Objectives: Does the exposure time influence the amount of DPG released from the gloves? Does the exposure of skin disinfectants before glove donning influence the release of DPG?
Methods: Using synthetic sweat, the amount of DPG released from the inside of the gloves at different times was measured by HPLC. The remaining extractable DPG was estimated by washing the inside of the gloves with ethanol (50% in water) for 10 min.
The amount of DPG found on the hands exposed to 3 ml skin disinfectant allowed to dry prior to glove donning was compared to the amount found on unexposed hands. After wearing gloves for 60 min the hands were washed with ethanol and the amount of DPG recovered was analysed with HPLC.
Results: After 10, 30, 60 and 180 min approximately 73%, 79%, 82%, 87% of the total amount of DPG was released. For all comparisons the amount of DPG released was higher on the hand exposed to disinfectants compared with the unexposed hand.
Conclusions: A comparatively short exposure time to gloves (10 min) implies a substantial exposure to DPG. Thus, repeated usage of gloves might enhance skin exposure to this rubber chemical. Skin disinfectants does increase the amount of DPG released from the gloves. Thus, possibly the components of the disinfectant remaining on the skin or some other mechanism add to the exposure to DPG.

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Keyword1: Contact allergic dermatitis
Keyword2: Patch test

Is ascaridole a sensitizing degradation product in tea tree oil?

Wietske Andrea Christoffers[1], Brunhilde Blömeke[2], Pieter-Jan Coenraads[1] and Marie-Louise Anna Schuttelaar[1]
[1]Department of Dermatology, University Medical Center Groningen, University of Groningen, The Netherlands, and [2]Department of Environmental Toxicology, University of Trier, 54286 Trier, Germany

Presenting Author: Wietske Andrea Christoffers

Background: Tea tree oil is a natural oil, which contains α-terpinene. Degradation of α-terpinene results in the endoperoxide ascaridole, which may cause allergic contact dermatitis.
Objectives: To study the prevalence of sensitizations to ascaridole, the optimal patch test concentration, concomitant reactions to ascaridole and oxidized tea tree oil and the clinical relevance.
Methods: A total of 319 dermatitis patients was patch tested with ascaridole 1%, 2% and 5% and 250 of them were in addition patch tested with oxidized tea tree oil 5%. Results were read on day 3 and day 7 according to a patch test calibration protocol.
Results: An increase in the ascaridole test concentration resulted in an increase in the frequency of positive reactions: ascaridole 1%: 1.4%; ascaridole 2%: 5.5%; ascaridole 5%: 7.2%. However, also the frequencies of irritant and doubtful reactions increased, especially for ascaridole 5%.
The irritant reactions for ascaridole 5% had a wide range of different morphologies and were difficult to differentiate from positive reactions.
A positive reaction to ascaridole correlated to a positive reaction to tea tree oil ($p < 0.001$), which suggests that ascaridole may be a relevant contact allergen in oxidized tea tree oil.
Seven clinical relevant reactions were detected by patch testing with ascaridole, but 6 of these were missed by solely patch testing with oxidized tea tree oil.
Conclusions: We recommend patch testing with ascaridole at 2%. Ascaridole elicited clinical relevant positive reactions which were missed by patch testing with oxidized tea tree oil only. This highlights the importance of patch testing separate components of complex mixtures with emphasis on degradation products such as ascaridole.

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Keyword1: Patch test
Keyword2: Contact allergic dermatitis

Methylisothiazolinone/methylchloroisothiazolinone and formaldehyde: petrolatum-based patch tests detect more sensitizations

Radoslaw Spiewak[1], Zbigniew Samochocki[2], Marek Pasnicki[3], Ewa Czarnobilska[4], Elzbieta Grubska-Suchanek[5], Marzena Bukiel[6], Katarzyna Jedrzejewska-Jurga[7], Magdalena Czarnecka-Operacz[8], Anna Cisowska[9] and Bo Niklasson[10]
[1]Institute of Dermatology, Krakow, Poland, [2]Medical University of Warsaw, Dermatology Clinic, Warsaw, Poland, [3]Alergicus-Dent, Zary, Poland, [4]Department of Clinical and Environmental Allergology, Jagiellonian University Medical College, Krakow, Poland, [5]Dermatology Clinic, Medical University of Gdansk, Gdansk, Poland, [6]NZOZ Alergologia-Pulmonologia, Stargard Szczecinski, Poland, [7]Lower-Silesian Centre for Occupational Medicine, Wroclaw, Poland, [8]Dermatology Clinic, Medical University of Poznan, Poznan, Poland, [9]Dermatology Practice, Kamienna Gora, Poland, and [10]Chemotechnique Diagnostics, Vellinge, Sweden

Presenting Author: Radoslaw Spiewak

Background: Aqueous solutions for patch testing may dry out without ensuring sufficient penetration of tested haptens into the skin. Evaporation may also affect the final amount and concentration of hapten. Petrolatum seems a better vehicle for haptens, however, polar molecules are hardly dispersible in it. This can be solved by the use of emulsifiers.
Objectives: To compare patch tests results to methylisothiazolinone/methylchloroisothiazolinone 1:3 (MI/MCI) and formaldehyde carried out with commercial aqueous solutions and novel formulations in petrolatum/emulsifier vehicle.
Methods: One thousand and twenty-six patients with chronic/recurrent eczema were patch tested to formaldehyde 1% aq. (F-002A) and MI/MCI 0.01% aq. (C-009A), as well as two novel petrolatum/emulsifier-based formulations of formaldehyde 1% pet. (Dor-695) and MI/MCI 0.01% pet. (Dor-696). On day 1, the test substances were applied for 2 days in IQ Ultra chambers on the patient's back, with subsequent readings on days 3, 5 and 8. COI: Materials used for this study were supplied free of charge by Chemotechnique Diagnostics.
Results: Positive reactions to at least one of the compared formaldehyde formulations were recorded in 68 patients (6.6%), including 2 who reacted to both, 11 to F-002 only, and 55 to Dor-695 only (chi2: $p = 0.16$). The positivity rate was 1.3% for F-002 (13 positive reactions, including 2 rated as clinically relevant), and 5.6% for Dor-695 (57 positive, 24 relevant). Positive reactions to

at least one of the compared MI/MCI formulations were recorded in 69 (6.7%) patients, including 17 who reacted to both formulations, 9 to C-009A only, and 43 to Dor-696 only (chi2: $p < 0.001$). The positivity rate for C-009A was 2.5% (26 positive, 19 relevant), while for Dor-695 it was 5.8% (60 positive, 39 relevant). No irritant reactions to the new petrolatum/emulsifier preparations were observed.

Conclusions: Petrolatum/emulsifier preparations of water-soluble haptens formaldehyde and methylisothiazolinone/methylchloroisothiazolinone yield more positive reactions on patch testing, and detect more clinically relevant sensitizations, as compared to aqueous solutions.

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Keyword1: Epidemiology
Keyword2: Occupational dermatosis

Development of skin diseases in Danish hairdressing apprentices

Majken Gabriel Hougaard[1], Lone Winther[2], Claus Zachariae[2], Heidi Søsted[2] and Jeanne Duus Johansen[1]

[1]The National Allergy Research Centre, Copenhagen University Hospital Gentofte, and [2]Department of Dermato-Allergology, Copenhagen University Hospital Gentofte

Presenting Author: Majken Gabriel Hougaard

Background: Hairdressers are exposed to cutaneous irritants and allergens daily and are consequently at risk of developing occupational skin diseases. While hand eczema (HE) is a widely recognized occupational risk for hairdressers, contact urticaria (CU) is less extensively studied.

Objectives: The aim of this study was to compare the prevalence of CU and HE between Danish hairdressing apprentices and adolescents from the general population. Additionally, we examine the prevalence of contact urticaria and eczema in hairdressing apprentices with different durations of exposure to the trade.

Methods: A cross-sectional, web-based questionnaire study was conducted among 504 hairdressing apprentices in Denmark and a control group of 1400 adolescents from the general population. The questionnaire contained pre-validated questions on hand eczema, contact urticaria, atopic dermatitis, smoking and education.

Results: CU caused by skin contact with rubber chemicals, hair dyes, cosmetics or the like was significantly more prevalent in the hairdressing apprentice with a frequency of 7.3% compared to 4.2% in the controls ($p = 0.006$). Also, the prevalence of HE was significantly higher in the hairdressing apprentices (OR = 2.28 CI 95% = 1.82–2.86). Increased duration of exposure to the hairdressing trade was associated with a significant increase in odds of developing HE and CU. Hairdressing apprentices with more than 2 years of exposure had about a threefold increase in odds of HE compared with controls (OR = 3.03 CI 95% = 2.05–4.48). This association increased further with increasing exposure duration. The same pattern was present for CU. Indeed, CU increased more than fourfold after 3 years of exposure to the hairdressing trade (OR = 4.28 CI 95% = 2.25–8.16).

Conclusions: Hairdressing apprentices are at increased risk of both contact urticaria and hand eczema. These skin diseases develop after only few years of exposure to the hairdressing trade.

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Keyword1: Contact allergic dermatitis
Keyword2: Atopy

Contact allergy in atopic patients entering allergen-specific immunotherapy

Ingrid Siemund[1], Monica Hindsén[1], Eva Netterlid[1], Nuray Güner[2] and Magnus Bruze[1]

[1]Department of Occupational and Environmental Dermatology, Skåne University Hospital, Malmö, Sweden and [2]Competence Centre for Clinical Research, Skåne University Hospital, Lund, Sweden

Presenting Author: Ingrid Siemund

Background: Type I sensitizations and atopic dermatitis often appear in the same patient. Beneficial effects of allergen-specific immunotherapy (ASIT) in patients with both atopic dermatitis and type I allergies have been reported in the literature. The role of atopic dermatitis as a risk factor for development of type IV sensitization is discussed. Whether ASIT of type I allergy influences the burden of type IV allergies is unknown.

Objectives: To compare numbers of contact allergies in patient groups with/without atopic dermatitis before or after 1 years treatment with ASIT.

Methods: The study group consisted of children and adults with allergic asthma and/or rhinoconjunctivitis untreated or treated with ASIT participating in a study performed to investigate the developement of contact allergy to aluminium during ASIT and the number of other contact allergies. Two hundred and five individuals completed the study, 133 treated with ASIT during 1 year (exposed) and 72 before starting ASIT (unexposed). By using questionnaires and by patch-testing with the baseline series history of atopic dermatitis and the number of contact allergies were surveyed.

Results: In participants with atopic dermatitis significantly more contact allergies were found in the groups of all children ($p = 0.002$), of all exposed children ($p < 0.001$) and of all exposed study persons ($p = 0.013$). Independent of atopic dermatitis significantly more contact allergies were noted in the groups of all unexposed adults ($p = 0.004$) and of all unexposed study persons ($p = 0.004$).

Conclusions: Increased number of contact allergies in patients with atopic dermatitis indicates that atopic dermatitis is a risk factor for type IV sensitization. The lower number of contact allergies in patients exposed to ASIT suggests an immunomodulatory effect also in type IV sensitization.

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Keyword1: Textiles
Keyword2: Dyes

Patch testing with a textile dye mix in two concentrations

Kristina Ryberg[1], Johanna Bråred-Christensson[2], Malin Engfeldt[3], Marléne Isaksson[3], Magnus Lindberg[4], Mihaly Matura[5], Berndt Stenberg[6], Cecilia Svedman[3] and Magnus Bruze[3]