SHORT COMMUNICATION

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Occupational Sensitization to Colophony Subsequently Giving Rise to Both Environmental and Occupational Allergic Contact Dermatitis

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In recent years, several young individuals from the Swedish Armed Forces have been referred to the Department of Occupational and Environmental Dermatology in Malmö due to suspected occupational allergic contact dermatitis from adhesives used prophylactically to prevent chafing. This is a follow-up of the first referred patient (1) and a description of a new one, both sensitized while serving in the Swedish Armed Forces. Both patients were re-referred within 2 years after ending their conscription due to suspected occupational and environmental allergic contact dermatitis, respectively.

MATERIALS AND METHODS

Patch testing

Test preparations were obtained from Chemotechnique Diagnostics (Vellinge, Sweden) or prepared in our laboratory. Furthermore, material and products obtained from Essity (BSN Medical SAS, Vibraye, France) were used in aimed testing. Ultrasonic bath extracts (2) in acetone and ethanol were made from the patients' own products. Products were also tested as is. Finn ChamberAQUA® (SmartPractice, Phoenix, AZ, USA) was used. Patches were removed on day (D)2. Readings were performed twice by a dermatologist, on D3/4 and D7, with test classification according to the International Contact Dermatitis Research Group (3) and clinical relevance assessment according to the European Society of Contact Dermatitis (4).

Chemical analyses

Gas chromatography/mass spectrometry (5) was used to screen personal material for the presence of colophony. The chromotropic acid test was used to detect the presence of formaldehyde in the patient's own material (6).

Ethical considerations

The patients gave written informed consent to publish their histories and photos.

RESULTS

Case 1: Occupational sensitization causing new occupational allergic contact dermatitis. A 25-year-old male grounds maintenance worker re-consulted our department for severe hand dermatitis after constructing a fence. The patient was initially investigated 1.5 years earlier due to severe blistering after using medical adhesives as a conscript (1). Allergy to colophony and the adhesives, as well as other substances, mostly fragrances, was diagnosed. He received oral and written information on his multiple sensitizations. A report on occupational injury was filed by his employer.

In December 2023 he constructed a pine-wood fence while wearing protective gloves. The skin of his hands was, prior to this fence work, unaffected. After a few days he started to experience irritation of his left (non-dominant) hand, and at the end of the week blisters appeared on the interstitia of the proximal phalanges. Although exposure ceased during the Christmas holidays, the dermatitis deteriorated resulting in large bullae (**Fig. 1**). Topical corticosteroids were prescribed by his general practitioner and the dermatitis had healed a fortnight later, by the end of his Christmas leave.

Four months later, the patient presented with residual interstitial post-inflammatory changes. Colophony was suspected as the culprit agent as he was known to have a strong colophony allergy (1).

The patient's own materials were patch tested; positive results are listed in **Table I**. Used gloves (as is) tested negative. Chemical analysis found colophony in the sawdust. He received new written and oral information and recommendations on what to avoid in his present occupation

About a year later, he declared that he has been mostly asymptomatic. Minor dermatitis had subsided through self-care. He was still in grounds maintenance, but with adaptations so as to avoid colophony exposure.

Case 2: Occupational sensitization causing environmental allergic contact dermatitis. A previously healthy 20-year-old female student with no atopic history was referred to our department for suspected allergic contact dermatitis after wearing high boots.

Fig. 1. Bullous dermatitis following exposure to sawdust.

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Table I. Positive patch test results from the 2 cases

Material	Concentration and vehicle	Reaction
Case 1		
Sawdust	100% alc. extract[a]	+++
Sawdust	As is	++
Sawdust	100% ac. extract[a]	++
Used gloves	100% ac. extract[a]	++
Case 2		
Formaldehyde	2% aq	++
Hydroabietyl alcohol	10% pet	++
Canada balsam	25% pet	++
Colophony	20% pet	++
Colophony BSN[b]	20% pet	++
Colophony	60% soft[c]	++
Fluoride varnish[d]	As is	++
Fluoride varnish[d]	50% pet	++
Strappal®	As is	++
Strappal®	100% ac. extract[a]	++
Leukoplast®	As is	++
Leukoplast®	100% ac. extract[a]	++
Tensoplast® Sport	As is	++
Tensoplast® Sport	100% ac. extract[a]	++
Boots, top inside seam	As is	++
Methyl hydrogenated rosinate	20% pet	+
Abietic acid	10% pet	+
Boots, top inside seam	100% ac. extract[a]	+

Highest reaction magnitude from either reading is declared. [a](2), [b]Colophony supplied by the producer of medical adhesives; Essity, BSN medical SAS, Vibraye, France, [c](13) [d]Duraphat® (Colgate-Palmolive Company, New York City, NY, USA), contains 33% colophony (14). [c]Colophony supplied by the producer of medical adhesives, BSN Medical. alc: alcohol; ac: acetone; aq: aqueous; pet: petrolatum; soft: softisan.

During her conscription in 2023 the patient developed dermatitis of her feet and thighs following application of medical adhesives. The adhesives had previously been tolerated. She was successfully treated with oral betamethasone and emollients by army medics but ended her conscription without having been patch tested. A report on occupational injury was filed by the employer.

In spring 2024 the patient bought a pair of artificial leather boots that had a seam on the inside of the top. Bilateral dermatitis of the legs, corresponding to the placement of the seam, appeared after wearing the boots for one evening. The patient's own pictures showed two areas of clearly demarcated erythema without any visible blistering around the circumference of the lower legs (**Fig. 2**).

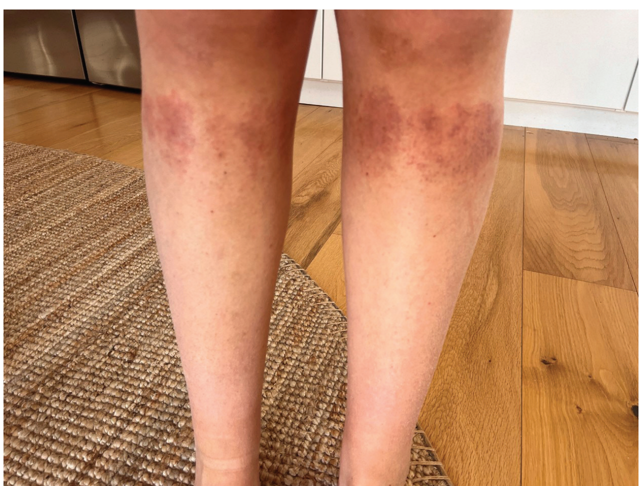

Fig. 2. Post-inflammatory changes after allergic contact dermatitis from colophony and formaldehyde in the seam of a pair of boots.

At referral a month later, patch testing was conducted using the Swedish baseline series, the Malmö extended baseline series, and a series used in previous investigations of conscripts (7). Additionally, the seam of her boots was patch tested and chemically analysed.

Positive patch test results are presented in Table I. Chemical analysis found both formaldehyde (20–40 ppm) and colophony in the boot seam.

The patient received written and oral information on how to avoid future exposure. One year later, she had been free of symptoms.

DISCUSSION

These patients were occupationally sensitized as conscripts, followed by elicitations on new locations in different environments in civilian life, illustrating the difficulty in eliminating exposure. Sensitization occurred at a young age and in their first occupation, resulting in a lifelong risk of dermatitis and other concomitant allergies (primarily fragrances and phenol-formaldehyde resin) (7, 8). Colophony is used in a wide variety of products, sometimes undeclared, and has even been found in products marketed as "hypoallergenic" (9).

In case 1, the dermatitis was most likely caused by colophony in the wood, which contaminated the gloves. Sawdust from pine wood can cause dermatitis in colophony-sensitive individuals (10). Allergy to the unused gloves cannot be excluded as they were not patch tested.

Case 2's symptoms were interpreted as being caused by colophony in the seam. The formaldehyde concentration in the seam was low, although it possibly exacerbated the dermatitis (11).

The Swedish Armed Forces are aware of the sensitizing potential of medical adhesives, and stopped recommending the use of Optiplaste®-C following our department's investigation of 27 conscripts (7). As demonstrated by Case 2, switching brands is often futile. Preventative taping is well known among outdoor enthusiasts and commonly advertised on social media (12), and it has been difficult for the Swedish Armed Forces to find alternative products. Perhaps other means of prophylaxis are preferable, as the evidence for preventative taping, to the best of the authors' knowledge, is inconclusive.

In conclusion, these cases demonstrate the importance of thorough investigation and patient information, especially for young patients to enable informed career choices.

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Data availability statement: The data that support the findings of this study are available on request from the corresponding author, JW. The data are not publicly available due to patient privacy.

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The authors have no conflicts of interest to declare.

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