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A novel case of a brush with discomfort: allergic contact dermatitis caused by mercaptobenzothiazole in rubber components of a toothbrush

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doi:10.1111/cod.12967

Key words: allergic contact dermatitis; cheilitis; mercaptobenzothiazole; toothbrush.

Cheilitis is a common inflammatory reaction involving the lips and occasionally the surrounding skin and oral mucosa. It can be the result of endogenous factors, atopic dermatitis or exogenous factors, or irritant or allergic contact dermatitis. This case shows a rare cause of allergic contact cheilitis, that is, rubber attachments on a modern toothbrush.

Case Report

A 68-year-old female presented with a several-year history of intermittent issues with her lips, which had escalated to become constant over the past 12 months. She described lip dryness and cracking, especially in both cornices of the mouth. It was associated with mild lip swelling several days a week. She denied systemic symptoms. She had a history of nickel allergy, confirmed with patch testing. Her lips improved, without resolution, with topical methylprednisolone aceponate ointment and petroleum jelly as a barrier ointment, and were further exacerbated by chilli, curry, wind and, possibly, coffee.

Clinically, there was mild general dryness and slight scaling of the lips, with a focus of mild erythema in the cornices of the mouth. Irritant or allergic contact dermatitis was suspected, and patch testing was arranged. The patient was patch tested with the Australian baseline series, plus the cheilitis and toothpaste series. Epicutaneous tests were applied on the upper back, with

allergens from Chemotechnique (Vellinge, Sweden) and AllergEAZE Chambers (AllergEAZE, Chatsworth, Australia), and checked at day (D) 2 and D4. Readings were performed according to the ESCD guideline (1). Reactions scored +, ++ or +++ were considered to be positive, and reactions scored ?+ were considered to be doubtful. The first patch test reading showed reactions to nickel (++) , mercaptobenzothiazole (MBT) (++) , mercapto mix (+) , and thiomersal (?+). The second patch test reading showed reactions to nickel (+++) , MBT (++) , mercapto mix (+) , thiomersal (+) , and palladium chloride (+).

Discussion with the patient identified her toothbrush as having multiple rubber strips attached to the head and shaft of the brush that were later confirmed by the manufacturer to contain MBT. The patient changed to using a simple toothbrush without these rubber features, and her cheilitis settled over the next 8 weeks, without subsequent recurrence. This clinical response was considered to be indicative of MBT in the toothbrush, as this was the single intervention performed.

Discussion

There have been several case series that have reported on the different causes of recalcitrant cheilitis. An Australian case series (2), involving 75 patients, found allergic contact dermatitis to be the second most common cause of cheilitis and to be present in 25%. The most common allergens were medicaments, lipsticks, sunscreens, toothpaste, and nail varnish, respectively.

Another retrospective study in Singapore that included 202 cases of cheilitis found allergic contact cheilitis to be the second most common cause, with 34% of patients having a diagnosis of allergic contact cheilitis (3). Again,

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Conflict of Interest: On behalf of all authors, the corresponding author states that there is no conflict of interest.

the most common allergens identified from patch testing in these patients were lip cosmetics followed by toothpastes.

A third study in the United Kingdom, involving 146 patients with cheilitis, further validated the results of the above-mentioned series on allergic contact cheilitis (4). The UK review reported that 15–21.8% of patients with cheilitis had relevant positive patch test reactions and were given a diagnosis of allergic contact cheilitis, with fragrances in lipsticks and lip balms being the most common causative allergens.

Consistently, it has been reported that allergic contact dermatitis is a common cause of recalcitrant cheilitis, with lip cosmetics and toothpastes being commonly cited as allergens. There has also been research on the specificities of toothbrush allergic contact cheilitis (5). Other allergens implicated in dental-related allergic contact dermatitis include metals in dental fillings, with mercury

being the most commonly reported allergen, followed by gold and palladium (6).

Rubber is a common allergen that is underreported in cases of allergic contact dermatitis in the oral area. This is a surprising observation, given the extent to which latex allergy is documented in the literature; natural rubber latex allergy is the most serious allergen considered by dentists, with reported cases of anaphylaxis caused by allergens in dentists' gloves and dental dams (7, 8). Additionally, there have been case reports of contact stomatitis to dental rubber bands with subsequently positive patch testing to mercapto mix and MBT employing a rubber test series (9).

This case highlights that allergic contact dermatitis caused by rubber components needs to be considered in cheilitis patients, particularly as modern toothbrushes are more and more equipped with rubber elements containing MBT.

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