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Bullous allergic contact dermatitis from disperse dyes in Lycra cycling shorts

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CASE REPORT

A 53-year-old man was referred urgently with a 1-week history of an intensely itchy bullous, partly crusted eruption. Examination showed localized well-demarcated involvement of the inner thighs with a "cut-off" at the knee (**Figures 1A and B**). Secondary eczematous changes were present on the trunk and upper limbs (**Figure 1C**). He was systemically well and apyrexial. His general practitioner had unsuccessfully treated him with oral clarithromycin and flucloxacillin for suspected cellulitis. There was no reported exposure to Trimovate (combination of clobetasone, nystatin, and oxytetracycline), Timodine (combination of nystatin, hydrocortisone, dimeticone, and benzalkonium chloride), or any other topical medicament or cosmetic. He was a keen cyclist and routinely wore dark-colored Lycra knee-length cycling shorts with a rubber seam (Figure 1D). Four days before the onset of the eruption, he had worn his usual shorts under a new pair of jeans and exerted himself by cycling vigorously, becoming sweaty. He worked as a printer and, as a hobby, carried out landscaping using treated timber. He had no previous history of eczema or atopy.

Allergic contact dermatitis (ACD) was suspected. The rash cleared with 6 weeks of oral prednisolone, initially 30 mg once daily, reduced

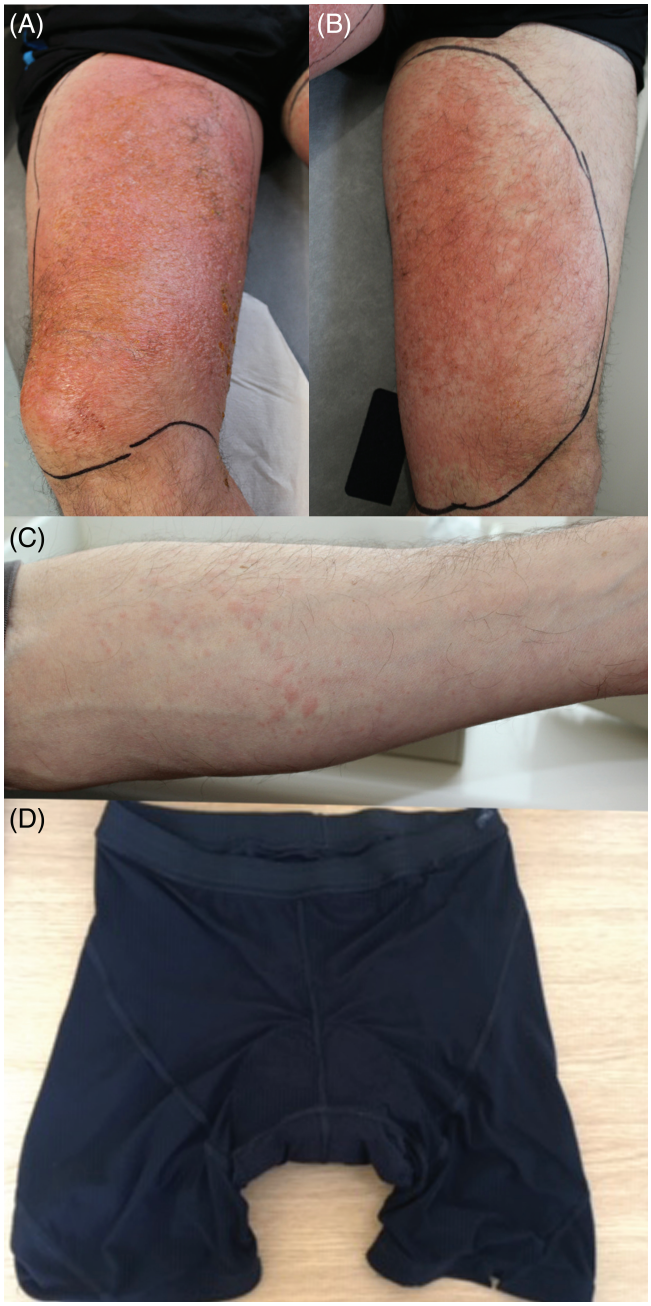


FIGURE 1 Patterned erythema, vesiculation, and crusting on inner thighs (**A**, **B**) with secondary spread to forearms (**C**). Patient's cycling shorts pictured (**D**)

by 5 mg daily every 7 days, and the application of emollients and topical clobetasol propionate 0.05% ointment once daily. He was patch tested with an extended British Society for Cutaneous Allergy baseline series, face series, extended face series, oils and coolants, rubber, textile dyes and resins, and an acrylate series (Chemotechnique Diagnostics, Vellinge, Sweden). He was also tested to the denim jeans, the rubber area of the shorts and the main body of the shorts. Patch tests were removed after 48 hours and readings carried out at day (D)2 and D4. Disperse Blue 106 1% pet., Disperse Blue 124 1% pet., and the mix of Disperse Blue 106 and 124 1% pet. each gave a + reaction at D4 (Figures S1A and S1B). We were unable to elicit a positive patch test to the rubber and Lycra from his shorts or to the denim jeans. Sodium metabisulfite 1% pet. gave a +++ reaction at D2 and D4. Other Disperse Dyes (DDs) and *p*-phenylenediamine (PPD) patch tested negative.

DISCUSSION

DDs are used to dye synthetic fabrics, usually dark in color. They do not chemically bond to fabric fibers. Their small lipophilic molecules easily migrate into the skin of the individual wearing a garment, especially if the textile fastness is poor. DDs may be leached from fabric by rubbing and by exposure to water and moisture, such as in our cyclist. They are not used to dye all types of synthetic fibers and are not used for wool and cotton.

Sports activities increase the skin's exposure to the environment and alter its barrier function against external agents. During exercise, repeated friction and hot, moist conditions expose the skin to numerous sensitizing compounds released from sports clothing and equipment.[1] Both irritant dermatitis and ACD may occur, especially in persons with reduced skin barrier function.

Rubber accelerators are the most frequent cause of ACD in sportsmen and sportswomen and allergy to dyes in sportswear has not been widely documented.[1] One case of DD sensitization (Disperse Yellow 3) has been reported in a cyclist who was also sensitized to PPD and benzocaine, so this may have been a cross-reaction due to primary sensitization to PPD in hair dye.[1] Our patient was sensitized to Disperse Blue 106 and 124 but not to PPD, consistent with primary sensitization to DD in his cycling shorts. Disperse Blue 106 and 124 are the most frequent DDs implicated in causing ACD from textiles[2] but have not been reported to cause ACD in sportswear. It is likely that our patient was gradually sensitized to the DDs in his shorts, and that when he wore the jeans over them, the pressure, heat and sweating caused severe leaching of dye molecules into his skin.

Sulfites are commonly used to preserve foods, wine, cosmetics, hair dyes, and topical medicaments. Sodium metabisulfite may also be used as a latex anticoagulant in rubber manufacture.[3,4] Our patient had no known source of exposure to topical sodium metabisulfite such as Timodine or Trimovate creams, and, in common with most patients with positive patch tests to this allergen, we regard this sensitization as unexplained. There are no reported cases of ACD to sodium metabisulfite in rubber clothing.

To avoid further exposure to DDs, our patient was advised to wear either white-colored Lycra or pale garments made of nonsynthetic material. This case illustrates that clothing dermatitis may occur in cyclists due to DDs in synthetic garments. With the current trend to cycle as a means of keeping healthy, and the fashion for specific synthetic cycling clothing, more cases of textile dermatitis may be seen.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to report.

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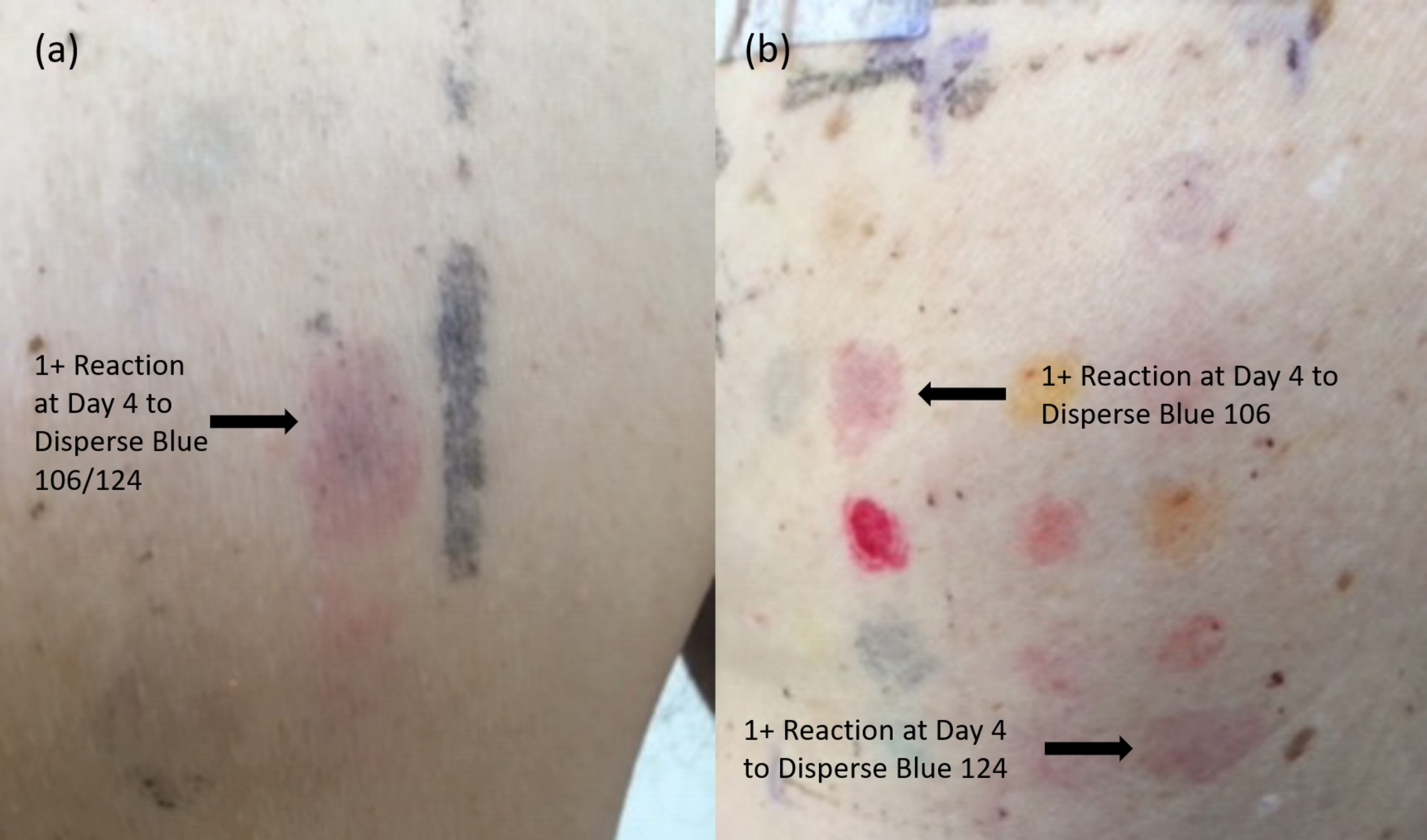
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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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(a)
1+ Reaction at Day 4 to Disperse Blue 106/124
(b)
1+ Reaction at Day 4 to Disperse Blue 106
1+ Reaction at Day 4 to Disperse Blue 124