Getting a Grip on Occupational Hand Dermatitis: Key Considerations for Evaluation and Management

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PRACTICE **POINTS**

- Occupational hand dermatitis (HD) is a common multifactorial disease with a major impact on quality of life, worker safety, and productivity.
- High-risk occupations include those involving wet work, such as hairdressers, beauticians, cleaners, and health care and construction workers.
- A detailed occupational and exposure history is essential for managing occupational HD.

Occupational hand dermatitis (HD) is a chronic refractory hand eczema that is caused or exacerbated by workplace exposures. The hands are uniquely vulnerable to dermatitis from exposure to allergens and irritants in the workplace, including metals, preservatives, acrylates, rubber accelerators, food, water, plants, and fragrances. In occupational allergic contact dermatitis (ACD), patch testing plays a critical role in identifying contact allergens to help guide avoidance strategies that are key for clinical improvement. A coordinated return-to-work plan is essential for managing patients with occupational HD. In this article, we review practical considerations for evaluation and management of occupational HD, highlighting relevant exposures and pearls on workup and management.

Hand dermatitis (HD) is a common dermatologic concern that can impair quality of life, work productivity, and daily functioning.[1] Occupational HD is defined as hand eczema caused or worsened by workplace exposures. When caused by work, HD may lead to reduced productivity and even job loss. Subtypes of HD include irritant contact dermatitis (ICD), allergic contact dermatitis (ACD), protein contact dermatitis (PCD), atopic dermatitis (AD), hyperkeratotic HD, and dyshidrotic eczema.[2,3]

Often caused by wet work, ICD is the most common subtype, whereas PCD—which is caused by immediate hypersensitivity to protein—is less common and usually seen in food service workers.[3,4] When HD does not improve with standard treatment, particularly in occupational cases, patch testing is prudent to evaluate for contact allergens. In this article, we review practical considerations for evaluation and management of occupational irritant and allergic HD, highlighting relevant exposures and pearls on workup and management.

Epidemiology of Hand Dermatitis

A 2021 systematic review and meta-analysis of European studies reported a 1-year HD prevalence of 9.1% and a

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lifetime prevalence of 14.5%.[5] Hand dermatitis is most common in women; individuals aged 30 to 39 years; and those who are employed, underscoring the role of workplace exposure.[6] High-risk occupations are those involving substantial wet work, such as hairdressers, beauticians, cleaners, and health care and construction workers.[7] Individuals with a history of AD also are at high risk for HD.[8]

Hand Dermatitis Subtypes

Irritant Contact Dermatitis—Irritant contact dermatitis, the most common form of occupational HD, is caused by repeated exposure to irritants (eg, water, detergents, cleansers, and soaps) that disrupt the skin barrier.[9] Occupations that involve wet work are a major risk factor, associated with a 56% higher likelihood of ICD.[8] Wet work involves frequent handwashing, prolonged contact with liquids, or occlusive glove use.[9] As a ubiquitous skin irritant, water can penetrate the stratum corneum, impair the skin barrier, and increase sensitization risk. The dorsal hands usually are affected by ICD due to the thinner stratum corneum in this area.[9]

Allergic Contact Dermatitis—Allergic contact dermatitis should be considered in cases of chronic, recurrent, or treatment-resistant disease. Clinical clues include dermatitis beyond irritant contact sites, recurrent pruritic and vesicular HD, and flares with occupational exposures or materials; however, it can be difficult to distinguish ACD from ICD on clinical presentation alone, as they have many overlapping features. When ACD is suspected, patch testing remains the gold standard for identifying allergens and guiding avoidance strategies, product alternatives, and workplace modifications.

Unique Occupational Considerations

Hairdressers—Hairdressers have an increased risk for HD due to wet work and exposure to sensitizers, with a pooled lifetime prevalence of 38.2% (including ICD, ACD, and occupational cases).[10] Notably, frequent shampooing, rinsing, cutting wet hair, handwashing, and glove use increase the risk for ICD. Hairdressers also are exposed to allergens in hair products, including p-phenylenediamine, toluene-2,5-diamine, persulfate salts, glyceryl thioglycolate, preservatives, and fragrances. Occupational exposure to the preservative methylisothiazolinone is high among hairdressers, with a sensitization rate of 10.5% in HD cases.[11]

It has been reported that hyperkeratotic fissured eczema of the dorsal hands caused by wet work often indicates ICD, whereas pruritic dyshidrotic eczema involving the lateral fingers or palms suggests ACD; however, these conditions can share overlapping features.[7] If ACD is suspected, broad patch testing with baseline and hairdresser series, along with specific chemicals that may be encountered in the workplace, is necessary. Management includes allergen avoidance, reduced wet work tasks, use of nitrile gloves with glove changes to mitigate occlusive effects, and skin barrier protection with emollients.

Health Care Workers—Health care workers are vulnerable to HD due to intensive hand hygiene, prolonged glove use, and allergen exposures, with a lifetime prevalence of self-reported HD of 33.4%.[12] Common allergens among health care workers include rubber accelerators, most often from rubber gloves.[13] Frequent handwashing and glove use can further impair the skin barrier, increasing irritant and sensitization risks.[14] In contrast, alcohol-based hand sanitizers containing emollients are less irritating, with prior analyses showing no significant association with HD risk.[15,16] Conversely, handwashing 8 to 10 times daily increased HD risk, with a relative risk of 1.51.[15]

Surgeons and proceduralists face unique risks for HD from preoperative scrubbing with products that can contain potential allergens such as chlorhexidine gluconate, chloroxylenol, povidone-iodine, fragrance, cocamide diethanolamine, lanolin, alkyl glucosides, sodium benzoate, sorbic acid, tocopherol, and propylene glycol.[17,18] Subsequent occlusion under glove layers drives ICD and ACD risks, highlighting the importance of patch testing in affected individuals. While patch testing, exposure avoidance, and limited glove use can mitigate HD risk, frequent handwashing can contribute to refractory HD.

Food Service Workers—Food service workers have an increased risk for HD from allergens and irritants. In a retrospective study of patients with occupational food-related HD (N=372), 57% were diagnosed with ICD, 22% with PCD, and 1.8% with ACD.[19] Skin barrier disruption from wet work, occlusion from glove use, and contact with food proteins increase HD risk, especially in bakers exposed to flours and grains, which can cause IgE–mediated PCD manifesting with contact urticaria. Protein contact dermatitis is confirmed by prick testing with suspected foods.[20] Additionally, exposure to garlic can cause ICD and ACD due to sulfur-containing compounds, particularly allicin and diallyl disulfide.[21,22] Pineapple also can trigger ICD associated with bromelain, a proteolytic enzyme that can break down the skin.[23] Nickel exposure is another concern, as steel utensils and cookware can release nickel onto the skin of sensitized individuals.[24] Rubber accelerator exposure from gloves also contributes to contact allergy and HD among food service workers; vinyl gloves usually are a good alternative in this setting.[25] Management of food-related HD involves exposure avoidance, which may affect occupational viability.

Construction Workers—Construction workers are at risk for occupational HD due to contact with irritants and sensitizers such as paints, adhesives, asphalt, cement, solvents, and gloves.[26] A retrospective analysis of North American Contact Dermatitis Group data identified HD in 37.2% (253/681) of patch-tested construction workers. The most common occupational allergens include potassium dichromate, which can be present in cement and leather items; bisphenol A epoxy resin; cobalt chloride hexahydrate; and the rubber accelerators carba mix and thiuram mix.[26] A thorough occupational history should

assess materials handled, and patch testing should include common construction-related allergens to inform avoidance strategies. Workplace task modification can reduce exposure, as certain managerial roles in construction work may involve less contact with irritants and sensitizers.[26]

Nail Technicians—Nail technicians are at risk for HD, especially ACD from acrylate monomers used in nail gels, dips, and acrylics. In a 10-year analysis, around 87.5% (14/16) of nail technicians with contact allergy to methacrylate demonstrated hand involvement.[27] Common acrylate monomers include 2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate, and ethyl cyanoacrylate.[28] Evaluation requires a detailed occupational history, assessing HD onset relative to exposure, services performed, glove-use practices, and whether symptoms improve away from work. While gloves may appear to reduce exposure, a glove-penetration study showed that acrylate-containing nail products can penetrate commonly used disposable gloves from within seconds to approximately 20 minutes, depending on glove and product type.[29] Among available options, nitrile gloves may provide dexterity and allergen avoidance when acrylate exposure is brief, with glove changes required every 15 to 30 minutes.[30] Patch testing with 2-hydroxyethyl methacrylate and ethyl cyanoacrylate can identify nail acrylate allergy; however, avoidance can be challenging for nail technicians, as these products often are ubiquitous in their work.

Florists—Florists can develop HD from plant allergens and irritants, particularly tulipalin A and calcium oxalate, with a lifetime prevalence of 19.6%.[31] Tulipalin A is a well-documented sensitizer causing ACD among florists exposed to tulip bulbs and other *Alstroemeria* flowers.[32] The term *tulip fingers* actually was coined to describe ACD caused by tulip bulbs in the European tulip industry.[33] Patch testing involves testing for tulipalin A, which may be commercially limited, or tulip plant materials; however, fresh tulips require open testing with small amounts due to higher allergen concentration.[32] Additionally, the term *daffodil itch* describes a type of ICD caused by calcium oxalate crystals in daffodil bulbs and tulip sap.[32,34] Diagnosis of plant-related HD requires an occupational history and targeted patch testing, while glove protection and exposure avoidance are essential for improvement.

Evaluation and Management

The workup for HD involves physical examination and medical history, including disease onset, course, and history of AD, along with occupational and exposure history to identify allergens and irritants. Understanding the patient's tasks and responsibilities and workplace practices along with the materials they handle allows the dermatologist to anticipate relevant allergens for patch testing.

Patch testing should be comprehensive, as baseline screening series alone may miss between 26.3% and 50% of occupationally relevant allergens.[35,36] Comprehensive patch testing also should include specialty series and supplemental allergens based on the patient's clinical history and exposures. Specialty series may include hairdressing, bakery, cosmetics, dental, machinists, and adhesives.[37] Gloves also warrant attention, as they may be overlooked as a sensitizer following repeated contact and occlusion. In persistent HD associated with glove use, patch testing should include a rubber accelerator series with relevant allergens, such as thiurams, carbamates, mercaptobenzothiazole, diphenylguanidine, and the patient's own gloves.[38] Latex allergy also should be considered, particularly in immediate-type reactions, and can be evaluated with latex-specific IgE testing.[39]

Management of HD relies on accurate diagnosis and allergen avoidance, which can be challenging in occupational settings. Structured tools, such as the American Contact Dermatitis Society's Contact Allergen Management Program (https://www.contactderm.org/resources/acds-camp), can help identify safe alternatives.

In occupational HD, risk assessment should identify occupational exposures and determine appropriate personal protective equipment while minimizing the risk for HD associated with such equipment. Protective gloves are advised to prevent contact with allergens and irritants. When glove use lasts more than 10 minutes, cotton glove liners may be worn to avoid occlusion and moisture retention.[40] For wet work, vinyl gloves are recommended, with regular emollient use to support skin-barrier repair. Overall, gloves should be used when possible, changed regularly, and worn for limited periods of time to prevent ICD.

Work modification may be required to reduce exposure and flares, including task reassignment or substitution of materials containing allergens and irritants. Occupational HD may necessitate workplace accommodations, disability evaluation, medical leave, or even permanent job change. Dermatologists play a crucial role in the medical determination of work relatedness and functional impairment, guiding patients through occupational health, disability, and workers' compensation when warranted.

Treatments for Occupational HD

Treatment of occupational HD depends on disease severity, chronicity, and avoidance of allergens and irritants in ACD, ICD, and PCD. Foundational management includes regular emollient use, which can even serve as monotherapy in mild occupational HD.[40] Corticosteroids are the cornerstone of topical therapy, while calcineurin inhibitors can be used as a steroid-sparing option in milder disease.[41] Off-label topical calcipotriol and AD-approved therapies crisaborole and ruxolitinib may be effective. For refractory disease after topical treatments, phototherapy can be considered.[40] Biologic and targeted therapies also have emerged as potential treatments. Dupilumab is effective for atopic chronic HD and has demonstrated promise for nonatopic chronic HD.[42] Recently,

delgocitinib, a topical pan–Janus kinase inhibitor cream, showed clinical efficacy for chronic hand eczema and was approved by the US Food and Drug Administration.[43] Off-label use of alternative systemic therapies, including acitretin, cyclosporine, methotrexate, and azathioprine, and other biologics and systemic Janus kinase inhibitors also may treat HD, but larger studies are lacking.[40]

Our Final Interpretation

Occupational HD is a common skin condition with multiple etiologies. It is important for clinicians to gather a thorough occupational and exposure history to narrow the differential diagnosis, inform patch testing, and guide effective management. In practice, successful treatment depends on screening for and diagnosis of workplace exposures driving disease.

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