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Contact sensitivity to oak moss

S. Gonçalo, F. Cabral and M. Gonçalo

Clinica de Dermatologia e Venereologia dos Hospitais da Universidade de Coimbra, Coimbra 3000 Portugal

Oak moss allergy was the principle allergen in contact sensitivity to perfumes (45%); 31 patients reacting to oak moss were studied. The sensitivity was attributed to contact with perfumes in 20, lichens in 7 and unknown in 4. Atranorin was the most frequent allergen, followed by usnic, evernic and fumarprotocetraric acids. Concomitant allergy occurred to several lichen acids and also to balsam of Peru, colophony and other fragrance components.

Key words: oak moss; lichens; lichen acids; atranorin; cosmetics; occupational; forestry; allergic contact dermatitis.

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Oak moss is a lichen extract, obtained particularly from *Evernia prunastri* and *Pseudovernia furfuracea* (1). It is a component of many types of perfume, mainly those for men. Sensitivity to oak moss, described by many authors (2–6), has been attributed mainly to atranorin, evernic acid and fumarprotocetraric acid (1, 3). Sensitivity is frequently induced by the use of perfumed products, especially aftershave lotions, because the integrity of the epidermis is lost during shaving, facilitating sensitization. Cases of sensitization from direct contact with lichens have been described (3, 6).

During the last 6 years (1980–1986), 2411 patients were patch tested with the standard test series recommended by the ICDRG and 192 (7,9%) reacted to the fragrance mix. Of these, 69 were tested with the components of the mix and 31 reacted to oak moss (45%). In this group of patients, we studied the sex and age distribution, origin of sensitization to oak moss, and the frequency of concomitant reactions.

Material and Methods

Among the 31 patients sensitive to oak moss, 18 were male and 13 female. They were aged between 16 and 75 years, most being in their 4th decade (11 patients) (Table 1).

Patients were asked about their jobs and hobbies, about possible contact with lichens, and about contact with perfumes that might contain oak moss.

25 patients were patch tested with a mix of the lichens *Evernia prunastri, Pseudovernia furfuracea, Parmelia caperata* and *Usnia* spp., triturated and incorporated into petrolatum at 2% each, and with *Frullania dilatata* and *Frullania tamarisci* undiluted. 20 of these patients were also patch tested with usnic acid 0.1% pet., atranorin 0.5% pet. (Hermal-Chemie, Hamburg), and fumarprotocetraric, evernic and stitic acids 0.1% pet. (Serva Feinbiochemica, Heidelberg).

Patch tests were performed with Leukotest (Beiersdorf AG, Hamburg) or Finn Chamber (Epitest, Helsinki). Reactions were read at 48 and 96 h. Photopatch tests were carried out with oak moss and atranorin, irradiated with a dose of 5 J/cm^2 UVA (Psoralite: P.B. Elder Company, Bryan, Ohio), and read at 24 and 48 h after irradiation.

Table 1. Age distribution (31 patients)

Age (years)	Female	Male	Total
16–20	1	–	1
21–30	3	2	5
31–40	5	6	11
41–50	2	4	6
51–60	2	3	5
61–70	–	2	2
>70	–	1	1
Total	13	18	31

Table 2. Origin of sensitization

	Female	Male	Total
contact with lichens	1	6	7
contact with perfumes	11	9	20
unknown	1	3	4
total	13	18	31

Results

20 of our patients had regular contact with perfumed products, mainly after-shave lotions, toilet waters and deodorants. 7 patients were rural or forestry workers, having contact with lichens on tree trunks but denying contact with after-shave lotions or other perfumed products. 4 remembered no contact with lichens or with perfumed products that might contain oak moss (Table 2).

Among the 20 patients tested with lichen acids, 10 reacted to atranorin, 8 to usnic acid, 6 to evernic acid, 3 to fumarprotocetraric acid and 2 to stitic acid (Table 3). Concomitant reactions to 2 or more lichen acids were observed in 8 patients. No difference was found between the patch and photopatch test to atranorin or oak moss.

Table 3. Positive reactions to lichen acids in 20 patients (13 male and 7 female)

	Female	Male	Total
usnic acid	4	4	8
evernic acid	3	3	6
stitic acid	1	1	2
fumarprotocetraric acid	2	1	3
atranorin*	7	3	10

* No significative difference between patch and photopatch test.

Concomitant positive reactions were observed with balsam of Peru (12/31), colophony (8/31), lichen mix (20/25) and Frullania (16/25). With components of the fragrance mix, the most frequent concomitant reactions were isoeugenol (9/31), eugenol (8/31) and cinnamaldehyde (6/31) (Table 4).

Discussion

Sensitivity to oak moss, our most frequent allergen in the fragrance mix (45% of cases), occurred especially in men in the 4th decade. The origin of sensitization was attributed to contact with perfumed products in 20 patients, with lichens in 7, and was unknown in 4.

Atranorin, and usnic and evernic acids were mainly responsible for the sensitivity to oak moss, which is in agreement with the results of Thune in 23 patients (10, 11). Photosensitivity to atranorin and oak moss, reported by Thune (9, 10) and Corres (5), was not seen.

Fumarprotocetraric acid was positive in only 3 patients, and 2 of them also reacted to atranorin. Dahlquist & Fregert (3) suggested a cross-reaction between these 2 substances, due to their chemical similarity. This was not confirmed by Thune (11), and we too think that this is a concomitant sensitization, as is also the reaction to stitic acid, which occurred in 2 patients.

Table 4. Other positive patch tests.

	Tested	Positive
balsam of Peru	31	12
colophony	31	8
isoeugenol	31	9
eugenol	31	8
cinnamaldeyde	31	6
geraniol	31	5
cinnamic alchool	31	4
a amylcinnamic aldehyde	31	2
lichen mix	25	20
Frullanias	25	16

Among the 25 patients tested with the mix of lichens, 5 failed to react, differing from the cases observed by Thune, all of whom were sensitive to the mix of lichens. However, the species tested were different.

Concomitant positive reactions to several fragrance materials, described by Addo et al. (12), and to balsam of Peru and colophony, found by Burry (13), can be explained by the presence of several synthetic ingredients in commercial oak moss, including geraniol, benzyl alchohol and colophony (3).

Sensitization to *Frullania* occurred in rural and forestry workers, who have direct contact with these plants in their work, and similarly in people living in the countryside. Multiple specific sensitization or a cross-reaction with certain aromatic lichen acids (14) may be considered.

In conclusion, in our patients, oak moss is the most frequent cause of contact allergy to perfumes. Induction of sensitization by cosmetics may be of importance in leading to occupational allergic contact dermatitis among rural and forestry workers through their contact with naturally occurring lichens (11).

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Address:

Saudade Gonçalo
Clinica de Dermatologia e Venereologia
Hospital da Universidade
3000 Coimbra
Portugal