Acta Orthop Scand *56*, 158–160, 1985

Increasing incidence of forearm fractures

A comparison of epidemiologic patterns 25 years apart

During 1980 and 1981, 1914 fractures of the distal forearm occurred in Malmö, Sweden. The age-specific incidence peaked in childhood and there was a large increase in women after the age of 50; in men there was a smaller increase after the age of 70. In comparison with the Alffram & Bauer (1962) study of the same population in 1953–57, the age-specific incidence in elderly women and men has almost doubled. There was almost the same incidence of shaft fracture of the ulna or radius as 25 years ago.

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We have recently shown that there have been secular changes in the occurrence of hip fractures, with the age-specific incidence doubling over 30 years (Johnell et al. 1984). We have non-compared the present age-specific incidence of forearm fractures with that of the same population 25 years ago (Alffram & Bauer 1962).

Material and methods

Population

The population figures for the two investigated years, 1980 and 1981, were obtained from the city files. In Malmö, the third largest city in Sweden, the population was 234 000 during this period. In the city there is only one general hospital, with a large outpatient clinic.

Fracture material

The material was selected in the same way as in the study of Alffram & Bauer (1962). The data on forearm fractures were collected at the Department of Diagnostic Radiology. The registration of roentgen films is performed in exactly the same way today as it was in 1950. All roentgen films were evaluated and the patients' medical records were examined to ascertain the degree of trauma and to find out whether the fracture was reduced or not. Fractures in non-residents were excluded (62 cases). Private practitioners not connected with the hospital and doctors at the Department of Radiology of the geriatric hospital were interviewed, and they confirmed that they had very few patients with forearm fractures.

Fracture classification

1. *Distal fractures* (1990 cases) included fractures within 3 cm of the radio-carpal joint (1914 cases), fracture of the styloid process of the radius (35 cases) and displacement of the distal epiphysis of the radius (41 cases). Fractures of the styloid process of the ulna were excluded.
2. *Shaft fractures* (104 cases) included the radius, ulna, or both bones.

Fifteen patients had simultaneous bilateral distal fractures. In the patients with distal fractures during these 2 years, 105 had other fractures, of which 43 occurred simultaneously with the distal fracture.

Degree of trauma. From the medical records the degree of trauma was classified as *moderate* (a fall from a standing position) or *severe* (any other trauma such as a fall from a height or a staircase, and traffic accidents).

Displacement. From the medical records, displaced fractures were defined in the same way as by Alffram & Bauer (1962), i.e. as a fracture which was reduced.

Statistical method. The chi-square test was used.

Results

Distal forearm fractures

In women, there was a peak in the age-specific incidence in childhood as well as a sharp increase after age 50. In men, there was a peak in childhood and a moderate increase after age

70 (Table 1). Compared with the same fractures in 1953–1957 (Figure 1), there was almost no increase in women in the age-specific incidence under the age of 19, but from then on there was an increase in each age group ($p<0.001$). Comparison of the results for men in the 1950's and the 1980's showed the same trend, and also an increase in childhood. The most spectacular change occurred after age 70 with an increase of almost six times the age-specific values for 1953–1957. The number of male fractures at age 80 is now approaching that of women 30 years ago (Figure 1).

The ratio moderate versus severe trauma in both women and men increased with increasing age (Figure 2). Comparison with the values of Alffram & Bauer (1962), which obviously entails certain difficulties, indicates that moderate trauma now occurs more frequently in the age groups over 20.

Both in men and women there was an increase in the number of reduced fractures with increasing age (Figure 3). A comparison with 1953–1957 gave approximately the same profile in women, whereas men over 70 seem to have more reduced fractures now than 25 years ago.

In patients with distal radius fractures, 5 per cent had other fractures during 1980–1981, notably fracture of the proximal humerus in 22 women (12 simultaneously) and one man, trochanteric hip fractures in 17 women (four simultaneously) and cervical hip fracture in 17 women (seven simultaneously) and in two men (both simultaneously). The hip fractures were compared with the age-specific incidence in

Table 1. Fractures of the distal forearm during 1980 and 1981 in relation to age and sex. Total number and age-specific annual incidence per 10 000 inhabitants in Malmö, Sweden

	Women		Men	
Age (years)	No.	Incidence	No.	Incidence
0– 9	47	22	78	34
10–19	86	32	132	47
20–29	33	10	32	9
30–39	62	20	47	15
40–49	53	19	38	15
50–59	258	77	39	13
60–69	401	120	34	12
70–79	322	124	50	30
>80	181	161	21	45

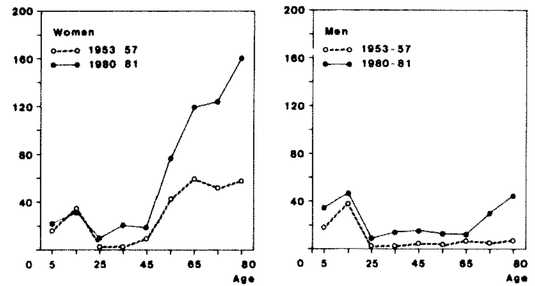

Figure 1. Age-specific annual incidence of fracture of the distal forearm per 10 000 in 1980–81 and 1953–57 (Alffram & Bauer 1962).

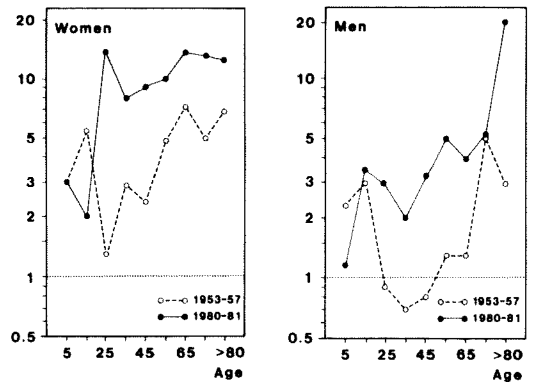

Figure 2. Ratio of moderate to severe trauma in fractures of the distal forearm in 1980–81 and 1953–57 (Alffram & Bauer 1962).

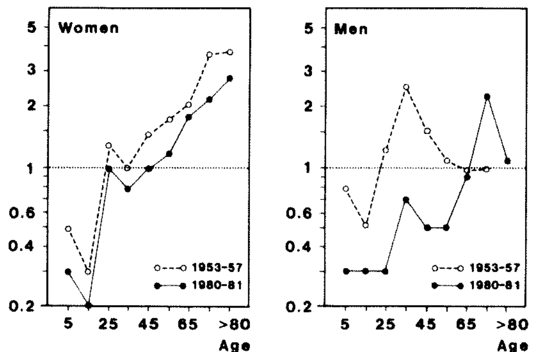

Figure 3. Ratio of reduced to non-reduced fractures of the distal forearm in 1980–81 and 1953–57 (Alffram & Bauer 1962).

Malmö for the same years (Johnell et al. 1984). Men and women with radius fractures had a higher risk for hip fractures than the total population of Malmö. The risk was twice the expected age-specific incidence for both men and women; if only those fractures which did not occur simultaneously were included, the values

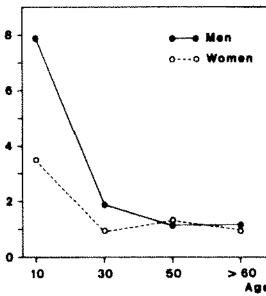

Figure 4. The age-specific annual incidence per 10 000 of fractures of the shaft of the radius or ulna, or both, in 1980–81.

were 1.4 times the expected age-specific incidence (not statistically significant).

If only the snow-free months were included, the incidence figures did not change for the youngest age groups, but in women over 30 and men over 50 they were reduced by 25–30 per cent.

Shaft fractures

By comparison with 1953–1957, the age-specific incidence for shaft fractures (Figure 4) was slightly lower in the youngest age group and almost identical above age 20.

Discussion

Comparing our results with previous data (Alffram & Bauer 1962, Knowelden et al. 1964, Matkovic et al. 1979, Melton & Riggs 1983), we found a higher age-specific incidence of distal forearm fractures, especially in women over 50, but also in elderly men. The values presented by Falch (1983) are almost identical with ours up to the age of 79. Above this age, he found a decrease in the values for women, while we found high values in both sexes.

Two explanations can be given to account for our observations. One is that the inhabitants of Malmö now attend hospital more frequently when they have a fracture of the forearm than they did 25 years ago. However, we still have the same incidence of shaft fractures of the radius and the ulna and of all fractures in the youngest age group of women. The ratio of moderate versus severe trauma seems to have increased, but the number of reduced fractures is approximately the same. Displaced fractures of the distal forearm would probably induce patients to come to hospital now to the same extent as 25 years ago.

The other possibility, which is more plausible, is that there is a real increase in the age-specific incidence. One factor supporting this explanation is that the same increase was observed in the number of hip fractures in elderly women as in elderly men during the same years in Malmö (Johnell et al. 1984). The reason for this increase is unknown. It is difficult to believe that bone mass has decreased to this extent in 25 years. We have data on bone mineral content only from the 1970's for forearm fractures (Nilsson & Westlin 1974) and from the 1970's and 1980's in Malmö for hip fractures (Johnell & Nilsson 1984). Obviously, the incidence of falls is an essential parameter for fractures; we observed a marked fracture increase in the winter. In the winter of 1980–81, there was some snow in Malmö in December, January and February; the amount of snow was approximately the same as in 1953–57.

Clearly, the challenge in fracture treatment during the 1980's and probably the 1990's will continue to be elderly women.

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