The Johnson-Elloy (Accord) total knee replacement
POOR RESULTS AT 8 TO 12 YEARS
From the Princess Elizabeth Orthopaedic Centre, Exeter, England

We have found poor mid-term results in a multisurgeon series of 94 Johnson-Elloy (Accord) total knee replacements. A total of 27 knees (29%) has required revision, in 26 for aseptic loosening. Only 18 (19%) remain in situ, and these give poor function, are painful and most show radiological evidence of early failure. At 12 to 13 years the survival rate is 43% (confidence interval 29 to 57) with failure requiring revision as the endpoint. Proximal migration of the femoral component is associated with considerable loss of bone stock. We believe that all patients who have this implant should be recalled for regular review in order to anticipate this problem.

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The Accord knee (Thackeray, UK) is a posterior-cruciate-ligament-sacrificing, meniscal-bearing total knee replacement (TKR) (Fig. 1). The femoral component has a constant curve in the sagittal plane, but is flat in the coronal plane (Fig. 2). The tibial tray has a polished conical superior surface which may be fitted with one of two optional central pegs (Fig. 3), and which articulates with the polyethylene meniscus. Without the peg in situ, the meniscal insert is constrained with reference to the tibia by soft tissues only, but has a central flattened peg to limit medial and lateral translation with reference to the femoral component. With the smaller of the optional tibial pegs, the meniscal insert is constrained to limit subluxation but with the larger peg it can only rotate.

The Accord TKR was first used in 1982 and early results were encouraging. Johnson et al.\textsuperscript{1} reported a survivorship of 97.7% at 80 months and Harvey et al.,\textsuperscript{2} reporting a series of 122 TKRs, described excellent tibial alignment and a low incidence of radioluencies. Results in the longer term,\textsuperscript{3,4} however, have suggested a poor outcome. We therefore describe our experience with this implant at eight to 12 years.

Patients and Methods
Between September 1986 and July 1991, we implanted 94 Accord TKRs in 86 patients (8 bilateral). This was a
prospective multisurgeon series (five surgeons) with most operations being done by consultants. All patients gave informed consent. The femoral and tibial implants were both cemented in all knees and the meniscus was always restrained with either a small or large peg on the tibial tray. The patella was usually resurfaced. The indications for operation were advanced degenerative disease with severe pain on weight-bearing and limitation of daily activities. In 89 knees (95%) the diagnosis was primary osteoarthritis while in the remainder it was rheumatoid disease.

At a minimum of eight years after surgery 41 patients (47 knees) had died, two (two knees) had been lost to follow-up and two (two knees) were not available for review because of poor health although their knees were known to be functioning satisfactorily from interviews with relatives. This left 41 patients (43 knees) available for follow-up.

We used the Knee Society Clinical Rating System\(^5\) and the Oxford knee score\(^6\) to evaluate the results and failure was defined as a knee which required revision.

We used the life-table method\(^7\) for survivorship analysis with revision as the endpoint. The 95% confidence limits were calculated by the method of Peto et al.\(^8\)

**Results**

Of the 94 TKRs, 26 have either undergone or await revision. One patient died with a failed implant in situ. Therefore, 27 implants (29%) had failed. Of the 19 TKRs which

### Table 1. Survivorship life table of 94 Johnson-Elloy (Accord) total knee replacements using revision surgery as the definition of failure

<table>
<thead>
<tr>
<th>Years from operation</th>
<th>Number of failures</th>
<th>Number of knees withdrawn (dead)</th>
<th>Number lost to follow-up</th>
<th>Number at risk</th>
<th>Annual failure rate (%)</th>
<th>Annual success rate (%)</th>
<th>Survival rate (%)</th>
<th>Standard error</th>
<th>95% confidence interval</th>
<th>95% (Peto) confidence limit</th>
<th>95% (Rothman) confidence limit</th>
<th>Error bars</th>
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![Fig. 3](https://via.placeholder.com/150)

Photograph showing the Accord tibial components and meniscal polyethylene with large tibial peg on the left and small peg on the right.

![Fig. 4](https://via.placeholder.com/150)

Survival curve for the Accord total knee replacement with revision as the endpoint. The Peto 95% confidence limits are shown with error bars.
have been revised there was aseptic loosening in 17; one, with deep infection, was converted to an arthrodesis and one underwent revision of the patellar component only for loosening. The 16 knees available for review had a mean Knee Society score of 62.8 points (SD 26.4) and a mean Knee Society function score of 41.1 (SD 34.5). The best score available for each is 100. They had a mean Oxford knee score of 32.6/60 (SD 12.8). The best score available is 12/60. As shown in Table I and Figure 4, survival analysis indicates exceptionally poor survival of the TKR from seven years onwards. A survival of only 43% is found at 12 to 13 years using the life-table method.

Discussion

The initial results of the Accord TKR at five to eight years were encouraging, after some early failures from meniscal instability. The long-term results are, however, very poor when compared with those of other knee implants. A tribological study of 27 retrieved Accord knees showed little damage to the articulating surfaces with low rates of wear and penetration. By contrast, as shown in Figure 5, the explants retrieved from our patients showed severe delamination of the ultra-high-molecular-weight polyethylene. As far as we are aware, there was no sig-

Fig. 5

Photograph showing polyethylene delamination on a meniscal insert retrieved from failed Accord knees.

Fig. 6a

Radiographs showing a) the anteroposterior and b) the lateral views with massive femoral bone loss, tibial osteolysis and instability with subluxation.

Fig. 6b
significant difference in the design or material between the implants in previous studies and those used by us. It is difficult to establish whether delamination of the polyethylene is the primary failure which induces osteolysis and proximal migration of the femoral implant, or whether debris generated by this migration causes third-body wear and delamination of the polyethylene.

The predominant finding at revision is proximal migration of the femoral component (Fig. 6) with massive bone loss. The knee is unstable because of this bone loss and further associated ligamentous damage. The bone deficit on the femoral side makes revision technically difficult. Osteolysis is also common on the tibial side, but the defects are usually contained and allow for impaction bone grafting.

We understand that more than 1000 Accord TKRs were sold in the UK and that most patients with this implant have not undergone regular clinical and radiological review. In view of the poor results in our series, we recommend that all patients with this implant should be traced and reviewed, and revision offered early to avoid technical difficulties. We strongly support the view that regular clinical review be recommended for all patients who have had joint replacement and that registries be established so that problems of this nature can be detected as soon as possible.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References


