

# Perioral dermatitis – causes, treatment and differentiation

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Perioral dermatitis is a common problem, but the solution is not easy to find. Associated irritations are rather persistent and definitely an ordeal for the persons affected but also for cosmeticians.

**R**edness and an increased sensitivity of the skin around the mouth are symptoms for perioral dermatitis. The skin becomes more and more irritated particularly after contact with food and skin care preparations and inflammations may appear in the form of tiny bumps.

What looks like contact allergy on first sight frequently proves to be a skin irritation evoked by a physical-chemical rather than substance-specific cause. This is the good news. Bad news is that these unspecific skin reactions require discontinuation of most of the skin care preparations on the market for a while which is rather annoying since the skin starts to dehydrate and becomes tense. Frequently the dermatologist already is contacted at an early stage with the result that topical antibiotics such as metronidazole, minocycline, erythromycin or azelaic acid are prescribed when bacterial infections are suspected.

## Prompt but not sustainable effects

In order to get a grip on the inflammation, also corticoids are prescribed. They guarantee a fast relief however tend to trigger boomerang effects in the long run since they make the skin even more sensitive as it already is. In other words: Shortly after discontinuing the medicine, the problems start at the scratch. The skin barrier is not yet restored and irritating substances and facultative pathogenic germs still can penetrate from outside. Hence also allergens – for instance from essential oils of fruit peels and juices – can find their way into the skin to “wreak havoc” with the result of further damages. The problem intensifies with every relapse. The situation can be compared with rosacea where corticoids also are contraindicated<sup>1</sup>.

<sup>1</sup> Luger TA, Loske KD, Elsner P, Kapp A, Kersch M, Korting HC, Krutmann J, Niedner R, Röcken M, Ruzicka T, Schwarz T, Topische Dermatotherapie mit Glukokortikoiden – Therapeutischer Index, Stand 31.1.2012

If the person concerned – there are a lot more perioral dermatitis cases among women than men – now goes to the beauty institute, she will inform on the medical treatment but also on the various skin care preparations she used and couldn't tolerate: O/W emulsions are not tolerated since the water phase of the preparations after drying irritates the damaged skin barrier. The preservatives and perfumes contained may even have sensitizing effects. On the other hand, the covering fats and oils of the rich W/O emulsions can facilitate the spreading of anaerobic bacteria – the same types that also are found in rosacea and acne cases. With knowledge of the potential interrelations, the experienced cosmetician will have to dampen the expectations of the stressed out customer to receive a miracle drug that resolves all problems in a single stroke. As already mentioned above, she will recommend discontinuing the preparations used.

## Minimalistic approach

Abandoning skin care creams altogether to get a grip on a skin completely out of balance proves to be a considerable challenge for both sides. The minimalistic approach exclusively focuses on small amounts of aqueous active agent sera:

- Azelaic acid is a 5-alpha-reductase inhibitor, in other words, it inhibits anaerobic germs such as propionibacterium acnes and staphylococcus epidermidis. Since the Federal Institute for Risk Assessment (BfR) proposes a maximum amount of 1 % for skin care purposes<sup>2</sup>, liposomal solutions should be recommended in order to transport sufficient concentrations of the polar substance into the skin.

<sup>2</sup> Bundesinstitut für Risikobewertung (BfR), Azelainsäure als pharmazeutisch-technologischer Hilfsstoff in kosmetischen Mitteln, Stellungnahme des BfR vom 23. Januar 2003

- Proteases degrade proteins, and bacteria and fungi utilize them to spread in the host tissue. The natural proteases of the skin are activated by UV exposure of the skin or by inflammatory processes. Therefore protease inhibitors are beneficial against inflammations but also if there is a risk of photo damage. Effective protease inhibitors are boswellic acids<sup>3</sup> from frankincense resins as e.g. boswellia serrata. Carriers also are recommended in this context in order to guarantee a sufficient bioavailability with moderate concentrations. Biodegradable nanodispersions for instance can be used as carrier substances.
- The natural 5-lipoxygenase oxidizes the omnipresent arachidonic acid in the body into 5-hydroperoxyeicosatetraenoic acid (5-HPETE), the base for the formation of the inflammatory leukotrienes LTA<sub>4</sub>, LTB<sub>4</sub>, LTC<sub>4</sub>, LTD<sub>4</sub> and LTE<sub>4</sub>. In the cosmetic context, boswellic acids (frankincense) can also be used as 5-lipoxygenase inhibitors. In how far the referenced in-vitro-results<sup>4</sup> can actually be related to an inhibited lipoxygenase has not yet been defined though. It is however proven that boswellic acids show a significant anti-inflammatory effect, as in the related rosacea cases. Note: the minocycline used in medical therapy also is a 5-lipoxygenase inhibitor.
- Vitamin B<sub>3</sub> (INCI: Niacinamide): In the cosmetic field, it is used for the recovery of the skin. In the case of acne vulgaris<sup>5,6</sup> where similar germ colonisations occur as in perioral dermatitis, vitamin B<sub>3</sub> also has an anti-inflammatory effect which is comparable to clindamycin<sup>6</sup>.
- Provitamin B<sub>5</sub> (INCI: D-panthenol), the pre-stage of pantothenic acid improves the skin hydration. In the pharmaceutical field it is used in similar concentrations as in cosmetics and administered to treat inflammatory processes.<sup>7</sup> It improves the cell formation and epithelialization after skin lesions and also inhibits the itching.
- Vitamin A (INCI: Retinol) and its derivatives stimulate cell growth as well as collagen synthesis in the epithelial tissue. Retinoids have an irritation threshold. Hence the treatment should start with low dosages. Systemic relevant concentrations will not occur with standard cosmetic applications. Nevertheless, the Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung) recommends limiting the vitamin A application to the facial and hand care.<sup>8</sup>

In the case that the perioral dermatitis symptoms appear rosacea-like and that capillary blood vessels are affected, the following active agents can be considered for the treatment.

- Tranexamic acid is used in liposomal sera in a maximum dosage of two percent. Whereas the main application for tranexamic acid in the cosmetic field is the hyperpigmentation treatment<sup>9</sup>, the antifibrinolytic acid also stabilizes damaged blood capillaries and thus attenuates redness.
- Saponins from butcher's broom, kigelia and aescin extracts stabilize the connective tissue.<sup>10</sup>

<sup>3</sup> Tausch L, Henkel A, Siemoneit U, Poeckel D, Kather N, Franke L, Hofmann B, Schneider G, Angioni C, Geisslinger G, Skarke C, Holtmeier W, Beckhaus T, Karas M, Jauch J, Werz O, Identification of human cathepsin G as a functional target of boswellic acids from the anti-inflammatory remedy frankincense, *J Immunol* 183(5), 3433-3442 (2009)

<sup>4</sup> Ammon HP, Boswellic acids in chronic inflammatory diseases, *Planta Med.* 72 (12), 1100-1116 (2006)

<sup>5</sup> Shalita AR, Smith JG, Parish LC, Sofman MS, Chalker DK, Topical nicotinamide compared with clindamycin gel in the treatment of inflammatory acne vulgaris, *Int J Dermatol.* 1995 Jun;34(6):434-7

<sup>6</sup> Khodaeini E et al., Topical 4% nicotinamide vs. 1% clindamycin in moderate inflammatory acne vulgaris, *Int J. Dermatol* 2013;52:999-1004

<sup>7</sup> Lautenschläger H, Gegenüberstellung – kosmetische und pharmazeutische Wirkstoffe, *Kosmetik International* 2010 (10), 32-36

<sup>8</sup> Stellungnahme Nr. 005/2014 vom 31. Januar 2014 des BfR (Bundesinstitut für Risikobewertung)

<sup>9</sup> Tsz Wah Tse et al., Tranexamic acid: an important adjuvant in the treatment of melasma (Review Article), *Journal of Cosmetic Dermatology* 2013; 12: 57-66

<sup>10</sup> Lautenschläger H, Indikationsgemäße Anwendungen von Nanodispersionen, Vortrag auf der 19. Jahrestagung der Gesellschaft für Dermopharmazie (GD) in Berlin am 18.3.2015

- Echinacea extract has immune modulatory effects<sup>11</sup> due to its unsaturated fatty acid amides and supports the recovery in the case of rosacea but also perioral dermatitis.

Since the skin may feel tense and become chapped in the beginning of the recovery process, astringent sera and compresses are beneficial. They contain tannins and other polyphenols which react with the superficial proteins of the skin surface and thus have cross-linking effects.

- Green or black tea extracts. As a matter of fact also common infusions can be used.
- Witch hazel extract
- Oak or birch bark extracts
- Horse tail extract
- Grape seed extract: it contains oligomeric proanthocyanidins (OPC) and catechins which also belong to the polyphenols.

### Systematic treatment in moderation

The broad range of active agents naturally invites to combine all the good features into one mixture. This leads to the result that the concentrations of the different active agents automatically are minimized and the effects cannot further be ensured. Priorities need to be set in this case. It is recommended focusing on a causal treatment with a small selection of sera in order to achieve prompt results.

During the inflammatory phase, emphasis should be laid on protease, reductase and lipoxygenase inhibitors. After remission of the inflammation, a treatment with the recovering vitamins A, B<sub>3</sub>, B<sub>5</sub> and connective tissue stabilizing sera is suggested. The above-mentioned sera also are beneficial in treating the rosacea skin in the immediate vicinity. In the case that superficial blood vessels are affected, butcher's broom, kigelia and aescin extracts as well as tranexamic acid have proved successful. Some of the sera as for instance azelaic acid, vitamin B<sub>3</sub> and tranexamic acid influence the melanin formation. Wearing a head covering, anyway a must for persons with perioral dermatitis and rosacea prone skin, will protect the facial skin against sun radiation and avoid the use of fat-enriched sun protection creams. The sera should be free of perfumes and pre-

servatives since the risk of sensitizations is increased due to the damaged skin barrier. And another word of advice: Liposomal or nanodispersal solutions considerably improve the bioavailability of active agents.<sup>12</sup>

### Avoid additional irritations

There is one thing left to say: any kind of peelings – mechanical, enzymatic or chemical (herbs or AHA acids) – are absolutely counterproductive during the acute phase. Experience has shown that particularly chemical peelings that are performed over an extended period of time generally increase the sensitivity of the skin and may even be a contributory cause for perioral dermatitis. Surface active tensides and emulsifiers should be avoided for skin cleansing. Lukewarm and soft (!) water is the best remedy for the skin.

After the skin has been soothed, barrier active creams can gradually be applied however only sparingly in order to avoid a recrudescence of the problem.<sup>13</sup> It is important to readjust the TEWL to a normal level. Occlusive skin care in combination with make-up leads to skin swellings and subsequently to an increased sensitivity. By the way: Similar symptoms around the eyes develop in the same way. The eyelids are particularly affected in this case.

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<sup>11</sup> Raduner S, Majewska A, Chen JZ, Xie XQ, Hamon J, Faller B, Altmann KH, Gertsch J (17 March 2006), Alkylamides from Echinacea Are a New Class of Cannabinomimetics, Journal of Biological Chemistry 281 (20): 14192–14206

<sup>12</sup> Lautenschläger H, Biodegradable lamellar systems in skin care, skin protection and dermatology, SOFW-Journal 139 (8), 2-8 (2013)

<sup>13</sup> Lautenschläger H, Überpflege – Einfach zu viel des Guten, Kosmetik International 2015 (3), 22-25