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# Abstract Packet





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## ◆ ❖ FISHER PRESENTATIONS ❖ ◆

### **Occupational Contact Dermatitis in North American Healthcare Workers: Trends and Triggers (2005 - 2022)**

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#### **Abstract**

##### **Objectives:**

Healthcare workers (HCWs) face an increased risk for occupational contact dermatitis (CD). This study reports the frequency of occupational CD among North American HCWs compared to non-HCWs, characterizes causative allergens and sources, and describes trends over time.

##### **Methods:**

The North American Contact Dermatitis Group (NACDG) patch testing database was queried between 2005-2022 to compare demographics, clinical features, and patch test results between HCWs and non-HCWs.

##### **Results:**

Of 37720 patch tested patients, 6.1% (2293) were HCWs. Female sex, hand involvement, and atopic dermatitis were more common in HCWs. Within HCWs, 68.1% (1562/2293) of subjects had at least one positive allergen reaction and 12.7% (621/4875) of reactions were occupationally relevant. The most common occupationally relevant allergens were carba mix (23.0%, 143/621), thiuram mix (17.4%, 108/621), diphenylguanidine (9.5%, 59/621), cocamide diethanolamine (4.0%, 25/621), and quaternium-15 (4.0%, 25/621). The most common occupational sources were gloves and disinfectant solutions. Over half (58.8%, 1348/2293) of HCWs had a final diagnosis of ACD and 26.7% (611/2293) had a final diagnosis of ICD. HCWs were more likely than non-HCWs to have occupational skin disease, and there was a notable increase in occupational skin disease rates among HCWs from 26.7% (539/2017) in 2005-2019 to 36.6% (101/276) in 2020-2022.

##### **Conclusions:**

Allergic and irritant CD continue to be prevalent among HCWs. Over two-thirds of HCWs had at least one positive patch test reaction with 12.7% of these reactions being occupationally relevant. The incidence of occupational skin disease among HCWs increased during the COVID-19 pandemic.

## Contact Allergens in "PPD-Free" Hair Dyes

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### Abstract

#### **Objectives:**

Hair dyes are a commonly used cosmetic product and important cause of allergic contact dermatitis. Primary hair dye agents - paraphenylenediamine (PPD) and other aromatic amines - are potent contact sensitizers. Despite hair dyes being advertised as all natural or allergen-free, patients still present with contact allergy following their use. We hypothesized that these products may contain cross-reactive ingredients not tested on standard series or undisclosed ingredients such as trace amounts of the allergens. Thus, we aimed to test hair dyes advertised as 'PPD-free' for common hair dye allergens.

#### **Methods:**

We tested best-selling hair dyes marketed and sold in the United States as 'PPD-free' for the presence and quantity of hair dye allergens and ingredients including PPD, 3-aminophenol, 4-aminophenol, 2,5-diaminotoluene-sulfate, 2-nitro-1,4-paraphenylenediamine, and 2-hydroxy-1,4-naphthoquinone. We utilized high-performance liquid chromatography and mass spectrometry to analyze all samples.

#### **Results:**

In 7 of 51 hair dye products, we detected a compound of interest that was not present on the ingredient list. Five products contained PPD despite no mention of PPD on the ingredient list and four being labeled 'PPD-free.' One of these products contained PPD levels higher than the regulatory 2% on-head limit, while the rest contained levels of unknown clinical significance.

#### **Conclusions:**

These findings reinforce the importance of performing allergy alert testing before the use of any hair dye product in vulnerable patients, regardless of how it is commercially advertised or labeled. Study limitations include the limited number of tested products and potential oxidation of chemical components during sample processing leading to lower sensitivity of detection.

#### **Acknowledgements:**

Funding for this project was provided by the American Contact Dermatitis Society (ACDS) Clinical Research Award.

## **From Patch to Plate: Evaluation of Systemic Symptoms in Patients with Positive Patch Test Reactions to Sodium Disulfite**

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### **Abstract**

#### ***Objectives:***

Sulfite preservatives are used in high concentrations in certain foods and beverages. In sulfite sensitive patients, systemic symptoms (such as headache and gastrointestinal symptoms) have been documented upon ingestion of high-sulfite foods or beverages. Sulfites are also established as sources of contact allergy. However, little is known regarding the relationship between these two types of reactions. This study aims to address the question: Do patients with known contact allergy to sulfites also report systemic symptoms when consuming high-sulfite foods?

#### ***Methods:***

Forty-one patients with positive patch test reactions to sodium disulfite were surveyed regarding history of systemic symptoms after consuming high-sulfite foods. Prevalence, frequency, and symptom type were recorded as well as patch test reaction strength. Symptom severity was rated on a scale of 1 (mild) to 3 (severe).

#### ***Results:***

Fifty-three percent of respondents reported one or more systemic symptoms upon ingestion of a high-sulfite food or beverage. Wine (58.1%) and sauerkraut (21.4%) were most associated with symptoms. The most common symptoms were headache (n=10) and gastrointestinal symptoms (n=9). Average symptom severity scores (the sum of severity scores for all reported symptoms across all foods per patient) differed between patients with borderline (1.82), mild (1.83), and strong (6.58) patch test results.

#### ***Conclusions:***

Patients with positive patch test results to sodium disulfite report high rates of systemic symptoms with high-sulfite food consumption. Patients with stronger patch test reactions tend to report greater systemic symptom severity. These findings suggest a potential need for patient education on sulfite exposure beyond topical products.

# **An Investigation of Culprit Allergens in Diabetes Technology-Associated Allergic Contact Dermatitis in an Irish Population**

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## **Abstract**

### **Objectives:**

Continuous glucose monitors and continuous subcutaneous insulin infusion pumps are associated with allergic contact dermatitis (ACD). We sought to identify the culprit allergens in people with type 1 diabetes, and to determine which devices were implicated.

### **Methods:**

18 subjects experiencing skin reactions to diabetes technology underwent patch testing (age 1 - 47 years, 10 male) with British Society for Cutaneous Allergy standard series, methacrylate series, a special medical device series and scrapings from devices. Participants attended on day 0, 4 and 7 for readings. Devices were analysed by gas chromatography-mass spectrometry.

### **Results:**

12 participants had definite positive reactions to devices. Three had definite negative reactions. Three had +/- reactions. Nine reacted to Dexcom G7<sup>®</sup>; one to Dexcom G6<sup>®</sup>; two to Tandem t:slim X2<sup>®</sup>; one +/- reaction to Dexcom G6<sup>®</sup>; one +/- reaction to Dexcom G7<sup>®</sup>; and one +/- reaction to Tandem t:slim X2<sup>®</sup>; 11 had positive reactions to colophonium in the medical device series. Only two of those had definite positive reactions to colophonium in the standard series, two had +/- reactions. Two reacted to hexanediol diacrylate, two to isobornyl acrylate (IBOA) and one to N,N-dimethyl diacrylamide but not modified colophonium. The colophonium derivative methyldehydroabietate was present in several devices, including Dexcom G7<sup>®</sup>; IBOA was detected in devices and adhesives.

### **Conclusions:**

Colophonium derivatives are the predominant allergens in Dexcom G7<sup>®</sup>. The standard series only detected four cases of allergy to colophonium in this study, two of which were weak positive results. Devices still contain IBOA despite it being a common cause of ACD.

### **Acknowledgements:**

We would like to thank our colleagues at the Department of Occupational and Environmental Dermatology, Lund University, Malmo, Sweden for providing us with samples of their non commercially available medical device series and our colleagues at the School.

# Advancing Patch Testing: Comparing an Artificial Intelligence Model and Human Observers Performance Across Fitzpatrick Skin Types

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## Abstract

### **Objectives:**

The required in-person visits for patch testing (PT) limit its widespread adoption, especially in underserved populations. This study evaluates an artificial intelligence (AI) model for PT interpretation, comparing its performance to human observers.

### **Methods:**

Adults underwent PT with 10 allergens. Tested areas were photographed in three visits using a smartphone. A dermatologist experienced in PT served as the reference standard. Photographs were assessed by an AI model and 15 human observers with varying levels of training, grouped by Fitzpatrick skin types (FSTs) (I-III, IV-VI) for subgroup analysis.

### **Results:**

206 participants (mean age, 39 years; 66% female; 47% FSTs IV-VI) were tested. At least one reaction occurred in 42% (FSTs I-III: 47%; IV-VI: 36%). The AI model was 58% sensitive (95% CI: 49%-67%), 93% specific (95% CI: 92%-94%). Humans demonstrated higher sensitivity (70%, 95% CI: 68%-72%) and specificity 97% (95% CI: 96%-97%). Sensitivity in readers without formal medical training was 56.8%. For FSTs I-III, AI sensitivity was 60.8% and specificity 92.9%; for FSTs IV-VI, sensitivity was 54.7% and specificity 93.7%. In FSTs I-III, human observer sensitivity was 72.2% with a specificity of 97.6%, whereas in FSTs IV-VI, sensitivity increased to 79.2% with a specificity of 99.4%.

### **Conclusions:**

The AI model demonstrated moderate sensitivity and high specificity across FSTs. Human observers outperformed the model, except for those without formal medical training. AI holds promise as a supportive tool to enhance access to PT.

## **Legs vs Back: Patient Experience and Quality of Patch Testing for Allergic Contact Dermatitis on Different Body Sites**

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### **Abstract**

#### **Objectives:**

Though patch testing is generally performed on the back, anecdotal evidence has shown that the legs may be the preferred location for some patients. We sought to compare patient perception and quality of patching with placement on the back and legs, which has not been previously studied.

#### **Methods:**

The HealthPartners Institutional Review Board approved this study. Patients already scheduled to undergo patch testing who met inclusion criteria were randomized for patch placement on the back or anterior upper legs. At 48 hours, a survey was administered to evaluate patient experience. Quality of patch testing was assessed by inspection of patch occlusion immediately after removal.

#### **Results:**

63 patients were randomized, and 60 patients were analyzed (n=31 legs, n=29 back). There was no significant difference in age, gender, and race between study arms. Differences in patient perception of patch location included greater sleep disturbance ( $p < 0.001$ ), distraction ( $p=0.004$ ), discomfort ( $p=0.002$ ), and pulling sensation ( $p=0.013$ ) with placement on the back compared to the legs. The back group was more likely to report a preference for placement on the legs (0.005). The leg group perceived an increased need to reattach patches at home ( $p=0.044$ ). There was no difference in patch occlusion.

#### **Conclusions:**

In our experience, the legs offer an alternative patch testing site which may limit sleep disturbances and overall discomfort while providing equivalent testing quality to the back. This may be particularly beneficial for patients with domestic duties which require physical labor caring for others.

#### **Acknowledgements:**

Grant funding was provided by the American Contact Dermatitis Society.

## Assessing Patient Literacy of Allergic Contact Dermatitis After Patch Testing

**Authors and Affiliations:** Sarah Kamsiah Zemlok, BA, University of Connecticut School of Medicine; Mykayla Sandler, BA, Harvard Medical School; Jared M. Boetes, BS, Perelman School of Medicine, University of Pennsylvania; Emma Woodard, BS, Massachusetts General Hospital; JiaDe Yu, MD, MS, Massachusetts General Hospital, Harvard Medical School

### Abstract

#### **Objectives:**

While patch testing is the gold standard for diagnosing allergic contact dermatitis (ACD), patients may not fully understand results, limiting clinical improvement. This study aimed to characterize patient ACD literacy and common barriers to management after patch testing to inform future educational interventions.

#### **Methods:**

Adults who completed patch testing at the Massachusetts General Hospital Contact Dermatitis Clinic and had at least one positive, relevant contact allergen were recruited. Participants completed online surveys which assessed demographics, comprehension of ACD, and barriers to ACD management, one and three months after patch testing.

#### **Results:**

While 72.7% (N = 27) of patients self-report accurate allergen recall, 57.2% of patients reported difficulty recognizing different chemical names. Overall, 59.1% incorrectly believe that ACD may be caused by common food and environmental allergens, and that patch testing identifies allergies to mold (31.8%), foods (22.7%), dust mites (31.8%), and drug reactions (27.3%). Barriers to allergen avoidance including unavoidable exposures at home or work, and accessibility or acceptability of product replacements affected less than 25% of respondents. Thirty-eight percent had concerns regarding the cost of product replacement.

#### **Conclusions:**

Patients may benefit from improved education on the process and outcomes of patch testing. While costs of product replacement were a moderate barrier, the limited economic diversity of this sample may underestimate this challenge. Difficulty finding products for specific skin and hair types may also be an underestimated barrier, as a more diverse study population is needed. Further insights are anticipated with continued recruitment and analysis of follow-up surveys.

#### **Acknowledgements:**

The medical student leading this study was funded by the 2024 Pediatric Research Alliance (PeDRA) Research Fellowship.

## **Analysis of Sulfite Concentrations in Common Beverages Consumed in the United States**

**Authors and Affiliations:** Jon Kibbie, University of Colorado Denver School of Medicine; Victoria Asuquo, Morehouse School of Medicine; Sandy Zheng, University of Minnesota; Nicole Case, University of Colorado; Aaron Wang, University of Colorado; Cory A. Dunnick, MD, Colorado Skin Surgery & Dermatology, Rocky Mountain Veterans Affairs, University of Colorado; Delaney Ding, University of Florida School of Medicine

### **Abstract**

#### ***Objectives:***

Sulfites are widely used as preservatives in food and beverages and can naturally occur in fermentation. Their presence can pose health risks to sensitive individuals, such as contact dermatitis. Accurate quantification of sulfite concentrations in consumer products is essential for regulatory compliance and public safety.

#### ***Methods:***

This study evaluates the sulfite content in a range of top-selling beverages in the United States, including wines(n=10), beers(n=13), juices(n=10), and soft drinks(n=12), using a rapid and reliable sulfite strip testing method. Samples were analyzed for total sulfite content using commercially available food-grade sulfite test strips with a detection range of 10 ppm to 500 ppm. Each product's test was run in duplicate and compared to a purified drinking water control.

#### ***Results:***

Red and white wines had the highest average levels, at times surpassing regulatory limits (range 50 -250 ppm). Moreover, there was notable variation in the sulfite concentrations depending on the manufacturer. There was also variation in sulfite concentration within tested beers, with ales and porters recording the highest (50-250 ppm) and lagers the lowest levels of sulfites (10 ppm). Soft drinks, energy drinks, and malt beverages had the lowest recorded sulfite concentrations, with many at or below the industry standard of 10 ppm.

#### ***Conclusions:***

These findings underscore the importance of improved sulfite monitoring in beverages and enforcement of regulatory limits, particularly in wines and certain beers. Further research into alternative preservation strategies and enhanced labeling standards are recommended to help those with known sulfite allergies avoid products with higher sulfite concentrations.

## Reactions to Cyanoacrylate Vein Treatment: A Case Series Highlighting Varied Management Strategies and Implications for Clinical Practice in Dermatology

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### Case Study

#### **Background:**

Vein closure with cyanoacrylate glue is effective for treating venous reflux, however, there are reports of hypersensitivity reactions following treatments with the glue. This case series presents four patients with distinct clinical presentations following vein treatment using the VenaSeal Closure System, a butyl-cyanoacrylate-based treatment, and their respective management strategies.

#### **Case Presentation:**

Case 1: A 71-year-old female experienced erythema, swelling, and fever two days post-treatment of right great saphenous vein (GSV) reflux. The localized erythema lasted two months, resolving after four-weeks of prednisone taper. Case 2: A 52-year-old female developed generalized erythema and pruritus within seven days of left GSV treatment. Ultrasound revealed possible foreign body granulomas (FBGs) and symptoms persisted despite initial phlebitis treatment. All clinical findings resolved following treatment with prednisone for nearly two months. Case 3: A 68-year-old female developed erythematous, painful nodules at the sites of injection two days after right small saphenous vein treatment. A punch biopsy revealed inflammation and ultrasound showed FBGs. Epicutaneous testing with Octyl-cyanoacrylate showed a mild positive reaction. Treatment with monthly intralesional Kenalog (ILK) improved inflammation within four months. Case 4: A 80-year-old male within five days of treatment of a non-healing ulcer of right leg due to GSV reflux developed weeping erythematous wounds. Imaging confirmed FBGs. Treatment with ILK and prednisone had minimal benefits. Eventually, GSV removal and debridement were deemed necessary with additional surgical procedures over subsequent months.

#### **Conclusions:**

These cases highlight the need for awareness of various clinical manifestations. We share our findings and emphasize the need to develop management algorithms.

#### **Acknowledgements:**

We are grateful to the patients who consented to this study.

## **Dermatologists vs Skinfluencers on Tiktok: Investigating the Allergenicity & Cost of Recommended Skincare Products**

**Authors and Affiliations:** Brailyn Weber, BS, BA, Park Nicollet Contact Dermatitis Clinic; Sarah Karels, BS, Park Nicollet Contact Dermatitis Clinic; Sara Hylwa, MD, Park Nicollet Dermatology

### **Abstract**

#### **Objectives:**

TikTok has transformed the way dermatologic advice is disseminated and received by consumers, with nearly 90% of users reporting purchasing skincare products recommended in posts. While previous studies have compared content categories between non-experts (aestheticians/skinfluencers) and experts (dermatologists) in the field, none have investigated the skincare products recommended on TikTok. Our study sought to compare the allergenicity and cost of these recommended products, with the hypothesis that experts recommend less allergenic and more affordable options.

#### **Methods:**

In November 2024, the keywords 'dermatologist' and 'skinfluencer/aesthetician' were queried on TikTok to identify the top 10 expert and non-expert accounts, respectively. For each account, 30 of the most recent posts were viewed. Each product recommended in a post, along with its price, was recorded. Ingredients of these products were then screened for the North American Contact Dermatitis Group's top 10 allergens (and/or their cross reactors) found in consumer products (methylisothiazolinone, fragrance, benzisothiazolinone, propolis, formaldehyde, lanolin, propylene glycol, cetrimonium chloride, sodium metabisulfite, oleamidopropyl dimethylamine).

#### **Results:**

Approximately 28.6% (106/379) of the skincare products recommended by dermatologists were free of the NACDG's top 10 allergens, compared to 17.5% (65/392) of products recommended by aestheticians/skinfluencers ( $p < 0.001$ ). Dermatologists tended to recommend less expensive skincare products compared to aestheticians/skinfluencers, with median average product prices of \$23.09 and \$32.02, respectively.

#### **Conclusions:**

Compared to non-experts, dermatologists recommend less allergenic and more affordable skincare products on TikTok. However, with a majority of product recommendations still containing allergens, the importance of checking ingredient lists or using a database-driven safe list remains paramount.

## ◆ ❖ GENERAL SESSION PRESENTATIONS ❖ ◆

### North American Contact Dermatitis Group Patch Test Results: 2021 - 2022

**Authors and Affiliations:** Marie-Claude Houle, MDCM, Laval University; Joel DeKoven, MD, Sunnybrook Health Sciences Center, University of Toronto; Amber R. Atwater, MD, Duke University; Margo Reeder, MD, University of Wisconsin; Erin M. Warshaw, MD, MHSc, Park Nicollet Health Services, University of Minnesota; Melanie D. Pratt, MD, University of Ottawa; Donald V. Belsito, MD, Columbia University; Brandon Adler, MD, University of Southern California; Jonathan Silverberg, MD, PhD, George Washington University; JiaDe Yu, MD, MS, Massachusetts General Hospital, Harvard Medical School; Nina Botto, MD, University of California - San Francisco; Christen M. Mowad, MD, Geisinger Medical Center; Cory A. Dunnick, MD, Colorado Skin Surgery & Dermatology, Rocky Mountain Veterans Affairs, University of Colorado; James Taylor, MD, Cleveland Clinic

#### Abstract

##### **Objectives:**

This study documents the North American Contact Dermatitis Group (NACDG) patch testing results from 2021-2022.

##### **Methods:**

At 12 centers in North America, patients were tested in a standardized manner with a screening series of 80 allergens.

##### **Results:**

Overall, 3056 patients were tested; 2200 (72.0%) had at least 1 positive/allergic patch test reaction and 1412 patients (46.6%) had a primary diagnosis of ACD. The most commonly positive allergens were nickel sulfate hexahydrate 5% and 2.5% petrolatum (24.9% and 22.1%, respectively), methylisothiazolinone (MI) (11.5%), hydroperoxides of linalool (10.1%), cobalt chloride hexahydrate (9.2%), and methylchloroisothiazolinone/methylisothiazolinone (MCI/MI) (9.0%). MI positivity continued to decrease from its peak in 2017-2018. More than one-fifth of patients (n = 640, 21.1%) had at least one clinically relevant reaction to an allergen/substance not present on the NACDG screening series.

##### **Conclusions:**

The epidemic of MI contact allergy in North America appears to continue its descent. Fragrance allergy is still very common, but composition of fragrance allergy markers appears to be changing. Patch testing using a robust screening series, and supplemental allergens as indicated, is necessary for comprehensive evaluation of ACD.

## **Systemic Contact Dermatitis: Subtypes and Mimics**

**Authors and Affiliations:** Susan Nedorost, MD, Dermatologists of the Central States;

### **Abstract**

#### ***Objectives:***

Systemic contact dermatitis (SCD) is defined as cutaneous sensitization with recall dermatitis after systemic exposure. Mercury as a cause of SCD was called baboon syndrome in the 1950s and is still sometimes equated with systemic contact dermatitis (SCD). However, symmetrical drug related intertriginous and flexural exanthem (SDRIFE) has replaced the term baboon syndrome for drug reactions, which often occur upon initial exposure. Systemic administration of topical medication initially used in the perianal area with recall there is SCD and not SDRIFE<sup>1</sup>. SCD appears as recurrent dermatitis in the same areas, with dyshidrotic eczema (DE) as a subtype recurrent on palms and soles. Understanding of the mechanism of SCD and DE allows us to appreciate SCD to foods in atopic dermatitis. The purpose of this presentation is to differentiate SCD and DE from fixed food eruption and SDRIFE.

#### ***Methods:***

Review of the literature focusing on FFE, SDRIFE, DE, and ACDS to compare and contrast underlying immunology, common ingested triggers, and diagnostic tests.

#### ***Results:***

Patch testing plays a role in SCD including food-triggered atopic dermatitis 2, and in DE.. When SCD mimics SDRIFE there is a role for patch testing if there is remote history of application of topical medications to the affected areas. For fixed food eruption, patch testing may be less sensitive than food diary.

#### ***Conclusions:***

Patch testing should be performed for 'recall' dermatitis that cannot be diagnosed by history. Patients with SCD or DE should not be tested while under treatment with medications that block Th2 cytokines

## **Implant-Related Delayed Hypersensitivity Reactions: Retrospective Analysis of North American Contact Dermatitis Group Patch Test Results 2016 - 2022**

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### **Abstract**

#### **Objectives:**

The NACDG has collected implant data since 2016. Objective: To determine demographics, presentation, results for 2016-2022 NACDG implant patch testing.

#### **Methods:**

42 allergens were patch tested per NACDG protocol. Reaction strength, interpretation, relevance, demographics, signs/symptoms, dermatitis/implant site and diagnosis were recorded. Timing includes Pre-implant (testing before placement), Post-implant (after placement) and Both. Post-implant/Both groups were pooled.

#### **Results:**

Pre-implant n=128. Top implant sites were knee (46.8%), hip (15.9%), cardiac (9.5%). Top reactions included nickel (5%: 43%; 2.5%: 29.1%), vanadium (14.3%), cobalt (11%). Post-implant n=170. Dermatitis sites were 'None' (45.3%), 'At implant site' (29.8%), 'Scattered' (14.9%), 'Other' (9.9%). Top implant sites were knee (54.4%), hip (12.4%), foot (7.7%). Top reactions with current relevance: nickel (5%: 16.5%; 2.5%: 12.9%), cobalt (6.5%), neomycin (5.9%). Post-implant, n=18 had diagnosis 'Allergic contact dermatitis (ACD) at implant site due to implant', with top implant sites knee (55.6%), foot (27.8%). Signs/symptoms included pain (66.7%), swelling (55.6%), loosening (40%). Main allergens were titanium oxalate (22.2%), tobramycin (16.7%), cobalt (16.7%), nickel (16.7%).

#### **Conclusions:**

Pre-implant patients had higher reaction frequencies for nickel and cobalt compared to NACDG 2019-2020 standard series, suggesting increased likelihood for metals reactions in this population. Almost half of Post-implant patients had no dermatitis and about 1/3 had implant site dermatitis, with top sites of knee, hip and foot and top relevant reactions to nickel, cobalt and neomycin. Final diagnosis 'ACD at implant site due to implant' occurred primarily at knee and foot (not hip); >50% had signs/symptoms, with top allergens titanium oxalate, tobramycin, cobalt and nickel.

#### **Acknowledgements:**

Thank you to Rabina Walsh MD for IRB support and Duke Dermatology for statistical support.

## Outcomes and Characteristics of Patients with Negative Patch Test Results

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### Abstract

#### **Objectives:**

Patch testing is the gold standard for diagnosing allergic contact dermatitis (ACD). Positive results and allergen identification facilitate allergy avoidance and symptom improvement. However, some patients with dermatitis have negative patch test (NPT) results. This project seeks to describe the clinical presentation and outcomes linked to NPT results.

#### **Methods:**

This prospective review of an IRB-approved REDCap registry from the University of California, Davis, Contact Dermatitis Clinic includes patients who underwent patch testing from December 2018 to August 2024. Characteristics such as age, sex, race, body sites of involvement, history of atopic dermatitis (AD), final diagnosis, and quality-of-life assessments were analyzed with STATA®.

#### **Results:**

161 (16.1%) of 1,001 patch-tested patients had negative results. Sex, age, duration of rash, history of AD, and number of patches placed were not significantly different between NPT and patch-positive groups. NPT patients were less likely to identify as Asian or Pacific Islander compared to other races ( $p=0.009$  and  $p=0.007$ , respectively). NPT patients were less likely to have eyelid involvement ( $p=0.02$ ) and more likely to have upper or lower extremity involvement ( $p=0.04$ ), with no other significant differences in body site involvement. The most common final diagnoses in NPT patients were “other dermatitis” ( $n=123$ , 42.7%), irritant contact dermatitis ( $n=60$ , 20.8%), and AD ( $n=19$ , 6.6%). Despite negative results, patients had improvement of Dermatology Life Quality Index and total Skindex score post patch testing ( $p<0.00001$  and  $p=0.013$ , respectively).

#### **Conclusions:**

Eyelid dermatitis was less common, and extremity dermatitis more common in NPT patients. NPT patients still experienced improvement in quality-of-life measures post patch testing.

#### **Acknowledgements:**

We would like to thank the American Contact Dermatitis Society and the UCD patch test team (Angelina Litvinov, Jasmine Johl, Jessica Higgins, Kao Lee Yang, Julie Taylor, Delia Juarez, Lucia Aruaz, Nadia Sychev, Angelina Samchuk, and Faiza Brandt) for their support.

# Recognizing Diversity in Dermatology: Patch Test Interpretation Across Fitzpatrick Skin Types

**Authors and Affiliations:** T. Austin Black, BS, McGovern Medical School; Sanjana Likki, McGovern Medical School; Rajani Katta, McGovern Medical School; Megan Rogge, MD, UTHealth Houston McGovern Medical School

## Abstract

### **Objectives:**

The U.S. Census Bureau projects that by 2030, half the U.S. population will consist of individuals with skin of color (SOC). Despite similar prevalence of allergic contact dermatitis (ACD) across racial groups, patients with SOC are significantly less likely to receive an ACD diagnosis. This study examines patch test reaction variability across Fitzpatrick skin types (FSTs) and presents a new visual resource to improve diagnostic accuracy.

### **Methods:**

A literature review was conducted in September 2024 to examine differences in patch test reaction presentations across FSTs. Techniques for detecting subtle reactions in SOC were also reviewed. Patient images were compiled to create a comprehensive table illustrating differences in patch test reaction presentations across all FSTs (I-VI) and reaction grades (?+, +, ++, +++, and irritant reaction (IR)).

### **Results:**

Presentation of 'classic' positive patch test (PPT) results often differ across FSTs. For example, patients with SOC often lack pronounced erythema in PPTs. Instead, early follicular or papular eruptions, hyperpigmentation, or lichenification are common. When erythema is present in SOC, it typically appears as faint violaceous, brownish-red, or pale-pink hues, in contrast to the bright pink or red erythema seen in lighter FSTs. Techniques such as angled viewing, side lighting, and dermoscopy are useful in revealing subtle reactions, including papules, vesicles, and induration, that may otherwise be overlooked.

### **Conclusions:**

Variability in PPT presentation and limited SOC representation in dermatological materials contribute to diagnostic disparities in ACD. The proposed table offers clinicians a practical tool to recognize these differences, fostering equitable diagnostic practices.

## **Innovative Strategies for Managing Acrylate Allergy in Diabetic Continuous Glucose Monitor Users: Insights from the UK Community**

**Authors and Affiliations:** Faheem Latheef, MBCHB, MRCP (Dermatology), MD, MBA, FRCP (London), Leeds Teaching Hospitals NHS Trust;

### **Case Study**

#### ***Background:***

Continuous glucose monitors (CGMs) play a crucial role in managing diabetes, but present challenges due to allergic contact dermatitis (ACD) from acrylates in their adhesives. Isobornyl acrylate (IBOA), a prevalent acrylate monomer in CGM adhesives, frequently triggers ACD, even at low exposure levels. IBOA ACD varies regionally, with fewer cases reported in the UK compared to Europe. This case report explores innovative protective measures adopted by the UK diabetic community to mitigate sensitisation and manage CGM-related skin reactions.

#### ***Case Presentation:***

A 36-year-old woman with type-1 diabetes presented with eczematous eruptions surrounding multiple CGMs, including a Freestyle Libre, Dexcom sensor, and Omnipod. Patch testing confirmed a positive reaction to IBOA. Discussion with the patient provided insights into UK diabetic forums, where individuals exchanged strategies and shared photographs on how to prevent sensitisation and manage CGM-related skin reactions. A widely endorsed recommendation involved using hydrocolloid dressings, like Compeed blister pads, thoroughly dried with a hairdryer, and applied beneath the sensor to create a protective barrier between the CGM adhesive and the skin. An investigative study with eight patients validated the efficacy of this approach<sup>1</sup>. Additionally, the Dexcom website<sup>2</sup> now features these barrier methods under the sensitive skin section. Implementing this method facilitated the patient's continued use of her CGM without further adverse reactions.

#### ***Conclusions:***

This case underscores the proactive measures adopted by patients within the UK diabetic community to address CGM-related ACD, potentially contributing to the lower incidence of reported reactions in this region. By disseminating effective protective strategies, such as hydrocolloid dressings, these individuals mitigate the risk of sensitisation and maintain CGM usage without the need for secondary care referral or patch testing. The collaborative endeavours and shared experiences within UK support groups offer invaluable insights into effectively managing CGM-related dermatological challenges, emphasising the significance of patient-driven solutions in dermatological care.

## ◆ ❖ POSTER PRESENTATIONS ❖ ◆

### **Black Spot Poison Ivy Dermatitis Mimicking Bullous Arthropod**

**Authors and Affiliations:** Chinecherem Chime-Eze, MD, MPH, University of; colleen cotton, Children's™ National Hospital, Washington

#### **Case Study**

##### ***Background:***

Black spot poison ivy dermatitis is a rare presentation of dermatitis. Its characteristic appearance includes a black macule preceding the rash, which distinguishes it from typical allergic contact dermatitis. We report a case in a pediatric patient.

##### ***Case Presentation:***

A 7-year-old female presented with a right lower leg lesion that darkened to a black color with surrounding erythema over a six day period after sitting on grass. Her mother documented daily photographs of the lesion. Over time, new pruritic papules developed. Examination revealed a well-demarcated, heme-crusted, nontender erosion with surrounding erythema and pink-yellow edematous papules. Initially, a diagnosis of insect bite was favored with the proposal that the lesion represented incidental intraepidermal hemorrhage. Three days later, the patient presented to an urgent care for worsening redness, pain and large tense bullae formation. The following day, the previously identified papules had become vesicular. Additionally, she developed new lesions on her face and ear. The patient's mother found an article with a photo that resembled the very first day of her presentation, leading to the diagnosis of black spot poison ivy dermatitis. Given that the timeline of presentation aligned with a delayed hypersensitivity reaction and continued worsening of symptoms, a prednisolone taper was initiated.

##### ***Conclusions:***

This case highlights the importance of continued evaluation of evolving skin processes and re-evaluation of diagnosis if needed. It also illustrates the advantages of patient photos and partnering with patients and their families to provide the best care.

# Oud Perfume Oils: Common Practice in Middle Eastern Cultures and Allergic Contact Dermatitis

**Authors and Affiliations:** Amina Tariq, UMass Chan Medical School

## Case Study

### **Background:**

Oud, also known as agarwood, is a heavily concentrated essential oil extracted from the fungus-infected resinous heartwood of the agar tree. The oud oil is made by extraction by distillation from the wood or by melting the resin (1). Both oud oils and Bakhoor (burning of the oud wood for fragrance) is an essential ritual in many Middle Eastern countries. Previous research has been done on the adverse effects of the burning fumes of Bakhoor and contact dermatitis (2,3). However, little is known about the effects of oud oils on the skin.

### **Case Presentation:**

This is a case of a 24 year old female with no significant past medical history presenting to the dermatology clinic with two days of pruritic, erythematous patches on the neck and clavicle with associated vesicles eruptions and crusting, diagnosed with contact dermatitis and treated with 2.5%hydrocortisone with significant improvement.

### **Conclusions:**

This case presents with a case of allergic contact dermatitis with the use of Oud essential oil. It is important to conduct further research to understand the formula of the Aquilaria wood oleoresin and potential side effects on the skin. As Oud is a very concentrated oil and widely used in many cultures, more focus should be done on the proper use of the product. Some practices may include cautiously using patch testing before application, applying on clothing instead of on the skin directly or diluting solution as needed. These safe practices may be useful as we understand the formulation and the pathology of Oud and allergic contact dermatitis.

# Allergens in Hospital Personal Care Products

**Authors and Affiliations:** Jenna Ruggiero, Medical College of Wisconsin - Milwaukee; Keri S. Chaney, MD, Medical College of Wisconsin

## Abstract

### **Objectives:**

Allergenic ingredients found in personal care products given to patients while in the hospital may cause allergic contact dermatitis.

### **Methods:**

We sought to examine personal care and hygiene products within three hospital systems in Milwaukee, Wisconsin, including the Clement J. Zablocki Veterans Affairs Medical Center, Froedtert Hospital, and Children's Wisconsin. Ingredients in 30 products were evaluated and compared with the American Contact Dermatitis Society 2020 Core Allergen Series, including cross-reactors.

### **Results:**

Nearly all the products analyzed contained ACDS Core 90 allergen, seen in 29 of the 30 products. The most common core series allergen were fragrance (19/30, 63.3%), phenoxyethanol (9/30, 30%), tocopherols (9/30, 30%), ethylhexylglycerin (8/30, 26.7%), glucosides (5/30, 16.7%), cocamidopropyl betaine (5/30, 16.7%), and propylene glycol (5/30, 16.7%). Of the most common contact allergen in general, isothiazolinones were not present in any products and formaldehyde releasers were found in 2/30 (6.7%).

### **Conclusions:**

Overall, contact allergens within personal care products distributed within the hospital was common. The most frequent allergens included fragrances, phenoxyethanol, tocopherol, and ethylhexylglycerin. This study provides insight into a potential source of allergic contact dermatitis in hospitalized patients.

# A Spicy Case of Contact Dermatitis to Carvone

**Authors and Affiliations:** Laura Xiang, MD, Cleveland Clinic Foundation; Isabella Ribaldo, MD, Cleveland Clinic Foundation; Shifa Akhtar, MD, Cleveland Clinic Foundation; John S. Anthony, MD, Cleveland Clinic Foundation; Wilma Bergfeld, MD, Cleveland Clinic Foundation

## Case Study

### **Background:**

We present a unique presentation of allergic contact dermatitis (ACD) in a patient with persistent lip irritation and mucosal hyperpigmentation. Patch testing revealed contact allergens to be hydroperoxide of linalool and carvone. Carvone was heavily present in the patient's diet. Notably, there have been no prior reports of these allergens inducing mucosal hyperpigmented macules and patches.

### **Case Presentation:**

A 75-year-old South Asian female presented with a five-month history of lip irritation, dryness, swelling, and the onset of black patches on her lips. Physical examination revealed hyperpigmented macules and patches on her lips, palate, and buccal mucosa. Patch testing revealed positive reactions to hydroperoxide of linalool (1+) and carvone (1+), the latter associated with the patient's regular consumption of fennel seeds, a common South Asian snack. The patient was instructed to avoid fennel, peppermint, and other allergens. Four months later, her mucosal pigmentation had significantly improved with allergen avoidance and topical steroids.

### **Conclusions:**

This case highlights an unusual presentation of ACD associated with mucosal hyperpigmentation, most likely caused by carvone sensitization from fennel seeds, compounded by a hydroperoxide of linalool allergy. While linalool sensitivity is common, carvone sensitivity, particularly due to dietary sources, is rare and often underrecognized. The case underscores the importance of thorough patient history, including dietary habits, in diagnosing and managing ACD, with personalized allergen avoidance proving to be an effective treatment strategy.

# Allergic Contact Dermatitis due to Chlorpromazine in a Healthcare Worker: A Case Report

**Authors and Affiliations:** Bruna Albuquerque, MD, Complexo Hospitalar Padre Bento (Padre Bento Hospital); Mario Cezar Pires, MD, PhD, Complexo Hospitalar Padre Bento; Renata Pires, MD, Complexo Hospitalar Padre Bento; Luciana Melo, MD, Complexo Hospitalar Padre Bento

## Case Study

### **Background:**

Allergic contact dermatitis (ACD) is often occupational and healthcare workers have higher risks to develop it. This case study highlights the importance of diagnosing ACD among this group of patients.

### **Case Presentation:**

A 46 yo woman with eczema on both hands for at least 2 years. Initially localized in the distal phalanx, then evolved to the hands, wrists and cubital folds. She had no history of atopic dermatitis or other comorbidities. The hypothesis of ACD was raised and a standard patch test with the Brazilian series was performed, with a positive result to nickel sulfate, paraphenylenediamine and cobalt chloride. Even avoiding these allergens, the symptoms persisted. Since she was a caregiver in a healthcare facility and helped patients to take their medications, we patch tested the medications she had contact with. In petrolatum: sertraline 5%, diclofenac 5%, chlorpromazine 1%, carbamazepine 1%, diazepam 30%, imidazolidinyl urea 2%, phenoxyethanol 1%, budesonide 0,1%. In alcohol: hydrocortisone 2,5%. The test was positive to chlorpromazine. Then, we did an open application test, advising the patient to apply the substance, twice a day, on the forearm, which was also positive.

### **Conclusions:**

This case of occupational induced ACD due to chlorpromazine corroborates that reactions due to this drug are more common in caregivers or healthcare workers, although it is not frequently reported. Also, it is essential to diagnose this group of patients, since maintaining their work activities implies in decreased quality of life. The use of personal protective equipment and maybe work relocation will be necessary.

# Ingredient Integrity in Clean Beauty

**Authors and Affiliations:** Anood Al-issa, MD, Dermatology Clinic

## Abstract

### **Objectives:**

As clean beauty products rise in popularity, consumers are drawn to claims of safer, more natural ingredients. However, the safety of these ingredients often remains uncertain. This study critically examines the scientific evidence behind clean beauty ingredient claims, focusing on common concerns such as irritants, endocrine disruptors, and carcinogens. The aim is to assess whether these products live up to their promises and to offer insights on navigating the clean beauty market.

### **Methods:**

A comprehensive review was conducted using trusted databases like PubMed, MEDLINE, and Embase. Peer-reviewed articles, clinical trials, and reviews were carefully selected to evaluate the scientific safety profiles of ingredients commonly found in clean beauty products, with a focus on those frequently debated.

### **Results:**

Certain ingredients, such as methylisothiazolinone (MI), fragrance, and formaldehyde, were confirmed allergens and linked to dermatitis, supporting their exclusion from clean beauty formulations. The role of endocrine disruptors like Triclosan remains unclear, with most studies based on animal models. Carcinogenic concerns related to formaldehyde and 1,4-dioxane are emerging, though human evidence is still lacking.

### **Conclusions:**

The clean beauty movement highlights the risks of specific chemicals, yet many ingredient safety claims remain inconclusive. While eliminating harmful substances is essential, further research and regulatory oversight are needed to understand the long-term effects of clean beauty ingredients, ensuring safer formulations for consumers.

# Beyond the Surface: Exploring Psychiatric Dimensions in Atopic Dermatitis

**Authors and Affiliations:** Anood Al-issa, MD, Dermatology Clinic

## Abstract

### **Objectives:**

Atopic dermatitis (AD) is a chronic inflammatory skin condition with a well-documented association with allergic and autoimmune disorders. However, its potential connection to psychiatric conditions, particularly obsessive-compulsive disorder (OCD), remains underexplored. This study examines a case of persistent pruritus in an AD patient, emphasizing the interdisciplinary overlap between dermatology and psychiatry.

### **Methods:**

A 30-year-old female presented with severe pruritus unresponsive to two years of topical steroid therapy. Examination revealed excoriations without primary lesions, and biopsy showed dermal eosinophilia. Blood tests indicated elevated IgE levels (7280 IU/mL) and eosinophilia. Despite negative allergy tests, treatments with montelukast and antihistamines showed no improvement. Psychiatric consultation revealed sterilization-focused OCD triggered by excessive sanitizer use during the COVID-19 pandemic.

### **Results:**

The patient responded positively to systemic antidepressants combined with behavioral therapy, achieving significant resolution of both dermatological and psychiatric symptoms. This case underscores the bidirectional relationship between AD and OCD, where chronic inflammation and psychological stress exacerbate symptoms. Shared inflammatory pathways and immune dysregulation appear central to both conditions, aligning with current literature.

### **Conclusions:**

This case highlights the critical need for dermatologists to recognize and address psychiatric comorbidities in AD patients. Early interdisciplinary collaboration can optimize therapeutic outcomes and improve quality of life. Future research should explore the genetic and environmental factors underpinning this link, paving the way for targeted, personalized interventions in dermatological care.

# **Workplace Prevention and Education Practices Among Workers Assessed for Contact Dermatitis: A Study in the National Dermatology Center of Mongolia**

**Authors and Affiliations:** Zolzaya Gankhulug, DermaSolution Hair and Skin Clinic; Bulgan Jargalsaikhan, The National Dermatology Center of Mongolia

## **Abstract**

### ***Objectives:***

To identify gaps in workplace prevention and education practices among workers assessed for contact dermatitis in Mongolia.

### ***Methods:***

Following ethical approval, patients assessed for contact dermatitis at the National Dermatology Center of Mongolia, either while working or on leave due to skin disease, were invited to participate. A self-completed questionnaire was used to collect data on demographics, workplace characteristics, and prevention and education practices.

### ***Results:***

A total of 85 patients participated in the study. The mean age of participants was 44 years, with 45 males and 40 females. The primary industry sectors represented included healthcare and manufacturing. Although most participants reported receiving general occupational health and safety training, only half indicated receiving skin-specific training. Among those who received skin-related training, education commonly focused on avoiding exposure, proper handwashing, and glove use. However, training on the use of creams and early symptom recognition was less frequently reported.

### ***Conclusions:***

Workers continue to experience gaps in workplace prevention and education practices. Addressing these gaps can help regulatory bodies prioritize inspection activities and improve workplace health practices

# Workplace Screening for Hand Dermatitis: A Study Conducted in the National Dermatology Center of Mongolia

**Authors and Affiliations:** Zolzaya Gankhulug, DermaSolution Hair and Skin Clinic; Bulgan Jargalsaikhan, The National Dermatology Center of Mongolia

## Abstract

### **Objectives:**

To assess the validity of the Hand Dermatitis Screening Tool and the feasibility of implementing workplace screening among workers in a healthcare setting in Mongolia.

### **Methods:**

Following institutional ethics approval, 85 employees at the National Dermatology Center of Mongolia participated in the study. Among the participants, 45 were male, and the remaining were female. Workers completed a survey evaluating risk factors for hand dermatitis. Subsequently, they were screened for hand dermatitis using the Hand Dermatitis Screening Tool, administered either by an occupational health nurse (OHN) or through self-screening. After the screening, participants completed a feasibility evaluation of the tool.

### **Results:**

Of the 85 participants, 31% screened positive for hand dermatitis. Workers with a positive screen were more likely to report engagement in wet work and have a history of eczema, dermatitis, or similar conditions. A majority of participants (81%) reported that using the Hand Dermatitis Screening Tool took less than one minute, and 98% found the tool easy to use.

### **Conclusions:**

The identified risk factors for hand dermatitis in this study align with existing global research on healthcare settings. The findings demonstrate that the Hand Dermatitis Screening Tool is both valid and feasible for use in a busy healthcare environment, making it an effective tool for early detection of occupational hand dermatitis among healthcare workers in Mongolia.

# Promoting Workplace Health Among Nail Technicians: A Study at the National Dermatology Center of Mongolia

**Authors and Affiliations:** Zolzaya Gankhulug, DermaSolution Hair and Skin Clinic; Bulgan Jargalsaikhan, The National Dermatology Center of Mongolia

## Abstract

### **Objectives:**

This study aimed to explore the occupational health concerns of female nail technicians, identify barriers to improving workplace health, and assess their perceived needs for resources to address these challenges.

### **Methods:**

A qualitative study was conducted at the National Dermatology Center of Mongolia, involving in-depth interviews with 40 female nail technicians working in the Ulaanbaatar region. The interviews were designed to gather insights into their health concerns, barriers to improving workplace safety, and the types of resources they felt would be helpful.

### **Results:**

The study revealed that nail technicians were most concerned about chemical exposure, including solvents, acrylics, and other products commonly used in the industry. Major barriers to addressing these health concerns included a lack of knowledge on self-protection measures, fear of job loss if they raised health concerns, and the unstable nature of salon work. Participants indicated that printed resources written in simple language, with visually engaging designs, would be most helpful in addressing their health issues and improving their workplace conditions.

### **Conclusions:**

Female nail technicians in Mongolia face significant health risks, primarily related to chemical exposure. However, challenges such as limited knowledge of protective measures, the desire to retain their jobs, and the precarious nature of their employment hinder their ability to address these concerns effectively. The study highlights the need for tailored, accessible resources that can raise awareness and promote workplace health improvements within this vulnerable population. These findings will contribute to the development of more effective health education materials and interventions aimed at improving the working conditions for nail technicians in Mongolia.

# Severe Allergic Contact Dermatitis with Id Reaction Mimicking "Crown of Jewels" Lesions in a Pediatric Patient with Atopic Diathesis

**Authors and Affiliations:** Diane Fernandes, DO, San Antonio Uniformed Services Health Education Consortium; Jarrod Odom, MD, SAUSHEC

## Case Study

### **Background:**

We present a significant case of a robust allergic contact dermatitis with id reaction in a child with atopic diathesis.

### **Case Presentation:**

The patient is a 13-year-old male with a past medical history of asthma and environmental allergies causing intermittent urticaria, who presented to the emergency department for evaluation of a skin rash without systemic symptoms. The initial lesion affected his right lower face where he contacted the grass after being tackled during football practice and quickly progressed to involve his lower extremities within hours. Physical exam showed a single, irregular eczematous plaque over his right lower face, and multiple, ovoid well-demarcated vesicular plaques with central necrosis on a background of erythema involving both his lower extremities with newer lesions on his right upper extremity and suprapubic area. Previous treatments included cetirizine, hydroxyzine, and a four-day course of oral Prednisone 30mg with persistence of lesions. We favored a diagnosis of allergic contact dermatitis with id reaction and extended the course of oral Prednisone for a total of two weeks along with topical steroids and continuation of cetirizine and hydroxyzine with resolution of symptoms, but presence of post inflammatory hypopigmentation over some previously affected areas.

### **Conclusions:**

This presentation of allergic contact dermatitis with an id reaction had an appearance like the 'crown of jewels' typical of linear IgA bullous dermatosis of childhood. It is important to recognize this unique appearance for the administration of appropriate treatment without unnecessary medical workup.

# Allergic Contact Dermatitis to Tapinarof: Report of a Case

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## Case Study

### **Background:**

Tapinarof (VTAMA; Dermavant Sciences, Inc.) is a novel topical aryl hydrocarbon receptor agonist approved for plaque psoriasis, seborrheic dermatitis, and atopic dermatitis with generally good tolerability. Allergic contact dermatitis to tapinarof is extremely rare, with only one prior case reported. As its use grows, clinicians must recognize this reaction when evaluating patients using this medication.

### **Case Presentation:**

A 69-year-old female with psoriasis presented with worsening thick pink plaques on the axillae, inguinal folds, abdomen, and lower legs, refractory to topical steroids, calcipotriene, and risankizumab. Preferring to avoid topical steroids, she was started on tapinarof 1% cream. Shortly after, she developed worsening pruritus and enlargement of her psoriasis plaque, which resolved after discontinuing tapinarof and initiating topical mometasone 0.1% cream. Comprehensive patch testing with the Contact Dermatitis Institute series, T.R.U.E. Test, and personal products was negative, including bezonic acid and propylene glycol which are inactive ingredients in VTAMA. However she had a 1+ reaction to tapinarof 1% cream as is. Her psoriasis remained well controlled at 6 month follow-up.

### **Conclusions:**

This is a rare case of allergic contact dermatitis to tapinarof, the second reported to date. With no limitations on treatment duration or application sites, tapinarof is a valuable alternative for patients avoiding chronic steroid use or systemic therapies. As its use increases, clinicians should consider allergic contact dermatitis in patients who do not respond as expected or in cases where their disease worsens. Timely recognition and management are essential. Further research is needed to understand this rare reaction.

# Wrestling with the Diagnosis: A Case of Allergic Contact Dermatitis in a Young Athlete

**Authors and Affiliations:** Ariel Leung, MD, University of Kansas Department of Allergy and Immunology; Jessica M. Hobson, MD, University of Kansas Department of Allergy

## Case Study

### **Background:**

Allergic contact dermatitis (ACD) is a delayed hypersensitivity reaction presenting as chronic, pruritic, eczematous dermatitis. Misdiagnosis is common, particularly when environmental or occupational allergens are not immediately evident. This case underscores the value of detailed history-taking and patch testing in identifying the etiology of persistent dermatitis and guiding effective treatment.

### **Case Presentation:**

A 17-year-old female presented with a 10-month history of intermittent, red, raised, pruritic rashes resembling ringworm, located on her face, arms, hands, and occasionally thighs. Initially diagnosed with atopic dermatitis, she was treated with tacrolimus, betamethasone, and ketoconazole, with partial and inconsistent improvement. The rash began following a wrestling camp, raising suspicion of exposure to allergens in athletic equipment. Patch testing revealed sensitization to 1,3-diphenylguanidine (DPG), a synthetic rubber component, and propylene glycol, used in her previous antifungal treatments. Avoidance of these allergens led to complete resolution, confirming ACD triggered by DPG exposure from wrestling gear and mats.

### **Conclusions:**

This case highlights the critical role of environmental and social histories in diagnosing ACD and the importance of patch testing to identify allergens. Avoidance is the cornerstone of management, requiring sustained effort for resolution. This case demonstrates how ACD can mimic other dermatologic conditions, emphasizing the need for heightened awareness in evaluating refractory dermatitis. Broader implications include increased recognition of contact allergens in sports settings, particularly for adolescent athletes.

# Acrylate Contact Dermatitis from UV Cured Gel Nails Causing Nail Dystrophy

**Authors and Affiliations:** Jennifer Wittmann, BS, University of Nevada, Reno School of Medicine; Irene Mannering, MD, UNR, School of Medicine

## Case Study

### **Background:**

Acrylate containing products such as acrylic nails, gel nail polish, and UV-cured gel nails have been implicated in cases of allergic contact dermatitis (ACD)<sup>1</sup>. Acrylates are produced through polymerization of monomers of acrylic or methacrylic acid and can have strong sensitizing properties<sup>2</sup>.

### **Case Presentation:**

A 45-year-old patient presented with nail dystrophy, onycholysis, splinter hemorrhages, and subungual debris. Minimal erythema and scaling of the skin surrounding the nail. She had recently undergone application of UV cured gel nails at a nail salon. Nail clippings did not reveal onychomycosis nor findings consistent with psoriasis. Symptoms improved upon cessation of gel nail polish application with UV curing. The patient was able to tolerate polyacrylate containing nail polish applied at home without complication.

### **Conclusions:**

Literature demonstrates that ACD caused by acrylates, manifest with a wide range of clinical presentations including onycholysis, paronychia, and eczematous changes. In our patient, findings revealed nail disease in the absence of skin changes. Our patient only developed symptoms secondary to UV curing while tolerating polyacrylate-based nail polishes without UV exposure. Gel polish requires UV light for curing, a chemical process where acrylate monomers undergo polymerization, hardening the polish and increasing durability. It is suggested that unpolymerized monomer and oligomers of acrylate and methacrylate are responsible for occurrence of ACD<sup>3</sup>. In this case it is thought that the UV curing process is incomplete, and monomers still exist causing allergy and disease limited to just the nail. The surrounding skin remained unaffected due to the careful application of the polish exclusively onto the nail surface.

# Tripping Out... And Breaking Out: A Psychedelic Drug Rash

**Authors and Affiliations:** Landon S. Hendrickson, MD, University of Oklahoma - Health Sciences Center; Chase Pitchford, The University of Oklahoma; Jeffrey McBride, MD PhD, University of Oklahoma; Jarad Levin, MD, University of Oklahoma

## Case Study

### **Background:**

Cutaneous drug reactions to oral psilocybin have not been previously reported. Rahman et. al described cyanosis, jaundice, and vesicular eruptions from intravenous psilocybin [1]. However, literature published by Hinkle et al. and Kaminski and Reinert did not specifically mention cutaneous reactions [2,3].

### **Case Presentation:**

We report the case of a 37-year-old African American female presenting with a pruritic rash on the lower extremities and abdomen [Figures 1 and 2]. The rash exhibited a relapsing and remitting course and resolved spontaneously over 3-4 weeks. Minimal relief was achieved using topical triamcinolone 0.1% and mupirocin 2% ointments. A 4-mm punch biopsy of the left lower extremity [Figure 3] revealed interface dermatitis with vacuolar changes, band-like dermal infiltrate, and scattered dermal eosinophils and melanophages. Epidermal changes included variable hypergranulosis, orthokeratosis, and parakeratosis. At follow-up, the patient reported lesion recurrence following the ingestion of psilocybin-containing 'magic mushrooms.' Retrospectively, she identified psilocybin as a trigger for previous flares.

### **Conclusions:**

This is the first reported case of a lichenoid drug eruption triggered by oral consumption of psilocybin-containing mushrooms. This case highlights the importance of a thorough medication history, including recreational substances.

### **Acknowledgements:**

The authors have no relevant acknowledgements.

# Weaving Trouble: Allergic Contact Dermatitis from Synthetic Hair Extensions

**Authors and Affiliations:** Mallory A. Von Lotten, University of Alabama at Birmingham School of Medicine; Tiffany T. Mayo, M.D., FAAD, University of Alabama (UAB) Dermatology

## Case Study

### **Background:**

Allergic contact dermatitis (ACD) is a prevalent inflammatory condition caused by exposure to allergens like paraphenylenediamine (PPD), commonly found in synthetic hair products. The U.S. hair extension market exceeds \$2.5 billion annually, with synthetic hair products widely used, particularly among African American women-34% of whom report using synthetic extensions. Despite their popularity, research on their allergenic potential is limited. This case highlights the challenges in diagnosing and managing ACD linked to synthetic hair, emphasizing its impact on underrepresented communities.

### **Case Presentation:**

A 37-year-old African American woman with Fitzpatrick skin type 5 and a history of atopic dermatitis presented with persistent pruritus, scalp irritation, and hair thinning following the use of synthetic hair extensions. Examination revealed hyperpigmented, lichenified plaques symmetrically distributed around the neck and ears, consistent with lichen simplex chronicus and suspected allergic contact dermatitis (Figure 1). The patient denied any known contact triggers. Tacrolimus 0.1% ointment was prescribed for twice-daily application, and she was referred for patch testing. She was counseled to avoid synthetic hair products.

### **Conclusions:**

Synthetic hair products, which often contain PPD, adhesives, and other allergens, pose significant risks for allergic contact dermatitis (ACD) in predisposed individuals. This case underscores the importance of clinician education and highlights the need for further research into the allergenic potential of synthetic hair. Given the disproportionate impact of synthetic hair-related dermatitis on vulnerable populations, targeted public health efforts are essential to enhance patient care and promote equity in dermatologic health. Patch testing and patient education remain critical tools for accurate diagnosis and effective management.

# Is Lower Better? Upper vs Lower Regional Back Patching in Metal Hypersensitivity - Which Region is More Reliable?

**Authors and Affiliations:** Jacob Gencher, BSc Hon, McMaster University and Hamilton Allergy; Jason A. Ohayon, MD, FRCPC, Hamilton Allergy

## Abstract

### **Objectives:**

Patch testing (PT) is increasingly important in identifying metal hypersensitivity (MH) patients at risk for implant reactions. Identifying these patients at risk by PT to metals pre-operatively is essential.

### **Methods:**

A chart review of MH patients referred was performed in a community allergy clinic. PT included the NACD 90 panel along with a supplement metal panel. Duplicate metal allergen testing to Nickel (Ni) and Cobalt (Co) were performed. The NACD panel was applied to the left upper back (LUB) region. The duplicate metal panel was applied to the right lower back (RLB) region. Average PT scores (1+ to 3+) were calculated for all patients and t-test performed.

### **Results:**

Fifty-nine patients were identified with either Ni, Co or combined positive MH responses over 3 years, 2021-2024. At 96 hours, 11/59 (19%) tested negative for Ni/Co in the LUB, when positive in the RLB. Eight of 59 (14%) tested negative in the RLB when positive in the LUB. Five of these 8 were Co positive and 3 of 8 Ni positive. Overall the average PT positive response was greater in the RLB (2.14) compared to LUB (1.96), ( $p=0.0135$ ). The sub-cohort, 18/59 (31%) referred specifically for pre-op orthopedic MH evaluation identified a higher average PT response in the RLB, (2.29) vs LUB (1.43) ( $p=0.017$ ). RLB patch placement appeared to favour a higher sensitivity for Ni allergy.

### **Conclusions:**

Metal PT appears to favor more reliable responses in the RLB, especially to Ni, in MH patients. Patch testing to screen for MH may benefit additional RLB application.

# Clarifying Quantitative Risk Assessment in the Context of Next Generation Risk Assessment: Bridging Traditional Methods with New Approach Methodologies

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## Abstract

### **Objectives:**

The concept of Next Generation Risk Assessment (NGRA) emerged as animal alternatives are increasingly implemented in the risk assessment process, particularly for the skin sensitization endpoint. Some in the field view NGRA as distinct from traditional Quantitative Risk Assessment (QRA) methods. However, the underlying principles of both approaches—such as hazard identification, exposure assessment, and uncertainty determination—remain consistent across systemic toxicity and skin sensitization endpoints. Classical QRA for dermal sensitization involves determining the quantitative potency of a sensitizer, typically using animal or human data, while NGRA leverages New Approach Methodologies (NAMs) to make risk decisions without animal data. This review aims to clarify that QRA and NGRA are complementary, not competing, approaches.

### **Methods:**

We show the evolution of skin sensitization assessment from qualitative to quantitative methods, detailing the theoretical foundation of both QRA and NGRA, including skin sensitization threshold effects, point of departure (reference dose), and margin of safety.

### **Results:**

We discuss the development of QRA2 and its integration into NGRA frameworks, demonstrating how it can be applied to derive safe concentrations of fragrance ingredients in consumer products using animal-free data. We also provide a case study illustrating the practical application of QRA2 within an NGRA framework.

### **Conclusions:**

This work clarifies the role of QRA within NGRA and emphasizes their combined role in an animal-free risk assessment for the skin sensitization endpoint.

# Application of In-Vitro Skin Sensitization Regression Models in Next Generation Risk Assessment

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## Abstract

### **Objectives:**

Quantitative risk assessment (QRA) for dermal sensitization is essential for determining safe concentrations of potential skin sensitizers in consumer products. The fragrance industry developed the QRA2 approach, which uses the No Expected Sensitization Induction Level (NESIL) as a reference dose. NESIL represents a dose at which no skin sensitization is observed in a confirmatory human repeat insult patch test (HRIPT). As the industry moves away from animal testing, non-animal alternatives for both hazard and potency assessment have emerged. One such alternative is the use of regression models based on OECD in vitro methods, which calculate quantitative points of departure (PoD). The objective here is to present a framework for incorporating regression models into next-generation risk assessment (NGRA).

### **Methods:**

The framework begins with hazard assessment using in vitro methods (OECD guideline 497), followed by PoD calculation through regression models and QRA. After determining PoD, uncertainty factors are applied to derive predicted NESIL (pNESIL) for QRA. This framework was applied to two sensitizers, p-Mentha-1,8-dien (CAS 2111-75-3) and 3-Propylideneephth (CAS 17369-59-4), to calculate acceptable exposure levels (AEL) for products like deodorants and bar soaps. The AEL was then compared to consumer exposure levels (CEL) to determine the margin of exposure.

### **Results:**

Results show that the comparison of AEL/CEL based on pNESIL with human-derived NESIL supports the reliability of in vitro models, with pNESIL being more conservative in some cases.

### **Conclusions:**

This approach offers a promising alternative for QRA, eliminating the need for confirmatory animal or human testing.

# **A Case of Occupational Acrylate Allergy - A Success Story!**

**Authors and Affiliations:** Faheem Latheef, MBCHB, MRCP (Dermatology), MD, MBA, FRCP (London), Leeds Teaching Hospitals NHS Trust; Yasmin Khan, MBCHB, MRCP, Leeds Teaching Hospitals NHS Trust

## **Case Study**

### ***Background:***

Occupational acrylate allergy presents a significant challenge for nail technicians, often resulting in debilitating hand dermatitis. This case demonstrates the successful clinical management of a nail technician with severe hand and finger dermatitis by applying the results of an in-vivo study.

### ***Case Presentation:***

A 35-year-old nail technician presented with escalating hand symptoms over the last two years, characterized by painful, cracked and excoriated skin. Patch testing revealed positive reactions to 2-hydroxyethyl methacrylate, ethyleneglycol dimethacrylate, 2-hydroxyethyl acrylate, and triethyleneglycol diacrylate-common components in acrylic, gel, and shellac nail products routinely used in her profession. The patient was reluctant to adhere strictly to allergen avoidance, citing practicality concerns considering her limited alternative income source and qualifications. She sought alternative solutions to manage her occupational dermatitis.

### ***Conclusions:***

Occupational acrylate allergy poses significant challenges due to the rapid penetration of acrylates through most glove types, complicating protective measures. An in-vivo study<sup>1</sup> investigating glove efficacy, wherein open gel chambers filled with acrylate gels were applied to the skin, with glove materials serving as a protective membrane against acrylate exposure, yielded valuable insights into suitable protective glove materials. The study was limited practically by its prolonged duration. Applying the study findings to clinical practice, the patient was initially treated with oral steroids to alleviate acute symptoms. Subsequently, she was advised to double glove during procedures and limit client interaction to 20 minutes to reduce acrylate penetration time. Coupled with frequent handwashing in-between clients these measures enabled her to successfully sustain her career.

# "If it's not the Hair, Maybe it's in the Air?" - A Case of Allergic Contact Dermatitis from Airborne Exposure to Acrylates

**Authors and Affiliations:** Faheem Latheef, MBCHB, MRCP (Dermatology), MD, MBA, FRCP (London), Leeds Teaching Hospitals NHS Trust; Yasmin Khan, MBCHB, MRCP, Leeds Teaching Hospitals NHS Trust

## Case Study

### **Background:**

An increasing incidence of allergic contact dermatitis (ACD) to acrylates has been noted, particularly among nail technicians and consumers. Airborne contact dermatitis to acrylates is rare and our case demonstrates a rare presentation of a consort airborne allergic contact dermatitis to acrylates

### **Case Presentation:**

A 38-year-old auditor was referred for patch testing for a suspected hair dye reaction following having developed a florid eczematous reaction on her face after a hair dye appointment. This reaction predominantly affected her cheeks, with the left more so than the right, extending to just below her eye. She also had mild eye swelling. The description and photographs taken at the time was atypical for a hair dye reaction and on further questioning she revealed she had been sat in close proximity to someone undergoing acrylic nail treatment during the hair appointment. We undertook patch testing to our baseline, anti-infective, excipient, hairdressing, fragrance, acrylic nail, cosmetic, photopatch, and perianal series. Positive results were observed for 14 acrylates, including methyl methacrylate, 2-hydroxypropyl methacrylate, ethyleneglycol dimethacrylate, triethyleneglycol dimethacrylate, urethane dimethacrylate, BIS-MA2%, BiS-GMA 2%, 1,6-hexanediol diacrylate, tetrahydrofurfuryl methacrylate, tetraethyleneglycol dimethacrylate, butyl acrylate, ethyl acrylate, 2-hydroxyethyl acrylate, and triethyleneglycol diacrylate. No reactions were observed to any hair dyes on patch testing. Skin prick testing to PPD was also negative. She reported prior but infrequent use of acrylic nails, the last instance being over a year ago.

### **Conclusions:**

It is therefore likely that the patient became sensitised through these exposures, leading to a pronounced reaction following subsequent airborne exposure to acrylates

# Consort Allergic Contact Dermatitis to Occupational Acrylates

**Authors and Affiliations:** Faheem Latheef, MBCHB, MRCP (Dermatology), MD, MBA, FRCP (London), Leeds Teaching Hospitals NHS Trust; Yasmin Khan, MBCHB, MRCP, Leeds Teaching Hospitals NHS Trust

## Case Study

### **Background:**

Consort Allergic Contact Dermatitis (CACD) is a recognized phenomenon wherein one develops allergic reactions to allergens originating from another individual. This case represents to our knowledge the first documented instance of CACD attributed to occupational acrylates. It highlights the need for comprehensive social and occupational history-taking in dermatology settings. It underscores the importance of considering potential sources of allergen exposure from partners or dependents, particularly in cases with unusual clinical presentations.

### **Case Presentation:**

A 52-year-old female presented to dermatology with severe widespread dermatitis, characterized by spongiosis on a recent skin biopsy. Despite thorough investigation, a definitive cause remained elusive. The patient underwent patch testing with our baseline, photopatch, anti-infective, excipient, cosmetic, textile, fragrance, and acrylate series. Patch testing revealed multiple positive 3+ blistering reactions to various acrylates (2-hydroxyethyl methacrylate, 2-hydroxypropyl methacrylate, ethyleneglycol dimethacrylate, 1,4-butanediol dimethacrylate, 1,6-hexanediol diacrylate, tetrahydrofurfuryl methacrylate, tetraethyleneglycol dimethacrylate, butyl acrylate, ethyl acrylate, 2-hydroxyethyl acrylate and triethyleneglycol diacrylate). The patient lacked any direct exposure to acrylates through common sources such as gel/shellac/acrylic nails, dental materials, dressings or bone cement.

### **Conclusions:**

Further inquiry revealed the husband's profession in windscreen repairs. Analysis of the husband's work-related resin products showed several acrylates implicated in the patient's patch test reactions, which he would wipe on to his work overalls. Transfer of resin onto his clothing, subsequently laundered alongside the patient's own clothes, likely facilitated sensitization. Following advice the patient avoided close contact with her partner's work clothing and laundered her garments separately. Remarkably, this led to complete resolution of her symptoms confirming our suspected diagnosis.

# Dual Systemic Therapy in Refractory Atopic Dermatitis: A Case of Sustained Control Using Upadacitinib and Dupilumab Combination Therapy

**Authors and Affiliations:** Rebecca Pratt, MD; Leo Morjaria, Bachelor of Mathematics, Michael G. DeGroot School of Medicine, McMaster University

## Case Study

### **Background:**

In recent years, JAK inhibitors and biologic therapies have demonstrated efficacy in managing severe atopic dermatitis (AD) refractory to topical therapy. However, many patients do not achieve optimal control on either of these agents alone and are thus often given short courses of systemic corticosteroids as rescue therapy-entailing significant long-term adverse effects. This case highlights the successful control of refractory AD using upadacitinib and dupilumab combination therapy.

### **Case Presentation:**

A 22-year-old male was referred to our specialty clinic for longstanding AD, with concomitant allergic rhinitis and asthma. At baseline, the patient had an EASI score of 50, a BSA of 80%, and an IGA of 4, reflecting severe disease. Despite trialing multiple topical creams and oral medications, his AD remained suboptimally controlled. Initially, upadacitinib alone improved symptoms but efficacy waned by the end of the daily dosing interval. Dupilumab was then trialed; the patient reported reduced flares but persistent dryness and mild erythema. After failing both agents as monotherapies, as well as a course of cyclosporine, upadacitinib and dupilumab combination therapy was initiated-upadacitinib maintained as a bridging agent (used once or twice weekly for itch relief) until dupilumab's longer-acting effects could be established. Over a 3-month follow-up period, this achieved sustained symptom control without significant new adverse effects.

### **Conclusions:**

This case demonstrates the potential effectiveness of targeting distinct but complementary immunologic pathways to manage refractory AD. JAK inhibitor and a biologic agent as combination therapy may prevent the need for systemic corticosteroids and offer clinicians a valuable option in managing challenging cases.

# Acrylate-Induced Allergic Contact Dermatitis from a Vein Procedure

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## Case Study

### **Background:**

Acrylate-induced dermatitis is a delayed hypersensitivity reaction, typically presenting 24 to 48 hours following exposure, requiring prompt management. A VenaSeal™ procedure is a vascular intervention that utilizes acrylate intravenously to seal a vein and improve venous insufficiency. The active ingredient in VenaSeal™ is n-butyl-2-cyanoacrylate, an endovascular adhesive. Literature links VenaSeal™ with type IV hypersensitivity reactions, but allergic contact dermatitis (ACD) reports are rare. Patch testing across previous cases of ACD post-VenaSeal™ procedure reveals that although patients typically test positive for VenaSeal™, reactions to other cyanoacrylates vary.

### **Case Presentation:**

A 50-year-old woman with a history of eczema on Dupixent presented with a pruritic eruption on the thigh that became widespread over several days. The patient had recently undergone a VenaSeal™ procedure for venous insufficiency, where acrylate was used intravenously to seal the vein. She had a history of acrylate contact allergy confirmed via patch testing but had forgotten to inform vascular surgery of her known allergy before the procedure. Days later, a pruritic plaque appeared on her left medial thigh, followed by a widespread eruption of pruritic papules on the torso. ACD with secondary id reaction was suspected based on the history and findings. Symptoms were successfully managed with intramuscular kenalog, an oral steroid taper, antihistamines, and topical steroids.

### **Conclusions:**

Reports describe a range of presentations, most commonly localized eruptions following a vein's anatomical course, usually occurring within days after the procedures. Our case highlights an unusual case of acrylate-induced contact dermatitis from a VenaSeal™ procedure in a patient with a known acrylate allergy.

# Occupational Unilateral Linear Depigmentation of the Dorsal Webspaces in Spearfishers: A Cultural Marker of Occupational Prestige

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## Case Study

### **Background:**

Contact leukoderma, vitiligo, and other forms of depigmentation have been reported in the occupational setting, often with concomitant allergic contact dermatitis or chronic friction. Sling-style fishing spears, or 'Hawaiian slings' are used by fishermen in Baja California Sur, Mexico. Cultural markers of occupational prestige include work attire, clothing style, or physical attributes that are associated with high-status or certain occupations, signifying a professional standing to others without explicitly stating their job title.

### **Case Presentation:**

We report the cases of six spearfishers from Loreto, Baja California Sur, Mexico who developed linear depigmentation of the dorsal webspaces of their dominant hand. This well-circumscribed linear plaque correlated with placement of the rubber sling of their fishing spears. All spearfishers were male, Fitzpatrick skin type IV or V, aged 20-63 years, and had worked as spearfishers for 15-40 years. All reported that the pigmentation change started within 1 year of work and began with associated pain and occasional bleeding. None reported any pruritus. All denied any reactions to any other latex or synthetic rubber products. None of the spearfishers had attempted any form of treatment, as this linear depigmentation was a desired cultural physical marker of their occupation.

### **Conclusions:**

This case series highlights occupational linear dorsal hand depigmentation in a group of spearfishers. Clinicians should be aware of the possibility of pigmentation change in areas of high friction especially in occupational settings and in skin of color; these cases also highlight a physical marker of occupational prestige within communities of Baja California Sur.

# Artificial Intelligence in Contact Dermatitis: Current and Future Perspectives

**Authors and Affiliations:** Akriti Agrawal, MD, All India Institute of Medical Sciences, Bhopal

## Abstract

### **Objectives:**

The potential of Artificial Intelligence (AI) in contact dermatitis (CD) is an upcoming area of research. The aim was to perform a literature review of the existing evidence regarding the application of AI in CD to assess its current utility and future possibilities.

### **Methods:**

A comprehensive search was conducted from inception till 5th December 2024 in databases Pubmed, IEEE Xplore and ACM digital library. Keywords included 'Artificial intelligence', 'Machine learning', 'deep learning', 'Contact dermatitis', 'Patch test', 'irritant contact dermatitis' (ICD) and 'allergic contact dermatitis' (ACD). Inclusion criteria included all original studies examining the role of AI in CD.

### **Results:**

5678 articles were screened and 12 studies were included in the review. The most common AI algorithms used were Convolutional Neural Network, Multiple correspondence analysis and Principal Components Analysis. Six studies used image recognition for diagnosis of ACD from patch-test results with a diagnostic accuracy of 85- 99 % and one of them compared AI models with human reader performance with the former providing high discrimination and specificity. Two studies analysed biomarkers and gene signatures to distinguish ACD and ICD , one study predicted the risk of clinically relevant positive patch-tests using patient parameters while three studies assessed association between ACD and patient characteristics.

### **Conclusions:**

AI for the diagnosis of CD is an exciting area of research which can potentially be used in future for standardized patch-test readings, differentiation of subtypes and assessing important patient factors. However, there might be certain drawbacks including unrepresentative datasets and overfitting.

# The Secretion of Nickel and Cobalt by Coronary Artery Stents

**Authors and Affiliations:** Alecia M. Blaszcak, MD, PhD, Northwestern University; Sarah Rigali, BA, Northwestern University; Jon W. Lomasney, MD, Northwestern University; Walter Liszewski, MD, Northwestern University

## Abstract

### **Objectives:**

Objectives: Metal allergies including nickel and cobalt are commonly identified on patch testing with an estimated 5-15% of people having a cutaneous allergy to nickel and an estimated 1-2% having an allergy to cobalt. Metallic stents which are used for coronary artery stenosis are often comprised of nickel-containing stainless-steel alloys or cobalt-chromium alloys. Numerous studies have sought to examine the retrospective outcomes of patients with known metal allergies and coronary artery stents with meta-analyses demonstrating no difference in stent occlusion or mortality in individuals with or without a known metal allergy. Despite the growing body of evidence that coronary artery stents are safe in patients with metal allergies, there is still significant concern among patients and physicians. The objective of our study was to determine if used cardiac stents secrete nickel or cobalt ions.

### **Methods:**

Methods: Five stents were collected from four patients at time of cardiac explant or post-mortem examination. All stents had been in place for greater than eight years. Nickel and cobalt spot tests were used to assess for metallic ion secretion. The lumen, exterior, and lateral edges were tested for a total of ten sites on each stent for nickel and cobalt secretion.

### **Results:**

Results: Of the five stents tested, all were negative for nickel and cobalt ion secretion.

### **Conclusions:**

Conclusions: Cardiac stents do not secrete nickel or cobalt ions with real world use. This provides further evidence that cardiac stents resist corrosion and are likely safe in patients with known nickel and/or cobalt allergies.

# Dyshidrotic Eczema & Ixekizumab: Emerging Eczematous Eruptions During Anti-Interleukin 17 Treatment of Psoriasis

**Authors and Affiliations:** Ochanya Ogah, MD, UCSF Health St. Mary's Hospital; Uzoamaka Okoro, MD, MSc, Eisenhower Army Medical Center

## Case Study

### **Background:**

Psoriasis is a common cutaneous disorder affecting 0.1 to 3% of the population, driven by dysfunctional, T-cell-driven responses with subsequent cytokine imbalances (e.g., Th1 and IL-17).<sup>1-3</sup> We report a patient who developed severe dyshidrotic eczema while taking ixekizumab for psoriasis.

### **Case Presentation:**

A 53-year-old female with plaque psoriasis treated with ixekizumab presented with a one-month history of worsening pruritic blisters and swelling of the right 2nd and 3rd digits. The patient had no personal or family history of atopic dermatitis or eczema. Failed treatments included topical steroids, topical antihistamines, calcipotriene, methotrexate, phototherapy, and apremilast. Treatment with ixekizumab began ten months prior to presentation. Five months into treatment, the patient developed pruritic, excoriated papules and fluid-filled blisters affecting the dorsal and palmar surfaces of her right hand and was empirically treated for scabies. Examination of the patient's right hand showed edematous, erythematous 2nd and 3rd digits with fissures, excoriations, and coalescing vesiculobullous eruptions. Ixekizumab was discontinued and the patient transitioned to an IL-23 inhibitor (Skyrizi) and topical clobetasol 0.05% cream with gradual improvement.

### **Conclusions:**

Biologic treatment for psoriasis and dermatitis target various cytokines. Psoriasis biologics target various interleukins, including IL-12, 17, and 23. Treating the imbalance in the Th1/Th17 to Th2 response in psoriasis or dermatitis with biologics may cause a shift in cytokine levels, thus paradoxically favoring the opposing cutaneous disease. Treatment-emergent eczematous eruptions from IL-17 inhibitors warrant a standardized treatment approach. Effective management of adverse reactions is critical for patients whose psoriatic disease is optimally controlled with biologic agents.

# Rare Anaphylactic Reaction to Initial Intramuscular Triamcinolone Acetonide Administration

**Authors and Affiliations:** Amol Garg, Wake Forest University School of Medicine; Marc Gebara, Wake Forest School of Medicine; John Edminister, Wake Forest School of Medicine

## Case Study

### **Background:**

Immediate-type hypersensitivity to triamcinolone acetonide is exceedingly rare, with most documented cases involving repeated exposures. First-time administration leading to severe anaphylaxis is highly unusual. Given triamcinolone's frequent use in dermatologic and rheumatologic practice, this case study underscores the importance of early recognition and intervention.

### **Case Presentation:**

A 33-year-old male with hidradenitis suppurativa presented to the emergency department following intramuscular administration of 7 mg of triamcinolone for a flare. Within minutes, he developed angioedema of the lips and tongue, periorbital swelling, stridor, diffuse urticaria, confusion, and hypotension (initial systolic in the 70s mmHg). Prompt administration of three intramuscular epinephrine injections (0.3 mg each), intravenous diphenhydramine (50 mg), and high-flow oxygen via non-rebreather mask stabilized his condition. Over the subsequent hour, his mental status cleared (GCS 15), vital signs improved (blood pressure 103/60 mmHg), and airway edema resolved sufficiently for safe discharge after observation. He was prescribed an epinephrine auto-injector, famotidine, and diphenhydramine. Notably, this was his first exposure to triamcinolone, although he had known childhood allergies to penicillin and morphine. Follow-up dermatology evaluation the next day initiated allergist referral for further testing and alternative therapeutic strategies for his recalcitrant hidradenitis.

### **Conclusions:**

This case highlights a rare, severe IgE-mediated anaphylactic reaction to first-time intramuscular triamcinolone exposure. It underscores the need for clinicians to remain vigilant for anaphylaxis even with initial corticosteroid administration. Comprehensive allergy evaluation and preparedness to manage such anaphylaxis reactions are crucial. Further research is necessary to understand underlying immunologic mechanisms and to develop guidelines for prevention and management.

## Two Cases of Allergic Contact Dermatitis After Ablative Laser Procedure

**Authors and Affiliations:** Janet Choi, BS, Albert Einstein College of Medicine/Montefiore Medical Cent; Veronica Azmy, MD, Montefiore Einstein Medical Center; Kseniya Kobets, MD, MHS, Montefiore Einstein Medical Center

### Case Study

#### **Background:**

Ablative resurfacing lasers vaporize the epidermis and dermis to promote skin rejuvenation via collagen remodeling. Due to the disruption in the skin barrier, patients can become prone to allergic contact dermatitis (ACD) secondary to introduction of these ingredients deeper into the skin.

#### **Case Presentation:**

We present two cases of likely ACD to topical products after an ablative laser treatment. Patient 1 is a 38-year-old male presenting with pruritus and erythema of the face appearing four days post-fractional laser procedure and resulting in redness and delayed healing. He had been applying a cream with shea butter labeled hypoallergenic. After discontinuing the cream, the patient was treated with cetirizine 10 mg and betamethasone 0.1% ointment, resulting in significant improvement in redness and itching. Patient 2 is a 59-year-old female presenting with pruritus, erythema, cobblestone-like fissures and scaling of the face starting four days post-fully ablative laser treatment. The patient had been applying a chemical sunscreen containing avobenzone to her face. After discontinuing the sunscreen, she was treated with doxycycline 100 mg, terbinafine 250 mg and a topical nystatin/mupirocin/clobetasol ointment. At her 3-week follow-up, the rash had improved significantly and eventually resolved. The patients were recommended to undergo confirmational allergy testing.

#### **Conclusions:**

These cases represent instances of probable ACD from allergens in topical products, presenting as prolonged redness and delayed healing after an ablative laser treatment. In patients undergoing laser procedures, it is important to restrict the use of topical agents, even those labeled hypoallergenic, to bland emollients due to increased sensitivity of the skin.

# Titanium Implant Hypersensitivity with Associated Systemic Symptoms

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## Case Study

### **Background:**

While titanium is generally considered hypoallergenic, titanium implant hypersensitivity is increasingly being recognized as a source of allergic contact dermatitis. Metal allergies have been implicated in the development of autoimmunity through endocrine and immune pathways. We report a case of suspected titanium hypersensitivity with systemic symptoms due to a titanium-based implant.

### **Case Presentation:**

A 58-year-old female with history of obstetrical antiphospholipid syndrome presented with diffuse pruritic rash, localized dermatitis over the right hip, arthralgias, and fatigue. Symptoms began two weeks following open reduction and internal fixation (ORIF) of the right hip using a titanium gamma-nail. Patch testing identified 1+ hypersensitivity to titanium (IV) oxalate hydrate. Rheumatology evaluation revealed newly positive ANA (1:1280), beta-2 glycoprotein IgM, anti-cardiolipin antibodies, and lupus anticoagulant. She was placed on prednisone and hydroxychloroquine; however, repeat serologies became negative and treatment was discontinued. Due to ongoing symptoms, the patient underwent ORIF revision with a stainless-steel system eight months later. During the procedure, nonviable tissue surrounding the implant was debrided but cultures are negative to date. According to published criteria, the patient fulfills 3 of 4 major and 4 of 6 minor diagnostic criteria for a hypersensitivity reaction to metal implants. Further follow-up is ongoing to monitor for improvement after explantation.

### **Conclusions:**

We present an interesting case of likely titanium allergy with associated systemic manifestations after metal orthopedic implant necessitating explantation. The etiology was determined to be hypersensitivity to titanium, supported by eruption overlying the metal implant, positive patch test reaction, and chronic dermatitis beginning after implantation.

# Chronic Allergic Contact Dermatitis of Mastectomy Wound due to Alkyl Glucoside Found in Medihoney Gel

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## Case Study

### **Background:**

Medihoney is a sterile Manuka-honey product licensed for wound care and has minimal adverse effects. We report a case of chronic and severe allergic contact dermatitis (ACD) due to Medihoney gel and an alkyl glucoside allergy.

### **Case Presentation:**

A 70-year-old female with history of invasive ductal carcinoma of the right breast and a chronic right chest wound presented with a 4-month history of a burning rash on her trunk. Several months after the wound developed, a surrounding rash appeared and eventually spread to her abdomen and back, developing intense pruritus and intermittent blisters. On examination, there was a depressed ulceration at the right chest, with surrounding dark red papules coalescing into plaques with overlying scale, primarily on the right chest, flank, and abdomen, with extension to the left submammary fold and back. Biopsy showed psoriasiform epidermal hyperplasia with spongiosis and eosinophils. Clobetasol ointment resulted in substantial improvement, however she experienced recurrent flares. Patch testing revealed a +1 positive reaction to both decyl glucoside 5% and lauryl glycoside 3%. Upon further investigation, the US patent for Medihoney Gel denotes the use of capryl glucoside. Discontinuation of this gel product led to an abrupt cessation of symptoms and rash improvement, and the patient continued to use alternative Medihoney formulations without issue.

### **Conclusions:**

To our knowledge, there is only one other report of ACD to Medihoney, which also occurred with use of the gel formulation on a post-surgical site. Clinicians should be aware that there are several formulations of Manuka-honey products which may contain allergenic ingredients.

# Evaluating Titanium Allergy in Dermatology: Diagnostic Methods, Challenges, and Treatment Options

**Authors and Affiliations:** T. Austin Black, BS, McGovern Medical School; Noel Yang, McGovern Medical School; Megan Rogge, MD, UTHealth Houston McGovern Medical School

## Abstract

### **Objectives:**

Titanium allergy is a rare hypersensitivity reaction, with an estimated incidence of 0.6%, though recent studies suggest this may be overestimated. This study aims to review clinical and systemic manifestations, diagnostic challenges, and treatment options for titanium hypersensitivity, with a focus on the role of dermatologists in diagnosis through epicutaneous patch testing.

### **Methods:**

A literature review conducted in September 2024 examined titanium allergy, including local (e.g., dermatitis) and systemic symptoms (e.g., chronic fatigue, neurological issues, etc.). Diagnostic approaches, particularly patch testing, MELISA, and lymphocyte transformation tests (LTT), were evaluated, with emphasis on the reliability of epicutaneous patch testing in a dermatological setting. The limitations of these diagnostic approaches and their clinical relevance were also analyzed.

### **Results:**

Patch testing remains the gold standard for diagnosing titanium allergy but is often compromised by challenges such as titanium's instability and contamination with metal impurities, which affect test sensitivity. False-negative results are common due to poor epidermal penetration of titanium dioxide. MELISA, while more specific, is limited by frequent false positives. Co-allergies with other metals, found in 60% of patients, further complicate diagnosis. Symptom management typically involves corticosteroids and antihistamines, though titanium implant removal is often necessary for complete resolution in cases of severe allergy. Non-titanium materials, such as zirconium dioxide and stainless steel, are effective alternatives for allergic patients.

### **Conclusions:**

Dermatologists play a crucial role in diagnosing titanium allergies through epicutaneous patch testing; however, limitations in testing underscore the need for improved diagnostic methods to enhance patient outcomes.

# Exploring the Allergic Potential of Bone Cement: A Review of Clinical Manifestations, Diagnosis, and the Role of Dermatologists in Patch Testing

**Authors and Affiliations:** T. Austin Black, BS, McGovern Medical School; Annabel Shen, McGovern Medical School; Megan Rogge, MD, UTHealth Houston McGovern Medical School

## Abstract

### **Objectives:**

Bone cement is commonly used in orthopedic procedures, yet its allergic potential has rarely been explored. This study reviews clinical manifestations, diagnostic challenges, and treatment options for bone cement hypersensitivity, focusing on dermatologists' role in diagnosis through patch testing.

### **Methods:**

A literature review conducted in September 2024 examined allergic reactions to bone cement constituents, including polymethylmethacrylate (PMMA), N,N-dimethylparatoluidine (N,N-DMT), gentamicin sulfate, benzoyl peroxide (BPO), and other related compounds. Case reports and studies on implant allergies and aseptic loosening were reviewed with an evaluation of diagnostic strategies, particularly patch testing.

### **Results:**

In a study of 250 patients with suspected implant allergies post-cemented arthroplasty, 19.6% reacted to bone cement components via patch testing, with gentamicin sulfate (10%) and BPO (9%) as the most common triggers. A smaller study identified sensitization to N,N-DMT in patients with rapid aseptic loosening. Patch testing remains the gold standard for diagnosis as other modalities are relatively sparse. Diagnosis is often confounded by nonspecific symptoms, including dermatitis, pain, and implant loosening, which are difficult to differentiate from other postoperative complications. Management typically involves avoiding the offending compounds, such as switching to gentamicin-free cement or cementless implants. Topical corticosteroids may be used for allergic contact dermatitis. Studies showed that 60% of patients who underwent revision surgeries with non-cemented implants or gentamicin-free cement achieved symptom resolution.

### **Conclusions:**

Dermatologists play a critical role in diagnosing bone cement allergies through patch testing. While it remains the gold standard, further research is necessary to enhance diagnostic sensitivity and refine treatment options.

# Nemolizumab as a Novel Therapeutic for Pruritus Control Prior to Patch Testing: A Review of Patch Testing on Systemic Modulatory Agents

**Authors and Affiliations:** Eryn Patin, BS, The University of Texas Southwestern; Emi Murase, University of California, Davis; Arianne S. Kourosh, MD, MPH, Harvard Medical School; Jenny E. Murase, MD, University of California San Francisco

## Abstract

### **Objectives:**

Patch testing (PT) is integral in the diagnosis and management of allergic contact dermatitis (ACD), which often coexists with other forms of dermatitis. Consequently, systemic immunomodulators (SI) may be indicated prior to PT, yet their effects on PT results remain unclear.[1] We aim to summarize the current literature on the use of SI during PT, and introduce a novel treatment option.

### **Methods:**

A literature review was conducted using PubMed to identify the effects of SI on PT. Data from 20 patients on nemolizumab for dermatitis-related pruritus was collected for review.

### **Results:**

Our review revealed that while effective, prednisone should be discontinued or reduced to <u></u> 10mg and intramuscular triamcinolone held <u></u> 30 days before PT, as they may interfere with results.[1] JAK1 inhibitors may induce false-negative PT results and mycophenolate mofetil can impair PT readings via dose-dependent inhibition, warranting caution with use.[2,3,4] Our preliminary nemolizumab data identified a <u></u> 4-point improvement in the Numerical Rating Scale (NRS) among all patients within one month of treatment, with 8 patients (40%) reporting complete resolution of symptoms.

### **Conclusions:**

Our results highlight the current lack of pruritus treatments for difficult-to-manage dermatitis that also preserve the validity of PT results. Furthermore, our preliminary results suggest that nemolizumab, a monoclonal antibody targeting the IL-31 receptor (IL-31R), shows promise in managing dermatitis-related pruritus.[5] Given the absence of IL-31R on Th2 lymphocytes, it can be inferred that nemolizumab may serve as a novel agent for managing pruritus in patients prior to PT with likely negligible effects on results.[6]

# Occupational Allergic Contact Dermatitis in Manicurists: A Systematic Review

**Authors and Affiliations:** Nicholas Belair, BS, Oakland University William Beaumont School of Medicine; Holly A. Kerr, MD, Henry Ford Health

## Abstract

### **Objectives:**

Acrylates are a prevalent cause of allergic contact dermatitis (ACD) in both non-occupational and occupational settings. This is particularly evident in the artificial nail practice, where consumers and manicurists face increased sensitization risks. A focused analysis on occupational ACD among manicurists is needed to identify industry trends and exposure risks. This study systematically reviews documented cases of occupational ACD in manicurists.

### **Methods:**

A literature search was conducted in PubMed, Embase, and Scopus using appropriate MESH terms and keywords. 272 studies were identified, with 14 included for data analysis. Case studies that included individualized demographic data and patch testing results were included. Studies that did not focus specifically on professional manicurists or lacked patient data were excluded.

### **Results:**

From the 272 studies, 14 articles detailing 17 patients were analyzed. A total of 100 positive patch tests were documented between all patients. Hydroxymethyl methacrylate (100% of patients), ethylene glycol dimethacrylate (76%), and hydroxypropyl methacrylate (41%) were the most common. Two patients left the profession due to ACD, allergen avoidance was advised for all, and specialty gloves recommended for four.

### **Conclusions:**

This study highlights the risk of occupational ACD in manicurists, primarily from acrylates like hydroxymethyl methacrylate and ethylene glycol. The findings emphasize the need for improved safety protocols, including the use of specialty gloves, to reduce workplace allergen exposure. Standardizing nail product ingredient labels is crucial for allergen avoidance. Given that patients left the profession due to ACD, proactive measures are essential to protect workers and address the rise of occupational ACD in this industry.

# **Intraoral Series Patch Testing and Metal Dental Hardware in the Setting of Oral Lichen Planus: A 13-Year Retrospective Review**

**Authors and Affiliations:** Seneca D. Hutson, MD, Mayo Clinic - Rochester; Molly J. Youssef, MD, Mayo Clinic - Rochester

## **Abstract**

### ***Objectives:***

This study investigated the presence of metal dental hardware (including implants, filling, or other metal restorations/devices) in patients diagnosed with oral lichen planus (OLP) who underwent the intraoral complete patch testing series, and whether patch testing results impacted subsequent oral hardware management.

### ***Methods:***

An IRB-exempt retrospective review was conducted from 2009 - 2022 of adult patients at a large academic center with an ICD-10 code for OLP who underwent intraoral complete series patch testing with at least one relevant positive to a metal in this series. Review identified 53 patients meeting inclusion criteria.

### ***Results:***

Of the 53 patients with history of OLP who underwent intraoral patch testing, 36 (67.9%) had metal dental hardware present. Of the 36 patients with metal dental hardware, 17 (47.2%) had them removed following patch testing and 5 (13.9%) did not. Of the 17 patients who had their dental hardware removed, 12 (71%) reported subsequent improvement in oral symptoms, and only 1 (5.9%) reported lack of improvement; the remaining 4 patients (23.6%) did not have chart-documented follow-up of symptom evolution following hardware removal. Of note, 14 (38.8%) of the 36 patients with metal dental hardware did not have chart-documented record of how their hardware was managed following patch testing.

### ***Conclusions:***

These results suggest that removal of dental hardware may be impactful in improving oral symptoms associated with OLP in patients with at least one relevant metal positive in the intraoral series. Limitations of this study include limited patient follow-up and limited knowledge of hardware duration relative to symptom onset.

# **Sacuda Syndrome / Systemic Allergic Contact Urticaria, Dermatitis, Angioedema and Anaphylaxis: Report of a Patient with Combined Immediate (I) and Delayed -Type (IV) Hypersensitivity to Contact Triggers**

**Authors and Affiliations:** Pamela K. Weinfeld, MD, Dermatology and Skin Care Associates, PC/ NWH Hospital

## **Case Study**

### **Background:**

Various forms of systemic contact dermatitis are recognized. We present a case of severe combined Type I and IV reactions, naming it SACUDA syndrome.

### **Case Presentation:**

A 14 year old female developed urticaria, abdominal pain, and diarrhea to food triggers. History was significant for contact dermatitis to baby wipes, earrings; urticaria to red drinks. Family history included chronic urticaria and contact dermatitis. RAST and skin prick testing were non-contributory. Almond challenge triggered hives, cough, abdominal pain, and diarrhea. Patch testing to NAC80, bakery series demonstrated immediate reaction to cinnamic aldehyde, 3+ nickel, cobalt, balsam of Peru, and 1+ or 2+ Fragrance II, limonene, linalool, potassium dichromate. Nut reactions were attributed to systemic nickel allergy, and dietary avoidance helped. Subsequent exposure to cinnamon oil diffusers and fragrances resulted in escalating symptoms including headache; facial, lip, and throat swelling; urticaria; dermatitis; and shortness of breath requiring epi-pen. Workup revealed increased MMP-1; decreased IgG3, IgA; normal tryptase; MTFHR heterozygosity. Antihistamines were insufficient. Treatment with omalizumab 600mg q2weeks and dupilumab 300mg qweek improved anaphylaxis and allowed normalization of diet but did not resolve symptoms. Dapsone, upadacitinib, mycophenolate, and cyclosporine were unhelpful. At age 15, she opted for virtual schooling, with improvement. Tezepelumab helped modestly. Hydroxychloroquine was added recently.

### **Conclusions:**

Antihistamines were insufficient. Treatment with omalizumab 600mg q2weeks and dupilumab 300mg qweek improved anaphylaxis and allowed normalization of diet but did not resolve symptoms. At age 15, she opted for virtual schooling, with improvement. Dapsone, upadacitinib, mycophenolate, plaquenil, and cyclosporine were unhelpful. Adding tezepelumab-ekko monthly produced significant improvement.

### **Acknowledgements:**

Thanks to: Dr. Amber Atwater for mentorship/editing, Dr. Pamela Scheinman for patch testing, and clinical advisors Drs. Rebecca Saff, Brian Kim, Deon Wolpowitz, Jiade (Jeff) Yu, Andrew MacGinnitie, Sarbjit Saini, and Keith Choate.

# Footwear Fallout: Leather Sandals Trigger a Full-Body Rash

**Authors and Affiliations:** Jonathan Banta, MD, San Antonio Uniformed Services Health Education Consortium; Kevin Puri, DO, United States Air Force

## Case Study

### **Background:**

We report a unique case showcasing allergic contact dermatitis with id reaction and the critical role of history, physical examination, and patch testing in achieving accurate diagnosis and successful treatment.

### **Case Presentation:**

A 34-year-old male presented to dermatology with a complaint of a rash that started on his feet and spread to his torso and extremities. Symptoms first presented as a blistering rash on his feet that in the shape of his leather sandal straps after wearing his sandals immediately after swimming in a chlorinated pool. Physical examination revealed a well-defined red rash with crust and peeling on his dorsal feet, itchy red patches on his thighs, elbows, wrists, hands, and flanks, and small blistering papules on his fingers. The differential diagnosis included allergic contact dermatitis with id reaction, irritant contact dermatitis, dyshidrotic eczema, vesiculobullous tinea pedis, and epidermolysis bullosa. Based upon the location of initial eruption on dorsal feet with subsequent full body pruritic eruption, allergic contact dermatitis with id reaction was favored and the patient was started on a 4-week prednisone taper (1 mg/kg) with complete resolution. The patient subsequently underwent TRUE patch testing which confirmed allergies to nickel sulfate (1+), colophony (2+), thimerosal (3+), and disperse blue (2+). The patient was provided detailed lists of products to avoid and instructed to follow up as needed.

### **Conclusions:**

This case underscores the value of combining clinical insight with diagnostic testing in identifying and managing ACD effectively and emphasizes the need for heightened clinical awareness of uncommon allergens.

### **Acknowledgements:**

The opinions offered are those of the authors and do not represent the official position of the US Air Force or the Department of Defense

# Comorbidity Associations in Pediatric Allergic Contact Dermatitis

**Authors and Affiliations:** Haig Pakhchanian, MD, Thomas Jefferson University Department of Dermatology; Patrick Sockler, MD, University of Pennsylvania; Rahul Raiker, MD, GWU School of Medicine; Andrew Parrish, MD, Community Medical Center RWJBH

## Abstract

### **Objectives:**

Allergic Contact Dermatitis (ACD) is a common skin condition in children, triggered by immune reactions to environmental allergens. Despite its impact on quality of life, its relationship with comorbidities in pediatric patients is poorly understood. This study explores the prevalence and patterns of comorbid conditions in children with ACD to inform clinical care and prevention.

### **Methods:**

A cross-sectional study used the TriNetX (Cambridge, MA) database, comprising over 110 million electronic medical records from around 103 healthcare organizations. Data from January 2006 to December 2024 were analyzed. Pediatric patients ( $\leq 17$  years) with ACD were identified using ICD-10 codes and compared to those without contact dermatitis (CD). Comorbidity associations were evaluated using odds ratios with 95% confidence intervals (OR[95% CI]).

### **Results:**

Among 17,076,720 children in the database, 0.54% had ACD. The mean age of ACD patients was 11 years, with 54.0% being male. Of the cohort, 13.4% were Black, 49.7% White, and 54.3% Hispanic. A total of 93,051 pediatric ACD patients were compared to 16,983,669 without CD. ACD was significantly associated with obesity (1.432[1.352,1.515]), acne vulgaris (3.385[3.06,3.744]), atopic dermatitis (4.052[3.919,4.19]), ADHD (1.093[1.023,1.169]), psoriasis (3.04[2.408,3.838]), seborrheic dermatitis (1.313[1.211,1.423]), secondary bacterial skin infections (6.25[5.834,6.697]), dermatophytosis (2.96[2.699,3.246]), and secondary viral skin infections (1.463[1.39,1.54]).

### **Conclusions:**

These findings underscore the significant comorbidity burden in pediatric ACD, highlighting the need for comprehensive care strategies to address dermatologic and systemic health concerns. Study limitations include potential coding inaccuracies and the inability to assess disease severity.

# **Extended vs Screening Series for Contact Allergy: A Retrospective Chart Review from Vancouver, British Columbia, Canada from 2022 - 2024**

**Authors and Affiliations:** Kylie Peake, University of British Columbia; Harman Toor, MD, University of British Columbia; Gillian de Gannes, MD, University of British Columbia

## **Abstract**

### ***Objectives:***

In British Columbia, the ACDS80 is utilized as a screening series for patients being tested for contact allergy (CA). Patients with CA may also undergo patch testing to extended series as indicated based on clinical context. The purpose of this study is to identify the current common allergens for patients in Vancouver, BC from the ACDS80 screening series as well as extended series.

### ***Methods:***

Retrospective chart review from October 2022 to 2024 of all patients who attended the Contact Dermatitis Clinic at St. Paul's Hospital and underwent patch testing to either the ACDS80, extended series, personal products, or a combination of these.

### ***Results:***

569 patients were included, 427 (75%) were female and the mean age was 47. 382 patients tested to the ACDS80 had a positive patch test result to at least one allergen (74.8%) and 185 patients tested to the extended series had at least one positive test result (50.7%). The most common allergen identified in the ACDS80 series was nickel sulfate (13.0%) and the most common allergen in the extended series was gold sodium thiosulfate (11.7%). Of the patients tested to extended series, the cosmetic series was the most common to be positive (41.6%).

### ***Conclusions:***

In our centre, over 30% of patients had at least 1 positive patch test reaction on an extended series, which would have been missed if only the ACDS screening series was tested.

### ***Acknowledgements:***

St. Paul's Hospital, the UBC Department of Dermatology and Skin Science, UBC Faculty of Medicine, Sanofi Genzyme, and Actelion.

# Impact of Anxiety on Patch Testing Results for Allergic Contact Dermatitis

**Authors and Affiliations:** Jared M. Boetes, BS, Perelman School of Medicine, University of Pennsylvania; Sarah K. Zemlok, BA, University of Connecticut; Kyle Polen, BS, University of Pennsylvania; Mykayla Sandler, BA, Harvard Medical School; JiaDe Yu, MD, MS, Massachusetts General Hospital, Harvard Medical School

## Abstract

### **Objectives:**

While patch testing remains the gold standard for diagnosis of allergic contact dermatitis (ACD), the reliability and reproducibility of patch testing results have been questioned in the literature. Anxiety is known to be associated with systemic inflammation and has been shown to increase the incidence of positive reactions in skin prick testing; however, the effect of anxiety on patch testing results has not been studied. This study aimed to investigate the impact of anxiety on patch testing results.

### **Methods:**

Adult subjects (n = 35) presenting to an outpatient patch testing dermatology clinic completed two questionnaires on the day of patch placement: the State-Trait Anxiety Inventory (STAI-S) and the Generalized Anxiety Disorder-7 (GAD-7). All participants completed patch testing with the NACDG 80 series. Patches were removed after 48 hours, and a final reading was performed after 120 hours.

### **Results:**

No meaningful correlations were found between the incidence of all positive reactions (+/-, +, ++, and +++) and participants' STAI-S scores (Pearson's  $r = -0.036$ ) or GAD-7 scores (Pearson's  $r = 0.1$ ). Weak negative correlations were identified between the incidence of strong positive reactions (++ and +++) and participants' STAI-S scores (Pearson's  $r = -0.2$ ) and GAD-7 scores (Pearson's  $r = -0.2$ ).

### **Conclusions:**

The results of this study suggest that anxiety does not have an impact on patch testing results for patients with suspected ACD. Future studies would benefit from having a larger sample size and greater gender and racial diversity within the study population.

# Race and Dupilumab Response in Children with Atopic Dermatitis: An Analysis of Real-World Data

**Authors and Affiliations:** Jared M. Boetes, BS, Perelman School of Medicine, University of Pennsylvania; Sarah K. Zemlok, BA, University of Connecticut; Kyle Polen, BS, University of Pennsylvania; Ether Dharmesh, BS, University of Pennsylvania; JiaDe Yu, MD, MS, Massachusetts General Hospital, Harvard Medical School

## Abstract

### **Objectives:**

Atopic dermatitis (AD) phenotypes are known to vary across racial and ethnic groups due to genetic, environmental, and socioeconomic factors. While current data show that dupilumab is an effective pediatric AD treatment regardless of race or ethnicity, data on the level of clinical improvement across racial or ethnic groups are limited. Further delineation of patient outcomes would enhance therapeutic decision-making for pediatric cohorts who may exhibit distinct AD phenotypes and have limited treatment options. This retrospective cohort study aimed to investigate whether the degree of response to dupilumab differs by race and ethnicity in children with AD.

### **Methods:**

Electronic medical records of 236 children on dupilumab seen at an academic medical center in Boston, MA between January 2017 and October 2024 were reviewed. Inclusion criteria included AD diagnosis, dupilumab prescription, self-reported race and ethnicity data, and adequate follow-up records. Degree of response was determined by systematic evaluation of physicians' assessments. Racial and ethnic groups included White Hispanic, Non-White Hispanic, Black Non-Hispanic, Asian Non-Hispanic, and White Non-Hispanic.

### **Results:**

No statistically significant association between the racial and ethnic groups and the degree of dupilumab response was identified ( $p = 0.07$ ). Broader comparison of White versus Non-White children also did not yield a statistically significant association ( $p = 0.7$ ).

### **Conclusions:**

The results of this study suggest that race and ethnicity do not impact response to dupilumab for pediatric patients with AD. Variability in provider assessments is a potential limitation of this study.

# Identification of N-Cyclohexylthio Phthalimide-Free Gloves for ACD Patients

**Authors and Affiliations:** Mihir M. Shah, BA, Stanford University School of Medicine; Ben L. Schwartz, Stanford School of Medicine; Golara Honari, MD, Stanford Department of Dermatology; Jennifer K. Chen, MD, Stanford Department of Dermatology

## Case Study

### **Background:**

N-cyclohexylthio phthalimide (CTP) is a vulcanization retarder used in the rubber industry. Positive patch tests have been reported to CTP, with rubber gloves being the most commonly suspected source of sensitization. The proprietary nature of glove formulations has made it challenging to identify CTP-free gloves for patients with suspected allergic contact dermatitis (ACD) to this agent.

### **Case Presentation:**

A 43-year-old surgeon presented with a long-standing history of intermittent hand dermatitis. Over six months, the dermatitis had significantly worsened, spreading to the wrists, forearms, antecubital fossae, and eyelids. The patient reported intense itching, painful fissures, and skin breakdown. Patch testing at 96 hours was significant for 1+ reactions to CTP, as well as Balsam of Peru, benzyl alcohol, nickel sulfate, and hydroperoxides of linalool. All except nickel were thought to be clinically relevant. We contacted seven glove manufacturers to identify CTP-free gloves. Three manufacturers (Medline, Showa, and SmartPractice) responded. We provide here a list of manufacturer-reported CTP-free gloves. After 3 months of allergen avoidance, the patient reported clearance of his dermatitis.

### **Conclusions:**

CTP is a lesser-known allergen that may cause sensitization to rubber gloves. Here, we report several potential safe alternative gloves that may be helpful to clinicians in the management of patients with suspected ACD to CTP. Simultaneously, this case highlights the need for collaboration between clinicians and manufacturers to ensure identification of safe products for patients with suspected ACD to gloves.

### **Acknowledgements:**

We thank Medline, Showa, and SmartPractice for providing CTP-free options.

# Demographic and Regional Disparities in Patch Testing Utilization Among Dermatitis Patients: A Cross-Sectional Study Using the Epic Cosmos Database

**Authors and Affiliations:** Mihir M. Shah, BA, Stanford University School of Medicine; Jennifer K. Chen, MD, Stanford Department of Dermatology; Golar Honari, MD, Stanford Department of Dermatology

## Abstract

### **Objectives:**

This study aimed to assess disparities in patch testing utilization among dermatitis patients. We hypothesized that patch testing rates would vary significantly across racial, gender, ethnic, age, insurance, and regional groups, with some facing lower access to testing.

### **Methods:**

A cross-sectional study was conducted using the Epic Cosmos database. Patients diagnosed with dermatitis between January 1, 2021, and December 31, 2023, were identified using ICD-10 codes. We identified dermatitis patients who received patch testing using Current Procedural Terminology code 95044. Comparisons of patch testing rates were made across demographic groups, insurance types, and U.S. Census regions.

### **Results:**

Of 5,940,211 patients with a clinical diagnosis of dermatitis, 33,102 (0.56%) underwent patch testing. Black patients had the lowest rate (0.34%), compared to White (0.62%), Asian (0.68%), and Other racial groups (0.47%). Males had lower patch testing rates than females (0.32% vs. 0.73%). Hispanic patients had lower rates than non-Hispanic patients (0.35% vs. 0.59%). Insurance type influenced rates, with Medicaid at 0.33%, Medicare at 0.69%, Miscellaneous/Other at 0.61%, and Self-Pay at 0.40%. Younger patients (<19 years) had the lowest rate (0.15%), while those aged 19-44 had the highest (0.75%). Regionally, the West had the highest rate (0.89%) and the South the lowest (0.41%).

### **Conclusions:**

In general access to patch testing is limited and significant variation across demographic, insurance, and regional groups, highlights disparities in access to care. Limitations include the inability to index based on new diagnoses, potential classification bias, and patients possibly selecting multiple races or insurance types.

### **Acknowledgements:**

We thank Epic Cosmos for dataset access.

# Not Just Pink Eye: Allergic Contact Dermatitis to Alcaftadine 0.25% Ophthalmic Solution

**Authors and Affiliations:** Mayra A. Betancourt Ponce, BS, University of Wisconsin School of Medicine and Public Health; Margo Reeder, MD, University of Wisconsin

## Case Study

### **Background:**

Periorbital dermatitis is a common skin condition that can be caused by allergic contact dermatitis (ACD). It is characterized by erythematous eruptions in the eyelids with associated symptoms, such as edema and pruritus. Common causative allergens include metals, preservatives, and fragrances and sources include cosmetics, skincare, and nail products. Eyedrops can also trigger ACD. We present three cases of periorbital dermatitis from an unexpected source: alcaftadine 0.25% eyedrops.

### **Case Presentation:**

Three different patients presented to our clinic with a history of recurrent periorbital dermatitis. All patients were using alcaftadine 0.25% drops (Lastacaft™) and other ophthalmic products. Patch testing was conducted and included the North American Contact Dermatitis Group (NACDG) screening series, an expanded cosmetic series, and custom patches to the patients' eye drops 'as is.' All three patients tested positive to alcaftadine 0.25% solution and negative to solution excipients like benzalkonium chloride at 96-120 hour delayed readings. Of the two patients for whom clinical follow up was available, both showed improvement with discontinuation of alcaftadine drops.

### **Conclusions:**

While ACD to ophthalmic solutions is well-documented, only one prior case of ACD to alcaftadine 0.25% solution had been reported. This case series highlights the importance of considering ophthalmic products as potential triggers in periorbital dermatitis, especially when common allergens have been ruled out. Custom patch testing to patients' ophthalmic products can help identify novel allergens, such as alcaftadine, that are not included in a standard series and would otherwise be missed as an important cause of ACD.

# Allergic Contact Cheilitis in Singapore: A Single-Centre Retrospective Study of Patch Test Data from 2004 to 2021

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## Abstract

### **Objectives:**

Cheilitis may result from exogenous irritants, allergens, endogenous factors, or remain idiopathic. Identifying causative allergens is essential for effective management. Our study aims to determine the prevalence and common allergens associated with allergic contact cheilitis in patients with cheilitis in Singapore.

### **Methods:**

A retrospective analysis of patch test results was conducted for cheilitis patients at our tertiary centre from 2004 to 2021. Patients underwent testing with the standard and lip allergen series, with readings recorded on days 3 and 7. Descriptive statistical analysis was performed.

### **Results:**

Among 10,954 patients referred to our contact clinic, 509 (4.6%) presented with lip involvement. The mean age was 34.6 ± 13.6 years; 421 (82.7%) were female, and 449 (88.2%) were Chinese. 218 (42.8%) had a history of atopy. 429 (84.3%) patients had patch test data recorded, of which 195 had one or more positive reactions. 414 underwent testing to the standard series and 362 underwent testing to the lip series. Among the standard series, the highest prevalence of contact allergy was to Nickel (117 of 420, 27.9%), Fragrance Mix 1 (17 of 278, 6.1%), and *Myroxylon pereirae* (19 of 414, 4.6%). Among the lip series, the highest prevalence of contact allergy was to Shellac (2 of 35, 5.7%), Modified colophonium (2 of 37, 5.4%), Propolis and Tocopherol (1 of 35, 2.9% each). 89 reactions were deemed of past or present relevance.

### **Conclusions:**

Allergic contact cheilitis is prevalent among cheilitis patients. Patch testing with comprehensive allergen series, including targeted lip series, is essential for accurate diagnosis and management.

# A Diagnostically Challenging Case of Systemic Allergic Contact Dermatitis to Sodium Metabisulfite

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## Case Study

### **Background:**

Delayed hypersensitivity reactions to sodium metabisulfite (SMBS) are increasingly recognized. A recent retrospective study demonstrated 132 (2.7%) of 4885 patch-tested patients had positive reactions to SMBS.<sup>1</sup> Non-occupational exposures to SMBS include a variety of topical medications and local anesthetics.

### **Case Presentation:**

A 72-year-old male with a history of mild atopic dermatitis, drug-induced hypersensitivity syndrome (DIHS) presumed due to piperacillin-tazobactam or cefazolin, and morbilliform drug eruption to oral fluconazole, presented with a pruritic full body rash two days after a hernia repair. Exam was notable for widespread, confluent pink papules. The patient was febrile and tachycardic. Labs demonstrated lactic acidosis (2.5 mmol/L), elevated creatinine (1.9 mg/dL), and neutrophil-predominant leukocytosis (28,000 cells/ $\mu$ L), which normalized following fluid resuscitation. A sepsis workup was negative. DIHS or acute generalized exanthematous pustulosis (AGEP) to vancomycin was suspected; however, the RegiSCAR score<sup>2</sup> was 0 and there was no definitive pustulosis. Widespread allergic or irritant contact dermatitis to chlorhexidine was also considered. Treatment with topical mid-to-low potency topical corticosteroids resulted in near resolution of the rash at one-week follow-up. Patch testing to the ACDS Core Allergen series, an institutional cosmetic series, SMBS, vancomycin, and ChlorPrep demonstrated a strong reaction to SMBS, which was a preservative in the bupivacaine administered during hernia surgery. No additional relevant reactions were noted.

### **Conclusions:**

Systemic allergic contact dermatitis to SMBS is uncommon and may present a diagnostic challenge in patients with multiple exposures or prior drug reactions. Prompt recognition and distinction from other drug hypersensitivity reactions are important for management and risk stratification.

# Identifying Common Allergens Implicated in Infantile Allergic Contact Dermatitis: A Scoping Review

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## Abstract

### **Objectives:**

Few studies have focused on allergic contact dermatitis in infants 0-2 years of age. Thus, there is limited information to guide clinicians caring for the youngest patients with ACD. Our review aims to report the most common allergens reported in infants.

### **Methods:**

The Ovid MEDLINE database was queried, and articles meeting inclusion criteria were imported into Covidence™. Inclusion criteria were primary studies written in English that confirmed a diagnosis of ACD by patch testing in infants 0-2 years of age. The reviewers resolved any discrepancies in screening.

### **Results:**

A total of 618 articles were screened, and 32 studies met inclusion criteria for full-text data extraction, comprising 41 total patient cases. The most commonly identified allergens were metals (n=12) including nickel (n=9) and aluminum (n=3). The second most common allergens were associated with diaper components (n=7), including mercapto-containing elastic borders (n=2), cyclohexyl thiophthalimide-containing elastic borders (n=1), and Pampers Drymax® diapers (n=4). The third most commonly reported type of allergen was beta-blocker therapies used in hemangioma management (n=5). Case studies also reported allergens of ECG electrode adhesive materials (n=2), chlorhexidine (n=2), octocrylene and parasol-containing sunscreens (n=2), and fragrance mixes (n=2). There were single reports of parabens, silicone, sorbic acid, isoeugenol, isobornyl acrylate, and PTBC (4-tert-butylcatechol).

### **Conclusions:**

Our preliminary data highlights allergens contributing to ACD in infants. Limitations include reliance on existing literature and case reports, variability in testing methodologies, and exclusion of non-English sources, which may introduce bias. Dedicated prospective data collection on this age group is essential.

# The Association Between Allergic Contact Dermatitis and Chemical Leukoderma: A Review of Trends in Allergens and Therapeutic Management

**Authors and Affiliations:** Emily Lee, BA, Sidney Kimmel Medical College at Thomas Jefferson University; Anthony A. Gaspari, MD, Thomas Jefferson University

## Abstract

### **Objectives:**

Chemical leukoderma (CL) is an acquired hypopigmentation disease caused by repeated exposure to melanocytotoxic chemicals and can occur in the presence or absence of allergic contact dermatitis (ACD). Lesions are clinically and histologically indistinguishable from vitiligo and can have detrimental psychosocial effects on patients, especially those with skin of color. We sought to identify the association between ACD and CL.

### **Methods:**

A literature search was conducted on PubMed using experimental studies, clinical trials, review articles, and case reports/series related to CL, acquired vitiligo, and contact dermatitis-induced CL. Case reports from 2010 onwards were utilized. Representative cases are presented.

### **Results:**

CL can occur after repeated exposures to a xenobiotic that causes ACD. The most frequently reported allergens to cause CL after ACD in the past 15 years are acrylates, paraphenylenediamine (commonly in hair dyes or contaminating henna dyes), para-tertiary butylphenol formaldehyde resin and nickel. Patch testing is a useful method in identifying the precipitating cause of ACD-associated CL and can rarely cause CL as a complication. Although specific therapeutics have not been formulated for the treatment of CL, repigmentation has been successful using phototherapy (NB-UVB/PUVA), topical immunomodulators, and avoidance of the causative agent.

### **Conclusions:**

Chemical leukoderma is a rare but serious complication of ACD, especially in skin of color. Dermatologists should utilize detailed history taking and patch testing to differentiate between ACD-associated CL and vitiligo. While phototherapy and allergen avoidance of the agent are first-line therapy, the emergence of novel topical immunomodulators like JAK-inhibitors demonstrate potential in treating CL.

# Readability of Online Materials in Spanish and English for Contact Dermatitis

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## Abstract

### **Objectives:**

To assess and compare the readability, understandability, actionability, and cultural sensitivity of online health materials on contact dermatitis in English and Spanish.

### **Methods:**

We analyzed the first ten Google search results for 'contact dermatitis' in both English and Spanish, excluding articles requiring translation services. The Patient Education and Materials Assessment Tool (PEMAT) and Cultural Sensitivity Assessment Tool (CSAT) were utilized for analysis. Readability was determined using the SMOG grading system for English and SOL for Spanish materials. Statistical analysis was performed with SPSS software to compare the two language sets.

### **Results:**

The PEMAT scores showed no significant difference in understandability (89.4% +/- 2.7% for English, 84.3% +/- 3.0% for Spanish) or actionability (66.1% +/- 7.6% for English, 62.4% +/- 6.0% for Spanish). However, Spanish materials consistently scored lower in these areas. The cultural sensitivity analysis indicated a need for more culturally appropriate materials for the Spanish-speaking demographic. The readability scores suggested that online materials in both languages were often above the recommended reading level for the general population.

### **Conclusions:**

While there was no significant difference in the PEMAT scores for English and Spanish materials, subtle disparities exist that can impact the LEP population's understanding of and action on health information. The lower scores for Spanish materials highlight a crucial area for improvement to ensure equitable healthcare information access. This study underscores the importance of developing high-quality, culturally sensitive, and easily comprehensible online health materials to better serve Spanish-speaking patients with CD, potentially improving patient outcomes and reducing healthcare disparities.

# Analyzing the Lack of Hypoallergenic Alternatives for Black Hair with High Curl Index

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## Abstract

### **Objectives:**

Hair care (HC) products are major contributors to the development of allergic contact dermatitis (ACD), therefore identifying HC free of specific allergens is crucial for achieving clinical improvement in affected patients.[1] We aim to investigate the availability of hypoallergenic HC tailored to Black women (BW) with higher curl indexes.[2]

### **Methods:**

A search of the SkinSafe database for all ethnic HC was conducted to identify the prevalence of common allergens in accordance with the American Contact Dermatitis Society (ACDS) 2020 Core Allergen Series.

### **Results:**

Compared to the 786 hypoallergenic non-ethnic HC products identified, all 120 products under the 'Ethnic Hair Care' category contained at least one potential allergen and 15 (12.5%) contained 3 or more allergens. The most common allergen was fragrance, present in all 120 products. Benzalkonium chloride was in 29 (24.2%), formaldehyde was in 28 (23.3%), methylisothiazolinone was in 15 (12.5%), and benzophenone-4 was in 6 (5%) of the products analyzed.

### **Conclusions:**

This study reveals a notable lack of hypoallergenic HC tailored for BW with ethnic hair. More fragile and prone to breakage, ethnic hair requires specialized care, particularly as individuals of African descent are more susceptible to scalp conditions like seborrheic dermatitis.[3,4] Despite spending nine times more on HC than non-Black women, BW often struggle finding formulations that meet their unique needs without causing allergic reactions and hair breakage.[5] This disparity underscores the demand for inclusive, hypoallergenic formulations that address the needs of ethnic hair in an effort to offer safe, effective solutions for all consumers.

# A Definitive Case of Allergic Contact Dermatitis to Hypoglossal Nerve Stimulator Implant

**Authors and Affiliations:** Akshay Tangutur, MS, Schmidt College of Medicine at Florida Atlantic University; Katherine K. Brown, MD, FAAD, University of Pennsylvania; Raj C. Dedhia, MD, MSCR, University of Pennsylvania

## Case Study

### **Background:**

This case highlights the first confirmed instance of an allergic contact reaction from an isocyanate allergy to a hypoglossal nerve stimulator (HGNS) implant, an increasingly popular alternative to positive airway pressure (PAP) therapy for obstructive sleep apnea (OSA). The report underscores the importance of considering noninfectious causes for HGNS device reactions and performing patch testing to identify offending components.

### **Case Presentation:**

A 64-year-old male with severe OSA (AHI 54 events/hour) underwent HGNS implantation. He developed erythema, swelling, and pustular drainage at the neck incision site two months postoperatively, resulting in device extrusion and subsequent explantation. Patient underwent contralateral reimplantation three months later, but by postoperative day 10, swelling, erythema, and purulence recurred at both the neck and chest incision sites. His wound cultures were negative, and patch testing revealed a strong positive reaction to isophorone diisocyanate (IPDI), a component of the device's polyurethane materials. All symptoms resolved following second explantation.

### **Conclusions:**

Isocyanates are low molecular weight compounds used in the production of polyurethanes, commonly found in medical devices like HGNS. The literature regarding isocyanate allergies with medical implants is limited, and this is the first confirmed case with a HGNS device. This report highlights the importance of noninfectious causes of device reactions, especially occurring beyond the postoperative wound infection window. Patch testing for isocyanates and other components can guide patients and providers regarding cause of current device failure and implications for future implantable devices.

### **Acknowledgements:**

Department of Otorhinolaryngology-Head & Neck Surgery and Department of Dermatology at the University of Pennsylvania; Inspire Medical Systems, Inc.

# A Case Series Demonstrating Co-Reactivity of a Cocamidopropyl Hydroxysultaine-Containing Facial Cleanser with Dimethylamines and Amidoamine

**Authors and Affiliations:** Puneet Arora, Park Nicollet Contact Dermatitis Clinic; Brailyn Weber, BS, BA, Park Nicollet Contact Dermatitis Clinic; Sarah Karels, BS, Park Nicollet Contact Dermatitis Clinic; Anne Neeley, MD, Park Nicollet Contact Dermatitis Clinic

## Abstract

### **Objectives:**

Cocamidopropyl hydroxysultaine (CAPH) is a surfactant structurally related to cocamidopropyl betaine (CAPB) and has been reported to cause allergic contact dermatitis (ACD). ACD from CAPB-containing products is due to the presence of trace amounts of dimethylaminopropylamine (DMAPA) and amidoamine. CAPH is synthesized by a similar process to CAPB and therefore would be hypothesized to cause ACD by the same mechanism. The aim of this case series is to present co-reactions between CeraVe Foaming Facial Cleanser, a popular product that contains CAPH, and dimethylamines or amidoamine.

### **Methods:**

Results of all patients comprehensively patch-tested at our clinic from 2020-2024 were retrospectively reviewed. Patients with reactions (+/- with definite clinical significance, 1+, 2+) to CeraVe Foaming Facial Cleanser tested semi-open 'as is' were identified. Patients with +/- reactions of undeterminable significance or with reactions to other tested ingredients in the product were excluded.

### **Results:**

Ten patients (average age: 32; sex: 7 female, 3 male) demonstrated reactions to CeraVe Foaming Facial Cleanser. Eight of these patients reacted to DMAPA 1% aq and/or oleamidopropyl dimethylamine 0.1% aq and 5 reacted to amidoamine 0.1% aq. Seven patients reacted to at least one CAPB-containing product tested 'as is' as well.

### **Conclusions:**

Results suggest that products which declare CAPH likely contain dimethylamines and/or amidoamine. CAPH should be considered a cross-reactor to CAPB to reduce the risk of inadvertent exposure to dimethylamines and amidoamine in allergic patients.

# Rubber Accelerators in Medical Examination and Surgical Gloves: A Post-Covid-19 Update

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## Abstract

### **Objectives:**

Rubber accelerator contact allergy is a common cause of glove-related allergic contact dermatitis, especially in occupational settings. While previous studies have reported accelerator presence in medical gloves, updated information is needed after COVID-19 pandemic-associated supply chain challenges. Here we provide an updated post-COVID-19 guide for exam and surgical medical glove accelerator content for accelerator-allergic patients.

### **Methods:**

In August 2024, an internet-based search was conducted to compile a list of commercially available medical examination and surgical gloves. Manufacturers were then contacted.

### **Results:**

Nine glove manufacturers were included in our final analysis, totaling data for 142 gloves. 76 gloves were discontinued since the previous analysis, primarily natural rubber latex gloves. Carbamates were the most common accelerators, found in 83.1% of gloves, followed by mercaptobenzothiazole at 21.8%. Other accelerators were present at lower frequencies, including diphenylguanidine in 13.4% and dialkyl thioureas in 12% of gloves. The number of accelerator-free gloves has increased 3-fold since 2018.

### **Conclusions:**

The COVID-19 pandemic created supply chain challenges that resulted in discontinuation of many available medical examination and surgical gloves. Accelerators remain common in most medical rubber gloves, however, accelerator-free options are available.

### **Acknowledgements:**

The authors have no funding or conflicts of interest to declare.

# Sticky Sensitivities: Investigating Allergens Found in Athletic Tape Adhesives

**Authors and Affiliations:** Brailyn Weber, BS, BA, Park Nicollet Contact Dermatitis Clinic; Sarah Karels, BS, Park Nicollet Contact Dermatitis Clinic; Katherine Lee, MD, Park Nicollet Dermatology

## Abstract

### **Objectives:**

Adhesive allergens play a major role in tape-related allergic contact dermatitis (ACD). Athletes are a group that can be impacted due to their use of athletic tapes. Patch testing is a crucial first step in identifying culprit allergens; however, finding safe tape alternatives can be challenging, primarily due to a lack of full ingredient disclosure by manufacturers. The aim of this study was to ascertain the specific ingredients found in athletic tape adhesives for major tape producers within the United States.

### **Methods:**

An initial web-based search was conducted to identify major athletic tape manufacturers and their individual products available for purchase. Each company was contacted to investigate specific adhesive ingredient profiles. The presence or absence of major adhesive allergens were confirmed by reviewing safety data sheets or by direct communication with customer service representatives.

### **Results:**

Seventeen companies were identified and contacted. Of these, 13 provided sufficient information to be included in our study, totaling data for 80 athletic tapes. Rubber chemicals were the most common allergen declared, used in 42.5% (34/80) of tapes. Zinc oxide and abitol/colophony were declared less frequently, used in 18.8% (15/80) and 12.5% (10/80) of tapes, respectively. Acrylates were declared in only 6 athletic tapes (7.5%), and lanolin was declared in only 2 (2.5%).

### **Conclusions:**

The results of our study enhance the current understanding of allergens commonly found in athletic tapes and provide improved resources for athletes with adhesive-related ACD. Restricted ingredient disclosure by manufacturers was a notable limitation, which may be improved by more stringent consumer regulations.

# Formaldehyde Allergic Contact Dermatitis: Are Paper-Based Menstrual Products a Significant Source of Exposure?

**Authors and Affiliations:** Brailyn Weber, BS, BA, Park Nicollet Contact Dermatitis Clinic; Sarah Karels, BS, Park Nicollet Contact Dermatitis Clinic; Javed Shaik, PhD, University of Minnesota Medical School; Anne Neeley, MD, Park Nicollet Contact Dermatitis Clinic

## Abstract

### **Objectives:**

Formaldehyde may be used as a wet-strength additive in the production of various paper-based products, including menstrual products. In the United States, menstrual products are considered medical devices and are thus exempt from full ingredient disclosure by manufacturers, making counseling for formaldehyde-allergic patients challenging. Several countries outside of the United States have declared formaldehyde release from menstrual products; however, a similar study in the United States has not been conducted. In this study, we sought to assess menstrual products available for purchase in the United States for formaldehyde release using the chromotropic acid method.

### **Methods:**

A subset of commercially available menstrual products (13 pads, 11 panty liners, 10 tampons) were assessed for formaldehyde release using the chromotropic acid method.

### **Results:**

Of the menstrual products tested, none exhibited qualitative formaldehyde release during chromotropic acid testing.

### **Conclusions:**

In the United States, menstrual products (pads, panty liners, tampons) are likely not a significant source of formaldehyde exposure. The results of our study have implications for patch testing dermatologists, who may counsel formaldehyde-allergic patients accordingly.

### **Acknowledgements:**

We would like to thank Javed Shaik, PhD for providing laboratory facilities and equipment to conduct chromotropic acid testing.

# No Wrinkles, No Worries? Evaluating Anti-Wrinkle Laundry Products for Formaldehyde Release Using the Chromotropic Acid Method

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## Abstract

### **Objectives:**

Formaldehyde resins have long been used in the textile industry to provide clothing with a wrinkle resistant permanent-press finish. The literature boasts ample investigation into formaldehyde resin-containing fabrics and their ability to potentiate allergic contact dermatitis. However, to our knowledge, no published studies analyzing the presence of formaldehyde in wrinkle-releasing laundry products currently exist. In this study, we sought to assess commonly used anti-wrinkle laundry products for formaldehyde release, with the goal of improved counseling for formaldehyde-allergic patients.

### **Methods:**

A subset of commercially available wrinkle-releasing laundry products (8 sprays, 2 dryer sheets, 1 fabric conditioner) were assessed for formaldehyde release using the chromotropic acid method. Initial positive results were retested.

### **Results:**

Of the wrinkle-releasing laundry products tested, 1 spray and 1 fabric conditioner exhibited qualitative formaldehyde release during both consecutive rounds of chromotropic acid testing. The manufacturer of the fabric conditioner did declare formic acid on the product's ingredient list; however, the manufacturer of the fabric spray did not explicitly declare formaldehyde or other releasers. The remainder of the products tested did not release formaldehyde.

### **Conclusions:**

Certain wrinkle-releasing laundry products may be a safe alternative for formaldehyde-allergic patients who prefer permanent press clothing. However, patients should use caution to read ingredient labels for formaldehyde releasers. Our study additionally raises concern for the presence of undeclared formaldehyde in consumer products. Full ingredient disclosure by manufacturers, as well as more stringent regulations, may be beneficial.

### **Acknowledgements:**

We would like to thank Javed Shaik, PhD for providing laboratory facilities and equipment to conduct chromotropic acid testing.

# Getting Duped: An Update on the Irritancy of Supergoop! Unseen Sunscreen and its "Dupe" When Patch Tested "As-Is"

**Authors and Affiliations:** Sarah Karels, BS, Park Nicollet Contact Dermatitis Clinic; Anne Neeley, MD, Park Nicollet Contact Dermatitis Clinic; Brailyn Weber, BS, BA, Park Nicollet Contact Dermatitis Clinic

## Case Study

### **Background:**

Irritant patch test reactions to products tested 'as-is' may cause patient morbidity and present diagnostic challenges, especially when the causative ingredients are unclear. Supergoop! Unseen Sunscreen, a popular product, has been reported to cause irritant reactions when tested 'as-is' under occlusion. We report two similar reactions to Trader Joe's Daily Facial Sunscreen, a formulation closely resembling Supergoop! Unseen Sunscreen and often referred to as the product's 'dupe.'

### **Case Presentation:**

We present two cases of irritant reactions to Trader Joe's Daily Facial Sunscreen. In the first case, a patient showed a dramatic pustular reaction to the product tested 'as is' under occlusion at the 48-hour reading. This reaction underwent a decrescendo by the 96-hour reading, indicating its irritancy. In the second case, a patient reacted to the Trader Joe's product when tested under occlusion but exhibited no reaction when tested semi-open. The pH of both products was tested in clinic and was found to be ~5.5, making pH an unlikely irritancy factor. Many ingredients were shared between the two products, including silica, a known abrasive component of diatomaceous earth that was previously hypothesized as the irritant ingredient. However, neither of the two patients reacted to other silica-containing products, suggesting that additional factors contribute to these irritant reactions.

### **Conclusions:**

This case series highlights the need for ingredient-specific investigations to identify the irritant(s) responsible for the dramatic patch test reactions to these popular sunscreens. Additionally, these findings highlight the importance of semi-open testing for products with known irritancy - and their dupes.

# To Avoid or Not to Avoid: Cross-Reactivity Between Fragrance and Commonly Used Botanicals

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## Abstract

### **Objectives:**

Fragrance allergy can be difficult to define, with thousands of known fragrance-related compounds. Whether certain botanicals should be considered 'fragrance' and whether fragrance-allergic patients should avoid these ingredients remains unclear, with minimal published data on the topic. This study aimed to evaluate whether there is cross-reactivity between fragrance allergens and various non-essential oil, non-Compositae botanical compounds such as aloe, coconut oil and shea butter, among others.

### **Methods:**

A cohort of fragrance-allergic patients was identified using data from 2,038 patients patch-tested at a tertiary referral center from 2020-2024. Cross-reactivity rates to several botanicals common to personal-care products were calculated, and statistical significance was determined using the Fisher's exact test. Cross-reactivity was defined as >10% reaction incidence.

### **Results:**

There was no cross-reactivity from fragrance to any of the investigated botanical compounds. Though rare, patients with allergy to candelilla wax ( $p = 0.02$ ), aloe vera ( $p = 0.01$ ), and licorice root extract ( $p = 0.01$ ) did demonstrate unidirectional cross-reactivity with fragrance.

### **Conclusions:**

The low concomitant rates of reaction between fragrance and the investigated substances suggest that patients allergic to fragrance do not need to avoid certain common botanicals. Many products contain these compounds, including ones marked as 'fragrance-free.' Dermatologists can safely reassure fragrance-allergic patients of the safety of certain botanicals commonly used in personal-care products.

# Cutaneous Manifestations of Tear Gas Exposure: A Scoping Review of the Literature

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## Abstract

### **Objectives:**

Tear gas is commonly used in crowd control and law enforcement, yet its effects on human health, particularly the skin, are under explored. Globally, the use of tear gasses as a form of riot control has increased substantially. This scoping review aims to identify common cutaneous manifestations of tear gas exposure and treatments.

### **Methods:**

A comprehensive literature database search was conducted: MEDLINE, Embase, and Web of Science using terms 'tear gas', 'chloroacetophenone', 'o-chlorobenzylidene malononitrile', and 'skin'. Two screeners reviewed 531 studies based on relevance to cutaneous manifestations of tear gas exposure, with a third resolving conflicts.

### **Results:**

Studies discussed exposure to tear gas accidentally and during incidents of civil unrest with a London study observing 'erythematous dermatitis' in 36% of those sprayed by police and in 7% of tear gas incidents not sprayed by police. The most frequent cutaneous manifestations were: 'dermatitis,' 'blistering,' and 'erythema.' Severity appeared to vary based on concentration and duration of exposure. Individual susceptibility, such as pre-existing skin conditions, may also affect severity. Preliminary findings suggest that while acute skin irritation is common, more severe and long-lasting dermatologic conditions requiring treatment with systemic steroids have been recorded. Studies on patch testing revealed sensitization to chloroacetophenone, o-chlorobenzylidene malonitrile, and methylchloroform and chloroacetophenone after a single exposure, indicating allergic contact dermatitis.

### **Conclusions:**

This review highlights cutaneous manifestations associated with tear gas exposure, including dermatitis, blistering, and erythema, with severity influenced by exposure concentration and individual susceptibility. Further studies are needed to determine potential long-term dermatologic outcomes of tear gas exposure.

# Artificial Intelligence in Patch Testing: A Comprehensive Review of Current Applications and Future Prospects in Dermatology

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## Abstract

### **Objectives:**

The integration of artificial intelligence (AI) into patch testing for allergic contact dermatitis (ACD) offers the potential to standardize diagnoses and expand access. However, the limitations hindering clinical implementation have not been thoroughly explored. This review aims to examine the current applications of AI in patch testing, identify challenges, and propose future directions for their use in dermatology.

### **Methods:**

We conducted a search within PubMed to identify studies involving human participants undergoing patch testing with AI interventions. Data were synthesized to assess study design, performance, and potential for clinical application.

### **Results:**

Ten out of 94 reviewed articles met the inclusion criteria. Half of the studies used the standard European baseline allergen series, while others did not specify or used a custom selection of allergens. The majority utilized convolutional neural networks (CNNs) for image analysis, with accuracy ranging from 90.1% to 99.5%. Other AI models, such as Gradient Boosting and Random Forest, were used for risk prediction and biomarker discovery. Notably, only four studies reported participant Fitzpatrick skin types or ethnicities, with the majority of these patients being Fitzpatrick Types I-III or Caucasian, underscoring a need for greater demographic diversity in future research.

### **Conclusions:**

Although AI has significant potential to improve the patch testing process, our review uncovered numerous challenges including the need for standardized imaging protocols, larger and more diverse datasets, and enhanced regulatory frameworks to fully unlock the potential of AI in this field.

### **Acknowledgements:**

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# Exploring the Applications of Artificial Intelligence in Contact Dermatitis

**Authors and Affiliations:** Megan S. Lowe, MPH, Queen's University; Sonja C. Molin, MD, Queen's University

## Abstract

### **Objectives:**

Artificial intelligence (AI) is revolutionizing dermatology, offering innovative tools for diagnosing and managing skin conditions. Despite significant advancements, research on AI's application in contact dermatitis (CD) remains limited. This review critically examines the current use and effectiveness of AI in diagnosing and managing CD, with a focus on accuracy, efficiency, and clinical outcomes.

### **Methods:**

A comprehensive literature search from 2014 to 2024 was conducted across PubMed, EMBASE, Web of Science, and ScienceDirect databases. The search utilized key terms such as 'artificial intelligence,' 'AI,' 'machine learning,' 'augmented intelligence,' 'neural network,' and 'deep learning' in combination with 'contact dermatitis.' The search was limited to studies that included original data, with no restrictions on language.

### **Results:**

The initial search identified 352 unique studies, with 19 included after full-text review. Six studies focused on AI for CD prevention by assessing skin sensitization and predicting allergenicity. Eight explored automating and streamlining CD diagnosis. Two studies used random forest models to identify biomarkers and gene signatures, while three evaluated AI's role in recommending treatment and management plans.

### **Conclusions:**

The findings highlight AI's potential to improve the prevention, diagnosis, and treatment of CD while addressing longstanding research gaps in this field. Among these gaps is the underrepresentation of darker skin tones in AI datasets, reflecting broader disparities. Additionally, the limited focus on AI applications in CD emphasizes the need for more comprehensive research to optimize its clinical utility. Addressing these gaps will be essential to advancing equitable care, particularly as AI continues to enhance telemedicine and access for underserved populations.

### **Acknowledgements:**

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# Enhancing Recognition of Allergic Contact Dermatitis in Skin of Color: A 3D Imaging Approach

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## Abstract

### **Objectives:**

Patch testing, the diagnostic gold standard for allergic contact dermatitis, heavily relies on erythema assessment, which can be challenging to evaluate in skin of color (SOC) due to variations in erythema presentation and limited SOC representation in dermatological resources. This study explores the utility of 3D imaging technology to objectively analyze patch test reactions, minimizing reliance on subjective erythema assessment.

### **Methods:**

Using a 3D camera (LifeViz Micro, Quantificare, Sophia Antipolis, France) and DermaPix image processing software, topographic image maps and videos were created to highlight infiltration and edema associated with patch test reactions. Patch test sites were photographed 96 hours after application, and reactions were graded visually. 3D images were analyzed and paired with clinical photographs for doubtful (?), weak positive (1+), strong positive (2+), extreme positive (3+), and irritant reactions. Objective variables of average height, volume, and roughness were measured.

### **Results:**

116 3D images of patch tests were read by an experienced patch test reader. There were 13 irritant, 37 doubtful, 37 weak positive, 17 strong positive, and 12 extreme positive reactions. Objective variables of average height, volume, and roughness were found to be increasing in value from doubtful to 3+ reactions, although not statistically significant. Topographic maps and videos demonstrated additional insight into infiltration and edema corresponding to each reaction grade.

### **Conclusions:**

While this proof-of-concept study demonstrates the feasibility of using 3D imaging for patch test reaction analysis, further research is needed to determine its clinical utility and validate its role in improving diagnostic accuracy. These findings indicate that 3D imaging may complement traditional visual assessments, particularly in SOC, where erythema is less prominent or presents differently. Furthermore, this study highlights the need for continued exploration of objective tools to reduce subjectivity in patch test grading.

# Patch Testing in Acquired Dermal Macular Hyperpigmentation: A Retrospective Case-Control Study

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## Abstract

### **Objectives:**

Few studies have assessed patch test results among patients with lichen planus pigmentosus (LPP) and erythema dyschromicum perstans (EDP). Our study aimed to examine differences in patch test results between LPP/EDP patients and the general patch-test population.

### **Methods:**

This was a single-center retrospective case-control analysis of patients with biopsy-supported LPP/EDP referred for patch testing at the University of Southern California from 2020-2024. Cases were compared to age, sex, and race/ethnicity-matched controls (i.e., patients patch tested for other indications) in a 1:2 ratio. Relevant positive reactions to the North American Contact Dermatitis Group (NACDG) screening series (80 allergens) were compared. Relevant positive reactions included those with possible, probable, or definite relevance per NACDG guidelines.

### **Results:**

Fifteen patients with LPP/EDP were identified. Two-thirds of cases (66.7%) reported associated pruritus, compared to 86.7% of controls. Nearly half (46.6%) of cases had at least one relevant positive patch test, compared to 56.7% of controls. No significant differences were detected in the odds of relevant positive patch test reactions between cases and controls. Analyzed by allergen category, LPP/EDP patients had numerically greater but nonsignificant relevant positive reactions to fragrances (33.3% vs. 20%,  $p=0.36$ ).

### **Conclusions:**

Although no significant differences in patch test results were detected between patients with LPP/EDP and controls, there was a trend toward more relevant positive reactions to fragrances among the cases. Our study is limited by a small sample size. Larger studies are needed to characterize the role of contact allergens in LPP/EDP and improve management of these challenging pigmentary conditions.

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