

Epidemiology of distal radius fractures

In the county of Frederiksborg, Denmark, all distal radius fractures in inhabitants over 20 years of age were recorded throughout 1981; the population at risk was a quarter million, and fractures occurred in 394 women and 99 men. The age-specific incidence confirmed the rise in osteoporotic fractures over the past 20 years demonstrated recently in Malmö and Oslo.

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We have determined the age-specific incidence of distal radius fractures in a Danish county, and compared our observations with similar investigations from other countries.

Patients and methods

In 1981 the county of Frederiksborg, Denmark was served by five hospitals and had 224 705 inhabitants, 20 years of age or older.

All cases of distal radius fractures, defined as fractures within 4 cm of the wrist joint, were recorded. In the calendar year 1981, 493 residents were included in the study; some of these had had primary treatment elsewhere.

The material consisted of 394 woman and 99 men; 32 patients were admitted to hospital for other injuries.

The age- and sex-specific incidences were calculated on the basis of the population census January 1, 1981 (Table 1). For all patients the age, sex, side of fracture and mechanism of injury were recorded.

Ninety-two per cent of the radiographs were available for review, and the fractures were classified according to displacement and comminution (Older et al. 1965). Information about the average temperature and the number of days with snow-cover in the year 1981 was obtained from the Danish Institute of Meteorology.

Calculation of the confidence limits for the age-specific incidences was performed, and for statistical evaluation the chi-square test with Yates' correction was used.

Results

Reduction of the fracture was performed in 46 per cent of men and in 58 per cent of women ($P = 0.02$). The mechanism of injury was a fall on level ground in 87 per cent of the female and 64 per cent of the male patients ($P < 0.00005$). The rest of the fractures were caused mainly by traffic accidents and falls from height. There

Table 1. The age-specific incidences of distal radius fractures in men and women over 20 years of age in the county of Frederiksborg, 1981

Age	Women			Men		
	No. of fractures	Population at risk in thousands	Incidence per 10.000	No. of fractures	Population at risk in thousands	Incidence per 10.000
20-	13	21	6.2	21	21	10
30-	29	32	9.2	21	31	6.7
40-	27	21	13	15	22	6.8
50-	77	15	50	16	16	9.8
60-	101	12	81	14	12	12
70-	95	8.2	115	11	6.3	18
80-	47	3.5	133	1	1.8	6
90-	5	0.74	68	-	0.20	-
Total	394	114	35	99	111	9

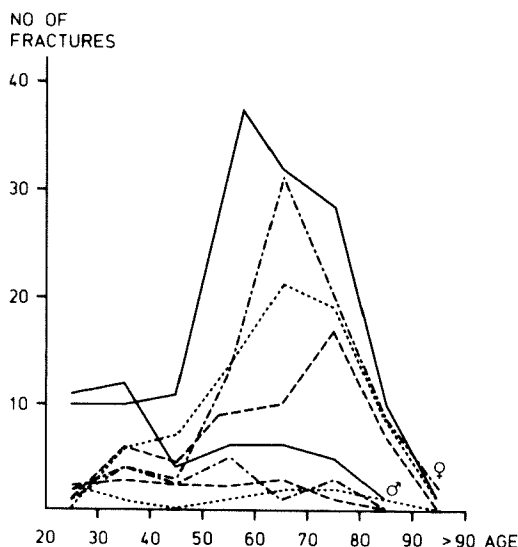


Figure 1. Number of fractures in Older's classification system in women (upper curves) and men (lower curves). — Type 1; --- Type 2; Type 3; - · - Type 4.

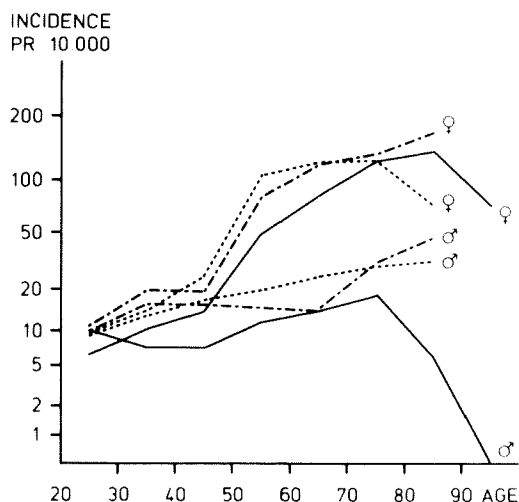


Figure 2. Age-specific incidence of distal radius fractures in men and women in Oslo (Falch 1983), Malmö (Bengnér & Johnell 1985) and Hillerød (present series). Oslo; --- Malmö; — Hillerød.

was no difference in fracture incidence between patients living in urban and rural areas.

In women, the number of fractures was highest during the winter months, corresponding to a low average temperature and a high number of days with snow-cover. In men, the number of fractures was more evenly distributed throughout the year.

Eight of 452 patients with available radiographs had Smith's fracture and two patients had a Barton fracture. In four cases the fracture could not be classified. The rest of the patients had distal radius fractures of the Colles' type (Figure 1). The number of undisplaced fractures was high in young men, but in older men the four types had a more equal distribution. In women the number of undisplaced fractures was maximal at age 40–50, whereas the number of more severely displaced and comminuted fractures was maximal in older women.

Discussion

When the present series of wrist-fractures is compared with earlier investigations (Buhr &

Cooke 1959, Alffram & Bauer 1962, Knowelden et al. 1964), the incidence can be seen to have increased. This has recently also been demonstrated by Falch (1983) and by Bengnér & Johnell (1985). The incidence in Malmö (Bengnér & Johnell 1985) and particularly in Oslo (Falch 1983), however, was higher than in our series (Figure 2). The higher incidence in men in Norway could possibly be explained by a higher number of fractures in the winter months in Oslo, but the seasonal variation could not explain the difference between Oslo and Denmark in women. When only the fractures sustained from April through September are included, the incidence in Oslo was still higher.

In the Norwegian investigation (Falch 1983), the peak incidence in women occurred in the age-group 60–70 years. A similar peak has been demonstrated in USA (Melton & Riggs 1983) and in Yugoslavia (Matković et al. 1979), but in a recent investigation from Malmö (Bengnér & Johnell 1985) the peak incidence was, as in the present series, at a higher age. A possible explanation for these differences in incidence could be a difference in the method of investigation. In Denmark, treatment and radiographic control of fractures is only possible

in hospitals, and non-residents have been excluded from the study.

The statistical analysis established that the overall incidence in women was higher in Oslo and Malmö ($P < 0.00005$). Calculation of confidence limits for the peak incidences in Oslo and Denmark, however, demonstrated no difference.

Earlier studies of the epidemiology of distal radius fractures have not included a classification of the fractures. In the present study, which is the first epidemiologic study of distal radius fractures in Denmark, it was demonstrated that in men the four fracture types were almost evenly distributed in the older age-groups. In women undisplaced fractures were seen most often in the younger age groups, whereas more severely displaced and comminuted fractures of Type 4 (Older et al. 1965) were most frequent among patients aged 70–80 years. In the Malmö investigation (Bengnér & Johnell 1985), the number of reduced fractures also increased with age. This probably reflects the increasing fragility of bone, but as demonstrated by Lucht (1971) the incidence of falls also increases with age, indicating that the cause of the fracture is a fall, but the severity is caused by bone fragility.

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