

29 **Introduction**

30 The cementless Oxford Unicompartmental Knee Replacement (OUKR) has been shown in five year
31 case series from both designer and independent surgeons to be a safe and reproducible treatment for
32 patients with symptomatic, end-stage anteromedial osteoarthritis (AMOA) ¹⁻⁷. In these studies the
33 survival and clinical outcome were similar to those achieved by the cemented OUKR. However in
34 two randomised controlled trials the cementless OUKR was found to have advantages over
35 cemented OUKR, including a reduced incidence of radiolucent lines (RL) ^{2,4,5,8} and faster surgical
36 time ^{6,8}. Partial or complete tibial RL were each present in about one third of cemented OUKRs ¹,
37 whilst complete RL were absent and partial RL were rare in the cementless OUKR. Although RL,
38 which are otherwise known as “physiological” radiolucencies, have been shown not to be
39 associated with a poor outcome and not indicative or predictive of loosening ⁹, they can be
40 misinterpreted and may lead to “unnecessary” revisions ¹⁰. Cementation can be challenging through
41 a minimally invasive approach. Excess cement, loose fragments or inadequate cement penetration
42 can cause impingement, unexplained pain, loosening, accelerated wear and early failure ¹¹.

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44 Studies based on National Joint Registry of England and Wales (NJR) data that have matched
45 unicompartmental knee replacement (UKR) and total knee replacement (TKR) have shown that,
46 compared to TKR, UKR provide a faster recovery, fewer complications, better functional outcome
47 and better satisfaction but have a revision rate that is twice as high ¹². The high revision rate of
48 UKR seen in all national registries, but not in most case series, needs to be addressed. There is now
49 some evidence from the NJR and the New Zealand Joint Registry that the revision rate of the
50 cementless OUKR is about half that of the cemented OUKR ¹³. Although this may partly be
51 because more experienced surgeons tend to use the cementless device, RL are likely to be
52 important. The widespread use of the cementless OUKR, with the associated reduction of RL and
53 avoidance of cementation errors, could potentially reduce the failure rate of UKR in registries and
54 therefore address the main problem with UKR. However before the cementless OUKR can be
55 generally recommended long-term results are required. The aim of this study is to report the 10-year
56 survival of a cohort of 1000 consecutive cases implanted by both designer and independent
57 surgeons.

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63 **Materials and Methods**

64 Between June 2004 and December 2011, 1000 consecutive medial cementless OUKRs were
65 performed in two institutions by two designer surgeons (Oxford, UK) and 7 independent surgeons
66 (Christchurch, NZ). Both centres are high volume, with most surgeons using UKR in more than
67 50% of their primary knee replacements. Patients were prospectively identified and independently
68 followed-up.

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70 All the cases fulfilled the recommended indications by Goodfellow et al. ¹⁴. Age, level of activity,
71 BMI, chondrocalcinosis or presence of patello-femoral OA (except for severe lateral OA with bone
72 loss and grooving) were not considered contraindications ¹⁵. Patients who had a friable, fragmented
73 or absent anterior cruciate ligament (ACL) or had undergone previous/simultaneous ACL
74 reconstruction or previous high tibial osteotomy were excluded.

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76 The cementless OUKR components were used, which are similar to the cemented but have a
77 calcium hydroxyapatite coating on surfaces that contact bone, porous titanium within the cement
78 pockets and two femoral pegs (Figure 1). All procedures were performed through a minimally
79 invasive approach ¹¹.

80 The series included the first components of this type implanted and the learning curve of all
81 surgeons with cementless fixation of the OUKR. Consequently the technique changed and
82 improved during the study. For example, initially the keel slot was prepared with a reciprocating
83 saw blade and a pick but subsequently a specially designed keel cut saw blade was introduced.

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85 Early mobilisation within pain limits and full weight-bearing as tolerated were encouraged. All
86 patients were treated with a standard rehabilitation protocol.

87

88 Patients were assessed pre-operatively and at 1, 2, 5, 7 and 10 years after surgery. The clinical
89 outcome was measured using the Oxford knee score (OKS) ¹⁶. Complications or further surgeries
90 were recorded when they occurred or at each follow-up appointment. Patients who were unable to
91 attend follow-up were contacted by post or telephone to obtain the OKS ¹⁷ and relevant clinical
92 information.

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94 Revision was defined as removal, exchange or addition of a component in the knee. Survival was
95 determined with life table analysis. The 95% confidence intervals (CI) were calculated using

96 the method described by Peto ¹⁸. The log-rank test was used to compare the survival between
97 designer and independent surgeons. Student's T-test was used to compare the preoperative and
98 postoperative OKS and the clinical outcome between the two centres.

99

100 **Results**

101 One thousand cementless OUKR were implanted in 865 patients. There were 135 bilateral
102 procedures (270 knees), 79 of which were simultaneous and 56 staged. 478 patients (55%) were
103 men. The mean age at the time of operation was 65.9 years (35-94). 318 cases were done by the 2
104 designer surgeons and 682 by the 7 independent surgeons.

105

106 The primary indication was AMOA in 995 cases and avascular necrosis in 5 cases. Sixty-five
107 patients (6.5%) were lost to follow-up during the study, although 38 of these had a clinical score
108 beyond one year of follow-up. There were no reported revisions for these 65 cases in the respective
109 national registries. Forty-two patients (4%) were deceased for unrelated causes. The mean follow-
110 up of patients that were not deceased, revised or lost was 7.0 years (SD 1.5, range 4.7 – 12.1), with
111 858 cases having a minimum follow-up of 5 years and 124 with minimum follow-up of 10 years.

112

113 *Survival*

114 Considering revisions for any cause, the survival at 10 years was 96.8% (CI 95%: 93.1-100%)
115 (Figure 2). In the tenth year there were 87 patients at risk (Table 1). There was no significant
116 (p=0.49) difference in the 10-year survival between the designer surgeons (97.5%) and the
117 independent surgeons (96.6%).

118

119 With conversion to TKR as the end-point, the 10-year survival was 98.4%. Many consider bearing
120 dislocation treated by insertion of a new bearing to be a reoperation rather than a failure. Excluding
121 these cases, the 10-year survival was 97.6%. With component failure as the end-point, such as
122 loosening, wear and component fracture, only one case required a revision for possible loosening of
123 the tibial component, producing a 99.9% survival at 10 years.

124

125 *Revisions*

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127 Twenty-five cases (2.5%) had revision surgery. Arthritis in the lateral compartment was the most
128 common reason for revision, and revision was done for this reason in 9 knees (0.9%), in 8 patients,
129 at a mean of 4 years after primary surgery. In three of these concomitant degeneration of the

130 patello-femoral joint was noted at operation. Four were converted to TKR and 5 had an additional
131 lateral UKR. Two of these were performed in the same patient, who originally underwent a bilateral
132 procedure. She was subsequently diagnosed with late onset rheumatoid arthritis and developed
133 bilateral lateral compartment arthritis, which was treated with lateral UKR three years after the
134 index procedure.

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136 The second most common reason for revision was bearing dislocation. There were 6 primary
137 bearing dislocations (0.6%). All were successfully treated and had a thicker bearing inserted. Two
138 further patients had a secondary bearing dislocation that occurred as the result of a twisting injury
139 with associated traumatic ACL tear. The first patient, who was 52 year old at the time of the
140 operation, was treated with an ACL reconstruction and insertion of new bearing, and had an
141 uneventful recovery with an OKS of 43 at the last follow-up. The second case occurred in 71 year
142 old patient and was treated with insertion of a new bearing only. His OKS was 48 at the last follow-
143 up.

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145 There were two tibial plateau fractures, both diagnosed post-operatively. Both underwent revision
146 to TKR, one month and two months after the index procedure, respectively.

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148 One revision, done 8 months after the primary was for possible tibial component loosening. The
149 patient had pain and developed a RL underneath the tibial component. In another case, the tibial
150 keel jammed on impaction and the component was left very proud. It did not settle with weight
151 bearing and the RL progressed. It was revised at one year.

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153 In four revisions the underlying pathology was not certain. Two had revisions by other surgeons
154 possibly due to PFJ degeneration. The first case developed symptoms about two years after the
155 index procedure and was treated with a PFJ replacement. However, the patient's pre-revision
156 radiographs showed preserved PFJ joint space. We do not know the outcome of the surgery and the
157 patient died about three years after the revision from unrelated causes. We do not have clinical and
158 radiographic information about the second patient, who underwent revision to TKR about 5 years
159 after the index procedure. Two patients had revision to TKR for persistent pain. The first case
160 underwent surgery two years after the primary operation. At operation no problem was identified so
161 the pain was unexplained. During revision of the second case, which was done at 5 years, the tibial
162 component was found to be overhanging and it was assumed that it was irritating soft tissue.

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164 *Re-operations not requiring revision*

165 There were 4 re-operations that were not revisions. Two patients with superficial infection needed
166 wound washout without component exchange. One patient underwent an arthroscopy for recurrent
167 haemarthroses. One patient required a manipulation under anaesthesia (MUA) for postoperative
168 stiffness.

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170 *Clinical outcome*

171 The mean Oxford Knee Score (OKS) improved from 23.2 (SD 7.9) preoperatively to 41.7 (SD 6.8)
172 at one year of follow-up ($p < 0.001$). The mean OKS was 41.8 (SD 7.1) at 5 years, 42.7 (SD 6.9) at
173 7 years and 41.7 (SD 6.8) at 10 years (Figure 3). The postoperative OKS did not change
174 significantly with time. Overall, 88% of patients were classified as achieving a good (OKS 34 to
175 40) or excellent (OKS ≥ 41) clinical outcome. There was no significant difference in outcome
176 scores between the designer and independent surgeons ($p=0.39$).

177

178 **Discussion**

179 In this two centre prospective series of 1000 cementless OUKR the 10-year survival was 97%. The
180 clinical results were good or excellent in 88% of patients at a mean of 7.0 years of follow-up. This
181 is the first study reporting 10-year survival of this device and it suggests that the good early results
182 reported from multiple centres will be maintained in the long-term. There was no difference in
183 results between the two designer surgeons and the 7 independent surgeon demonstrating that,
184 contrary to perceived wisdom¹⁹, independent surgeons can achieve results with this device as good
185 as those achieved by the designer surgeons.

186

187 After the initial introductory phase (which included randomised studies) cementless fixation was
188 used for all patients meeting the indications for a cemented medial OUKR. We found that no
189 subgroup of patients did badly suggesting that cementless fixation can safely be used in all patients
190 appropriate for medial UKR, without any additional contra-indications. In particular it can be used
191 in all patients independent of patient's age or bone quality, and without the need of any specific
192 preoperative work-up or change in the standard postoperative rehabilitation. We also found that
193 there was no common complication specific to cementless OUKR. Overall the survival and clinical
194 outcome were similar to those previously reported in a similar study from the designer surgeons of
195 1000 cemented OUKR, in which the 10-year survival was 96%³.

196

197 Although there is a theoretical concern about the quality of cementless fixation and potential for
198 loosening, there were no cases of definite tibial or femoral loosening. There were two revisions
199 (0.2%) where there was concern about tibial fixation. Both revisions were early (8 and 12 months)
200 after the index procedure and were within the surgeons' learning curves. In one the tibial
201 component was very proud and did not seat with weight bearing. This occurred because the keel
202 slot was not deep enough so the component was held off the tibial resection. Following the
203 introduction of the keel cut saw this complication has not occurred again and even if the component
204 is left slightly proud at operation it subsequently subsides and integrates. The second case was
205 considered to be tibial loosening and presented with persistent pain and a RL around the tibial
206 component, with minimal subsidence. With the growing experience of cementless fixation we now
207 treat this conservatively as, after initial subsidence, secondary fixation tends to occur with time with
208 consequent resolution of symptoms and a successful clinical outcome ²⁰. Even considering both
209 cases as loosening, the incidence of failures due to tibial component loosening is extremely low and
210 is not significantly different to that previously reported for the cemented OUKR (p=0.6) ⁵.

211

212 Tibial fractures are an uncommon but well-recognized complication of UKR ^{21,22}. They are a
213 particular concern with cementless fixation as a cadaver study has suggested that the risk of tibial
214 plateau fracture may be higher than with cemented fixation ²³. Despite this case series including the
215 first cementless OUKR ever performed, and consequently the learning curve of all the surgeons
216 involved in the study, the incidence of tibial plateau fracture was very low (0.2%). Both cases were
217 diagnosed in the first two postoperative months, and occurred at the beginning of the learning curve
218 of two surgeons. These observations suggest that careful surgery and adherence to the
219 recommended surgical technique can minimise the risk this complication. The keel cut saw should
220 be used and slot enlarged, if necessary, so it easily accommodates the trial component. The
221 component should be carefully impacted with a small hammer and left proud if it does not fully
222 seat. Some technical errors can increase the risk of fracture and must be avoided. These include
223 tibial re-cutting, a medial sagittal cut, a deep tibial resection and the damage to the posterior cortex
224 whilst performing the vertical cut or preparing the keel slot.

225

226 The commonest cause of revision was arthritis in the lateral compartment, which occurred in 9
227 cases. In these cases, at the primary operation there was full thickness cartilage laterally and at
228 revision there was severe arthritis. We can therefore conclude that lateral compartment arthritis had
229 developed and progressed and was the cause of pain. As the state of the patella-femoral joint is
230 ignored at the primary procedure a large proportion of cases had patello-femoral degeneration at the

231 primary procedure so it is not surprising that a third of the cases revised for lateral OA had patella-
232 femoral degeneration seen at revision, and there is no reason to believe that this was the source of
233 their pain. There were two cases revised by other surgeons for possible PFJ problems about which
234 we have very little information. As these may have had PFJ OA at the time of surgery the presence
235 of degeneration does not necessarily mean the OA had progressed. Furthermore in one case, the PFJ
236 joint space was radiographically normal before the revision so a revision for PFJ OA may not have
237 been justified. More importantly even if this case had severe PFJ problems requiring revision it
238 does not suggest that the recommendation, that the state of the PFJ can be ignored when deciding
239 whether to do an OUKR, is wrong, as this patient did not have severe PFJ damage at the primary
240 procedure.

241

242 There were two wound washouts for superficial infection, but there were no failures caused by deep
243 infection. This is a remarkably low incidence of deep infection and is less than that previously
244 reported for the cemented OUKR, in which five cases out of 1000 were revised for infection or
245 suspicion of infection ($p=0.03$). It is not clear why the infection rate is lower but the shorter surgical
246 time may have contributed. Interestingly the absence of antibiotics leached from antibiotic cement
247 has not increased the infection rate.

248

249 The main difference found in the randomised studies comparing cementless and cemented OUKR
250 was in the incidence of RL: about one third of cemented tibias had complete RL whereas the
251 cementless tibias had none. The fact that the 10-year results of the cementless OUKR are similar to
252 the previously published results of the cemented OUKR ¹ confirms that RL seen under cemented
253 tibias are not a source of pain or indicative of loosening and can therefore be ignored ⁹. Despite this
254 we expect many surgeons do think they are source of pain and are indicative of loosening so will do
255 a revision in this situation. It has been hoped that the introduction of cementless components would
256 decrease the revision rate of UKR in Registers. There is now evidence that this is happening: The 5-
257 year survival in the NJR was 97% for the cementless OUKR compared to 93% for the cemented
258 OUKR. The 10-year survival in the 2017 report of the New Zealand Joint Registry NJR was 96%
259 for the cementless OUKR compared to 87% for the cemented OUKR ¹³.

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261 The results of the cementless OUKR compare favourably with the results of TKR. Although the
262 revision rate is similar the revisions are more straightforward with the majority being simple
263 conversions to TKR, lateral UKR or bearing replacement. Complex revisions, as would be expected
264 after failed TKR requiring stems and wedges, were only required after fractures. The functional

265 outcome was better than would be expected after TKR. The number of reoperations, not requiring
266 revision, (0.4%) was much lower than after TKR, with particularly low incidences of MUA (0.1%)
267 and wash out (0.2%). The worse complication of TKR, deep infection, was not seen.

268

269 This study has some limitations. First, a radiographic analysis at 10 years has not been performed.
270 However, a radiographic analysis was undertaken at 5-year in the subset of patients implanted by
271 the designers. This showed no complete radiolucent lines and no specific complications of
272 cementless fixation ². Secondly the study reports the results of two high volume centres so may not
273 be representative of what would happen in other centres. These centres used the recommended
274 indications and techniques and achieved similar results. Therefore it is likely that if other centres
275 use the same indications and techniques they will also achieve similar results ²⁴. The recommended
276 indications for the OUKR are satisfied in about half of the knees needing replacement. They are
277 different from those for fixed bearing UKR, which are satisfied in a much small proportion of knees
278 (Kozinn & Scott). It is therefore important that if surgeons use the OUKR they should use the
279 indications recommended for the OUKR.

280

281 **Conclusions**

282 Cementless fixation is a safe and effective alternative to cementation for all patients who are
283 candidates for medial OUKR, with excellent 10-year survival and mid- to long-term clinical
284 outcome in the hands of both designer and independent surgeons. The widespread use of the
285 cementless OUKR has the potential to decrease the revision rate of UKR in the national registries.
286 Therefore surgeons should consider using the cementless OUKR. If they decide to use it they
287 should also use the recommended indications and techniques and take particular care with tibial
288 preparation.

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290 **References**

- 291 1. Pandit H, Liddle AD, Kendrick BJ, Jenkins C, Price AJ, Gill HS, Dodd CA, Murray DW.
292 Improved fixation in cementless unicompartmental knee replacement: five-year results of a
293 randomized controlled trial. *J Bone Joint Surg Am* 2013;95-15:1365-72.
- 294 2. Pandit HG, Campi S, Hamilton TW, Dada OD, Pollalis S, Jenkins C, Dodd CA, Murray DW.
295 Five-year experience of cementless Oxford unicompartmental knee replacement. *Knee Surg Sports*
296 *Traumatol Arthrosc* 2015.
- 297 3. Pandit H, Jenkins C, Gill HS, Barker K, Dodd CA, Murray DW. Minimally invasive Oxford
298 phase 3 unicompartmental knee replacement: results of 1000 cases. *J Bone Joint Surg Br* 2011;93-
299 2:198-204.
- 300 4. Hooper N, Snell D, Hooper G, Maxwell R, Frampton C. The five-year radiological results of the
301 uncemented Oxford medial compartment knee arthroplasty. *Bone Joint J* 2015;97-B-10:1358-63.
- 302 5. Liddle AD, Pandit H, O'Brien S, Doran E, Penny ID, Hooper GJ, Burn PJ, Dodd CA, Beverland
303 DE, Maxwell AR, Murray DW. Cementless fixation in Oxford unicompartmental knee
304 replacement: a multicentre study of 1000 knees. *Bone Joint J* 2013;95-B-2:181-7.
- 305 6. Akan B, Karagüven D, Guclu B, Yildirim T, Kaya A, Armangil M, Cetin I. Cemented versus
306 Uncemented Oxford Unicompartmental Knee Arthroplasty: Is There a Difference? *Adv Orthop*
307 2013;2013:245915.
- 308 7. Campi S, Pandit HG, Dodd CA, Murray DW. Cementless fixation in medial unicompartmental
309 knee arthroplasty: a systematic review. *Knee Surg Sports Traumatol Arthrosc* 2016.
- 310 8. Pandit H, Jenkins C, Beard DJ, Gallagher J, Price AJ, Dodd CA, Goodfellow JW, Murray DW.
311 Cementless Oxford unicompartmental knee replacement shows reduced radiolucency at one year. *J*
312 *Bone Joint Surg Br* 2009;91-2:185-9.
- 313 9. Gulati A, Chau R, Pandit HG, Gray H, Price AJ, Dodd CA, Murray DW. The incidence of
314 physiological radiolucency following Oxford unicompartmental knee replacement and its
315 relationship to outcome. *J Bone Joint Surg Br* 2009;91-7:896-902.
- 316 10. Goodfellow JW, O'Connor JJ, Murray DW. A critique of revision rate as an outcome measure:
317 re-interpretation of knee joint registry data. *J Bone Joint Surg Br* 2010;92-12:1628-31.
- 318 11. Goodfellow J, O'Connor J, Pandit HG, Dodd CAF, Murray DW. *Unicompartmental*
319 *Arthroplasty with the Oxford Knee, second edition*. Goodfellow Publishers, 2015.
- 320 12. Liddle AD, Judge A, Pandit H, Murray DW. Adverse outcomes after total and
321 unicompartmental knee replacement in 101,330 matched patients: a study of data from the National
322 Joint Registry for England and Wales. *Lancet* 2014;384-9952:1437-45.
- 323 13. NZOA. The New Zealand Joint Registry. In: Report t, ed., 2017.
- 324 14. Goodfellow JOC, J.; Dodd, C.A.; Murray, D.W. *Unicompartmental Arthroplasty with the*
325 *Oxford Knee*. Goodfellow Publishers Limited, 2006.
- 326 15. Pandit H, Jenkins C, Gill HS, Smith G, Price AJ, Dodd CA, Murray DW. Unnecessary
327 contraindications for mobile-bearing unicompartmental knee replacement. *J Bone Joint Surg Br*
328 2011;93-5:622-8.
- 329 16. Murray DW, Fitzpatrick R, Rogers K, Pandit H, Beard DJ, Carr AJ, Dawson J. The use of the
330 Oxford hip and knee scores. *J Bone Joint Surg Br* 2007;89-8:1010-4.
- 331 17. Abdel Messih M, Naylor JM, Descallar J, Manickam A, Mittal R, Harris IA. Mail versus
332 telephone administration of the Oxford Knee and Hip Scores. *J Arthroplasty* 2014;29-3:491-4.
- 333 18. Peto R, Pike MC, Armitage P, Breslow NE, Cox DR, Howard SV, Mantel N, McPherson K,
334 Peto J, Smith PG. Design and analysis of randomized clinical trials requiring prolonged observation
335 of each patient. II. analysis and examples. *Br J Cancer* 1977;35-1:1-39.
- 336 19. Labek G, Sekyra K, Pawelka W, Janda W, Stockl B. Outcome and reproducibility of data
337 concerning the Oxford unicompartmental knee arthroplasty: a structured literature review including
338 arthroplasty registry data. *Acta Orthop* 2011;82-2:131-5.

- 339 20. Liddle AD, Pandit HG, Jenkins C, Lobenhoffer P, Jackson WF, Dodd CA, Murray DW. Valgus
340 subsidence of the tibial component in cementless Oxford unicompartmental knee replacement. *Bone*
341 *Joint J* 2014;96-B-3:345-9.
- 342 21. Rudol G, Jackson MP, James SE. Medial tibial plateau fracture complicating unicompartmental
343 knee arthroplasty. *J Arthroplasty* 2007;22-1:148-50.
- 344 22. Van Loon P, de Munnynck B, Bellemans J. Periprosthetic fracture of the tibial plateau after
345 unicompartmental knee arthroplasty. *Acta Orthop Belg* 2006;72-3:369-74.
- 346 23. Seeger JB, Haas D, Jager S, Rohner E, Tohtz S, Clarius M. Extended sagittal saw cut
347 significantly reduces fracture load in cementless unicompartmental knee arthroplasty compared to
348 cemented tibia plateaus: an experimental cadaver study. *Knee Surg Sports Traumatol Arthrosc*
349 2012;20-6:1087-91.
- 350 24. Murray DW MB, Kontochristos L, Dodd CAF, Pandit HG. The Oxford unicompartmental knee
351 replacement: long term results. *Chin J Joint Surg* 2013;7:540-4.
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355 **Figures legend**

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357 Figure 1: The cementless OUKR

358 Figure 2: Survival curve (95% confidence intervals)

359 Figure 3. Clinical outcome (Oxford Knee Score), 95% confidence intervals

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362 **Tables**

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364 **Table 1.** Life table with the point of failure defined as the exchange or addition of a new component in the
365 knee component

<i>Follow-up (yrs)</i>	<i>Number at start</i>	<i>Revised</i>	<i>Withdrawn</i>	<i>Lost to FU</i>	<i>Dead</i>	<i>At Risk</i>	<i>Annual Failure</i>	<i>Survival</i>	<i>95% CI</i>	<i>95% CI</i>
0 to 1	1000	5	21	18	3	990	0.005	99.5	99.1	99.9
1 to 2	974	7	14	11	3	967	0.007	98.8	98.1	99.5
2 to 3	953	3	22	12	10	942	0.003	98.5	97.7	99.2
3 to 4	928	3	10	2	8	923	0.003	98.1	97.3	99.0
4 to 5	915	4	49	6	10	891	0.004	97.7	96.7	98.7
5 to 6	862	1	242	10	6	741	0.001	97.6	96.5	98.7
6 to 7	619	1	242	3	1	498	0.002	97.4	96.0	98.8
7 to 8	376	0	175	2	0	289	0.000	97.4	95.5	99.2
8 to 9	201	1	76	1	0	163	0.006	96.8	94.1	99.4
9 to 10	124	0	74	0	1	87	0.000	96.8	93.1	100.4
10 to 11	50	0	40	0	0	30	0.000	96.8	90.6	103.0
11 to 12	10	0	9	0	0	6	0.000	96.8	82.2	111.3

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