

APPENDIX 3 – PUBLISHED DATA

Table 7. **Mobile Bearing Knee Clinical Outcomes**

Multidirectional platform devices

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow- up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Duffy ⁴⁴	Accord	Retrospective	61pts 74 knees 26 knees followed	F 69 M 68	95% OA 5% RA	5.3 yrs	Not reported	Knee score 35% good to excellent Func. score 4% good to excellent	Mean knee score 60 (18-97) Mean function score 42 (5-80) Survivorship 58% at 10 yrs	13% no pain 71% mild/occasional pain 16% moderate/ severe pain
Kaper ⁸¹	Self Aligning I	Prospective follow- up	141 pts 172 knees	71 (47-90)	100% OA	5.6 yrs (5-8)	KSS: 81 ROM: 6-110	KSS: 155 ROM: 0-111	Patient satisfaction at 5 to 8 yr follow-up: 94% of those questioned had good or very good outcome Survivorship: with poly as endpt. 98.8% With revision as endpt. 91.7%	37 died prior to 5yr. 4 died after 5yr 15 excluded b/c of revision. 1 pt lost to follow up 115 reviewed at minimum 5 yr follow-up.
Morgan- Jones ¹¹⁸	Motus	Prospective, consecutive	62 pts 75 knees	67	95% OA 5% Other	2.5 yrs (2-4)	KSS (0-200): 96	KSS (0-200): 188	No dislocations, subluxations, or breakages	
Polyzoides ¹³²	Rotaglide Total Knee	Retrospective	161 pts 170 knees	66 (49-82)	71% OA 21% RA 8% prior TKA	3.1 yrs		Scores not given	97% No pain 2% Slight pain 1% Severe pain	Of 160 of the 161 were either enthusiastic or satisfied.

Rotating platform devices

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Callaghan ²⁹	LCS rotating platform mobile bearing (cemented)	Prospective; non-randomized; consecutive	86 pts 119 knees Final F/U on 66 knees	70 (37-88)	88% OA 10% RA 2% Post-traumatic arthritis	9-12 yrs.	KSS Clinical=30 Functional = 44 HSS=57	KSS Clinical =90 Functional = 75 HSS = 84	Avg. range of active flexion @ final F/U was 0 to 102 degrees (15-120) 7 of 66 knees were painful anteriorly Of the 114 knees where the final outcome was known, 0 required reoperation and 0 had a dislocation.	No periprosthetic osteolysis and no evidence of loosening on radiographs.
Grodzki ⁶²	PFC & LCS rotational platform	Prospective, randomized, comparative study	38 pts 12 PFC 26 LCS	PFC: 74 (53-89) LCS: 73.1 (55-91)	Unable to determine	1 Year	KSS (0-200) PFC: 79.8 LCS: 94.0	KSS (0-200) PFC: 130.1 LCS: 159.7		Abstract in English, article in German

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Sorrells ¹⁵⁷	LCS rotating platform	Retrospective, non-randomized consecutive enrollment	521 pts 665 knees	70	84% OA 8% RA 7%PTA	1-11		Not reported	Survivorship: (Revision for any reason) 94.7% at 11 years 98% good/excellent at 1 year to 11 years	2% revision rate
Sorrells ¹⁵⁹	LCS rotating platform	Retrospective, non-randomized consecutive enrollment	99 pts 117 knees 74 pts, 91 knees followed	56 (28-64)	69% OA 21% RA 10% PTA	8.5 yrs (5-14)	NJOHS: (0-100) 61 Avg passive ROM: 104 ±17	NJOHS: (0-100) 91 Avg passive ROM: 115 ± 14	Survivorship: (Revision for any reason) 88.1% at 14 yrs (95% CI, 79.5%-96.7%) 85% good/excellent results at 8.5 yrs	6.8% revision rate

Meniscal bearing devices

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Bert ⁹	LCS	Prospective	43 knees	63 (46-79)	Degenerative arthritis	1 year	Not reported	>70 (91%)		4 cases of meniscal dislocation/subluxation (treated with revision surgery)
Hartford ⁶⁸	LCS	Prospective; non-randomized; consecutive	101 pts 139 knees	66 (45-85)	67% OA 33% RA	7.8 yrs. (60-156 months)	Not reported	KSS=80 (13-100) Avg. knee function =58 WOMAC=43 (6-100)	KSS (of 101 knees), 62 =excellent; 15= good; 5= fair; 0=poor. WOMAC (Pain, stiffness & function) Pain=10 (range, 0-20) Stiffness=7.3 (range, 6.8) Function=29.2 (range, 2-68)	Survivorship was 93% at an average follow-up of 7.8 years.
Jordan ⁷⁹	LCS meniscal bearing system	Prospective, non-randomized, consecutive	232 pts 256 knees 30 lost to follow-up 160 knees in 141 pts followed	68 (32-88)	93% OA 17% RA	11.5 yrs (9.2-13.7 yrs)	Not reported	Not reported	Survivorship: 99.5% at 12 yrs	2 revisions

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Jordan ⁸⁰	LCS mobile meniscal bearing w/o cement	Retrospective, non-randomized consecutive enrollment	374 pts 472 knees 410 knees followed	68 (29-87)	91% OA 9% RA	4.7 yrs (2-9.5 years)	KSS: 29 (9-58) KSS function: 34 (5-50)	KSS: 93 (87-100) KSS function: 92 (10-100)	Survivorship: (Revision for any reason). 94.6% at 8 yrs (95% CI, 92.0% - 97.2%) 85% good/excellent results at 8.5 yrs	Patient Groups: P = primary (no previous surgery) MO = Multiply Operated R = Revision
Kim ⁹⁰	AMK & LCS meniscal bearing	Prospective, randomized Fixed bearing in one knee, mobile bearing in the other (Simultaneous, bilateral comparison)	120 pts 120 AMK 120 LCS 116 pts followed	65 (33-70)	95% OA 5% RA	7.4 (6-8 years)	KSS AMK: 39.2 LCS: 39.0 ROM AMK: 9.5-126.8 LCS: 9.2-126.6	KSS AMK: 93.3 LCS: 94.4 ROM AMK: 0-120.9 LCS: 0-123.2	Survivorship: (Revision as the endpoint for failure) AMK: 98% LCS: 98% (Aseptic loosening as the endpoint for failure) AMK: 100% LCS: 100%	Outcomes thus far are similar for fixed bearing and mobile bearing devices implanted in the same patient. 4 pts lost to follow up
Minns ¹¹⁴	Minns meniscal knee prosthesis	Prospective; non-randomized; consecutive	165 devices	67 (36-89)	57% OA 43% RA	Up to 5 years	Flex: 89.65 Fixed flexion deformity 16.0° Instability 11.48°	Flexion: 103.1 Fixed flexion deformity 5.48° Instability 5.6°	75% Excellent 13% Good 9% Fair	

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow- up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Muller ¹¹⁹	LCS meniscal bearing; no patella	Retrospective, consecutive enrollment; sub- group randomized for functional stair test	436 knees	Not listed	Not listed	3.5 yrs. (2-5)	Not reported	The New Jersey Score increased over the 5- year follow- up from 83 at 2-yr 86 at 3 yrs, 89 at 4 yrs 90 at 5 yrs.	Functional stair test on 33 randomized pts, 1 pt. completed the test in 35 s. and the test was completed by the remaining 24 pts. In < than 60s.	This study theorized that patients with unresurfaced patellas in TKA fair as well as patients w/ resurfaced patellas in TKA's, when using a mobile bearing design.
Rosenberg ¹⁴⁶	Cementless LCS mobile bearing PCR	Retrospective, non- randomized consecutive enrollment	27 pts 35 knees 19 patients followed in final exam.	72 (54-86)	100% OA	5-8 years	Not Reported	14 pts favorable mean score of 83 5 pts fair mean score of 60	5-8 year survivorship = 97.1%	7 patients lost to follow-up 1 failed prosthesis (infection)

Combination of rotating platform and meniscal bearing in same study

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow- up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Buechel ²⁰	New Jersey LCS mobile bearing	Retrospective, non-randomized consecutive enrollment	282 pts 373 knees: 64 Cemented 309 UN = Cementless 109 knees in 76 patients followed	<u>C</u> P: 68 (38-89) MO: 70 (41-97) <u>UC</u> P: 67 (23-97) MO: 58 (23-84) <u>UC/CR</u> P: 67 (30-86) MO: 61 (36-81)	75.6% OA 5.0% PTA 19.4% RA	13.3 yrs (10–19.2)	<i>ROM</i> <u>C</u> P: 91 MO: 81 <u>UC</u> P: 93 MO: 88 <u>UC/CR</u> P: 106 MO:105 <i>NJOHS</i> <u>C</u> P: 39 MO: 42 <u>UC</u> P: 49 MO:51 <u>UC/CR</u> P: 55 MO:56	<i>ROM</i> <u>C</u> P: 110 MO: 98 <u>UC</u> P: 107 MO: 106 <u>UC/CR</u> P: 117 MO:115 <i>NJOHS</i> <u>C</u> P: 84 MO: 86 <u>UC</u> P: 87 MO: 87 <u>UC/CR</u> P: 97 MO: 89	Survivorship – <u>Revision for any component loosening:</u> UC/CR: 100% at 16 yrs UC: 99.4% at 20 yrs. C: 95.8% at 20 yrs <u>Revision for mechanical reason:</u> UC/CR: 97.4% at 10 yrs and 83% at 16 yrs C: 97.7% at 10 yrs and at 20 yrs. UC: 98.3% at 10 yrs and at 18 yrs. <u>Revision for a poor clinical knee score:</u> UC/CR: 98.9% at 10 yrs and 16 yrs C: 97.7% at 10 yrs and at 20 yrs UC: 98.3% at 10 yrs and 18 yrs.	Patient Groups: P = primary (no previous surgery) MO = Multiply Operated (no implant) C = Cemented UC = no cement – Rotating platform UC/CR – no cement – cruciate retaining.

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow- up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Buechel ²³	New Jersey LCS mobile bearing	Retrospective, non-randomized consecutive enrollment	320 pts 357 knees: 149 Cemented 208 Uncemented <u>C UC</u> <u>Type</u> 7 12 Uni 34 38 BCR 0 49 PCR 66 71 Rot. 42 38 Rev.	C: 64 (57-92) UC: 60 (21-86)	<u>C</u> 41% OA 29% RA 2% PTA 42% FKR <u>UC</u> 57% OA 19% RA 6% PTA 18% FKR	<u>C</u> 7.6 yrs (2.3-10.4) <u>UC</u> 4.4 yrs (2-7.5)	ROM <u>C</u> P: 95 MO:94 R: 87 <u>UC</u> P: 102 MO: 99 R: 93	ROM: <u>C</u> P: 124 MO: 100 R: 102 <u>UC</u> P: 112 MO: 105 R: 102	NJOHS Good/Excellent %: <u>C</u> P: 95.1% MO: 91.8% G/E R: 73.7% G/E <u>UC</u> P: 98.2% G/E MO: 91.8% G/E R: 73.7% G/E	Patient Groups: P = primary (no previous surgery) MO = Multiply Operated R = Revision

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow- up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Callaghan ²⁸	1.Oxford Uni 2.SAL Self aligning 3. LCS meniscal bearing; rotating platform	Multiple studies reviewed; retrospective, nonrandomized Some consecutive	1.Oxford (Murray) 144 2. Oxford (Lewold) 699 3. Oxford (Price) 378 4. SAL (Kaper) (61) 5. LCS (Buechel) 57 6. LCS (Jordan) 473 7. LCS (Sorrells) 665 8. LCS (Callaghan) 119	1.Range 35 yrs. – 90 yrs. 2. Not listed 3. Not listed 4. 71 (range, 47-90) 5. Not listed 6. Not listed 7. Not listed 8. Not listed	1. Anteromedial osteoarthritis 2. Medial comp. osteoarthritis 3. Anteromedial osteoarthritis 4. Osteoarthritis 5. Not listed 6. Not listed 7. Not listed 8. Not listed	1. 10 years 2. 5 years 3. 10 years 4. 5.6 yrs. (range, 5- 8 yrs.) 5. Avg=6yrs CR=12 yrs PS=10 yrs PCR=6 yrs 6. 8 yrs 7. 11 yrs. 8. 9 yrs	1.Not listed 2.Not listed 3. Not listed 4. KSS=81 ROM=6+/- 7 deg. Extension to 110+/- 15 deg. Flexion 5. Not listed 6. Not listed 7. Not listed 8. Not listed	1.Not listed 2. Not listed 3. Not listed 4. KSS=155 ROM=0 +/- 1 deg. Extension to 111 +/- 7 deg. Extension 5. Not listed 6. Not listed 7. Not listed 8. HSS=84 pts. Flexion= 102 deg. Avg.	1.Survival rate=98% 2. Survival rate= 90% 3. Survival rate = 95% 4. 94% rated good to very good; 6% rated fair. 5. Survival rate =98% avg. 6. Survival rate=95% 7.Survival rate=95% 8. Survival rate=100%	

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow- up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Keblish ⁸²	LCS meniscal bearing & rotating platform; cemented (C) & Uncemented (UC)	Multicenter (MC), prospective & Dr's Personal experience (consecutive enrollment)	MC trial: 918 knees (C) 963 knees (UC) Personal xp: 275 knees	MC trial: 68 Personal xp: Not reported	100% OA	MC trial: 2-8 yrs Personal xp: 2-8 yrs	NJOHS: (0-100) MC trial: Not reported Personal xp: 53	NJOHS: (0-100) MC trial: Not reported Personal xp: 89	Multicenter trial: 95.8% good/excellent results (C) 96.9% good/excellent results (UC) Personal xp: 97.4% good/excellent results	Personal xp: 3.3% revision rate
Keblish ⁸⁶	LCS	Prospective	52 pts. 104 knees	69 39-87	85% OA 12% RA 3% PTA	5.24 yrs	Not reported	Knee score 89.9		
Munzinger ¹²⁰	LCS metal backed rotating patella component	Retrospective, non-randomized, non-consecutive enrollment.	235 cases 105 statistically analyzed	68.1 (32-87)	92% OA 8% RA	5 yrs	HSS 53 (21-78)	HSS 84 (45-99)	Of 105 cases, 94.7% scored excellent on the HSS scale	Cases (130) with F/U < 2 yrs. were not calculated for statistical analysis but were included in post-op complications. Scores were calculated on only 105 cases

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow- up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Papachristou ¹²⁹	Oxford & Endo-Model	Retrospective, non-randomized, non-consecutive	Oxford: 9 pts Endo- Model: 18 pts	Oxford: 63.6 yrs 44-76 Endo- Model: 72.7 57-85	Oxford: 67% OA 22% RA 11% AVN Endo-Model: 78% OA 22% RA	Oxford: 2-5 yrs Endo- Model: 2 yrs	Not reported	Not reported	Acceptable results were obtained with all models with special reference to the degree of stability and the amount of pain relief	
Sanchez- Sotelo ¹⁴⁸	LCS meniscal bearing (82%) & rotating platform (18%)	Retrospective, non-randomized consecutive enrollment	104 knees 94 pts 101 knees followed	66 (53-76)	84% OA 16% RA	5.2 yrs (4-8)	KSS: 44 KSS function: 40	KSS: 93 KSS function: 78		7.9% revision rate 3 patients lost to follow up
Stiehl ¹⁶⁹	LCS, meniscal bearing, CR and the LCS rotating platform, PCL sacrificing	Prospective, non- randomized consecutive	290 knees (250 pts.) 191 knees followed	69 yrs. Mean age for the meniscal- bearing device 64 yrs. For the rotating platform design	158=OA 17=RA 12=Post traumatic arthritis 4=Other	5 years (mean, 68.5 months)	NJOHS=63 66 for the meniscal- bearing group 54 for the rotating platform group 31% rated good	NJOHS= 92, bearing 88, rotating platform 97% rated excellent or good, meniscal- bearing 100% rated excellent or good, rotating platform	Avg. ROM preop=106 deg. Avg. ROM postop=117deg. 120 deg- meniscal bearing 108 deg- rotating platform	7 year survivorship rate was 97.5% for meniscal bearing and 100% for rotating platform.

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow- up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Thompson ¹⁷⁵	LCS	Descriptive review of results	31/33	73 (58- 89)	100% OA	20 months	ROM 108	ROM 104	Knee pain: Preop: 33 Postop: 21 pain free, 12 occasional pain Average patellar tilt 10° preop, 7° post	
Weissinger ¹⁹⁰	LCS	Retrospective, non-randomized consecutive enrollment in one facility	41 pts 42 knees	65.8 (62-79)	Not mentioned in English Abstract	21 months (8-38)	Not reported in Abstract	Not reported in Abstract	Results as regards pain, stability, mobility, axis of the extremity and ability to walk evaluated as very good and good.	Abstract in English Article in German

Unicondylar mobile bearing devices

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Barrett ⁷	Oxford bicompartamental meniscal bearing	Prospective; non-randomized; consecutive	62 pts 67 knees	RA: 64.5 OA 75.7	RA: 46.3% OA 53.7%	4.5 years (4-7)	ROM: RA/OA:93 (60 – 120) Fixed flexion deformity: RA: 12.8 OA: 10.2	ROM: RA: 103 OA: 73 Average flexion overall 95. Fixed flexion deformity: RA: 8.1 OA: 10.0	Significant pain relief in 83% and overall flexion deformity of 9 degrees. RA patients generally had better outcomes than OA	
Bourne ¹³	Oxford (Bicomp)	Prospective, consecutive	67 knees 59 pts	67 (45-84 yrs)	80% OA 20% RA	5.5 yrs (5-8 yrs)	HHS: Not reported ROM: 9-109	HHS: 82 ROM: 4-104		32 knees were available for follow-up 6 pts lost to FU

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Carr ³¹	Oxford medial unicompartmental	Prospective, non-randomized	96 pts 121 knees	69 (SD 6.5 yrs)	100% OA of medial compartment	44.4 months			At review, 75% of knees had no pain on activity, 22% of knees had mild pain, 3% had moderate pain. Last fu ROM 106 degrees, preop ROM 95 degrees	The cumulative survival of the prosthesis at 9 years was 99.1% Pt selection key for successful UKA: 1) Intact cruciate ligaments 2) Varus deformity fully correctable 3) Full thickness articular cartilage present in lateral compartment.
Cohen ³⁴	LCS meniscal bearing unicompartmental knee	Retrospective, non-randomized	20 pts./21 knees	60 years (22-76)	14 =OA 5=Post Traumatic arthritis 1=RA	34 months (24-132 month)	Cemented group NJOHS=53 Uncemented group NJOHS=62	Cem group NJOHS=92 @ 1 yr Unc group NJOHS=89 @ 1yr	17 patients were followed; 15 pts. Had good to excellent results.	No statistical differences were apparent between the medial & lateral, or the cemented and uncemented replacement groups.

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Goodfellow ⁵⁵	Oxford uni/bicompartmental meniscal bearing	Prospective, non-randomized, consecutive	85 pts/ 103 knees 76 medial 27 lateral	70 years (SD 7.6 years)	OA 100%	36 months (21-56)			96% of cases had reduced pain after surgery Flexion ROM improved from 104 preop to 105 postop	5 pts lost to follow-up
Goodfellow ⁵⁶	Oxford bicompartmental meniscal bearing	Prospective; non-randomized; consecutive	107 pts 125 knees	64.6 (45-83)	OA 59.2 RA 41.8	Mean 49 mos. (24-72 mos.)	Mean flexion limit - 104°	Mean flexion limit - 99°	89% pain free or mild pain with activity 91% pain free or mild pain at rest	
Goodfellow ⁵⁷	Oxford bicompartmental meniscal bearing	Prospective, non-randomized, consecutive	22 pts 25 knees	67 (50-84)	OA 80% AVN 8% Other 10%	21 months (12-54)			92% report mild or no pain after surgery. Stat. significant improvement in stance alignment (p < .001) No improvement in ROM (Preop 104 vs. post-op 101)	4% revision rate

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Gunther ⁶³	Oxford Lateral Uni (Reports on lateral sided replacements only)	Prospective, non randomized	51 pts 53 knees	68 (40-88)	OA	5.2 years	Severe pain with activity 53%	Severe pain with activity 5%	40 of 42 knees that did not require further surgery had good relief of symptoms and restoration of function.	The risk of bearing dislocation in the lateral compartment with the Oxford Unicompartmental Knee replacement is greater than in the medial compartment.
Harding ⁶⁶	Oxford Uni	Retrospective	50 knees 35 Oxford Phase I 15 Oxford Phase II	Not reported	OA	6 year period			Phase I survival 66% Phase II survival 86%	For Phase II implants, survival was 100% for pts who met implant indications perfectly.
Keys ⁸⁸	Oxford II Uni (medial replacements)	Prospective, controlled	41 knees	Not reported	OA	3.3 years	Not reported	Clinical results: 97.5% good to excellent	Survival rate 100% at 5 years	No pts lost to follow-up
Kumar ⁹³	Oxford Uni	Retrospective	100 knees follow up on 83 knees in 65 patients (18 bilat)	71 (49-85)	OA 91% RA 9%	5.6 years (1-11 years)	Knee score: 62 Function score: 45	Knee score: 91 Function score: 71	Survival rate 85% at 11 years	86% of pts pleased with result 12% satisfied 1% unsure 1% unsatisfied

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
McLardy-Smith ¹⁰⁹	Oxford Uni (medial replacement)	Retrospective	475 knees 42 young group (<60) 433 older group (≥ 60)	Young group 55 (34-59) Older group 73 (60-86)	OA	10 year period			Survival rate for young group 94% at 10 years Survival rate for older group 95% at 10 years	
Murray ¹²²	Oxford Medial Uni (Reports on medial sided replacements only)	Retrospective	143 knees 114 pts.	35-91 mean 70.0	OA	7.6 years			Survivorship At 10 years – 98%	
Price ¹³⁵	Oxford Medial Uni	Prospective, randomized comparative	40 knees through short incision, 20 knees through open procedure, compared with 40 TKA	57-91	OA					Avg. rate of recovery after short incision UCA was twice as fast as with open UCA and 3 times faster than after TKA.

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Rees ¹⁴⁰	Oxford Medial Uni Knee	Retrospective non-randomized	631 knees 507 patients (613 primary & 18 for failed HTO)	35-90 mean 70 for previous HTO group and 68 for HTO group	OA	5.8 years for group without previous HTO 5.4 years for HTO group			Cumulative survival rate at 10 years 98% Survival for primary 96% Survival for failed HTO 66%	All knees had isolated primary osteoarthritis with an intact ACL, and full thickness of the articular cartilage of the lateral compartment on preop xray.
Sherman ¹⁵⁵	Oxford Meniscal-bearing Bilateral bicompartamental	Prospective, non-randomized	34 patients, 68 knees 2 lost-to-follow-up	43-85 63 yrs	41% OA 59% RA	51 months 14-96	ROM (OA): 7-110 RA: 15-101	ROM (OA): 6-102 RA: 8-103	97% improvement in pain	78% very satisfied with surgery 16% satisfied 6% disappointed
Svard ¹⁷³	Oxford Meniscal-bearing Uni Knee	Retrospective non-randomized	395 knees (315 pts.)	50-85 mean age 70	OA of medial compartment	12.5 years			Cumulative survival rate 95%	
Vorlat ¹⁸⁰	Oxford Uni Knee	Prospective	41 knees 39 pts.	46-84 mean 62	OA	5 year		87		
Weale ¹⁸⁵	Oxford Meniscal bearing unicompartmental	Prospective, non-randomized comparison	31 knees 28 pts	70 (47-86)	100% OA	6 months to 4 years			Oxford 12-itme function score mean of 36.5 out of 48	

First Author/ Ref. #	Device	Study Design	# Patients/ # Devices	Age (Range)	Diagnosis	Avg. Follow-up	Preop Score	Postop Score	Other Clinical Outcome	Other Comments
Weale ¹⁸⁷	Oxford Uni Knee	Retrospective	28 clinically examined	65-89 Mean 80.3 years	OA	11.4 years	See comment column	AKS & HSS showed that 25 of the 28 knees examined clinically were graded as either excellent or good by both systems		The AKS scores had not been used preoperatively, but since all the necessary measurements had been recorded, it was possible for the AKS scores to be calculated retrospectively.
Witvoet ¹⁹³	Lotus unicompartmental	Not listed	135; 121 cases were clinically evaluated	Not listed	Unicompartmental arthritis	4.5 years	Not listed	Score not listed	71.9% were rated good; 28.1% were rated poor. 19% revised.	Abstract in English; article in French

Table 8. **Mobile Bearing Knee Adverse Events/Complications**

Multidirectional platform devices

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow- up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Duffy ⁴⁴	Accord	Retrospective	61pts 74 knees 26 knees followed	5.3 yrs	25 Failures	16 pts 20 knees	0	3	8	8	19 instability 2 wear 2 prosthetic failure *Cause of failure was thought to be multifactorial and knee entered into more than one category
Kaper ¹⁸	Self Aligning I	Prospective follow-up	141/172	5.6 (5-8)	15 Revisions 4 infection 4 aseptic loosening 2 poly wear 2 fractures 1 stiffness 1 pain	41	4		4		
Morgan-Jones ¹¹⁸	Motus	Prospective, consecutive	62 pts 75 knees	2.5 yrs	0 Revisions	0	0	0	0	0	1 patellar replacement
Polyzoides ¹³²	Rotaglide Total Knee	Retrospective	170 knees 161 pts.	3.1 years	0	0	1	0	0	0	3 pts. With delayed wound healing, 2 pts. With DVT 1 pts. with fracture of patella 6 weeks after surgery.

Rotating platform devices

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow- up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Callaghan ²⁹	LCS rotating platform mobile bearing (cemented)	Prospective; non-randomized; consecutive	119 knees; 86 patients; Final F/U on 66 knees	9-12 yrs.	0	18 (28 knees)	0	0	0	0	At final F/U 45=No pain 15=Mild pain 5=Moderate pain 1=Severe pain
Grodzki ⁶²	PFC & LCS rotational platform	Prospective, randomized, comparative study	38 pts 12 PFC 26 LCS	1 Year	Unable to ascertain due to German text article	Unable to ascertain due to German text article	Unable to ascertain due to German text article	Unable to ascertain due to German text article	Unable to ascertain due to German text article	Unable to ascertain due to German text article	
Sorrells ¹⁵⁷	LCS rotational platform	Retro., non-randomized consecutive enrollment	521 pts 665 knees	1-11 yrs	13 revisions 6 malpositioning 2 pain 1 laxity 1 poly wear 1 septic loosening 1 subluxation 1 subsidence	No perioperative deaths Postoperative deaths not reported	3 (0.6%)	7 (1.3%)	0	Not reported	
Sorrells ¹⁵⁹	LCS Rotating platform	Retro., non-randomized consecutive enrollment	99 pts 117 knees	8.5 (5-14)	8 revisions 4 malpositioning 1 osteolysis 2 dislocation/poly wear 1 infection	15 pts 18 knees	1	2	1	1	

Meniscal bearing devices

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow- up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Bert ⁹	LCS	Prospective	43 knees	1 year	4	0	0	4	0	0	9.3% revision rate
Hartford ⁶⁸	LCS	Prospective non-random, consecutive	139 knees	7.8 yrs. (60-156 months)	10	28 pts 37 knees	3	1	7	0	No cemented tibias /femurs were revised for aseptic loos.
Jordan ⁷⁹	LCS meniscal bearing system	Prospective, non-randomized, consecutive	256 knees 232 pts 30 lost to follow-up 160 knees in 141 pts followed	11.5 (9.2-13.7)	2 patellar revisions 1 poly wear 1 pain/decr ROM	63 pts 66 knees	0	0	0	0	Survivorship 99.5% at 12 years
Jordan ⁸⁰	LCS mobile meniscal bearing w/o cement	Retrospective, non-randomized consecutive enrollment	374 pts 472 knees of which 62 were last seen less than 24 months baseline	4.7 yrs (2-9.5 years)	5 meniscal dislocation 7 fractures 5 subluxation 1 subsidence	4 – prior to 24-month evaluation 35 subsequent to 24-month evaluation	5 (1.1%)	5	2 secondary to bone graft resorption	0	99% Kaplan-Meier survivorship for mechanical loosening of fixation (including bone graft resorption)

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg- Follow- up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Kim ⁹⁰	AMK & LCS meniscal bearing	Prospective, randomized	120 pts 116 followed	7.4 (6-8 years)	AMK: 2 devices (Complete wear of poly) LCS: 2 devices (1 for dislocation of medial poly, 1 for complete wear of medial poly)	0	0	0	0	0	18% with AMK & 21% with LCS had non-symptomatic patellofemoral crepitation
Minns ¹¹⁴	Minns meniscal knee prosthesis	Prospective; non-randomized; consecutive	165 devices	Up to 5 years	8 revisions using sliding plateau 1 fracture			8 due to instability			
Muller ¹¹⁹	LCS	Retrospective, consecutive enrollment; sub-group randomized for functional stair test	436	5 years	3	Not listed	Not listed	Not listed	Not listed	1	1 patient that had had chronic patellar dislocation since childhood, had realignment done during the TKA. The Patella developed a fatigue fx. & almost disappeared by bone resorption.
Rosenberg ¹⁴⁶	Cement-less LCS mobile bearing PCR	Retrospective, non-randomized consecutive enrollment	27 pts 35 knees 19 patients followed	5-8 years	1 Infection	3	1				4 patients lost to follow-up 3 deaths

Combination of rotating platform and meniscal bearing in same study

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow -up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Buechel ²⁰	New Jersey LCS mobile bearing	Retrospective, non- randomized consecutive enrollment	282 pts 373 knees: 64 Cemented 309 Uncemented 109 knees in 76 patients followed	13.3 yrs (10– 19.2 yrs)	1 Fracture	Not reported	3	5	3	3	Study is a 20-year follow-up to the Buechel studies mentioned above
Buechel ²³	New Jersey LCS MB Cemented and Uncemented	Retrospective, non- randomized, consecutive enrollment	320 pts 357 knees: 149 Cemented 208 Uncemented <u>C UC Type</u> 7 12 Uni 34 38 BCR 0 49 PCR 66 71 Rot. 42 38 Rev	<u>C</u> 91.2 mos. (27-125) <u>UC</u> 52.4 mos. (24-90)	1 Trauma 2 Fractures 2 changed from meniscal bearing to rotating to lessen intra- articular adhesions	1	7	6	6	0	

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow -up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Callaghan ²⁸	1.Oxford Uni 2.SAL Self aligning 3. LCS meniscal bearing; rotating platform	Multiple studies reviewed; retrospective, enrolment. Some consecutive	1.Oxford 144 2. Oxford 699 3. Oxford 378 4. SAL (61) 5. LCS 57 6. LCS 473 7. LCS 665 8. LCS 119	1. 10 yr 2. 5 yrs 3. 10yrs 4. 5.6 yrs. 5. Avg=6yrs CR=12 yrs PS=10 yrs PCR=6 yrs 6. 8 yrs 7. 11 yrs. 8. 9 yrs	1. 1 2. 50 3. Not listed 4. 14 5-8 Not listed	1. Not listed 2. Not listed 3. Not listed 4. 42 5-8 Not listed	1. Not listed 2. Not listed 3. Not listed 4. 4 5-8 Not listed	1. 1 2. 37 3. Not listed 4. 0 5-8 <0.5 percent	1. Not listed 2. Not listed 3. Not listed 4. 4 5-8 <2%	1. Not listed 2. Not listed 3. Not listed 4. 0 5-8 Not listed	1 bearing dislocation in Phase I devices and 0 bearing dislocation in Phase 2. Most common cause of early failure was bearing dislocation. 3. Failure rate from center to center ranged from 0 to 30%. The failures reported by Lewold reflect the learning curves associated with new technique. 4. Polywear=2;fx.=2; stiffness=1;pain=1
Keblish ⁸²	LCS meniscal bearing & rotating platform; cemented (C) & Uncemented (UC)	Multicenter, prospective & Dr's Personal experience (consecutive Enrolment)	Multicenter trial: 918 knees (C) 963 knees (UC) Personal xp: 275 knees	2-8 yrs	Multicenter trial: Not reported Personal xp: 9 revisions 4 subsidence/loos. 2 patellar fractures 3 patellar wear						Cemented complication rate: 5.8% Uncemented complication rate: 2.8% Lower comp. rate for UC due to improved surgical technique & more prosthetic sizes available

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow -up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Keblish ⁸⁶	LCS	Prospective, non- randomized	104 knees 52 pts.	5.24 years	1 revision for malposition of the tibial component	0	0	0	1	0	1
Munzinger ¹²⁰	LCS metal backed rotating patella	Retrospective, non- randomized, non- consecutive	235 cases 105 underwent statistical analysis	4.2 yrs. (2-10)	7 total; 4 patella 2=PE bearing spinout 1=infection 1=patella necrosis 1=PE breakage 1=patella maltracking 1=traumatic patella component loosening	0	1	1	0	0	Complications > in cases of non-ideal patellofemoral maltracking Revision rate: 6.6%
Papachristou ¹²⁹	Oxford & Endo-Model	Retrospective, non- randomized, non- consecutive	Oxford: 9 pts Endo- Model: 18 pts	Oxford: 63.6 yrs 44-76 Endo- Model: 72.7 57-85	3 retrievals	Oxford: 0 Endo-Model: 0	Oxford: 0 Endo- Model: 1	Oxford: 0 Endo- Model: 0	Oxford: 2 Endo- Model: 0	Not reported	Endo-Model: 33% had postpatellar pain (associated with sitting and standing from a chair) Oxford revision rate: 22% Endo-Model revision rate: 5.6%

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow -up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Sanchez-Sotelo ¹⁴⁸	LCS meniscal bearing (82%) & rotating platform (18%)	Retrospective, non-randomized consecutive enrollment	104 knees 94 pts 101 knees followed	66 (53-76)	8 revisions 2 meniscal dislocation 2 progressive osteolysis 1 infection 1 supracondylar fem. Fracture 1 patellar loosening 1 poly wear	0	1	2	0	2	
Stiehl ¹⁶⁹	LCS meniscal-bearing and LCS rotating platform	Prospective, nonrandomized, consecutive	191 followed	5 years (mean, 68.5 mo.)	5 (meniscal bearing)	35 of original 290 knees	2	1	0	0	1 patellar fracture; 9 thrombophlebitis and 4, peroneal nerve palsy.
Thompson ¹⁷⁵	LCS	Prospective f/u	31/33	20 months	None	None	1 superficial				1 atrial fib 1 lower resp tract inf
Weissinger ¹⁹⁰	LCS	Retrospective, non-randomized consecutive enrollment in one facility	41 pts 42 knees	21 months (8-38)	Unable to report due to German text article	Unable to report due to German text article	Unable to report due to German text article	Unable to report due to German text article	Unable to report due to German text article	Unable to report due to German text article	Loosening of cement-free components was not observed. Abstract in English Text in German

Unicondylar mobile bearing devices

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow -up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Barrett ⁷	Oxford bicom. Meniscal bearing	Prospective; non-randomized; consecutive	62 pts 67 knees	4.5 years (4-7)	3 due to pain/limited mov. 1 fracture – subsequent dislocation with tibial prosthetic loosening.	0	5 superficial	2	2		7% Revision Rate 1 case of lateral popliteal nerve palsy. 4 deep venous thrombosis (one progressed to PE).
Bourne ¹³	Oxford bicom. Meniscal bearing	Prospective, consecutive	67 knees 59 pts	5.5 yrs (5-8 yrs)	20 revisions/reoperations 9 aseptic loosening 7 aseptic loosening & patellofemoral syndrome 2 patellofemoral syndrome 1 MB dislocation 1 sepsis	9	1	1	16	Not reported	(24-□ 30% revision rate
Carr ³¹	Oxford medial comp	Prospective, non-randomized	96 pts 121 knees	44.4 months	1 revision loosening of tibial comp	1	0	0	1	0	0.8% revision rate

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow -up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Cohen ³⁴	DePuy mobile bearing unicompartmental	Retrospective, non-randomized	20 pts./21 knees	34 months (24-132 months)	1	2	0	0	1	0	
Goodfellow ⁵⁵	Oxford bicompartmental meniscal bearing	Prospective; non-randomized; consecutive	85 pts/ 103 knees	36 months (21-56 months)	9 Revisions (7 occurred in medial comp & 2 in the lateral comp)	5	2	3	4	2	9.2% revision rate Absence of ACL was associated with a significantly greater incidence of failure
Goodfellow ⁵⁶	Oxford bicompartmental meniscal bearing	Prospective; non-randomized; consecutive	107 pts 125 knees	Mean 49 mths (24-72 mths)	8 Revisions 4 Failures	1	1	5	6		4 lost to follow-up
Goodfellow ⁵⁷	Oxford bicompartmental meniscal bearing	Prospective; non-randomized; consecutive	25 pts/ 22 pts	21 months (12-54 months)	1 Revision	0	0	0	1	0	4% revision rate
Gunther ⁶³	Oxford Lateral Uni (Reports on lateral sided replacements only)	Prospective, non-randomized	51 pts 53 knees	5.2 years	11 revisions	7 pts 8 knees	3	6	1	0	1 revision due to tibial plateau fracture 20.8% revision rate
Harding ⁶⁶	Oxford Uni	Retrospective	50 knees 35 Phase I 15 Phase II	6 year period	14 failures 12 Phase I 2 Phase II	1	Not reported	0	Not reported	Not reported	Overall revision rate 28%

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow -up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Keys ⁸⁸	Oxford II Uni (medial replacement)	Prospective, controlled	41 knees	3.3 years	0	1	0	0	0	0	0% revision rate Strict selection criteria used for study.
Kumar ⁹³	Oxford Uni	Retrospective	100 knees follow up on 83 knees in 65 patients (18 bilat)	5.6 years	7 revisions	11	0	0	4	0	2 revisions due to progressive arthritis 1 revision due to tibial plateau fracture 6 pts lost-to-follow-up 7% revision rate
McLardy-Smith ¹⁰⁹	Oxford Uni (medial replacement)	Retrospective	475 knees 42 young group (<60) 433 older group (≥ 60)	10 year period	Not reported						No data reported on revisions or deaths
Murray ¹²²	Oxford Medial Uni Knee	Retrospective	143 knees 114 pts.	7.6 years	5 revisions	29 pts. Died post operatively (34 knees)	0	1	0		

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow -up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Price ¹³⁵	Oxford Uni Knee	Prospective, non-randomized comparative	40 knees through short incision, 20 knees through open procedure, compared with 40 TKA	Not available	0	0	0	0	0	0	One TKA who had TKA on one side and UCA on the other suffered a subendocardial infarct in the early postoperative period. An arteriogram showed 90% coronary artery stenosis.
Rees ¹⁴⁰	Oxford Medial Uni Knee	Retrospective non-randomized	631 knees 507 patients (613 primary & 18 for failed HTO)	5.8 years	24 revisions (19 primary & 5 with failed HTO)						
Sherman ¹⁵⁵	Oxford Meniscal-bearing bilateral bicompartm ental	Prospective, non-randomized	34 patients 68 knees 2 lost-to-follow-up	51 months (range 14-96 months)	5 revisions 1 for infection 3 aseptic loosening 1 dislocation	0	1	1	3	0	2 pts lost-to-follow-up 7.6% revision rate
Svard ¹⁷³	Oxford Meniscal-bearing Uni Knee	Retrospective non-randomized	124 knees (103 pts.)	12.5 years	6 revisions (4.8%) 5 to TKA & 1 had bearing exchange	37 pts. Died	1	3	2		
Vorlat ¹⁸⁰	Oxford Uni Knee	Prospective	41 knees 39 pts.	5 years	3 revisions		1	1			4
Weale ¹⁸⁵	Oxford Uni knee	Retrospective	28 knees	11.4 years				1			

First Author/ Ref. #	Device	Study Design	#Patients/ # Devices	Avg. Follow -up	Retrieval	Death	Infection	Disloc.	Aseptic Loose	Lysis	Other Comp.
Weale ¹⁸⁷	Oxford Uni Knee	Prospective, non- randomized	31 knees 28 patients	6 months to 4 yrs	2 revisions 1 aseptic loosening 1 pain	2	0	0	1	0	6.5% revision rate
Witvoet ¹⁹³	Lotus unicomartm ental	Not listed	135; 121 cases were clinically evaluated	4.5 years	18	Not listed	0	Not listed	Not listed	Not listed	Poly wear; radiolucencies.

Table 9. Survival analysis comparison for mobile bearing knees

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Duffy and Phillipson ⁴⁴ 2000	MP PCL sacrificing	Accord	Thackaray, UK	74	5.3	Failure for any reason Revision surgery	58 68.5	25 (34)
Kaper et al. ⁸¹ 1999	MP PCL retaining	Self Aligning I	Sulzer	172	5.6	Revision surgery for any reason Revision surgery because of poly wear	91.7 98.8	14 (8.1)
Callaghan et al. ²⁹ 2000	RP	LCS System	DePuy	119	9	Reoperation or dislocation	100	0 (0)
Sorrells ¹⁵⁹ 1996	RP	LCS System	DePuy	665	(11 year period)	Revision for any reason	94.7	13 (2)
Sorrells ¹⁶¹ 2001	RP	LCS System	DePuy	117	8.5	Revision for any reason	88.1	8 (6.8)
Jordan et al. ⁸¹ 2002	MB	LCS System	DePuy	256	11.5	Revision for any reason	99.5	2 (0.8)
Jordan et al. ⁸⁰ 1997	MB	LCS System	DePuy	472	(8 year period)	Revision surgery for any mechanical reason Revision surgery due to mechanical loosening	94.6 99	18 (3.8)
Kim et al. ⁹⁰ 2001	MB	LCS System	DePuy	120	7.4	Any revision or recommended revision	98	2 (1.7)
Rosenburg et al. ¹⁴⁸ 2001	MB	LCS System	DePuy	35	5	Revision for any reason	97.1	1 (2.9)

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Buechel et al. ²⁰ 2001	RP & MB	LCS System	DePuy	373	10.2	<u>Cementless MB PCL retaining:</u> Poor clinical knee score at 10 years 98.9 at 16 years 98.9 Revision for any mechanical reason at 10 years 97.4 at 16 years 83 <u>Cemented RP:</u> Poor clinical knee score at 10 years 97.7 at 20 years 97.7 Revision for any mechanical reason at 10 years 97.7 at 20 years 97.7 <u>Cementless RP:</u> Poor clinical knee score at 10 years 98.3 at 18 years 98.3 <u>Revision for any mechanical reason:</u> at 10 years 98.3 at 18 years 98.3		15 (4.0)
Stiehl & Voorhorst ¹⁷¹ 1999	RP & MB	LCS System	DePuy	290	(7 year period)	<u>Revision of metal components:</u> RP 100 MB 97.5		0 (0) 5 (5.4)

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Argenson et al. ⁴ 1993	UM	Oxford	Biomet	552	(14 year period)	Revision surgery	92	45 (8.2)
Carr et al. ³¹ 1993	UM	Oxford	Biomet	121	(9 year period)	Need for a revision operation	99.1	1 (0.8)
Gunther et al. ⁶³ 1996	UM (lateral comp. only)	Oxford	Biomet	53	5	Aseptic loosening Aseptic revisions All revisions	98 86 82	9 (17)
Harding et al. ⁶⁶ 2000	UM	Oxford	Biomet	50	(6 year period)	<u>Revision surgery:</u> (Did not ensure intact ACL†) Oxford Phase I (n= 35) Oxford Phase II (n = 15)	66 80	12 (34)† 2 (13)
Keys et al. ⁸⁸ 2000	UM	Oxford	Biomet	41	(5 year period)	Revision, impending revision, or pain scores	100	0 (0)
Kumar & Fiddian ⁹³ 1999	UM	Oxford	Biomet	100	(11 year period)	Revision surgery	85	7 (7.0)
McLardy-Smith et al. ¹¹⁰ 2001	UM	Oxford	Biomet	475	(10 year period)	<u>All cause revision:</u> patients < 60 (n=42) patients ≥ 60 (n=433)	94 95	†† ††
Murray et al. ¹²³ 1998	UM	Oxford	Biomet	143	(10 year period)	Revision and lost to follow up considered failures	97	5 (3.5)
Rees et al. ¹⁴¹ 2001	UM	Oxford	Biomet	613	5.8	Revision surgery	96	19 (3.1)
Svard et al. ¹⁷⁵ 2001	UM	Oxford	Biomet	124	12.5	Revision for any cause	95	6 (4.8)

*MP= Multidirectional platform, RP= Rotating platform, MB= Meniscal bearing, UM= Unicompartmental meniscal bearing

††Data not included in article

Table 10. Survival analysis comparison for fixed bearing knees

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Colizza et al. ³⁵ 1995	Posterior stabilized	Insall-Burstein I	Zimmer	165	10.6	<u>Any revision or planned revision with:</u> Lost-to-follow-up considered withdrawals Lost-to-follow-up considered failures	96.4 92.6	4 (2.4)
Diduch et al. ³⁹ 1997	Posterior stabilized	Insall-Burstein I Insall-Burstein II Total Condylar	Zimmer Zimmer Zimmer	103	8	Revision of femoral or tibial component Rev. of femoral, tibial, or patellar comp Revision for any reason	94 90 87	6 (5.8)
Emmerson et al. ⁴⁷ 1996	Posterior stabilized	Kinematic Stabilizer	Howmedica	109	12.7	<u>Revision of the implant:</u> at 10 years at 13 years	95 87	9 (8.3)

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Font-Rodriguez et al. ⁴⁸ 1997	Total condylar	Total Condylar	J & J	215	(21 year period)	<u>Any revision with:</u> Lost-to-follow-up considered withdrawals Lost-to-follow-up considered failures	90.8 85.3	13 (6.0)
	Posterior stabilized (All poly tibia)	Insall-Burstein I	Zimmer	265	(16 year period)	<u>Any revision with:</u> Lost-to-follow-up considered withdrawals Lost-to-follow-up considered failures	94.1 90.3	14 (5.3)
	Posterior stabilized (Metal backed tibia)	Insall-Burstein II	Zimmer	2036	(14 year period)	<u>Any revision with:</u> Lost-to-follow-up considered withdrawals Lost-to-follow-up considered failures	98.1 93.1	26 (1.3)
	Posterior stabilized (Modular augmented components)	Insall-Burnstein II	Zimmer	49	(10 year period)	<u>Any revision with:</u> Lost-to-follow-up considered withdrawals Lost-to-follow-up considered failures	93.6 89.1	3 (6.1)
	Constrained condylar	IB II CCK	Zimmer	64	(7 year period)	<u>Any revision with:</u> Lost-to-follow-up considered withdrawals Lost-to-follow-up considered failures	98.1 95.2	1 (1.6)

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Gill et al. ⁵² 1999	Total condylar (PCL retaining)	Total Condylar	J & J	63	17.2	<u>Any revision:</u> at 15 years at 20 years <u>Any revision or recommended revision:</u> at 15 years at 20 years	98.6 98.6 98.6 93.6	3 (4.2)
Malkani et al. ¹⁰⁵ 1995	Total condylar (PCL retaining)	Kinematic-I Condylar	Howmedica	119	10	Revision Poor pain score (Knee Society Score) Revision or poor knee score (HSS) Revision, poor knee score (HSS), or presence of radiolucent line	96 97 78 76	8 (6.7)
Ranawat et al. ¹³⁸ 1988	Total condylar	Total Condylar	J & J	112	9.5	Any revision or recommended revision Any revision or recommended revision or presence of radiolucent line with pain	94.1 88.7	2 (1.8)
Ranawat et al. ¹³⁹ 1993	Total condylar	Total Condylar	J & J	112	13.2	Any revision or recommended revision Any revision or recommended revision or presence of radiolucent line with pain	94.1 90.9	5 (4.5)

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)	
Rand et al. ¹⁴⁰ 1991 (9 implant types studied)	Older resurfacing	Geometric Polycentric UC Irvine		3159	2	Revision of an implant	95	739 (23)	
					5	Revision of an implant	88		
					10	Revision of an implant	77		
	Older constrained	Guepar Walldius Tavernetti Herbert Sheehan Spherocentric		356	2	Revision of an implant	93		77 (22)
					5	Revision of an implant	84		
					10	Revision of an implant	76		
	Resurfacing, non-metal-Backed	Total Condylar Anametric Duopatellar Freeman-Swanson	J&J, Zimmer Zimmer Howmedica	337	2	Revision of an implant	96	38 (11)	
					5	Revision of an implant	94		
					10	Revision of an implant	85		
	Condylar resurfacing metal-backed tibia	Total Condylar Cruciate Condylar Townley Kinematic Condylar Porous-Coated Anatomic Miller-Galante Press-fit Condylar Orthomet Cloutier	J&J, Zimmer	3907	2	Revision of an implant	99		65 (1.7)
					5	Revision of an implant	98		
					10	Revision of an implant	†		
Howmedica			Howmedica						
			Howmedica	Zimmer					
			Howmedica						

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Rand et al. ¹⁴⁰ 1991 (continued)	Posterior stabilized	Kinematic Stabilizer	Howmedica	234	2	Revision of an implant	97	9 (3.8)
		Stabilocondylar	J & J		5	Revision of an implant	96	
		Insall-Burnstein I and II	Zimmer	10	Revision of an implant	†		
		Kinematic Rotating Hinge	Howmedica	114	2	Revision of an implant	92	
	Newer constrained Unicompar-tmental	Total Condylar III	J & J	676	5	Revision of an implant	81	19 (16.7)
					10	Revision of an implant	†	
		Polycentric		2	Revision of an implant	95		
		Geometric		5	Revision of an implant	86		
	Porous-Coated Anatomic	Howmedica		10	Revision of an implant	67	149 (22)	

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Rand et al. ¹⁴⁰ 1991 (continued)	Other cemented	Other types		107	2 5 10	Revision of an implant Revision of an implant Revision of an implant	96 96 †	3 (2.8)
	Condylar resurfacing	Porous-Coated Anatomic	Howmedica					
	without cement	Miller-Galante	Zimmer	310	2	Revision of an implant	98	
		Press-Fit Condylar	Howmedica		5 10	Revision of an implant Revision of an implant	93 †	8 (2.6)
Overall	All Implants			9200	2 5 10	Revision of an implant Revision of an implant Revision of an implant	96 91 80	1107 (12)

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Ritter et al. ¹⁴³ 1989	Total condylar (PCL retaining)	Cruciate Condylar	Howmedica	440	4.8	Revision due to loosening	94.6	
						Loosening (X-ray evidence)		
						Revision due to loosening	86.9	
						Loosening (X-ray evidence) &		
						Pain (HSS \leq 15)	81.4	6 (1.4)
						Revision due to loosening		
						Loosening (X-ray evidence) &		
						Pain (HSS \leq 20)		

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Ritter et al. ¹⁴² 2001	Anatomic graduated components	AGC	Biomet	4583	15	<u>Revision or radiographic loosening:</u> Assumed lost-to-follow-up doing well Lost-to-follow-up excluded Assumed lost-to-follow-up as failures	99.7 99.7 94	6 (0.1)
Schai et al. ¹⁵² 1998	PFC System (PCL retaining)	PFC	J & J	235	10.5	Reoperation for any reason	90	9 (3.8)
Scuderi et al. ¹⁵⁶ 1989	Total condylar (All poly tibia)	Total Condylar	Zimmer	224	(15 year period)	Revision or recommendation	90.6	12 (4.5)
	Posterior stabilized (All poly tibia)	Insall-Burnstein I	Zimmer	289	(10 year period)	Revision or recommendation	97.3	6 (2.1)
	Posterior stabilized	Insall-Burnstein II	Zimmer	917	(7 year period)	Revision or recommendation	98.8	7 (0.8)

Article	Knee design*	Brand Name	Manufacturer	Knees total N	Average follow-up (yrs.)	Definition of failure used for analysis	Survival %	Rev N (%)
Stern et al. ¹⁶³ 1992	Posterior stabilized (All poly tibia)	Insall-Burnstein I	Zimmer	289	(10 year period)	Revision due to failure of arthroplasty	94	14 (4.8)
Weir et al. ¹⁹¹ 1996	Total condylar	Kinematic Condylar	Howmedica	208	12	Recommendation for revision	92	22 (10.6)

†The data were inadequate for analysis.