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TOTAL HIP ARTHROPLASTY USING THE McKEE & WATSON-FARRAR PROSTHESIS

A Prospective Follow-up Study of 327 Arthroplasties

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In a prospective study of 327 total hip arthroplasties using the McKee-Farrar prosthesis the patients were followed up each year for up to 8 years after the operation. The immediate results concerning pain and to some extent walking capacity and mobility were good in up to 90 per cent of cases. The excellence of the results declines with time, and after 7 years "good" results were noted in about 50 per cent. The infection rate without prophylactic antibiotics was 3.4 per cent and the rate of aseptic loosening 16 per cent. In elderly patients total arthroplasty is the operation of choice, but in younger patients one should be more restrictive.

Key words: total hip arthroplasty, early complications, late complications

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During the period 1969–1972, 327 hip arthroplasties were performed at the Orthopaedic Hospital, Härnösand, Sweden. McKee-Farrar prostheses were used in all cases. The purpose of this paper is to present the results up to 8 years after operation.

PATIENTS AND METHODS

From 1969 to 1972, 299 patients were given McKee-Farrar total hip prostheses. In 28 patients operations were done bilaterally – in 5 patients at the same session owing to extreme bilateral flexion contractures. Sixty years was the lower age limit for the operation, but some younger incapacitated patients with rheumatoid arthritis and one with bilateral congenital dislocation aged 36 were nevertheless included (Table 1). The indications for surgery are shown in Table 2. In 275 hips arthroplasty was the primary procedure, but it was secondary to other forms of operation in 52 hips.

Surgical technique

Moore's southern approach (Moore 1959) was preferred to the original technique of McKee & Watson-Far-

Table 1. Age distribution at operation

Age	36–49	50–59	60–69	70–79	80–92
No.	7	31	170	112	7

Mean age: 67 years

Table 2. Indications for McKee-Farrar arthroplasty

	No.
Primary osteoarthritis	223
Rheumatoid arthritis	14
Acetabular fracture	3
Necrosis capitis femoris	29
Congenital dislocation	6
Previous Moore arthroplasty	11
Previous Smith-Petersen arthroplasty	11
Previous Ring total arthroplasty	2
Previous McKee-Farrar arthroplasty	28
Total	327

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Table 3. Postoperative complications

		No.	Per cent
Mortality (within 4 weeks)		8	2.5
Cardiac insufficiency	2		
Cerebral insult	1		
Pulmonary embolism	5		
Without late disability		58	18
Femoral fracture	2		
Dislocation (within 1 day)	8		
Thromboembolism	20		
Peroneal palsy	2		
Ischialgia	2		
Superficial wound infection	24		
With late disability		51	16
Deep infection, early	4		
Deep infection, late	7		
Aseptic loosening	38		
Fracture of prosthesis	1		
Peroneal palsy	1		

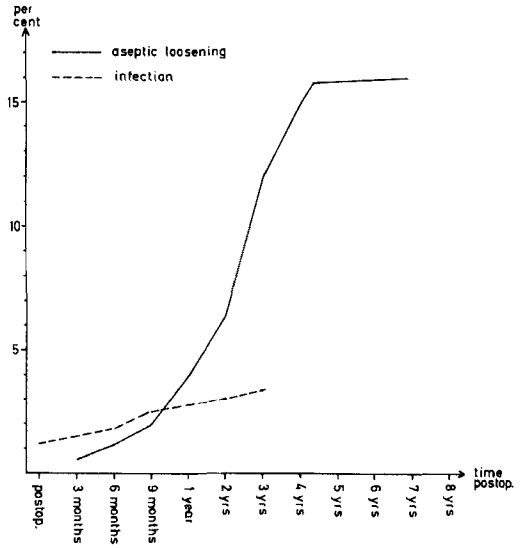

Figure 1. Cumulative percentage of deep infection and aseptic loosenings.

rar (1966), and no screws were put in the acetabulum. The patients were mobilized the day after operation, and weight-bearing was freely allowed.

Prophylactic antibiotics were not routinely used, but were given to 27 patients when the operation had taken longer than 2 hours or when the blood loss exceeded 2000 ml.

In the first 80 operations no thrombosis prophylaxis was given. Because of the high mortality from pulmonary embolism (Table 3) administration of high-molecular dextran was started.

To evaluate the results the patients were questioned and examined before, 3 and 6 months after operation, and then each year until 1977. The results are classified according to the rating system described by Merle d'Aubigné & Postel (1954) and modified by Charnley (1969, 1972).

RESULTS

Postoperative complications are shown in Table 3. The postoperative mortality includes all those who died within 4 weeks of operation. Five died from pulmonary embolism; all were among the first 80 operations, when no antithrombosis prophylaxis was given. After introducing prophylaxis one pulmonary embolus occurred but the patient survived. Other complications are subdivided into those producing and those not producing late sequelae (Table 3). The dislocations mostly occurred during recovery from anaesthesia and were treated by closed reduction without further complication. Deep infection appeared a few days after operation in 4 hips and later in 7 (Figure 1). None of the deep infections healed despite antibiotics. In 8 infections total removal of the prosthesis (Girdlestone) has been done (Table 4). In this study the total incidence of loosening up to 8 years after operation is 16 per cent or 53 hips (Figure 1). Fourteen loosenings occurred after some form of trauma, e.g. a fall.

The results concerning pain, walking capacity and mobility according to Charnley's grading 1 year after operation are compared with the preoperative status in Figure 2. The 1-year and 7-year results are compared in Figure 3. The

Table 4. Procedures after failure

	No.
Reinsertion of new McKee-Farrar prosthesis	28
Removal (Girdlestone)	14
Removal acetabular part	1
Arthrodesis	1
Total	44

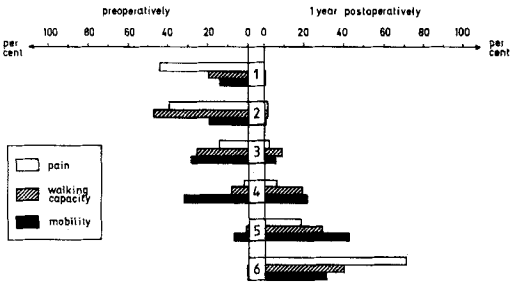

Figure 2. Findings before and 1 year after operation.

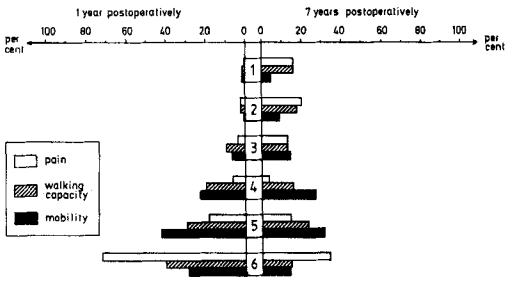

Figure 3. Findings 1 and 7 years after operation.

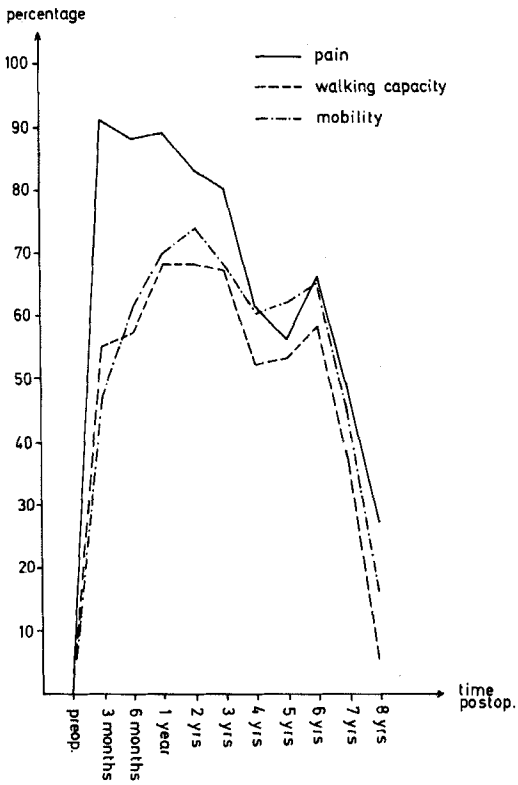

Figure 4. Changes in "good" results (Charnley's grades 5+6) year by year.

Charnley grades 5 and 6 are combined and assessed as "good", and are illustrated in Figure 4.

DISCUSSION

Orthopaedic surgery in the 1970s was dominated by total arthroplasties of various joints, especially of the hip, and dramatically good results created enthusiasm among both patients and surgeons. This is well illustrated by the present study, with total freedom from pain in 90 per cent after only 3 months, lasting up to 2 years postoperatively. Others have reported similar results (Coventry 1975, Hult 1978). But as time elapses the picture changes, and many new problems involving further treatment develop. Four years after operation 60 per cent showed good results (cf. 70 per cent reported by Eftekhar (1973) and Hult's figure of 83 per cent (Hult 1978)). The figures presented in the present study cannot be directly compared with those of others because this study is prospective whereas most others are retrospective with the figures for early and late operations combined. Figure 4 shows that 7 years after the operation approximately 50 per cent of the patients had good results (Charnley's grades 5 and 6) as regards pain, walking capacity, and mobility. The results after 8 years apply to only 19 patients.

Many of the poor results represent patients in whom the prosthesis worked loose; in most of these cases a new one was inserted. The immediate results after a second operation are good, but not as good as after a primary procedure (Tillberg & Thorblad, to be published). Concerning mobility, the subjective result experienced by the patient was better than indicated by the Charnley grading. However, it is doubtful whether the normal range of motion in these elderly patients could be as high as 210 degrees or more, corresponding to Charnley's grade 6 (cf. Olsson et al. 1979).

The operations in this study were performed at a special orthopaedic hospital, but in an operating theatre without any special arrangements such as laminar flow or an operation box; and prophylactic antibiotics were not administered. The infection rate of 3.4 per cent in this study is in

accordance with some reports (Charnley & Eftekhar 1969, Goldie 1977) but is less than that reported by others (Carlsson et al. 1977, Hult 1978). A high level of discipline in theatres where total joint replacement surgery is being carried out can cut the infection rate to 0.5 per cent (Eftekhar 1973). Eftekhar's study shows the same incidence of infection with an operation box, although Charnley (1972) and Hult (1978) have obtained a significantly lower incidence by using box equipment. Concerning the use of prophylactic antibiotics, Olsson et al. (1979) had no infections in 238 total hip replacements performed in a conventional operation theatre also used for general surgery. The conclusion is that a high level of surgical discipline and the use of prophylactic antibiotics are the remedies of choice to reduce the infection rate in these highly sensitive hip-replacement operations.

As can be seen in Figure 1, no late infection was diagnosed after the third postoperative year. The difficulty in making the diagnosis has been pointed out by many authors. Some of the X-ray changes shown in Table 5 could mask infection. But the changes are not exactly the same as those described by Brinkeman & Heilmann (1974) or Willert (1972). Some patients also showed a slight increase in erythrocyte sedimentation rate but neither the X-ray changes nor the sedimentation rate could be correlated with the subjective complaints.

Loosening of the McKee-Farrar prosthesis components because of infection or for aseptic reasons is reported to occur in 9.2 per cent of patients within 2 years of operation (Dandy & Theodoron 1975) and in 9 per cent within 3 years (Patterson & Selby-Brown 1972). The figure in the present study, up to a corresponding follow-up time, was similar. But the incidence rose sharply after the second postoperative year, and after 8 years the incidence of aseptic loosening was 16 per cent, and together with loosening due to infection 19.4 per cent (see Figure 1). McKee (1978) reported 21 loosenings in 100 patients operated upon 15 years earlier. His figure included also loosening due to infection. It is thought that a high incidence of loosening may be due to high friction between the metal components, although opinions differ (Andersson et al. 1972, Simon et al. 1975). Friction between metal and plastic should be less. The incidence of loosening with such low-friction prostheses may be lower; Olsson et al. (1979) reported 5.7 per cent loosening with the Müller-Charnley prosthesis, and Visuri et al. (1977) reported 2.1 per cent loosening with the Brunswick prosthesis. In both these studies the follow-up time was shorter than in the present study. At SICOT (Kyoto 1978) Charnley admitted quite a high incidence of loosening, with figures somewhere around those given by McKee in the long run.

Table 5. X-ray changes

	No.	Per cent
New bone formation	23	7
Femoral resorption	37	11
Pelvic resorption	12	3
Total	72	21

In a previous study the incidence of thrombosis when no prophylaxis was used was about 60 per cent (Tillberg 1974) and in the present study the mortality from pulmonary embolism was 6 per cent in the first 80 operations. After starting prophylaxis routinely the incidence of thrombosis was 8 per cent; all were diagnosed on clinical criteria, so the figure is uncertain. One pulmonary embolus occurred among the 247 patients (0.4 per cent) treated after routine thrombosis prophylaxis had been established. It may be concluded that in hip surgery it is essential to use thrombosis prophylaxis.

No drawbacks to the posterior approach have been detected. The postoperative dislocation rate (2.4 per cent) was the same as in other published series. In fact the surgical technique was found to be simple, giving little traumata and little bleeding, with reduced likelihood of infection. The personal experience of the author is that the patients are mobilized sooner and experience less discomfort than patients given a Charnley prosthesis by Charnley's approach with chiselling of the trochanter major.

It may be concluded that in elderly patients with only a few years left to live total arthroplasty

is the operation of choice because of the immediate good effect. It is important to have a lower age limit, because the long-term results are less satisfactory. In young patients and patients still able to work, hip arthrodesis (Lindström 1957), intertrochanteric osteotomy (Tillberg 1968) and Smith-Petersen arthroplasty (Tillberg 1969) are worth reviving because of the better results in the long run. After these operations it is still possible to perform a total arthroplasty later on.

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