Table I. Comparison of the characteristics in our study versus the studies by Kanti et al[5] and Vañó-Galván et al[4]

				P value*	
Characteristics	**Our study**	**Kanti et al**	**Vañó-Galván et al**	**Kanti et al vs our study**	**Vañó-Galván et al vs our study**
Age, y, mean (standard deviation)	58 (11.6)	65 (10)	56 (15.7)†	<.001	.382

	n/total number of patients analyzed	%	n/total number of patients analyzed	%	n/total number of patients analyzed	%		
Female sex	37/38	97.4	467/490	95.3	343/355	96.6	.557	.806
Hormonal therapy	13/38	34.2	—	—	—	—	—	—
Use of sunscreens	16/31	51.6	90/134	67.2	—	—	.104	—
Moisturizing care	18/31	58.1	127/134	94.8	—	—	<.001	—
Family history	2/38	5.3	—	—	30/355	8.5	—	.495
Body hair loss	7/32	21.9	—	—	86/355	24.2	—	.766
Eyebrow loss	15/38	39.5	397/482	82.4	283/355	79.7	<.001	<.001
Eyelash loss	1/38	2.6	—	—	50/355	14.1	—	.046
Facial papules	15/38	39.5	—	—	49/355	13.8	—	<.001
Lichen pigmentosus	2/38	5.3	14/486	2.9	—	—	.411	—
Autoimmune disease	4/29	8.2	34/490	6.9	57/355	16.1	.169	.749
Phototype II or III	33/38	86.8	403/463	87.0	350/355	98.6	.972	<.001
Postmenopausal	16/37	43.2	392/467	83.9	294/343	85.7	<.001	<.001

*Statistical analyses were conducted with Stata for Mac, version 12 (StataCorp, College Station, TX). Two-tailed binomial tests on the difference between 2 proportions were obtained by using the prtesti command; comparisons of mean ages were made by using the ttesti command.
†Standard deviation = (age range)/4.

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Occupational allergic contact dermatitis in a cohort of 458 consecutive dermatitis patients: A case series of 17 patients

To the Editor: Occupational contact dermatitis is the most common occupational skin disease (OSD).[1] Occupational allergic contact dermatitis (OACD) may comprise nearly 50% of cases of OSD.[2] Therefore, it is important for dermatologists to be aware of common occupational allergens.

From July 16, 2018, through June 30, 2019, patch testing results were collected prospectively for consecutive patients with dermatitis diagnosed with OACD at their final visit. All patients were tested to a standard series and additional series based on history and physical examination. Final readings were performed at days 3, 5, and 7 after placement.

Seventeen (3.7%) out of 458 patients were diagnosed with OACD. Allergens were deemed relevant if patients were exposed to them occupationally.

Table I. Localization of dermatitis and demographics of patients with occupational allergic contact dermatitis

Demographics	Value
Age, y, mean ± SD	43 ± 14
Female, %	53
History of atopy,* %	76
White, %	76
Non-Hispanic, %	88
Localization of dermatitis, n (%)	
Upper extremities	10 (59)
Hands	8 (47)
Lower extremities	6 (35)
Trunk	6 (35)
Scattered generalized†	3 (18)
Eyelids	2 (12)
Face	2 (12)
Neck	2 (12)
Feet	2 (12)
Scalp	1 (6)

SD, Standard deviation.
*Any one of the following: seasonal allergies/allergic rhinitis, asthma, childhood eczema.
†Dermatitis involving the trunk and upper and lower extremities.

Health care workers made up the largest category (n = 7; 41%), followed by hairdressers (n = 3; 18%). Other occupations included (1 each): building engineer, cleaner, customer service representative, electroplater, epoxy floor contractor, manufacturing engineer, and postal worker. The upper extremities were the most commonly affected location (Table I). At follow-up, 7 (41%) were still working, 7 (41%) were lost to follow up, 2 (12%) retired, and 1 (6%) was not working. Only 1 of 17 (5.9%) received Workers' Compensation (Table II).

The most common relevant occupational allergens were 1,3-diphenylguanidine (rubber additive) and disperse blue 106 (n = 7 each); carba mix (n = 6); methylisothiazolinone and formaldehyde (n = 4 each); benzalkonium chloride; and ammonium persulfate, propylene glycol, potassium dichromate, nickel sulfate, thiuram mix, and disperse blue 124 (n = 3 each) (Table II).

As a class, rubber additives were the most common relevant occupational allergens, found in 11 of 17 (65%), followed by cosmetic/preservative allergens and textile dyes in 8 of 17 (47% each) and metals in 6 of 17 (35%).

Patch testing results showed important relevant occupational allergens, including (1) ammonium persulfate (hair bleach) in a cleaner who cleaned a hair salon; (2) carba mix (a rubber additive), relevant for the rubber bands a postal worker used for bundling envelopes; (3) nickel in a building engineer with foot dermatitis wearing steel-toed shoes; (4) blue and black textile dyes, relevant for uniforms (pharmaceutical technician, cleaner, customer service representative, and material handler); and (5) despite questionable reactions to rubber additives, a nursing assistant showed positive reactions to her rubber gloves and hand soap/sanitizer.

The North American Contact Dermatitis Group[3] (13 dermatologists across the United States and Canada) found 10.2% of 70 allergens tested to be occupationally induced but categorize professions broadly, such as managerial/professional, technical, service, etc, without delineating specific jobs. Our much lower prevalence of OACD (3.7%) may reflect referral bias or may reflect the relatively high concentration of technology and finance industries in Massachusetts, which are occupations not necessarily associated with exposure to irritants and sensitizers. Additionally, allergens may vary based on culture and location.

Friis et al[2] (Copenhagen, Denmark) evaluated 228 patients with suspected OSD (tested to the 30 European baseline allergens, appropriate diluted work allergens, plus skin prick testing) and found 48% with OACD. The top 3 occupations were hairdressers, chefs, and nurses/nursing assistants. Their top 3 allergen categories were preservatives, rubber chemicals, and fragrances and metals.[2]

Davis and Yiannias[4] reviewed questionable patch test reactions in 2823 patients; 42% showed questionable reactions, and 78.8% of these were deemed relevant. Of our 9 patients with questionable rubber allergens, 89% wore rubber gloves. The one exception was our postal worker with severe hand dermatitis, who did not wear rubber gloves but used hundreds of rubber bands daily for bundling envelopes. Furthermore, our nursing assistant, who had only questionable reactions to rubber additives, showed a positive reaction to patch testing with her own gloves. Likewise, our hairdressers showed questionable reactions to dye/lightening chemicals, and these were relevant occupational allergens for them. These questionable reactions were not retested.

Invariably, dermatologists will see patients with OACD in their practices and should be aware of common culprits.

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Table II. Relevant occupational allergens in our cohort*

Occupation	Fragrances	Dental†	Epoxy/ isocyanate	Hair	Metals	Oil, cooling fluids	Cosmetic/ preservatives	Rubber additives	Textile	Relevance	Brief clinical history	Recommendations/ outcomes
Surgeon							BAK ++ PG 100%?			Hand soap OR scrub Purple and green top wipes	Eyelid dermatitis for 2 years since she began working in the hospital	Recommended using soap and OR scrub without PG and BAK cross reactors and minimizing direct exposure to purple and green top wipes (which contain BAK cross reactors). Her dermatitis cleared when she stopped using BD EZ scrub (which contains PG). No WC; she continues to work.
Nurse								Carba mix ? DPG ? Mercapto mix ?		Rubber gloves	Hand dermatitis for years	Recommended glove change. The patient is not avoiding her allergens and still has hand dermatitis. No WC; she is still working.
Nursing assistant	Limonene +							Black rubber mix ? Carba mix ?		Rubber gloves Hand soap	Itchy rash on bilateral hands for 2.5 years	Recommended gloves and hand soaps without her allergens. Her dermatitis cleared. and she continues to work; No WC
Dentist		ECA + TEGDMA ?			Cobalt dichloride ++ Copper sulfate ? Zirconium dioxide ?		Formaldehyde + BAK ? Benzoyl peroxide ?	Thiuram mix +++ TETD ++ TMTD ++ TMTM ++ ZDMC ++	Disperse blue 106 + Disperse blue 124 ?	Dental acrylates Dental metals Rubber gloves Uniform Hand soap	History of atopic dermatitis since childhood. with hands flaring for 2 years, temporally associated with beginning dental school	Recommended gloves, hand soap without her allergens. and minimizing exposure to proven allergens. She still has chronic hand dermatitis and is currently taking methotrexate 20 mg weekly. No WC; she is still working.
Dental technician		Sodium tetrachloropalladate +++ 2-HPMA ? MMA ?			Aluminum chloride +++ Cobalt dichloride + Ferric chloride ++ Gold sodium thiosulfate + Manganese (II) chloride ++ Palladium chloride +++ Potassium dichromate + Titan nitride ++ Zinc chloride + Zirconium (IV) chloride ++			DPG ?		Dental acrylates Dental metals Rubber gloves	Chronic hand dermatitis for years	Recommended gloves and hand soap without his allergens. The patient reported rash improvement with part-time work; no WC.

Pharmacy technician				PCMC +		Disperse blue 106 + Disperse blue 124 ?	Hand soap Uniform	Itchy rash on face, neck, and chest. The patient equated neck and chest rash with navy blue work scrubs.	Recommended wearing white shirts at work and hand soap without her allergens. No WC; the rash improved before retirement.
Hospital material handler				BAK ?		Reactive black 5 + Disperse blue 106 ? Melamine formaldehyde ?	Antiseptic wipes Uniform	Red pruritic rash on arms and chest with generalized pruritus for years. The patient equated symptoms with use of purple top wipes at work.	Recommended wearing white undershirt under blue shirt for work and minimizing direct exposure to purple top wipes (which contain BAK cross reactors). No WC; patient was lost to follow-up.
Hairdresser 1	Benzyl salicylate ? Eugenol ? FM II ? Limonene ? Rose oil ?	Ammonium persulfate +++ Ammonium thioglycolate + Hydrogen peroxide + 4-aminophenol ? HQ ? PPD ?		Formaldehyde ? MI ? PG 100% ?	DPG ?		Hair bleach Hair dye/lightening agents Hair perm Shampoos/hair products Rubber gloves	History of atopic dermatitis since childhood, with flaring rash on hands and forearms for 1.5 years	Recommended gloves, skin/hair care products without her allergens, avoiding bleaching clients' hair, and wearing a mask in the salon. No WC; the patient was lost to follow-up.
Hairdresser 2	Linalool + Amyl cinnamal ? Cinnamyl alcohol ? Cinnamic aldehyde ? FM I ? Isoeugenol ? Sandalwood oil ?	Ammonium persulfate +++	Nickel sulfate 2.5% ++	Amidoamine + Cocamide DEA + CAPB ? Lauryl glucoside ?	Black rubber mix ? Carba mix ? DHTMQ ? DPTD ? DPG ? HMT ? DDM ?	Disperse blue 35 ? Disperse blue 106 ? Disperse orange 3 ?	Hair bleach Metal hair instruments Shampoos/hair products Rubber gloves Textile dyes cross-reacting with hair dye	History of atopic dermatitis since childhood, with generalized itchy rash (total BSA involvement: approximately 70%) flaring for 1 year with an episode of shortness of breath requiring hospitalization	Recommended gloves, skin/hair care products and textiles without her allergens, avoiding bleaching clients' hair, and wearing a mask at work. No WC; the patient was started on dupilumab by her allergist for asthma. Skin (total BSA involvement: approximately 8%) and respiratory symptoms were much improved. The patient is still working.

Continued

Table II. Cont'd

Occupation	Fragrances	Dental[†]	Epoxy/ isocyanate	Hair	Metals	Oil, cooling fluids	Cosmetic/ preservatives	Rubber additives	Textile	Relevance	Brief clinical history	Recommendations/ outcomes
Hairdresser 3	Hydroxycitronellal + Linalool + Peppermint oil + Sandalwood oil + BOP ? Jasmine absolute ?			Ammonium thioglycolate + Hydrogen peroxide + HQ ? Resorcinol ?			CAPB + MI + DMAPA ? Formaldehyde ? Lauryl glucoside ? PG 30% + PG 100% ?	DPG ? DTDM ?	Disperse blue 106 ?	Hair perm Shampoos/hair products Dyes/lightening agents Rubber gloves Textile dyes cross-reacting with hair dye	History of atopic dermatitis since childhood; flaring with rash on the trunk, forearms, face, and lower extremities since working at the hair salon. Sneezes when highlighting hair.	Recommended gloves, skin/ hair care products and textiles without her allergens, and wearing a mask at work. No WC; the patient was lost to follow-up.
Postal worker								Carba mix ?		Rubber bands to bundle envelopes	Rash of bilateral hands for 1 year. The patient used hundreds of rubber bands daily to bundle envelopes.	Cleared within 3 weeks of retirement. No WC; the patient is retired.
Electroplater					Nickel sulfate 2.5% and 5% +++ Potassium dichromate +++		MI +++ MCI/MI +++			Worked with chrome, nickel, and coolants	Rash on forearms and lower portion of the legs for 3 years	Recommended supervisory position, avoiding as much aerosolized nickel and chromates as possible and/or using a respirator or self-contained breathing apparatus, and working in a well-ventilated area. The patient was lost to follow-up. No WC; the patient believed he was fired so company would not need to pay WC.
Manufacturing engineer			1,4 butanediol diglycidyl ether + TDI ?			Bioban CS 1246 ++ Bioban CS 1135 + 2-n-octyl-4-isothiazolin-3-one ? Euxyl K-400 ?	Formaldehyde + Grotan BK + MI + MCI/MI ++ Diazolidinyl urea ? Imidazolidinyl urea ? Quatenium-15 ?	Carba mix ? DPG ? DTDM ? HMT +		Worked with epoxies/ isocyanates, and coolants Rubber gloves	Chronic bilateral hand dermatitis for 10 years	Avoid direct contact with isocyanates, epoxies, and coolants. Recommended polyethylene barrier gloves without his allergens and overgloves for manual dexterity and a respirator to avoid airborne allergens. Received WC; the patient was lost to follow-up.

Building engineer			Nickel sulfate 2.5% and 5% +++			Steel-toed shoes	Itchy rash on dorsal great toes for 3 years that was better when not wearing steel-toed shoes	Of his own accord, the patient began wearing leather boots he tolerated without steel toes. No WC; the patient was lost to follow-up.
Epoxy floor contractor	1,4 butanediol diglycidyl ether ++ 1,6 hexanediol diglycidyl ether + Epoxy resin, bisphenol F ? Phenyl glycidyl ether ?		Potassium dichromate ?	Carba mix ? DPG ? Thiuram mix ?		Worked with epoxies and concrete (chromium) Rubber gloves	Itchy rash with blistering on hands intermittently for 6 years	Recommended polyethylene barrier gloves without his allergens and overgloves for manual dexterity and a respirator to avoid airborne allergens. No WC; the patient was lost to follow-up.
Cleaner		Ammonium persulfate +++		Thiuram mix ++	Melamine formaldehyde + Reactive black 5 + Disperse blue 106 ?	Cleans hair salon Uniform Rubber gloves	Asthma and generalized itchy rash for 2 years including hands, forearms. and face. One of his work sites was a hair salon.	Recommended gloves, skin/hair care products, and textiles without his allergens and, if respiratory symptoms continue, avoiding work in the hair salon. No WC. Three months of NB UVB and topical steroids failed; the patient was started on dupilumab. He is still working.
Customer service representative					Disperse blue 106 ? Disperse blue 124 ?	Uniform	History of atopic dermatitis since childhood with recalcitrant itchy rash of the trunk and extremities	Recommended wearing white shirt underneath blue work uniform and wearing loose-fitting and lighter-colored pants. No WC; the patient was lost to follow-up.

BAK, Benzalkonium chloride; *BD E-Z Scrub*, Becton, Dickinson and Company, Franklin Lakes, NJ; *Bioban CS 1135*, dimethyl oxazolidine and 3,4,4-trimethyloxazolidine; *BOP*, balsam of Peru (myroxylon pereirae); *BSA*, body surface area involvement; *CAPB*, cocamidopropyl betaine; *cocamide DEA*, coconut diethanolamide; *DDM*, 4,4′-diaminodiphenylmethane; *DHTMQ*, 2,2,4-trimethyl-1,2-dihydroquinoline; *DMAPA*, dimethylaminopropylamine; *DPG*, 1,3 diphenylguanidine; *DPTD*, dipentamethylenethiuram disulfide; *DTDM*, 4,4′-dithiodimorpholine; *ECA*, ethyl cyanoacrylate; *FM I*, fragrance mix I; *FM II*, fragrance mix II; *Grotan BK*, hexahydro-1,3,5-tris-(2-hydroxyethyl)triazine; *HMT*, hexamethylenetetramine; *2-HPMA*, 2-hydroxypropyl methacrylate; *HQ*, hydroquinone; *MCI/MI*, methylchloroisothiazolinone/methylisothiazolinone; *Mercapto mix*, n-cyclohexylbenzothiazyl-sulfenamide, dibenzothiazyl disulfide, and morpholinylmercaptobenzothiazole; *MI*, methylisothiazolinone; *MMA*, methyl methacrylate; *NB UVB*, narrow-band ultraviolet B; *OR*, operating room; *PCMC*, 4-chloro-3-cresol; *PG*, propylene glycol; *PPD*, *p*-phenylenediamine; *TDI*, toluene-2,4-diisocyanate; *TEGDMA*, tetraethylene glycol dimethacrylate; *TETD*, tetraethylthiuram disulfide; *TMTD*, tetramethylthiuram disulfide; TMTM, tetramethylthiuram monosulfide; WC, Workers' Compensation; *ZDMC*, zinc dimethyldithiocarbamate.

*All patients were tested with our standard series (modified American Contact Dermatitis Core Series; 80 allergens) plus the additional series as shown in the table. Allergens were from Chemotechnique Diagnostics, Vellinge, Sweden. A ? symbol indicates a questionable reaction (macular erythema or 1 or 2 papules within disc site), + indicates a weak reaction (papules and erythema), ++ indicates a strong reaction (papules, edema, or vesiculation), and +++ indicates an extreme reaction (spreading beyond the disc site or bullous reaction).

†Dental series and (meth)acrylate adhesive series.

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Trichoscopic findings of discoid lupus erythematosus alopecia: A cross-sectional study

To the Editor: Trichoscopy may allow us to diagnose alopecia caused by discoid lupus erythematous.[1] The aim of our study was to systematically describe the trichoscopic findings in a set of patients with discoid lupus erythematous on the scalp.

We designed an observational cross-sectional multicenter study approved by the local institutional review board. Inclusion criteria were patients with discoid lupus erythematous alopecia confirmed by skin biopsy. Patients with less than 1 year of follow-up were excluded. We collected epidemiologic data (age, sex, and autoimmune comorbidities), clinical presentation, duration of the disease (5 years or less, 6-10 years, and 11 years or more), and treatments received. Dry trichoscopy was performed with FotoFinder medicam 1000 (Fotofinder Systems Gmbh, Bad Birnbach, Germany). Vessels were evaluated with immersion fluid. For comparison between groups, we used the χ^2 test, as appropriate. All given P values are 2-tailed and $P < .05$ indicates statistical significance. All analyses were performed with SPSS (version 23.0) statistical software package.

Thirty-seven patients with a total of 55 lesions were analyzed. Thirty patients were women (89%) with a mean age of 54.4 years (range 25-90 years). The commonest Fitzpatrick's phototype was III (70.3%; range I-V). Thirteen patients had autoimmune conditions associated (35%), 12 patients had positive antinuclear antibody results (32.4%), and 4 patients had systemis lupus erythematosus (10.8%). The most frequent location of alopecia patches was the parietal region (19 patients; 45.2%), followed by the occipital and temporal region (10 [23.8%] and 9 patients [21.4%], respectively). The mean duration of the disease was 6.4 years (range 0.2-30 years). The treatments received were topical corticosteroids (18 patients; 48.6%), intralesional triamcinolone (10 patients; 27%), and oral hydroxychloroquine (4 patients; 10.8%). Three patients received all treatments simultaneously.

The trichoscopic findings are showed in Table I. Patients with 5 or less years' duration of discoid lupus erythematous presented incontinentia pigmenti signs ($P = .013$, Supplementary Figure 1, available on Mendeley at https://doi.org/10.17632/h69m9nwf5d.1) and thin vascular structures ($P = .002$) more frequently. Long-standing lesions presented an increased number of shiny white structures ($P = .01$). Patients with positive antinuclear antibody results showed a thin vascular pattern more frequently ($P = .02$). No statistically significant associations were found with the rest of the clinical variables or treatments received.

Trichoscopic findings of scalp discoid lupus erythematous have been described before in different groups of patients. Our study includes uncommon trichoscopic findings, such as red dots or "red spider on yellow dots,"[2,3] and establishes their frequency (14.5% and 7.3%, respectively).

Discoid lupus erythematous dermoscopic features have been previously correlated with the duration of the disease.[4] Telangiectatic vessels were found to be more common in older lesions. However, previous study included discoid lupus erythematous cases of less than 2 years of evolution, whereas our patients had a mean time of evolution of 6.4 years. In addition, our study was focused on trichoscopic findings of lupus alopecia, so data between studies are difficult to compare. We found a significant increase of shiny white structures in long-lasting discoid lupus erythematous lesions (chrysalides and rosettes) (Fig 1). They have been correlated to stromal alteration and fibrosis.[5] We suggest that they could be a diagnostic clue for long-