ABSTRACT

**Purpose.** To present midterm results of Duracon total knee arthroplasty (TKA) performed between 1991 and 2001.

**Methods.** One man and 43 women (65 knees) aged 46 to 84 (mean, 63) years who underwent primary TKAs using the Duracon prosthesis performed by a single surgeon were followed up for a mean of 8.5 (range, 5–11) years. All TKAs were cruciate-retaining and cemented, with only 9 of the patellae resurfaced. The diagnosis was osteoarthritis in 42 patients (61 knees), and rheumatoid arthritis in 2 patients (4 knees). Patients were assessed using the Knee Society Clinical Rating System, the Oxford Knee Score, and the Knee Society Total Knee Arthroplasty Roentgenographic Evaluation and Scoring System.

**Results.** The mean Knee Society knee score was 86 (range, 43–100) and the function score was 68 (0–100). 94% of patients reported no or only mild pain. The mean Oxford Knee Score was 19. There was no patellofemoral complication, deep vein thrombosis or pulmonary embolism. Complications included a superficial infection and an uncontrolled deep infection. One patient had the insert exchanged for wear at the 11-year follow-up, and another had the polyethylene insert and tibial tray revised after a motorcycle accident.

**Conclusion.** The Duracon TKA had good midterm clinical results with absence of patellofemoral complications.

**Key words:** arthroplasty, replacement, knee; knee prosthesis; prosthesis design

INTRODUCTION

The Swedish Knee Arthroplasty Register has longer follow-up of cases than do other national registers. From 1988 to 1997, the Duracon knee system for total knee arthroplasties (TKAs) had the lowest cumulative revision rate (1.05; confidence interval [CI], 0.72–1.52), with very favourable confidence limits. From 1994 to 2003, its cumulative revision rate was 0.90 (CI, 0.72–1.12). Such consistently low revision rates may be attributable to the design of the implant.

The Duracon knee is a modular tricompartmental device with patellofemoral articulation–friendly features. We aimed to determine whether it is...
applicable to Malaysians, as there are differences in morphometry between Sino-Asian and Caucasian populations.

MATERIALS AND METHODS

From October 1991 to March 2001, 71 patients (96 knees) underwent primary TKAs using the Duracon prosthesis (Howmedica, Rutherford [NJ], USA). All were performed by a single surgeon using a mid-line skin incision and medial parapatellar approach. All TKAs were cruciate-retaining and cemented, with only 9 of the patellae resurfaced using cemented all-polyethylene patellar components. Patients were followed up using the Knee Society Clinical Rating System, the Oxford Knee Score, and the Knee Society Total Knee Arthroplasty Roentgenographic Evaluation and Scoring System.

The Knee Society Clinical Rating System comprises 2 separate knee and function scores (maximum being 100 for each). The knee score assesses pain (50), range of movement (25), and stability in both sagittal and coronal planes (25). Deductions are made for flexion contracture, extension lag, and varus alignment. The function score assesses walking (50) and stair climbing (50). Deductions are made for the use of walking aids. Scores of 80 to 100 are rated as excellent, 70 to 79 good, 60 to 69 fair, and <60 poor. The Oxford Knee Questionnaire consists of 12 patient-based questions, each with 5 responses rated from 1 to 5, with 12 points being the best. The Knee Society Total Knee Arthroplasty Roentgenographic Evaluation and Scoring System assesses component position, knee alignment, and cement fixation, using standing anteroposterior and lateral radiographs. Loosening was defined as a radiolucent line of >2 mm around the entire circumference of the prosthesis, subsidence of the component, or a change in alignment.

Patients with patellar resurfacing were compared with those without. Their pain score and ambulatory status were compared using the Chi squared test or Fisher’s exact test, whereas the range of movement and functional scores were compared using Student’s 2-tailed t-test. No statistical significance was deducted as the number of patella resurfaced was small.

RESULTS

14 patients (16 knees) were lost to follow-up. 13 patients (15 knees) died of unrelated causes. The remaining 43 women and one man (65 knees) aged 46 to 84 (mean, 63) years were followed up for 5 to 11 (mean, 8.5) years, including all 5 patients (9 knees) with patellar resurfacing. All patients with TKAs surviving longer than 5 years required no revision. The estimated best-case implant survival rate at 5 years was 97%.

The diagnosis was osteoarthritis in 42 patients (61 knees), and rheumatoid arthritis in 2 patients (4 knees), with 59%, 23%, and 18% being Halley-Charnley categories A (unilateral or bilateral TKA), B (one knee symptomatic but not replaced), and C (multiple arthritis or medical infirmity), respectively.

The mean Knee Society knee score was 86 (standard deviation [SD], 12; range, 43–100) and mean function score was 68 (SD, 24; range, 0–100). 94% of patients reported no or only mild pain. The mean range of movement was 102º (SD, 13.4º; range, 70º–125º). 10 patients had unlimited walking ability and 14 could walk more than 1000 meters. 28 patients could ascend and descend stairs normally. 37 patients did not need aid in ambulation, whereas 6 required a cane and only one required a walker. The mean Oxford Knee Score was 19 (SD, 5; range, 12–39).

The mean tibiofemoral angle was 6º valgus (SD, 3º; range, 3º–11º valgus). None of the surviving knees had radiographic evidence of loosening, subsidence of component, or change in alignment. The degree and distribution of the radiolucency was deemed unremarkable.

There was no case of deep vein thrombosis or pulmonary embolism. Two patients with rheumatoid arthritis developed infection. One had superficial infection within 2 weeks, which resolved with antibiotics and dressing. Another had a deep infection 4 years after implantation, for which transfemoral amputation was carried out, after repeated debridement, implant removal, and antibiotic spacer insertion had failed. One patient had the polyethylene insert exchanged (at 11 years) with good soft-tissue tension, because of wear of the posterior rim of the medial plateau. There was no implant malposition or third body suggestive of early polyethylene wear. The wear pattern was related to the patient’s habit of squatting. One patient fell from a motorcycle at 58 months and sustained an anterior knee subluxation. The polyethylene insert and tibial tray were fractured posteriorly, for which revision was carried out (Fig. 1). At the final follow-up, she had a satisfactory Knee Society knee score of 86, function score of 70, and Oxford Knee Score of 21.

DISCUSSION

The femoral component of the Duracon knee system...
has an anatomically higher proximal-lateral flange in contact with patella when the knee is fully extended and the quadriceps tightened (Fig. 2). This proximal-lateral flange guides the patella into the trochlear groove when the knee flexes. The trochlear groove was deep enough to accommodate the non-resurfaced or resurfaced patella, and the concave shape of its medial and lateral margins provides congruent contact between the patellofemoral surfaces, even during extreme flexion (>110°). The all-polyethylene patellar component is oblong in shape, mimicking natural patellar morphology. It is available in 3 sizes to cope with natural patellar widths (Fig. 3).

To resurface the patella or not is a moot point in TKAs. Patellofemoral complications constituted up to 50% of all TKA complications and selective patellar resurfacing has been advocated, but others have recommended routine patellar resurfacing. More revision operations were reported in cemented bicompartmental than tricompartmental TKAs, but the difference was not significant at the 5-year follow-
The rate of revision for infections was 2.5 times higher in tricompartmental than bicompartamental TKAs. The higher risk of infection in TKAs with patellar resurfacing and of aseptic loosening of the patellar component must be weighed against the possible increase in the risk of revision due to anterior knee pain in TKAs without patellar resurfacing. Analysis of 29,946 TKAs without patellar button from 1993 to 2002 in the Swedish Knee Arthroplasty Register revealed that the Duracon and NexGen knee prostheses had significantly lower risk ratios. In 121 Duracon TKAs with patellar resurfacing, no patellofemoral complication was reported at the minimum 5-year follow-up.

There are differences in morphometry of the knee between Sino-Asian and Caucasian populations. The increased varus alignment and severe medial tibial torsion in Sino-Asian arthritic knees potentially result in higher posteromedial stresses and abnormal patellar tracking. Therefore, medial torsion of the tibia should be taken into account in TKAs to ensure proper patellar tracking. In our study, the implantation techniques were not modified for Sino-Asian patients, despite being recommended by the manufacturer. Nonetheless, no patient complained of any patellofemoral symptoms. There was no significant difference in anterior knee pain or postoperative range of flexion between the groups with or without patellar resurfacing, possibly because the number of knees with patellar resurfacing was small. The decision on patellar resurfacing should be supported by clinical results of prostheses with patellofemoral specific designs in all specific ethnicities.

As this was a retrospective review, preoperative knee and functional data were not retrieved. So it was not feasible to compare the extent of improvement following surgery. 14 (20%) of the patients were lost to follow-up and this could have a bearing on the final outcome. Objective assessment of patellofemoral articulation was lacking although kinematics after TKA differ substantially from natural kinematics.

CONCLUSION

The absence of aseptic loosening at a minimum 5 years of follow-up compares favourably with other studies of modern TKAs. The absence of patellofemoral complications in our series may be attributed to the patellofemoral articulation–friendly design that enables physiological patellar tracking.

REFERENCES