

Allergic contact cheilitis and hand dermatitis caused by a toothpaste

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Allergic contact cheilitis caused by toothpaste is rather uncommon, with flavourings being the allergens most often responsible (1). However, such ingredients are rarely specified on the label, which makes it difficult to find alternative products (2) if a contact-allergic reaction occurs.

Case Reports

Case 1

A 24-year-old woman presented to us with a 1-year history of cheilitis (Fig. 1), characterized by burning of the lips, and an itchy rash on the palm of the right hand only (Fig. 2). There was no personal history of atopy, but her father suffered from asthma. Patch testing 1 year earlier had shown a positive reaction to nickel, which was not considered to be relevant for the current skin problem. The clinical presentation of the eczematous lesions

suggested toothpaste as a possible cause, because of the lip involvement, and also the lesions on the palm of the right hand holding the brush. Indeed, the patient admitted that she spilled a lot of the paste on the right hand when brushing her teeth. She had started to use Elmex® 'Erosion Protection' toothpaste (Colgate-Palmolive Europe, Oudergem, Belgium) some time before the eruption had started.

We performed patch testing with the European baseline series and a cosmetic series, and the patient's personal cosmetic and other topical products used, with IQ Ultra® patch test chambers (Chemotechnique, Vellinge, Sweden) covered with Mefix® (Mölnlycke Health Care, Göteborg, Sweden). Patch testing with potential allergens present in toothpaste was also performed: *trans*-anethole (1, 3–5), menthol (1, 4–6), *R*-carvone (1, 4–8), and cocamidopropyl betaine (2), all obtained from Chemotechnique, peppermint oil 2% (Trolab®, Almirall Hermal GmbH, Reinbek, Germany) (2), and hydroxypropyl cellulose 5% in ethanol 70%, prepared in-house. A semi-open test with the toothpaste 'as is' was also performed. Readings were performed according to European Society of Contact Dermatitis (9) guidelines at day (D)2 and D4. Positive reactions confirmed contact allergy to nickel (+ on D2; ++ on D4), which was relevant for previous jewellery

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Fig. 1. Allergic contact cheilitis (angularis) caused by toothpaste (case 1).



Fig. 2. Allergic contact dermatitis on the right hand handling the tooth brush contaminated with the toothpaste (case 1).

intolerance, and showed positive semi-open test reactions to Elmex® 'Erosion Protection' toothpaste (++ on D2 and D4). We advised the patient to stop using this toothpaste, which resulted in complete and permanent resolution of the lesions.

The manufacturer was asked to send us all ingredients of the toothpaste; however, despite repeated contacts and requests, we obtained only coded ingredients. Upon confirmation from the producer of the toothpaste that dilutions had been performed *lege artis* and that no irritants were present, we performed patch tests with the coded ingredients, but all gave negative results. The patient even performed repeated open application tests with these ingredients on the volar aspect of the arm (twice-daily 5 × 5-cm applications for a minimum of 7 days), but no reaction could be observed. As one of the constituents, amine fluoride, was mentioned on the packaging, and had previously been identified as an allergen (10, 11), we wished to perform additional testing with this compound [kindly provided by C Foti (11)]; however, the patient refused further testing.

Case 2

A non-atopic 65-year-old woman consulted S.K. in March 2014 because of experiencing persistent cheilitis (dry lips and fissuring) since May 2013. Several topical corticosteroids had been applied, but had brought only some relief. The lesions had appeared after a couple of weeks of using the same toothpaste as in case 1. Patch testing was performed, with the same methods and materials as mentioned above, with the European baseline series, a cosmetic series, and the personal products used. A semi-open test with the toothpaste 'as is' was also performed: only the latter produced positive reactions, namely, + at D2 and ++ at D4. After avoidance of the toothpaste, the lip dermatitis resolved completely. The patient was also patch tested with the coded ingredients, supplied by the manufacturer to S.K., but no positive reactions could be observed. Additional patch testing with the same amine fluoride sample (11), and with vanillin (1, 4) and *trans*-anethole, both from Chemotechnique, gave negative results.

Discussion and Conclusion

In both cases presented here, Elmex® 'Erosion Protection' toothpaste was confirmed to be the source of the cheilitis, and, in case 1, also of the dermatitis on the right hand holding the tooth brush; however, the causal allergen could unfortunately not be identified. The coded ingredients might have been too diluted, or not all ingredients might have been provided. In 1997, Ganter et al. described a case with contact dermatitis and stomatitis caused by amine fluoride, used for its anti-caries and remineralizing properties, in a gel, namely Elmex Gelee® (10), and in 2014 Foti et al. (11) described the first case

of allergic contact cheilitis caused by amine fluoride in toothpaste.

We would like to highlight the importance of full ingredient labelling of toothpaste ingredients, also including 'aroma' chemicals, so that allergens do not remain

undetected. We once again stress the importance of manufacturers sending ingredients for patch testing correctly diluted and labelled, particularly as strong irritant reactions or even burns may arise when 'unknown' ingredients are tested.

References

- 1 Francalanci S, Sertoli A, Giorgini S et al. Multicentre study of allergic contact cheilitis from toothpastes. *Contact Dermatitis* 2000; **43**: 216–222.
- 2 Scheman A, Jacob S, Katta R et al. Lip and common dental care products: trends and alternatives: data from the American Contact Alternatives Group. *J Clin Aesthet Dermatol* 2011; **4**: 50–53.
- 3 Franks A. Contact allergy to anethole in toothpaste associated with loss of taste. *Contact Dermatitis* 1998; **38**: 354–355.
- 4 Ophaswongse S, Maibach H I. Allergic contact cheilitis. *Contact Dermatitis* 1995; **33**: 365–370.
- 5 Andersen K E. Contact allergy to toothpaste flavors. *Contact Dermatitis* 1978; **4**: 195–198.
- 6 Worm M, Jeep S, Sterry W, Zuberbier T. Perioral contact dermatitis caused by L-carvone in toothpaste. *Contact Dermatitis* 1998; **38**: 338.
- 7 Ghaffar S A, Horn H, Alfridge R D. How important is carvone allergy? *Br J Dermatol* 2008; **159**: 80.
- 8 Corazza M, Levratti A, Virgili A. Allergic contact cheilitis due to carvone in toothpastes. *Contact Dermatitis* 2002; **46**: 366–367.
- 9 Johansen J D, Aalto-Korte K, Agner T et al. European Society of Contact Dermatitis guideline for diagnostic patch testing – recommendations on best practice. *Contact Dermatitis* 2015; **73**: 195–221.
- 10 Ganter G, Disch R, Borelli S, Simon D. Contact dermatitis and stomatitis due to amine fluoride. *Contact Dermatitis* 1997; **37**: 248.
- 11 Foti C, Romita P, Ficco D, Bonamonte D, Angelini D. Allergic contact cheilitis to amine fluoride in a toothpaste. *Dermatitis* 2014; **25**: 209.