Therapy and wellness in the bathtub

published in Pharmazeutische Zeitung 148 (3), 22-26 (2003)

Bathing and balneological products already have a long tradition and still enjoy great popularity. Moreover: even in today's shower age, the wide range and the application of balneological products is still on the rise.

Water has a strong attraction for human beings. While children concentrate on fun and movement, adults rather focus on skin cleansing and aspects of health and relaxation.
Besides cleansing, pure water has a multitude of different effects on the organism and the skin. Above all the stimuli caused by hot or cold water and the buoyancy are useful in the therapy of circulation problems, rheumatic symptoms and general motility disorders. Physiotherapy in water is highly effective. Warm showers stimulate the circulation and cold showers have a smoothing effect on the skin, reactivate the circulation and prompt the adrenal glands to increase the production of hormones.
However, water also has its side effects: due to the surface active agents contained in skin cleansing products it washes substances out of the skin and especially persons with a tendency for dry skin and persons suffering from atopic symptoms are affected here. Also emulsifiers in skin care creams, which remain in the horny layer and form deposits there will be reactivated in contact with water and therefore contribute a major part to the wash out effect. Among others, ethoxilates which are widely used today can be stated here as an example.
In cases of skin barrier disorders, hard water even is increasing the skin problems as it may precipitate the natural acids available in the skin as for example palmitic acid into calcium salts which consequently deteriorate the skin barrier condition. Therefore, appropriate skin care creams and lotions corresponding to the individual type of skin to be applied after bathing or showering are an essential element of cultivated bathing habits.
Bathing preparations are those kind of products which help the skin to benefit from or even increase the positive effects of water and which at the same time can reduce the side effects. Bathing products are designed for skin cleansing, for therapeutic measures, the wellness in general and for skin care. Depending on their application either in the bathtub, as a partial bath or in the shower, the products have to meet different requirements.

Skin cleansing

One of the essential cleansing aids still is solid soap; however its composition has been completely modified. While a piece of soap formerly were made of sodium (curd soap) or potassium salts (soft soap) of the palmitic or stearic acid, today syndet detergents are used which consist of the sodium salts of different synthetic surface active agents. The pH value for this application mostly is between 4.5 and 6 and as a consequence, the skin will swell less compared to the use of conventional soaps which may reach pH values of 9 to 11.
Liquid soaps frequently contain ingredients similar to syndet pieces. By definition they proportionately have higher water content with less detergent substances. Liquid soaps and other water containing preparations like shower products and shampoos are more liable to attract microorganisms and therefore include higher concentrations of preservatives than solid soap.

Taking a shower...

Irrespective of the technological structure and unlike bathing products (foam baths), liquid soaps and shower products have a different effect on the skin due to their higher content of surface-active agents and there are specific requirements regarding their tolerance.
Depending on their application, the product names may vary. Thus cleansing and shower gels (shower baths) are more or less transparent products which are thickened by adding substances to control the consistency. Shower creams contain an additional oil phase which is attributed to have re-fattening effects. Similar differences can be found in shampoos which actually are designed for hair cleansing but in reality often are applied on the whole body.
Liquid soaps and shower products which simultaneously have cleansing and re-fattening

effects recently have been discussed quite controversially. Though, re-fattening agents generate a very agreeable feeling on the skin they penetrate into the skin barrier layers where they may increase barrier disorders for sensitive skins due to the frequently contained surface-active ethoxilate derivates which in physical respect only differ from emulsifiers by their CMC (**c**ritical **m**icelle **c**oncentration) and HLB value (**h**ydrophilic **l**ipophilic **b**alance).

Cleansing for sensitive skin

Persons with atopic skin are recommended to carefully select the re-fattening product. Experience has shown that they rather tolerate a highly diluted curd soap which is based on palmitic acid (natural acid) for cleansing and a separate skin care cream for re-fattening the skin afterwards. Specifically appropriate are skin care products on DMS base (**d**erma **m**embrane **s**tructure). DMS products are free of emulsifiers and as to their physical structure, they are similar to the membranes of the skin.
From the dermatological point of view foaming agents in cleansing products are not appropriate for sensitive and dry skin. Recommended here are products which are less foaming as e.g. products based on surface-active agents gained from sugar.
All cleansing products which are used in combination with water have a degreasing effect and the skin consequently also looses its natural protective agents. In cases of sensitive skin, this effect should be minimized by applying appropriate products together with adequate skin care. Alternatively parts of the body can be cleansed with cleansing milk free of emulsifiers. As a ”two in one” product it has the composition of a highly liquid skin care cream which is applied abundantly and afterwards removed together with the dispersed dirt particles. The skin then may be rinsed off with water.

Less foam means better tolerance

Just like liquid soaps, bathing concentrates contain high amounts of cleansing surface-active agents which however will not get to the skin in concentrated form as they are dispersed in water. Naturally, the amount of foaming agents is higher than in liquid soaps due to the higher volume of water.
Foam baths are very popular with children. Though, adults also judge a large amount of foam to be a synonym for effective skin cleansing. However, especially the foaming agents cause the skin to swell up and also extract the natural protective substances. Although from the dermatological point of view the avoiding of foam seems to be reasonable, it is quite difficult to convince consumers with a healthy skin of the benefits of these products. Persons with skin problems however show different attitudes: they generally prefer products free of foaming agents, re-fattening substances and perfumes or even avoid surface-active agents at all.
Basically it can be said that foaming baths can only be recommended for insensitive or oily skin. For small children whose skin still has a low resistance specifically mild cleansing substances should be chosen.

Salt baths for therapeutic purposes...

The daily bath has lost its significance of former days in favour of time-saving showers but it still is very important for skin cleansing.
In the field of dermatology salt baths still play a major role as they are often applied in cases of skin diseases to remove crusts and scales. Salts support the healing and influence the cell proliferation in the skin. Baths with salt of the Dead Sea, table salt and brine may reduce the increased production of epidermal lipids in cases of psoriasis and frequently are combined with a therapeutic UV treatment (photo-therapy). In comparison with pure water, salt baths reduce the swelling of the skin and thus allow a prolonged stay in the bathtub. It is however necessary that the salt concentration is high enough.

...and wellness

Conventional bath salts for a daily use on healthy skin have considerably lower concentrations than therapeutic salt baths and their effect more or less is of psychological nature for the general wellness. After their dispersion, perfumed tablets, granules or crystals based on table salt, sodium sulphate or sodium carbonate show a neutral or low alkaline pH value. The popular effervescent tablets contain sodium bicarbonate, citric or tartaric acid, perfumes and dyes in crystalline dry form. As soon as the tablets get into contact with water, the contained acid releases carbon dioxide from sodium bicarbonate.
Other bath salts produce a higher alkaline pH in the water due to a specifically high concentration of sodium carbonate. This is based on the theory of achieving a de-acidification of the organism by binding the natural acids of the skin. From the chemical point of view, by the extraction of acids and other barrier substances which are emulsified with the developing of water-soluble soaps, the skin is stimulated to produce more barrier substances, that is, the regenerational activity

of the skin will increase. While this effect is beneficial for persons with normal to oily skin it rather is counterproductive for persons with dry and atopic skin as the relatively low amount of barrier substances in the skin is further reduced.

Other therapeutic baths

Besides cold and warm water treatments like Kneipp baths as for instance water stepping, or underwater massage and exercises as well as salt baths, therapeutic baths like hip baths and foot baths are recommended for various medical indications. They contain above all astringent, anti-phlogistic, anti-itching, keratolytic, antimycotic, antiseptic, disinfectant, soothing and stimulating additives. In general monosubstances are used here but also extracts and essential oils; also additives may be included to facilitate the dispersion of the substances in water.
Objective here is the treatment of the skin or the complete organism. In case of volatile substances like essential oils for example, the effect will be supplemented by inhalation and thermotherapy, which is especially desired for cases of colds and flu.

Enjoying a cure in a thermal spa

In the narrower sense, spas belong to the balneotherapy which means therapeutic applications with water from mineral and thermal springs frequently in combination with thermal spas. As the substances with attributed healing effects mostly are available in low concentrations only, the mineral water cures have to be applied for a period of several weeks. With the exception of waters containing humic acid the dispersed substances mostly are mineral salts and dissolved gases.
Typical examples are brines which in higher concentrations have to be counted to the salt baths, trace elements, carbonic, sulfuric, radon and iodine waters. Depending on their composition and the combination with physiotherapies baths have healing effects primarily for chronic or degenerative diseases. Frequently they are combined with inhalations as for example fir twigs which release essential oils in brines.

From donkey milk to bath oils

Baths with donkey milk, mare milk and oil are the precursors of bath oils for the skin care. In today's products natural oils (triglycerides), waxes, paraffin oils and silicones and increasingly also high-quality oils like olive oils are used. For persons with atopic symptoms for example soybean and evening primrose oil are recommended.
There is also a great variety of different bath oils and depending on their composition they are also used as shower oils. Basically there are three types:

- Spreading bath oils which are free of emulsifiers or which only contain a small amount of emulsifiers; the technical term spreading means a fast and even dispersion on the water surface which mostly is facilitated by adding synthetic esters like isopropyl myristate (IPM);
- Milky dispersing bath oil concentrates with a high percentage of emulsifiers;
- Colourless soluble bath oil concentrates with a high emulsifier content which are also sold as "foam bath oils" or "oil shampoos".

Emulsifiers in bath oil concentrates disperse fatty substances or oils in water and avoid that they settle at the bathtub. But they also show some side effects: emulsifiers release natural protective substances out of the skin while this degreasing effect is not compensated by the transport of bath oil components into the skin.
This actually is the point where most of the bath oils differ from natural milk where membrane-active substances like phosphatidylcholine take over the function of emulsifiers. These physiological substances are very well tolerated and stick to the keratin of the skin which helps the milk drops to be deposited on the skin.
This principle is the example for a new type of bath oil which is composed of pure phosphatidylcholine and skin oils. Both the substances will spread on the skin however not settle at the bathtub. In contrast to conventional products bath oils with phosphatidylcholine will not develop the usual oil in water emulsions (O/W) after being mixed with water but a mixture of large-sized liposomes and nanoparticles (semisomes).

Aromatherapy

For specific purposes like aromatherapy and the wellness sector, bath oils are enriched with essential oils and fragrances and skin care oils have a transport function here. The products are specifically used for the body care and the circulation and depending on the specific type of essential oils or the appropriate mixtures relaxing, stimulating or anti-spasmodic effects may be achieved.
For these purposes, essential oils have to be very well dispersed in water as they may irritate the skin in concentrated form. Hence finished products generally contain emulsifying

components, a fact which also applies for fragrant sauna infusions.

Skin care after the bath

Depending on the pH value, the content of surface-active agents or emulsifiers, the products for bathing, shower and cleansing applications have a degreasing effect on the skin. As a consequence the transepidermal water loss (TEWL) increases and the skin dehydrates. Therefore it is recommended to apply a well spreading and fat-containing skin care cream or body lotion after the bath which also should include moisturizing substances. In cases of very sensitive skin, body lotions based on DMS or nanoparticles should be applied which are free of emulsifiers and thus support the regeneration of the skin.

Dr. Hans Lautenschläger