

Key words: allergic contact dermatitis; cellulitis; colophonium; neoprene; slimming suit; p-tert-butylphenol formaldehyde resin; thermal sauna shorts.

Introduction

Several cases of allergic contact dermatitis caused by neoprene, i.e. wetsuits and slimming suits, have been reported (1–6). Thiourea derivatives were the main contact sensitizers. We report a novel case with severe eczema caused by adhesive ingredients in neoprene thermal sauna shorts, with p-tert-butylphenol formaldehyde resin (PTBP-FR) being a rare, and colophonium a previously unreported, cause.

Case Report

A 29-year-old non-atopic Turkish woman bought Voit® thermal sauna shorts (anti-cellulite shorts) to treat 'cellulite' from an online shop. Prior to wearing them, she had applied a 1.0% tap water solution of the thermal Dead Sea salt that was provided with the shorts, according to the instructions. After 3–4 hr, she took off the shorts and rinsed off the salt solution. Within 24 hr, a pruritic, erythematous and vesicular eruption developed on the upper thighs, abdomen, and buttocks, sparing areas of contact with the seams (Fig. 1). The lesions resolved with systemic corticosteroids within 10 days. The shorts were made of neoprene, according to the product label. There was a 'made in China' indication, but the manufacturer was not declared.

According to the International Contact Dermatitis Research Group criteria, patch testing showed a ++ positive reaction to colophonium (20.0% pet.) at D3, +++ positive reactions to PTBP-FR (1.0% pet.) and to pieces of the neoprene shorts (inner and outer surfaces, immersed in tap water and in a 1.0% tap water solution of the Dead Sea salt for 15 min) at D2 (Fig. 2), and negative reactions to other ingredients of our extended European baseline series, and the rubber series including the thiourea derivatives (Brial Allergen, Greven, Germany, and Chemotechnique Diagnostics, Vellinge, Sweden). Tests were terminated at D3 because of a severe vesiculo-bullous and erosive reaction on the test sites of PTBP-FR and pieces of the shorts. The lesions

resolved with systemic corticosteroids within 10 days. After 1 month, a second patch test with thiourea compounds, textile series, glues, and resin series, including PTBP-FR-related allergens such as p-tert-butylphenol (PTBP) (1.0% pet.), formaldehyde (1.0% aq.), p-tert-butylcatechol (1.0% pet.), butylhydroxyanisole (2.0% pet.), and butylhydroxytoluene (2.0% pet.), and colophonium-related allergens, such as abitol (10.0% pet.) and abiestic acid (10.0% pet.), gave negative results.

The patient had had previous contact with hobby glues and adhesives. She had a history of recurrent vesicular eczema on her wrists and soles after wearing leather watchstraps and shoes, respectively. Adhesive plasters or cosmetics that might contain colophonium did not cause adverse reactions.

Discussion

Allergic contact dermatitis caused by neoprene thermal sauna shorts was diagnosed according to clinical and patch test findings. Although thiourea derivatives were the main contact sensitizers in neoprene products, according to previous reports (1–6), PTBP-FR and colophonium were the most probable inducers in the presented case. Two cases with contact allergy to PTBP-FR in a neoprene wetsuit have been reported recently (7, 8), but none with colophonium.

Neoprene is a special synthetic rubber that is being used in increasing numbers of products, such as wetsuits, slimming suits, gloves, and footwear (9). It may contain numerous sensitizing additives, e.g. antioxidants, accelerators such as thiourea compounds and carbamates (7, 9), or adhesives such as PTBP-FR (7–9). PTBP-FR, a resin made from PTBP and formaldehyde, is used mainly in adhesives for leather products such as watch straps and shoes, and in do-it-yourself glues. Hobby glues could have been the primary sensitizers in the presented case. Indeed, she had a history of contact dermatitis caused by leather watchstraps and shoe insoles.

According to recent technical information, certain neoprene adhesives may also contain about 4% colophonium (10). Colophonium sensitization might have contributed to the development of allergic contact dermatitis in our patient; however, the manufacturer of the thermal sauna shorts could not

Allergic contact dermatitis caused by p-tert-butylphenol formaldehyde resin and colophonium in neoprene thermal sauna shorts

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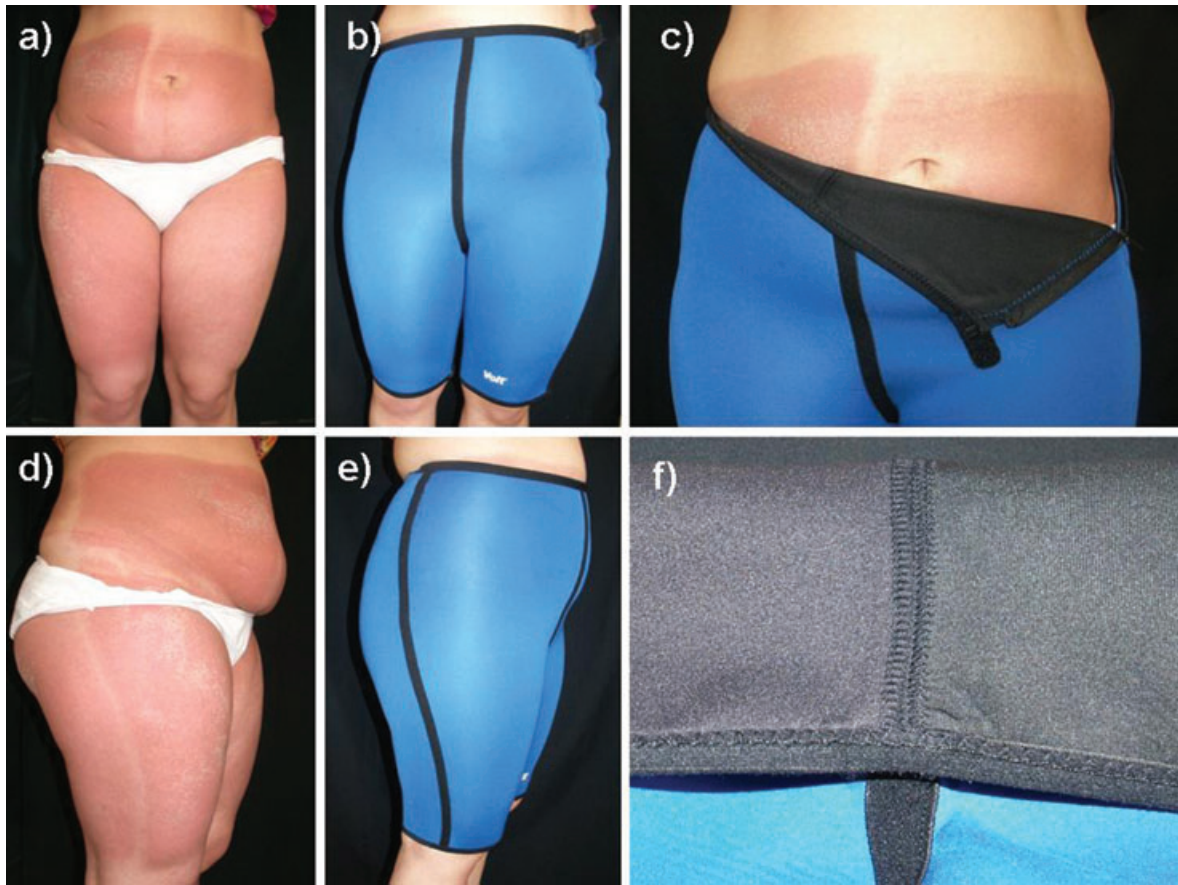


Fig. 1. Allergic contact dermatitis caused by Voit® thermal sauna shorts (a–e), sparing the median part of the abdomen (a, c) and the lateral part of the right thigh (d) in a linear pattern corresponding to the seams of the fabric (f).

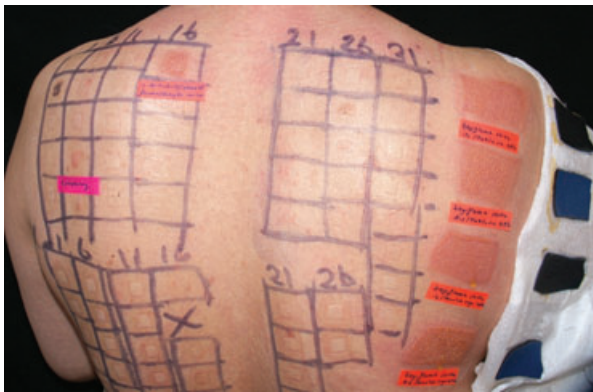


Fig. 2. Positive (++++) patch test reactions to p-tert-butylphenol formaldehyde resin (1.0% pet.) and to pieces of the neoprene shorts (from top to bottom: inner part immersed in a 1.0% tap water solution of the Dead Sea salt; outer part immersed in a 1.0% tap water solution of the Dead Sea salt; inner part immersed in tap water; and outer part immersed in tap water for 15 min) and a positive (+) reaction to colophonium (20.0% pet.) at D2; the latter progressed to a ++ positive reaction at D3.

be traced to provide any information about colophonium content. A recent study showed that dehydroabietic acid (DHA), one of the major constituents of colophonium, was identified in neoprene surgical gloves, and suggested

that neoprene gloves might be a source of DHA exposure, possibly enhanced by the presence of sweat (11).

Immersion of pieces of the neoprene fabric in salt solution did not seem to influence the patch test results in the

presented case; however, the salt solution, along with sweating and friction induced by wearing the shorts, might have enhanced the skin penetration of contact allergens.

In conclusion, this was a rare case of allergic contact dermatitis caused by neoprene adhesives in a novel product, i.e. neoprene thermal sauna shorts. Colophonium, like PTBP-FR, should be regarded as a sensitizing additive in neoprene products.

Conflicts of interest: The authors have declared no conflicts.

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