

Rosacea: use of skin care boosters – prevention and therapy

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The treatment of rosacea is an excellent example for the interaction of medical therapy and cosmetic prevention but also for the possibilities cosmeticians have at their disposal with purposefully adapted cosmetic measures aimed at minimizing or even superseding medical interventions.

There are various causes for developing erythema. Rosacea only is one of them and sometimes difficult to mark out since its clinical presentation can vary. Without taking a detailed recourse to the complex biochemical processes, it can be said that it is an interaction between modifications of both the surface capillaries and connective tissue and enlarged sebum glands, and that the symptoms appear in the form of erythema, pustules and telangiectasia (couperosis). Mainly affected are Caucasian adults with UV-affected, cold- or heat-stressed and very sensitive skin that reacts to minimal irritations. In addition to that, Demodex mites may participate in the inflammatory reactions. At the present time, there is no therapy to remedy the causes of rosacea. The objective is to treat the symptoms either with cosmetic-preventive- or with dermatologic-therapeutic measures and eliminate the factors that may aggravate the problem.

Prevention

An important preventive measure is the protection of the skin against UV stress with a sun screen in cases where sun exposure cannot be avoided by staying in the shade or by appropriate clothing as for instance a sun hat. The sun protection factor as required in such cases usually can only be realised with appropriate concentrations of carrier substances (solvents, lipids) which themselves involve high occlusivity and emulsifier-caused stress. Occlusivity stimulates the rosacea-typical anaerobic germ flora while conventional emulsifiers are counterproductive for the already damaged skin in such cases.

A loophole may be the use of lamellar, emulsifier-free creams based on hydrogenated phosphatidylcholine. Preservatives as listed in the annex of the German Cosmetic Regulation (Kosmetikverordnung – KVO) should be avoided due to their uniformly allergenic potential; they can easily diffuse through the attenuated stratum corneum and then trigger unwanted

reactions. A replacement can be azelaic acid as known from dermatology; as a consistency agent for cosmetic products the German Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung – BfR) has classified the substance as harmless in concentrations of up to 1%. It can be administered as a liposomal serum before the application of the preservative-free sun screen. It should however be mentioned that even such optimal protection requires caution since it cannot block off the infrared heat radiation of the sun. A further handicap for the rosacea-plagued skin is its sensitive reaction to concentrated aqueous media which possibly further dry up on the skin and thus can further concentrate. Such media are sweat, salt- and seawater, oil-in-water creams, shampoos and facial tonics rich in alcohol. While normal skin can balance such hypertonic situations, the rosacea-prone skin cannot cope with it, in particular if it is acutely inflamed.

Skin care

There are tight limits to a cosmetic skin care. Aqueous preparations can only be tolerated when very sparsely administered. Every overdose involves irritations and lipid-enriched products stimulate the spreading of anaerobic germs. The application of non-aqueous oleogels based on herbal triglycerides and phosphatidylcholine can be an alternative; they can incorporate antimicrobial non-allergenic components such as azelaic acid. In contrast to the conventional oleogels based on mineral oil they penetrate into the skin and hence have less occlusive effects, are non-irritant and do not stimulate the growth of anaerobic germs. Another specific feature of rosacea skin is that it is only sparsely equipped with antimicrobial peptides (AMP) which, although continuously synthesized in the body, are unfortunately even faster degraded by the natural proteolytic enzymes (proteases). This condition explains the skin's proneness to facultative pathogenic germs of the skin microbiome and the related

local inflammations in the form of pustules. Germs also work with proteases that are directed against the AMPs of the skin on the one hand but on the other hand also serve for the proteolysis of skin proteins and the breakdown of the resulting fractions and amino acids into nutrients.

Three active agent groups are essential for the care of the rosacea skin:

- **Protease inhibitors** have different effects. Preferable is the selective inhibition of the AMP degrading endogenous proteases and the exogenous microbial proteases that degrade the AMPs and other proteins. A non-selective inhibitor is EDTA; its effect is caused by the bonding of the central metal atoms of enzymes. Due to the fact that in this case also useful oxidoreductases are concerned, EDTA should be avoided in cosmetic products, in particular when we also consider the waste water problems caused by this substance. The boswellic acids of frankincense seem to be selective protease inhibitors and their anti-inflammatory effect has initially been ascribed to a 5-lipoxygenase inhibition that however could only be proven in in-vitro tests. In the field nanodisperse frankincense extracts show high efficacy in the skin care that accompanies the medical therapy in the case of rosacea and acne¹.
- **Anti-inflammatory substances** are a regular ingredient in skin care preparations. Among them are essential fatty acids that are topically metabolised by the enzyme 15-lipoxygenase. This process results in oxygenic metabolites with anti-inflammatory effects. In the case of expected sun exposure linoleic acid-, alpha- and gamma-linolenic acid-containing oils should not be administered due to the fact that the acids can oxidise uncontrollably after UV radiation and the impact of atmospheric oxygen and then form irritant peroxides.
With respect to vitamins, niacinamide (vitamin B₃) should be mentioned that also has a regenerative effect.
Azelaic acid occurs in small amounts in grain and has no anti-inflammatory activity itself but it inhibits the enzyme 5-alpha-reductase in bacteria which

then are impeded to spread under the protecting layer of lipids applied for skin care purposes.

Betulinic acid is gained from the bark of foliage trees such as birches and plane trees and develops antiparasitic effects against dermatophytes and plasmodia in the trees but also in the skin. The oil gained from the seeds of Indian lilac (alias *Melia azadirachta*) also has antiparasitic effects against the inflammatory *Demodex* mites.

- Besides niacinamide and essential fatty acids, zinc salts such as zinc pyrrolidone carboxylate and vaso-stabilising substances are **regenerative components** in the case of rosacea. Among these stabilising substances tranexamic acid is dominant; it is a synthetic antifibrinolytic substance that very effectively attenuates facial erythema. Among the extracts, the saponins of butcher's broom and echinacea extract (alias purple coneflower) should be pointed out as they also reduce erythema and telangiectasia (couperosis) and likewise stabilise the connective tissue and the surface capillaries. Also very effective is vitamin K which was banned for cosmetic applications years ago. Besides the orally administered vitamin A-acid (tretinoin) sometimes also vitamin A in the form of its esters is applied, however in low dosage.

Perioral dermatitis

Perioral dermatitis sometimes is related to rosacea. The symptoms also are bacterial infections and a high sensitivity to cosmetic emulsions and preparations rich in lipids. Every so often both occur at the same time while perioral dermatitis rather develops after excess skin care particularly in connection with regular chemical peelings. Except for the administration of the vaso-stabilising tranexamic acid, the cosmetic management of perioral dermatitis is similar to the rosacea treatment.

Corticoids are counterproductive during the acute phase, similar to rosacea, while other topical pharmaceuticals such as metronidazole and azelaic acid, have comparable effects. Barrier disorders are significantly pronounced in such cases. Exudative areas should not be treated with cosmetic products. Only after the skin surface has dried up, a treatment with anti-inflammatory liposomal sera (see above) can be started. Tannin- and polyphenol-containing extracts such as witch hazel and epigallocatechin gallate (EGCG) then have beneficial effects. EGCG with its antiangiogenic

¹ Lautenschläger H, Weihrauch – Harz mit Heilkraft, medical Beauty Forum 2015 (4), 12-16

effects also is a useful component in the treatment of rosacea; the low pH value of about 4.2 serves for the stabilisation of the active agent.

Skin barrier

Peelings with scrubbing agents, fruit- and other acids, herbal extracts („herbal peelings“) or microdermabrasion are counterproductive on the short but also on the long-term. Many cases of rosacea are caused thereby while gentle facial massages help conditioning the connective tissue. Among the barrier-stabilizing components in creams that should be equipped with the above-mentioned active agents and sparsely applied are phytosterines (instead of cholesterol), ceramides and, to a minor degree, fatty acids preferably from native- (linoleic acid) and hydrogenated phosphatidylcholine (stearic acid, palmitic acid) which then are released from the lamellar creams in a well-controlled way. Similar to rosacea also oleogels with the already mentioned components and the above cited antimicrobial active agents to inhibit the specific anaerobic skin flora are an alternative remedy – they should however be sparingly applied.

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