



Inflammatory reaction of the anterior dorsal tongue presumably to sodium lauryl sulfate within toothpastes: a triple case report

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Background. Sodium lauryl sulfate (SLS), a popular surface active agent ingredient within toothpastes, is known for its foaming action. Surface active agents increase the effectiveness of toothpastes with respect to dental plaque removal. SLS is a known irritant and also has allergenic potential. The authors report 3 patients with oral pain secondary to inflammation of the dorsal anterior tongue. These patients were all using toothpastes with SLS as an ingredient.

Results. The dorsal tongue lesions and oral pain resolved upon switching to toothpastes without SLS as an ingredient.

Conclusions. Clinicians should be aware of the potential of SLS within toothpastes to cause oral mucosal inflammatory reactions of the anterior dorsal tongue. To our knowledge, these are the first case reports of oral mucosal inflammatory reactions of the anterior dorsal tongue associated with SLS containing toothpastes. (Oral Surg Oral Med Oral Pathol Oral Radiol 2018;125:e17–e21)

Toothpastes are an indispensable oral health care product. They improve the tooth brushing process in aiding the reduction of bacterial plaque biofilm and thus aiding in the treatment and prevention of dental caries and periodontal disease. Like virtually all health care products and medications, toothpastes have the potential to cause hypersensitivity and irritant reactions.¹ The general composition of toothpastes includes abrasives (silica, titanium dioxide), fluoride, stannous, detergent (foam) flavorings (no sugar), desensitizing agents, humectant (prevent water loss in paste), and a thickening agent. Tooth pastes contain a number of chemicals, including abrasives (silica, titanium dioxide), sodium fluoride, stannous fluoride, sodium hexametaphosphate, zinc lactate, triclosan, sodium lauryl sulfate, propylene glycol, polyethylene glycol, glucose oxidase, ethoxylated stearyl alcohol, glycerin, carrageenan, sorbitol, cellulose gum, potassium sorbate, trisodium phosphate, sodium benzoate, zinc citrate, and sodium saccharin.²⁻⁴

Sodium lauryl sulfate (SLS), also known as sodium dodecyl sulfate, is a popular surface active agent. Surface active agents increase the effectiveness of toothpastes with respect to dental plaque removal. SLS is has many other commercial uses. It is used as an active ingredient in grease cleaners, car washing detergents, shampoos, bath foams, face cleaning soaps, and toothpastes. SLS is also well known for its allergic and

toxic potential.¹ Although there are only sparse reports, SLS has been implicated in both irritation and sensitization reactions.^{1,5-9}

We report here 3 similar cases of painful dorsal tongue lesions exhibiting inflammation and filiform papillae denudation, in which the lesions resolved after discontinuing SLS containing toothpastes and switching to toothpastes without SLS.

CASE 1

In late August 2016, a 42-year-old female patient referred by her primary care physician and otolaryngologist to an oral medicine clinic because of a chief complaint of “red spot on tongue.” The condition began 2.5 to 3 months before the patient’s visit. She described the tongue as feeling sensitive, burning, and raw. At the time of the patient’s initial visit, she had switched from Colgate Total toothpaste to Tom’s of Maine (without fluoride) toothpaste. The patient had been previously treated by her dentist with a trial therapy of dexamethasone elixir as a topical rinse. The steroid topical rinse alleviated the tongue lesions, but the tongue lesions recurred after discontinuing the steroid rinse. The patient’s medical history was unremarkable, and the patient was not taking any prescribed medications. The patient reported no known drug allergies or allergenic histories related to known SLS products, such as shampoo or soaps. The clinical presentation demonstrated inflammation, erythema, and denudation of the filiform papillae of the anterior dorsal tongue (**Figure 1A**). The working diagnosis was type IV hypersensitivity reaction to SLS. The oral medicine clinician directed the patient to switch to Biotene toothpaste, a toothpaste without SLS. At the 5-week follow-up appointment, the tongue lesions and symptoms had resolved (**Figure 1B**). The patient was referred to a dermatologist for patch testing to confirm or rule out SLS as the allergen. The dermatologist declined to perform allergy testing because the problematic inflammatory condition had resolved by that time, and

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Fig. 1. **A**, Case 1, demonstrating inflammation of the anterior dorsal tongue. **B**, Case 1, demonstrating healing of the anterior dorsal tongue.



Fig. 2. **A**, Case 2, demonstrating inflammation of the anterior dorsal tongue. **B**, Case 2, demonstrating healing of the anterior dorsal tongue.

skin allergy testing with respect to an oral mucosal reaction for SLS was deemed imperfect. The patient switched to another SLS-free toothpaste after 2 months, and at the 8-month follow-up, the patient continued to be asymptomatic.

CASE 2

At the end of November 2016, a 13-year-old male was referred by his pediatric dentist to an oral medicine clinician for a chief complaint of “tongue irritation.” The patient’s medical history was noncontributory. The patient reported no known drug allergies or a history of allergy related to known SLS products, such as shampoo or soaps. The condition had begun approximately 6 weeks earlier. The patient’s dentist had prescribed a nystatin rinse therapy and later topical triamcinolone topical steroid therapy, neither of which was successful in managing the condition. His tongue was sensitive to spicy foods and acidic beverages. He reported that his toothpaste caused a burning sensation.

The patient had switched from Crest Tartar Control toothpaste to Sensodyne toothpaste approximately 2 weeks ago. Clinically, no lymphadenopathy was noted. The clinical appearance demonstrated erythema of the anterior dorsal tongue bilaterally, which moved back up the midline to create a triangular appearance (Figure 2A). The working diagnosis was type IV hypersensitivity reaction to SLS. The patient was advised to switch to Biotene toothpaste.

The patient’s mother reported by telephone at the 1-month follow-up that the tongue sensitivity was gone but that the anterior tongue was still somewhat red. The patient requested another SLS-free toothpaste to try because the patient did not like the taste of Biotene. Sensodyne Pronamel was suggested. At follow-up 2 months later, the patient’s mother reported that the redness and irritation had both resolved (Figure 2B). The clinician suggested a referral to either a dermatologist or an allergy/immunology physician to confirm the diagnosis of type IV hypersensitivity reaction to SLS.

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