

THE LANCET

Supplementary appendix

This appendix formed part of the original submission and has been peer reviewed.
We post it as supplied by the authors.

Supplement to: Beard DJ, Davies LJ, Cook JA, et al. The clinical and cost-effectiveness of total versus partial knee replacement in patients with medial compartment osteoarthritis (TOPKAT): 5-year outcomes of a randomised controlled trial. *Lancet* 2019; published online July 17. [http://dx.doi.org/10.1016/S0140-6736\(19\)31281-4](http://dx.doi.org/10.1016/S0140-6736(19)31281-4).

Supplementary Tables:

The clinical and cost effectiveness of total versus partial knee replacement in patients with medial compartment osteoarthritis (TOPKAT): 5-year outcomes of a randomised trial

Table S1: Response categories for anchor type questions

<p>1) How satisfied are you with your knee? (Dissatisfied, Uncertain, Satisfied, Very satisfied). <i>This was analysed as a binary outcome of Satisfied/Very satisfied versus Dissatisfied/Uncertain.</i></p>
<p>2) How are the problems related to your knee now, compared with before your knee surgery? (No problems at all now; Much better; Slightly better; No change; Slightly worse; Much worse). <i>This was analysed as a binary outcome of; Better (No problems at all now; Much better; Slightly better) versus Not Better (No change; Slightly worse; Much worse).</i></p>
<p>3) If you could go back in time, would you still choose to have the knee operation? (Yes, No, Not sure). <i>This was analysed as a binary outcome; Yes (Yes) versus No/Unsure (No, Not sure).</i></p>

Table S2: Treatment received and implants used in the TOPKAT study. For wider comparison with implant usage in the UK [NJR data] please refer to Beard DJ et al. Health Technology Assessment (in press).

	PKR N=264	TKR N=264
Received surgery		
Yes	263 (99.6)	251 (95.1)
No	1 (0.4)	13 (4.9)
Received allocated knee replacement surgery		
Yes	232 (88.2)	238 (94.8)
No	31 (11.8)	13 (5.2)
	n=263	n=251
Surgical technique (and implant used)		
PKR	232 (88.2)	13 (5.2)
Oxford	150 (64.7)	7 (53.8)
Zimmer	36 (15.5)	4 (30.8)
MG	22 (9.5)	1 (7.7)
Corin uniglide	9 (3.9)	-
AMC	5 (2.2)	-
Du Puy	4 (1.7)	-
Mathys	4 (1.7)	-
Medacta	1 (0.4)	-
Sigma	1 (0.4)	-
Vanguard	-	1 (7.7)
TKR	31 (11.8)	238 (94.8)
LCS	10 (32.3)	61 (25.6)
PFC/Sigma	3 (9.7)	54 (22.7)
Vanguard	3 (9.7)	41 (17.2)
NexGen	8 (25.8)	29 (12.2)
Triathlon	4 (12.9)	27 (11.3)
Genesis	2 (6.5)	7 (2.9)
Scorpio/Kinemax	1 (3.2)	7 (2.9)
ACS	-	6 (2.5)
EUROS	-	2 (0.8)
AGC	-	1 (0.4)
AllPoly	-	1 (0.4)
Oxinium xlpe poly	-	1 (0.4)
Unknown	-	1 (0.4)
Values are numbers (%)		

Table S3: Operation details

	PKR N=264	TKR N=264
Received surgery	N=263	N=251
ASA grade- n (%)		
I	46 (17.5)	39 (15.5)
II	192 (73.0)	188 (74.9)
III	17 (6.5)	17 (6.8)
Missing	8 (3.0)	7 (2.8)
Ease of replacement- n (%)		
Straightforward	245 (93.2)	236 (94.0)
Difficult	16 (6.1)	14 (5.6)
Missing	2 (0.8)	1 (0.4)
Patella replaced- n (%)		
Yes	2 (0.8)	20 (8.0)
No	258 (98.1)	229 (91.2)
Missing	3 (1.1)	2 (0.8)
Bearing- n (%)		
Mobile	165 (62.7)	84 (33.5)
Fixed	96 (36.5)	161 (64.1)
Missing	2 (0.8)	6 (2.4)
Size of bearing – mean (SD); n	6.3 (2.9); 250	10.0 (1.7); 235
Cement- n (%)		
Palacos	145 (55.1)	137 (54.6)
CMW I	11 (4.2)	18 (7.2)
Optipac	13 (4.9)	11 (4.4)
Smart ser	15 (5.7)	7 (2.8)
Simplex	1 (0.4)	2 (0.8)
None	77 (29.3)	74 (29.5)
Missing	1 (0.4)	2 (0.8)
X-ray performed- n (%)		
Yes	2 (0.8)	1 (0.4)
No	253 (96.2)	240 (95.6)
Missing	8 (3.0)	10 (4.0)
Type of anaesthetic- n (%)		
Spinal	201 (76.4)	198 (78.9)
Periarticular LA	125 (47.5)	92 (36.7)
Femoral block	68 (25.9)	104 (41.4)
GA	61 (23.2)	66 (26.3)
Sciatic block	15 (5.7)	12 (4.8)
Epidural	7 (2.7)	-

Table S4: Complications by treatment received

	PKR N=264	TKR N=264
Treatment received	n=245	n=269
Number of participants with a complication	48 (19.6)	73 (27.1)
	RR 0.72	95% CI (0.53, 0.98)
Total number of complications	76	114
Details of complications		
Related to primary operation		
Number of participants (and complications)	1 (0.4)	2 (0.7)
Blood transfusion	-	2
Medical reasons	1	-
Post-operative		
Number of participants (and complications)	10 (4.1)	19 (7.1)
Blood transfusion	-	6
Respiratory problems	3	3
Renal and urological problems	2	3
Miscellaneous	2	3
Treated DVT or PE	2	1
Cardiac problems	-	2
Treated DVT or PE/Cardiac problems	-	1
Anaesthetic problems	1	-
Required readmission		
Required medical treatment only		
Number of participants (and complications)	3 (1.2)	9 (3.3)
Unexplained pain	1	3
Bearing dislocation	1	-
Wound breakdown	-	2
Bronchopneumonia	-	1
Cardiac problems	-	1
Cellulitis	-	1
Treated DVT or PE	-	1
Superficial infection	1	-
Values are number of events (%)		

Table S4: Complications by treatment received (continued)

	PKR N=264	TKR N=264
Treatment received	n=245	n=269
Required surgery		
Number of participants	15 (6.1)	21 (7.8)
Number of complications	25	28
Unexplained pain	9	8
Knee stiffness	-	10
Bearing dislocation	4	-
Device loosening (Tibia)	2	-
Infection	1	1
Ligamentous instability	1	1
Pain from trauma	1	-
Periprosthetic Fracture	1	-
Unexplained pain and knee stiffness	1	6
Mechanical failure and infection	-	1
Unexplained pain and swelling	1	-
Unexplained pain and skin complication	1	-
Unexplained pain and bearing dislocation	1	-
Device loosening (Tibia)and renal/urological	1	-
Problems		
Bearing dislocation and renal/urological problems	1	-
Unknown	-	1
Readmission further surgery intra-operative		
Number of participants (and complications)	-	1
Medical reasons	-	1
Readmission further surgery post-operative		
Number of participants	3 (1.2)	-
Number of events	4	-
Blood transfusion	1	-
Renal and urological problems	1	-
Skin complications	1	-
Bearing dislocation, renal/urological problems and	1	-
blood transfusion		
Values are number of events (%)		

Table S4: Complications by treatment received (continued)

	PKR N=264	TKR N=264
Treatment received	n=245	n=269
Did not require readmission		
2-month follow-up		
Number of participants	5 (2.0)	15 (5.6)
Number of events	5	18
Wound infection	3	6
Unexplained pain	1	2
Wound breakdown	-	3
Swelling	-	3
Miscellaneous	-	2
Knee stiffness	-	2
Skin complication	1	-
1-year follow-up		
Number of participants	13 (5.3)	18 (6.7)
Number of events	15	21
Unexplained pain	8	12
Knee stiffness	1	5
Swelling	3	1
Instability	1	1
Wound infection	1	-
Periosthetic fracture	-	1
Miscellaneous	1	-
Skin complication	-	1
5-years follow-up		
Number of events	13	16
Number of participants	12 (4.9)	16 (5.9)
Unexplained pain	10	10
Knee stiffness	1	1
Medical reasons	-	2
Miscellaneous	1	1
Wound infection	-	1
Wound infection	-	1
Ligamentous instability	1	-
Values are number of events (%)		

Table S5. Response level data for EQ-5D questionnaires at each follow-up time, by treatment allocation

	Baseline		2 months		1 year		2 years		3 years		4 years		5 years	
	PKR	TKR	PKR	TKR	PKR	TKR	PKR	TKR	PKR	TKR	PKR	TKR	PKR	TKR
Mobility														
No problems	7%	9%	44%	36%	54%	48%	59%	50%	48%	48%	46%	48%	51%	47%
Some problems	91%	87%	47%	53%	37%	41%	30%	42%	34%	37%	33%	36%	37%	37%
Extreme problems	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Missing	3%	5%	10%	11%	9%	11%	11%	8%	18%	14%	21%	16%	13%	16%
Self-care														
No problems	65%	66%	76%	74%	80%	72%	77%	75%	71%	68%	67%	66%	73%	66%
Some problems	33%	29%	14%	16%	11%	17%	12%	17%	11%	18%	12%	18%	14%	18%
Extreme problems	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Missing	3%	5%	10%	11%	9%	11%	11%	8%	18%	14%	21%	16%	13%	16%
Usual activities														
No problems	14%	11%	35%	30%	51%	45%	56%	48%	48%	47%	49%	45%	51%	47%
Some problems	76%	77%	49%	54%	38%	41%	31%	39%	32%	37%	27%	35%	33%	32%
Extreme problems	8%	7%	6%	5%	2%	3%	2%	5%	3%	2%	3%	4%	4%	4%
Missing	3%	5%	10%	11%	9%	11%	11%	8%	18%	14%	21%	16%	13%	16%
Pain														
No problems	1%	1%	19%	13%	36%	30%	41%	36%	35%	35%	36%	35%	42%	38%
Some problems	62%	51%	67%	72%	51%	53%	44%	48%	43%	44%	40%	42%	39%	37%
Extreme problems	35%	43%	5%	5%	3%	5%	5%	7%	4%	7%	3%	7%	7%	9%
Missing	3%	5%	10%	11%	9%	11%	11%	8%	18%	14%	21%	16%	13%	16%
Anxiety/depression														
No problems	60%	56%	69%	63%	72%	69%	71%	67%	68%	66%	63%	65%	67%	64%
Some problems	33%	34%	19%	24%	17%	18%	15%	23%	13%	16%	15%	16%	17%	17%
Extreme problems	4%	6%	3%	2%	2%	2%	3%	2%	1%	4%	2%	4%	3%	3%
Missing	3%	5%	10%	11%	9%	11%	11%	8%	18%	14%	21%	16%	13%	16%

Table S6. Missing data on healthcare resource use and EQ-5D utility by treatment allocation in each follow-up period

Follow-up time	Healthcare resource use		EQ-5D utility	
	PKR	TKR	PKR	TKR
Baseline	6 (2.3%)	7 (2.7%)	7 (2.7%)	12 (4.5%)
2 months	20 (7.6%)	28 (10.6%)	26 (9.8%)	29 (11%)
1 year	24 (9.1%)	27 (10.3%)	24 (9.1%)	29 (11.1%)
2 years	31 (11.8%)	29 (11.2%)	29 (11%)	20 (7.8%)
3 years	47 (18.0%)	36 (14%)	47 (18%)	37 (14.4%)
4 years	57 (22%)	44 (17.3%)	54 (20.8%)	41 (16.1%)
5 years	34 (13.2%)	43 (17.0%)	33 (12.8%)	41 (16.2%)
Average	219 (12.0%)	214 (11.8%)	220 (12.0%)	209 (11.5%)

Values are number of missing questionnaires (percentage missing)

Table S7: Index surgery costs by treatment allocation

	PKR	TKR	Difference (PKR v TKR), mean (95% CI)
Total admission costs	£3,991 (889)	£4,463 (1,709)	-£470 (-729, -211)
Implant device	£915 (199)	£1,205 (340)	-£292 (-408, -176)
Time in theatre	£1,932 (479)	£1,820 (639)	£112 (18, 207)
Hospital stay	£1,101 (536)	£1,358 (1,212)	-£256 (-463, -50)
Complications	£44 (278)	£79 (382)	-£35 (-91, 21)

Values are mean (standard deviation) in UK 2017 prices unless stated otherwise. CI = confidence interval; PKR = Partial Knee Replacement; TKR = Total Knee Replacement.

Table S8. Life years, quality-adjusted life years, healthcare costs, and cost-effectiveness for the base-case analysis at 5 years following multiple imputation

	PKR	TKR	Difference (PKR v TKR), mean (95% CI)
N	264	264	-
Life-years	4.917 (0.709)	4.831 (0.888)	0.085 (-0.032, 0.202)
QALYs	3.448 (0.970)	3.193 (1.060)	0.240 (0.046, 0.434)
Total costs (£)	£5,149 (56)	£6,048 (60)	-£910 (-1,503, -317)
Initial admission	£3,991 (30)	£4,463 (41)	-£471 (-729, -214)
Follow-up	£1,158 (54)	£1,585 (55)	-£433 (-979, 114)
ICER	-	-	-£3,792

SD = standard deviation; CI = confidence interval; PKR = Partial Knee Replacement; TKR = Total Knee Replacement; QALY = Quality-Adjusted Life Year; ICER = Incremental Cost Effectiveness Ratio.

Table S9: Impact of surgeon experience or clustering by surgeon on OKS at 5 years

Model	Treatment difference in OKS (95% CI)	Learning effect (95% CI)	Learning by treatment interaction (95% CI)
Standard OKS model	1.04 (-0.42, 2.50)		
Model extended to adjust for surgeon experience	1.84 (0.02, 3.65)	0.0001 (-0.0003, 0.0005)	-0.0032 (-0.0054, -0.0010)

Table S10: Deaths

	PKR N=264	TKR N=264
Number of deaths	6 (2.3)	11 (4.2)
Reason for death		
Cancer	4	6
Suicide	-	1
Sepsis	-	1
Multi organ failure/sepsis	-	1
Unknown	2	2
Values are number of events (%)		

Figure S12: Kernel density plot for OKS at baseline and 5-year follow-up for treatment group.

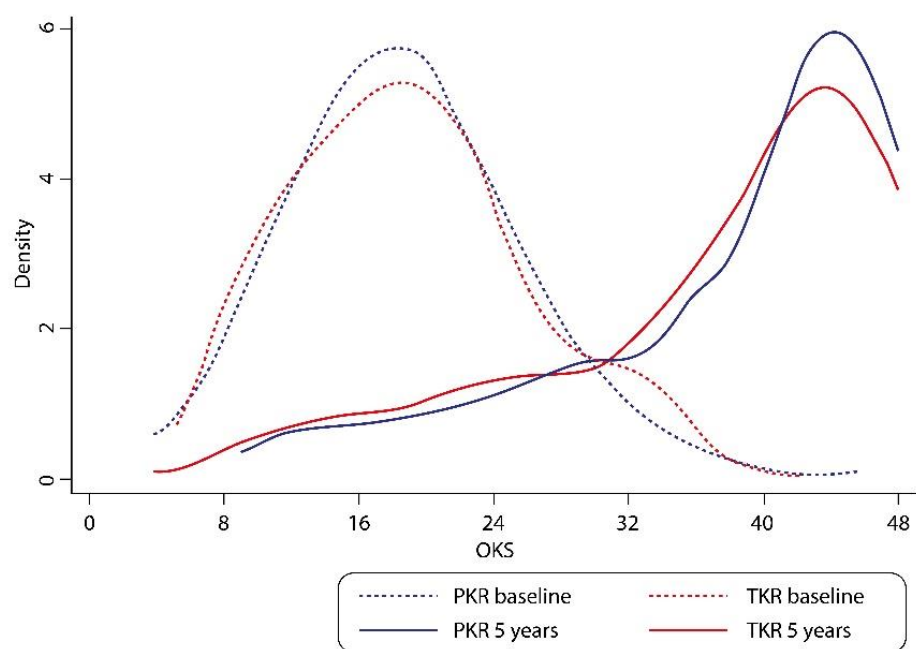


Figure S13: Summary plots to compare expertise versus equipoise randomisation (surgeon groups) and other subgroup analysis (age, gender and baseline OKS) in primary outcome OKS for PKR versus TKR 5-years post-randomisation

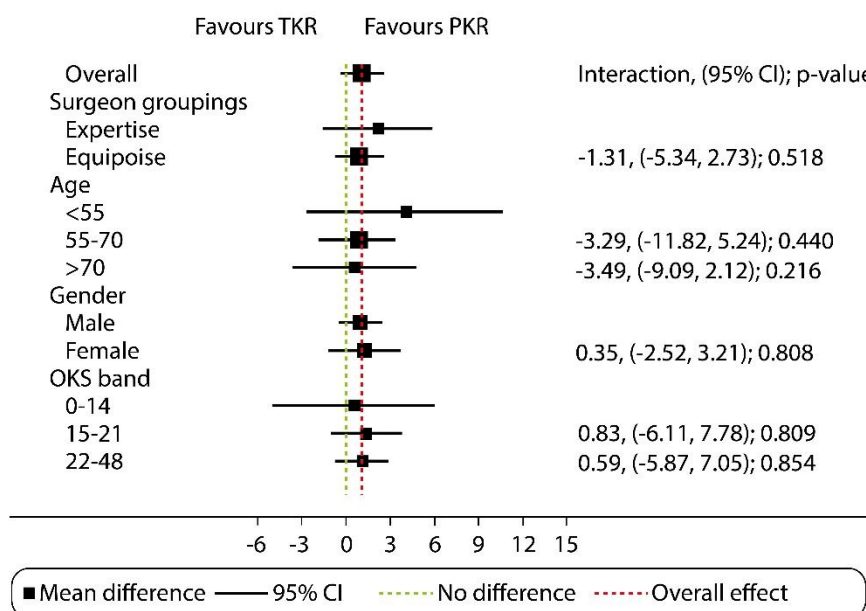


Figure S14: Operation time for both groups.

	PKR N=264	TKR N=264
Received surgery	N=262	N=250
Operation time (minutes) – median [IQR]; n	68.0 [55.0, 80.0]; 261	65.0 [55.0, 80.0]; 249
Theatre time (minutes) – median [IQR]; n	113.0 [95.0, 129.0]; 260	110.0 [90.0, 128.0]; 249
IQR Interquartile range; SD standard deviation		