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Recurrent cheilitis and lip oedema caused by (meth)acrylates present in ultraviolet-curable nail lacquer

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Ultraviolet (UV)-curable nail lacquers, also called 'gel polishes', are novel popular manicure agents that are designed to be applied on natural nails. They are marketed under different brands, one of which is Shellac[®], launched by CND[®], San Diego, CA, in 2010. These products have the advantages of being odourless, harden rapidly, and offering a wide spectrum of glossy colours. They are resistant and give a 2–4-week manicure without chipping (1). Gel polish contains the same pigments that are used in traditional nail lacquers, but also photoinitiators, and UV-curable acrylate or methacrylate monomers and oligomers (1). To the best of our knowledge, this is the first reported case of contact cheilitis caused by a UV-curable nail lacquer.

Case Report

A 49-year-old woman was referred because of episodes of non-pruritic cheilitis and lip oedema over the course of several months. She was using many facial cosmetics, including lipsticks and lip balm. Moreover, manicuring with a UV-curable nail lacquer was performed every 3 weeks for > 1 year (Easy on easy soak off, Guill d'or[®]). Symptoms had begun 3–4 months after the first manicure. While the cheilitis was worsening, the lip oedema remained constant, with no relationship with the manicure sessions. On physical examination, only moderate erythema and oedema of the mucosal surface of the lips were observed. Mild erythema of the periungual area was

Table 1. Patch test results with (meth)acrylates

Test allergen	D2	D3	D7
2-Hydroxyethyl methacrylate 2% pet.	+	+	+
2-Hydroxypropyl methacrylate 2% pet.	+	++	+
Ethylene glycol dimethacrylate 2% pet.	+	+	+
Ethyl acrylate 0.1% pet.	–	?	–
2-Hydroxyethyl acrylate 0.1% pet.	+	++	+
2-Hydroxypropyl acrylate 0.1% pet.	+	++	+
Methyl methacrylate 2% pet.	–	–	+
Triethyleneglycol dimethacrylate 2% pet.	–	–	?
Urethane dimethacrylate 2% pet.	–	–	+
Urethane diacrylate 0.1% pet.	–	–	+
Ultraviolet-polymerized polish colour layer as is	+	++	+
Ultraviolet-polymerized polish top coat as is	–	?	++

also noted. The patient admitted touching her lips with her nails frequently.

Patch tests were performed with the European baseline series supplemented with cosmetic, fragrances and acrylates series (Chemotechnique, Vellinge, Sweden; Trolab; Almirall Hermal, Reinbek, Germany), and the patient's own cosmetic products and UV-polymerized gel polish. The last of these was prepared by putting a thin layer of colour and a thin layer of top coat on two different patches, which were then polymerized under UV light. Allergens were applied with IQ Ultra[®] (Chemotechnique) and covered with Mefix[®] (Mölnlycke, Gothenburg, Sweden). Readings were performed at D2 and D3 and according to the guidelines of the ICDRG. Positive reactions were seen to many acrylates and methacrylates (Table 1). Readings were also performed at D7, because the patient observed new reactions on D5. The UV-curable varnish included: 'acrylated oligomer, urethane acrylate, methacrylate ester monomer, photoinitiator and pigments'. Removal of the varnish resulted in rapid resolution of the cheilitis and slower recovery of the lip oedema.

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Discussion

Allergic contact dermatitis caused by (meth)acrylates typically affects the nail area in consumers, and the hands and face in nail technicians (2, 3). It also has to be suspected in cases of unclear cheilitis or lip swelling, and use of a 'nail lacquer'. Contact dermatitis develops because of the persistence of unpolymerized (meth)acrylate monomers and oligomers (1). Contact allergy could be missed because this manicure has a very 'natural' aspect, mimicking classical varnish, and because (meth)acrylates are not included in the baseline series. A short screening series could include: 2-hydroxyethyl methacrylate (2-HEMA), triethyleneglycol dimethacrylate

(TREGDA), and ethylene glycol dimethacrylate (EGDMA) (2, 4). In cases of suspicion of (meth)acrylate allergy, Ramos et al. propose testing with 2-HEMA, and in cases of negative reactions, a broader series of allergens, including 2-hydroxypropyl methacrylate, TREGDA, EGDMA, and 2-hydroxyethyl acrylate (3). Multiple reactions may be explained by concomitant sensitization to different (meth)acrylates (2, 3) and to undeclared (meth)acrylates in the products (2) or cross-reactions (3). Previously acrylate-sensitized patients should be aware of the allergic risk of dental (2) or orthopaedic material. D7 reading is strongly recommended because of late-appearing reactions (4).

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