

Appendix 4: Characteristics of included studies

Study Key paper (all study references) Date Country	Group Bearing combination Head size Fixation	Number of hips randomised % bilateral (if reported)	Mean age (SD or range) % female % osteoarthritis (OA) Mean BMI (SD)	Outcome measures relevant to review Follow up times (months)
Amanatullah et al. 2011* (1, 2) 1999 – 2001 USA	1. CoC Alumina: Alumina 28-32mm Uncemented	196 15.3% bilateral	50.4 years (12.8) 36.1% female 88.8% OA BMI 29.6 (12.4)	Revision, HHS, SF-12 3, 6, 12, 24, 48, 60 months
	2. CoP Alumina: UHMWPE 28mm Uncemented	161 9.3% bilateral	54.7 years (12.9) 42.5% female 87.6% OA BMI 28 (5.1)	
Ando et al. 2015 (3) 2009-2011 Japan	1. MoM Co-Cr-Mo: Co-Cr-Mo 28-32mm Uncemented	91 3.3% bilateral	66.2 years (9.0) 74.7% female 92.3% OA BMI 23.1 (3.6)	HHS, EQ-5D, UCLA activity score 3, 6, 12, 24 months
	2. MoM Co-Cr-Mo: Co-Cr-Mo 38-52mm Uncemented	98 1.02% bilateral	65.4 years (8.6) 77.6% female 82.6% OA BMI 23.9 (3.7)	
Ayers et al. 2009 (4) Not stated USA	1. MoP Titanium: UHMWPE 28mm Uncemented	21 0% bilateral	58 years (6) 70% female 100% OA BMI 30 (4)	Revision, HHS, WOMAC, SF-12, UCLA activity score 6, 12, 24 months
	2. MoP Titanium: HXLPE 28mm Uncemented	25 4.2% bilateral	58 years (8) 44% female 87.5% OA BMI 29 (5)	
Bal et al. 2005 (5-7) 1998 – 2001 USA	1. CoC Alumina: Alumina 28mm Uncemented	250 13% bilateral	55 years (14.7) 44.8% female 64% OA BMI not reported	Revision, HHS 24 months
	2. CoP Alumina: PE unspecified 28mm Uncemented	250 12% bilateral	61 years (12.8) 53.2% female 73% OA BMI not reported	
Bascarevic et al. 2010 (8) 2003 – 2008 Serbia	1. CoC Alumina: Alumina 28mm Uncemented	82 4.9% bilateral	53.9 years (7.1) 79% female 56% OA BMI 26.7 (3.8)	Revision, HHS 2, 6, 12, 24, 36, 48, 60, 72 months
	2. MoP Co-Cr: HXLPE 28-32mm Uncemented	75 4% bilateral	55.6 years (6.5) 69% female 57% OA BMI 27.8 (4.2)	
Beaupre et al. 2013 (9, 10) 1998 – 2003 Canada	1. CoC Alumina: Alumina 32mm Uncemented	48	51.3 years (6.9) 46% female % OA not reported BMI not reported	Revision, WOMAC, SF-12, 12, 60 months
	2. CoP Alumina: HXLPE 28mm Uncemented	44	53.6 years (6.5) 46% female % OA not reported BMI not reported	
Bjorgul et al. 2013* (11) 1999 – 2003 Norway	1. MoM Co-Cr: Co-Cr 28mm Cemented	129	63.3 years (40.7-72.9) 68% female 82% OA BMI not reported	Revision, HHS 24, 60, 84 months
	2. MoP Co-Cr-Mo: PE unspecified 28mm	137	62.8 (24.5-72.7) 69% female 80% OA	

	Cemented		BMI not reported	
	3: CoP	131	63.9 years (30.6-73.8)	
	Alumina: PE unspecified		59% female	
	28mm		80% OA	
	Cemented		BMI not reported	
Brodner et al. 2003 (12, 13)	1. MoM	50	58.3 years (16-81)	Revision, HHS
1993 - Austria	Co-Cr-Mo: Co-Cr-Mo		62% female	3, 6, 12, 18, 24,
	28mm		%OA not reported	36, 48, 60 months
	Uncemented		BMI not reported	
	2. CoP	50	62 (26-87)	
	Alumina: UHMWPE		78% female	
	28mm		%OA not reported	
	Uncemented		BMI not reported	
Calvert et al. 2009 (14)	1. MoP	59	62.5 years (46-75)	Revision, HHS,
2001 – 2003	Co-Cr: HXPLE	0% bilateral	59.3% female	UCLA activity
New Zealand	28mm		100% OA	score
	Hybrid		BMI not reported	6, 12, 24, 36
	2. MoP	60	61 years (48-100)	months
	Co-Cr: Conventional PE	0% bilateral	45% female	
	28mm		100% OA	
	Hybrid		BMI not reported	
D'Antonio et al. 2002 (15-26)	1. CoC	349	53 years	Revision, HHS
1996 – 1998	Alumina: Alumina	9.7% bilateral	35% female	2, 6, 12, 24, 36,
USA	28-32mm		78.5% OA	48, 60, 72, 84, 96,
	Uncemented		BMI 28.7	108, 120 months
	2. MoP	165	53 years	
	Co-Cr: Conventional PE	2.5% bilateral	40% female	
	26-32mm		76% OA	
	Uncemented		BMI 28.7	
Dahlstrand et al. 2009 (27)	1. MoP	26	65 years (45-74)	HHS, SF-36
1998 – 2001	Co-Cr-Mo: PE unspecified	0% bilateral	%female	3, 6, 12, 24
Sweden, USA	28mm		100% OA	months
	Cemented		BMI 26.7	
	2. MoM	28	65 years (45-74)	
	Co-Cr-Mo: Co-Cr-Mo	0% bilateral	46.4% female	
	28mm		100% OA	
	Cemented		BMI 26.7	
Desmarchelier et al. 2013 (28)	1. MoM	125	63.7 years (12.7)	Revision, HHS
1999 - 2000	Co-Cr-Mo: Co-Cr-Mo	12.6% bilateral	61.6% female	Merle D'Aubigné
France	28mm		72.8% OA	score
	Uncemented		BMI 25.4 (3.3)	3, 12, 36, 60, 120
	2. CoC	125	59.6 years (14.6)	months
	Alumina: Alumina	7.8% bilateral	45% female	
	28mm		68% OA	
	Uncemented		BMI 25.8 (3.9)	
Digas et al. 2003 (29-33)	1. MoP	32	Median 54 years	Revision, HHS
1998 - 2001	Co-Cr: HXLPE	0% bilateral	(35-68)	3, 6, 12, 24, 36,
Sweden	28mm		53.1% female	60, 120 months
	Cemented		100% OA	
			BMI not reported	
	2. MoP	29	Median 55 years (41-70)	
	Co-Cr: Conventional PE	0% bilateral	48.3% female	
	28mm		100% OA	
	Cemented		BMI not reported	
Dorr et al. 2004 (34)	1. MoM	311	60.0 years	Revision, HHS
Not stated	Co-Cr-Mo: Co-Cr-Mo		41.0% female	60 months
USA	28mm		% OA not reported	
	Uncemented (cup)		BMI not reported	
	Cemented or uncemented stem			
	2. CoP	304	59.5 years	
	Zirconia: Unspecified PE		% female	

	28mm Uncemented (cup) Cemented or uncemented stem		% OA not reported BMI not reported	
Egglı et al. 2002 (35) 1986 - 1987 Switzerland	1. MoP Co-Cr-Mo: UHMWPE 22mm Cemented	49	Age not reported % female not reported % OA not reported BMI not reported	None relevant (radiological outcomes only) 3, 6, 12, 24, 36, 48, 60, 72, 84, 96, 108 months
	2. MoP Co-Cr-Mo: UHMWPE 32mm Cemented	40	Age not reported % female not reported % OA not reported BMI not reported	
Engh et al. 2006 (36, 37) 1999 - 2000 USA	1. MoP Co-Cr: HXLPE 28mm Uncemented	116	62.5 years (10.6, 26-87) 56 % female 85.3 % OA BMI 28.6 (5.5)	Revision, HHS 60, 108, 120, 156 months
	2. MoP Co-Cr: UHMWPE 28mm Uncemented	114	62.0 years (11.1, 34-84) 50 % female 78.9 % OA BMI 27.9 (5.1)	
Engh et al. 2009 (38, 39) 2003 - 2005 USA, Canada	1. MoP Co-Cr: HXLPE 28mm Uncemented	37 0% bilateral	61.6 years 29.7 % female % OA not reported BMI 29.9	Revision, HHS, WOMAC, SF-12 6, 12, 24, 60 months
	2. MoM Co-Cr: Co-Cr 28mm Uncemented	30 0% bilateral	62.2 years 60% female % OA not reported BMI 28.7	
	3: MoM Co-Cr: Co-Cr 36mm Uncemented	38 0% bilateral	63.4 years 28.9% female % OA not reported BMI 29.1	
Engh et al. 2015 (40) 2005 - 2006 USA, Canada	1. CoM Zirconia/ Alumina: Co-Cr- Mo 28-36mm Uncemented	194	59 years 43% female 83% OA BMI 30	Revision, HHS 3, 12, 24, 48, 60, 72 months
	2. MoM Co-Cr-Mo: Co-Cr-Mo 28-36mm Uncemented	196	60 years 46% female 89% OA BMI 30	
Garbuz et al. 2010* (41) 2005 - 2008 Canada	1. Resurfacing Co-Cr: Co-Cr 40mm Reverse hybrid	48 0% bilateral	51.5 years 10.4% female 100% OA BMI 28.3	PAT-5D, WOMAC, SF-36, UCLA activity score 24 months
	2. MoM Co-Cr-Mo: Co-Cr 40mm Uncemented	56 0% bilateral	52 years 10.7% female 100% OA BMI 28.2	
Garcia-Rey et al. 2008 (42, 43) 1999 - 2001 Spain	1. MoP Co-Cr-Mo: HXLPE 28mm Uncemented	45	62.5 years (47-78) 57.1% female 62.2% OA BMI not reported	Revision, Merle D'Aubigné score 6, 12, 24, 36, 48, 60, 72, 84, 108, 120, 132, 144 months
	2. MoP Stainless steel: UHMWPE 28mm Uncemented	45	60.6 years (25-88) 53.7% female 71.1% OA BMI not reported	
Garellick et al. 2000 (44-46) 1985 - 1989 Sweden	1. MoP Stainless steel: PE unspecified 22mm Cemented	206 9.3% bilateral	70 years (41-85) 70% female 57% OA BMI not reported	Revision, HHS, Pain score, Satisfaction 12, 36, 72, 120, 132 months

	2. MoP Co-Cr: PE unspecified 32mm Cemented	204 9.3% bilateral	71 years (40-86) 64% female 63% OA BMI not reported	
Gauthier et al. 2013 (47) 2007 - 2010 Canada	1. MoM Co-Cr-Mo: Co-Cr-Mo 36-54 Uncemented	25 0% bilateral	60.2 years (7.2) 44% female % OA not reported BMI 30.8 (5.6)	Revision, HHS, WOMAC, UCLA activity score, RAND-36
	2. MoP Co-Cr: HXLPE 28-32mm Uncemented	25 0% bilateral	63 years (5.5) 54 % female % OA not reported BMI 29.2 (5.0)	3, 6, 12, 24 months
Geerdink et al. 2006 (48) Not stated The Netherlands	1. MoP Co-Cr: Conventional PE 28mm Uncemented (cup)	67	63 years (37-72) % female not reported 94.4 % OA BMI 27	Revision 2, 12, 24, 36, 60 months
	2. MoP Co-Cr: MXLPE 28mm Uncemented (cup)	66	64 years (45-74) % female not reported 95.6 % OA BMI 28	
Geerdink et al. 2009 (49) Not stated The Netherlands	1. MoP Co-Cr: Conventional PE 28mm Uncemented	26	64 years (54-72) 43.4% female % OA not reported BMI 28	Revision, HHS 2, 12, 24, 36, 60, 96 months
	2. MoP Co-Cr: MXLPE 28mm Uncemented	22	64 years (48-74) 35.3% female % OA not reported BMI 28	
Girard et al. 2006 (50-58) 2003 - 2006 Canada	1. Resurfacing Co-Cr-Mo: Co-Cr-Mo 40mm Hybrid	104 5.4% bilateral	49.2 years (9.0, 23-64) 37% female 80% OA BMI 27 (5.3)	Revision, WOMAC, Merle D'Aubigné score, UCLA activity score
	2. MoM Co-Cr-Mo: Co-Cr-Mo 28mm Uncemented	99 5.6% bilateral	51.0 years (8.6, 24-65) 32% female 80% OA BMI 30 (6.8)	3, 6, 12, 24, 60, 96, 108, 120 months
Glyn-Jones et al. 2008 (59-62) 2002 - 2003 UK	1. MoP Co-Cr: UHMWPE 28mm Hybrid	27 0% bilateral	67 years (51-76) 50% female 100% OA BMI not reported	Revision, OHS 3, 6, 12, 24, 36, 60, 84, 120 months
	2. MoP Co-Cr: HXLPE 28mm Hybrid	27 0% bilateral	68 years (52-76) 50% female 100% OA BMI not reported	
Grubl et al. 2006* (63) 2000 - 2002 Austria	1. CoC Alumina: Alumina 28mm Uncemented	15 0% bilateral	58.2 years (32-81) 53.3% female 92.9% OA BMI not reported	HHS, UCLA activity score 12 months
	2. MoM Co-Cr-Mo: Co-Cr-Mo 28mm Uncemented	13 0% bilateral	66.8 years (56-78) 76.9% female 92.9% OA BMI not reported	
Haddad et al. 2015 (64, 65) 1999 – 2002 UK	1. Resurfacing Co-Cr: Co-Cr 38-58mm Hybrid	11	47.8 years (29-55) 25% female % OA not reported BMI not reported	HHS, WOMAC, OHS, EQ5D, UCLA activity score, University College
	2. MoP Co-Cr: PE unspecified 32mm Uncemented	13	48.2 years (31-55) 27.5% female % OA not reported BMI not reported	Hospital functional score 12, 60, 120 months
Hailer et al. 2011 (66)	1. MoP Co-Cr-Mo: HXLPE	44	Age not reported % female not reported	HHS

1998 – 2001 Sweden	28mm Cemented		% OA not reported BMI not reported	3, 6, 12, 24, 72 months
	2. MoM Co-Cr-Mo: Co-Cr-Mo 28mm Cemented	41	Age not reported % female not reported % OA not reported BMI not reported	
Hamilton et al. 2010 (67) 2003 – USA, Canada	1. CoC Alumina: Alumina 28mm Uncemented	177	56.4 years 49% female 89% OA BMI not reported	Revision, HHS 24 months
	2. CoP Alumina: MXLPE 28mm Uncemented	87	57.3 years 46% female 90% OA BMI not reported	
Hanna et al. 2012 (68) 2007 – 2009 UK	1. MoP Co-Cr: UHMWPE 28-32mm Cemented	22	72 years (66-80) 77% female 100% OA BMI 28.7	Revision, HHS, OHS, SF-36 12, 24, 36 months
	2. MoM Co-Cr: Co-Cr 44-54mm Hybrid	27	68 years (60-76) 78% female 100% OA BMI 28.1	
Howie et al. 2005 (69) 1993 – 1995 Australia	1. Resurfacing Co-Cr: Metal unspec 40mm Cemented	11 0% bilateral	Median 46 years (16-55) 45% female 64% OA BMI not reported	Revision, HHS, HHPS 3, 6, 12, 60, 120 months
	2. MoP Stainless steel: UHMWPE 26mm Cemented	13 0% bilateral	Median 50 years (22-54) 31% female 62% OA BMI not reported	
Howie et al. 2012 (70) 2001 – 2007 Australia, UK	1. MoP Unspecified metal: HXLPE 36mm Hybrid	273 0% bilateral	72.3 years (5.9, 59-93) 56.0% female 96.3% OA BMI 28.0 (5.9)	Revision 12 months
	2. MoP Unspecified metal: HXLPE 28mm Hybrid	284 0% bilateral	72.3 years (6.9, 60-92) 61.3% female 95.4% OA BMI 28.4 (5.2)	
Jacobs et al. 2004 (71) 1997 – 2000 USA	1. MoM Co-Cr: Unspecified metal 28mm Uncemented	118 0% bilateral	53.3 years (18-75) 51.6% female 61.1% OA BMI not reported	Revision, HHS 2, 6, 12, 24, 36, 48, 60, 72 months
	2. MoP Co-Cr: MXLPE 28mm Uncemented	118 0% bilateral	55.7 years (31-75) 32.9% female 71.1% OA BMI not reported	
Jassim et al. 2015 (72-74) 2005 – 2008 UK	1. MoP Co-Cr: HXLPE 32mm Uncemented	133	61 years (51-77) 68.4% female % OA not reported BMI not reported	Revision, WOMAC, SF-36, VAS pain 6, 12, 24, 36, 48, 60 months
	2. CoP Zirconia: HXLPE 32mm Uncemented	135	63 years (47-75) 55.6% female % OA not reported BMI not reported	
	3. CoP Zirconia: UHMWPE 32mm Uncemented	133	63 years (53-73) 62.4% female % OA not reported BMI not reported	
Jensen et al. 2011* (75-78) 2007 - 2009 Denmark	1. Resurfacing Co-Cr-Mo: Co-Cr-Mo 47-57mm Hybrid	21	57 years (5.1, 45-65) 39 % female % OA not reported BMI 27.3 (5.1)	Revision 2, 6, 12, 24 months

	2. CoP Alumina: Unspecified PE 28mm Uncemented	22	55 years (6.2, 44-64) 16% female 100% OA BMI 28.4 (2.8)	
Kadar et al. 2011* (79-81) 2004 – 2007 Norway	1. MoP Stainless steel: UHMWPE 22mm Cemented	30 0% bilateral	70 years (6.1) 67% female 93% OA BMI not reported	Revision, HHS 3, 12, 24 months
	2. MoP Co-Cr: UHMWPE 28mm Cemented	30 0% bilateral	69 years (5.9) 67% female 87% OA BMI not reported	
	3. CoP Zirconium: UHMWPE 28mm Cemented	30 0% bilateral	69 years (6.7) 77% female 87% OA BMI not reported	
	4. MoP Co-Cr: HXLPE 28mm Cemented	30 0% bilateral	70 years (5.3) 67% female 73% OA BMI not reported	
	5. CoP Zirconium: HXLPE 28mm Cemented	30 0% bilateral	70 years (5.4) 73% female 90% OA BMI not reported	
Kelley et al. 1998 (82) 1995 – 1996 USA	1. MoP Unspecified metal: Unspecified PE 22mm Uncemented cup, stem not stated	14	Age not reported % female not reported % OA not reported BMI not reported	Revision 12 months
	2. MoP Unspecified metal: Unspecified PE 28mm Uncemented cup, stem not stated	17	Age not reported % female not reported % OA not reported BMI not reported	
Kraay et al. 2006 (83) - 2001 USA	1. CoP Zirconia: UHMWPE 28mm Hybrid	30	69.5 years 74.1% female % OA not reported BMI not reported	Revision, HHS 48 months
	2. MoP Co-Cr-Mo: UHMWPE 28 mm Hybrid	30	68.9 years 63.3% female % OA not reported BMI not reported	
Langlois et al. 2015 (84) 2000-2002 France	1. MoP Co-Cr: HXLPE 22mm Cemented	50 0% bilateral	66.4 years (SD 12.9) 55% female 100% OA BMI 24.4 (3.7)	Revision, Merle D'Aubigné Score Minimum 96 months
	2. MoP Co-Cr: Conventional PE 22mm Cemented	50 0% bilateral		
Lavigne et al. 2010* (85) 2006 – 2007 Canada	1. Resurfacing Unspecified metal: Unspecified metal 40mm Hybrid	24	49.6 years (38-63) 41.7% female 76% OA BMI 27.9	Revision, WOMAC, SF-36, Merle D'Aubigné Scale, UCLA activity score 3, 6, 12, 18 months
	2. MoM Unspecified metal: Unspecified metal 40mm Uncemented	24	49.8 years (33-62) 37.5% female 80% OA BMI 27.8	

Lewis et al. 2008 (86) Not stated Canada	1. CoP Zirconium: Standard PE or HXLPE Not stated Uncemented	50	51 years (10.8, 22-74) 48% female 76% OA BMI not reported	Revision, HHS WOMAC, SF-12 3, 12, 24 months
	2. MoP Co-Cr: Standard PE or HXLPE Not stated Uncemented	50	51 years (11.0, 19-76) 48% female 76% OA BMI not reported	
Lindalen et al. 2015 (87) 2009-2010 Norway	1. CoP Zirconia/ alumina: HXLPE (vitamin E) 32mm Uncemented	25 0% bilateral	62 years (3.8) 84% female 100% OA BMI 28 (6.4)	HHS, OHS, UCLA activity score 24 months
	2. CoP Zirconia/ alumina: HXLPE (vitamin E) 36mm Uncemented	25 4% bilateral	61 years (3.8) 56% female 100% OA BMI 28 (5.1)	
Lombardi et al. 2001 (88, 89) 1995 – 1999 USA	1. MoM Co-Cr-Mo: Co-Cr-Mo 28mm Uncemented	97 2.8% bilateral	49.3 years (1.1, 26-73) 25.6% female 74.4% OA BMI 29.1 (0.61)	Revision, HHS 24, 60 months
	2. MoP Co-Cr-Mo: UHMWPE 30mm Uncemented	97 2.8% bilateral	48.9 years (1.4, 18-77) 23.6% female 72.2% OA BMI 28.7 (0.59)	
Lombardi et al. 2010 (90) 2000 – USA	1. CoC Alumina: Alumina 28-32mm Uncemented	64	57 years (33-76) 45% female 86% OA BMI 29.9	Revision, HHS 6, 12, 24, 36, 48, 60, 72, 84, 96, 108 months
	2. CoP Zirconia: HXLPE 28-32mm Uncemented	45	60 years (35-79) 47% female 84% OA BMI 28.8	
MacDonald et al. 2003* (91) 1998 – 1999 Canada	1. MoM Co-Cr-Mo: Co-Cr-Mo 28mm Uncemented	23	Age not reported % female not reported % OA not reported BMI not reported	Revision, HHS, WOMAC, SF-12 2, 3, 6, 12, 24, 36, 48 months
	2. MoP Co-Cr-Mo: UHMWPE 28mm Uncemented	18	Age not reported % female not reported % OA not reported BMI not reported	
Malviya et al. 2011 (92) Check UK	1. MoM Co-Cr: Unspecified metal 38-54mm Hybrid	50 5% bilateral	63.9 years (42-82) 62% female % OA not reported BMI 28.6	Revision, HHS, WOMAC, SF-36, HOOS 3, 12, 24 months
	2. MoP Unspecified metal: Unspecified PE 28mm Hybrid	50 5% bilateral	64.9 years (42-85) 54% female % OA not reported BMI 29.4	
Marston et al. 1996 (93, 94) 1982 – 1987 UK	1. MoP Unspecified metal: Unspecified PE 29mm Cemented	213	Age not reported % female not reported 88.7% OA BMI not reported	Revision, HHS 12, 24, 36, 48, 60, 72, 84, 96, 108, 120 months
	2. MoP Unspecified metal: Unspecified PE 22mm	200	Age not reported % female not reported 89.5% OA BMI not reported	

	Cemented			
Martell et al. 2003 (95) 1999 – 2001 USA	1. MoP Co-Cr: HXLPE 28mm Uncemented	24	60 years (28-76) % female not reported % OA not reported BMI 30.6	Revision 3, 12, 24, 36, 48 months
	2. MoP Co-Cr: UHMWPE 28mm Uncemented	22	55 years (28-75) % female not reported % OA not reported BMI 27.6	
McCalden et al. 2009* (96) 1999 – 2001 Canada	1. MoP Co-Cr: HXLPE 28mm Hybrid	50	72.3 years (56-79) 66% female 100% OA BMI 29.7	Revision, HHS, WOMAC, SF-12 2, 3, 12, 24, 36, 48, 60 months
	2. MoP Co-Cr: Conventional PE 28mm Hybrid	50	72.6 years (56-79) 72% female 100% OA BMI 29.7	
Morison et al. 2014 (97) 2004 – 2007 Canada, UK	1. MoP Co-Cr: UHMWPE 28mm Uncemented	21	50.6 years (31.7-67.5) 47.6% female % OA not reported BMI 30.3	Revision, HHS, WOMAC, SF-12 3, 12, 24, 60 months
	2. MoP Co-Cr: HXLPE 28mm Uncemented	24	53.7 years (22.8-66.0) 47.8% female % OA not reported BMI 27.9	
	3. CoP Zirconium: UHMWPE 28mm Uncemented	22	52.4 years (39.8-64.8) 36.4% female % OA not reported BMI 27.1	
	4. CoP Zirconium: HXLPE 28mm Uncemented	24	51.2 years (22.6-63.9) 54.5% female % OA not reported BMI 29.3	
Mutimer et al. 2010 (98) 2001 – 2003 New Zealand	1. MoP Co-Cr: HXLPE 28mm Hybrid	61	62 years (46-75) 36.4% female 100% OA BMI not reported	Revision 2, 6, 12, 24, 36, 48, 60, 72 months
	2. MoP Co-Cr: Conventional PE 28mm Hybrid	61	61 years (48-75) 53.0% female 100% OA BMI not reported	
Nakahara et al. 2010 (99) 2000 – 2001 Japan	1. CoP Zirconia: HXLPE 26mm Uncemented	51 6.8% bilateral	57.5 years (9.5, 27-76) 80.9% female 89.4% OA BMI 23.5 (3.8)	Revision, Merle D'Aubigné score, UCLA activity score 3, 6, 12, 24, 36, 48, 60, 72, 84 months
	2. MoP Co-Cr: HXLPE 26mm Uncemented	51 2.2% bilateral	56.9 years (10.5, 27-75) 87.2% female 87.2% OA BMI 23.5 (4.2)	
Nikolaou et al. 2012 (100) 2003 – 2005 Canada	1. MoP Co-Cr: UHMWPE 28mm Uncemented	36	52.6 years (20-64) 50.0% female 63.9% OA BMI 28.7	Revision, HHS, WOMAC, SF-12 3, 12, 24, 36, 48, 60 months
	2. MoP Co-Cr: HXLPE 28mm Uncemented	32	55.1 years (41-64) 43.8% female 59.4% OA BMI 32.6	
	3. CoC Unspecified ceramic: Unspecified ceramic 28mm Uncemented	34	52.0 years (19-64) 50.0% female 73.5% OA BMI 28.2	

Ochs et al. 2007 (101) 1997 – 1999 Germany	1. CoC Alumina: Unspecified ceramic 28mm Uncemented	35	56.0 years (7.6) 31.8% female 81.8% OA BMI not reported	Revision, HHS, Hannover Function Score 3, 12, 24, 60, 96, 108 months
	2. CoP Alumina: Conventional PE 28mm Uncemented	31	61.5 years (7.0) 33.3% female 80.9% OA BMI not reported	
Pabinger et al. 2003 (102) 1993 – 1995 Austria	1. MoM Co-Cr-Mo: Co-Cr-Mo 30mm Cemented	32 3.2% bilateral	50-70 years 38.7% female 94% OA BMI not reported	Revision 3, 6, 12, 24, 36, 48 months
	2. CoP Unspecified ceramic: UHMWPE (vitamin E) 30mm Cemented	29 3.6% bilateral	56-70 years 42.9% female 97% OA BMI not reported	
Penny et al. 2013* (75-77, 103) 2007 – 2009 Denmark	1. MoP Co-Cr: UHMWPE or HXLPE 28mm Uncemented	15	58 years (48-66) 46.7% female 100% OA BMI 27	Revision, HHS, WOMAC, EQ-5D, UCLA activity score 6, 12, 24 months
	2. MoM Co-Cr: Co-Cr 47-56mm Uncemented	18	63 years (54-64) 47.0% female 100% OA BMI 28	
Pitto et al. 2003 (104, 105) Not stated New Zealand, Germany	1. CoP Alumina: UHMWPE 28mm Uncemented cup and uncemented or cemented stem	27	Age not reported % female not reported % OA not reported BMI not reported	HHS 3, 6, 12, 24 months
	2. CoC Alumina: Alumina 28mm Uncemented cup and uncemented or cemented stem	23	Age not reported % female not reported % OA not reported BMI not reported	
Pitto et al. 2002 (106) Not stated New Zealand	1. CoC Zirconia: Alumina 32mm Hybrid	5	59 years (53-66) 80% female % OA not reported BMI 24.0	Revision, HHS 60 months
	2. CoC Alumina: Alumina 32mm Hybrid	5	57 years (56-67) 80% female % OA not reported BMI 25.1	
Poggie et al. 2007 (107) 1999 – 2003 USA	1. CoC Alumina: Alumina 28mm Uncemented	315 11.7% bilateral	54 years (12) 45% female 77% OA BMI 29 (4.6)	Revision, HHS, SF- 12 12, 24, 72 months
	2. CoP Alumina: UHMWPE 28mm Uncemented	157 6.8% bilateral		
Politi et al. 2013 (108) 2005 – 2010 USA	1. CoC Alumina: Alumina 28mm Uncemented	177	56.4 years (10.6) 49.2% female %OA not reported BMI not reported	HHS 6, 12, 24 months
	2. CoP Alumina: HXLPE 28mm Uncemented	87	57.3 years (10.3) 54.0% female % OA not reported BMI not reported	

Salemyr et al. 2015 (109) 2009 Sweden	1. MoP Co-Cr: UHMWPE (vitamin E) 32mm Uncemented	25 0% bilateral	62 years (6) 56.0% female 100% OA BMI 28 (4)	Revision, HHS, EQ-5D 3, 6, 12, 24 months
	2. MoP Co-Cr: HXLPE 32mm Uncemented	26 0% bilateral	62 years (5) 57.7% female 100% OA BMI 27 (4)	
Schouten et al. 2012 (110) 2009 – 2010 New Zealand	1. CoM Zirconia/ alumina: Co-Cr-Mo 28-36mm Uncemented	42 0% bilateral	61.5 years (42-75) 45% female % OA not reported BMI 29	Revision, WOMAC, OHS, UCLA activity score, VAS pain 6, 12 months
	2. MoM Co-Cr-Mo: Co-Cr-Mo 28-36mm Uncemented	39 0% bilateral	63.8 years (44-76) 36% female % OA not reported BMI 29	
Shareghi et al. 2015 (111) 2008-2010 Sweden	1. MoP Co-Cr: UHMWPE (vitamin E) 32mm Uncemented	38	Median 58 years (32-75) 42.1% female 100% OA BMI 25	Revision, HHS, HPS pain score, UCLA activity score 3, 12, 24 months
	2. MoP Co-Cr: HXLPE 32mm Uncemented	32	Median 58 years (36-67) 53.1% female 100% OA BMI 27	
Smolders et al. 2011 (112-114) 2007 – 2010 The Netherlands	1. Resurfacing Co-Cr: Co-Cr 49mm Hybrid	42 13.2% bilateral	Median 58 years (24-65) 44.7% female 92.1% OA BMI 26.0 (3.1)	Revision, HHS, OHS, SF-12, UCLA activity score, VAS satisfaction 6, 12, 24, 36, 60 months
	2. MoM Co-Cr: Co-Cr 28mm Uncemented	40 12.1% bilateral	Median 59 (37-65) 36.4% female 93.9% OA BMI 28.0 (5.1)	
Tiusanen et al. 2013 (115) Not stated Finland	1. MoP Co-Cr-Mo: Unspecified PE 30mm Uncemented	46	62 years 50.0% female 80.4% OA BMI not reported	HHS, OHS 12, 24 months
	2. MoM Co-Cr-Mo: Co-Cr-Mo 30mm Uncemented	46	60 years 47.8% female 71.7% OA BMI not reported	
Tricot et al. 2007 (116) 2000 – 2001 France	1. CoP Stainless steel: HXLPE 28mm Cemented	49 0% bilateral	67.9 years (44.1-85.2) 48.5% female 100% OA BMI 26.5	Revision, Merle D'Aubigné score 60 months
	2. MoP Stainless steel: UHMWPE 28mm Cemented	53 0% bilateral	70.1 years (44.8-82.6) 41.2% female 100% OA BMI 26.4	
Venditoli et al. 2007 (117-119) 1996 – 2001 Canada	1. CoC Alumina: Alumina 32mm Hybrid	71 19.1% bilateral	54.9 years (12.5, 23-70) 57.7% female 62.0% OA BMI 28.2	Revision, WOMAC, UCLA activity score, Merle D'Aubigné score 24, 84, 108, 132, 157+ months
	2. MoP Stainless steel: UHMWPE 28mm Hybrid	69 36.2% bilateral	56.8 years (10.7, 29-70) 44.9% female 62.3% OA BMI 27.3	
von Schewelov et al. 2005 (120) 1996 – 1998	1. MoP Stainless steel: UHMWPE 22mm	30	64 years (50-76) 54.4% female 100% OA	Revision, HHS 3, 6, 12, 24, 60 months

Sweden	Cemented		BMI not reported	
	2. MoP	30		
	Stainless steel: Hylamer UHMWPE 22 mm			
	Cemented			
	3. CoP	30		
	Zirconia: UHMWPE 22mm			
	Cemented			
	4. CoP	30		
	Zirconia: Hylamer UHMWPE 22mm			
	Cemented			
Weissinger et al. 2011 (121) Not stated Austria	1. MoM	42	Median 58.5 years (34.3-77.9)	HHS, UCLA activity score 24 months
	Co-Cr-Mo: Co-Cr-Mo 28mm Uncemented		66.7% female 88.1% OA BMI 28.1	
	2. CoC	38	Median 64.8 years (44.1-81.8)	
	Alumina: Alumina 28mm Uncemented		64.4% female 89.5% OA BMI 27.4	
Williams et al. 2007* (122-124) 2004 – South Africa	1. CoM	7	47.7 years (17.4-66.7)	None relevant (metal ion levels) 6, 12, 24, 48, 108 months
	Zirconia/ Alumina: Co-Cr-Mo 28mm Uncemented		71.4% female % OA not reported BMI not reported	
	2. MoM	7	47.1 years (31.6-58.9)	
	Co-Cr-Mo: Co-Cr-Mo 28mm Uncemented		85.7% female % OA not reported BMI not reported	
	3. CoP	10	51.3 years (32.0-66.2)	
	Zirconia/ Alumina: HXLPE 28mm Uncemented		60.0% female %OA not reported BMI not reported	
	4. CoC	7	47.8 years (32.5-57.9)	
	Zirconia/ Alumina: Zirconia/ Alumina 28mm Uncemented		42.9% female %OA not reported BMI not reported	
Zagra et al. 2013 (125, 126) 2007 – 2009 Italy	1. CoP	20	64.4 years (53-69)	Revision, HHS, 2, 4 months
	Unspecified ceramic: HXLPE 28mm Uncemented		100% female 100% OA BMI 27.5	
	2. CoP	20	65.9 years (55-71)	
	Unspecified ceramic: HXLPE 36mm Uncemented		100% female 100% OA BMI 27.1	
	3. MoM	20	65.2 years (56-70)	
	Unspecified metal: Unspecified metal 42-48mm Uncemented		100% female 100% OA BMI 26.1	
Zaoui et al. 2015 (127) 2006 France	1. MoP	25	Median 64 years (21-72)	Revision, Merle D'Aubigné score 72 months
	Stainless steel: UHMWPE 22mm Cemented	0% bilateral	59% female 100% OA BMI 26	

	2. CoP Zirconia: UHMWPE 22mm Cemented	25 0% bilateral	Median 60 years (41-75) 54% female 100% OA BMI 25	
	3. MoP Stainless steel: HXLPE 22mm Cemented	25 0% bilateral	Median 65 years (43-75) 56% female 100% OA BMI 27	
	4. Zirconia: HXLPE 22mm Cemented	25 0% bilateral	Median 58 years (41-75) 50% female 100% OA BMI 26	
Zerahn et al. 2011 (128) 2001 – 2003 Denmark	1. CoP Zirconia: UHMWPE Not stated Hybrid	76 0% bilateral	25.1-87.3 years 37.3% female %OA not reported BMI not reported	Revision, OHS 48 months
	2. MoM Co-Cr-Mo: Co-Cr-Mo Not stated Hybrid	74 0% bilateral	34.8-94.2 years 62.0% female %OA not reported BMI not reported	
	3. CoP Zirconia: UHMWPE Not stated Hybrid	73 0% bilateral	54.2-87.1 years 65.0% female %OA not reported BMI not reported	
	4. CoC Alumina: Alumina Not stated Hybrid	76 0% bilateral	50.4-87.2 years 73.0% female %OA not reported BMI not reported	
Zhou et al. 2006 (129) 2001 – 2002 Australia	1. CoC Alumina: Alumina 28mm Hybrid	31 0% bilateral	66 years (46-87) 67.7% female %OA not reported BMI not reported	WOMAC, SF-36 24 months
	2. MoP Co-Cr: HXLPE 28mm Hybrid	30 0% bilateral	68 years (53-83) 46.7% female %OA not reported BMI not reported	
Zijlstra et al. 2009 (130, 131) 1998 – 1999 The Netherlands	1. MoM Co-Cr-Mo: Co-Cr-Mo 28mm Cemented	102 0% bilateral	72 years (7.0) 79.4% female %OA not reported BMI not reported	Revision, HHS OHS 12, 24, 60, 120 months
	2. MoP Co-Cr-Mo: UHMWPE 28mm Cemented	98 0% bilateral	69 years (8.0) 79.6% female %OA not reported BMI not reported	
Zijlstra et al. 2011 (132, 133) 2006 – 2008 The Netherlands	1. MoM Co-Cr: Co-Cr 42-56 Uncemented	50	60 years (5.0) 48.0% female %OA not reported BMI not reported	Revision, HHS, OHS 12 months
	2. MoP Co-Cr: UHMWPE 28mm Uncemented	54	61 years (5.0) 48.0% female %OA not reported BMI not reported	

Studies whose authors provided further data and information about study conduct are marked with an asterisk. Bearing combinations (Femoral head bearing surface on acetabular bearing surface): MoP metal-on-plastic, MoM metal-on-metal, CoC ceramic-on-ceramic, CoP ceramic-on-plastic, CoM ceramic-on-metal; PE polyethylene, UHMWPE ultra-high molecular weight polyethylene, HXLPE highly cross-linked polyethylene, MXLPE moderately cross linked polyethylene, Co-Cr cobalt-chrome, Co-Cr-Mo cobalt-chrome-molybdenum. OA osteoarthritis, BMI body mass index.

OHS Oxford Hip Score, HHS Harris Hip Score, HHPS Harris Hip Pain Score, WOMAC Western Ontario and McMaster Universities Arthritis Index, EQ-5D EuroQol five dimensions questionnaire, PAT-5D Paper Adaptive Test in 5 Domains, SF-36 Short Form 36 items, SF-12 Short Form 12 items, HOOS Hip Disability and Osteoarthritis Outcome Score

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