

Epidemiology of distal radius fractures in Iceland in 1985

Grétar Ottó Róbertsson¹, Gunnar Thór Jónsson¹ and Kristján Sigurjónsson²

Between March 1985 and March 1986, 249 fractures of the distal radius in patients over 15 years of age were treated in the Reykjavik area, which had a total at risk population of 100,154. The incidence pattern was similar to what has been reported in recent Nordic studies except that the fracture risk of women was lower than in Oslo in 1979 and Malmö in 1980-81, and for men higher than in Fredriksborg in 1981. Fifty-seven percent of the patients had employment at the time of accident. The majority of accidents happened outdoors, especially on sidewalks and in streets, and were more common during the winter months.

We have determined the age-specific incidence of distal radius fractures and compared our standardized data with other recent studies. We also recorded site of accident, type of injury, type of fracture, seasonal variation in number of fractures, percentage of reduced fractures, and social status of the patients.

Moderate trauma was defined as violence less than or equal to a fall to the ground from a standing position, and severe trauma as all other trauma (Alf-ram and Bauer 1962). For comparing groups, the chi-square test was performed. For comparing mean age, analysis of variance was used; and for comparing incidence between studies, confidence limits for an age-standardized standard population were used.

Patients and methods

Our study was done between March 1985 and March 1986 and included all the fractures of the distal radius in the Reykjavik area in patients over 15 years of age. The corresponding population was 100,154. Patients living outside the capital area were excluded. Practically all the fractures of this type are referred to and treated at the Reykjavik City Hospital, which has the only emergency department. The relatively few fractures treated at other hospitals in the area were also included in the study.

All the fractures in the distal radius within 3 cm of the joint were classified as Colles', Smith's, and Barton's types; in addition, they were classified according to Frykman (1967). The age and sex incidence were calculated from the officially recorded population of December 1, 1985.

Results

Out of 249 fractures, 74 percent occurred in women. The mean age of the women and men was respectively 63 (16-93) and 42 (17-85) years. Fifty-seven percent of the patients had employment at the time of fracture (Table 1).

Table 1. Social situation of patients with distal radius fractures in Reykjavik in 1985

Social situation	Number	Percent
Employee	123	49
Pensioner living at home	66	27
Own employer	21	8
Housewife	14	6
Student	7	3
Lives in institution	7	3
Other/not known	11	4
Total	249	100

Departments of Orthopedics and Traumatology¹, and Radiology², Reykjavik City Hospital, Reykjavik, Iceland

Correspondence: Dr. Grétar Ottó Róbertsson, Department of Orthopedics, Centralsjukhuset, S-291 85 Kristianstad, Sweden

Table 2. Type of trauma in distal radius fractures in Reykjavik in 1985

Type of trauma	Women	Men	Total
Fall on level ground	135	32	167
Fall from height	14	19	33
Fall on stairs	24	4	28
Traffic accidents	2	3	5
Other	9	7	16
Total	184	65	249

Table 3. Distal radius fractures in Reykjavik in 1985; Frykman's classification

Frykman's type	Women		Men	
	Number	Percent	Number	Percent
1	50	28	9	14
2	46	25	11	17
3	11	6	11	17
4	5	3	7	11
5	5	3	3	5
6	18	10	1	1
7	10	5	8	12
8	36	20	15	23
Total	181		65	

Two thirds of the fractures occurred outdoors, and accidents on sidewalks and streets accounted for half of these. The fracture incidence was highest during the winter months (Figure 1). Seventy-three percent of the women and 49 percent of men had sustained a moderate trauma (Table 2). The fraction of moderate trauma as the cause of fracture increased with age in both sexes, and accounted for around 40 percent of the fractures in patients below 30 years of age and over 75 percent in patients over 60 years.

There were 239 Colles', 3 Smith's, 4 Barton's, and 3 unclassified fractures. Of the 246 classified fractures, intraarticular Frykman's 3-8 fractures occurred more often in men, whereas there was no difference between the sexes in occurrence of fractures with avulsion of the styloid process (Frykman's 2, 4, 6, and 8; Table 3). The age-specific incidence in women, being lower than in men in younger age groups, increases rapidly between the ages of 40 and 60 years (Figure 2).

Of the 249 fractures, 142 (57 percent) were reduced, thereof three by primary operation. Two fractures not reduced primarily had to be reduced at a later time because of deteriorating position. Of the 142 primarily reduced fractures, 18 (13 percent) needed rereduction, thereof eight by operation.

Percent of fractures

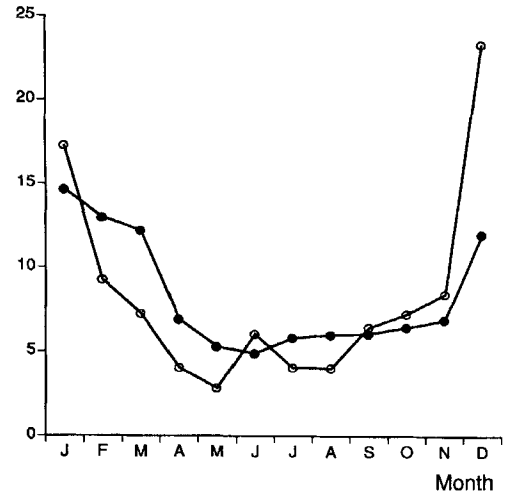


Figure 1. Monthly distribution of distal radius fractures in Reykjavik in 1985 (○) and Stockholm in 1981-82 (●).

Women's fractures more often needed reduction; 29 of 65 fractures in men were reduced or operated on and 115 of 184 fractures in women. The proportion of reduced fractures in women increased with age, reaching a peak in the 70s, while the rate of reduction in men was more constant.

Fractures with avulsion of the ulnar styloid process were reduced or operated on in 75 percent of the cases, whereas those without avulsion were operated on in only 35 percent of the cases.

Discussion

We have compared our results with Nordic epidemiologic studies (Alffram and Bauer 1962, Falch 1983, Bengnér and Johnell 1985, Schmalholz 1988, Solgaard and Petersen 1988) and have found the age-specific incidence pattern in Iceland to be very similar (Figure 2). However, in women the fracture-incidence was lower in Reykjavik than in Malmö in 1980-81 and in Oslo in 1979, whereas men in Denmark in 1981 had a somewhat lower incidence than in Reykjavik.

Fractures with avulsion of the ulnar styloid process were statistically not more common in our study (56 percent of Colles' fractures) than in Frykman's 1967 series (61 percent), but they were more frequent than in Stockholm in 1981-82 (47 percent). Intraarticular fractures were most common in Frykman's study (64 percent of fractures), as

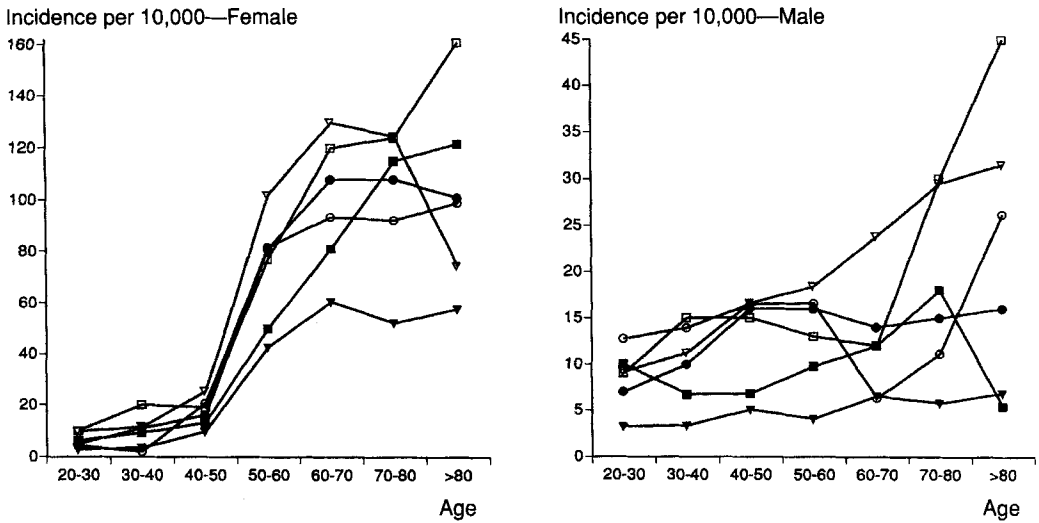


Figure 2. Age-specific incidence of radius fractures in different Nordic series in 1955-85. ○ Iceland in 1985, ● Sweden in 1981-82, □ Sweden in 1980-81, ■ Denmark in 1981, ▽ Norway in 1979, ▼ Sweden in 1953-57.

compared with our 52 percent and Stockholm's 33 percent. This great difference in intraarticular fractures between studies could partly be explained by different radiographic assessment, especially as regards fractures through the radioulnar joint.

We had a much higher reduction rate among fractures with avulsion of the ulnar styloid process than in those without, as did Frykman in his 1967 series. It could thus be argued that the avulsion should be regarded as an indicator of severity of dislocation. Avulsion was more common in older women, and this is consistent with the findings in this and previous studies that the women's reduction rate increases with age (Alffram and Bauer 1962, Bengnér and Johnell 1985). With higher age, the distal radius fractures are thus caused by less and less trauma, and in women the likelihood of dislocation also increases.

We found it interesting that, while the majority of patients were employed, relatively few fractures occurred at work. More than two thirds of the accidents happened outdoors, which make the weather conditions an important factor. The monthly distribution of fractures was very similar to that in Stockholm in 1981-82 (Figure 1). A higher incidence of fractures during the winter months was also reported in Oslo in 1979. It has been postulated (Schmalholz 1988) that a mild winter climate with long periods of temperatures around the freezing point is combined with more periods of icy ground conditions and increased fracture risk. This is supported by the

high incidence of fractures during the winter—shown in Oslo, Stockholm, and Reykjavik, and our findings—that the majority of fractures happen outdoors. The fact that half of these outdoor accidents occur on sidewalks and in streets shows that local authorities should fight these conditions with salt and sand distribution, clearing and heating of sidewalks, etc. Although the distal radius fracture is clearly the fracture of the elderly, it is by no means the fracture of the retired person.

References

- Alffram P-A, Bauer G. Epidemiology of fractures of the forearm. *J Bone Joint Surg (Am)* 1962; 44(1): 105-14
- Begnér U, Johnell O. Increasing incidence of forearm fractures. *Acta Orthop Scand* 1985; 56(2): 158-60.
- Falch J A. Epidemiology of fractures of the distal forearm in Oslo, Norway. *Acta Orthop Scand* 1983; 54(2): 291-95.
- Frykman G. Fracture of the distal radius including sequelae, shoulder-hand-finger syndrome, disturbance in the distal radioulnar joint and impairment of nerve function. A clinical and experimental study. *Acta Orthop Scand* 1967; 38 (Suppl 108)
- Schmalholz A. Epidemiology of distal radius fracture in Stockholm 1981-82. *Acta Orthop Scand* 1988; 59(6): 701-3.
- Solgaard S, Petersen V. Epidemiology of distal radius fractures. *Acta Orthop Scand* 1988; 56(5): 391-3.