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## Contact Allergy Strikes! Allergic Contact Dermatitis in a Bowling Pro Shop Operator

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This vignette illustrates a rare source of allergic contact dermatitis (ACD) from epoxy resin (ER) and hardeners found in a bowling pro shop operator.

### Case Report

A 58-year-old male presented with a 1.5-year history of pruritic, erythematous, scaly dermatitis on the forearms, legs, and bilateral dorsal hands with eventual spread to the face. Treatment with clobetasol cream, triamcinolone cream, and oral prednisone provided minimal relief of symptoms. He felt his work at a bowling pro shop exacerbated his symptoms. He worked with two-part epoxy systems, where resins are cured with hardeners to fill finger inserts of used bowling balls. He occasionally wore nitrile gloves and a face mask at work, which helped prevent flare-ups.

Patch testing was performed using the 2019-2020 North American Contact Dermatitis Group standard series, supplemental series (preservatives, emulsifiers, rubber, plastic/glues) (Chemotechnique Diagnostics, Vellinge, Sweden), and the patient's personal products. Allergens were occluded for 2 days and read on days 2 and 4. Results on day 4 revealed strong (++) reactions to bisphenol A (BPA, epichlorohydrin polymer) ER, 4-4-diaminodiphenylmethane (MDA), ER cycloaliphatic, triethylenetetramine (TETA) (**Figure 1**), quaternium-15, and formaldehyde. He had mild (+) reactions to methylchloroisothiazolinone/methylisothiazolinone, gold, grotan BK, and the cured Wizard 31 ER-hardener mixture "as is" and doubtful (+/-) reactions to iodopropynyl butylcarbamate, cresylglycidylether, and the Motiv Bowling ER-hardener mixture "as is".

Our patient handled 3 different epoxy systems: Wizard 31 (Brunswick Bowling Products, Muskegon, MI, USA), Vise CS Hybrid (Innovative Bowling Products, Jacobus, PA, USA) (**Figure 2**), and HD and HR (Motiv Bowling, Spring Lake, MI, USA). The Material Safety Data Sheets showed that the Wizard 31 resin and hardener contained BPA ER (epichlorohydrin), glycidylether compounds, and TETA; the HD and HR resin contained BPA. His hand and body lotions, anti-itch cream, and sunscreen contained formaldehyde, likely relevant to his back and leg rash.

## Discussion

Epoxy chemicals (resins, reactive diluents, hardeners) are ubiquitous compounds with easy curing and adhesive properties. ERs, mostly derived from BPA, are important causes of occupational ACD. Dermatitis on the hands and arms are common presentations.<sup>1</sup> Only one other case of ER-induced ACD in a bowling pro shop operator has been reported; this patient had a (+) reaction to BPA (diglycidylether), found in his bowling ball plugging kit.<sup>2</sup>

This is the first case of ACD to a bowling ball plug epoxy hardener. Hardener allergy typically presents concomitantly with ER allergy. TETA and MDA are polyamines and known hardener contact allergens; however, sensitization to TETA is rare.<sup>3</sup> Reactive diluents (cresylglycidylether) and hardeners can cause an airborne pattern of dermatitis (face/neck),<sup>1</sup> possibly explaining our patient's facial involvement.

Our patient reacted to the cured resin-hardener mixture, which has been documented as less sensitizing than the liquid constituents.<sup>2</sup> Unlike ERs, epoxy hardeners and reactive diluents are

not on standard series and may be missed on routine testing, underscoring the importance of patch testing to supplemental series and personal products in patients exposed to ERs.

Urethane-based plugs are epoxy-free alternatives but cure faster and may create an improper seal.<sup>2</sup> Therefore, wearing personal protective equipment is important, particularly polyethylene vinyl alcohol and butyl gloves. Also, single-component epoxy systems are recommended.<sup>4</sup>

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**Figure 1.** Strong (++) reactions to A) bisphenol A epoxy resin 1% pet., B) epoxy resin cycloaliphatic 0.5% pet., and C) triethylenetetramine 0.5%; mild (+) reaction to D) the Wizard 31 Ball Plug Two-Part Epoxy Resin-Hardener mixture tested “as is”.  
*Reactions read on day 5 of patch testing.*

**Figure 2.** Bowling Ball Plug Two-Part Epoxy Resin-Hardener Systems: A) Wizard 31 (Brunswick® Bowling Products) Ball Plug Resin, (B) Hardener, and (C) Resin-Hardener Mixture; (D) Vise CS Hybrid Ball Plug (Innovative Bowling Products Corporation) Mixture

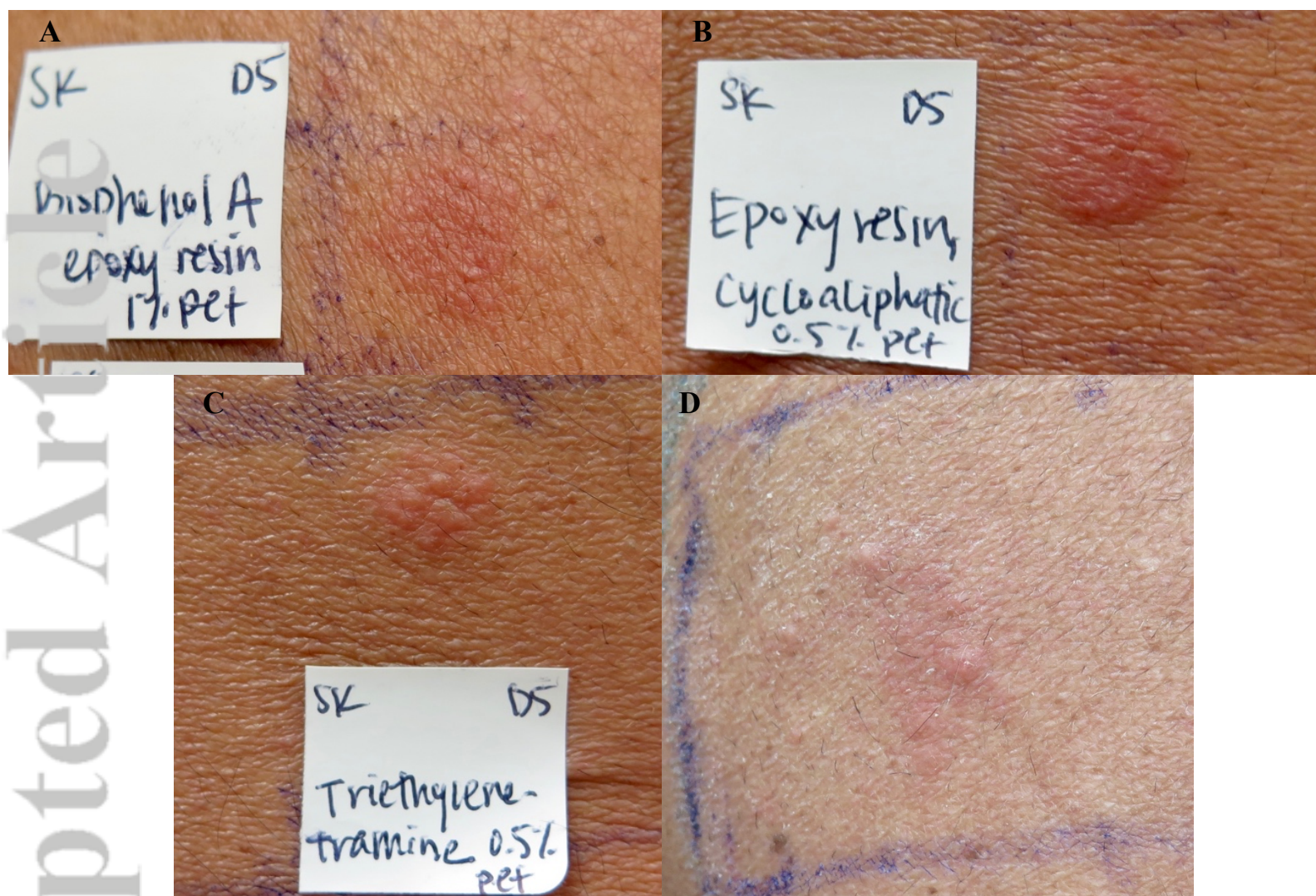


Figure 1.

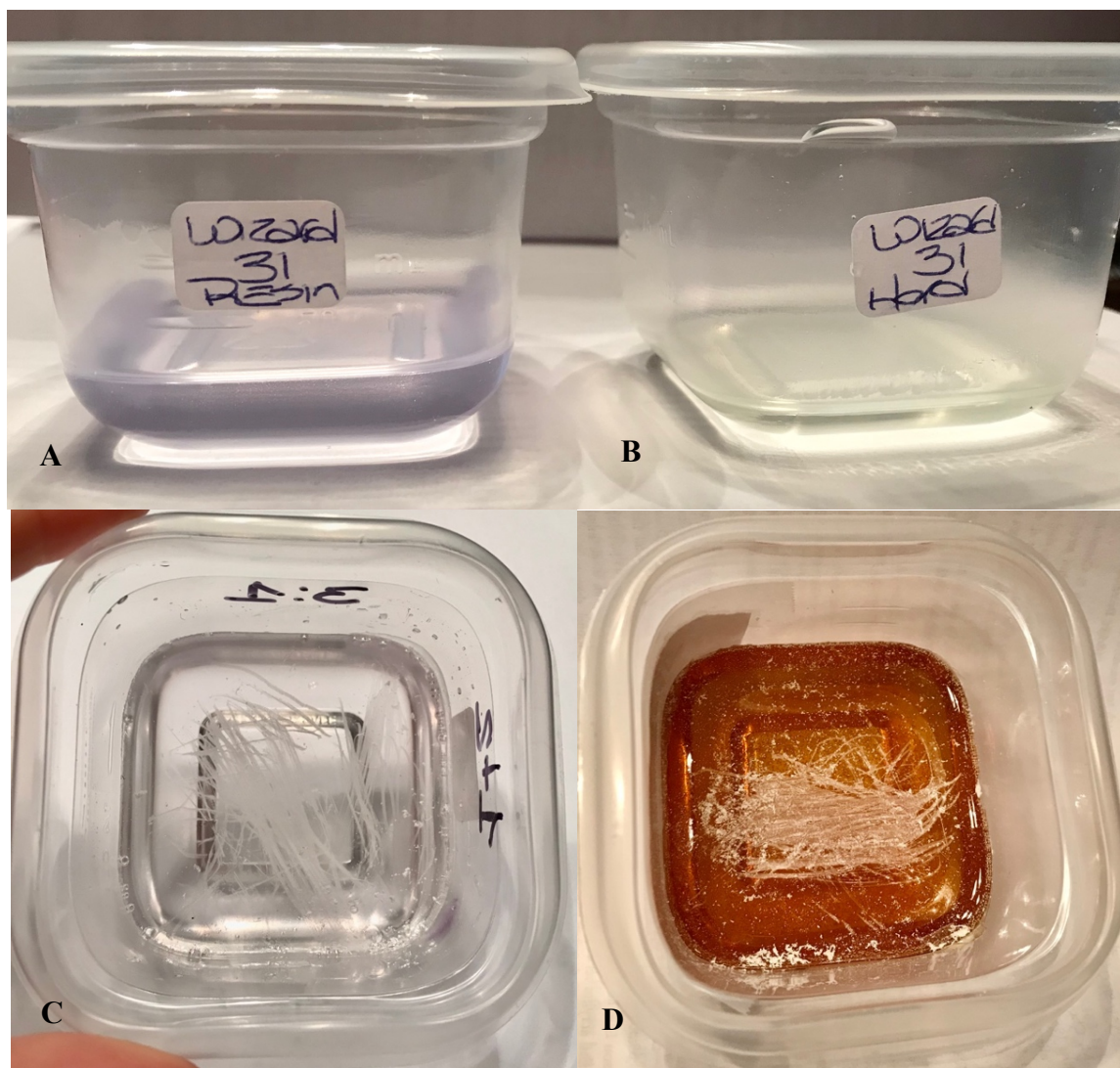


Figure 2.