Appendix 1 - Blood metal ion concentrations

A total of 308 patients with unilateral prostheses gave blood samples for metal ion testing.

Male:female hips	129:179
Median (range) shell size in mm	52 (50 - 66)
Mean (range) age at primary	66 (40 -89)
Mean (range) time to venesection in months	52 (4 - 109)
Median (range) Co in µg/l	1.81(0.33 – 22.1)
Median (range) Cr in µg/l	4.82 (0.36 – 20.3)

All non-parametric data was log normalised. A multiple regression model was constructed in order to examine the effect of cup inclination/anteversion, shell size, duration from primary operation to venesection and stem type on blood Co and Cr concentrations in patients with a unilateral prosthesis.

The results of this analysis are shown below

For Co concentrations:

Source	t	Pr > |t|	Lower bound (95%)	Upper bound (95%)
Intercept	2.583	0.010	1.036	7.676
Log[inclination]	0.413	0.680	-0.546	0.836
Log[anteversion]	-1.758	0.080	-0.273	0.015
log [shell size]	-3.223	0.001	-4.709	-1.138
Log[duration]	3.129	0.002	0.174	0.765
Stem-CORAIL	2.798	0.006	0.046	0.267

Equation of the model: [Log]cobalt = 4.356 + 0.145*log[inclination]-0.128*log[anteversion]-2.923*log[shell size]+0.4696*log [duration]+0.1565*Stem-CORAIL

The resulting r squared value was 0.082 ($p < 0.001$) meaning that the regression model described herein only accounted for approximately 8% of the variation in Co concentrations. Smaller shell sizes, longer duration from primary to venesection, and Corail stems were significantly associated with greater Co concentrations.

For Cr concentrations:

Source	t	Pr > |t|	Lower bound (95%)	Upper bound (95%)
Intercept	3.258	0.001	1.560	6.326
Log[inclination]	2.378	0.018	0.103	1.095
Log[anteversion]	-3.505	0.001	-0.288	-0.081
log [shell size]	-3.351	0.001	-3.463	-0.900
Log[duration]	-1.646	0.101	-0.389	0.035
Stem-CORAIL	0.412	0.681	-0.062	0.096

Equation of the model: Log[chromium] = 3.943+0.5992*log[inclination]-0.1842*[log anteversion]-2.1815*log[shell size]-0.1771*log [duration]+1.6538E-02*Stem-CORAIL

The resulting r squared value was 0.120 ($p < 0.001$) meaning that the regression model described herein accounted for approximately 12% of the variation in Cr concentrations. Smaller shell sizes, higher inclination angles and lower anteversion angles were significantly associated with greater Cr concentrations.