

# Incidence of Colles' fracture in Uppsala.

## A prospective study of a quarter-million population

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In a prospective study in Uppsala County (Sweden), certain characteristics of distal forearm fractures (DFFs) were investigated during a 1-year period in a mixed rural-urban population comprising all 214,000 persons above the age of 15 years.

During the study period, 625 DFFs occurred, with a female/male ratio of 3.2:1. There was an age-related

increase in DFFs among females that started as early as 40 years of age. In the males the incidence of DFFs was constant up to 70 years of age, and thereafter there was only a slight increase. The annual incidence of DFFs for women above aged 70 years was 115/10,000 and that for men 29/10,000.

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It is an old suggestion based on the similarities in the incidence curves that Colles' fracture is an early sign of increased fracture propensity (Bauer 1960); but later, more direct studies have not quite borne out this suggestion (Owen et al. 1982, Finsen and Benum 1987). Based on pathophysiologic characteristics (Riggs and Melton 1986), Colles' fracture is considered to be different (osteoporosis Type I) from a hip fracture (osteoporosis Type II).

In a comprehensive program, we have prospectively investigated the epidemiology of fractures of the distal forearm in one defined geographic area during a 1-year period.

### Methods

Between April 1, 1989 and March 31, 1990, all the persons above 15 years of age with a fracture of the upper extremity in Uppsala County (Sweden) were investigated. Only the patients registered as inhabitants in Uppsala County were included. All 11 radiological departments within the county provided us with copies of positive examinations of the upper extremity. A questionnaire was sent to all the fracture patients requesting information about the accident, e.g., time, cause, and degree of trauma. About 75 percent of the fractures were treated at our own hospital, and thus it was possible to retrieve information from the patients' records in these cases.

A distal forearm fracture (DFF) was defined as a fracture within 3 cm of the radiocarpal joint. The

trauma energy was classified as moderate (a fall from an upright position) or severe (any other trauma, such as a fall from a height or a staircase, and traffic accidents). Information was also retrieved regarding the necessity for reduction, and a displaced fracture was defined as one that was reduced (Bengnér and Johnell 1985). For comparison of frequencies, the chi-square test was used and a *P*-value of < 0.05 was considered statistically significant.

### Results

During the 1-year study, 616 patients were involved in 621 accidents resulting in 625 fractures of the distal forearm. Thus, 5 patients experienced two separate DFFs during the same year and 4 patients had bilateral, concomitant DFFs. There was an overall female to male ratio of 3.2:1 (Table 1). In the females, there was a gradual increase in age-specific incidences from aged 40 years and upwards without any tendency of leveling off even at the higher ages (Figure 1). The mailed questionnaires revealed that of the 71 women who sustained a DFF between 40 and 55 years of age only 31 had passed the menopause. In the males, there was only a moderate peak in the incidence between ages 50 and 60 years, and a definitive, sustained increase did not occur before aged 70 years (Figure 1).

There were considerable seasonal variations in DFF incidence, with a culmination during the winter months. In fact, during 4 single days, 13 percent of all the fractures occurred as compared with an average

Table 1. Population at risk and number of fractures involving the distal forearm from April 1, 1989 to March 31, 1990, and from April 1, 1989 to September 30, 1989. The annual incidence has been calculated in age and sex groups for the total year and for the summer months

Sex	Age group	Population December 31, 1989	April to March		April to September	
			No. of fractures	Annual incidence per 10,000	No. of fractures	Annual incidence per 10,000
Females	15-19	8,933	8	9	2	4.5
	20-24	10,022	5	5	1	2
	25-29	10,106	7	7	3	5.9
	30-34	9,676	7	7	1	2.1
	35-39	9,848	11	11	8	16
	40-44	11,291	24	21	6	11
	45-49	8,765	17	19	4	9.1
	50-54	6,373	30	47	9	28
	55-59	5,648	50	89	21	74
	60-64	5,716	50	87	17	59
	65-69	6,299	73	116	27	86
	70-74	5,403	66	122	27	100
	75-79	4,721	46	97	14	59
80-84	3,542	34	96	17	96	
≥ 85	2,835	44	155	20	141	
Males	15-19	9,340	25	27	15	32
	20-24	9,960	3	3	1	2
	25-29	10,236	7	7	2	3.9
	30-34	9,819	9	9	5	10
	35-39	10,002	14	14	4	8
	40-44	11,371	10	9	4	7
	45-49	9,339	6	6	4	8.6
	50-54	6,576	10	15	4	12
	55-59	5,522	17	31	7	25
	60-64	5,450	8	15	4	12
	65-69	5,432	7	13	2	7.4
	70-74	4,439	4	9	2	9.0
	75-79	3,500	10	29	0	0
80-84	2,233	12	54	5	45	
≥ 85	1,341	7	52	3	45	

daily incidence of 0.3 percent. This seasonal dependence was prominent for the elderly individuals, and only present for the DFFs caused by moderate trauma (Figure 2, Table 1).

For both sexes, there was an age-dependent decrease in the proportion of DFFs caused by high-energy forces. In the females, less than 15 percent of all DFFs above 70 years of age were considered to be of this type; and in the males, the percentage was even lower. A similar pattern was seen with regard to the displacement of the fracture.

## Discussion

Fractures of the distal forearm seemed clearly to be of the fragility type, because they were more common in the elderly, and then occurred with decreasing trauma. The importance of the accident was demonstrated in the present study by the prominent rise during winter (although the period studied was the mildest one in 200 years), which accorded with recent Scandinavian reports (Schmalholz 1988, Robertson et al. 1990).

One intention of our prospective study was to provide a basis for comparison with other areas in future studies. Presented as annual incidences, the figure for the summer half of the year was respectively 95/10,000 for women above aged 70 years and

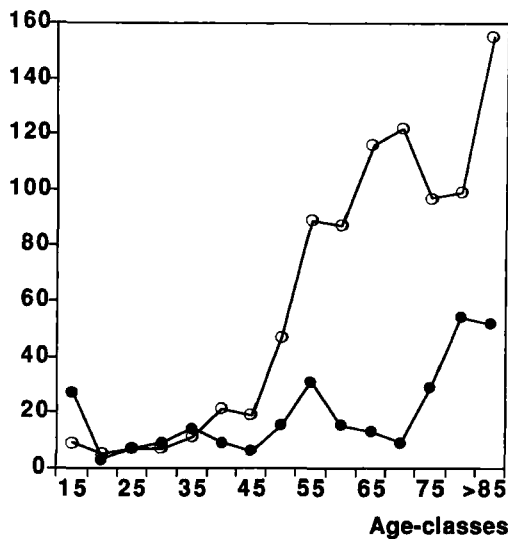


Figure 1. Age- and sex-specific incidences of fractures of the distal forearm/10,000 inhabitants. ○ women, ● men.

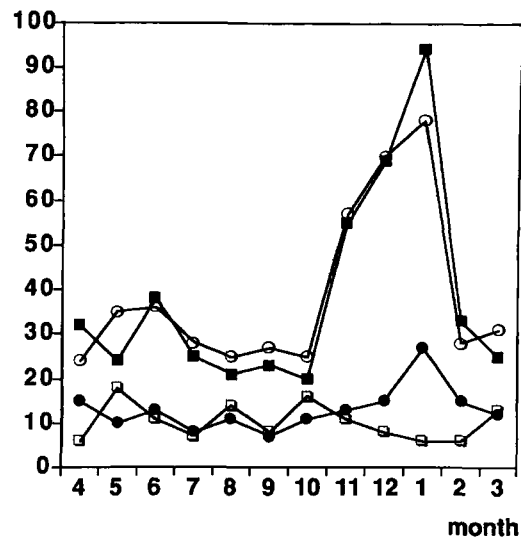


Figure 2. Seasonal distribution (during the study period from April to March) of the number of fractures of the distal forearm separated with regard to age and trauma intensity. ○ ≥ 50 years, ● < 50 years, □ high-energy trauma, ■ moderate-energy trauma.

17/10,000 for men. Our data cannot be exactly compared with previous retrospective investigations, but the frequency during summer in Oslo was around 80 for women and 15 for men in the hitherto most extensive study (Falch 1983), and the annual incidence was clearly less in other studies (Matkovic et al. 1979)

In our study the age-adjusted incidence in both females and males increased continuously with advancing age, which was in close agreement with that which has been reported from Malmö (Bengné and Johnell 1985). Some other studies have reported a decrease in fracture incidence among women in the highest age groups (Falch 1983, Solgaard and Petersen 1985) or a leveling off (Schmalholz 1988, Robertson et al. 1990). The increased fracture propensity with age depends not only on the progressive reduction in bone mass, but also on, e.g., postural instability (Crilly et al. 1987). Dissimilarities between materials could therefore also reflect more general health distinctions and not only osteoporosis per se.

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