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Orthodontics in the Swedish Public Dental Health Service

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SUMMARY During the fifties the Swedish Public Dental Health Services created a number of specialist posts limited to the treatment of orthodontics. At present (1974) there are 138 orthodontists working full-time within the service in 64 clinics. It is estimated that 11 per cent of the total number of children in the age range 7–16 years require specialist orthodontist attention and in order to be able to provide this treatment it is calculated that Sweden needs 340 orthodontists; this would give a ratio of one orthodontist to approximately 3,500 children. Treatment priority is estimated using a four grade Priority Index compiled by the Swedish Orthodontic Society and the Medical Board and the primary objective is to treat extreme disabling malocclusions which correspond to groups 4 and 3 in the Priority Index.

Introduction

In Sweden orthodontic treatment has been offered within the Public Dental Health Service since the mid-thirties. Originally, this treatment was obtainable only at the Eastman Institute in Stockholm (1936).

The earlier view, that the Public Dental Health Service need not concern itself with orthodontics, has changed and it is now generally agreed that orthodontics should be included in the Public Dental Health Service programme, as dental care for children is about the most important sector of the Public Dental Health Service in Sweden. From January 1st 1974 the Public Dental Health Service has been obliged by law to include orthodontics for all ages up to 17 years completely free of charge.

During the early fifties, counties began, on a voluntary basis, to employ specialists in orthodontics. This trend has continued and good progress has been made in increasing the number of specialists in Sweden. On January 1st, 1957, when the Swedish National Board of Health began to keep a special record of orthodontic clinics, the counties had six clinics run by seven dentists. Table 1 shows how the orthodontic sector of the Public Dental Health Service has developed since then up to 1974. The number of clinics has almost quintupled in fifteen years while the number of full-time orthodontists has increased more than tenfold.

There are, at present, 170 orthodontists in Sweden, 138 being employed full-time by the Public Dental Health Service, while five are private practitioners; another 27 work part-time within the Public Dental Health Service, at university faculties or privately.

The number of full-time practitioners is roughly one-third of the estimated requirement for the extension of orthodontic services to all children up to 17 years in need of specialist treatment in Sweden. (The population of Sweden is about 8 million.)

To answer the question 'how many orthodontists are needed in Sweden?' one must first know the answers to three other questions; the frequency of anomalies of the dentition; the criteria for the treatment of malocclusion and the demand for orthodontic treatment; and the average treatment time per patient per year.

The frequency of anomalies of the dentition

Various studies on Scandinavian populations indicate a frequency of malocclusion affecting about 80 per cent of children (Seipel, 1946; Telle, 1951; Engh, 1960; Helm, 1968, 1970; Myllärniemi, 1970; Lundström, 1971; Ingervall *et al.*, 1972; Thilander and Myrberg, 1973). Several of these anomalies are relatively trivial or of limited extent and consequently require little or no treatment. Many of them are certainly not serious enough to justify treatment within the Public Orthodontic Health Service. At present the proportion of children in Sweden with orthodontic defects warranting treatment is estimated at 20–25 per cent.

The criteria for the treatment of malocclusion

In what circumstances should orthodontic treatment be recommended? First, the subjective and objective need for treatment must be ascertained. Allowance should then be made for any inconvenience which treatment may cause the patient; the expected co-operation of the patient with orthodontic appliances and maintenance of dental hygiene should be considered and special attention should also be paid to the prospects of treatment resulting in a lasting orthodontic improvement.

A priority index of need for orthodontic treatment has been drawn up by the orthodontic section of the Swedish

Dental Society and the Swedish Medical Board (1966). It consists of a four grade index scale;

4. Very urgent need. Cosmetic and/or functionally handicapping anomalies, e.g. cleft lip and palate, extreme post- and pre-normal occlusion, retained upper incisors, extensive aplasia.

3. e.g. pre-normal forced bite, deep bite with gingival irritation, extremely open bite, crossbite causing transverse forced bite, scissor bite interfering with articulation, severe frontal crowding or spacing, retained canines, cosmetically and/or functionally disturbing rotations.

2. e.g. aesthetic and/or functionally disturbing proclined or retroclined incisors, deep bite with gingival contact but without gingival irritation, severe crowding or spacing of teeth, infracclusion of deciduous molars and permanent teeth, moderate frontal rotations.

1. Little need. Mild deviations from normal (ideal) occlusion, e.g. pre-normal occlusions with little negative overjet, post-normal occlusion without other anomalies, deep bite without gingival contact, open bite with little frontal opening, crossbite without transverse forced bite, mild crowding or spacing, inversion of single teeth without forced bite, mild rotations of only little cosmetic and/or functional significance.

Grade 1 includes malocclusions which one ought really to be able to disregard, and anomalies in this group are not meant to be referred to a specialist. In assessing the need for treatment one has to strike a balance between the subjective need for treatment as viewed by the patient, and the examining orthodontist's opinion.

Table 1 The development of orthodontics in the Public Dental Health Service in Sweden

Year	Number of clinics	Number of full-time orthodontists
1/1 1957	6	7
1/1 1958	12	12
1/1 1963	34	66
1/1 1968	51	86
1/1 1973	63	131
1/1 1974	64	138

This index of treatment requirements is intended more as a basic guide and its practical implementation calls for a sound sense of judgement. An accepted index of treatment requirements is a help to the orthodontist in his dealings with the patient's parents since it enables him to show that the patient is not being arbitrarily selected for treatment. An accepted index is also useful in organizing the orthodontic services, especially when resources are limited.

The demand for orthodontic care

An important factor in calculating current service requirements is the annual demand for orthodontic care. In connection with the specialist survey carried out by the Swedish National Board of Health, a study was recently made of 722 and 738 children in the counties of Halland and Örebro, respectively. These counties are in the southern and middle part of Sweden. The study also included 654 children from the centre of Stockholm but they are not included here. The figures for Stockholm were similar to those for the county of Örebro.

Table 2 shows the frequency figures obtained for children in the 7–16 year age group. In the county of Halland the total frequency rate for treatment requirement in groups 2, 3 and 4 was 35.1 per cent and the corresponding figure in Örebro county was 25.6 per cent. This represents a significant difference between the two counties and this is interpreted as a reflection of the accumulated need for orthodontic care in the county of Halland compared with Örebro where the treatment resources are almost adequate.

We also have to take into account the patient and parent interest in obtaining treatment and their prospects of doing so. The Halland and Örebro study included a measure of patient demand for treatment and one parent of each patient was present in connection with this study. Table 3 shows the number of children in the counties of Halland and Örebro who were offered treatment but who did not accept treatment. These figures were 11.8 per cent and 12.3 per cent for Halland and Örebro respectively, and if allowance for non-acceptance is made in estimating the total frequency of children in groups 2, 3 and 4 who require treatment, the original figures of 35.1 per cent for Halland and 25.6 per

Table 2 Comparison between two regions concerning frequency of need of treatment for 7-16 year old children.

Region	Number of investigated children	Grade of need of treatment (%)					
		0	1	2	3	4	2+3+4
Halland	722	15.6	49.3	17.8	16.6	0.7	35.1
Örebro	738	22.1	52.3	11.9	13.7	0	25.6
Difference Halland - Örebro. *t*-value		−3.25	−1.15	−3.17	1.54	0	3.96

cent for Örebro are reduced to true frequencies of 30.9 and 22.5 per cent, respectively.

From these true frequencies the distribution of treatment of children in priority groups 2, 3 and 4 between orthodontic specialists, dentists who have undergone further training, and dentists with only basic qualification was also calculated. It was found that 11 per cent of all the children in the age groups 7-16 years needed treatment by specialists.

The average treatment time

The average treatment time in hours per patient per annum was also calculated in the specialist survey for children in nine different parts of Sweden. Table 4 shows the results.

The average treatment time per patient per annum was 4.2 hours. Since treatment methods are improving we can use the figure of 4.0 hours per patient per annum when calculating total future need for specialists. This total need for specialist treatment in a given area can be calculated as the product of mean treatment time per patient per annum and the total number of children in need of specialist treatment.

Assuming that the number of children in Sweden between the ages of 7 and 16 is 1,073,700, 11 per cent of the children require specialist treatment and the average treatment time in hours per patient per annum is 4.0 hours, the total need for specialists will be:

$$\frac{1{,}073{,}700 \times 11 \times 4.0}{100} = 472.428 \text{ hours}$$

If it is assumed that every specialist can provide 1,400 treatment hours in a year the total number of specialists required can be calculated:

$$\frac{\text{total specialist treatment requirement in hours}}{\text{total specialist treatment hours per annum}} = \frac{472.428}{1.400} = 337$$

There is therefore a need for 337 full-time orthodontists in Sweden to provide specialist treatment for 11 per cent of the children between the age of 7 and 16 years. This corresponds to an average need of one orthodontist per 24,000 inhabitants or one orthodontist for every 3,500 children. Allowance must be made however for population structure and distribution within the county area and also for the anticipated demand for specialist treatment. The number of inhabitants per specialist will be greater in rural areas than in urban areas.

The aim is to provide 340 orthodontists in Sweden by 1985. How are orthodontic treatment resources allocated in the Swedish Public Dental Health Service?

Figure 1 shows a schematic illustration of different degrees of treatment requirement, the arrows show how the specialist and the general practitioner will cooperate in treating cases from grade 4 down to 3 and 2 as far as resources

Table 3 Number and frequency of children in two regions who have been offered orthodontic treatment but who have declined.

Region	Number of children who have been offered treatment	Number and frequency of children who have declined	
Halland	254	n	30
		%	11.8
Örebro	228	n	28
		%	12.3
Difference Halland - Örebro. *t*-value			−0.16

Table 4 Average treatment time/patient per year in nine regions of Sweden.

Region	Method of calculating	Average treatment time/patient per year (in hours)	Number of children
Public Health Service			
Halland	1	3.1	50
	2	2.6	1,166
Kopparberg	1	4.0	15
	2	3.1	993
Kristianstad	1	4.0	10
	2	3.0	854
Stockholm	1	7.3	50
	2	2.8	1,786
Västernorrland	1	4.0	16
	2	3.4	146
Örebro	1	5.6	86
	2	4.9	1,266
Private offices			
Göteborg	1	4.6	47
Stockholm	1	4.5	15
	2	5.2	309
Stockholm	1	5.3	19
	2	4.9	350

Average treatment time/patient per year is 4.2 hours.

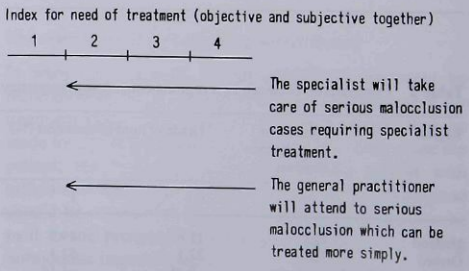

Figure 1 The distribution of orthodontic treatment between the orthodontist and the general practitioner.

permit. The specialist will deal with serious malocclusions requiring specialist treatment while the general practitioner deals with those malocclusions that can be treated by more simple means. The diagnosis will always be made jointly with the orthodontic specialist. Developmental checks and preventive measures are carried out by the general practitioner either alone or in collaboration with the orthodontist, the scope of this treatment being determined by the general practitioner's interest and ability.

How are the orthodontists organized in relation to the general practitioners in the Public Dental Health Service? The Public Dental Health Service is organized in separate dental districts in each of the 24 counties in Sweden. In each county there is one orthodontic clinic with one or more orthodontists and this clinic serves the general practitioners in the district dental clinics within that county. The orthodontists visit the clinic once or twice a year for consultation.

The selection of new cases for registration with the orthodontist is left to the general practitioner who, because of his knowledge of the individuals derived from his experience in general practice, is acquainted with the patient's domestic background and general environment and can assess their likely co-operation with orthodontic treatment.

The orthodontic clinics in the Public Dental Health service are modern and well equipped. In many cases the orthodontist has two chairs in his operating room. The orthodontists are completely free to choose the type of treatment that they think best for the patient.

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