10

Clinical Results

The results of UKA can be gathered from three main sources: the reports of the national registers, observational studies (both comparative and case series), and randomised controlled trials. In this chapter, we attempt an overview of the clinical results of UKA in general and OUKA in particular. It is important to note that the 'result' is of the whole arthroplasty which includes the indications, the technique as well as the implant.

National registers

In Joint Registries, longitudinal data is collected from large numbers of participating institutions before being assembled centrally. In most cases, a report is issued annually and raw data are released on request for research studies. The principal aim of joint registries is to facilitate the identification of poorly-performing implants at the earliest possible stage, allowing modification or abandonment of such implants before large numbers are implanted. Registers collect data when a joint replacement implant is inserted, ideally from the surgeons. Although there is some variation between registers, a revision operation is usually considered to have occurred the second time an implant is inserted in a particular joint. Using this information, cumulative revision rates (CRR) can be calculated. They are our best source of information on the epidemiology and demography of arthroplasty.

The first national joint registry was established in Sweden in 1975. Since then, national joint registers have been established in Finland (1980), Norway (1987), Denmark (1995), Australia, and New Zealand (both 1998), amongst others. The National Joint Registry for England and Wales (NJR) was established in 2003 and is currently the largest database of joint replacements in the world.

The principal advantage of national joint registers is the large number of cases they report. In some cases, participation is near-universal (and in some cases is obligatory) which minimises the problems of reporting and publication bias. The fact that national joint registers study the population as a whole allows great diversity within cases studied in terms of implant type, surgical technique and experience, patient selection and postoperative regimen. The large overall number of cases allows the study of these subgroups with acceptable power. National registers have additional benefits in allowing surgeons to compare their results with their peers', and allowing easy identification of implants in need of recall.

However, national registers remain imperfect tools to measure outcome. The large number of cases reported, and the reliance on operating units to report their cases, limits the quantity of data that can be gathered on each patient. In all national registers, the primary measure of outcome is the rate of revision surgery; whilst this has the benefit of being objective and easy to measure, it has several deficiencies. When a revision occurs, the implant is considered to have failed. If it has not been revised, it is considered to have survived and be a success even if it is painful and has poor function. Implant survival is a solid end-point and has been described as the point at which both the surgeon and the patient agree that revision is preferable to continuing with the prosthesis *in situ*. As a result of the way data is collected by the registers, revision is considered to occur if a new implant is inserted. The commonest revision is therefore removal of a joint replacement and replacement with a new one. The addition of an extra component, such as secondary resurfacing (after TKA), the addition of a lateral or patellofemoral replacement (to a medial UKA with osteoarthritis progression) or exchange of a bearing (for a dislocation or a washout) are therefore also considered to be a revision whereas replacement of the original bearing after a dislocation is not. Using the same definition, an amputation, a knee fusion or death resulting from surgery would not be considered a "revision" and so that the knee arthroplasty would be considered a success.

It is therefore important to consider a whole series of different end points other than just revision to assess success or failure of a joint replacement. These could include all adverse events such as reoperations, complications, mortality and morbidity and patients with poor outcome scores and/or dissatisfaction.

Comparison of UKA and TKA

All national registers have found that the revision rate of UKA is about three times that of TKA. As a result, it is generally concluded that UKA have more poor results than TKA and therefore that UKA should not be used. This conclusion is probably not justified. There are many reasons why the revision rate of UKA is higher than that of TKA. Perhaps the most important is that the threshold for revision of UKA is much lower than that of TKA and therefore the higher revision rate does not necessarily suggest that UKA have worse outcomes than TKA.

Figure 10.1 shows a graph based on presented data from the Trent Regional Arthroplasty Register comparing the long term outcome of seven different total knee arthroplasties [1]. As would be expected, most of the knee replacements have a survival of 90 to 95% at 15 years. However, there is a single implant with a survival rate of 100% at 15 years. This implant appears to be so much better than the other knee replacements that all surgeons should use it. However, this implant, the Sheehan knee (Fig. 10.2), is a hinged knee replacement with long stems which is no longer available because of its poor performance. Due to the size of the implant and the damage it caused when it failed, revisions were very difficult. Therefore, surgeons would try to avoid revising it even if it was loose and was causing the

patient significant symptoms.

This suggests that for different types of implant there are different thresholds for revision and that these thresholds have a profound effect on the revision rate of the implant. This effect can be so large that comparison of revision rates between implants may lead to misleading conclusions.

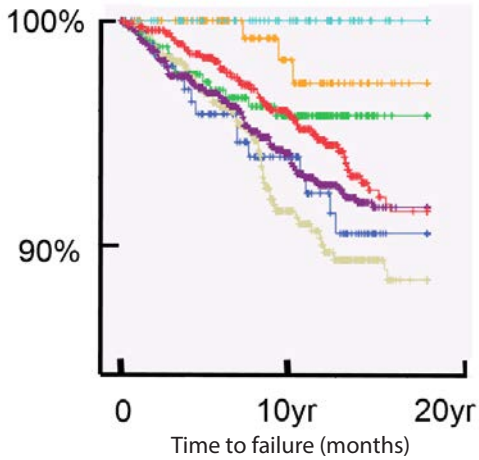

Figure 10.1 Graph showing survival data of seven TKAs from the Trent Regional Arthroplasty Register [1].

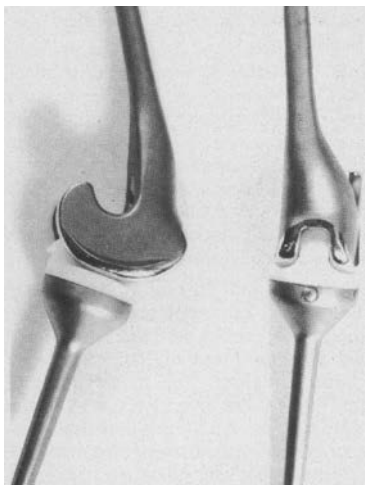

Figure 10.2 Sheehan Total Knee Replacement (G F McCoy, N W McLeod and J R Nixon, Experience with the Sheehan knee replacement. *Ulster Med J* **1983**; 52(1): 35-39).

There is evidence to suggest that the threshold for revision influences the comparison between UKA and TKA. The New Zealand Joint Registry (NZJR), as well as collecting data about revision, also collects Oxford Knee Scores (OKS) six months after the operation. The OKS is subcategorised into poor, fair, good and excellent [2,3] (Fig. 10.3). Data from the NZJR demonstrates that UKA not only have more excellent results but also fewer poor results than TKA. Therefore, the high revision rate of UKA is not because UKA have more poor results.

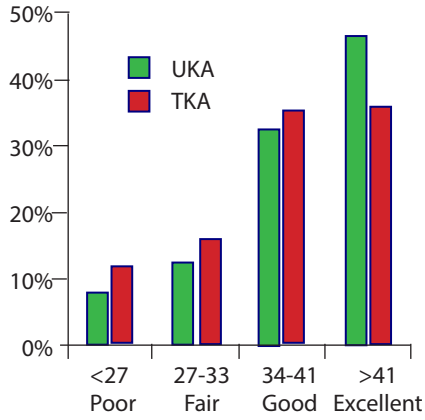

Figure 10.3 Proportion of UKR and TKR achieving four classes of OKS outcome.

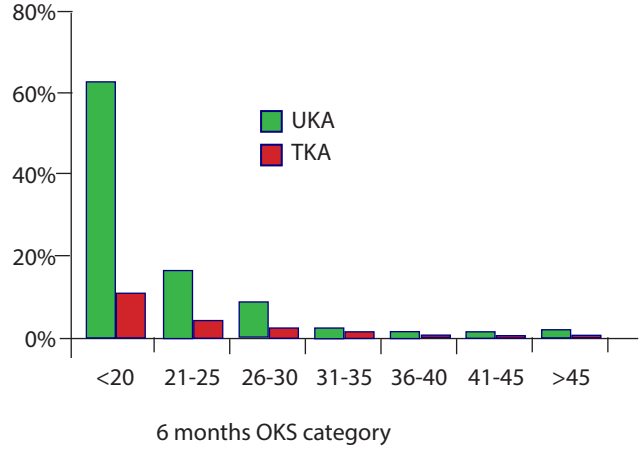

Figure 10.4 Two year revision rates for UKA and TKA having different PROMS results at six months post-surgery [3].

The NZJR also compares the six month OKS with the subsequent revision rate [4]. We have used data derived from the NZJR to draw the graph shown in Figure 10.4 [3]. The graph demonstrates that, for each outcome score, the revision rate of UKA is about five times higher than that of TKA. This suggests that factors independent of outcome score increase the revision rate by five times. The most important factor is likely to be a different threshold for revision.

The most striking difference in revision rate occurs in patients who are likely to have a worse score postoperatively than preoperatively (OKS less than 20). These patients have a 10% chance of being revised if they have had a TKA and a 60% chance of being revised if they have had a UKA. This is not surprising because the revision of a UKA is usually a simple conversion to a primary TKA and the outcome of this is generally expected to be good. In contrast, a revision of a TKA is often complex, requiring the use of stems, wedges and stabilised implants and the outcome of this type of revision is known to be unpredictable. We therefore