

Supplementary table 1. Summary of studies included and their key features

Study ID	Study design	Follow up	Sample size	Propensity Matched?	Inclusion criteria	Mean Age (SD or range)	Sex (M:F)	Mena BMI (SD)	Outcome measures
RCT Studies									
Beard et al 2017.(65) (118)	RCT	1 year	TKA 264, UKA 264	Not applicable	Adult AMOA	65.2(8.8) 64.7 (8.5)	TKA 111:153 UKA 111:153	TKA 30.9(4.5) UKA 31.0(4.7)	PROMs Complication
Costa CR, et al 2011(63)	RCT	5 years	34 UKA 34 TKA	Not applicable	Adult AMOA	73 (49-86)	15:34	29.17 Range (23-33)	VAS KSS, <i>Complication Revision</i>
Kulshrestha et al. 2017 (66)	RCT – bilateral simultaneous procedures	2 years	72 pts 72 UKA 72 TKA	Not applicable	Simultaneous bilateral AMOA Adult patients	59.72 (8.7) 62.19 (6.4)	TKA 6:30, UKA 10:26	28.3 (3.4) 27.5 (4.3)	PROMs satisfaction
Newman J et al 1998 (62)	RCT	5 years	102 50 UKA 52 TKA	Not applicable	Adult AMOA Functional ACL	69.7 (47-89)	56:98	-	BKS Pain relief Revision ROM
Newman J et al 2009(68)	RCT	15 years	102 50 UKA 52 TKA	Not applicable	Adult Functional ACL and isolated medial OA	69.7 (47-89)	56:98	-	BKS survivorship
Sun et al. 2011(64)	RCT	4 years	28 pts 28 UKA 28 TKA	Not applicable	Medial OA ASA<3 Deformity <8 BMI <30 Minimal PFJ Intact ACL	60.5	36:56	30	KSS ROM pain <i>Complication Revision(VTE, transfusion,</i>
Weal et al 1999(67)	RCT	5 years	102 50 UKA 52 TKA	Not applicable	Adult Functional ACL and isolated medial OA	69.7 (47-89)	56:98	-	Patella tendon length Pain ROM
Registry and National Database Studies									
Baker et al. 2012(69)	UK NJR analysis	6 months	TKA 23,393, UKA 505	No	All implants	TKA 69.6(9) UKA 63.6(9.8)	TKA 43:57 UKA 51:49	TKA 31(5.5) UKA 30.1(5.2)	PROMs

Bini et al 2017 (79)	Kaiser Permanente Total Joint Replacement Registry (USA)	10 years	TKA 74,185 UKA 1054,	Propensity matched, age, sex, race length of op	Adult pts Primary arthroplasty Kaiser implants	TKA 63.84 UKA 68.0	45:37	TKA 29.3 UKA 31.5	Revision / survival
Bolognesi et al 2013(81)	USA – Medicare beneficiaries Registry analysis	3 years	TKA 65505, UKA 3098	No Adjusted for age, sex, comorbidities	+65 All primary knee arthroplasty	TKA 74.6 (5.8), UKA74.2 (6)	TKA 22271:43234. UKA 1406:1692	-	Revision Complication Mortality
Courtney et al 2018 (82)	USA – ACS NSQIP national database	30 days	TKA 49,136, UKA 1351	Not matched	+65 Primary knee arthroplasty	TKA 72.7(5.8) UKA 72.5(5.9)	TKA38% male UKA 51% male	TKA 31.7(6.4), UKA 30.5(6.0)	Length of operation, Length of stay, mortality, reoperation, VTE
Drager et al. 2016 (83)	USA – ACS NSQIP national database	30 days	TKA 36,274 UKA 3140	Not matched	Adult primary knee arthroplasty	TKA 67 (10) UKA 64 (11)		TKA 32.6, UKA 30.8	Length of stay Early complications
Duchman et al 2014.(80)	ACS NSQIP (US NJR) analysis	1 year	27,745 TKA, 1588 UKA	Propensity matched	All primary knee arthroplasties	TKA 67.14(10.1) UKA63.96 (10.68)	TKA 63.24 UKA 55.32	TKA 32.4(6.97) UKA 31.5(6.46)	30 day mortality, complications
Dyrhovden et al. 2017(74)	Norwegian NJR analysis (two time periods)	2.7 years and 4.6 years	TKA 17,404, UKA 2,297 TKA 43,219, UKA 5,351	Propensity matched age, sex, fixation	All primary knee arthroplasties	Reported separately for each time frame	Reported separately for each time frame	Reported separately for each time frame	Revision Infection
Furnes et al. (78)	Norwegian NJR analysis	10 years	TKA	Not matched	All primary knee arthroplasties	TKA 70 UKA 66	M:F TKA 26:74 UKA 38:62	-	Survival (revision and cause, including deep infections)
Gioe 2007(77)	Retrospective NJR analysis	10 years	738 TKA, 127 UKA	Not matched	All Primaries under 55 years	49.8	-	-	Revision rate
Hunt et al. 2014 (13)	UK NJR, analysis	45 days	421,657 TKA, 40,428 UKA	Propensity matched	All implants All adult primary TKA and UKA	Stratified for age	Stratified	Stratified	Mortality (45 days)
Koskinen et al. 2008(75)	Finnish NJR analysis	20 years	1,886 UKAs 48,607 TKAs	Case matched	All adult primary OA	UKA 65 (38-91) TKA 70 (31-98)	-	-	Revision any cause Survival Cost
Liddle et al. 2014(14, 22)	UK NJR analysis	8 years	10557 TKA, 3519 UKA	Propensity matched	Primary knee arthroplasty surgery in UK	64.1 (9.3)	4670:5887	30.0(4.9)	Revision reoperation rate Mortality

Liddle et al 2015 (71)	UK NJR analysis	6 months	10557 TKA, 3519 UKA	Propensity matched	All primary arthroplasty, in adult patients	TKA 64.4 (8.6), UKA 64.4 (8.2)	TKA 5595:4926, UKA 1865:1654	-	PROMS complications
Lygre et al. 2010(73)	Norwegian NJR analysis	5 years	972 TKA 372 UKA	Not matched	All primary knee arthroplasties	TKA 76.7 (7.6) UKA 69.4 (9.1)	TKA 262:710 UKA 148:224	-	KOOS
Niinimäki et al 2014 (70)	Finnish NJR registry analysis	15 years	4713 – UKA 83511 – TKA	Not matched	All primary knee arthroplasties (minus implants with less 100 registered)	TKA 69(23-96), UKA 63(33-91)	-	-	Survival/ revision Cause of revision
Pearse AJ et al 2010(76)	New Zealand NJR analysis		4284 UKA, 34369 TKA	Not matched	All primary UKA and TKA	TKA 68.4, UKA 66.0	-	-	Revision Functional outcomes
Robertsson et al. 2009(72)	Swedish NJR	10 years	10,624 UKA, 15,437 TKA	Not matched	All primary UKA and TKA	TKA 72.7, UKA 70.8	M:F ratio TKA 1:2.2 UKA 1:1.7	-	Revision
Cohort Studies									
Ackroyd et al. 2002 (84)	Single centre prospective cohort	10 years	408 UKA 531 – TKA	Not matched	Medial OA adult	TKA 70(48-93), UKA 72(38-91)	-	-	Survival BKS
Amin et al 2006(85)	Single centre UKA prospective, TKA retrospective	5 years	54 UKA 54 TKA	Matched age, sex, BMI, KSS, ROM	OA adult patients	TKA 69.3(8.7), UKA 68.1(8.3),	TKA 27:27, UKA 23:31,	TKA 28.7 (4.4) UKA 29.2 (4.6)	PROMS Survival
Artz et al. 2015(86)	Prospective, cohort single centre	2 years	471UKA 206 TKA	Not matched	Adult OA RCT TKA patients and cohort of UKA	260:229	TKA 61.7, UKA 61.6	-	ROM Kneeling PROMS
Berger et al 2012(106)	Prospective single centre cohort	1 year	25 UKA, 86 TKA	Not matched	Adult All types of OA	65(48-65)	66:45	28.8 (18.8 – 43.2)	Length of stay Early complications
Burn et al 2016(87)	Single centre, prospective matched cohort	2 years	590 UKA, 590 TKA	Yes Age/sex/ OKS / EQ5D	Adult end stage OA, primary surgery	TKA 67.66 (9.0), UKA 67.59(8.37)	TKA 300:290, UKA 295:295	-	Revision PROMS
Chen et al 2012 (43)	Single centre Prospective	1 year	25 UKA 25 TKA	Not matched	Adult end stage OA Primary arthroplasty				Operation time
Craik et al 2015(88)	Single centre prospective	5 years	546 UKA, 6753 TKA	Not matched	Adult Primary arthroplasty	TKA 71 UKA 66	M:F ratio TKA 0.56, UKA 1.05	TKA 30.6 UKA 30.0	Revision PROMS

Fabre Aubrespy 2018(111)	Single centre retrospective	5 years	101 UKA 101 TKA	Retrospectively	Adult OA primary UKA TKA ACL intact	TKA 79.7 (3.3) UKA 79.5(3.5)	M:F TKA 41/59 UKA 41:59	TKA 27.1(5.1) UKA 27.2(4.5)	Revision IKS PROMs VTE
Fisher D et al.(89)	Retrospective cohort	2 years	41 UKA 50 TKA	Not matched	All non-inflammatory arthritis + 70 years old	70-93	23:68	-	KSS ROM Opiate use
Foote et al 2008(36)	Prospective Single centre	6 months	41 TKA, 31 UKA	Not matched	All primary TKA and UKA	TKA 54.1, UKA 52.6	22:19 10:21	-	Return to work
Goh et al.2017(112)	Prospective single centre (self-reports as registry)	2 years	160 TKA 160 UKA	Propensity matched	Primary TKA and UKA Under 55 years No control for degree of OA	TKA 52.3(3.2) UKA 52.0(2.5)	M:F TKA 35:125 UKA 34:126	TKA 29.4(5.2) (5.5) UKA 28.6(5.3)	ROM, KSS OKS PROMs satisfaction
Ho et al(109)	Retrospective cohort	1 year	36 UKA, 40 TKA	No	Adult OA, primary joints	59.6	24:52	31.0	Return to sport Pain
Horikawa et al. 2015 (90)	Retrospective Cohort Single centre	10 years	(pts 73) TKA 50 UKA 28	No	Adult OA 15 deg varus 5 deg flexion 90 deg active flexion ACL intact Isolated AMOA	TKA 10:40, UKA 3:25	TKA 72.2(7.9), UKA 74(6.4)	TKA 25(4), UKA 24.1(3.6)	PROMS (JOA, JKOM) ROM Revision
Howell et al 2015 (53)	Retrospective cohort, single centre	2 years	5135 TKA 1538 UKA	No	Adult primary arthroplasty	-	-	-	PROMS Range of movement
Kim et al (107)	Retrospective cohort Single centre	2 years	100 TKA, 100 UKA	Propensity matched	All primary joint arthroplasty for OA	TKA 69.0 (1.4) UKA 60.8 (6.1)	11:89 10:90	26.0 (3.1) 26.0(3.1)	PROMS (WOMAC, HFKS, FJS)
Ko et al 2011(91)	Retrospective, cohort	2 years	UKA 527 TKA 1716 (pts 2243)	Non matched	UKA and TKA - all types, All adult patients having a primary joint replacement	TKA 67.1 (7.6), UKA 62.9 (8.8)	TKA 20:79 UKA 21:78		OKS HRQoL SF36
Lim et al. 2014 (93)	Retrospective cohort	3 years	602 – TKA 602 - UKA	Matched age, sex	Single centre, all stages of OA	TKA 70(10). UKA 70 (10)	TKA 319:283 UKA 319:283	TKA 30.33 (5.79) UKA 30.19 (5.03)	KSS Revision rate Pain scores LOS Post op complications
Liu et al 2010(105)	Prospective , cohort	52 months	UKA 48 TKA 52	Matched age, sex and BMI	+50 years old Primary arthroplasty for OA	52-76	68:18	TKA 21-32.4 UKA 21-32.7	LOO LOS ROM HSS

Lombardi A et al. 2009(94)	Prospective cohort	30 months	206 pts 115 UKA 115 TKA	Age sex, BMI and OA	UKA +TKA – all designs	TKA 62 (10) UKA 61(10.3)	TKA 38:65 UKA 38:65	TKA 31(5.1), UKA 31(5.1)	Revision, complication, Length of stay, ROM PROMS
Lum et al. 2016 (95)	Retrospective cohort	5 years	219 UKA 228 TKA	Not matched	All primary joint replacements	TKA 59.7, UKA 59.7	TKA 35:65 UKA 43:57	TKA 32.2 (5.9) UKA 34.5 (9.1)	Reoperation Revision complications
Lum et al 2018(110)	Retrospective cohort	2 years	650 UKA, 1300 TKA	Matched for age, sex, BMI	Adult OA BMI +35	TKA 59.7, UKA 59.7	TKA 42:58 UKA 41:59	TKA 40.5, UKA 40.5	Length of stay, op time ROM Infection Reoperation Revision
Lyons et al 2012 (96)	Retrospective	6 years	5606 TKA 279 UKA (4266pts)	NOT MATCHED	All implant types 1978- 2009	TKA 67.65 (9.31), UKA 66.02 (8.81)	TKA 2953:2653, UKA 110:169	TKA 31.8 (6.55), UKA 29.3(4.69)	KSORS SF12 WOMAC Revision
Manzotti et al. 2007 [50]	Prospective cohort	3 years	34 TKA 34 UKA	Matched, age	Adult OA Computer assisted TKA	TKA 70.7 (6.06) UKA 69.08 (5.7)	TKA 14:20 UKA 14:20	-	length Of Stay, PROMs
Matthews et al. 2013 [51]	Prospective Matched cohort	2 years	34 – TKA 34 - UKA	None	Adult AMOA	TKA 69.2 (7.7) UKA 67.3(9.1)	TKA 14:20 UKA 10:24	TKA 28.1 +/-6.6, UKA 28.6 +/-8.1	Visual analogue WOMAC OKS
Schwab et al. 2015 (33)	Retrospective, Matched cohort	30 days	105 TKA 105 UKA		Adult OA primary arthroplasty	TKA 64 (11) UKA 64 (10)	TKA 54:46 UKA 54:46	TKA 30(5) UKA 29.5(5)	Blood loss Length of stay Length of operation
Shankar et al 2016(114)	Retrospective , single centre	90 days	64- TKA 64 UKA	None	Adult primary arthroplasty	TKA 63.9(8.6), UKA 63.9 (8.6)	TKA 25:39 UKA 26:38		Costs (Length of operation, length of stay)
Siman et.al 2017 (15)	Retrospective single centre	2 years	188 TKA (170pts) 120 UKA (106pts)	Matched for AMOA	Adult AMOA OA, fixed flexion less than 10 degrees	TKA 79.6 +/-3.6, UKA 80.1 +/- 4.3	TKA 97:91 UKA72:48		Length of operation, length of stay, PROMS, revision
Van der List et al. 2016 (99)	Retrospective, cohort	3 years	166 – UKA 63 - TKA	Radiographic ally matched isolated medial OA	All primary knee TKA and UKA	TKA 65.6 +/-8.9, UKA 64.9 (+/-9.2)	TKA 93:73, UKA 30:33	TKA 31.5 (+/-5.6) UKA 29.2 (+/-5.3)	Functional outcome WOMAC PROMS
Van der List et al.2017	Retrospective single centre	5 years	170pts 52TKA, 59 only UKA, 59	None	Adult , primary arthroplasty				WOMAC PROMS

Walton 2006(119)	Retrospective single centre	1year	183 UKA, 142 TKA	None	All primary knee TKA and UKA	71.53 (+/-9.87)	-	-	OKS, Grimby score return to activities
Weale et al. 2001 (100)	retrospective cohort	2 years	301 TKA 31 UKA	None	Single centre Single surgeon AGC vs Oxford	69.9 (47-86)	93:68	-	OKS Complication revision
Williams et al. 2013 (101)	Retrospective Cohort Single centre	Up to 10 years	214 UKA, 2242 TKA	Liner regression performed	Single centre adult OA	71.4 (SD 9.1 (17.7- 95.8))	39:60	28.9 (SD50 (17.1- 54.9))	OKS satisfaction Survival
Xie et al 2009(104)	Prospective cohort	2 years	UKA 102 TKA 431	No	Adult OA	TKA 66.9 (7.6) UKA 63.3 (9.2)	TKA 346:85 UKA 25:77	TKA 27.9 (4.3) UKA 27.6)	OKS LOS QALY Cost effectiveness
Xu JP et al 2013 (102)	Matched cohort	20.5 months	30 UKA 30 TKA	Same patients	Single compartment both knees Adult patients	60-79	21:9	-	HSS Blood loss
Yang et al 2003 (103)	Prospective Matched cohort	1 year	UKA 50 TKA 50 100pts	No	Community Adult OA	TKA 65.1(54-80) UKA 65.5(55-80)	TKA 6:44 UKA8:42	-	Length of op Hospital stay ROM Cost effectiveness

Supplementary table 2. Risk of bias table for RCTs using Cochrane collaboration's tool. (✓ = clear documentation that the study meets this requirement, U = unclear from publication, ✗ = no evidence that requirements met.

Study Title	Sequence generation	Allocation concealment	Blinding	Incomplete outcome data	Selective outcome report	Free of other bias
Beard et al 2017.(65, 118)	✓	✓	✓	✗	✓	✓
Costa CR, et al 2011(63)	U	✓	✓	✓	✗	✓
Kulshrestha et al 2017 (66)	✗	✗	✓	✓	✗	✓
Newman J et al 1998 (62)	✗	✓	✓	✓	✗	✓
Newman J et al 2009(68)	✗	✓	✓	✓	✗	✓
Sun et al. 2011(64)	✗	✗	✓	✓	✗	✗
Weal et al 1999(67)	✗	✓	✓	✓	✗	✓

Supplementary table 3. Risk of bias for cohort studies using Newcastle-Ottawa Scale

Study ID	Selection				Comparability	Outcome		
	1	2	3	4	1	1	2	3
Registry Cohorts								
Baker et al. 2012(69)	a	a	a	a	a	b	a	c
Bini et al 2017 (79)	a	a	a	a	a	b	a	d
Burn et al 2016(87)	a	a	a	a	a	b	a	b
Bolognesi et al 2013(81)	a	a	a	a	a	b	a	b
Duchman et al 2014.(80)	a	a	a	a	a	b	a	c
Dyrhovden et al. 2017(74)	a	a	a	a	b	b	a	d
Furnes et al 2007(78)	a	a	a	a	b	b	a	c
Gioe 2007(77)	a	a	a	a	b	b	a	b
Hunt et al. 2014 (13)	a	a	a	a	a	b	a	b
Koskinen et al. 2008(75)	a	a	a	a	b	b	a	d
Liddle et al. 2014(22)	a	a	a	a	a	b	a	c
Liddle et al 2015 (71)	a	a	a	a	b	b	a	c
Lygre et al. 2010(73)	a	a	a	a	b	b	a	b
Niinimäki et al 2014 (70)	a	a	a	a	b	b	a	c
Pearse AJ et al 2010(76)	a	a	a	a	b	b	a	c
Robertsson et al. 2009(72)	a	a	a	a	b	b	a	d
Cohort studies								

Ackroyd et al. 2002 (84)	a	a	a	a	b	c	a	b
Amin et al 2006(85)	a	c	a	a	b	c	a	d
Artz at al. 2015(86)	a	c	a	a	b	c	a	d
Berger et al 2012(106)	c	b	a	a	b	c	a	b
Burn et al 2016(87)	b	c	a	a	b	c	a	b
Craik et al 2015(88)	b	b	a	a	b	b	a	b
Fabre Aubrespry et al 2018 (111)	b	b	a	a	b	b	a	a
Fisher D et al.(89)	c	b	a	a	b	c	a	d
Foote et al 2008(36)	c	b	a	a	b	c	a	c
Goh et al 2017(112)	b	b	a	a	b	b	a	b
Ho et al(109)	b	b	a	a	b	c	a	a
Horikawa et al. 2015 (90)	a	b	a	a	b	c	a	c
Kim et al (107)	b	b	a	a	b	c	a	d
Ko et al 2011(91)	b	b	a	a	b	c	a	d
Lim et al. 2014 (93)	a	b	a	a	b	c	a	b
Liu et al 2010(105)	b	b	a	a	b	c	a	b
Lombardi A et al. 2009(94)	b	b	a	a	b	c	a	b
Lum et al. 2016 (95)	b	b	a	a	b	c	a	a
Lum et al.2018	c	b	a	a	b	c	a	d
Lyons et al 2012 (96)	b	b	a	a	b	c	a	d
Manzotti et al. 2007 [50]	b	a	a	a	a	c	a	a
Matthews et al. 2013 [51]	b	b	a	a	b	c	a	d

Schwab et al. 2015	b	b	a	a	b	c	a	b
Shankar et al 2016(114)	b	b	a	a	b	c	a	d
Siman et al 2017 (15)	b	b	a	a	b	c	a	b
Van der List et al. 2016 (99)	b	a	a	a	b	c	a	d
Van der List et al. 2017 (113)	b	b	a	a	b	c	a	b
Walton 2006(119)	c	a	a	a	b	c	a	a
Weale et al. 2001 (100)	b	b	a	a	b	c	a	a
Williams et al. 2013 (101)	b	b	a	a	b	c	a	c
Xu JP et al 2013 (102)	c	a	a	a	a	c	a	a
Xie et al 2009(104)	b	b	a	a	b	c	a	d
Yang et al 2003 (103)[44]	b	b	a	a	b	c	a	b

Key: NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE - COHORT STUDIES

Selection

1) Representativeness of the exposed cohort

- a) truly representative of the average
- b) somewhat representative of the average
- c) selected group of users eg nurses, volunteers
- d) no description of the derivation of the cohort

2) Selection of the non exposed cohort

- a) drawn from the same community as the exposed cohort
- b) drawn from a different source
- c) no description of the derivation of the non exposed cohort

3) Ascertainment of exposure

- a) secure record (eg surgical records)

- b) structured interview
- c) written self report
- d) no description

4) Demonstration that outcome of interest was not present at start of study

- a) yes
- b) no

Comparability

1) Comparability of cohorts on the basis of the design or analysis

- a) study controls for stage of OA
- b) study controls for any additional factors age/sex/BMI

Outcome

1) Assessment of outcome

- a) independent blind assessment
- b) record linkage
- c) self report
- d) no description

2) Was follow-up long enough for outcomes to occur

- a) yes
- b) no

3) Adequacy of follow up of cohorts

- a) complete follow up - all subjects accounted for
- b) subjects lost to follow up unlikely to introduce bias
- c) large loss to follow up rate and no description of those lost
- d) no statement

SEARCH STRATEGY

Search Name:

Date Run: 21/11/16 17:43:27.815

Description:

ID	Search	Hits
#1	MeSH descriptor: [Osteoarthritis, Knee] explode all trees	2134
#2	unicondylar near/4 osteoarthritis near/4 knee	0
#3	unicondylar osteoarthritis knee	14
#4	unicompartment* osteoarthritis knee	77
#5	end stage osteoarthritis	286
#6	medial osteoarthritis	592
#7	#1 or #3 or #4 or #5 or #6	2699
#8	MeSH descriptor: [Arthroplasty, Replacement, Knee] explode all trees	2127
#9	"total knee replacement*"	1719
#10	TKR	335
#11	TKA	1092
#12	#8 or #9 or #10 or #11	3336
#13	"partial knee arthroplast*"	6
#14	"partial knee replacement*"	7
#15	"unicompartmental knee replacement*"	34

#16	"unicompartmental knee arthroplast*"	58
#17	"unicondylar knee arthroplast*"	9
#18	"unicondylar knee replacement*"	11
#19	UKA	48
#20	UKR	94
#21	#13 or #14 or #15 or #16 or #17 or #18 or #19 or #20	205
#22	#7 and #12 and #21	58