

Increase in contact allergy to fragrances: patch-test results 1989–1998

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We report the results of patch tests with fragrance-mix as a part of the standard series carried out over the last 10 years (1989–1998) during routine testing of 6129 patients in our department. 5.9% of the total number of patients who were patch tested were positive to fragrance mix. The sex ratio was 2.3:1 with a female predominance. In 1989–1993, the frequency of contact sensitivity to fragrance mix was 3.9% (4.9% for females and 2.1% for males). This rate rose both in female and male patients during the observed period of time and attained 8.9% (females) and 4.1% (males) in 1994–1998; the overall frequency in 1994–98 was 7.5%. This rising trend, which was statistically significant, might be the consequence of an increased use of cosmetics and toiletries containing fragrances in our population.

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Fragrances are an important cause of allergic contact dermatitis in most countries. Patch testing with fragrance mix is widely used as a screen. It is estimated that the mix detects possibly 70–80% of fragrance sensitivity (1). It is one of the most frequently positive allergens in the European standard series, and in many countries, it rates second after nickel sulfate. Some investigators have reported an increase in the frequency of positive reactions to fragrance mix during the last 2 decades (2, 3).

In Slovenia, fragrance mix has been routinely tested since 1986 as a part of the standard series. In 1986–1988, the frequency of contact sensitivity to the mix was low. In Ljubljana, it rated 7th among the most frequently positive allergens. However, an upward trend has become apparent since 1989. This study was undertaken to follow the epidemiology of contact allergy to fragrance mix over the past 10 years (1989–1998).

Patients and Methods

All patients attending our department for patch testing from 1989 to 1998 were patch tested to fragrance mix 8% (with 5% sorbitan sesquileate) pet. as part of the standard series. The test concentration and the composition of fragrance mix (cinnamic aldehyde 1%, cinnamic alcohol 1%, amyl-

cinnamic alcohol 1%, eugenol 1%, isoeugenol 1%, oak moss 1%, geraniol 1%, hydroxycitronellal 1%, sorbitan sesquileate 5%) have been the same between 1989 and 1998. The methodology of patch testing in the department, performed in a special laboratory for epicutaneous testing, has also remained unchanged during the whole study period. Allergens were supplied by Hermal (Trolab) and applied using Leukotest Epikutan-Testpflaster (Beiersdorf AG). Patches were removed after 2 days and read at 2 and 3 days according to ICDRG guidelines. The data were analysed using the SPSS 9.0 statistical package. To assess the trend of positive reactions to fragrance mix over the years, the linear regression of the allergen frequency (y -variable) for the years (x -variable) was determined. We used the last 2 numbers of the year, e.g., 98 for 1998, as values of the independent variable.

Results

6129 patients were routinely patch tested for suspected allergic contact dermatitis during the study period. There were 4180 (68.2%) female and 1949 (31.8%) male patients. 363 (5.9%) of the patients had a positive patch test reaction to fragrance mix. The overall frequency of positive reactions in women was 2.3× higher than in men (7.2% and 3.1%, respectively).

Table 1. Frequency of allergic reactions to fragrance mix: Department of Dermatovenereology, Ljubljana 1989–1998

Period	1989–1993			1994–1998		
	female	male	total	female	male	total
no. tested	1731	926	2657	2449	1023	3472
no. positive	84	19	103	218	42	260
% positive	4.9	2.1	3.9	8.9	4.1	7.5

An increase in the frequency of positive reactions to fragrance mix was observed comparing the time periods 1989–1993 and 1994–1998. The data in Table 1 show that this frequency almost doubled in both sexes, attaining a 1.8-times higher value during the last time period than before in women (8.9% versus 4.9%); the corresponding ratio in men was 2.0 (4.1% versus 2.1%). The sex ratio of the frequencies of positive reactions, showing a pronounced female predominance, was almost the same in the time periods compared (2.4:1 and 2.2:1, respectively).

Throughout the 10-year period, the frequency of allergic patch test reactions to fragrance mix rose steadily from 2.4% in 1989 to 11.3% in 1998 (Fig. 1). In women, it rose from 3.3% in 1989 to 13.1% in 1998. However, a parallel increase in this frequency was also seen in men, rising from 0.6% in 1989 to 5.8% in 1998.

Since 1995, fragrance mix has rated second (after nickel sulfate) among the most frequently positive allergens in our department. In 1989, however, it had only sixth place among the most important allergens.

The results of statistical analysis (Table 2) confirmed a significantly increasing trend in sensitivity to fragrance mix over the period of observation ($p=0.003$). This trend was especially pronounced in women ($p=0.005$) but was also seen in men ($p=0.04$).

Discussion

Fragrances are generally recognized as one of the 5 most common contact sensitizers (4). The reported frequencies of positive patch test reactions to fragrance mix, which is widely used as a screening tool for fragrance sensitivity, range worldwide

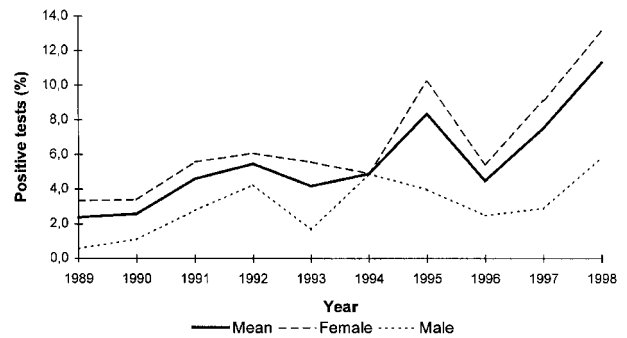


Fig. 1. % of patients with positive patch test reactions to fragrance mix.

from 5% to 14% (2, 5–16). In our 10-year survey, the overall frequency of positive reactions to fragrance mix was 5.9%. This figure is similar to the frequency of positive reactions reported in Denmark for the time periods 1984–1987 (5.1%) and 1988–1992 (6.3%) (2) or in Sweden during 1984–1990 (5.5%) (8). However, if we consider only our data during the period 1989–1993, the corresponding frequency was only 3.9%. Otherwise, our data resemble the recently reported frequency of 5.3% during 1989–1998 in India (16).

Previous studies, comparing the response rate to fragrance mix in female and male patients, mostly reported higher values in women: 7.4% versus 5.0% in Denmark during 1988–1992 (2), 7.9% versus 7.1% in Germany during 1990–1991 (9), 8.5–11.6% versus 6.6–10.3% in Germany during 1990–1993 (13). Our data show a more pronounced female predominance, since during 1989–1998 the observed frequencies in women and in men were 7.2% and 3.1%, respectively. This difference may be attributable to a more pronounced difference in habits between the sexes in our population, i.e., a much more extensive use of scented cosmetics and toiletries in women than in men during the past decades. The described difference in the frequency of sensitization persisted throughout the period of study, despite the observed rise in frequency of positive reaction to fragrance mix in men.

Relatively few reports compare the rate of fragrance sensitivity in one and the same department over a longer period of time. There are drawbacks

Table 2. Parameters of the regression line equation show the upward trend of positive patch test reactions to fragrance mix during 1989–1998

	y-intercept	line slope	Correlation coefficient <i>r</i>	<i>p</i> -value	Mean frequency (%)
men	−31.1	0.365	0.657	0.04	3.1
women	−71.9	0.841	0.809	0.005	7.2
total	−64.3	0.747	0.824	0.003	5.9

comparing test results from different departments since patient selection may vary and indications required for patch testing may be more or less liberal. An increase in the frequency of allergic patch test reactions to fragrance mix has been noted in Copenhagen (2) and in Singapore (3). Data from multicentre studies in Germany (9, 14) also indicate a rising trend in fragrance allergy. Our data show a striking increase in the frequency of positive tests to fragrance mix during 1989–1998. The values almost doubled in women and in men, attaining an overall frequency of 11.3% in 1998. This rising trend, which was statistically significant, might be the consequence of an increased use of cosmetics and toiletries containing fragrances during the last decade(s). These assumptions are supported by statistical data that show a steady increase in the wholesale of cosmetics in Slovenia, as well as of expenditure on goods for personal care and cosmetics per Slovenian household during recent years (17). Unfortunately, the methodology used for collecting the aforementioned statistical data changed in 1989, and thus made it difficult to compare long-term trends of the use of scented products in our population.

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