

## Supplementary article data

# Have cementless and resurfacing components improved the medium-term results of hip replacement for patients under 60 years of age?

## Patient-reported outcome measures, implant survival, and costs in 24,709 patients

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Table 1. Summary of the demographic and surgical variables available for analysis

	Source	Description
<b>Patient factors</b>		
Age (years)	NJR/PROMs	
Sex	NJR/PROMs	
American Society of Anaesthesiology (ASA) grade	NJR	Grades 1 to 4
Body mass index (BMI) (kg/m <sup>2</sup> )	NJR	Only BMI within 15 kg/m <sup>2</sup> to 60 kg/m <sup>2</sup> included
Comorbidities	PROMs	Recorded by patients as part of the preoperative PROMs questionnaire. Nine comorbidities: i) ischaemic heart disease, ii) respiratory disease, iii) diabetes, iv) hypertension, v) kidney disease, vi) liver disease, vii) circulatory problems, viii) cancer, ix) depression
Preoperative general health	PROMs	Indicates the patient's perception of their own general health with 5 options: i) excellent, ii) very good, iii) good, iv) fair, v) poor
Preoperative disability	PROMs	Indicates whether the patient considers themselves to have a disability
Preoperative Oxford hip score (OHS)	PROMs	Derived from adding the points (0 to 4) together from the response to hip symptom-specific questions on a scale of 0 to 48 (0 worst, 48 best)
Preoperative EQ5D Visual Analogue Score	PROMs	Indicates how well the patient feels on the day of completing the questionnaire on a scale of 0–100 (0 worst, 100 best)
Preoperative EQ5D index	PROMs	Single summary score derived from EQ5D profile (based on response to 5 questions) by applying a formula with appropriate operation specific weightings
<b>Surgical factors</b>		
Lead surgeon grade	NJR	Consultant or other
Surgeon volume	NJR	i) Low, ii) medium, iii) high
Approach	NJR	i) Posterior, ii) direct lateral, iii) other
Patient position	NJR	i) Lateral, ii) supine, iii) not recorded
Type of replacement	NJR	i) Best cemented, ii) Other cemented, iii) Best hybrid, iv) Other hybrid, v) Best cementless, vi) Other cementless, vii) Best resurfacing, viii) Other resurfacing
Anaesthesia	NJR	i) Regional only, ii) general only, iii) general and regional
Chemical venous thromboembolism prophylaxis	NJR	Intended prophylaxis as recorded at time of operation: i) aspirin only, ii) LMWH only, iii) other, iv) none, v) not recorded
Mechanical venous thromboembolism prophylaxis	NJR	Intended prophylaxis as recorded at time of operation: i) Compression stockings (CS) only, ii) combination CS/mechanical pump, iii) foot pump only, iv) intermittent calf pump only, v) other, vi) none, vii) not recorded
Time from operation to postoperative PROMs completion	PROMs	Calculated from the date of operation as recorded on the NJR database to the date of postoperative PROMs as recorded on the questionnaire
NJR – National Joint Registry, PROMs – patient-reported outcome measures, LMWH – low molecular weight heparin		

Table 8. Competing-risks survival modeling of hip type using different variable sets

Males	Simple			BMI included <sup>a</sup>			BMI excluded, ASA group and age included		
	HR	(95% CI)	p-value	HR	(95% CI)	p-value	HR	(95% CI)	p-value
Best cemented	1			1			1		
Other cemented	0.78	(0.17–3.46)	0.7	–			0.77	(0.17–3.45)	0.7
Best hybrid	0.48	(0.11–2.16)	0.3	–			0.48	(0.11–2.16)	0.3
Other hybrid	1.40	(0.45–4.35)	0.6	1.16	(0.23–5.74)	0.9	1.34	(0.43–4.17)	0.6
Best cementless	0.62	(0.14–2.79)	0.5	0.31	(0.03–3.45)	0.3	0.62	(0.14–2.78)	0.5
Other cementless	1.51	(0.55–4.18)	0.4	1.00	(0.23–4.25)	1.0	1.46	(0.53–4.05)	0.5
Best resurfacing	1.01	(0.37–2.76)	1.0	0.67	(0.16–2.77)	0.6	1.02	(0.37–2.78)	1.0
Other resurfacing	2.08	(0.72–6.00)	0.2	1.91	(0.41–8.86)	0.4	2.06	(0.71–5.97)	0.3

HR – hazard ratio, CI – confidence interval.  
<sup>a</sup> BMI (body mass index) data available for 4,781 implants (37%)

Table 9. Variables included in the competing-risks survival model

	Females		Males	
	Simple	Multi-variable	Simple	Multi-variable
Age	< 0.001	0.07	0.25	0.24
ASA grade	0.92	0.08	0.11	0.04
Body mass index (BMI)	0.45	-	0.02	(0.08) <sup>a</sup>
Hip type	< 0.001	<0.001	0.12	0.17
Approach	0.18	-	0.05	-
Surgeon grade	0.59	-	0.93	-
Surgeon volume	0.65	-	0.45	-
Anaesthesia type	0.31	-	0.28	-
Mechanical VTE prophylaxis	0.72	-	0.02	-
Chemical VTE prophylaxis	0.65	-	0.75	-

<sup>a</sup> BMI data available for only 4,781 procedures (37%) therefore excluded from the model. Results in appendix Table 3 show similar results for models with and without BMI.

Table 10. Variables included in the change score analysis of covariance models

	Oxford hip score change		EQ5D index change	
	Females	Males	Females	Males
Hip type	0.005	0.8	0.7	0.3
Age	–	–	–	–
Approach	0.02	–	–	–
Preoperative Oxford hip score	< 0.001	< 0.001	–	0.001
ASA group	–	0.002	–	0.005
Preoperative EQ5D index	–	–	< 0.001	< 0.001
Preoperative general health	< 0.001	< 0.001	< 0.001	< 0.001
Preoperative disability	0.001	0.001	0.001	0.001
Circulatory problems	–	0.001	–	< 0.001
History of depression	< 0.001	–	< 0.001	0.02
Body mass index	–	–	–	–
History of heart disease	< 0.001	0.01	0.005	–
Time from op to PROMs completion	–	–	–	–
Goodness of fit of model (adjusted R2)	33%	32%	60%	52%