

Contact dermatoses – causes, prevention and professional care of irritated skin

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Contact dermatoses occur at the workplace but also during leisure time. What people tend to call allergy actually more often turns out to be an irritation. Prevalence varies and depends on a multitude of different factors. If the persons concerned know about preventive measures and how to apply them or know about the measures to take whenever symptoms strike, the associated problems can be largely minimized.

The term dermatoses, in general, covers all conditions that are distinguished from normal skin conditions, as for instance redness, inflammations, blisters, barrier and cornification disorders (keratoses) or swellings accompanied by itching, pain, altered local sensitivity or other symptoms.

Dermatoses can have genetic, microbial, viral and physical causes (e.g. radiation, mechanical strain of the skin) or develop after contact with incompatible substances (contact dermatoses) whereas the combination of substance-based and physical factors is rather frequent.

Various causes

In practice, particularly three types are of interest and various synonyms are used for the same symptoms; a fact which is quite common in medicine:

- **Allergic contact dermatosis** – alias allergic contact dermatitis or allergic contact eczema:
Allergic reactions imply the passage of substances with low molecular mass via skin barrier and the subsequent triggering of excessive immune reactions. There are immediate reactions or late onset allergies (up to 72 hours after contact). The biological mechanisms may vary substantially.
- **Irritative contact dermatosis** – alias toxic contact eczema or irritative contact eczema:
The term irritation means that exogenous substances directly attack the skin structures and cause acute inflammations. Synthetic as well as natural substances can be the triggers.
- **Cumulative sub-toxic contact eczema** – alias sub-toxic degenerative eczema, irritative eczema or wear and tear dermatitis:
This kind of irritation is rather insidious and frequently occurs in combination with the medium water either at the workplace or during housekeeping activities.

Contact dermatoses, in general, occur rather often in the context of manual work and the use of allergenic or aggressive substances as such, or in combination with solvents such as water, hydrocarbons, low molecular esters (e.g. acetic acid ethyl ester), isopropyl alcohol and acetone. That is why professional associations stipulate that the respective companies shall display skin protection plans.

Widespread contact allergens

Contact allergens lurk in many places where they just aren't suspected. Already a look at do-it-yourself market products can be quite revealing. Today, we are talking here of summer 2016, all the solvent-free enamel finishes and dispersion paints based on aqueous acrylates for indoor and outdoor applications are preserved with methylchloroisothiazolinone and methylisothiazolinone (alias Kathon CG). Among them are indoor wood lacquers which even are advertised as being saliva safe. The German Cosmetic Regulation (KVO) has only recently banned both the chemicals from leave-on products due to their allergenic potential. The situation is similar with aqueous solutions for waterproofing purposes (primers), fillers based on gypsum (liquid and in powder form) and wood glues. The household cleaner, detergent and liquid laundry detergent sections of supermarkets also are quite a bonanza in this respect. In this context it should be kept in mind that the reduced spin cycles of "express" washes may lead to residues which then, depending on the type of textiles (e.g. sports clothing), can be transmitted to the skin via sweat.

Halogenated aromatic compounds in disinfectants pose a similar problem. Besides allergies, they also can trigger chlorine acne. In combination with sunlight, triclosan¹, 5-chloro-2-(2,4-

¹ Lautenschläger H, Triclosan - teils verboten, weit verbreitet, *Beauty Forum* 2016 (5), 92-94.

dichlorophenoxy)phenol, i.e. a potential ingredient in plastics for toilet seats, forms halogenated dibenzodioxins and dibenzofurans on the skin. Only recently, the German Cosmetic Regulation (KVO) has also banned triclosan for leave-on products.

Big allergenic potential

According to an EU Regulation issued in 2001, fashion jewellery, buttons, zippers, belt buckles, wrist watches etc. which are permanently in contact with the skin, should only emit 0.5 µg nickel per cm² and week at maximum (piercings 0.2 µg per cm²). According to a report of the German Federal Office of Consumer Protection and Food Safety (BVL, Bundesamt für Verbraucherschutz und Lebensmittelsicherheit), in 2014, 17.4% of the tested (new) fashion jewellery was above threshold values – with upward tendency. The release of this or other metals still increases with the application of skin care preparations that contain polyethylene glycols (PEG) and complexing agents, such as EDTA, and the exposure to atmospheric oxygen. Allergenic heavy metals still are an issue in the context of unlicensed tattoo colours.

Hair dyes and thioglycolic acid preparations for perms and depilation are typical allergy sources at hair dressers.

The furocoumarins (psoralens) of cartwheel flowers (alias giant hogweed or giant cow parsley), cow parsnips (alias elrot, hogweed or common hogweed) or celery are transmitted with direct skin contact and have phototoxic effects (grass dermatitis). They also are prevalent in lemon and orange peels and can trigger perioral dermatitis after contact with the peels. In the case of essential oils, scents and resins, mainly the peroxides and other oxygen compounds which form during storage can trigger allergies; examples here are ascaridole (tea tree oil) and the oxides of abietic acid (colophony resin). The polyethylene glycols (PEG) contained in cosmetics also will form peroxides when exposed to sunlight; they are responsible for triggering Majorca acne.

The preservatives specified in the German Cosmetic Regulation (KVO) are a further allergy source. Invariably all of them have allergenic potential. This is why they are listed in the German Cosmetic Regulation (KVO) and put on a level with the active substances of disinfectants.

Plant extracts are multicomponent systems. The higher the number of plant extracts in a skin care product, the higher the potential that allergenic proteins, biogenic amines and other individually incompatible substances are contained.

Examples for animal allergy sources are cat hair, insect bites, parasites (e.g. mites) and the contact with jellyfish in the sea.

Irritating substances

- Acids (low pH levels) such as concentrated fruit acids (AHA), medicinal acid peelings and herb peelings cause irritations or even corrosive injury (chemical burns). The first named are intended treatments whereas the latter stated definitely are malpractices. The same applies for alkaline solutions, liquids and creams for the removal of callus and corns. Their high pH levels are required for peeling off the keratinized material.
- Exsiccation and housewife eczema are insidious conditions. They form as a consequence of daily bathing and washing routines when shampoos and body cleansing lotions degrease the skin. The skin becomes dehydrated, reddish and cracks. The tensides, as e.g. lauryl (ether) sulfates, used during housekeeping and manual work still intensify the process. Frequently the famous single drop makes the difference, or in other words, causes the mentioned effects after prolonged water exposure. Diaper dermatitis (or diaper rash) forms when urine gets in contact with the thoroughly cleansed baby skin.
- A widespread phenomenon yet less realized are the degreasing effects of tightly fitting textiles and of paper and cardboard packaging. Bulking agents of cardboard packaging, such as calcium carbonate, additionally damage the acid mantle of the skin. Recycled paper and cardboard also contain the above mentioned abietic acid oxides, among other substances, and can lead to hand eczemas. The continuous mechanical friction of tightly fitting clothes can also cause sore spots – comparable with a permanent peeling.
- High doses of vitamin A have irritating effects due to the formation of vitamin A acid. In the meantime, too much skin care² has become an everyday phenomenon due to the concentration of different product ingredients which will lead to adverse reactions in the skin.

Therapy and prevention

In the case of weeping rashes, the skin care routines should be stopped until the skin areas

² Lautenschläger H, Überpflegung - Einfach zu viel des Guten, Kosmetik International 2015 (3), 22-25

feel dry. A helpful exception can be aqueous sera containing active agents with astringent (gallic acid, tannins), anti-inflammatory (omega 3, omega 6, boswellic acids, and chamomile) or anti-itching effects (urea, allantoin, fatty acid amides).

When the skin starts to crack, a first treatment with astringent substances such as tea preparations (tannins) or witch hazel extract and subsequently the application of emulsifier free, fatty, but mineral oil free creams are recommended as they reduce the tension. A short-time glucocorticoid therapy will improve inflammations. Acute and active forms of eczema may need a short systemic therapy with adequate pharmaceutical preparations.

Avoid allergens, if possible

To prevent contact dermatoses, it is recommended to avoid all the potential contact substances. In daily life, there is sometimes just no alternative, above all, if the triggering substances are unknown. A diary might be helpful in finding the traces. Gloves can be beneficial when handling with solvents or disinfectant substances. This also applies for housekeeping work using water and a low tenside concentration. It should however be mentioned that gloves also could lead to adverse reactions due to components such as latex and rubber and due to occlusive conditions. Wearing cotton liners under the gloves and the application of the above mentioned astringent, tannin-containing extracts may be beneficial in this case.

In dermatitis free periods and above all at night-time, it is recommended to apply recovering skin care creams with the lowest possible content of additives. They complement the occupational skin protection with barrier creams. Considering the skin cleansing routines, tenside containing preparations should be avoided during the acute phase and only lukewarm water be used. A water softening system can be helpful in the case of hard water.

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