Incidence of congenital clubfoot in Sweden

128 cases in 138,000 infants 1946–1990 in Malmö

Lars G. Danielsson

The incidence of congenital clubfoot, neurological disorders excluded, was studied over a period of 45 years (1946–1990). The number of children, born alive with clubfoot, and detailed census data for the period were available. Altogether 137,614 living infants were born and of these 128 had congenital clubfoot.

56 (44 percent) were bilateral and 101 (79 percent) were boys. The overall incidence was 0.93 per thousand children. The annual incidence rose during the 45-year-period. This was, however, fully explained by the higher incidence among children of non-Nordic extraction.

Lund University, Department of Orthopedics at Malmö General Hospital, S-214 01 Malmö, Sweden
Tel +46–40 33 10 00. Fax +46–40 33 62 00
Submitted 91-10-13. Accepted 92-03-26

The incidence of congenital clubfoot varies due to ethnic and geographical factors. During recent decades an increasing part of the Malmö population is of non-Nordic extraction. The two subsets were compared in this study.

Material and methods

Since 1946 all children born alive with congenital clubfoot have been registered in Malmö. Detailed census data were also available. Data about the parents' extraction have been available since 1970. During the period 1946–1990 altogether 128 children (101 boys and 27 girls) with congenital clubfoot were born alive in Malmö; cases secondary to neurological disorders and postural cases (Somppi 1984) were excluded. 56 (44 percent) were bilateral. The total number of children born alive during the period was 137,614.

For the statistical analysis the actual numbers of newborns with congenital clubfoot—corrected for contemporary population—were related to time in a linear regression analysis. In addition, the incidence of congenital clubfoot since 1970 was compared between newborns of Nordic and non-Nordic (mother and/or father) extraction using the chi square test.

Results

The total incidence was 0.93 per thousand and increased during the 45-year-period. When children of non-Nordic extraction were excluded, the incidence remained unchanged (Figure 1). The annual incidence—after 1969—was higher ($P < 0.01$) for newborns of non-Nordic than of Nordic extraction (Table 1).

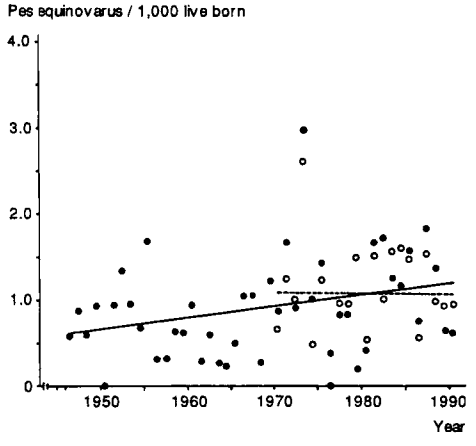

Figure 1. Annual incidence of congenital clubfoot.
——● total number,
- - - - -○ number of Nordic extraction.

Table 1. Number of children (in thousands) born alive and children born with congenital clubfoot grouped in 5-year periods, according to Nordic and non-Nordic extraction

	Total number		Nordic		Non-Nordic	
	Children	Clubfoot	Children	Clubfoot	Children	Clubfoot
1946–50	16	10				
1951–55	15	17				
1956–60	16	9				
1961–65	18	7				
1966–70	18	16				
1970			3	2	0.38	1
1971–75	16	25	14	18	1.7	7
1976–80	12	11	10	8	1.9	3
1981–85	12	18	10	14	2.1	4
1986–90	14	15	11	10	3.2	5
Total	138	128	48	52	9.3	20

Table 2. Incidence of congenital clubfoot

	Period of investigation	Country	Number of newborns (thousands)	Incidence per 1,000
Nilsonne (1927)	1913–26	Sweden	34	1.0
Severin (1956)	1936–45	Sweden	1,077	0.78
Thomasen (1941)	1931–38	Denmark	36	0.8
Reimann (1967)	1956–62	Denmark	325	0.96
Somppi (1984)	1963–78	Finland	67	0.98
Zimmer (1940)	1932–39	Germany	22	1.39
Wynne-Davies (1964)	1948–60	Scotland	–	1.24
Ivy (1957)	1951–56	U.S.A.	1,202	1.5
Elliot (1961)	1961	New Zealand:		
		Maoris	–	4.4
		Europeans	–	0.7

Discussion

The published incidence of congenital clubfoot varies due to ethnic factors, differences in definition and in collecting the basic data. Thus the incidence is higher among white than colored newborns in New York (Shands 1953), and in Europe the incidence ranges from 0.27 to 3.78 per thousand (Lindahl 1963) and from 0.1 to 4.33 per thousand (Severin 1956). The incidence in the Far East is said to be half of that in Europe, whereas Asians run a six times higher risk of being born with clubfoot than Europeans (Somppi 1984). It has also been proposed that the incidence is low in the Chinese population while high among the Japanese (Neel 1958).

According to some well defined materials (Table 2), the incidence seems to be the same (0.78–0.98) in the Nordic countries but somewhat higher in Germany, Scotland and the U.S.A. The ethnic difference between Maoris and Europeans is clearly shown.

In all published materials congenital clubfoot is more common among boys than girls with a range from 76 percent (Monberg 1931) to 64 percent (Nilsonne 1927). In a material consisting of 3,806 patients collected from the literature, Somppi (1984) estimated the figure as 69 percent.

The frequency of bilateral cases varies from 59 percent (Mac Even et al. 1961) to 40 percent (Ponseti and Smoley 1963) and in the above-mentioned compilation of data it was 50 percent (Somppi 1984).

Severin (1956) and Reimann (1967) did not find any change in the annual incidence of clubfoot over a period of 9 and 6 years, respectively.

The incidence (0.93 per thousand) and bilateral occurrence (44 percent) in this investigation correspond well to previous studies. The sex distribution with 79 percent-boys was, however, somewhat higher.

References

Elliot J K. Clubfoot in the Polynesian. J Bone Joint Surg (Br) 1961; 43: 190–205.

Ivy R H. Congenital anomalies as recorded on birth certificates in the division of vital statistics of the Pennsylvania Department of Health, for the period 1951–55, inclusive. Plast Reconstr Surg 1957; 20, P. 400–11.

Lindahl O. Den medfödda klumpfoten. Läkartidn 1963; 60: 441–59.

MacEven G D, Scott Jr D J, Shands Jr A R. Follow-up survey of clubfoot. JAMA 1961; 175: 427–30.

Monberg A. Om den medföde klumpfod og dens behandling. Thesis, University of Copenhagen, Copenhagen, Denmark 1931.

Neel J V. A study of major congenital defects of Japanese infants. Amer J Hum Genet 1958; 10: 398–445.

Nilsonne H. Eine statistische Studie über den kongenitalen Klumpfuss. Z Orthop Chir 1927; 48: 219–28.

Ponseti I V, Smoley E N. Congenital clubfoot: the results of treatment. J Bone Joint Surg (Am) 1963; 45: 261–75.

Reimann I. Congential idiopathic clubfoot. Munksgaard, Copenhagen 1967.

Severin E. Frekvensen av luxatio coxae congenita och pes equino varus congenitus i Sverige. Nord Med 1956; 55: 221–3.

Shands A R. The care and treatment of crippled children in the United States. J Bone Joint Surg (Am) 1953; 35: 237–44.

Somppi E. Clubfoot. Review of the literature and an analysis of a series of 135 treated clubfeet. Acta Orthop Scand (Suppl 209) 1984; 55.

Thomasen E. Der angeborenene Klumpfuss. Über die Mechanik der Deformität und ihre primäre Behandlung. Acta Orthop Scand 1941; 12: 33–100.

Wynne-Davies R. Family studies and the cause of congenital club foot. J Bone Joint Surg (Br) 1964; 46: 445–63.

Zimmer J. Das Geschlechtsverhältnis beim angeborenen Klumpfuss. Z Orthop 1940; 70: 126–8.