

Cornification disorders - the adequate skin care

published in Kosmetische Praxis 2004 (6), 6-8

Keratoses of the skin are common public diseases. As a result, also cosmeticians are frequently faced with questions regarding the care of the affected skin. In the following, you will find interesting information on active agents, cream bases as well as cleansing and skin care products for these conditions.

In the narrower sense, mainly ichthyoses and palmoplantar keratoses pertain to the cornification disorders. Ichthyosis originates from the word "ichthys" which is the Greek term for fish and relates to the frequently fish scale similar appearance of the affected skin. Palmoplantar keratoses are hyperkeratoses which particularly affect the palms and soles. These cornification disorders usually are hereditary skin conditions and already develop in early childhood. The term hyperkeratosis indicates an abnormal thickening of the horny layer. In contrast to hyperkeratoses, parakeratoses are characterized by a largely missing stratum granulosum and psoriasis e.g. belongs to this group of skin disorders. Specifically rough skin on the outside of the upper arm with resisting scales and isolated minor nodules also is genetically induced and pertains to the hyperkeratoses.

Dermatological agents

A precise differential diagnosis and the following dermatological treatment of the specific keratoses belong to the responsibilities of the dermatologist. Frequently, urea, salicylic acid, lactic acid salts as well as vitamin A acid products (retinoids) are used as active agents in the ointments and creams applied for the treatment.

Urea – In low concentrations it retains the water in the frequently extremely dehydrated skin which keeps it smooth. In higher concentrations urea has keratolytic effects and in this function it is an appropriate substance for the treatment of severe cornifications.

Salicylic acid – This substance also has keratolytic effects and is rather used in less severe cases. Salicylic acid may sometimes cause intolerances.

Lactic acid salts – They are applied as moisturizing agents. Still in use are **vitamin A acid products (retinoids)** to be taken orally in severe cases and also in cases of palmoplantar keratoses. Free alpha hydroxy acids (AHA) to which, among others, the lactic acid

belongs to are appreciated because of their keratolytic effects.

The lipid content of the base substances used for ointments has to be individually adapted. Vaseline bases may lead to intolerance and may cause itching. In combination with moisturizers, lipid substances avoid the formation of rhagades as well as additional infections. Oil baths may also be helpful especially if they are free of emulsifiers (see below). Frequently glucocorticoids are used for the symptomatic treatment.

Objective: effects in deeper skin layers

Besides the conventional dermatological treatment which is based on pharmaceutical agents, the individually adapted care of the skin with the appropriate cream base may show impressive results. According to the American dermatologist Professor Kligman, an effective care of the stratum corneum consequently causes positive results in deeper skin layers which can be compared with the effects of pharmaceutical agents. The advantage is quite obvious: The side effects of pharmaceutical agents can thus be avoided. For this specific type of therapy, Kligman has coined the term "corneotherapy". Especially in cases of skin barrier disorders this therapy has proved successful which has also been verified by scientific studies.

However, also for corneotherapy, hyperkeratoses are a very complex issue as genetic dispositions generally can not be cured with topical therapies using adequate cream bases. Though, already effectively influencing the moisture and lipid balance in the skin by applying physiological skin care concepts has positive effects on the smoothness and softness of the skin. Both are essential preconditions for the successful treatment and for avoiding secondary effects.

Adapted to the skin

Moreover, positive results can be achieved by

avoiding substances in preparations which cause additional stress on the skin. Today, allergenic substances like **preservatives** and **perfumes** which actually are unnecessary can easily be eluded. Although mineral oils applied for covering purposes increase the moistness, in physiological respect they rather act like foreign bodies on the skin. One of the essential aspects is to avoid conventional emulsifiers particularly those which are deposited in the skin after penetration and then cause wash-out effects whenever they come in contact with water which subsequently leads to an increased dehydration of the skin. This also applies for today's non-ionic as e.g. PEG and derivatives as well for non-degradable anionic emulsifiers like sulfates and phosphates whereas the monoglycerides and diglycerides of physiological acids will not create any problems in this respect. Regarding physical aspects, the components copying the membrane bilayer structures which are also found in the lipid bilayers of the skin like **ceramides** and **phospholipids** are the ideal choice. Only recently, dermatologists in Moscow were able to show that ichthyosis congenita cases could substantially be improved with the help of creams with derma membrane structure already after a period of three weeks. Besides physiological lipid substances and moisturizers, creams with derma membrane structure also contain **phosphatidylcholine** as a binding element between lipid and water phase. Similarly positive results could also be achieved among barrier disorder cases like atopic dermatitis (neurodermatitis) and contact dermatitis.

For acne vulgaris cases for example which frequently are caused by cornification disorders at the exits of the sebaceous glands, **essential fatty acids** can be an important aspect. In acne vulgaris cases caused by follicular keratosis, the skin shows deficits in linoleic acid. These cases can be treated with appropriate linoleic acid containing liposome products which also have membrane bilayers. In this context, clinical studies showed comedone reductions of almost 70 percent within a period of four weeks.

Knowing the tricks

Of course, cosmetic products can only help by providing the adequate care for the skin suffering from cornification disorders. If the products, however, conform with the **corneo-therapeutic principles** and moreover, if they additionally are in accordance with the respective dermatologist, they are the ideal

precondition for **synergetic effects** as defined for the holistic treatment.

A typical **cosmetic cream base** which can be applied for ichthyosis cases for example contains water, triglycerides (neutral oil, olive oil, shea butter), phytosterols (included in shea butter), moisturizers (NMF), phosphatidylcholine (extracted from soybean lecithin), squalane and ceramides. It is worth mentioning that the cholesterol content of the horny layer is specifically low in the skin suffering from ichthyosis. This deficit can however be compensated by the **phytosterols of the shea butter** which have a very similar structure.

Applying mild skin care products

Skin cleansing – A very important issue is the cleansing of the skin. Attention should be paid to the fact that the ingredients of the cleansing products must be completely removed from the skin as e.g. refattners in order to guarantee the efficacy of the follow-up treatment like skin care creams and packs. The tensides used should be very mild on the skin. Frequently, highly diluted soapsuds consisting of the alkali salts of physiological acids like palmitic and stearic acid are more appropriate than today's liquid soaps.

Peelings – Depending on the specific hyperkeratosis cases, also peelings are applied and the dermatologist mostly uses peeling substances based on fruit acids (AHA acids). For the general use at home, however, skin care creams containing abrasive bodies based on waxes as well as on the above-mentioned criteria are more appropriate.

Packs – When using packs, vitamin packs should be preferred which stay on the skin when the surplus cream is removed after the appropriate span of time. A frequently used cosmetic agent is **vitamin A** in form of its derivatives which slowly release the active agent in the skin. In this context also vitamin A products in form of nanoparticles are an interesting alternative. They may be applied in pure form and subsequently be covered up with base creams. After permeating into the skin vitamin A will be transformed into vitamin A acid and thus supports the dermatological retinoid therapy. Other vitamins like vitamin C and also E as well as D panthenol and evening primrose oil may be helpful and partly also show synergetic effects.

Body lotions – For body lotions which are applied after the shower or bath, also products with a membrane bilayer structure have proved successful. They keep the skin smooth without any sealing effect. In this connection barrier lotions consisting of phosphatidylcholine nano-

particles are also an interesting alternative. Just similar to the liposomes, they effectively provide the skin with linoleic acid but simultaneously also supply additional lipid substances. An essential advantage of linoleic acid is the fact that it improves the elasticity of the stratum corneum which shows a rough and scaly surface in cases of deficits in linoleic acid. Among the pure oils, avocado oil can be recommended which is rich in phytosterols. There are also avocado oil extracts (Avocadin) on the market which contain even higher concentrations of phytosterols. These extracts may be mixed into oleogels (skin care products without water) which are likewise free of paraffin oils and represent the appropriate skin care for extremely dehydrated skin conditions, above all for cracked soles and hands. Also oil baths containing avocado oil which are based on phosphatidylcholine and, moreover, are free of emulsifiers can be helpful for ichthyosis cases as they will not degrease the skin.

Dr. Hans Lautenschläger