.20	17.623	0.331
	Fixed	46.03	16.467	
Latest WOMAC	Mobile	72.28	20.671	0.676
	Fixed	73.68	24.372	

KSCRS = Knee Society clinical rating score; SF12 MCS = Short Form 12 mental component score; SF12 PCS = Short Form 12 physical component score; Latest = latest followup.

Fig. 1 The 5-year cumulative survival rates using the endpoint of revision to tricompartmental knee arthroplasty, with no difference between the fixed (MG) and mobile bearing (Oxford) designs. Black solid line: Fixed bearing (MG): 96% at 5 years. Grey solid line: Mobile bearing (Oxford): 89% at 5 years. Broken lines represent the 95% Confidence intervals for group.

The 5-year cumulative survival rates were 96% (SE $\pm$ 0.18) and 89% (SE $\pm$ 0.46) for the fixed- (MG) and mobile-bearing (Oxford) designs respectively using the endpoint of revision to tricompartmental knee arthroplasty (Fig. 1). Cumulative survival rates calculated for a worst-case scenario including the patients lost to followup as failures were 95.6% (SE $\pm$ 0.02) and 89.3% (SE $\pm$ 0.04) for the fixed- (MG) and mobile-bearing (Oxford) designs

respectively. The 95% confidence intervals for the two bearing designs overlapped at 5-years (log rank analysis p-value = 0.745), indicating no difference in survivorship between groups.

The mechanisms of failure differed between the groups in terms of their frequency and timing from the index surgery (Table 3). In the fixed-bearing group (MG) at a mean of 6.9 years, 22 knees underwent revision to a total knee arthroplasty (TKA). Revisions were performed for aseptic loosening in three patients at a mean of 5.6 years (range, 2.9–7.6 years), progression of osteoarthritis in eight patients at a mean of 6.2 years (range, 1.1–12.5 years), and polyethylene wear in seven patients at a mean of 8.8 years (range, 3.9–14.3 years) following the index procedure. Additional indications for revision surgery included traumatic anterior cruciate ligament injury with subsequent instability in one patient, retention of excess bone cement in one patient, and pain of unknown cause in two patients.

In the mobile-bearing group (Oxford) at an earlier mean of 2.6 years, seven knees were revised. Revision to a TKA occurred in six patients, with aseptic loosening the predominant cause of early failure in the mobile bearing group occurring in four patients at a mean of 2 years (range, 1.5–2.3 years) following the index procedure. Two additional patients were revised for progression of arthritis at a mean of 3.9 years (range, 2.9–5 years). A single patient in the mobile-bearing (Oxford) group had a dislocation of the meniscal bearing at 8 months postoperatively. This patient had further surgery with insertion of a thicker bearing without further complication. The frequency of aseptic loosening was not statistically different between the two groups ($p < 0.05$). The timing of aseptic loosening in both groups was not statistically different using the Breslow test ($p = 0.082$).

Revisions were uncomplicated for both bearing designs with improvements in outcome scores seen in both groups (Table 4). In the fixed-bearing group standard primary components were used including six cruciate-retaining and 16 posterior cruciate-substituting total knee arthroplasties, with no augments used. One patient had autologous morselized bone graft for a contained tibial defect. Mobile-bearing revision procedures involved six posterior cruciate-substituting total knee arthroplasties without the requirement of augments or bone graft. One patient was revised to an increased thickness meniscal bearing.

Discussion

Unicompartmental arthroplasty remains one of several surgical options in the treatment of isolated medial compartment arthritis of the knee. Successful survivorship has been reported over the midterm for both mobile- and

Table 3. Unicompartmental arthroplasty revision details for both bearing designs

Reason for revision	Fixed (MG) (n = 22)	Mean time to revision (years)	Mobile (Oxford) (n = 7)	Mean time to revision (years)
Progression of arthritis	8	6.2 (1.1–12.5)	2	3.9 (2.9–5)
Aseptic loosening	3	5.6 (2.9–7.6)	4	2.0 (1.5–2.3)
Polyethylene wear	7	8.75 (3.9–14.3)	–	–
Traumatic instability	1	3.4	–	–
Bearing dislocation	–	–	1	0.7
Retained PMMA	1	2.3	–	–
Pain, unknown cause	2	7.1 (7–7.2)	–	–

Table 4. Outcomes of revised unicompartmental arthroplasties

Outcome score	Preoperative (mean)	Postoperative (mean)	Latest followup, mean (years)
Fixed bearing (MG)			
KSS	85.2	151.8	3.8
WOMAC	36.9	64.1	3.8
SF12 MCS	58.4	50.7	4.5
SF12 PCS	28.5	33.1	4.5
Mobile bearing (Oxford)			
KSS	95.6	179.4	2
WOMAC	39.7	72.7	2
SF12 MCS	53.4	55.9	2
SF12 PCS	30.2	39.7	2

fixed-bearing designs [14, 16, 34, 35, 37, 44, 54–57, 59]. Studies comparing fixed- and mobile-bearing designs have not been consistent in demonstrating an advantage [11, 13, 17, 31] of one bearing design over another. In our study we have asked whether mobile- and fixed-bearing design UKAs differed in (1) clinical outcome; (2) survivorship; (3) the reasons for revision; (4) the timing of failures; and (5) the complexity of revision surgery.

Limitations of this study include (1) nonrandomized groups with incomplete matching resulting in differing group sizes; (2) numbers of patients lost to followup or deaths; (3) a short followup duration; and (4) use of each prosthesis based on surgeon preference. Our fixed-bearing group is larger in size with longer followup compared to the mobile-bearing group, although the patient demographics of age, gender, body mass indices, and percentage of bilateral procedures are similar for each group. Our radiographs were not subjected to review by multiple blinded observers and are therefore subject to inter- and intra- observer error.

We found both bearing designs provided excellent relief of pain and improved function in the treatment of medial compartment arthritis. The only differences noted in

clinical outcome were higher SF-12 mental ($p = 0.041$) and physical ($p = 0.04$) scores in the mobile-bearing group at latest followup. Possible explanations for this difference could be the shorter followup (3.6 versus 8.1 years) in the mobile-bearing group or the improved knee kinematics with the mobile-bearing design [42, 43]. The 5-year cumulative survival rates using the endpoint of revision were 96% ($SE \pm 0.18$) and 89% ($SE \pm 0.46$) for the fixed- and mobile-bearing designs respectively (Fig. 1). These survivorship figures are similar to those reported in the literature for fixed- [4, 8, 16, 35, 37, 41, 54, 55, 57, 58] and mobile-bearing [14, 29, 34, 45, 56, 59] designs (Table 5). In comparative studies using an Oxford mobile-bearing UKA, Newman reported improved pain relief and survival with a fixed bearing (Saint Georg Sled, Newsplint) [17], while Emerson et al. [13] reported the fixed-bearing Brigham prosthesis to have a poorer survival. A randomized study comparing a fixed bearing (Allegretto, Centerpulse, Baar, Switzerland) and mobile bearing (AMC, Quiershied, Germany) reported no differences between the two designs at a mean of 5.7 years followup [11]. Conclusions from the small number of comparative studies comparing fixed- and mobile-bearing prostheses, [11, 13, 17, 31] have not been consistent in advocating one bearing design over the other.

Earlier reports from Swedish register data suggested the mobile-bearing Oxford prosthesis had a revision rate two times higher than a fixed-bearing design Marmor prosthesis [29]. In a later review from the Swedish registry, Robertsson et al. [48] reported higher revision rates in hospitals performing a lower annual surgical volume of Oxford mobile-bearing UKAs and suggested that the learning curve for the mobile-bearing system to be less forgiving than a fixed-bearing design. More recent studies comparing revision rates [49] and long-term survivorship [26] suggest no differences between the fixed-bearing (MG) and mobile-bearing (Oxford) designs.

Reasons for failure leading to revision in our patients were similar to those cited in other reports [12, 14, 15, 51, 55] with progression of arthritis, aseptic loosening, and

Table 5. Comparison of study variables with those reported in the literature

Author	Number UKA	Followup (years)	Clinical outcome	Bearing design/ survivorship	Mean patient age (years)	Number of revisions/reasons for revision	Mean time to failure or revision (years)
Gioe et al. [16]	516	–	–	F (Mixed designs, Osteonics) 88.6% 10 years	63.7	39/A20, L10, P8, O1	3.62 (0.4–8.4)
Argenson et al. [4]	160	5.5 mean	HSS 59 to 93	F (MG)	66	5/A3, P2	2.4 (0.2–4.4)
Berger et al. [8]	62	12 mean	HSS 55 to 92	94% 10 years F (MG)	68	2/A2	8.3 (7.9–8.7) 9 (7–11)
Naudie et al. [35]	113	10 mean	KSS 111 to 165	98% 10 years F (MG)	68	12/A4, L3, P3, O2	–
O'Rourke et al. [37]	136	21 min	KSS 85 to 125 HSS 58 to 74	90% 10 years F (Marmor)	70.9	19/A9, L8, O2	10.6 (1–22)
Pennington et al. [41]	46	11 mean	HSS 59 to 94	84% 20 years F (MG)	54	3/L1, P2	–
Squire et al. [54]	140	15 min	KSS 73 to 156 HSS 57 to 82	92% 11 years F (Marmor)	68	14/A7, L6, O1	7.2 (0.9–18.3)
Steele et al. [55]	203	14.8 mean	BKS 54.8 to 84	84% 22 years F (St Georg)	67.1	16/A7, L4, P3, F2, I2	12.9 (10.2–21.6)
Tabor and Tabor [57]	67	9.7 mean	KSS postop 168	85.9% 20 years F (Marmor)	61	11/A4, L7	4.58 (1.1–12.8)
Emerson and Higgins [14]	55	11.8 mean	KSS 99 to 165	91% 5 years 84% 10 years M (Oxford)	64	7/A5, L1, O1	10.2 3.7
Murray et al. [34]	143	7.6 mean	–	85% 10 years M (Oxford)	70.7	5/ A2, L1, D1, O1, I1	4
Price et al. [45]	439	10 min	HSS 57 to 86	98% 10 years M (Oxford)	69.9	23/A7, L6, D5, O2, I2, F1	3.4 (0.3–8.5)
Svard and Price [56]	124/6	12.5 mean	–	93% 15 years M (Oxford)	69.6	6/D3, L2, I1	2.61 (0.3–5.7)
Vorlat et al. [59]	140/24	5.6 mean	KSS postop 163	95% 10 years M (Oxford)	66	24/A9, L7, D4, O2, F2	–
Whittaker et al. [current study]	79/7	3.6 mean	KSS 98 to 178	82% 10 years M (Oxford)	63	7/A2, L4, D1	2.2 (0.7–5.0)
	150/22	8.1 mean	KSS 101 to 172	89% 5 years F (MG)	68	22/A8, L3, P7, O4	5.56 (1.1–14.3)
				96% 5 years			

F = fixed bearing design; M = mobile bearing design; – = not available; mean = mean followup duration; min = minimum followup duration; A = progression of arthritis; L = aseptic loosening; P = polyethylene wear; D = bearing dislocation; O = other (instability/pain/unknown/PMMA retention); I = infection; F = component fracture; KSS = Total Knee Society score; HSS = Hospital Special Surgery score; BKS = Bristol Knee score; CRR = cumulative revision rate.

polyethylene wear responsible in 82% of our cases. The leading indication for revision varies between reports with both progression of arthritis [12, 14, 16] and aseptic loosening identified [30, 51]. In our study the predominant indication in the mobile-bearing (Oxford) group was aseptic loosening, occurring on average 3.6 years earlier than in the fixed-bearing (MG) group (Table 3). Revisions for polyethylene wear occurred only with longer followup in the fixed-bearing (MG) group at a mean of 8.8 years (range, 3.9–14.3 years) following the index procedure. We speculate these wear-related failures may relate in part to the fact that the polyethylene used in the fixed-bearing group was gamma-sterilized in air, although shelf life of the inserts was not determined in this study.

Although the proportion of revisions for progression of arthritis was similar for both groups, the fixed-bearing (MG) group had four revisions within 25 months for progression of arthritis, which may have been related to patient selection during our early experience with the procedure. The mobile-bearing (Oxford) group procedures were performed later chronologically than the fixed-bearing group (MG) with one early revision for progression of arthritis at 2.9 years suggesting improved patient selection. However there were four early revisions for aseptic loosening between 1.5 and 2.3 years and one revision for bearing dislocation.

When compared to revision of a primary TKA, some authors have reported revision of UKA to TKA is less complex [12, 24, 28, 33, 50] with a similar outcome to primary TKA [24, 28], although others have reported greater degrees of complexity [51] particularly when revising for UKA component subsidence [2]. From the UKAs undergoing revision in our study, we used primary TKA implants only without the need for augments or stems.

In summary, we compared mobile- and fixed-bearing medial UKA at our institution to investigate the relative merits of each bearing design with reference to the clinical outcomes, survivorship, the reasons for revision, and timing of failures. Both bearing designs demonstrated excellent pain relief and restoration of function with durable implant survival. The reasons for revision were similar for both groups with progression of arthritis and aseptic loosening predominant. Polyethylene wear did not feature in the mobile-bearing group with the shorter duration of followup. Comparing the timing of failures revealed early revisions for progression of arthritis in fixed-bearing design prostheses performed initially at our institution, reinforcing the importance of patient selection. The mobile-bearing design demonstrated a trend towards an earlier occurrence of aseptic loosening which may be related to the learning curve of the mobile-bearing system.

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