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Allergic contact dermatitis from acetophenone azine in a Canadian child

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Patch testing with commercially available allergens is often negative in cases of suspected allergic contact dermatitis (ACD) to shin pads and shoes. Recently, high-performance liquid chromatography of samples of shin pads made from ethyl vinyl acetate (EVA) resulted in the discovery of acetophenone azine (AA) as the cause of ACD in European children.¹ We report a case of AA-induced shin pad and sports shoe dermatitis in a North American child.

CASE REPORT

During the summer of 2017, a 6-year-old boy began to play soccer. He progressively developed an eczematous dermatitis on the anterior of his legs at the site of contact with the EVA core of his shin pads (Figure 1). The dermatitis resolved in the winter months but recurred during the following summer, becoming vesicular and oozy, with dissemination to the trunk and shoulders. He was treated with topical corticosteroids. A pruritic dermatitis later appeared on the soles of both feet. At that time, he was wearing Nike Cr7 soccer shoes that after discarding resulted in resolution of the dermatitis; however a relapse occurred when he wore Adidas cleats. (Figure 2).

Initial patch testing in the fall of 2019 included a 34-allergen pediatric series and a shoe series on IQ Ultra chambers (both Chemotechnique Diagnostics, Vellinge, Sweden), as well as a 2 × 2 cm piece of black EVA from the shin pad, moistened with water. Readings were performed on day (D) 2 and D4. The only positive reaction was to the piece of EVA. A second patch test was carried out in January 2020 with a glues and plastics series, pieces of the insole of the Adidas shoe, and AA (Sigma-Aldrich, Saint Louis, Missouri) diluted 1%

and 0.1% pet. Positive reactions were seen to the insole and AA, both reactions being close together, merging into a single large reaction (Table 1).

DISCUSSION

Recent European publications have identified AA (methylphenylketazine, CAS no.729-43-1) as a new allergen causing ACD from shin pads, sneakers and flip-flops.¹⁻⁵ Our patient had a similar clinical presentation, including generalization of the dermatitis beyond



FIGURE 1 Nike charge shin guard



FIGURE 2 Adidas soccer cleats

TABLE 1 Results of patch testing

Test series and products	Day 2	Day 4
Pediatric baseline series (34 allergens)	—	—
Shoe series	—	—
Rubber series	—	—
Plastics & glues series (epoxies and acrylates)	—	—
Disperse dye mix	—	—
Piece of black ethyl vinyl acetate from shin pad	+	+
Piece of insole from Adidas cleats	—	+
Acetophenone azine 1% pet.	+	+
Acetophenone azine 0.1% pet.	+	+

the site of initial contact. AA is likely to be a byproduct of EVA synthesis and, therefore, manufacturers of sports equipment are largely unaware of its presence.³ The concentration of AA is higher in shin pads than in shoes, explaining why patients, primarily sensitized by the former, later react to their shoes. Most publications recommend

testing AA 0.1% in acetone.¹⁻⁴ Our results show that petrolatum is a suitable vehicle, which could help maintain the stability of AA over an extended period.

Given the worldwide use of EVA in all sorts of sports-wear and footwear, we suggest adding AA 0.1% pet. or acetone to patch test shoe series. We also recommend that suppliers of patch testing materials make this allergen commercially available.

CONFLICT OF INTEREST

Dr. Denis Sasseville receives royalties from UpToDate (Wolters Kluwer Health). The other authors declare no conflicts of interest.

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