

# Photodamaged skin: sun-bathing and after sun care

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Overexposure to UV radiation causes serious long-term skin damage, premature skin aging and may even trigger skin cancer. Even if the infrared light of the sun seems harmless though, it may build up extremely high temperatures in the outermost skin layers and as a consequence also lead to premature skin aging.

It is a common misunderstanding that a good sun screen provides an overall protection against the sun. Even on the contrary, a water repellent product which prevents increased transepidermal water loss because of its high mineral oil and silicon content leads to a swelling of the skin beneath the protective layer and hence causes intense thermal stress due to infrared radiation (IR). The most efficient protective measure up to day is the use of a sunshade or light clothing.

However, what can be done after UV and IR radiation already have left their traces or even if further damaging effects have to be expected? The following overview gives appropriate recommendations to support the regeneration of the skin on a long-term base.

## Repairing the skin barrier

It is very important to restore the skin barrier function e.g. to repair the so-called bilayers of the stratum corneum. This procedure has become known as corneotherapy and uses skin care base creams with a chemical and physical structure similar to the bilayers of the skin. Appropriate moisturizing substances are amino acids which are also contained in the NMF (natural moisturizing factor) of the skin. Corneotherapy is the perfect precondition to support the healing process in the deeper layers of the skin. In this connection, the well-known dermatologist Professor A. Kligman has coined the term outside-in therapy.

Disorders of the barrier function are caused by intense IR radiation. And just to imagine it, it should be mentioned that the same amount of heat which accumulates on the scorching body of a car exposed to the hot sun is also produced on and in the skin.

## Echinacea against sun burns

Whenever the individual threshold dosage is exceeded the UV radiation of the sun causes erythema. Symptoms are ranging from minor reddening to distinct sunburn. There are

several skin care therapies which have proved successful such as active agents with echinacea extract and D-panthenol, which both quickly show positive results. The combination with a liposomal concentrate has synergetic effects as the phosphatidylcholine contained has additional anti-inflammatory effects because of the linoleic acid and choline contents. Also evening primrose oil encapsulated in phosphatidylcholine-containing nanoparticles acts anti-inflammatory due to the high dosage of gamma linolenic acid. The application of an aloe vera product in form of a surface film protects the skin and provides cooling effects.

As skin with erythema symptoms also is extremely permeable, a fact which also applies for a barrier-damaged horny layer, preservatives and perfumes are contraindicated for individuals with sensitive skin.

## Permanent protection

It is recommended to protect photodamaged skin in the long run in order to avoid accumulated damage. This does not necessarily involve a permanent use of skin care products with UV filter. The skin requires a certain amount of UV light e.g. to produce vitamin D<sub>3</sub>. However, it is very important that the cells are safely protected. Also in this specific case phosphatidylcholine has proved successful as already mentioned above. Combinations with amino acids (NMF) with the potential to scavenge reactive oxygen-containing radicals and peroxides, and CM glucan which is a natural polysaccharide derivative with DNA protective functions do not strain the skin and are free of allergenic and irritating substances.

## Vitamin C with a double function

The **skin elasticity** is impaired by UV radiation as well as by IR radiation activated collagenases and metalloproteinases. Liposomal vitamin C derivatives may activate the collagen forming enzymes by permeating the vitamin C

derivatives into the skin where they are hydrolyzed by enzyme reactions. In this connection it should be considered that the applied vitamin C has a bleaching effect i.e. that the skin produces less melanin to protect against UV radiation.

Thus vitamin C liposomes may also be used in case of **hyperpigmentation**. Similar effects have liposomal encapsulated vegetable extracts of mallow, mint, cowslip, lady's mantle, veronica, balm and yarrow. With very few exceptions these plants are reported to inhibit the tyrosinase which is responsible for the melanin synthesis. As tyrosinase inhibitors may only be used on a preventive base, already formed pigmentations take some time to show a bleaching effect. Peelings may increase the effects as they remove part of the already formed melanin.

### Olibanum is the solution here

Photodamaged skin showing actinic keratoses symptoms is very common. The condition develops on head, neck and back of the hand areas and is diagnosed as an early stage of skin cancer today. The symptoms are clearly defined red areas with minor scaling as well as cornifications ranging from white to yellow-brownish color. It is recommended to use oily olibanum extract for the care of this type of problem skin as among other effects, olibanum inhibits the natural enzyme 5-lipoxygenase which plays a major role in the formation of inflammations. Additionally, the boswellia acids contained in the extract accelerate the apoptosis process and have anti-tumor effects.

However, the pure oily extract is quite useless as it is just like glue. Only recently the extract has been successfully encapsulated in phosphatidylcholine containing nanoparticles to be applied on the skin in concentrated form without any adhesive side effects. It has been observed that the condition of the above mentioned skin lesions like inflammations and keratoses is considerably improving after the application of boswellia skin care products.

### Skin care concepts

Besides the protection against further radiation it is important to focus on a long term care of the damaged skin. Experience shows that in addition to the above mentioned corneo-therapeutic measures the application of liposomes and nanoparticles proves successful as they repair skin problems which are induced by disorders of the ceramide household. They interfere with the ceramide sphingomyelin balance, reactivate the exchange of substances between the different skin layers and

catalyze the natural regenerative potential of the skin.

### Specific treatment procedures

The above mentioned skin care concepts also allow innovative treatment procedures and as an example here a facial treatment after an extensive exposure to sun radiation will be described. The following treatment also is an appropriate measure for **hands, back and arms** and may considerably reduce the negative effects of sun exposure:

**Cleansing:** apply mild sugar tensides (non-foaming!) rinse and dab.

**Tonic & Lotion:** Use a D-panthenol containing facial tonic followed by a lotion consisting of empty liposomes (pure phosphatidylcholine), in each case cautiously dab off surplus liquid.

**Mask:** Consisting of the following steps

- Apply echinacea extract or vitamin K nanoparticles which have a stabilizing effect on the vascular system,
- subsequently apply boswellia nanoparticles,
- concluding, abundantly apply a base cream individually adapted to the lipid content of the skin, leave the pack on for some minutes
- cover with a flexibly hardening spirulina algae mask, leave on for 20 minutes,
- remove mask and dab off remains.

An additional treatment after the mask should be avoided in the acute phase following the photodamage.

Depending on the skin condition, instead of empty liposomes also **NMF liposomes** with an increased moisturizing effect may be used. The active agent free base cream can alternatively be replaced by a base cream enriched with **evening primrose oil**.

Post acute cases can also be treated with a **light massage** however before applying the mask.

### Never exaggerate though...

Depending from an adequate analysis assisted by state-of-the-art instruments and the individual basic condition of the skin additional active agent concentrates like aloe vera and algae extract, vitamin E and coenzym Q10 nanoparticles may be appropriately integrated into the specific treatment procedures. It is recommended however to focus on calming down the stressed skin and avoid any negative effects of superfluous and overdone treatment procedures.

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