Work-related skin and airway symptoms among Swedish dentists rarely cause sick leave or change of professional career

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Dentistry usually is 'wet work' with risk of damage to the skin barrier, and the hands may be exposed to skin irritants and contact-sensitizing substances used in dental materials or gloves. Airway irritants may also be present. This study assessed the consequences of work-related skin and airway symptoms among dentists in terms of contact with health authorities, sick leave, or changes in the professional career. A questionnaire on these factors was answered by more than 3000 Swedish dentists. Only 6% of the respondents had consulted a physician, although 22% had noted work-related skin symptoms. In 2% the skin symptoms had caused sick leave, and about 2% had reported their skin symptoms as an occupational disease. Two per cent had consulted a physician owing to work-related airway symptoms, which is a minor part of the 13% who had experienced such symptoms when in contact with dental materials. Twenty-five dentists (<1%) had been on sick leave because of work-related airway symptoms. Only 19 dentists reported change of activities or occupation owing to work-related skin or airway symptoms, and in most cases these symptoms only contributed to their decision. In summary, whereas sick leave in dentists because of musculoskeletal problems may be common, the present study shows that this is not the case for work-related skin or airway symptoms, and such symptoms seldom affect the dentists' professional career. ☐ *Change of work; dental materials; dentists; sick leave*

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Ordinary dentists have 'wet work' with a risk of damage to the skin barrier, resulting in dry skin and hand eczema. The hands are exposed to skin irritants and to contact-sensitizing substances used in dental materials. Several reports of skin reactions to dental materials, especially acrylates, among dental personnel were published in the 1990s (1–8).

The use of protective gloves in dentistry has increased with the intention of improving protection against infection. Protective gloves have also been advocated to protect the skin from direct contact with uncured composite resin materials. Protective gloves are, however, insufficient in this respect, owing to the permeability of natural rubber latex (NRL), vinyl, and nitrile gloves to acrylic monomers (9, 10). The use of gloves may also induce other side effects, and rubber latex gloves can cause immediate and delayed-type allergic skin reactions (11, 12).

Both volatile substances and particles from drilling and grinding may be found in the breathing zones of dental personnel and might induce airway symptoms (13, 14), especially in those dentists who already have asthma or rhinitis.

A few studies have reported the consequences of work-related symptoms from the back, neck, and shoulders among dentists (15–17). We found no such report, however, on the fate of dentists acquiring work-related skin or airway symptoms.

We have recently reported the prevalence of self-reported skin symptoms in a large sample of Swedish dentists (8). The aim of the present study was to assess the consequences of work-related skin and airway symptoms among these dentists, in terms of contact with health authorities, sick leave, or changes in professional career.

Subjects and methods

Subjects

All licensed dentists in Sweden are registered by the National Board of Health and Welfare. From this register (n = 10,621 in 1996) 3500 dentists, aged less than 65 years and licensed in Sweden between 1965 and 1995, were randomly selected.

Questionnaire

A questionnaire on skin and airway symptoms, atopy, occupational experience, and other background factors was sent by mail to the 3500 dentists in 1996 (8). It included questions on whether the dentist had contacted a

Table 1. Questions on skin and airway symptoms, medical treatment, sick leave, and consequences for the professional career

1. Do you often experience dry and rough skin on your hands?
2. Do you have or have you had hand eczema?
4. Have you on any occasion experienced hand eczema during the past 12 months?
6. Has your hand eczema been diagnosed by a physician?
7. Have you, in relation to the hand eczema, been patch-tested at a dermatological clinic?
8. Did you experience childhood eczema?
11. Have you had from blocked nose or attacks of sneezing without having caught a cold during the past 3 months?
12. Do you have or have you had allergic rhinitis?
13. Has your allergic rhinitis been diagnosed by a physician?
14. Do you have or have you had asthma?
15. If yes to Q 14, how old were you when your asthma started?
17. Has your asthma been diagnosed by a physician?
Self-observed skin and airway symptoms related to dental materials
Have you experienced any/some of following reactions when in contact with dental materials?
18. Rapid itching on the hands?
19. Aching/burning feeling on the hands or fingers?
20. Itching on the face?
22. Irritation of the airways or cough?
23. Blocked nose?
24. Asthma?
Final questions
27. Have you experienced rapid onset of itching on the hands when in contact with protective gloves?
32. If you have or have had skin symptoms when in contact with dental materials or protective gloves, have you consulted a physician?
36. Have you been on sick leave due to your skin symptoms?
37. Have you reported your skin symptoms as an occupational disease?
38. Were your skin symptoms so severe that you changed your activity?
39. If you have or have had airway symptoms when in contact with dental materials, did you contact a physician?
40. Have you been on sick leave owing to your airway symptoms?
41. Have you reported your airway symptoms as an occupational disease?
42. Were your airway symptoms so severe that you changed your activity?

physician owing to work-related skin or airway symptoms, about sick leave caused by these symptoms, or about notification of occupational disease and whether the symptoms had caused changes of occupation or work tasks. The questions related to the present study are shown in Table 1. Data on skin symptoms have been reported previously (8).

Response rate

After three reminders and the completion of some questionnaires in a telephone interview, 3082 (88%) questionnaires could be used in the present study. Forty-seven per cent of the respondents were employed in public dentistry, and 38% in private practice. The others had faculty positions or were no longer active as dentists. The age and sex distribution of the responders is given in Table 2.

Table 2. Number of completed questionnaires stratified by sex and age

Age (years)	Men, *n*	Women, *n*	Total, *n*
25–39	329	468	797
40–49	731	653	1384
50–64	558	343	901
Total	1618	1464	3082

Analysis of non-responders

Of those who did not return the questionnaire, 150 were randomly selected for a short telephone interview; for details see Ref. 8. Among those 43% (65 of 150) who agreed to a telephone interview, 82% were still working as dentists. Twelve had changed their occupation but none of them owing to work-related skin or airway symptoms.

Interview

A telephone interview was carried out with those 19 dentists who, in the questionnaire, reported change of professional career or work tasks due to work-related skin or airway symptoms. In this interview time, place, and diagnoses from skin or airway examinations were asked for. Whenever possible, the medical files were checked (in six cases), with the permission of the patient. The main reasons for change of occupation or work tasks were recorded.

Statistics

Differences between men and women were tested by using the Mantel–Haenzel chi-square technique (18, 19).

The study was approved by the Research Ethics Committee, Göteborg University.

Table 3. Dentists reporting both skin symptoms when in contact with dental materials or gloves and medical treatment, sick leave, or report of occupational disease. The table shows the fractions (in percentage) of all dentists ($n = 3082$)

	Consulted a physician		Sick leave		Reported occupational disease	
Age (years)	Men	Women	Men	Women	Men	Women
25–39	5.5	5.3	0.3	1.1	1.2	0.9
40–49	4.5	7.5	1.5	1.8	1.6	2.0
50–64	6.5	8.5	3.0	3.2	2.5	5.2
Total	5.4	7.0*	1.8	1.9	1.9	2.4

* Significantly higher than men ($P = 0.03$).

Results

Skin symptoms

As reported previously, dry and rough skin on the hands was common (45%) among dentists, and about 14% reported hand eczema during the past 12 months (8). Dentists with childhood eczema had an increased risk of self-reported hand eczema in adult life (8). Dry and rough skin on the hands and self-reported hand eczema during the past 12 months were more common in dentists than in general population samples studied, using the same postal questionnaire (8, 20). Skin symptoms related to dental materials or gloves (questions 18, 20, or 27 in Table 1) were reported by 22% of the respondents (8).

Airway symptoms

Twenty-four per cent of the respondents had had (after 15 years of age) more than 3 months of blocked nose or attacks of sneezing without having a cold. Fifteen per cent reported physician-diagnosed allergic rhinitis, 7% had had asthma, and 5% reported physician-diagnosed asthma (8). Airway symptoms related to dental materials (questions 22—24 in Table 1) were reported by 13% of the respondents.

Medical treatment and sick leave

Table 3 shows the number of dentists who reported both skin symptoms when in contact with dental materials or gloves and medical treatment, sick leave, or reports of occupational disease. Six per cent had consulted a physician owing to these problems—that is, only about one fourth of the 22% that had noted work-related skin symptoms when in contact with dental materials or gloves. For about 2% (56 of 3082) of the dentists skin symptoms had resulted in sick leave. Thirty male dentists and 35 female dentists (2%) had reported their skin symptoms as an occupational disease.

We did not find any association between sick leave and childhood eczema. Fifteen respondents with childhood eczema and 41 without childhood eczema reported sick leave because of work-related skin symptoms.

Two per cent ($n = 59$) had been treated by a physician for work-related airway symptoms (Table 4). This is a minor part of the 13% who had experienced airway symptoms when in contact with dental materials (questions 22–24). Medical treatment was more common among women than men. Twenty-five dentists (0.8%; 10 men and 15 women) had been on sick leave because of work-related airway symptoms. Only six dentists had reported airway symptoms as an occupational disease.

Changes in the professional career

In the telephone interviews ($n = 19$) 14 dentists reported that they had changed activities or occupation because of work-related skin symptoms. In addition, three had done it owing to both skin and airway symptoms, and another two owing to airway symptoms only (Table 5). Some of the dentists had not consulted a physician because of these symptoms. It was also shown that for most of the dentists the work-related skin or airway symptoms only contributed to their decision, other factors being more important. As shown in Table 5, only four of the dentists had early retirement pensions as a consequence of work-related skin

Table 4. Dentists reporting both work-related airway symptoms and medical treatment, sick leave, or reports of occupational disease owing to such symptoms. The table shows the fractions (in percentage) of all dentists ($n = 3082$)

	Consulted a physician		Sick leave		Reported occupational disease	
Age (years)	Men	Women	Men	Women	Men	Women
25–39	1.2	0.6	0.6	0.2	0.3	0.0
40–49	0.7	3.1	0.1	0.9	0.3	0.2
50–64	2.3	4.1	1.3	2.3	0.2	0.3
Total	1.4	2.5*	0.6	1.0	0.2	0.1

* Significantly higher than men ($P = 0.007$).

Table 5. Dentists who changed occupation or work tasks because of work-related skin or airway symptoms

No.	Sex	Born	Year of examination	Previous dental activity	Childhood eczema	Symptoms	Symptoms started	Diagnosis	Year of change	Main reason for change	Present work
1	F	1937	1966	Private practice	No	Skin	1984	Allergic contact dermatitis	Unknown	Other	Partly retired, works 10 h/w
2	M	1940	1965	Private practice	No	Skin	1990	Hand eczema*	1996	Hand eczema	Early retirement pension
3	F	1943	1972	Public dentistry	No	Skin	1980	Allergic contact dermatitis (nickel)	1988	Hand eczema	School teacher
4	F	1948	1983	Private/teacher, 50%/50%	Yes	Skin	1980	Hand eczema*	1984	Other	Pharmaceutical company
5	M	1949	1980	Public dentistry	No	Skin	1982	Hand eczema*	1986	Other	Travel agency
6	F	1950	1976	Private practice	No	Skin	1980	Allergic contact dermatitis* (formalin)	1993	Other	Unemployed
7	F	1954	1978	Public dentistry	No	Skin	1988	Allergic contact dermatitis (nickel)	1994	Other	Oro-facial dental work
8	M	1955	1980	Public dentistry	Yes	Skin	1982	Irritant contact dermatitis*	1994	Hand eczema and back pain, 50/50%	Student
9	F	1955	1982	Dental teacher	No	Skin	1982	Hand eczema*	Unknown	Hand eczema and other, 50/50%	Dental teacher (other department)
10	M	1957	1980	Private/public	No	Skin	1988	Hand eczema*	1988	Other	Salesman
11	M	1957	1982	Private practice	No	Skin	1980	Hand eczema*	1994	Hand eczema	Manager
12	M	1958	1986	Public dentistry	No	Skin	1990	Hand eczema*	1992	Shoulder pain	Accountant
13	M	1964	1991	Dental teacher	No	Skin	1991	Hand eczema*	1993	Hand eczema and other 50/50%	Research
14	M	1965	1991	Public dentistry	No	Skin	1994	Hand eczema*	1995	Other	Research
15	M	1940	1968	Private practice	Yes	Skin and airways	1980	Allergic contact dermatitis (acrylates)	1987	Hand eczema	Early retirement pension
16	M	1944	1972	Private practice	No	Skin and airways	1975	Hand eczema*	1990	Neck and shoulder pain	Computer work
17	F	1954	1980	Private practice	Yes	Skin and airways	1981	Atopic dermatitis, latex allergy	1991	Latex allergy	School teacher
18	M	1942	1972	Private practice	No	Airways	1986	Lung disease, not caused by work	1992	Lung disease	Early retirement pension
19	M	1948	1973	Private practice	No	Airways	1983	Rhinitis and cough*	1995	Back pain	Early retirement pension

* Self-reported diagnosis, medical files not available.

and airway problems. Two had changed work because of allergic contact dermatitis and one owing to latex allergy. The mean number of years as a dentist before change of occupation or activity was 13 years (median, 6 years). They were at that time on average 41 years of age.

Of 19 dentists who had changed occupation because of work-related skin or airway symptoms, 4 reported childhood eczema. Of the non-responders who could be interviewed ($n = 65$), no one reported childhood eczema and none had changed work because of work-related skin or airway problems.

Discussion

The main findings in this study are that, although work-related skin and airway symptoms were common in dentists, only a small proportion sought medical treatment, and few of them had to change their work tasks or occupation.

Validity

The present study included a relatively large random sample of dentists—almost half of the practicing dentists in Sweden—and the response rate was high. In cross-sectional studies of work-related disease there is always a possibility of underestimating the true risk due to the 'healthy worker effect' (21). Since the present study focused on consequences like sick leave and change of professional career, caused by work-related adverse effects, it is crucial that our sample also includes dentists whose work-related symptoms had such consequences. Our design—not sampling only the active dentists but using the records of all dentists licensed from 1965, to establish a cohort of these dentists—minimizes bias due to selection from the dental profession.

Of the non-respondent group about half could be reached for a telephone interview. Among these, 12 had changed their work or occupation, but none of them because of work-related symptoms. Therefore, our con-

clusion that few dentists leave their occupation owing to work-related symptoms is still valid after taking the non-responders into account.

Medical treatment and sick leave

Only a few dentists with work-related skin (or airway) symptoms sought medical treatment and/or were on sick leave because of these symptoms. The reason is probably that the symptoms were intermittent and moderate in intensity. Furthermore, dentists with a slight traumatic dermatitis may increase the use of emollients or change their habits with regard to glove use rather than seeking medical treatment. Only in serious cases is a period of sick leave necessary. A recent clinical dermatological study of dentists from the present study base showed that most cases of hand eczema were non-allergic (22). Work-related airway symptoms were reported to be relatively common, but few dentists had sought medical treatment or been on sick leave owing to these symptoms.

Whereas the present study shows that sick leave owing to work-related skin or airway symptoms is relatively uncommon, other studies have shown higher figures for sick leave in general. In a sample of Swedish dentist ($n = 238$) in northern Sweden long-term sick leave was rare among male dentists but common among female dentists. Only 2%–3% of male dentists were on long-term (>30 days) sick leave, as compared with 11% of female dentists (23). In a sample of American dentists about 60% reported musculoskeletal pain during the past year, and 40% of these had sought medical treatment (prescription medication) (15).

One of the reasons some studies have reported substantial sick leave for dentists is therefore probably the fact that musculoskeletal problems are common in dentistry (24) and often cause sick leave. Milerad & Ekenvall (16) found that 22% of a sample of dentists had current neck symptoms. Fourteen per cent of the dentists had received medical treatment, and 5% had been on sick leave during the past 12 months because of musculoskeletal symptoms.

Among hand eczema patients in general, medical treatment and sick leave are relatively common. In a Swedish population study about two thirds of those with hand eczema had consulted a physician, and one fifth had been on sick leave at least once owing to hand eczema (25, 26). However, the fraction of the total population sample that had consulted a physician owing to skin problems was about the same as in our cohort of dentists (6%). Sick leave is common in service occupations (26). In a study of car mechanics, however, only about one fourth of those with self-reported hand eczema had consulted a physician, and few (4%) had been on sick leave because of hand eczema (27). These figures are similar to the results for dentists in the present study. In a Norwegian population study (28) about a tenth of those with hand eczema had been on sick leave because of the eczema. In a study of hospital employees in Finland about half of those diagnosed with hand eczema during a 10-year period had been on sick leave (29). It should be noted, however, that there are problems when comparing data on sick leave between time periods and between countries, since differences in social insurance systems may affect the occurrences of sick leave.

Change of professional activity

A minority of the dentists (19 of 3082) (Table 5) reported change of professional activity owing to work-related skin or airway symptoms. One reason for this may be the same as mentioned above—that is, that the work-related symptoms in most cases are of moderate intensity. Moreover, the dental profession is a specialized one, the skills and education being less useful in other occupations.

Among the dentists who changed work at least partly because of work-related skin or airway symptoms the distributions by sex and occupational activity were similar to those of the total population of dentists. Nor was the number of dentists with childhood eczema (4 of 19) remarkable. The median time from onset of symptoms until change of professional activity was 6 years. Most of the dentists (Table 5) changed their activities in the 1990s. Even when taking into account the increasing number of dentists, changes of professional activity seem to have been more common in the 1990s. It is therefore conceivable that this problem is increasing, possibly owing to increased use of acrylates (22) or protective gloves.

In contrast to our findings for dentists, it is not uncommon in other occupational groups that work-related skin symptoms cause changes of occupation or work tasks. In a population study (30) 8% of those with hand eczema had changed work because of this condition. In a study of bakers the highest incidence of hand eczema occurred during the 1st year of employment (31). About 6% of all bakers, and 31% of those with hand eczema, had to change jobs because of the eczema. In a study of hairdressers (32) one third had to give up their work owing to work-related skin or airway disease. Again, comparisons between time periods and occupations should be interpreted with caution, since the possibility of changing work is affected by the unemployment rates.

In a recent study by Åkesson et al. (17) 30 randomly selected female dentists were re-examined after a 5-year interval. By then, three dentists had left their profession, all of whom had musculoskeletal symptoms at the initial examination. So, although skin and airway symptoms seldom force dentists to change their occupation, such consequences are not uncommon as a result of musculoskeletal symptoms.

Conclusions

Of the respondents 22% reported work-related skin problems on contact with dental materials or gloves, but only 6% received medical treatment because of such symptoms, and only 2% had been on sick leave. The latter figures are similar to those found in the general

population. Thus, the work-related skin symptoms of dentists seem not to increase medical treatment or sick leave. A similar result was found for airway symptoms, 14% reporting airway symptoms, but only 2% having sought medical treatment and 0.8% having been on sick leave. Even though work-related skin or airway problems are common among Swedish dentists, most dentists with such symptoms could continue their work, albeit after change in their work methods.

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