

testing for fragrance mixes alone may fail to identify an allergy to an essential oil.

Essential oils have become increasingly popular because of their use in fragrances, cosmetics, and homeopathic remedies.<sup>4</sup> Linalool, a fragrance found in 88% of essential oils, is only weakly allergenic.<sup>2,5</sup> Upon exposure to air, it is oxidized to hydroperoxide, and a potent allergen is created.<sup>5</sup> Moreover, substances are more likely to cause ABCD when they are volatile or when they are heated, because a sufficient amount of gas can then accumulate to cause dermatitis.<sup>1</sup> Thus, many fragrance diffusers create a perfect storm for ABCD: heating linalool-containing essential oils and allowing the allergen to widely disperse. Whereas most cases of allergic contact dermatitis to essential oils are a result of the application of pure oil,<sup>2</sup> this case highlights the importance of inquiring about the use of diffusers in the environment to elucidate a unique potential exposure mechanism when such allergens are identified through patch testing.

## ZEBRA

Essential oils released through fragrance diffusers may be the culprit in causing allergic contact dermatitis.

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## Pediatric Cases Involving Chemical Burns to Garlic Used to Treat Warts

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## PRECÍS

Contact dermatitis and chemical burns have been described from crushed or cut garlic under an occlusive dressing. These 2 cases broaden understanding of the condition.

## DISCUSSION

Patient 1 was a 2-year-old girl whose parents, the night before presentation, wrapped a wreath of whole garlic cloves around her abdomen, a traditional remedy for abdominal discomfort from their home country. It was left in place for approximately 9 hours, and it is unknown whether the patient slept prone. Examination showed a partial thickness abdominal burn (Fig. 1A) with small additional wounds over the bilateral iliac crests underlying the wreath. The wound was debrided (Fig. 1B) and a foam dressing applied, and she was diagnosed with gastroenteritis. At clinic follow-up 8 days later, there was near-complete resolution.

Patient 2 was a 12-year-old boy whose mother, the night before presentation, applied garlic paste to the site under an occlusive dressing to treat a plantar wart (*Verruca vulgaris*). It was left in place for approximately 8 hours. Examination showed a partial thickness burn (Fig. 2A). The wound was debrided (Fig. 2B) and treated with bacitracin ointment. On phone follow-up 24 days later, the burn was healing well but the wart remained.

Both patients presented to an emergency department with no medical history or known allergies. There was no trauma, thermal injury, or other potential chemical exposure.

Garlic (*Allium sativum*) has antimicrobial properties that have long been used medicinally, and it continues to be used by naturopathic doctors and as a traditional remedy in some cultures. Topical garlic has been associated with both contact dermatitis and chemical burn. The first report in 1987 described partial thickness burns in a 17-month-old after garlic-petroleum jelly plaster application.<sup>1</sup> Garlic burns have subsequently been infrequently reported, with all cases from cut or crushed garlic, and nearly all with an occlusive dressing.

Two small studies have found that garlic has benefit in treating warts, although one lacked a control group and the other was nonrandomized.<sup>2,3</sup> A 2013 report described a 23-year-old with a partial thickness burn after treating a cheek wart with crushed garlic under an occlusive dressing.<sup>4</sup>

Garlic's acantholytic effect has been attributed to allyl disulfide, although allylmercaptan and allylmethylsulfide are also implicated in vitro.<sup>5</sup> Cutting or crushing garlic triggers an enzymatic reaction that results in formation of diallyl disulfide, which becomes oxidized to allicin. Burn necrosis may be related to allicin interacting with thiol groups of numerous cellular enzymes.

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**Figure 1.** A, Predebridement. B, Postdebridement.

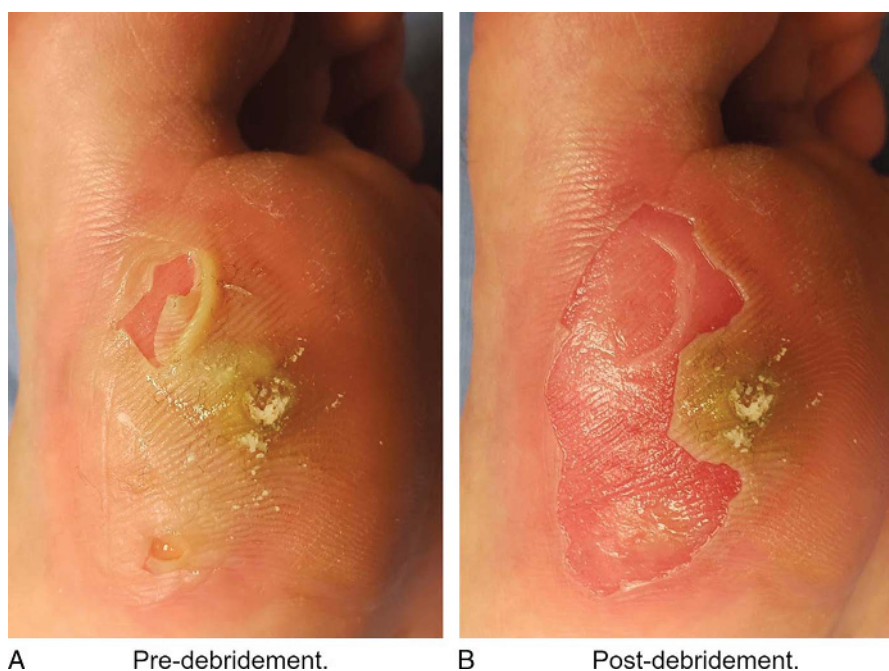


**Figure 2.** A, Predebridement. B, Postdebridement.

The case involving patient 1 is unique in that the garlic was not cut or crushed, so there would have been minimal diallyl disulfide present. In addition, garlic chemical burn without an occlusive dressing is rare. The case involving patient 2 is the second reported burn from garlic used as wart treatment, and this case clarifies a risk. Although garlic's potential medicinal use continues to be studied, clinicians should recognize the potential for significant chemical burn secondary to topical garlic.

## PEARL

Garlic chemical burn is possible from whole garlic not under an occlusive dressing. Topical garlic treatment of warts risks dermatitis or burn.

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## Allergic Reaction to Red Cosmetic Lip Tattoo Treated With Hydroxychloroquine

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### PRECIS

We present a case of a patient with a cutaneous allergic reaction to red tattoo pigments in a cosmetic lip tattoo, successfully treated with hydroxychloroquine.

### DISCUSSION

A 73-year-old woman visited the dermatology department with painful and itching skin lesions and a discoloration of the lips for 6 months. Two years ago, both her entire lips were tattooed with red tattoo ink, for cosmetic reasons. Her eyebrows, tattooed with black tattoo ink simultaneously, were unproblematic. She had no further medical history. On physical examination, we observed a slightly elevated plaque, confined to the red tattooed area, with yellow acneiform-like inclusions (Figs. 1A, B). There was no lymphadenopathy. Skin biopsy showed a lymphohistiocytic, granulomatous inflammation surrounding the red tattoo pigment. Ziehl-Neelsen and periodic acid-Schiff–diastase staining were negative. A chest x-ray and serum angiotensin-converting enzyme were performed, which showed no abnormalities, specifically no signs of sarcoidosis. The used tattoo ink could not be retrieved, and patch testing was not performed. Based on the clinical and histological findings, we diagnosed a delayed allergic reaction to the red tattoo pigment.

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Because of potential cutaneous atrophy and limited penetration depth, therapy with topical or intralesional corticosteroids was not considered. Surgical procedures, such as dermatome shaving, were rejected because of potential scarring. Therefore, treatment with hydroxychloroquine 200 mg twice daily was initiated. After 3 months, we noticed a significant clinical improvement. After 18 months, there was a complete remission of all symptoms (Fig. 2). The dosage of the hydroxychloroquine was slowly tapered and finally discontinued after 3 months without reoccurrence of symptoms thus far. No adverse effects occurred.

Cosmetic tattoos, when applied facially sometimes referred to as permanent makeup, are used to enhance facial appearance.<sup>1</sup> Frequently, eyebrows, eyelids, and lips are tattooed. Furthermore, these tattoos can camouflage lesions of skin diseases, such as alopecia of the eyebrows, hypopigmentation, and vitiligo. Potential complications include infections, allergic reactions, autoimmune skin diseases, scarring, pigment migration, and fanning/fading of the tattoo.<sup>1</sup>

In allergic reactions to tattoo pigments, red pigments are most frequently involved.<sup>2</sup> These reactions are chronic and can cause tenderness, pain, swelling, and severe itch.<sup>3</sup> Onset of symptoms may vary, ranging from days to several years after tattooing.<sup>4</sup> These reactions can lead to a reduced quality of life.<sup>5</sup> Clinical patterns observed are plaque elevation, ulceronecrotic, and hyperkeratotic pattern.<sup>6</sup> In allergic reactions to tattoo pigments, occluded epidermal cysts can occur, as in our case. Patch testing was not performed because the tattoo ink was not retrievable, and it would not have influenced



**Figure 1.** A and B, Pictures of the patient before treatment with hydroxychloroquine: showing slightly elevated plaque and yellowish papules on both the upper and lower lips, sharply confined to the tattooed area. The location of skin biopsy is marked.