

Allergic contact stomatitis due to desensitizing toothpastes

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Abstract

Toothpastes are one of the most common personal care products among people of all ages. The various toothpaste types and their complex ingredients could cause irritation or allergic reactions. Allergic contact stomatitis has been often seen in clinical practice; however, desensitizing toothpastes as a trigger are often unrecognized. Here, we report three cases of allergic contact stomatitis due to stannous chloride-containing desensitizing toothpastes. General dentists and other professionals should pay more attention to the safety and adverse effects of toothpastes.

KEYWORDS

adverse effects, allergic reactions, stannous chloride, stomatitis, toothpastes

1 | INTRODUCTION

Toothbrushing effectively using toothpastes is well known as being essential for maintaining and improving oral hygiene, resulting in the consumption of 620–800 tons of toothpaste annually per million people.^{1–4} Toothpastes are complex mixtures of active and inactive ingredients, and different toothpaste types are available. The active ingredients include anticaries, desensitizing, and antimicrobial agents; inactive ingredients include abrasive agents, detergents, flavoring agents, humectants, thickening agents or binders, and peroxide.⁵ Per the different types of active ingredients, toothpastes could be classified into regular fluoride,

desensitizing, and whitening toothpastes and toothpastes for periodontal diseases.⁶ However, the various toothpaste types and their complex ingredients could cause irritation or allergic reactions. Hitherto, limited studies have reported toothpastes' adverse reactions.

The most common allergens in toothpastes are flavoring agents, including menthol, spearmint, peppermint, cinnamon, and other unspecified flavors.^{7,8} Stannous, an active toothpaste component providing dentin hypersensitivity relief and enamel erosion protection, has been rarely reported to cause allergic reactions.⁹ Hitherto, only four cases of contact allergy caused by toothpastes with stannous have been reported worldwide.^{10–12} Here, we report three cases of allergic contact stomatitis due to stannous chloride-containing desensitizing toothpastes.

Wenxiu He and Xiaosheng Hu contributed equally to the article.

2 | CASE REPORT

2.1 | Case 1

A 24-year-old man presented to the Department of Oral Medicine, Peking University Hospital of Stomatology, with a 3-week history of pain of the labial and buccal mucosa. He reported minor ulcers on the labial mucosa with significant pain, especially when toothbrushing and eating. He had been using Sensodyne Sensitivity & Gum toothpaste for 2 months. Intraoral examination showed extensive bilateral swelling and erythema of the mucosa (Figure 1a,b). He had no dental metal materials in the oral cavity. A patch test for 1.0% stannous chloride pet. (Chemotechnique MB Diagnostics AB) using IQ Ultra™ chamber (Chemotechnique MB Diagnostics AB) showed a strong reaction (++) along with skin erythema and papules after 96-h follow-up (Figure 1c). Patch test for his toothpaste and 10% diluted toothpaste showed doubtful reaction (\pm) with faint erythema. After this toothpaste was replaced with regular fluoride toothpastes and the patient was treated with steroid-based mouth rinses for 2 weeks, the oral lesions resolved (Figure 1d,e). After the desensitizing toothpaste was restarted and used five times, similar lesions appeared on the lower labial mucosa (Figure 1f). These lesions completely resolved 7 days after toothpaste discontinuation.

2.2 | Case 2

A 30-year-old woman was referred to our clinic with the chief complaint of an intermittent feeling of lip tightness and rawness with small erythema spots on the labial mucosa for 1 month. She had been using Sensodyne Sensitivity & Gum toothpaste for 3 months. Clinical examination showed punctate hyperemia of the upper and

lower labial mucosa (Figure 2a,b). She had no dental metal materials in the oral cavity. Patch test of 1.0% stannous chloride pet. with IQ Ultra chamber revealed a strong reaction (++) after observation for 96 h (Figure 2c). After the desensitizing toothpaste was stopped and the patient received antiallergic treatment for 1 week, the lesions resolved and did not reappear (Figure 2d,e).

2.3 | Case 3

A 33-year-old woman presented to our department with a complaint of roughness of the labial mucosa for 2 weeks. She reported pain in the labial mucosa when eating and denied lip-biting or any other habits causing mechanical friction. She had been using Oral-B Sensitivity & Gum Calm toothpaste for 2 weeks. Intraoral examination showed erythema, desquamation and edema of the lower labial mucosa (Figure 3a). She had no dental metal materials in the oral cavity. Patch testing for 1.0% stannous chloride pet. using IQ Ultra chamber after 120-h follow-up showed intense erythema, infiltration, and coalescing vesicles, indicating a very strong positive reaction (+++) (Figure 3b). After replacing the toothpaste with a regular fluoride toothpaste for 6 days, the patient showed complete remission, and the stomatitis healed completely (Figure 3c).

3 | DISCUSSION

Toothpastes are one of the most common personal care products among people of all ages. Toothbrushing with toothpastes at least twice per day is recommended for maintenance of oral health care, and up to 620–800 tons are consumed per year per million people.^{1–4} According to the European Regulation (EC) No. 1223/2009,

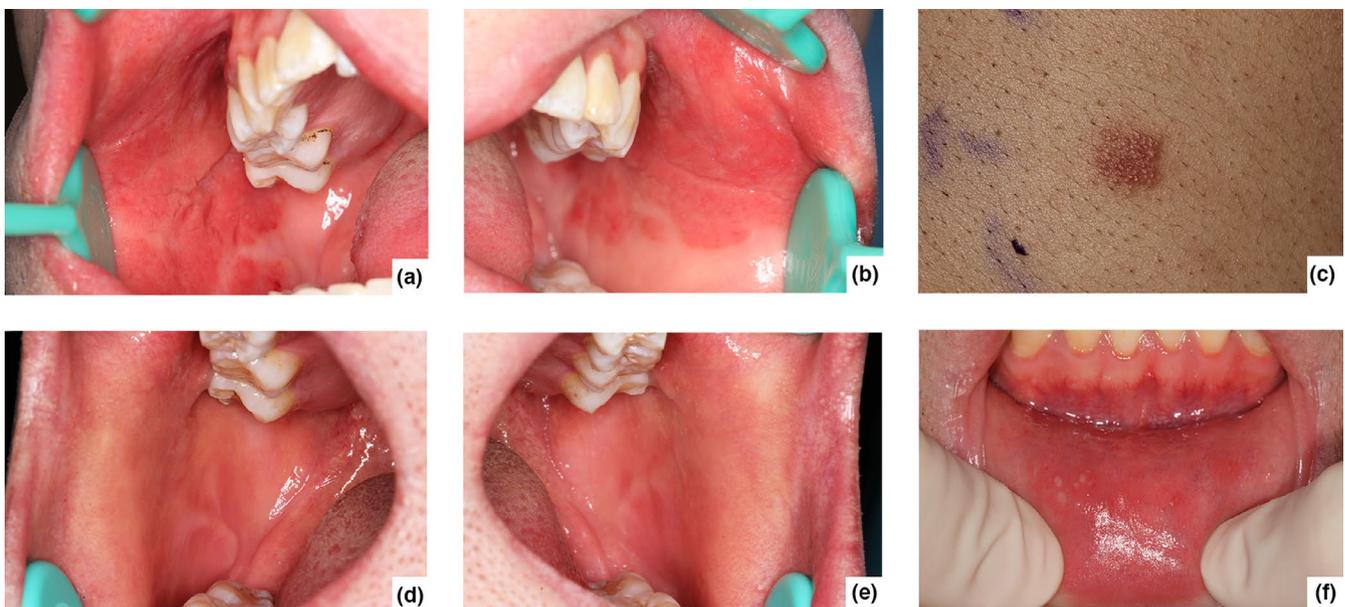


FIGURE 1 Clinical manifestations of allergic contact stomatitis caused by desensitizing toothpastes (a,b) before and (d,e) after treatment of case 1. (c) The strong reaction (++) of patch test for 1.0% stannous chloride pet. (f) The positive reaction of stop-restart test of case 1



FIGURE 2 Clinical manifestations of allergic contact stomatitis caused by desensitizing toothpastes (a,b) before and (d,e) after treatment of case 2. (c) The strong reaction (++) of patch test



FIGURE 3 Clinical manifestations of allergic contact stomatitis caused by desensitizing toothpastes (a) before and (c) after treatment of case 3. (b) The very strong positive reaction (+++) of patch test

toothpastes are categorized as cosmetic products, which has limited evaluations of their adverse effects. However, the allergic contact reactions caused by toothpastes are increasing in dental practice and deserve the attention of dental practitioners.

The most common clinical manifestations of allergic contact reactions to toothpastes include cheilitis and dermatitis of the perioral skin. Allergic contact stomatitis commonly manifests as erythema, ulceration, and desquamation and swelling of oral mucosa, which were seen in our cases.¹³ Only four cases of allergic contact reactions to desensitizing toothpastes containing stannous have been reported to date, which manifested as cheilitis, erythema, lip swelling, and dermatitis around the mouth.^{10–12} Here, we reported three cases of allergic contact stomatitis that showed typical clinical features after the use of Sensodyne Sensitivity & Gum toothpaste and Oral-B Sensitivity & Gum Calm toothpaste, which were desensitizing toothpastes containing stannous chloride.

The diagnosis of allergic contact stomatitis to toothpastes is based on the positive results of patch tests and the remission of oral symptoms after discontinuation of the culprit toothpaste.^{13,14} However, there are no definitive recommendations regarding the toothpaste concentrations to be used for patch tests. Undiluted toothpaste can induce false-positive reactions in patch tests, while excessively diluted samples can yield false-negative reactions.^{13,14} Commercial patch-testing kits specially designed for toothpastes are very rare in the market. For the three cases described here, we performed a specially designed patch test for the allergens of cocamidopropyl betaine 1.0% aq., fragrance mix I 8.0% pet., fragrance mix II 14.0% pet., titanium dioxide 10.0% pet. and stannous chloride 1.0% pet. with IQ Ultra chamber and observed positive results of stannous chloride. In addition, the patients had no discomfort when they used the regular fluoride toothpastes in the past and their symptoms relieved rapidly after stopping the desensitizing toothpastes. These

findings indicated that the patients had shown allergic reactions to desensitizing toothpastes containing stannous chloride.

Indeed, allergic contact stomatitis has been often seen in clinical practice; however, toothpastes as a trigger are often neglected by dentists. With the improvement in the public awareness of oral health care and the diversification of oral health-care needs, people tend to choose toothpastes with active ingredients for daily oral health care. However, these active ingredients, including anticaries agents, desensitizing agents, and antimicrobial agents, could induce allergic reactions of contact stomatitis. With the increasing adoption of toothpastes, manufacturers' innovations and modifications in toothpaste compositions have increased accordingly, which requires attention. Therefore, general dentists and other professionals should pay more attention to allergic contact reactions caused by toothpastes to identify possible allergens and to decrease the adverse effects of toothpastes. In addition, commercial patch-testing kits for toothpaste ingredients should be developed to assist dentists in obtaining definite diagnoses rapidly. In conclusion, the safety of toothpastes and the adverse effects caused by toothpastes with active ingredients merit further investigation by manufacturers and as well as dental practitioners in the future.

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CONFLICT OF INTEREST

None declared.

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