

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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REFERENCES

1. Aquino M, Rosner G. Systemic contact dermatitis. *Clin Rev Allergy Immunol*. 2019;56(1):9-18.
2. Bajaj AK, Saraswat A. Systemic contact dermatitis. *Indian J Dermatol Venereol Leprol*. 2006;72(2):99-102.

3. Doms-Gossens A, Dubelloy R, Degreef H. Contact and systemic contact-type dermatitis to spices. *Dermatol Clin*. 1990;8(1):89-93.
4. Fabbro SK, Zirwas MJ. Systemic contact dermatitis to foods: nickel, BOP, and more. *Curr Allergy Asthma Rep*. 2014;14(10):463.
5. Hafner J, Riess CE, Wüthrich B. Protein contact dermatitis from paprika and curry in a cook. *Contact Dermatitis*. 1992;1992(26):51-52.
6. Otang WM, Grierson DS, Afolayan AJ. A survey of plants responsible for causing allergic contact dermatitis in the Amathole District, Eastern Cape, South Africa. *S Afr J Bot*. 2014;157(1):274-284.

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Allergic contact dermatitis caused by polyurethane components in bulletproof glass manufacturing

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Polyurethanes are versatile materials and are widely used in industrial and consumer settings. We present a case of a worker from a bulletproof glass manufacturing company who developed sensitization to both the isocyanate and to a component of the polyurethane resin which contained polyols.

CASE REPORT

A 29-year-old woman with an atopic background presented with a 1-month history of intermittent hand dermatitis following an accidental exposure to polyurethane resin at work. The resin was used to seal glass sheets together to create bulletproof glass and was composed of Part A: isophorone diisocyanate (IPDI; CAS 4098-71-9) and Part B: gamma-glycidioxypropyltrimethoxysilane (CAS 2530-83-8); bis(1,2,2,6,6-pentamethyl-4-piperidyl) sebacate (CAS 41556-67-7); phenyl mercury neodecanoate (CAS 26545-49); polyol blend. The patient wore nitrile gloves, long-sleeved clothing and protective goggles, but was exposed to the resin on her wrist after it leaked out of a closed system. She developed dermatitis at the site of exposure on her wrist. A few days later, she developed a pruritic rash involving her hands, arms, and

neck, and oedema of her eyelids and face. The patient was treated with oral prednisolone and the more generalized rash resolved over days. She then gave a history of ongoing intermittent hand dermatitis. She had no associated respiratory symptoms.

Patch testing was completed with the Australian Baseline Series, the rubber and isocyanate series, and the patient's own samples from work, appropriately diluted using allergEAZE patch test chambers (SmartPractice, Phoenix, Arizona) and allergens from Chemotechnique Diagnostics (Vellinge, Sweden). Positive patch test reactions were seen to Part A 1% pet., Part B 1% pet., and IPDI 1.0% pet. (Table 1). The patient did not react to the hardened polyurethane that was tested "as is" or to

TABLE 1 Patch testing reactions on day 2 and 4

Allergen	Concentration	Day 2	Day 4
Part A	1.0% pet.	+	+
Part B	1.0% pet.	+	+
Hardened polyurethane	"as is"	-	-
Isophorone diisocyanate	1.0% pet.	-	+
Isophorone diamine	0.1% pet.	-	-
Formaldehyde	1.0% aq.	-	+

isophorone diamine 0.1% pet. She also had a positive patch test reaction to formaldehyde 1.0% aq., which was not thought to be relevant to the acute dermatitis. A latex-specific immunoglobulin E test was negative.

DISCUSSION

Polyurethane resins are formed by a reaction between a diisocyanate and polyol compound.¹ Polyurethanes are used in various products including paints, glues, adhesives, varnishes, elastomers as well as soft and hard foams.¹ Most polyurethanes, particularly in rigid foams, use aromatic isocyanates such as toluene diisocyanate and 4,4'-diphenylmethane diisocyanate. In coatings and adhesives where having visible or UV radiation and weather resistance characteristics are desirable, aliphatic isocyanates including 1,6-hexamethylene diisocyanate (HDI) and IPDI are used.² Isocyanates are strong sensitizers known to cause occupational asthma and allergic contact dermatitis (ACD).^{2,3} Cases of ACD to isocyanates have been documented in various settings such as manufacturing of electronics, motor vehicles, adhesives, glues, lacquer, paints, and in road workers and technicians of laboratories, printing firms, and telephone companies.²⁻⁶ Accidental spillage is often a source of sensitization as in our patient.⁶

Our patient also developed ACD to Part B of the polyurethane resin, which is a compound of multiple hydroxyl groups often made up of polyesters or polyethers.⁵ Of the polyol components, bis(1,2,2,6,6-pentamethyl-4-piperidyl)sebacate (CAS 41556-67-7) has been reported to be a potential skin sensitizer which could be a possible culprit for the patient's positive patch test reaction to part B of the polyurethane resin.⁷ We did not have that polyol available for testing to confirm this.

To our knowledge, this is the first report of ACD to both the isocyanate and polyol groups in the manufacture of ballistic proof glass. This case highlights the importance of appropriate training and use of personal protective equipment when handling polyurethane components, as a result of their strong allergenic potential.

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The authors declare no potential conflicts of interest.

AUTHOR CONTRIBUTIONS

Jennifer Nguyen: Writing – original draft (equal). **rosemary nixon:** Writing – review and editing (equal). **Adriene Lee:** Conceptualization (equal); writing – review and editing (equal).

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REFERENCES

1. Kanerva L, Wahlberg J, Elsner P, Maibach H. *Handbook of Occupational Dermatology*. New York: Springer-Verlag; 2000:597-601.
2. Aalto-Korte K, Suuronen K, Kuuliala O, Henriks-Eckerman ML, Jolanki R. Occupational contact allergy to monomeric isocyanates. *Contact Dermatitis*. 2012;67(2):78-88.
3. Goossens A, Detienne T, Bruze M. Occupational allergic contact dermatitis caused by isocyanates. *Contact Dermatitis*. 2002;47(5):304-308.
4. Engfeldt M, Isaksson M, Zimerson E, Bruze M. Several cases of work-related allergic contact dermatitis caused by isocyanates at a company manufacturing heat exchangers. *Contact Dermatitis*. 2013;68(3):175-180.
5. Frick M, Isaksson M, Björkner B, Hindsén M, Pontén A, Bruze M. Occupational allergic contact dermatitis in a company manufacturing boards coated with isocyanate lacquer. *Contact Dermatitis*. 2003;48(5):255-260.
6. Engfeldt M, Pontén A. Contact allergy to isocyanates after accidental spillage. *Contact Dermatitis*. 2013;69(2):122-124.
7. Environment and Health Canada. Screening Assessment for the Challenge. Decanedioic acid, bis(1,2,2,6,6-pentamethyl-4-piperidyl)-ester (CAS No. 41556-26-7) 2010. <http://www.ec.gc.ca/ese-ees/default.asp?lang=En&n=F638D9CF-1> Accessed December 15, 2020.

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“High-vis” dermatitis. A case report

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KEYWORDS: high-vis, high-visibility reflectance tape, irritant contact dermatitis, lichenoid contact dermatitis

High-visibility reflective tape forms an important component of personal, protective equipment for industrial workers, designed to reduce

the occurrence of workplace injuries. However, in rare instances, this high-visibility tape can contribute to occupational morbidity.¹