

Allergic Contact Cheilitis From a Variety of Lip Balm Ingredients

Linghong Linda Zhou¹ and Melanie Pratt²

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Keywords

allergic contact cheilitis, allergic contact dermatitis, contact dermatitis, cheilitis, lip balm.

Potential causes of allergic contact cheilitis (ACC) include food, topical medicaments, oral hygiene products, and cosmetics such as toothpastes, dentifrices, sunscreen agents, lipsticks, and lip balms.^{1,2} Lip balms, primarily indicated to treat chapped and cracked lips, have been paradoxically found to exacerbate cheilitis in certain patients.

The case described below highlights the importance of considering lip balms as a potential source of ACC.

Case Report

An 18-year-old male patient was referred to the Ottawa Hospital Dermatology Patch Testing Clinic following a 1-year history of papulovesicular, scaly dermatitis of the lips and perioral region (Figure 1). At times, the patient experienced explosive flares of acute, spreading erythematous and edematous dermatitis with intense itching (Figure 2). Past medical history was significant for asthma and atopic dermatitis.

During this period, the patient applied a wide assortment of topical lip balms, including Nivea for Men (Beiersdorf AG), Nivea Hydro Care (Beiersdorf AG), Eucerin lip balm (Beiersdorf AG), Chapstick (Pfizer), Blistex Medicated Lip and Blistex Fruit Smoothies (Blistex Inc), La Roche-Posay

Nutritic Lips and Anthelios Sunscreen Lip Balm (La Roche-Posay Laboratoire Pharmaceutique), Carmex (Carma Laboratories Inc), EOS lip balm (EOS Products, LLC), and Vaseline (Unilever).

The patient was patch tested to the North American Contact Dermatitis Group (NACDG) screening series of 70 common allergens (allergEAZE, Smart Practice) on Scanpor tape (Norgesplaster Alpha AS): the sunscreen series, the corticosteroids series, additional vehicles and preservatives from the cosmetic series, hydroperoxides of limonene and linalool, additional flavors and fragrances (Chemotechnique Diagnostics, Dormer Laboratories Inc), and several of his own products. The patches remained in place for 48 hours, and test sites were evaluated at 48 and 96 hours. A positive reaction was graded using the NACDG protocol.³ The results at 96 hours revealed a positive allergic contact dermatitis reaction to propolis 2+, rosin 3+, peppermint oil 1+, limonene hydroperoxide 2+, linalool hydroperoxide 2+, eugenol 1+, and ylang ylang oil 2+, as well as to a number of the patient's own lip balm products, which are summarized in Table 1. These results are relevant because a number of his lip balms contained the putative positive allergens.

Discussion

Cheilitis is a common disorder, characterized as cracking, fissuring, and peeling of the lips. It often begins with frictional irritation as a result of lip licking, biting, or rubbing. This is further exacerbated by cold, dry climates. In this case, the patient's inherited endogenous atopic dermatitis is an additional factor that predisposed him to having dry, sensitive skin and lips. Lip balms are used by

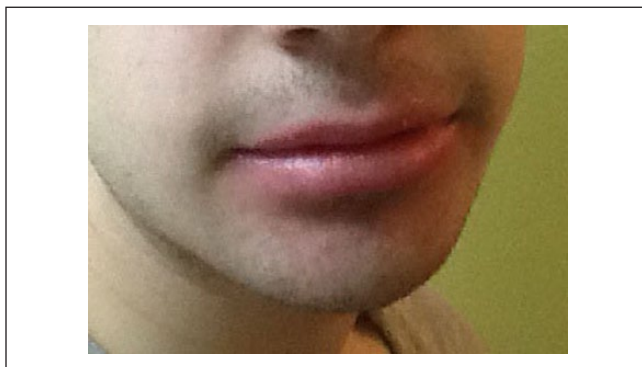


Figure 1. An erythematous, edematous, papulovesicular eruption affecting the lips and the perioral area of an 18-year-old man.

¹Faculty of Medicine, University of Ottawa, Ottawa, ON, Canada

²Division of Dermatology, University of Ottawa, Ottawa, ON, Canada

Corresponding Author:

Linghong Linda Zhou, Faculty of Medicine, University of Ottawa, 451 Smyth Road, Ottawa, ON, K1H 8M5, Canada.
Email: Lzhou026@uottawa.ca



Figure 2. Explosive flares of acute erythematous and edematous cheilitis in an 18-year-old man.

many to treat cheilitis, but they may also exacerbate the condition by causing a superimposed ACC due to one or more ingredients.

Lip balms are made up of a variety of key components. The largest component of lip balms is fatty acids, such as waxes, oils, and butters that work as emollient carriers to provide consistency.⁴ Lip balms may also contain additives, such as preservatives, chemical sunscreen agents, and fragrances and flavors. Our patient acquired multiple significant contact allergies to a number of these ingredients.

Beeswax (*cera alba*) is commonly used in lip balms for its low melting point and soft physical properties.⁴ Beeswax often contains propolis, a resinous lipophilic secretion of poplar, birch, and willow buds, used by bees to seal and repair their hives.⁵ There are many reported cases of ACC from propolis in the literature.⁵⁻⁷ As a result, propolis was included in the NACDG's screening series as of January 2007.⁸

Colophony (rosin), a natural residue derived from distilling the volatile oil of oleoresin from the *Pinaceae* family plants,⁹ has been associated with ACC.^{10,11} As colophony has been found to cross-react with propolis,⁹ it is possible that colophony was a cross-reactor agent in our patient.

Fragrances and flavors, used to mask the bitter taste and odor of certain lip balm ingredients, are the most common source of ACC.¹² In our patient, these include peppermint, limonene, linalool, eugenol, and ylang ylang oil.

Peppermint oil, a common ingredient found in lip balms and many other hygiene products, is a perennial flowering member of the mint family, found widely in Europe and North America.¹³ It has been reported to cause ACC in numerous cases.^{8,14,15}

Limonene and linalool are common fragrance compounds of natural origin from sources such as the peels of citrus fruit.¹⁶ They are 2 of the most commonly used terpene fragrances in scented domestic and occupational products.^{16,17} Studies have shown that limonene and linalool are not significant allergens themselves but strong sensitizers in their oxidized forms, emphasizing the need to be tested in the hyperoxide state.¹⁸

Table 1. Results at 96 Hours.^a

Patch Test Reaction	Allergen
+++	Rosin
+++	Nivea man lip balm
+++	Nivea Hydro care lip balm
+++	Anthelios lip balm
++	Propolis
++	Limonene hyperoxide
++	Linalool hyperoxide
++	Ylang ylang oil
++	LaRoche Nutritic lip balm
++	Eucerin lip balm
++	Blistex lip balm
++	EOS lip balm
+	Peppermint oil
+	Eugenol

^aPatch test results at 96 hours after initial placement, graded using the North American Contact Dermatitis Group protocol.

Eugenol, a weak sensitizer and fragrance ingredient, is a common part of domestic and occupational products and a natural component of spices and flavorings.^{19,20} It has been associated with several cases of contact dermatitis,²⁰⁻²² and its use has been limited by the International Fragrance Association since 2004.²¹

Ylang ylang oil, derived from the fragrant yellow flowers of *Cananga odorata*, is another common fragrant. Its oil is obtained by steam distillation and has been cited as a source of positive patch testing and allergen in Asian populations.^{9,23,24}

Chemical sunscreen agents and preservatives are other lip balm components associated with ACC. Chemical sunscreen agents such as benzophenone-3 (oxybenzone) and octyl methoxycinnamate (octinoxate) are among the most common culprits.²⁵ Gallate preservatives, including octyl gallate and propyl gallate, are phenolic antioxidants used to prevent oxidation of unsaturated fats.²⁵ They have been reported as lip balm ingredients associated with ACC,²⁶ and their prevalence with ACC has been suggested to have increased in recent years.²⁷

Conclusion

We conclude that lip balms, a common treatment for cheilitis, contain many ingredients that have been associated as allergens of ACC. These include ingredients from a variety of lip balm components, such as emollient carriers, waxes, chemical sunscreen agents, preservatives, and fragrances and flavors. Due to the widespread use of lip balms and resultant cases of ACC, an awareness of this phenomenon is warranted.

Declaration of Conflicting Interests

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