

# Skin care for the vitiligo-affected skin – aspirations and reality

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Vitiligo is a rather conspicuous skin disease since the respective skin areas have completely lost their pigmentation. Although, the causes of the disease still are largely unidentified, there is help available for the patients concerned in the form of adequate skin care products and active agents.

**V**itiligo skin modifications can affect smaller spots but also extensive, inter-related skin areas which tend to expand in the course of time. The skin areas concerned become pale, hairs may turn white or grey. Vitiligo will not cause any sensations of pain, nor does the pigmentation disorder involve any kind of itching. Melanocytes as well as the melanin forming tyrosinase are completely absent. Vitiligo is quite a burden for the patient and rather a challenge for the corneotherapeutic treatment.

## Causes

The specific causes of vitiligo with a prevalence of about 0.5 % to 2 % worldwide are still fairly unknown. Heredity, traumatic experiences, diseases of the thyroid gland and specific medical drugs like e.g. beta blockers or antibiotics are discussed to be triggers of the disease. Topical coenzyme Q<sub>10</sub>- and curcumin-containing preparations (curcumin or turmeric is the yellow dyeing component in curry) can deteriorate the vitiligo condition due to the disordered quinone metabolism (dopaquinone, indol-5,6-quinone). A disorder of the hydrogen peroxide balance in the skin is suspected with an increased formation of peroxide that either is stored or degraded on a slower scale. The catalase concentrations in the skin are reduced. The catalase transfers hydrogen peroxide into water and molecular oxygen. Other clues indicate that peroxynitrite can be involved which, similar to hydrogen peroxide in pathologically high concentrations, generates oxidative respectively nitrosative stress which in their turn affect amino acid and peptide structures, both responsible for the transport of mineral substances like calcium. The L-nitrotyrosin, formed by reaction of L-tyrosin – the base substance for the melanin synthesis – and peroxynitrite is considered as a reliable biomarker for nitrosative stress as well as for the apoptosis. As the thyroid hormones result from the iodination of tyrosin through iodide

and hydrogen peroxide (thyroid peroxidase), a linkage in this context can also be suspected.

## Treatment

The narrowband UVB phototherapy (311 nm) seems to be one of the therapies with a relatively high rate of re-pigmentation and takes about one year. The effects may be enhanced by applying a cream containing calcium and manganese with the result that the UVB radiation then transfers Mn<sup>2+</sup> ions into Mn<sup>3+</sup> ions. This type of treatment corresponds with the bathing conditions in the Dead Sea. Manganese traces show the effects of a “pseudo-catalase”. The success of the treatment seems to be associated with both the skin thickness and possibly correlating unfavourable passage of the UVB radiation, and the manganese salts since feet, hand and anal areas are reported to respond less positively to the therapy. Bathing in chlorinated water (oxidative stress through hypochlorite anions) aggravates the disease. Also a combination of UVB radiation and calcitriol (vitamin D) leads to a partial re-pigmentation.

## Skin care

The vitiligo skin care generally is oriented toward preparations that are free of irritating and sensitizing substances in order to prevent additional stress for the skin. Peroxide forming substances like polyethylene glycols and other phototoxic components in perfumes and extracts as well as barrier disordering emulsifiers should be avoided. There are several basic skin care approaches:

- Recovering and protecting skin care in general
- Minimizing skin contrast by bleaching non-affected skin areas
- Use of self tanning products on the pale skin areas
- Use of a covering camouflage product

The most important active agents and ingredients are described in the following. Combinations can also be used.

**Amino acids:** The amino acids of the dermal NMF form a natural non-selective protective barrier against exogenous radicals. Hence, liposomal skin care lotions with amino acids are suitable preparations for the stratum corneum of the vitiligo skin.

**Azelaic acid** is described as a competitive tyrosinase inhibitor. In liposomal dispersion (max. 1%) it supports the whitening of the non-affected skin areas and so minimizes the contrast between pigmented and non-pigmented skin. Azelaic acid, also successfully used in the treatment of melasma conditions, is a non-toxic dicarboxylic acid that naturally occurs in various types of grains and has antimicrobial effects in acne and rosacea skin conditions.

**Camouflage:** Compared to a customary makeup, the camouflage is absolutely smear-resistant and water proof. As long chained hydrocarbons are required for technical reasons in order to incorporate the pigments, the camouflage has occlusive effects which are detrimental to a natural skin recovery. That is the reason why camouflage products should not be applied constantly. Colour corrections via camouflage work better if the respective areas are pre-treated with a self-tanning product.

**Carotenoids:** A light yellowish to reddish colouring of the white spots may be achieved with beta-carotene products. The beta-carotene that penetrates into deeper skin layers will be degraded into vitamin A.

**Dihydroxy acetone (DHA):** This self-tanning agent reacts with the amino group containing components of the skin surface in a complicated condensation reaction (brownish colouring). In vitiligo cases, this colouring should be enhanced with a subsequent makeup or camouflage application.

**Glutathione:** The natural tripeptide reacts with free radicals.

**Bases:** Ceramide and phytosterol containing creams with Derma Membrane Structure have proved to be successful bases for a combination with additional active agents.

**Exfoliation:** A light exfoliation with abrasive wax bodies or enzyme peelings helps attenuating the transitions of pigmented to non-pigmented skin.

**Pepper extract:** Main active agent of the extract is piperine which is an amide-structured pungent alkaloid. It still has to be proved whether the melanocyte proliferation found in experiments with mice also applies for the human vitiligo condition. The melanin formation additionally needs to be stimulated by UV radiation. The pungency of piperine and the formaldehyde splitting potential of the methylene dioxyphenyl residue of the piperic acid may prove to be an obstacle to the long term use though.

**Phosphatidylcholine** is the carrier substance for hydrophilic agents in liposomal dispersions and for lipophilic agents in nanodispersions.

**Powders:** In order to stop the formation of additional radicals in cosmetic powders, it is recommended to use pigments that will not release traces of iron.

**Radical scavengers:** It still needs to be discussed whether radical scavengers other than vitamins are beneficial in this context since the redox reactions in the different skin compartments vary considerably on the one hand and prove to be cross-linked in a rather complex way on the other hand, all the more since the intrinsic causes and clinical courses of vitiligo in detail still are unknown. It should also be added that the appropriate substance still needs to get to the appropriate point of biochemical activity. This rather insinuates the attempt to fight a non-locatable smouldering fire with the first extinguishing agent coming along, neither knowing the exact position of the fire nor whether the extinguishing agent is appropriate for the specific type of fire. Phenolic compounds which affect the quinone metabolism may even prove counterproductive.

**Sun protection** is essential as the protecting melanin is absent in vitiligo conditions. However, it should also be mentioned that a moderate UV radiation may be beneficial in individual cases as it stimulates the pigmentation process as well as the vitamin D formation.

**Trace elements:** A medical determination of the trace elements is important. Only on this basis, a treatment with food supplements or cosmetic formulations can be attempted. Otherwise this therapy might involve the risk of unnecessarily interfering with functionary regulatory circuits. An exception here may be manganese salts.

**Vitamins:** They are an essential component in cosmetic preparations for the vitiligo skin care.

From a present-day perspective, vitamin A (retinol), B<sub>2</sub> (riboflavin), B<sub>3</sub> (niacin), provitamin B<sub>5</sub> (D-panthenol), vitamin B<sub>12</sub> (cobalamin), C (ascorbic acid) und E (tocopherol) are of specific interest in this context as they participate in redox reactions.

**Whitening agents:** Several vegetable extracts, liposomal ascorbyl phosphate and azelaic acid have bleaching effects on the skin. These substances are applied on the non-affected skin to act as tyrosinase inhibitors and avoid the re-pigmentation in order to attenuate the contrast to the fair skin areas. Counterproductive here are de-pigmenting substances like kojic acid, hydroquinone and hydrogen peroxide.

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