Total hip and knee replacements

Ian Goldie

Department of Orthopedics, Karolinska Hospital, Stockholm, Sweden

In the beginning of the 1970s, Charnley's method for replacing the destroyed and painful hip with prosthetic components rapidly became generally accepted. It alleviated pain, increased mobility, and, above all, it proved to be reliable over a long period of time. The number of total hip replacements increased markedly, and it soon became evident that a backlog of work was awaiting the orthopedic surgeons. This was evident by the ever-increasing operation queues.

In the years 1987 and 1988, journalists occupied themselves reporting on the inability of orthopedic surgery by announcing that patients had to wait for more than 30 months for a total hip replacement. However, the true story was not told. Waiting times varied considerably at different centers all over the Nordic countries. This was exemplified by the waiting lists at different hospitals in the Stockholm area, where times varied from 6–30 months.

The great demand, which was not obviated by an acceptable solution, required an assessment by surgeons, administrators, and politicians, a task which seemed to be unsurmountable. For this reason, a consensus conference was arranged in 1982 in Stockholm. Although with some local flavor, the problems discussed were common to all orthopedic centers in the Nordic countries. The intention was to analyze the different problems and to solve these through a combination of contributions from surgeons, administrators, and politicians.

The conclusions drawn at the conference, among others, were that the waiting time for total hip replacement was too long, that the long waiting time was due to inefficiency by hospital administrators, that patients who paid for health care through their taxation should not be further burdened by having to pay for private care in order to have a more expedient service, and that the document produced by the consensus conference contained acceptable recommendations to be followed by the hospital administrators for reducing waiting time for a total hip replacement.

The main recommendation by the consensus conference was to increase the resources of orthopedic surgery both materially and with increased staff. This recommendation may be considered as being a simple generality that, nevertheless, practically applied in a limited area could yield very good results. An example was that at one of the orthopedic departments in Stockholm the waiting time in 1982 was 18 months for a total hip replacement. By improving all the facilities to increase efficiency, additional surgeons and nurses were employed, and other facilities were supplied. The waiting time in the years 1983 and 1984 was reduced to 3 months. At the end of 1984, the additional resources were withdrawn, and within 6 months the waiting time returned to more than 18 months.

Arthrosis, which constitutes one of the main indications for both total hip and knee replacement, seldom appears in the hip before 50 years of age. Its

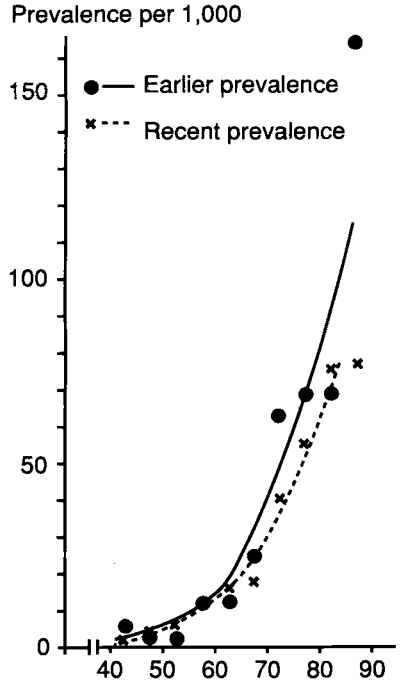

Figure 1. Prevalence of hip arthrosis as observed in two investigations made at an interval of 20 years. (From Danielsson et al. Clin Orthop 1984).

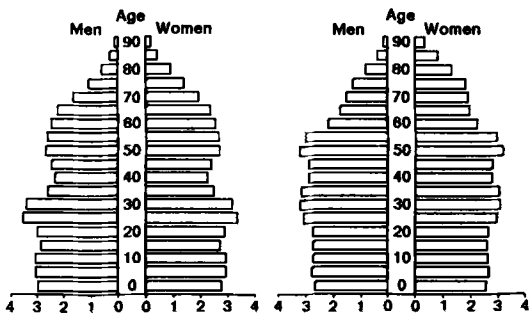

Figure 2. Observed and estimated age distributions in Sweden (5-year intervals in 100,000).

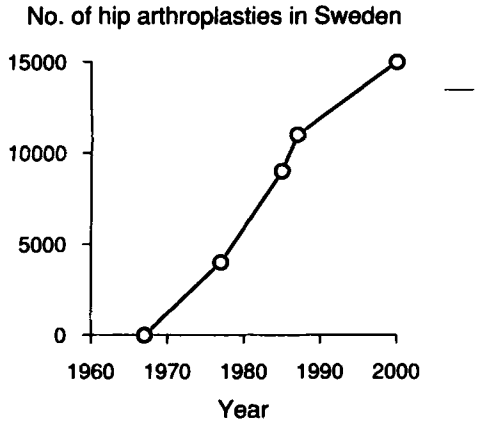

Figure 3. Observed and estimated number of hip arthroplasties in Sweden

Table 1. Percentage of the population aged 60 years or more

	Total population	Percentage > 60 yrs
Denmark	5,124,794	20
Finland	4,924,644	18
Iceland	244,157	14
Norway	4,174,005	21
Sweden	8,381,515	23

Table 2. Hip and knee arthroplasties. Total number and percentage of the population aged more than 60 years

	Hip arthroplasties		Knee arthroplasties	
Denmark	4,500	0.44	1,500	0.15
Finland	2,600	0.29	750	0.08
Iceland	190	0.56	75	0.22
Norway	4,000	0.46	570	0.07
Sweden	8,000	0.41	2,000	0.10

debut is more noticeable at about 65 years of age, with a prevalence of some 3–5 percent, and with an acceleration after 70 years of age. It has been shown that this prevalence is constant, as observed in investigations made at an interval of 20 years (Figure 1). Thus, there is no reason to await any changes in the year 2000 and thereafter.

In 1975, the population in Sweden had a nonproportional representation of elderly in comparison with young people (Figure 2). In the year 2000, however, a slight change is observed prospectively, with a proportional decrease in the elderly versus the young in Sweden.

The conditions are somewhat the same in the other Nordic countries (Table 1). In Iceland the number of old people more than 60 years of age in the year 2010 is estimated at 17 percent of the total population and in 2020, 21 percent.

The number of total hip replacements and total knee replacements, respectively, are presented in Table 2.

What can be expected within the next 10–15 years, i.e., about the year 2000? Based on the above figures, it is possible to calculate the number of future operations. The indication for total hip replacement is estimated at 20–40 percent of persons with primary arthrosis with symptoms. Due consideration has, however, to be taken to the presence of secondary arthrosis as a sequential effect of femoral neck fracture, congenital abnormalities, and developmental deformities. Total hip replacement yields extremely good results, with 90 percent improved function over a 10–15-year period; but in some 10 percent, complications arise necessitating reoperations that will influence the magnitude of operations to be carried out in the future. Between 1979 and 1983, 3,848 revision arthroplasties of the hip were carried out in Sweden. Until 1986, the figure increased to more than 7,000. The results of these operations are not as good as those of the primary operation; and generally speaking, an improved technology is a desideratum as regards material supplies and advanced surgical skill. In calculating the future demand of total hip replacements, it is, therefore, necessary also to include the failures that necessitate a reoperation.

In 1977, more than 4,000 total hip replacements were performed in Sweden; and in 1985, the numbers

rose to more than 9,000, with a projected increase to about 15,000 in the year 2000 (Figure 3). Proportionally, the same calculations coincide with those of the other Nordic countries.

As for total knee arthroplasty, this has proved to be a more manageable problem, for the demand numerically is less than is met with in total hip replacement. In 1975, a multicenter study on total knee replacement was introduced in Sweden and named the "Swedish knee arthroplasty project". The registration is centered at the Department of Orthopedics in Lund, and 45 orthopedic departments are participating. To date, more than 25,000 operations have been reported. In this way, detailed information has been gathered on the quality of arthroplasty techniques. One of the observations in this immense project has been—which is still very successful—that too few patients are operated on because the waiting times have been too long. In other words, there is a problem of queues. Further, there is a lack of knowledge of the relatively poor natural history of knee arthrosis. Finally, there is a lack of knowledge of the good results obtained with total knee arthroplasty. The results are comparable nowadays to those of total hip replacement.

Additional information from the knee arthroplasty project has indicated a difference in survivorship of different prostheses. It was found that in arthrosis after 6 years there is a very good survivorship for, e.g., the total condylar prosthesis and the Townley prosthesis, whereas the Freeman prosthesis was not as successful. An interesting observation has been that unicompartmental arthroplasties have given very good results.

In Norway, there is an expected increase in total hip replacements to 5–6,000 per year, and some 600 total knee replacements.

The rapid change of population in Iceland as regards the elderly will probably result in an increase in total hip and knee arthroplasties. This will probably be more rapid than in the other Nordic countries. And because the number of femoral neck fractures is expected to increase continuously, the prospect is that no joint replacement can be performed after the year 2012. Thus, the situation will be critical if there is no change in the present health care system signifying shorter hospitalization times for both replacement and femoral neck fracture patients, including a better and more extended organization for home care (Mogensen 1988).

The expenditure in total hip replacement is well known and rather uniform over the Nordic countries, and at present an operation costs roughly 40–45,000 Swedish kronor. Revision arthroplasties, however, are far more expensive.

The benefit from a total hip replacement is not only medical and social, but also an economic one. In persons under aged 60 years, the profit has been estimated at 10 times the expenditure for an operation and hospitalization. In persons more than aged 65 years, the profit is roughly double the costs.

In an interesting study by Herberts and Malchau (1988) on the costs and other economic effects of a total hip replacement in young persons, they concluded that there were great advantages in operating on younger persons because society seemed to gain much from this. The future will, however, tell, for it is the survival time of the prosthesis in the young person that will be decisive. The question then remains whether the cementless prosthetic replacement will be superior to the cemented one.

Finally, a question of some interest is whether the number of operations for arthrosis of the hip—and also of the knee—can be brought down? In this context, it certainly is important to observe the so-called natural history of hip arthrosis.

In an analysis of the waiting list for total hip replacements in patients with arthrosis at the Department of Orthopedics, Karolinska Hospital, Stockholm, it was eventually shown that more than 30 percent of the patients could be dismissed, because during the time they had waited (2–3 years) their symptoms had subsided so appreciably that there was no longer an indication for an operation. A follow-up of the same material 2 years later disclosed no change in the symptomatic presentation that changed the previous decision not to operate. This confirms the observations reported by Nilsson et al. (1982). They reexamined a group of patients who 10 years previously had been reported by Danielsson (1964); they found that during this 10-year period 12 percent became completely free from pain and that a considerable reduction in pain was experienced by not less than 59 percent.

As regards arthrosis of the knee, the conditions are somewhat the reverse. As a rule, deterioration is progressive, with an increase in pain and further decreased function.

Other factors, such as heredity, environment, and various preventive measures, can hardly change the enigma of arthrosis before the year 2000, nor thereafter. Not only is arthrosis a problem for orthopedics today, it will remain so tomorrow as well.

Finally, it gives satisfaction, however, that such a revolutionizing method as arthroplasty—the success rate being 90 percent over a long period of time—can be offered to the patient with arthrosis. Indeed, arthroplasty has come to stay. It offers the elderly person freedom from pain, independence, increased

activity, and last, but not least, an improvement in the quality of life. These in combination lessen the burden on society in providing for the welfare of the elderly.

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