

Contact urticaria caused by carvone in toothpaste

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Contact allergy to toothpaste is uncommon. Most reported cases concern contact dermatitis giving rise to cheilitis, caused by the flavours of the toothpaste (1, 2). Some reports on contact urticaria caused by the flavours of toothpaste have also been published (3–5). The flavour in toothpaste induced bronchospasm in one patient, and in a recent paper, rhinitis was related to menthol-containing flavours (6, 7). No pure chemical substance has hitherto been established as being responsible for the toothpaste-related urticarial reactions of the lips.

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Case Report

Here, we present a 33-year-old man with a 6-month history of swelling of his lips within minutes of contact with toothpaste. After a further 5–10 min, he also noticed a swelling of his gingiva and shortness of breath. He had tried several different brands of adult toothpaste, but experienced the same symptoms with all of them. The only exception was his children's fruit-flavoured toothpaste. He reported no signs of atopy or other diseases.

We performed open testing with the test concentrations recommended for patch testing and with the substances mixed in pet. (Table 1). Readings were performed after 2, 15 and 30 min. No further reactions were seen later. We observed a fast and strong reaction to carvone after only

Table 1. Open test results

Substance	% in pet.	2 min	15 min	30 min
Benzoic acid	5	—	—	Only weak infiltration
Salicylic acid	1	—	—	—
Citric acid	1	—	—	—
Peppermint oil Brand A	2	—	Flare, infiltration 10 mm	Strong flare, 10 mm more infiltration
Peppermint oil Brand B	2	—	Flare, infiltration 10 mm	Strong flare, 10 mm more infiltration
Eucalyptus oil	2	—	—	—
<i>R</i> -Limonene	1	Weak flare	Flare, infiltration 10 mm	Strong flare, 10 mm more infiltration
<i>S</i> -Limonene	1	Weak flare	Flare, infiltration 10 mm	Strong flare, 10 mm more infiltration
<i>R</i> -Carvone	5	Strong, wheal 10 mm	Strong, wheal 10 mm	Strong, wheal 25 mm
<i>S</i> -Carvone	5	Strong, wheal 10 mm	Strong, wheal 10 mm	Strong, wheal 25 mm



Fig. 1. Urticarial reactions at open testing with carvone 5% in pet. and read after 15 min. The names D-carvone and L-carvone used in the figure correspond to *S*-carvone and *R*-carvone, respectively, used in the text.

a couple of minutes. At 15 min, we observed a wheal 10 mm in diameter with both *R*-carvone and *S*-carvone (Fig. 1). We also observed flares (10 mm in diameter) with infiltration but without any wheal with peppermint oil, *R*-limonene, and *S*-limonene. A weak reaction with only a faint infiltration was seen with benzoic acid at 30 min. The patient did not feel any systemic reaction during the

testing. All skin reactions disappeared within 1 hr, except for the two responses to *R*-carvone and *S*-carvone, which persisted for more than 6 hr.

Discussion

There are some reports of urticarial reactions to the flavour of toothpaste (3–5). Most of the reactions have been related to peppermint. Menthol and limonene are the major components of peppermint oil. *R*-Carvone is the main substance in spearmint oil. Carvone in toothpaste is well known to cause a delayed type of allergy resulting in cheilitis, which is the main reason for the investigation of these patients. The toothpaste was labelled with a 'taste of mint', but pure carvone was not declared. *R*-Carvone and *S*-carvone were bought from Acros (Geel, Belgium). The patient reported here experienced swelling and pruritus of his lips after only a few minutes of contact with toothpaste. For that reason, an urticarial reaction was primarily suspected and open testing was performed. We also performed an ordinary occlusive patch test with the suspected substances, but with negative results. However, the patient reported severe pruritus in the patch test area after only a couple of minutes, probably because of an early urticarial reaction that had disappeared before the reading after 3 days.

R-Carvone has a smell of spearmint, and *S*-carvone has a smell of caraway and dill. This patient reacted with almost the same strength to the two stereoisomers of carvone. He is now using a toothpaste with a fruit taste, and avoiding spearmint gum and spearmint sweets.

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