

CONTACT POINT

Allergic contact dermatitis caused by nickel in an eyebrow pencil

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Allergic contact dermatitis (ACD) caused by skin exposure to nickel-containing cosmetics has been reported.^{1,2} Nickel may be found in various coloured cosmetic products, but has not yet been identified as a contact allergen in eyebrow pencils. We report 2 women with eyebrow dermatitis who had been diagnosed as having seborrheic dermatitis. Our patients were patch tested, and ACD caused by nickel in the eyebrow pencil was finally diagnosed.

CASE REPORTS

Case 1

A 21-year-old woman presented with itchy erythematous and oedematous plaques on her eyebrows, eyelids and forehead of 4 days duration. Two months prior to the development of the rash, she started to use new “12 plus eyebrow pencil natural brown” (Ying Piao Industrial, Nantou, Taiwan). Moreover, previous rashes caused by costume jewellery were reported. She was patch tested with the international baseline series (Chemotechnique Diagnostics, Vellinge, Sweden) and a cosmetic series including her own cosmetic products, the latter being patch tested “as is”. Patch testing was performed with Finn Chambers on Scanpor tape (SmartPractice, Phoenix, Arizona), and the results are shown in Table 1. Scoring was performed according to ICDRG guidelines. Positive reactions to nickel (++) on day [D] 2 and D4), and to 12 plus eyebrow pencil (+ on D2 and D4) were found (Figure 1). The patient's symptoms improved after avoidance of the eyebrow pencil.

Case 2

A 35-year-old woman presented with an itchy rash on her eyebrow (Figure 2) after starting to use “12 plus eyebrow pencil natural brown”. Avoidance led to clinical improvement. Patch testing as above was performed, and the results are shown in Table 1.

TABLE 1 Patch test results

	Case 1		Case 2	
Allergen	D2	D4	D2	D4
Nickel	++	+	++	++
Colophonium	+	+	–	–
Myroxylon pereirae (balsam of Peru)	++	+	+	+
Fragrance mix I	–	–	+	+
Fragrance mix II	+	+	–	–
Triclosan	+	+	–	–
“12 plus eyebrow pencil” ^a	+	+	?+	?+
Cobalt	–	–	+	++
Mite	–	–	+	+

^a “12 plus eyebrow pencil natural brown” ingredients, including *Copernicia cerifera* wax, *Oryza sativa* bran wax, hydrogenated vegetable glycerides, hydrogenated coco-glycerides, caprylic/capric triglyceride, *Ricinus communis* (castor) seed oil, CI 77 499, CI 77 492, CI 77 491, CI 77 891, and CI 77 007.

Chemical analysis of 3 samples of “12 plus eyebrow pencil natural brown” with inductively coupled plasma mass spectrometry showed nickel levels of 8.13, 9.10, and 8.39 mg/kg, respectively.

DISCUSSION

Periorbital dermatitis is a common dermatological condition, mostly in terms of allergic contact dermatitis, with reported prevalences of 28% to 77%.³ The most frequent causes were cosmetics and topical ophthalmic medications.³ The most common allergens associated with dermatitis were metals such as gold and nickel, fragrances, and preservatives.⁴

Our patients presented with eyebrow dermatitis, which could easily be diagnosed as seborrheic dermatitis. Both of them had strong positive reactions to nickel, and case 1 also had a reaction to the eyebrow pencil. The association between nickel allergy and eyebrow dermatitis is probably explained by nickel contamination in the



FIGURE 1 (A), Positive reaction on day (D) 2 to nickel. (B), 12 plus eyebrow pencil natural brown



FIGURE 2 Eyebrow dermatitis in case 2

manufacture of pigments and other raw materials. The “12 plus eye-brow pencil” contains iron oxides (CI 77 491, CI 77 492, CI 77 499), which are often contaminated by nickel.⁵ According to a study from Finland, up to 44 ppm of nickel was found in 49 eye shadows.⁶ EU Regulation 1223/2009 bans nickel and nickel salts as intentionally added ingredients in cosmetics, but permits traces of metal as impurities.⁷ However, our reported eyebrow pencils were made in Asia, where there is still no legislation in effect. Oh et al showed 5.8 to 21.7 ppm of nickel among 5 brown eye shadows sold on the Korean market,⁸ that is, above the putative safe level of nickel in consumer product of 5 ppm minimizing the risk of sensitization.⁹

ACD caused by nickel in make-up products, including eye pencils,¹ eye shadow,² mascara,¹⁰ eyelash curler, and foundation products,¹ has been reported. Nevertheless, Thyssen et al found no association between self-reported cosmetic dermatitis caused by eye cosmetics and nickel allergy.¹⁰

As a limitation of our study, patch testing with single ingredients of the eyebrow pencil could not be performed. Sale of this series of eyebrow pencils was discontinued in Thailand because of the high incidence of reactions. In addition, both patients also had positive reactions to other allergens (patient 1, colophonium; patient 2, cobalt), which are possibly also contained in the eyebrow pencil. We presume that nickel was either used as a pigment colour or was a contaminant of iron oxides in the reported eyebrow pencil, causing eyebrow ACD in nickel-allergic patients. To our knowledge, ours is the first report of ACD caused by a nickel-containing eyebrow pencil.

Conflict of interest

The authors declare no potential conflict of interests.

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