

Academic dissertations by dentists in Finland, 1891–1991, and in Finland, Norway, and Sweden, 1984–93

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Dental education in the Nordic countries was founded in the late 1800s, but the doctor's degree in dentistry (Ph.D.) was established somewhat later. Since the first dissertation in Finland in 1891, a total of 204 doctoral dentist candidates had defended their Ph.D. theses by 1991, 50% of them during the most recent 12 years. Over the 100-year period, 54% of the dentists' Ph.D. theses in Finland were defended at the University of Helsinki, 27% at Turku, 14% at Kuopio, and 5% at Oulu. Women constituted a minority of the candidates (23%) during the first 90 years but 54% from 1982 to 1991. From 1984 to 1993 a total of 374 dentist candidates in Finland, Norway, and Sweden defended their Ph.D. theses. The mean ages of the candidates ranged from 37.7 to 41.7 years for men and from 40.6 to 43.2 years for women. In the 10-year period on average 53 doctor's degrees were received per institute in Sweden, compared with 28 in Finland and 27 in Norway. In all three countries about 6 of 100 graduates in 1980s received a doctor's degree in dentistry. Almost all of these Ph.D. theses were written in English and based on collections of articles. Female candidates dominated in Finland (56%), compared with 34% in Sweden and 26% in Norway, where, however, women's contribution increased most rapidly, being tripled from early 1980s to 1990s. □ *Dental education; dental history; Nordic countries; postgraduate education*

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The 100th anniversary of dental education in Finland was celebrated in 1992 at the University of Helsinki, where Matti Äyräpää, later known as the father of dental education in Finland, had been nominated as the first teacher for the first post in dentistry in 1892, 1 year after his dissertation (1).

In the Nordic countries dental education was founded during the same period, in the late 1800s, in Helsinki, Oslo, and Stockholm and is nowadays quite similar in Finland, Norway, and Sweden, resulting in professional degrees corresponding to each other. The doctor's degree in dentistry (comparable to a Ph.D.) was established in Finland in 1917, in Sweden in 1948, and in Norway in 1953. Before these dates, dentists had, however, the opportunity of postgraduate studies and earning a doctorate, in for example, medicine or philosophy (2).

The numbers of dental schools and dental students remained small until the second half of the 20th century, when seven new dental schools were opened, three in Finland (Turku in 1958, Kuopio and Oulu, both in 1973), one in Norway (Bergen in 1962), and three in Sweden (Malmö (incorporated into the University of Lund) in 1948, Umeå in 1956, and Göteborg in 1967). As a consequence of these new schools, the number of graduations in dentistry increased markedly in each country (Table 1). However, a clear decrease in the number of graduations was later seen: first in Norway, starting in 1975, then in Sweden, starting in 1980, and, finally in Finland, from 1985.

Expansion of dental education almost doubled the dental profession in about two decades (3–7). In 1985 the official statistics gave as the population–dentist ratio (the number of citizens per active dentist) as 881 for Sweden, 1122 for Norway, and 1252 for Finland. Compared with the corresponding ratio in 1966, the change over two decades had been only 17% for Norway but 34% for Sweden and 35% for Finland.

The purpose of the present paper was to offer detailed statistics on dentists' Ph.D. dissertations in Finland from 1891 to 1991 and to compare figures on dentists' Ph.D. dissertations in Finland, Norway, and Sweden over the 10-year period from 1984 to 1993.

Materials and methods

Information on dentists' dissertations in Finland is available in the *Bibliography of Finnish Dental Literature*, published three times since 1982, listing all dissertations since 1891 (8–10). The listing also includes candidates who have graduated both in dentistry and in medicine but who have taken their doctor's degree in medicine. Background information on doctoral dentist candidates came from the biography of Finnish dentists published several times since 1907 (11–17).

A bibliography of dental dissertations in four Nordic countries: Sweden, Norway, Denmark, and Finland, in 1907–1975 was published by Löfgren (2) in *Acta Odontologica Scandinavica* in 1976. Besides the data on

Table 1. Numbers of dental school graduates, dentists, and the dentist to population ratio in three Nordic countries, 1966–90.

Statistics	Finland	Norway	Sweden
Graduations per year*			
In 1966	113	92	247
In 1975	126	136	325
In 1980	166	109	440
In 1985	203	88	353
In 1989	157	83	246
In 1990	144	70	170
Total no. of graduations in 10 years†			
From 1980 to 1989	1753	933	3463
Total number of active dentists*			
In 1966	2326	2900	5880
In 1975	3254	3842	7060
In 1980	3938	3484	8489
In 1985	4743	3702	9478
In 1989	4369	3702	9548
Estimated mean for 1980s†	4350	3629	9172
Percentage of female dentists in the 1970s‡	72%	30%	30%
Population per active dentist*			
In 1966	1927	1359	1343
In 1975	1450	1046	1162
In 1980	1261	1176	980
In 1985	1252	1122	881
In 1989	1136	–	889

* Data from official statistics (Refs. 3–7).
 † Estimated using the data from Refs. 3–7.
 ‡ Data source (Ref. 19).

dissertations his report includes information on dental colleges and faculties in Nordic countries. Since the first edition, Löfgren has published the bibliography annually, covering the years from 1976 to 1983. After that, his work was continued by Kvam et al. In 1990 they published a collection for the 5-year period from

1984 to 1988 (18), listing dentists' dissertations for the doctor's degree in dentistry only.

Preliminary information on dissertations in Denmark, Norway, and Sweden was picked up from the above-mentioned bibliographies, but the data proved to be insufficient. Therefore, the lists collected by us were sent

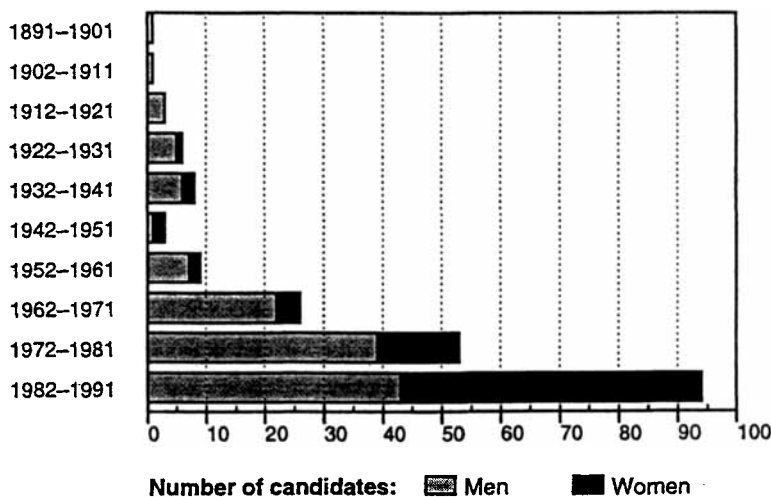


Fig. 1. Number of dentists' Ph.D. dissertations in Finland by gender in 10-year periods from 1891 to 1991.

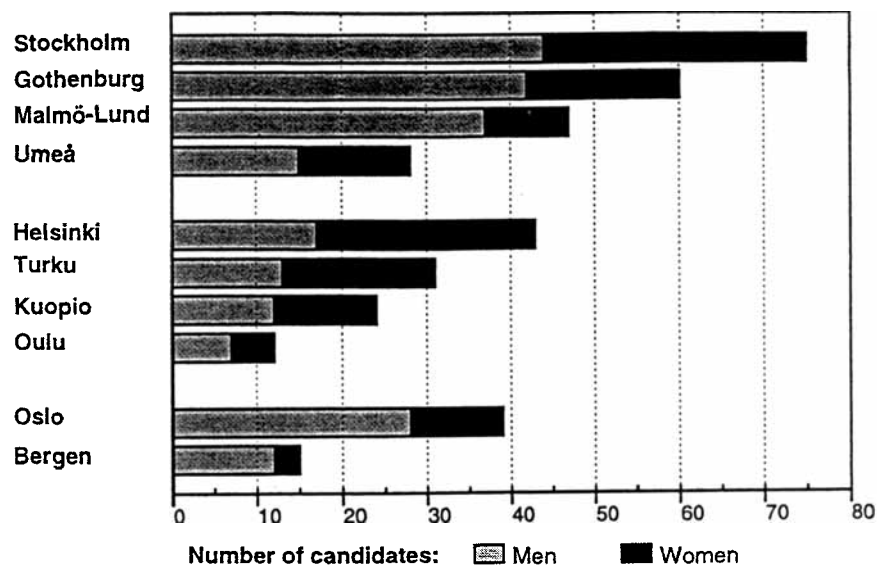


Fig. 2. Number of dentists' Ph.D. dissertations by gender and dental school in three Nordic countries, 1984-93.

to each dental school and, at our request, checked and completed by their deans to cover recent years up to the end of 1993. Owing to differences in receiving a doctoral degree in dentistry in Denmark the data on Danish dissertations were, however, excluded.

The final data include the name and date of birth of the candidate in question, the date and place of his or her dissertation, and the language and type of each thesis: a monograph or a collection of articles.

Statistical evaluation of differences between the subgroups to be compared was carried out by means of the *t* test and the chi-squared test.

Results

Dentists' dissertations in Finland from 1891 to 1991

During the hundred years since Matti Äyräpää's dissertation, a total of 204 doctoral dentist candidates, 128 men and 76 women, have defended their Ph.D. theses in Finland. Fig. 1 shows the number of dentists' dissertations by gender in 10-year periods from 1891 to 1991.

In the first 70 years, only 31 dentists' dissertations were defended in Finland, 24 by men and 7 by women. During the next decades, however, the number of dissertations by dentists increased rapidly, 50% having been defended in the last 12 years of the 100-year period, from 1980 to 1991.

In the first 80 years, one in five candidates in Finland was a woman. Since then, women's contribution has

been on the increase: 26% of candidates were women from 1972 to 1981, and 54% from 1982 to 1991.

By 1991 the mean age of all doctoral dentist candidates in Finland was 39.1 years (range, 26.3 to 63.2 years; median, 38.3 years). No trend in candidates' ages over the years was seen, but male candidates tended to be younger than the female ones ($p < 0.01$). Mean ages were 37.9 years for men and 41.3 years for women, the median ages being 38.1 and 40.6 years, respectively.

The distribution of candidates by age was clearly different for men than for women ($p < 0.001$). Candidates younger than 35 years dominated among men (37%, compared with 25% for women), whereas candidates aged 50 years or older were extremely rare (<2%) among men, but quite common (18%) among women.

In Finland, 54% of all Ph.D. dissertations by dentists over the 100-year period have been defended at the University of Helsinki, 27% at Turku, 14% at Kuopio, and 5% at Oulu. The first dissertation at Helsinki was by Matti Äyräpää, at Turku by Heikki Luoma in 1964, at Oulu by Arvi Tasanen in 1969, and at Kuopio by Lauri Turtola in 1977.

During the 100-year period 80% of the Ph.D. theses in Finland were written in English, 11% in Finnish, 7% in German, and 2% in Swedish. The first thesis in English was by Kalevi Koski in 1948. The most recent thesis in Swedish was by Hellas Groundstroem in 1954 and in German by Bertil Ekensten in 1940. Matti Äyräpää himself wrote his thesis in Finnish, and so have 21 of his successors, even recently: there were 7 in

Table 2. Comparison of dentist doctoral candidates by gender in three Nordic countries, 1984–93

Country	Male candidates			Female candidates			All candidates					
	n	Age (years)		n	Age (years)		n	Age (years)				
		Mean	(SD)		Median	Mean		(SD)	Median	Mean	(SD)	Median
Finland	49	37.7	(5.6)	38.0	61	41.0	(7.1)**	41.9	110	39.5	(6.6)	39.3
Norway	40	41.7	(10.3)*	39.3	14	43.2	(7.2)	42.9	54	42.1	(9.6)*	39.8
Sweden	138	39.1	(7.0)	37.9	72	40.6	(8.2)	38.8	210	39.6	(7.5)	38.3

Statistical evaluation using *t* test. Difference by gender within countries: ***p* < 0.01 for Finland; all others, NS. Differences between the countries: **p* < 0.05 for male candidates and for all; for women, NS.

1972–1981 and 9 in 1982–1991. Äyräpää's thesis was translated into German in 1892 and into Russian in 1893 (1).

Dentists' doctoral theses were all monographs until Matti Elomaa defended his thesis based on a collection of articles in 1968, and his four successors in 1972: Inkeri Rytömaa, Anna-Maija Raeste, Reijo Ranta, and Markku Larmas. This type of Ph.D. thesis rapidly became more frequent: 47% of theses in 1972–1981 and 80% in 1982–1991 were based on collections of articles. Women seemed to adopt the new type with enthusiasm as 79% of their theses in 1972–81 and 84% in 1982–91 were based on collections of articles, compared with 36% and 74% among men, respectively. Since 1972 the doctoral candidates writing monographs tended to be older than those with articles: the differences were 4.4 years for men (*p* < 0.01) and 3.1 years for women (*p* < 0.10).

Dentists' dissertations in three Nordic countries from 1984 to 1993

During the 10 years from 1984 to 1993 a total of 374 candidates, 227 men and 147 women, in Finland, Norway, and Sweden, defended their Ph.D. theses (Fig. 2). The oldest male candidate in Finland was aged 48.3 years, in Sweden 60.0 years, but in Norway 80.6 years. For female candidates the corresponding figures were 58.7 years, 66.3 years, and 54.2 years, respectively. The mean age of the candidates was highest (*p* < 0.05) in Norway, 42.1 years. Within each country an age difference by gender was only seen for Finland, where female candidates were older than the male (41.0 versus 37.7 years; *p* < 0.01). Table 2 shows the basic statistics on the number of candidates and their mean ages by country and gender, from 1984 to 1993.

More detailed statistics on dentists' Ph.D. dissertations in these three Nordic countries are given in Table 3. Female candidates dominated in Finland (56%) compared with 34% in Sweden and 26% in Norway. Women's contribution, as compared in 5-year periods, seemed to have increased most rapidly in Norway, from

13% to 37% (Fig. 3). In early 1990s Finland was still the only country with an even distribution by gender, as one in two Finnish candidates was female.

With regard to such characteristics as the language and type of the theses, Norway and Sweden were quite similar, with almost all theses (96% to 99%) written in English and the vast majority (93% to 98%) based on collections of articles. The corresponding figures for Finland were somewhat lower, but still high: 93% and 85%, respectively.

In proportion to the number of dentists in each country, postgraduate education was most prevalent in Finland and Sweden, with 25 Finnish and 23 Swedish dentists out of 1000 dentists receiving a doctors' degree in dentistry, compared with 15 in Norway (Table 3). The postgraduate productivity of dental schools was highest for Sweden, where 53 doctor's degrees were received per institute in this 10-year period, compared with 28 for Finland and 27 for Norway.

In proportion to the number of graduations in the 1980s, postgraduate education proved to be equally

Table 3. Statistics on dentists' Ph.D. dissertations in three Nordic countries, 1984–93

Characteristics	Finland (n = 110)	Norway (n = 54)	Sweden (n = 210)
Percentage of female candidates	55.5***	25.9	34.3
Percentage of theses in English	92.7*	96.3	98.6
Percentage of theses based on collections of articles	84.5***	92.5	98.1
No. of dissertations in 10 years per 1000 dentists in the 1980s	25.3	14.9**	22.9
No. of dissertations in 10 years per 100 graduates in the 1980s	6.3	5.8	6.1
No. of institutes graduating dentists	4	2	4
No. of dissertations per institute, 1984–93	27.5	27.0	52.5*

Statistical evaluation using the chi-squared test and the *t* test. Difference between the countries: *** *p* < 0.001; ** *p* < 0.01; * *p* < 0.05; all others, NS.

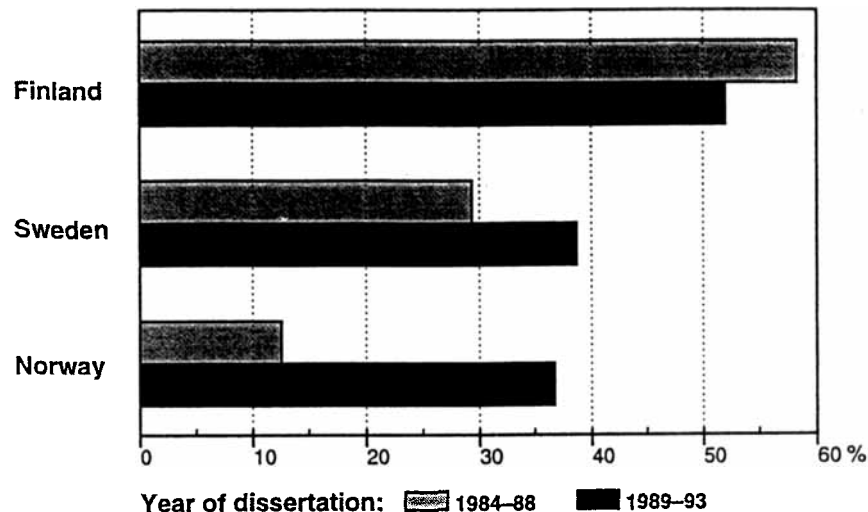


Fig. 3. Proportion (percentage) of female doctoral dentist candidates in three Nordic countries, 1984-93.

frequent in the three countries: around 6 of 100 graduates defended their theses for doctor's degree in dentistry (Table 3).

Discussion

Matti Äyräpää's lifework created a strong scientific basis for dental education and dental research in Finland. He was a cosmopolitan whose international relations were numerous and fruitful, offering later generations an inspiring model of communication between researchers. His example has been followed by Finnish dentists, as exemplified by their high participation rates in international dental meetings. In 1993, for example, almost 60 Finnish dentists presented scientific papers at the IADR general session, three of them winning prizes for their merits.

Although Matti Äyräpää's Ph.D. thesis was written in Finnish, it was soon translated into other languages, to enable his research results to be discussed in international scientific circles. Nowadays this goal is achieved as part of the postgraduate education process because most of the Ph.D. theses are originally written in English, and the vast majority are based on collections of articles published in international journals. With regard to the theses written in Finnish, translation has not been the practice, but these candidates tend to publish their main findings afterwards in international dental journals.

Women dentists' contribution to dental research in Finland has been remarkable over the past years, which reflects their long-term majority in the Finnish dental profession. Since the 1920s approximately 70% of the dentists in Finland have been women (18). However,

women became the majority of doctoral dentist candidates no earlier than the 1980s, and compared with their actual share of dental profession, they have not reached their level yet.

Comparison of the three Nordic countries over the past 10 years showed a considerable similarity of the dentists' doctoral theses by language and type. Small differences were found among candidates' age, but the most remarkable contrast was in the high proportion of female candidates for Finland. The proportion of female doctoral candidates in the other two countries, however, reflected women's proportion of the dental profession even more precisely (34% versus 30% in Sweden, and 26% versus 30% in Norway) than did Finland's (56% versus 70%). Furthermore, the increase in women dentists' Ph.D. dissertations seemed to be sharpest in Norway, where it was tripled from the early 1980s to 1990s.

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