

Allergic Contact Dermatitis of the Eyelids: Swimming Past Goggle Dermatitis

Sarah E. Tonelli, MD* and Ari M. Goldminz, MD†

PRECÍIS

Use of sports' goggles and other eyewear should be part of the history taking in patients presenting with periocular dermatitis.

DISCUSSION

A 13-year-old competitive swimmer with no dermatologic history presented with 2 months of pruritic, periocular dermatitis. She experienced flares within hours to days after swim practices and races that would resolve after several days away from the pool. On physical examination, there were pink-to-erythematous, thin, scaly plaques over the eyelids and periocular skin (Fig. 1).

A diagnosis of allergic contact dermatitis (ACD) secondary to her rubber and foam swimming goggle gaskets was made by the history and examination findings. We recommended that she use a goggle with 100% silicone gaskets. Her eyelid dermatitis resolved within several days of switching to silicone-based goggles, and more than 2 months later, she had not experienced a flare. Subsequent exposure to foam padding present in protective eyewear for lacrosse caused a flare of her periocular dermatitis, and a silicone-based alternative was sought.

Swimming goggle ACD presenting with periocular dermatitis is most commonly reported as a result of rubber-related allergens, such as rubber accelerators (ie, dibutylthiourea), cross-linking agents



Figure 1. Symmetric, periocular dermatitis in a swimmer using goggles, one pair with foam and another with rubber gaskets.

From the *Brinton Lake Dermatology, Glen Mills, PA; and †Department Dermatology, Brigham and Women's Hospital, Contact Dermatitis and Occupational Dermatology Program, Chestnut Hill, MA.

Address reprint requests to Ari M. Goldminz, MD, 850 Boylston St, Suite 437, Chestnut Hill, MA 02417. E-mail: agoldminz@bwh.harvard.edu.

The wife of A.M.G. has stock in Johnson and Johnson.

DOI: 10.1097/DER.0000000000000541

© 2019 American Contact Dermatitis Society. All Rights Reserved.

TABLE 1. Examples of Sporting Activities Where Goggles With Rubber or Foam Gaskets May Be Used

Handball
Lacrosse
Motorcycling
Paintball
Protective sport frames for glasses
Skiing/snowboarding
Skydiving
Swimming

(ie, phenol-formaldehyde resin), vulcanizing agents (ie, benzoyl peroxide), and antioxidants (ie, amines), which can be present in goggle gaskets.^{1–3} Exposure to rubber allergens in protective eyewear may also occur in other sports (Table 1) and in sensitized individuals can cause dermatitis as was observed in the current case.

Unlike rubber-related ACD, silicone ACD is rare. Silicone, or polysiloxane, is a polymer of siloxane units built from silicone, oxygen, and other elements, such as hydrogen and carbon. Several cases of ACD to silicone components in pacemakers and one case to the silicone component of swimming goggles have been published.⁴

TABLE 2. Examples of 100% Silicone Gasket Swim Goggles (Left Column) and Swedish-Style Swim Goggles (Right Column) Currently Available

100% Silicone Gasket Swim Goggles (By Company and Model)	Swedish-Style Swim Goggles (By Company)
Aqua Sphere	Arena
All models	Head
Arena	Jaked
Cobra Ultra Swipe Mirror	Malmsten
Barracuda	Speedo
Aqua Lightning	Sporti
Fenix	Sprint Aquatics
Cressi	Swedes
Right	TYR Sport
Skylight Clear Lens	
Nike	
Blackhawk	
Kids Swimple	
One Piece Frame Mirrored	
Special Ops 2.0	
Special Ops 3.0	
Vesi	
Speedo	
Vanquisher	
Sporti	
All models	
US Masters Swimming or USMS	
Antifog Plus	
Antifog S2	
Antifog S2 Mirrored	

“Swedish-style” swimming goggles create a direct seal between the periocular skin and the plastic goggle frame itself without requiring a rubber or foam gasket. Swedish-style goggles also require assembly, including attachment of the nose bridge and head strap, and adjustment of the swimmer to the style and fit of this gasket-free goggle. However, they are also more easily customizable, allowing, for example, modification of the distance between the goggles’ lenses. In addition, rarely, there may be a contact allergy to plastic-related materials, and in these cases Swedish-style swimming goggles may not be an appropriate option.

PEARL

There are currently several options for swimmers with rubber-related contact allergens who develop periocular ACD including silicone-based gaskets and Swedish-style goggles (Table 2).

REFERENCES

1. Alomar A, Vilaltella I. Contact dermatitis to dibutylthiourea in swimming goggles. *Contact Dermatitis* 1985;13(5):348–349.
2. Azurdia RM, King CM. Allergic contact dermatitis due to phenol-formaldehyde resin and benzoyl peroxide in swimming goggles. *Contact Dermatitis* 1998;38(4):234–235.
3. Vaswani SK, Collins DD, Pass CJ. Severe allergic contact eyelid dermatitis caused by swimming goggles. *Ann Allergy Asthma Immunol* 2003;90(6):672–673.
4. Sakuragi Y, Sawada Y, Nakamura M. Leukoderma following allergic contact dermatitis caused by the silicone component silprene-30A/B in swimming goggles. *Contact Dermatitis* 2017;77(6):418–419.

Relevant Contact Allergy to Benzisothiazolinone in a Personal Care Product

Rachit Gupta, BS,*† Sara A. Kullberg, BA,*†
and Erin M. Warshaw, MD, MS*‡

PRÉCIS

This vignette illustrates a novel source of benzisothiazolinone, hand soap, distinct from the usual culprits such as paints and various cleaning solutions.

DISCUSSION

A 35-year-old woman presented with a 3-month history of bilateral hand dermatitis coinciding with a household move. The rash began in

the interdigital web spaces, spreading to both palms with generalized erythema and desquamation (Fig. 1A). Topical steroids, crisaborole, oral cephalexin, and intramuscular triamcinolone were ineffective.

Patch testing to the 2019–2020 North American Contact Dermatitis Group screening series as well as additional series (corticosteroid, emulsifiers, preservatives, rubber, and medicament) and personal care products (PCPs) was completed. The final read demonstrated strong (++) reactions to nickel (2.5%, 5% pet) and benzisothiazolinone (0.1% pet) (Fig. 1B), and a borderline (+/–) reaction to bronopol (0.5% pet). Notably, the patient did not react to methylchlorisothiazolinone (MCI)/methylisothiazolinone (MI), MI, or octylisothiazolinone. Methylchlorisothiazolinone/methylisothiazolinone and MI were retested and the results remained negative, consistent with previously reported low cross-reactivity rates of 1,2-benzisothiazolin-3-one (BIT) and MCI/MI.¹

Ingredients of home products were investigated; benzisothiazolinone was found in her Puracy Natural Foaming Lavender & Vanilla Hand Soap (Fig. 1C), as well as her all-purpose surface cleaner and 2 laundry products. Further questioning revealed that the patient had purchased the Puracy hand soap shortly after moving. She was advised to switch to benzisothiazolinone-free hand soaps and handle cleaning chemicals with gloves. Nickel testing found few nickel-releasing products, and bronopol was not found in her products, making those reactions less likely relevant.

Products designed for use on human skin are regulated differently from those *not* designed for use on human skin. 1,2-Benzisothiazolin-3-one is a biocide and fungicide banned for use in PCPs in Europe. Although declared a moderate skin sensitizer by the US Environmental Protection Agency, BIT still remains in US products.² Other isothiazolinones (MI/MCI) are routinely found in US hand soaps, whereas BIT has been historically used in products *not* designed for use directly on human skin (eg, paints, varnishes, cleaners, and laundry detergents).^{1,2} 1,2-Benzisothiazolin-3-one is not listed in the International Nomenclature of Cosmetics Ingredients dictionary, with no reported PCP use as per FDA Voluntary Cosmetic Registration Program (<https://www.fda.gov/cosmetics/voluntary-cosmetic-registration-program>), although no US prohibitive regulations exist (Don Belsito, MD, personal communication, October 2, 2019).

Case reports document allergy to BIT in continuous airway positive pressure wash, polyvinyl chloride gloves, and glues.^{3,4} Previous analyses of household exposures to BIT demonstrated all-purpose cleaners as the most common source; PCPs were not reported. Inspection of the Environmental Working Group, National Institutes of Health Household Products, and National Institutes of Health DailyMed databases revealed only one other PCP containing BIT—Seventh Generation Natural Hand Wash.⁵ Other hand soaps on DailyMed were combination hand-dish soaps or marketed for industrial use.

Although intermittent exposure to BIT in household cleaners was a likely contributor, frequent exposure to BIT in her hand soap is likely very relevant. To the authors’ knowledge, allergic contact dermatitis of the hands from benzisothiazolinone present in PCPs has not been reported. This case underscores the importance of investigating PCPs for identified allergens, even when not anticipated. We would

From the *Park Nicollet Contact Dermatitis Clinic; †University of Minnesota Medical School; and ‡Department of Dermatology, University of Minnesota, Minneapolis.

Address reprint requests to Rachit Gupta, BS, Park Nicollet Contact Dermatitis Clinic, 7550, 34th Ave S, Suite #101, Minneapolis, MN 55450. E-mail: gupt0339@umn.edu.

The authors have no funding or conflicts of interest to declare.

Submitted for publication on October 9, 2019.

Patient provided consent for publication of patient images.

DOI: 10.1097/DER.0000000000000558

© 2020 American Contact Dermatitis Society. All Rights Reserved.