

Acetophenone azine: a new shoe allergen causing severe foot dermatitis

Charlotte De Fré¹, Ola Bergendorff², Nadia Raison-Peyron³, Karen van de Voorde¹, Elien Romaen¹, Julien Lambert¹, Christina Persson² and Olivier Aerts¹ 

¹Department of Dermatology, University Hospital Antwerp (UZA) and University of Antwerp (UA), 2650 Antwerp, Belgium, ²Department of Occupational and Environmental Dermatology, Skåne University Hospital, Lund University, 214 28, Malmö, Sweden and ³Allergy Unit, Department of Dermatology, Hôpital Saint Eloi CHU Montpellier, 34295, Montpellier Cedex 5, France

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Acetophenone azine (AA) has recently been identified as a new allergen in shin pads, causing severe allergic contact dermatitis in children (1). We here report the first adult with allergic contact dermatitis of the legs, caused by AA present in shin pads, in whom, additionally, AA-containing sport shoes were shown to be the cause of recalcitrant foot dermatitis.

Case Report

A 29-year-old non-atopic male hockey player was referred to us for the evaluation of dermatitis on both legs, which had commenced shortly after the wearing of a new pair of shin pads, lined with a grey foam (Fig. 1). Dermatitis had started on his shins, and had rapidly spread to his trunk and arms. Previously, dermatitis had also occurred after the wearing of another (older) brand of shin pads, with a similar, blue inner foam (Fig. 1). More recently, the patient had experienced severe dermatitis on the soles of both feet, which he related to the wearing of new sports shoes with a grey foam insole. Occasionally, generalized skin lesions would appear on top of the foot dermatitis.

Patch tests were performed with the Belgian baseline series and with additional series (cosmetics, rubbers, plastics and glues, shoe allergens, and textile colourants), all from Chemotechnique (Vellinge, Sweden), mounted on Allergeaze[®] patch test chambers (SmartPractice, Calgary, Canada), and occluded for 2 days with Fixomull[®] stretch



Fig. 1. Shin and foot dermatitis after the wearing of several types of shin pads, with grey and blue internal foam, respectively. The sport shoes subsequently provoked foot dermatitis.

(BSN Medical, Hamburg, Germany). Additionally, pieces of the internal grey foam of the patient's newest shin pads, and of the similar grey foam of the sport shoe insoles, were both patch tested 'as is', moistened with acetone. The older shin pads were not brought in by the patient, and could therefore not be patch tested separately. AA, provided by N.R.-P., was patch tested 0.1% and 0.01% in acetone. All tests were removed on day (D) 2 and read on D2, D4, and D7, according to ESCD guidelines (2). Positive reactions to pieces of the grey foam, contained in the shin

Correspondence: Dr. Olivier Aerts, Department of Dermatology, University Hospital Antwerp (UZA) and University of Antwerp (UA), Wilrijkstraat 10, B-2650 Antwerp, Belgium. Tel: +32 3 8214272; Fax: +32 3 8253428. E-mail: olivier.aerts@uza.be

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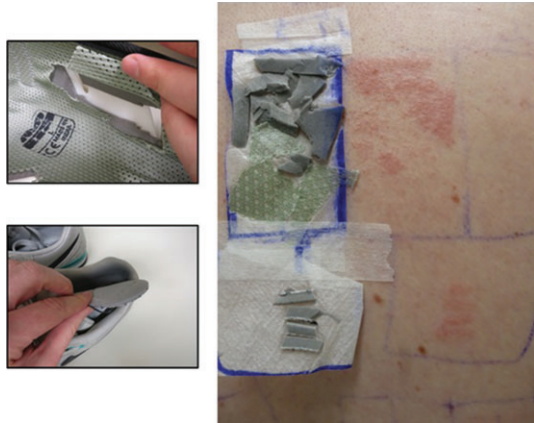


Fig. 2. Positive reactions on day 4 to the grey foam present in the shin pads (++; upper pieces) and in the soles of the sport shoes (++; lower pieces).

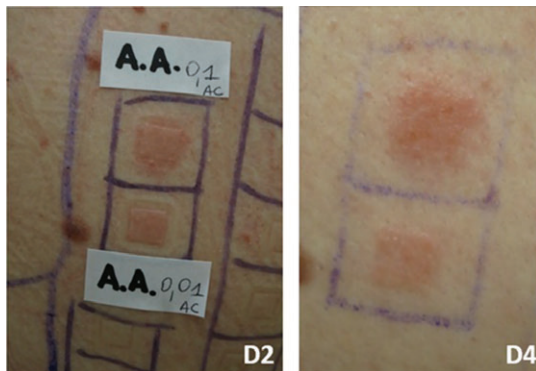


Fig. 3. Positive reactions on day (D) 2 and D4 to acetophenone azine (AA) 0.1% (++) and 0.01% (+) in acetone (AC).

pads and in the soles of the sport shoes, were seen on D2 and on D4 (+ and ++, respectively) (Fig. 2). Moreover, ++ and + reactions were observed to AA 0.1% and 0.01%, respectively, on D2 and D4 (Fig. 3). No later-occurring reactions were observed.

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Chemical analyses, performed in Malmö as detailed in (1), of the foam layers of both brands of shin pads, and of the grey foam soles of the sport shoes, confirmed the presence of AA in all three items. The highest concentration of AA, namely 88 µg/g, was found in the most recent brand of shin pads (grey foam), to which a positive patch test reaction was also obtained. In the older pair of shin pads (blue foam), possibly accounting for initial sensitization, AA was detected at 60 µg/g, whereas the concentration in the shoe soles was only 8 µg/g. The patient was successfully managed with topical corticoids, and, following avoidance of the culprit shin pads and shoes, his dermatitis did not recur.

Discussion

Shin pad dermatitis has mainly been reported in children, and common allergens include mercapto and thiuram derivatives, *N*-isopropyl-*N*-phenyl-*p*-phenylenediamine, thioureas, dithiocarbamates, (disperse) dyes, benzoyl peroxide, and urea formaldehyde and phenol formaldehyde resins (1). Contact irritant reactions, especially in atopic children, are a differential diagnosis (3). For allergic foot dermatitis, compounds contained in footwear, socks or stockings may be the causal agents (4), and reported allergens include chromium, rubber accelerators, and dyes. Recently, octylisothiazolinone, which is used as an antifungal during the processing of leather (5), and dimethylthiocarbamyl benzothiazole, which is a strongly sensitizing rubber compound (6), have also gained attention as new shoe allergens.

Our case adds to the evidence that AA (syn. methylphenylketazine, CAS no. 729-43-1), owing to its presence in shin pads, is indeed a problematic sensitizer for children, also for adults. Moreover, the presence of this strong sensitizer in even more widely used consumer products, such as (sport) shoes, might warrant the inclusion of this allergen in a shoe series, or as an addition to the baseline series, for example 0.1% in acetone (1).