

PRACTICAL TREATMENT OF DRY SKIN

W. Raab*

*Medical Director, Allergy Clinic "Innere Stadt" Vienna, Austria

Received: October 25, 1995.

Key words: Dryness, Moisture, Ultraviolet, Age, Photodamage, Atopy.

Synopsis

Dry skin may result of exogenous or of endogenous factors. Exogenous factors may be excluded by informing the patient of his false behaviour. If endogenous factors are the cause of the dry skin state, reasonable measures of skin cleansing, skin care and skin protection should be considered.

Riassunto

La pelle secca può essere il risultato di fattori esogeni o endogeni. I fattori esogeni si possono eliminare facendo presente al paziente il suo comportamento errato. Nel caso invece in cui siano fattori endogeni la causa della secchezza della pelle, dovranno essere prese in considerazione misure adatte per la sua detersione, cura e protezione.

INTRODUCTION

Water is the softener of the horny layer and secures smoothness, elasticity and suppleness. Under normal conditions, water enters the horny layer via transdermal diffusion (TEWL). The evaporation of water from the skin surface is prevented by the action of the natural moisturizing factors (NMF). The water balance of the horny layer is depicted in figure 1, the composition of the NMF is shown in figure 2. Dry skin is either caused by external factors or by endogenous changes.

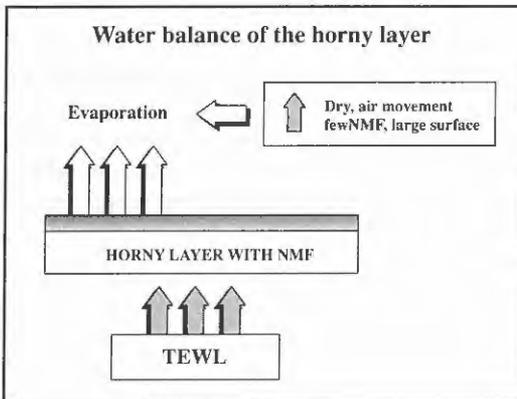


Fig. 1

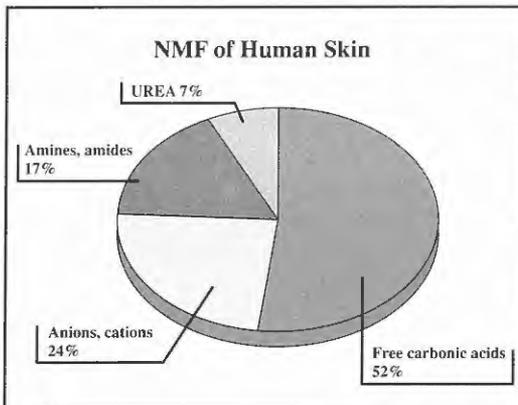


Fig. 2

EXTERNAL CAUSES OF DRY SKIN

Among the external causes of dry skin, abuse of soaps and detergents must be mentioned on the first hand.

But often a prolonged contact with water is the reason for skin dryness, as the NMF is dissolved and rinsed off.

For facial skin, prolonged exposure to a dry environment causes skin dryness, unless the water loss is prevented by the application of moisturizing skin care products.

ENDOGENOUS REASONS FOR DRY SKIN

There are three endogenous reasons for dry skin:

- constitution, especially atopy,
- genetic ageing and
- photodamage.

In atopy, the disturbed barrier function must be regarded as the main reason for skin dryness. Furthermore, there is almost always some inflammation present which causes skin dryness.

In senile skin, water loss is increased due to the numerous wrinkles and folds which increase the surface. Furthermore, water supply is decreased as general circulation is reduced and an atrophy of rete plugs occurs (reduced size of the contact area with the supplying dermal tissues).

In photodamage, the surface is even more increased than in senile skin as there are numerous wrinkles and deep folds (elastosis); solar keratoses provoke a further increase in water loss. - The mechanisms for endogenous dry skin are depicted in figure 3.

SIGNIFICANCE OF DRY SKIN

For the patient, dry skin causes an unpleasant "old and neglected" appearance. Steady application of skin care products is needed to counteract

itch and tension. From the dermatological point of view, dry skin often is the cause of eczemas and infections, especially in older persons.

REGIMEN IN DRY SKIN

Three important measures have to be taken to counteract dry skin and to prevent the disturbing consequences of this skin state:

- mild, non-alkaline skin cleansers,
- regular application of O/W or W/O-emulsions with moisturizing compounds, and
- skin protection against all kinds of environmental influences (ultraviolet, heat, cold).

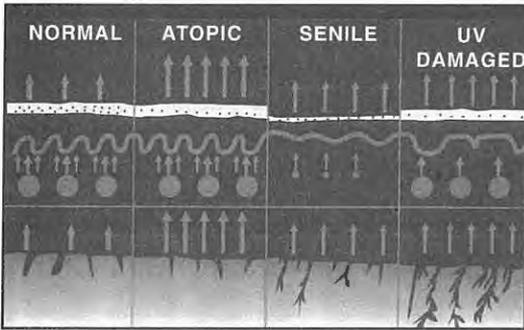


Fig. 3

CLEANSING MEASURES IN DRY SKIN

Skin cleansing may be effectuated by the application of

- natural (soaps) and synthetic detergents (syndets),
- adsorptive cleansing agents (e. g. oatmeal),
- desquamating agents ("exfoliation") and peeling agents,
- dermabrasive agents, e. g. polyethylene granules (cf. 2,5).

The best way of cleansing dry skin is the use of slightly acid, mild detergents. In cases of very sensitive skin, in atopy or in atrophic skin, the use of adsorptive complexes should be preferred. Oatmeal extracts, prepared for cleansing purposes, contain complexes consisting of polysaccharides, oligosaccharides, oils and proteins. That means that the complex exhibits lipophilic and hydrophilic groups on its surface thus permitting the removal of lipophilic and hydrophilic "dirt" (substances from the environment, decomposition products of sweat, sebum and topically applied preparations) by adsorption.

Figure 4 demonstrates the roughness of the skin surface following the use of soaps, detergents or adsorptive cleansing agents with smoothing additives.

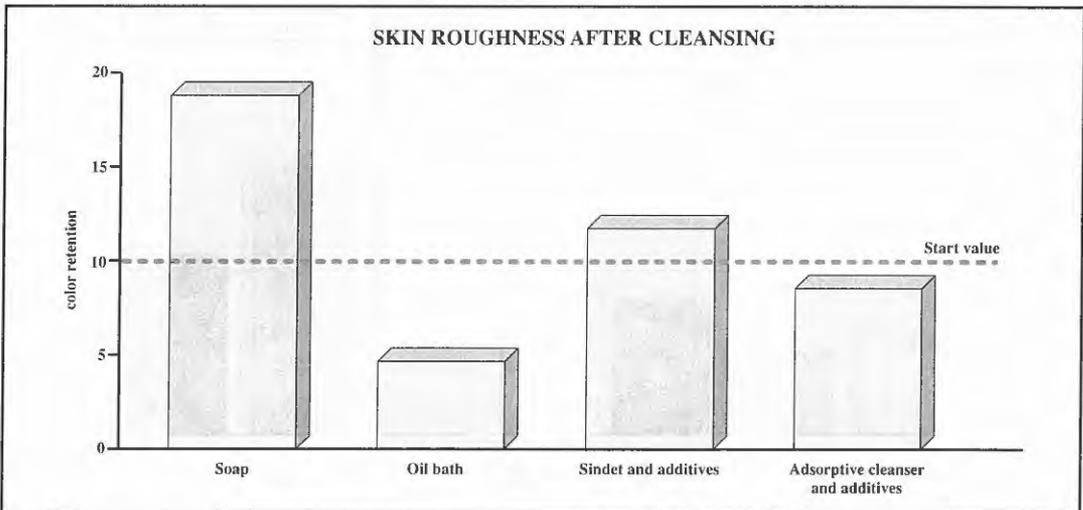


Fig. 4: Skin roughness after different forms of cleansing, determined by the colour retention method

SKIN HYDRATION

Skin hydration may be effectuated by the application of emollients (pseudo-occlusive effect closing small clefts on the surface of the stratum corneum), by the application of moisturizing compounds, or by the increase of oxygen tension in the stratum corneum. The various possibilities of increasing hydration in the stratum corneum are depicted in figure 5.

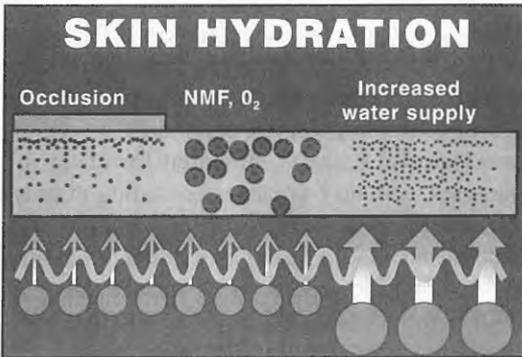


Fig. 5

Among the moisturizers, humectants (e. g. glycerol) and moisturizers have to be mentioned. Moisturizers such as mucopolysaccharides (hyaluronic acid) are preferable as they retain water even in a dry environment and offer it to the horny layer. Under such unfavorable conditions, humectants may even withdraw water from the skin (cf. figure 6).

The observation that oxygen tension in the horny layer decreases steadily with increasing age (figure 7) has provoked investigations of the changes in dry skin following the application of oxygen delivering preparations (1).

In fact, applications of a cream containing oxygen (4,5%) in 10% perfluorodecaline significantly increases oxygen tension in the horny layer as compared to the vehicle (6,7). Cf. figure 8. Parallel to the increase in oxygen tension an increase in moisture was noted (figure 9). Furthermore, wrinkle number and depth decreased under the influence of an oxygen delivering cream (figure 10).

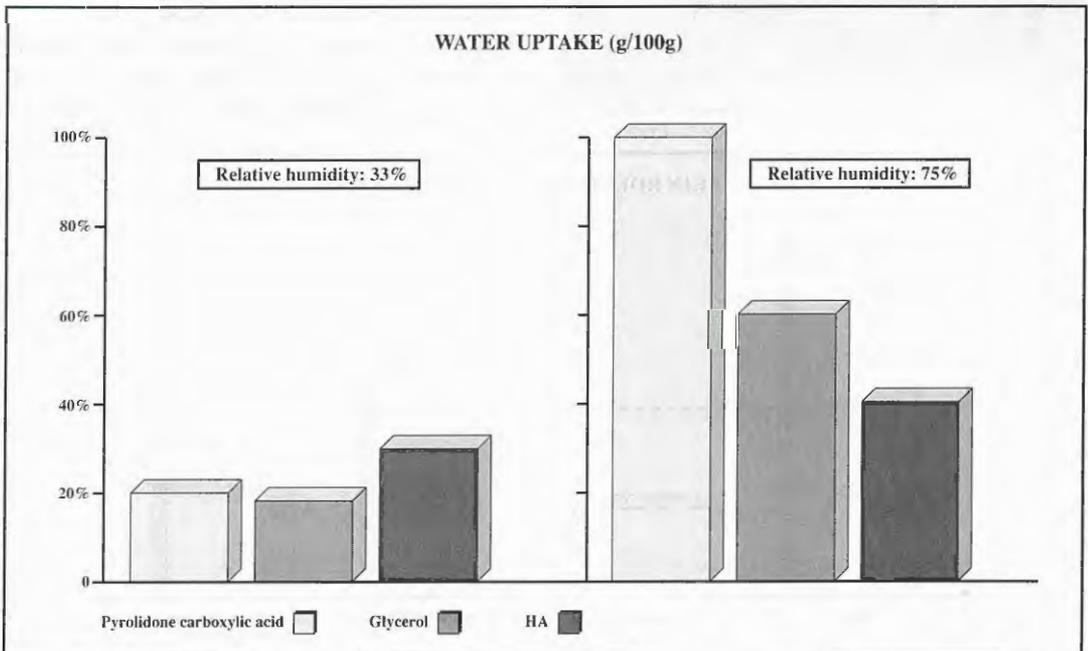


Fig. 6: Water uptake by different moisturizing compounds, humectants and true moisturizers depending upon the humidity in the environment

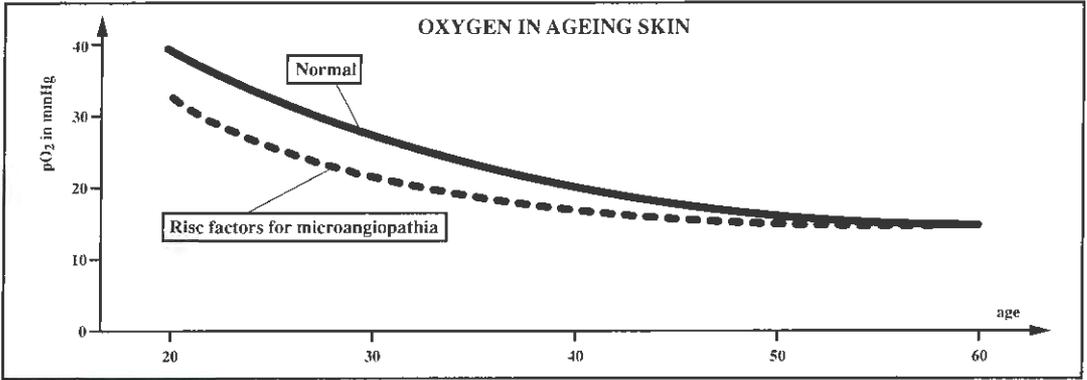


Fig. 7: Oxygen pressure in the skin, depending upon age. Note the reduced oxygen pressure in persons with risk factors for microrangiopathis such as cigarette abuse

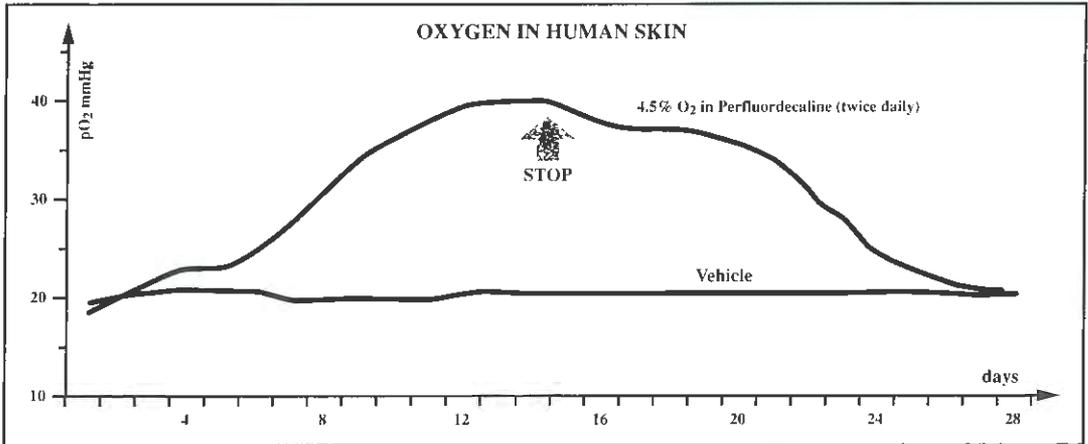


Fig. 8

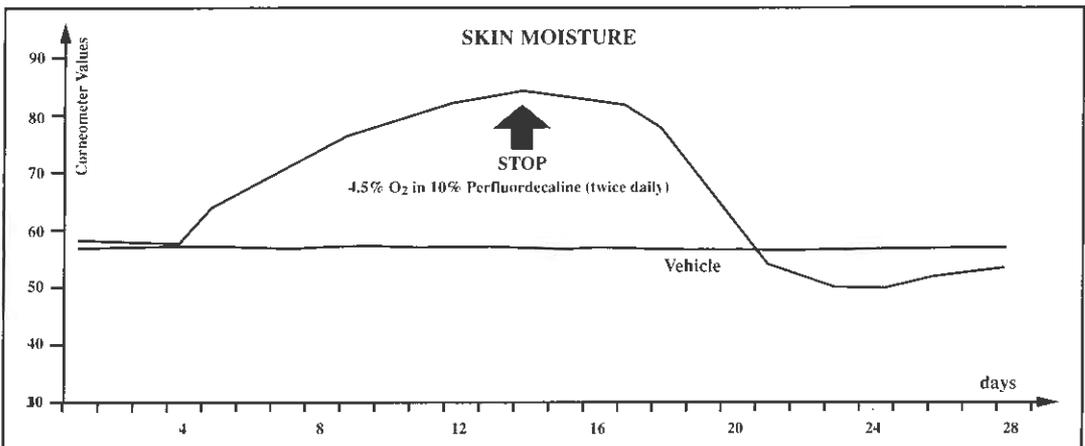


Fig. 9

SKIN PROTECTION

Most forms of environmental stress increase skin dryness. Therefore, protection against physical influences or, even better, avoidance of those plays an important role in treatment and prophylaxis of dry skin states. Ultraviolet irradiation, UVB as well as UVA, provokes skin dryness due to alterations of the epidermis and the dermis over the years (3, 4). As it is non realistic to try to keep people out of the sun, doctors should advise their patients to apply sun protecting creams in a reasonable manner.

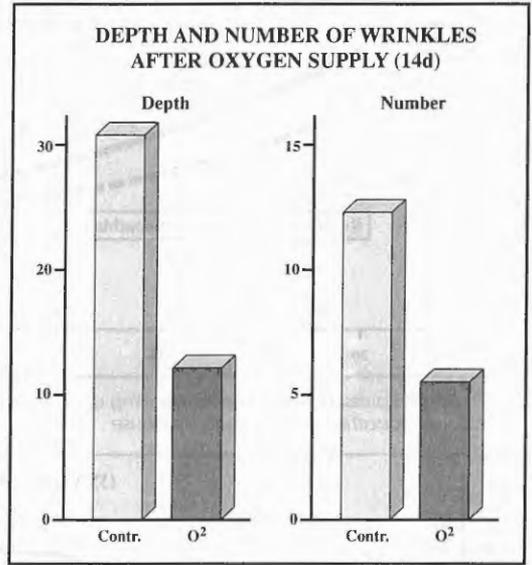


Fig. 10

REFERENCES

1. Artmann, C. et al.(1993), Sauerstoff in der Haut. Ein neuer Parameter der Hautalterung, *SÖFW Journal* 1993 15, 1-5.
2. Raab, W. (1990), Skin cleansing in health and disease, *Wien. Med. Wschr.* 140, Suppl. 108.
3. Raab, W., Zeitalterung und Umweltalterung der Haut, *hautnah 6/1994 Dermatologie*, 589-594.
4. Raab, W. (1994), Reinigung, Pflege und Schutz der Altershaut, *Handbuch der Gerontologie. Bd. 7*, 365-388, Fischer, Stuttgart, Jena, New York.
5. Raab, W. und U. Kindl (1997), Pflegekosmetik. Fischer und Govi, Stuttgart und Eschborn (2nd ed.).
6. Stanzl, K. et al.(1993), A new cosmetic product containing molecular oxygen, *Eurocosmetics* 1993 1, 1-6
7. Zastrow, L. et al., The effectiveness of molecular oxygen in cosmetic formulations, *In press*.

Author Address:

W. P. Raab, M. D., FAAD
 Professor in Dermatology
 3, Walfischgasse
 A-1010 Vienna, Austria