

Allergic contact dermatitis caused by nickel in a green eye pencil

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Pigmented make-up may contain metal allergens, including nickel (1), and because such products are applied on thin areas of facial skin, such as the eyelids, they may represent a source of sensitization (2), but they certainly more frequently cause elicitation reactions.

Case Report

A 47-year-old non-atopic woman, intolerant of costume jewellery, was referred for patch-testing to the Contact Allergy Unit in Leuven with a 4-month history of itching, erythema, moderate infiltration and scaling of both eyelids, which she attributed to the use of eye make-up products. Her symptoms resolved during a 1-month vacation in Africa, where she did not use any make-up, but recurred following her return. Patch tests were performed with the baseline (Trolab, Hermal, Reinbeck, Germany) and cosmetic series, as well as the patient's own products and topical medicaments, using Van der Bend patch test chambers (Van der Bend, Brielle, The Netherlands). Positive reactions were observed to nickel (+ at D4) and the Deborah® green eye pencil (Deborah, SpA, Milano, Italy) (+ at D2 and D4) (Fig. 1) only. At follow-up of this patient, the lesions had disappeared completely after avoidance of the eye pencil.

Chemical analysis of the Deborah® green eye pencil was performed in Malmö, by dissolving about 240 mg of the colour in dichloromethane by shaking. After a few minutes a green insoluble precipitate was

formed. The precipitate was dried, and the residue (52 mg) was dissolved in 2 ml of 0.5% nitric acid plus 200 µl of concentrated nitric acid. The solution was filtered, and then analysed for nickel with atomic absorption spectrometry (AAS). The instrument used was an AAnalyst 800 equipped with a THGA graphite furnace (Perkin Elmer Instruments, Norwalk, CT, USA). The colour of the pencil was also dissolved in a dimethylglyoxime solution used for nickel spot-tests (about 10 mg of the colour was dissolved in 1 ml of test solution).

The result from the AAS analysis showed that the sample from the dissolved residue contained 3 µg nickel/l, corresponding to 0.028 µg nickel/g colour. Moreover, no colour change indicating the presence of nickel was visible in the dimethylglyoxime solution when the colour from the eyeliner was dissolved.

(Comment: dry-ashing at high temperature is often used for this kind of sample, to remove organic material before analysis. As the laboratory lacks this kind of equipment, dichloromethane was used instead to dissolve and separate organic material before the colour was dissolved in acid suitable for AAS analysis.)

Discussion

This patient, previously sensitized by nickel in jewellery, presented with an allergic contact dermatitis caused by an eye pencil in which the presence of nickel, 0.028 µg nickel/g colour, could be identified. Comparing its nickel content with patch testing, in the baseline series nickel sulfate, NiSO₄ · 6H₂O 5% pet., is used, which corresponds to 0.014 g nickel/g test preparation, whereas application of 20 mg of test preparation corresponds to 0.28 mg of nickel. Hence, the amount of nickel in the eye pencil was shown to be relevant to the patient's condition. Unfortunately, we did not perform

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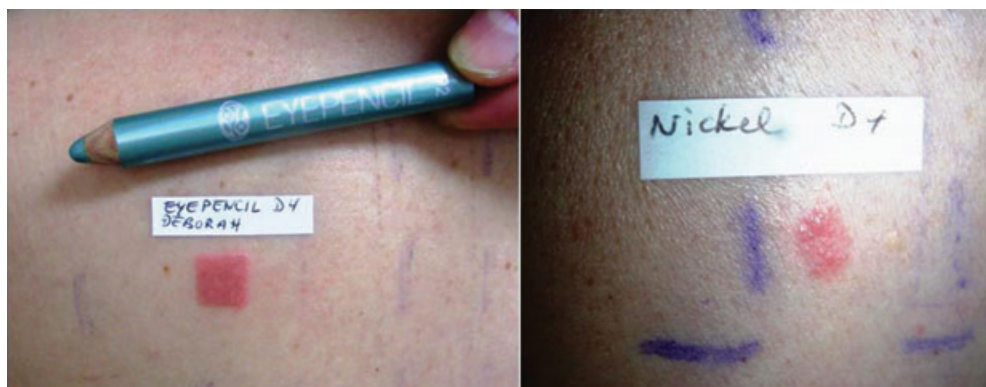


Fig. 1. Positive reactions to Deborah green eye pencil® and nickel, at D4.

testing with a dilution series, which would have allowed identification of the lowest concentration to which the patient reacted.

As we were unable to obtain any information from the company, we presume that nickel was used as a pigment colour or was present as a contaminant of ferric oxides (3). Metallic nickel and some of its salts are prohibited by the European Commission (4) in cosmetic products.

Allergic contact dermatitis caused by nickel in make-up products, namely eye-pencils (5), mascara (6), eye shadow (3, 7), and foundation products (8), and instruments, such as an eyelash curler (9, 10), have been reported in the literature. The thin stratum corneum and intermittent exposure to sweat on the eyelids have been associated with increased nickel skin absorption from make-up products, allowing lower nickel concentrations to elicit a reaction (1).

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