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Allergic cheilitis due to stannous fluoride-containing toothpaste: First case from Italy and mini-review of previously published cases

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[Correction added on 4 September 2024, after first online publication: The full name of the authors have been added in this version.]

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CASE REPORT

A 52-year-old female outpatient was evaluated due to a 2-month history of repeated episodes of lip swelling accompanied by small blisters, itching and redness on her lip, but not

intra-oral symptoms (Figure 1). The symptoms were responsive to short courses of oral corticosteroids (prednisone or beta-methasone) and antihistamines (levocetirizine) but reappeared upon discontinuation.

The patient's medical history showed hypothyroidism, with no recent changes in her therapies or cosmetic products except for a different toothpaste. Considering the morphology, regional distribution

and temporal course of the clinical manifestations, an allergic contact dermatitis was considered a potential diagnosis.

To confirm this hypothesis, informed consent was obtained from the patient, and patch tests were performed on the upper back using a dental series patch test; readings were performed on Days 2, 3 and 7 after application.

On Day 2, the test reading appeared to be negative. However, on Day 3, the patient exhibited a stronger positive reaction (++) to stannous oxalate. On Day 7, there was a significant increase (+++) in response to stannous oxalate.

An analysis of the components of the patients who commonly used hygiene and cosmetic products showed the presence of stannous fluoride in the 'Sensodyne Sensibilità & Gengive®' toothpaste.

To assess sensitization to stannous, we applied a semi-open patch test using a solution of toothpaste diluted in water at a concentration of 1%, which resulted in negative readings at 48 and 72 h. Lastly, we conducted a patch test utilising dilutions at 5%, 10%, 20% and 30% in water.

All dilutions produced negative findings over 48 h (Table 1). However, erythema and vesiculation of the upper lip were noticed, likely due to the absorption of the hapten, as documented in earlier scientific literature.

During the Day 3 and Day 7 assessments, the 20% and 30% dilutions exhibited positive results, with greater positivity observed on Day 7. All patch tests were conducted in accordance with the ESCD recommendations.¹

The positivity of the readings, along with the disappearance of symptoms upon discontinuation of the aforementioned toothpaste,



FIGURE 1 Clinical presentation of the patient with allergic cheilitis showing lip swelling, small blisters, and redness.

confirmed the diagnosis of allergic contact cheilitis induced by stannous fluoride. To date, after the toothpaste was substituted with a product that does not contain stannous fluoride, no symptoms have been observed by the patient.

DISCUSSION

Stannous fluoride is a chemical compound frequently used as an active ingredient in many toothpastes and mouthwashes due to its anti-caries, bacteriostatic, and bactericidal properties.² Allergic contact cheilitis caused by toothpaste is rare but should be considered in patients with recurrent lip dermatitis.

Several cases of allergic contact cheilitis from toothpaste have been reported in the literature, with a small number specifically linked to stannous fluoride (tin) sensitization, as shown in Table 2.³⁻⁷

Clinicians should also take into account the possibility of stannous fluoride sensitivity caused by toothpaste use as a possible underappreciated factor in the development of cheilitis.

AUTHOR CONTRIBUTIONS

Elena Saracco: Conceptualization; methodology; data curation; supervision; writing – original draft; writing – review and editing.

Nicolò Rashidy: Conceptualization; methodology; writing – original draft; writing – review and editing; data curation. **Richard Borrelli:** Conceptualization; methodology; formal analysis; data curation; writing – original draft; writing – review and editing; validation.

Federico Meli: Conceptualization; resources; data curation.

Salvatore Schinocca: Conceptualization; methodology; data curation;

investigation. **Luca Lo Sardo:** Conceptualization; investigation; methodology; supervision.

Iuliana Badiu: Conceptualization; investigation; supervision; data curation.

Federica Corradi: Conceptualization; investigation; data curation.

Stefania Nicola: Conceptualization; investigation; writing – original draft; writing – review and editing; data curation; validation; methodology.

Luisa Brussino: Conceptualization; investigation; methodology; validation; software; formal analysis; data curation; supervision; writing – review and editing; resources.

TABLE 1 Results of performed tests with toothpaste.

Tests with toothpaste performed	Concentration	Day 2	Day 3	Day 7
Semi-open test toothpaste	1% aqua	–	–	Not performed
Patch test toothpaste	5% aqua	–	–	–
	10% aqua	–	–	–
	20% aqua	–	+	++
	30% aqua	–	++	+++

TABLE 2 Case reports of allergic contact cheilitis and stomatitis due to stannous-containing toothpaste.

Publications	Patient's age and sex	Other dermatitis or atopy	Tests with toothpaste	Tin/stannous 50% pet. patch test
Enamandram et al. ³	55 F	CSU	Not performed	+ (Day 4)
Toma et al. ⁴	50 F	CSU	+ (Day 2), + (Day 4)	++ (Day 4)
Von Amerongen et al. ⁵	69 M	Atopy	+++ (Day 3), +++ (Day 7)	+ (Day 3), ++ (Day 7)
	62 F	No	+++ (Day 3), + (Day 7)	+ (Day 3), ++ (Day 7)
He et al. ⁶	24 M	No	± (Day 4) for toothpaste; ++ (Day 4) for 1% stannous chloride	++ (Day 4)
	30 F	No	± (Day 4) for toothpaste; ++ (Day 4) for 1% stannous chloride	++ (Day 4)
	33 F	No	± (Day 5) for toothpaste; +++ (Day 5) for 1% stannous chloride	+++ (Day 5)
George et al. ⁷	23 F	Psoriasis	± (Day 4) for toothpaste; + (Day 4) for tin 50%, ++ (Day 4) for tin chloride, + (Day 4) for tin oxalate	+ (Day 4)

Abbreviation: CSU, Chronic spontaneous urticaria.

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