

Appendix 1. Supplementary tables

Supplementary Table S1. Patient demographics of the included studies.

Primary Author	Year	Study Design	Date of Surgery	Preoperative Diagnosis	# Patients	# Hips	% Female	Mean Age (yrs)	Mean BMI (kg/m ²)	Mean FU (yrs)	Lost to FU (%)
Choi	2017	Case Series	2004–2006	5 RA, 5 DDH, 3 AS, 3 AVN, 2 OA, 1 post-trauma, 1 SCFE	17	20	47	36.2 (21–40)	NR	11 (10–13.5)	31.0
Philippot	2017	Case Series	1985–1995	37 DDH, 39 OA, 31 AVN, 16 SCFE, 12 OCD, 2 tumor	114	137	NR	41 (18–50)	NR	21.9 (3.3–30.9)	6.1
Schmolders	2017	Case Series	1995–1998	60 DDH, 27 AVN, 23 OA, 1 tumor	77	81	47	48 (30–50)	27 (18–42)	13.5 (9.7–16.9)	23.0
Stambough	2017	Case Series	2001–2004	38 OA, 28 AVN, other	72	75	59	41.2 (17–50)	28.8 (17.7–26.2)	10 (8.2–11.9)	10.0
Kim	2016 CORR	Randomized Trial	2004–2005	(118 AVN, 62 OA, 10 AS, 10 tumor) x2 due to bilateral THA	200	400	69	52.5 (26–54)	29.6 (27.6–35.8)	11.8 (10–13)	5.7
Kim	2016 JA	Randomized Trial	1988–1990	(98 AVN, 34 DDH, 34 OA, 5 tumor) x2 due to bilateral THA	171	342	26.9	48 (21–50)	28 (27–33)	26.1 (25–27)	7.6
McLaughlin	2016	Case Series	1983–1990	29 DDH, 27 OA, 19 AVN, 6 RA, 1 Perthes	67	82	50.7	36.4 (20–49)	29 (20–43)	25 (20–29)	26.4
Kim	2014	Case Series	1984–1986	32 secondary OA, 24 AVN, 17 DDH, 3 RA	70	88	NR	45.6 (19–49)	NR	28.4 (27–29)	20.5
Babovic	2013	Case Series	1999–2002	45 OA, 5 AVN, 4 RA	50	54	NR	38.9 (15–50)	NR	10.4 (Range NR)	None
Chana	2013	Case Series	1997–1999	76 OA, 30 DDH, 5 AVN, 5 SCFE, 4 JIA	100	110	52.7	45.8 (20–55)	27 (16–39)	11.5 (10–13.5)	9.1
Schmitz	2013	Case Series	1988–2004	21 AVN, 18 JIA, 7 DDH, 6 Perthes, other	48	69	66.7	25 (16–29)	NR	11.5 (7–23)	None
Yoon	2012	Case Series	1997–2000	38 AVN, 17 secondary OA, 7 DDH, 5 AS, 4 Perthes, 4 other	62	75	40.3	24 (18–30)	22 (16–32)	11.4 (10–13.4)	16.2
Biamond	2011	Case Series	1992–1997	27 OA, 21 DDH, 11 RA, 10 AVN, 7 secondary OA, other	80	93	NR	44 (16–50)	NR	12.3 (9.8–15.5)	5.9
Faldini	2011	Case Series	1995–1998	28 DDH	28	34	85.7	47 (44–50)	NR	12 (10–14)	None
Hsu	2011	Case Series	1997–2000	39 AVN, 30 OA, 8 DDH, 3 post-trauma	62	80	34.4	38.6 (16–49)	NR	10.1 (10–12.3)	3.1
Kim	2011	Randomized Trial (Cemented; Cementless)	1991–1993	52 AVN, 10 OA, 10 septic arthritis, 6 other; 52 AVN, 12 OA, 8 septic arthritis, 7 other	78; 79	109; 110	20.5; 26.6	43.4 (21–50); 46.8 (21–49)	22.2 (22.1–24.8); 22.2 (21.9–24.4)	18.4 (17–19); 18.4 (16–19)	6.0; 4.8

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Pakvis	2011	Case Series	1990–1997	46 OA, 38 DDH, 29 RA, 16 post-trauma, 13 AVN, 16 other	131	158	51.4	42 (18–50)	NR	13.2 (10–18)	3.1
Boyer	2010	Case Series	1993–2003	45 AVN, 15 RA, 7 DDH, 7 CDH, 5 AS, 4 OCD	69	76	NR	39 (Range NR)	22 (19–34)	10 (7–15)	9.2
Burston	2010	Case Series	1995–1998	29 OA, 12 DDH, 12 AVN, 5 other	44	54	56	39.5 (18–50)	NR	12.5 (10–17)	6.4
Flecher	2010	Case Series	1990–2002	88 DDH, 77 AVN, 41 OA, 27 post-trauma	212	233	NR	42.6 (20–50)	25 (16–48)	10 (5–16)	None
Wroblewski	2010	Case Series	1969–2001	23 JIA, 7 DDH, 4 AS, 3 secondary OA, 2 AVN, other	26	35	78.6	17.9 (12–19)	NR	15.6 (2.3–34)	7.1
Akbar	2009	Case Series	1992–1994	25 DDH, 12 post-trauma, 8 CDH, 8 AVN, 8 Perthes, 7 RA, 2 SCFE	59	70	47.2	35 (22–40)	26 (18–41)	14 (10–16)	3.3
Lewthwaite	2008	Case Series	1988–1995	43 OA, 40 DDH, 24 inflammatory arthritis, 6 Perthes, 4 AVN, 3 SCFE, 3 septic arthritis, 7 other	101	123	NR	42 (Range NR)	NR	12.5 (10–17)	None
Utting	2008	Case Series	1991–1995	29 OA, 18 DDH, 8 AVN, 5 post-trauma, other	53	70	54.7	40 (19–49)	NR	13.6 (12–16)	None
Wangen	2008	Case Series	1989–1996	24 CDH, 6 AVN, 4 post-trauma, 3 Perthes, other	42	47	63.6	25 (15–30)	NR	13 (10–16)	4.5
Singh	2004	Case Series	1988–1997	19 OA, 10 DDH, 3 post-trauma, 2 Still's disease, 2 Perthes, 1 SCFE, 1 RA	33	38	33.3	42 (22–49)	27 (Range NR)	10 (5.3–14.2)	None
Keener	2003	Case Series	1970–1976	28 DDH, 11 OA, 11 post-trauma, 11 infection, 8 RA, 8 SCFE, 7 AVN, 4 polio, 2 Perthes, 3 other	42	57	50.7	42 (18–49)	NR	25.7 (25–30)	39.1
Crowthers	2002	Case Series	1984–1989	19 inflammatory arthritis, 18 AVN, 14 OA, 2 post-trauma, 3 other	44	56	61.4	37 (22–49)	NR	11 (9–14)	21.4
Chiu	2001	Case Series	1978–1987	21 AS, 19 AVN, 3 RA, 2 JIA, 1 post-trauma	33	47	39.4	28.8 (17–39)	NR	14.9 (6.9–21.1)	21.4
Duffy	2001	Case Series	1984–1987	26 DDH, 16 AVN, 13 post-trauma, 12 inflammatory arthritis, other	72	82	45.8	32 (17–39)	NR	10.3 (10–14)	None
Garcia-Cimbrello	2000	Case Series	1971–1978	23 AVN, 15 inflammatory arthritis, 11 DDH, 11 secondary OA, 7 post-trauma	58	67	37.9	32.4 (18–39)	NR	21.7 (5–25)	13.4
Smith	2000	Case Series	1976–1978	OA secondary to congenital hip disease	40	47	NR	41 (21–50)	NR	18.2 (17–20)	None

AS, ankylosing spondylitis

AVN, avascular necrosis

CDH, congenital dislocation of the hip

DDH, developmental dysplasia of the hip

JIA, juvenile idiopathic arthritis

NR, not reported

OA, osteoarthritis

OCD, osteochondritis dissecans

RA, rheumatoid arthritis

SCFE, slipped capital femoral epiphysis

Supplementary Table S2. Surgical details and implant selection.

Primary Author	Year	Surgical Approach	Implant Fixation	Acetabular Component	Femoral Component	Femoral Stem Fit	Bearing Surface	Femoral Head Material	Femoral Head Diameter (mm)	Liner
Choi	2017	Anterolateral	Cementless, Hybrid	Cementless Zimmer Trilogy	Zimmer Versys (14 Cementless, 6 Cemented)	Diaphyseal	Metal-on-HXLPE	Metal	36	HXLPE
Philippot	2017	NR	Cementless	Cementless Bousquet Dual-Mobility	Cementless Conical Screw Stem (SERF PF, SERF PROFIL)	Screwed into Femoral Canal	MoP	Metal	22, 28	Conventional Poly
Schmolders	2017	Anterolateral	Cementless	Cementless Smith & Nephew Bicon-Plus	Cementless Zimmer Zweymüller SL	Metaphyseal-Diaphyseal Junction	CoP	Ceramic	32	Conventional Poly
Stambough	2017	Posterolateral	Cementless	Cementless Zimmer Trilogy	Cementless (Manufacturer NR)	NR	Metal-on-HXLPE	Metal	28	HXLPE
Kim	2016 CORR	Posterolateral	Cementless	Cementless Depuy Duraloc	Cementless Depuy Proxima Ultra-short; Cementless Depuy Profile	Metaphyseal; Metaphyseal	CoC	Ceramic	28	Ceramic
Kim	2016 JA	Posterolateral	Hybrid; Cementless	Cementless Depuy Duraloc	Cemented Depuy Charnley Elite Plus; Cementless Depuy Profile	N/A; Metaphyseal	MoP	Metal	N/A; NR	Conventional Poly
McLaughlin	2016	NR	Cementless	Cementless Zimmer T-tap	Cementless Zimmer Taperloc	Metaphyseal	MoP	Metal	NR	Conventional Poly
Kim	2014	NR	Cementless	Cementless Stryker PCA	Cementless Stryker PCA	Metaphyseal	MoP	Metal	NR	Conventional Poly
Babovic	2013	NR	Cementless	Cementless Zimmer (52), Cementless Implex (2)	Cementless (Manufacturer NR)	NR	Metal-on-HXLPE (52), Ceramic-on-HXLPE (2)	Metal (52), Ceramic (2)	22-32	HXLPE
Chana	2013	Posterior	Cementless	Cementless Osteonics ABC	Cementless Osteonics Secur-Fit	Metaphyseal	CoC	Ceramic	NR	Ceramic
Schmitz	2013	Posterolateral	Cemented	Cemented Stryker Exeter (29), Cemented Charnley Elite Plus LPW (26), Cemented Zimmer Muller Allopro (14)	Cemented Stryker Exeter (45), Cemented Charnley Elite Plus (13), Cemented Zimmer Muller Straight (11)	N/A	MoP	Metal	22, 28, 32	Conventional Poly
Yoon	2012	Mixed	Cementless	Cementless Aesculap Plasmacap	Cementless Aesculap Biocontact	Metaphyseal	CoC	Ceramic	28	Ceramic
Biamond	2011	Posterolateral	Cementless	Cementless Robert Mathys	Cementless Zimmer CLS Spotorno	Metaphyseal-Diaphyseal Junction	MoP	Metal	28	Conventional Poly (Monoblock)
Faldini	2011	Posterolateral	Cementless	Cementless (Manufacturer NR)	Cementless Zimmer Wagner Cone	Metaphyseal-Diaphyseal Junction	MoP (28), CoC (7)	Metal (28), Ceramic (7)	NR	Conventional Poly (28), Ceramic (7)
Hsu	2011	Posterolateral	Hybrid	Cementless Wright Transcend	Cemented Wright Perfecta	N/A	CoC	Ceramic	NR	Ceramic

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Kim	2011	NR	Hybrid; Cementless	Cementless Depuy Duraloc	Cemented Depuy Charnley Elite Plus; Cementless Depuy Profile Cementless Zimmer CLS Spotorno (99), Cementless Robert Mathys Isoelastic (38), Cementless Zimmer Wagner (21)	N/A; Metaphyseal	MoP	Metal	N/A; NR	Conventional Poly
Pakvis	2011	Posterolateral	Cementless	Cementless Robert Mathys	Cementless Zimmer CLS Spotorno (99), Cementless Robert Mathys Isoelastic (38), Cementless Zimmer Wagner (21)	Metaphyseal-Diaphyseal Junction	CoP (100), MoP (58)	Ceramic (100), Metal (58)	28	Conventional Poly
Boyer	2010	Posterolateral	Hybrid, Cementless	Cementless Ceraver Cerafit/HA	Cemented Ceraver Osteal (63), Cementless Ceraver Multicone (20)	N/A, Metaphyseal	CoC	Ceramic	NR	Ceramic
Burston	2010	Posterolateral	Cemented, Hybrid	Cemented Stryker Exeter (20), Cementless Zimmer Harris-Galante (38)	Cemented Stryker Exeter (36), Cemented Zimmer CPT (22)	N/A	MoP	Metal	22–28	Conventional Poly
Flecher	2010	Anterolateral	Cementless	Cementless Symbios Hilock	Cementless Symbios HA-Coated Custom	Metaphyseal	CoP	Ceramic	28	Conventional Poly
Wroblewski	2010	Trans-trochanteric	Cemented	Cemented Charnley	Cemented Charnley	N/A	MoP (19), CoP (10)	Metal (19), Ceramic (10)	22	Conventional Poly (Monoblock)
Akbar	2009	Anterolateral	Cementless	Cementless OS Orthopedic Services GmBH DSP-CUP	Cementless OS Orthopedic Services GmbH CT3D-A Custom	Metaphyseal	CoP	Ceramic	28	Conventional Poly
Lewthwaite	2008	Mixed	Cemented	Cemented Stryker Exeter	Cemented Stryker Exeter	N/A	MoP	Metal	22–30	Conventional Poly
Utting	2008	Mixed	Hybrid	Cementless Zimmer Harris-Galante	Cemented Zimmer CPT (31), Cemented Stryker Exeter (29), Cemented Zimmer Sheehan (8), Cemented Charnley	N/A	MoP	Metal	22–32	Conventional Poly
Wangen	2008	Mixed	Cementless	Cementless (Manufacturer NR)	Cementless HA-Coated Depuy CORAIL	Metaphyseal	MoP	Metal	28	Conventional Poly
Singh	2004	Lateral	Hybrid, Cementless	Cemented JRI Polyethylene (14), Cementless JRI HA-Coated (24)	Cementless JRI HA-Coated Furlong	Diaphyseal	CoP (36), MoP (2)	Ceramic (36), Metal (2)	28–32	Conventional Poly
Keener	2003	Trans-trochanteric	Cemented	Cemented Charnley	Cemented Charnley	N/A	MoP	Metal	NR	Conventional Poly (Monoblock)
Crowthers	2002	Mixed	Cementless	Cementless Zimmer Harris-Galante	Cementless Zimmer Harris-Galante	Metaphyseal	MoP	Metal	22–32	Conventional Poly
Chiu	2001	Mixed	Cemented	Cemented Charnley	Cemented Charnley	N/A	MoP	Metal	NR	Conventional Poly (Monoblock)
Duffy	2001	Mixed	Cementless	Cementless Stryker PCA (39), Cementless Stryker Dual Geometry (21), Cementless Zimmer Harris-Galante (22)	Cementless Stryker PCA (58), Cementless Zimmer Harris-Galante (24)	Metaphyseal	MoP	Metal	22–32	Conventional Poly
Garcia-Cimbrello	2000	Trans-trochanteric	Cemented	Cemented Charnley	Cemented Charnley	N/A	MoP	Metal	NR	Conventional Poly (Monoblock)

Appendix 1 to Mei X, Gong YJ, Safir O, et al. Long-term outcomes of total hip arthroplasty in patients younger than 55 years: a systematic review of the contemporary literature. *Can J Surg* 2019.

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Smith	2000	NR	Cemented	Cemented Charnley	Cemented Charnley	N/A	MoP	Metal	22, 26	Conventional Poly (Monoblock)
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CoC, ceramic-on-ceramic

CoP, ceramic-on-conventional polyethylene

HXLPE, highly cross-linked polyethylene

MoP, metal-on-conventional polyethylene

N/A, not applicable

NR, not reported

Supplementary Table S3. Implant survivorship, complications, radiographic and functional outcomes.

Primary Author	Year	Final Implant Survival	5-Year Implant Survival (%)	10-Year Implant Survival (%)	Dislocation (n, %)	Deep Infection (n, %)	Other Complications	Reoperation (n, %)	Acetabular Radiolucent Lines (%)	Femoral Radiolucent Lines (%)	Functional Outcome
Choi	2017	95%–11 yrs	95	95	1 (5.0%)	None	None	1 (5.0%)	None	None	Mean post-op mHHS 91 (86–95) Mean post-op MAS: 15 (15–18)
Philippot	2017	77%–21.9 yrs	NR	NR	15 intra-prosthetic (10.9%)	1 (0.7%)	1 fractured stem	44 (32.1%)	11.7	0.7	Mean HHS: 48.3 → 85.1 Mean MAS: 11.5 → 17.1
Schmolders	2017	93%–13.5 yrs	NR	96.8	1 (1.2%)	None	1 DVT, 1 UTI, 1 neuropraxia, 1 cup breakage	6 (7.4%)	10.8	15.3	Mean HHS: 45 → 98 Mean HOOS: 30.6 → 84
Stambough	2017	92%–10 yrs	96	92	1 (1.3%)	1 (1.3%)	1 HO	5 (6.7%)	None	None	Mean mHHS: 46.3 → 81.9
Kim*	2016 CORR	99.5%–11.8 yrs	99.5	99.5	None	None	1 unstable stem	1 (0.3%)	NR	None	Mean HHS: 48 → 93.5 Mean WOMAC: 62 → 17
		99.5%–11.8 yrs	99.5	99.5	None	None	1 unstable stem	1 (0.3%)	NR	None	Mean HHS: 45 → 94 Mean WOMAC: 59 → 16
Kim†	2016 JA	79% cup, 96% stem–26.1 yrs	NR	NR	3 (1.8%)	None	None	36 (21.1%)	11.7	1.8	Mean HHS: 45 (9–58) → 91 (60–100) Mean WOMAC: 66 (39–85) → 16 (4–28)
		78% cup, 95% stem–26.1 yrs	NR	NR	2 (1.2%)	1 (0.6%)	None	37 (21.6%)	10.5	None	Mean HHS: 45 (6–56) → 93 (70–100) Mean WOMAC: 69 (45–89) → 17 (6–31)
McLaughlin	2016	90% stem–27 yrs	NR	NR	None	3 (3.7%)	2 PE, 1 neuropraxia	9 (11.0%)	NR	15.9	Mean HHS: 55 (20–74) → 92 (70–100)
Kim	2014	66% cup, 90% stem–28.4 yrs	NR	NR	2 (2.3%)	None	None	39 (44.3%)	85.2	90.9	Mean HHS: 39 (24–55) → 86 (30–100)
Babovic	2013	98.1%–10.4 yrs	NR	NR	1 (1.9%)	None	None	1 (1.9%)	None	None	Mean HHS: 58.7 (33–75) → 91.2 (72–99)
Chana	2013	96.5%–11.5 yrs	NR	96.5	1 late traumatic (0.9%)	None	1 PPF, 1 PE, 1 neuropraxia, 3 iliopsoas tendonitis, 2 squeaking	4 (3.6%)	0.8	2.5	Mean HHS: 53.4 (15–86) → 94.7 (63–100) Mean Modified UCLA Activity Score: 6.4 (4–10) → 9.0 (4–10)
Schmitz	2013	75%–15 yrs	NR	86	2 (2.9%)	4 (5.8%)	1 neuropraxia, 1 PPF	16 (23.2%)	26.1	4.4	Mean HHS: 47 (15–81) → 88.3 (55–100) Mean OHS: 43.2 (34–52) → 17.5 (12–34)
Yoon	2012	98.9%–10 yrs	NR	98.9	1 with fractured liner (1.3%)	None	1 fractured ceramic liner, 2 squeaking	1 (1.3%)	None	None	Mean HHS: 59 (40–83) → 97 (93–100) Mean post-op WOMAC 13 (0–28)

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Biemond	2011	84%–12.3 yrs	NR	84	6 (6.5%)	None	3 intra-op fracture, 1 neuropraxia, 1 HO,	17 (18.3%)	NR	35.0	Mean post-op HHS in unrevised patients: 94 (35–100)
Faldini	2011	100%–12 yrs	100	100	1 (2.9%)	None	1 intra-op fracture, 1 DVT	None	None	None	Mean HHS: 56 (45–69) → 97 (83–100)
Hsu	2011	96.3%–10 yrs	NR	96.3	None	None	2 fractured ceramic liner, 1 squeaking	3 (3.8%)	None	None	Mean post-op HHS 89.8
Kim [#]	2011	87%–20 yrs	NR	93.6	2 (1.8%)	1 (0.9%)	None	16 (14.7%)	7.9	7.0	Mean HHS: 44 (5–66) → 91 (75–100) Mean WOMAC: 68 (38–91) → 11 (4–35)
		84%–20 yrs	NR	93.6	1 (0.9%)	2 (1.8%)	None	22 (20.0%)	11.4	13.2	Mean HHS: 48.8 (6–55) → 90 (71–100) Mean WOMAC: 71 (39–95) → 13 (4–33)
Pakvis	2011	80%–14 yrs	NR	98	7 (4.4%)	3 (1.9%)	3 intra-op fracture, 2 UTI, 1 neuropraxia, 2 HO	39 (24.7%)	NR	NR	Post-op HHS: 79% excellent–good, 7% fair, 15% poor Post-op MAS: 91% excellent–good, 9% poor
Boyer	2010	92%–10 yrs	NR	92	3 (3.9%)	1 (1.3%)	1 neuropraxia, 1 PPF, 1 fractured ceramic liner	5 (6.6%)	1.3	2.6	Mean MAS: 11 (7–13) → 17 (12–18)
Burston	2010	79.2%–12.5 yrs	NR	NR	4 (7.1%)	2 (3.6%)	None	14 (25.0%)	NR	8.6	Mean HHS: 42 (24–60) → 86 (48–100) Mean OHS: 46 (33–60) → 27 (12–48)
Flecher	2010	87%–15 yrs	NR	96.7	6 (2.6%)	4 (1.7%)	3 HO, 1 PPF, 2 GT fracture	23 (9.9%)	1.3	2.2	Mean HHS: 54.2 (26–87) → 97 (50–100) Mean MAS: 7.6 (0–13) → 16.3 (12–18)
Wroblewski	2010	59%–15.6 yrs	NR	NR	None	1 (2.9%)	1 PPF	16 (45.7%)	10.3	2.6	Mean post-op MAS 9.1 for juvenile idiopathic arthritis patients, 17.6 for other patients
Akbar	2009	86%–14 yrs	100	100	None	None	1 GT fracture, 2 neuropraxia	5 (7.1%)	2.9	None	Mean HHS: 41 (17–58) → 87 (42–100)
Lewthwaite	2008	92.6%–12.5 yrs	NR	94.4	1 (0.8%)	1 (0.8%)	1 PPF	13 (10.6%)	11.4	9.8	Mean HHS: 36 (1–68) → 81 (18–100)
Utting	2008	84% cup/liner–16 yrs	NR	NR	2 (2.9%)	1 (1.4%)	1 HO	13 (18.6%)	44.3	38.6	Mean post-op HHS: 81 (37–100) Mean post-op OHS: 20 (12–46)
Wangen	2008	51%–13 yrs	NR	NR	3 (6.4%)	None	None	24 (51.1%)	NR	16.3	Mean post-op HHS: 88 (62–100) Mean post-op WOMAC: 80 (37–100)
Singh	2004	Cup Cemented 90.5%/Cementless 96%, Stem 100%–12 yrs	NR	NR	None	None	1 PPF	4 (10.5%)	18.4	None	Mean HHS: 44 → 92 Mean post-op WOMAC 29, OHS 16, MAS 16.6

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Keener	2003	60%–30 yrs	NR	NR	1 (1.8%)	4 (7.0%)	2 PPF	22 (38.6%)	15.1	7.5	Median post-op WOMAC 19
Crowthers	2002	87.5%–11 yrs	NR	NR	None	1 (1.8%)	None	7 (12.5%)	29.0	NR	Post-op HHS: 71% excellent, 18% good, 4% fair, 3% poor
Chiu	2001	27%–15 yrs	97.8	84.5	2 (4.3%)	1 (2.1%)	None	30 (63.8%)	4.3	10.6	Mean HHS: 43.8 (26–74) → 87.7 (74–99)
Duffy	2001	78.1%–10 yrs	96.3	78.1	1 (1.2%)	2 (2.4%)	7 intra-op fracture, 2 neuropraxia	26 (31.7%)	8.5	8.5	Mean HHS: 51 → 92
Garcia-Cimbrelo	2000	70%–24 yrs	98.5	88	3 (4.5%)	None	2 intra-op fracture, 1 neuropraxia	19 (28.4%)	42.3	21.8	Mean MAS: 8.8 → 14.4
Smith	2000	96.8%–10 yrs	NR	96.8	1 (2.1%)	None	1 DVT, 1 UTI, 1 neuropraxia, 2 superficial infection	6 (12.8%)	10.8	15.3	Mean HHS: 45 → 98 Mean HOOS: 30.6 → 84

DVT, deep vein thrombosis

GT, greater trochanter

HHS, Harris Hip Score

HO, heterotopic ossification

HOOS, Hip disability and Osteoarthritis Outcome Score

MAS, Merle d'Aubigné Score

mHHS, modified Harris Hip Score

NR, not reported

OHS, Oxford Hip Score

PE, pulmonary embolism

PPF, periprosthetic fracture

UTI, urinary tract infection

WOMAC, Western Ontario and McMaster Universities Arthritis Index

*Kim 2016 CORR, *Ultra-short stem group Italicized*; Conventional stem group Non-Italicized

†Kim 2016 JA, *Cemented stem group Italicized*; Cementless stem group Non-Italicized

#Kim 2011, *Cemented stem group Italicized*; Cementless stem group Non-Italicized