



FOOT CARE CURRENT

The magazine
for the practice

Special edition

Treatment, skin care and care consultation for diabetics

When feet have sugar



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Experience from science and practice



Diabetics prefer to be informed by their foot care pro. Consultations are an important service, and do not require a lot of time with suitable means.

Foot complications in diabetes

Preventive care is important

Foot complications are among the most common consequential complications of diabetes. The associated problems are well known: Out of the approx. 60,000 amputations per year in Germany, approx. 70 percent are in diabetics.

Aside from the pain, suffering and the physical and emotional strain to the affected persons, the socio-economic dimension naturally also plays an important role in view of these figures. According to a Swedish study, merely the direct costs for long term treatment after amputation are up to 63,100 US dollars. Calculated by the frequency of amputations, this would mean 1.7 billion annually in Germany - not including the indirect consequential costs, e.g. for early pensioning, care and the financial burden on patients due to treatment and care.

But it's much worse: About half of the amputees pass away within three years. More than twenty years ago (1990), the St. Vincent Declaration therefore demanded that the amputation rate should be cut in half in Europe – a goal which has still not been widely achieved. Efforts are therefore being made in the direction of even better medical care, which particularly includes expansion of outpatient foot departments, specialised practices and integrated care concepts.

These efforts are necessary in view of the expected worldwide doubling of diabetic numbers by the year 2030. And they are

bearing fruit now, as an evaluation of approx. 3800 patient data in 2007 shows. However medical care alone is not the non plus ultra. The best care does not help if the patient has not realised the need to carry out their own preventive care. All guidelines on diabetic foot which were meanwhile issued by the occupational expert associations (DDG), the KBV and BÄK therefore unanimously demand the following: Prevention with home and professional foot care is an important prerequisite to avoid diabetic foot complications and therefore, one of the most important information objectives when providing advice to diabetics.

On the other hand: Many diabetics do not even know that they need to do something for the health of their feet. This is shown by the results of the GEHWOL Diabetes Report 2009. For the investigation, the research institute INSIGHT Health surveyed 3375 diabetics out of a treatment pool of 376 physician's and specialist practices. Two thirds of patients (69 %) consequently do not even know that they have to pay attention to their feet. But if diabetics do perform foot care, then it is at the recommendation of relevant experts. When se-

lecting care products, for instance, they give preferred attention to the expertise of a foot care professional. 61 percent of patients who regularly do something for their feet value expert advice by a specialist, while 31 percent value the exclusivity of the products that are available at the foot care practice. The care of diabetes patients is therefore not just a therapeutic challenge. Information is just as important, and patients welcome it. After all, advice helps them take shared responsibility for keeping their feet healthy, lastly also obtaining the desired sustained benefit from the foot specialist's practical work.

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Redaktion und Verlag

Dorothea Küsters Life Science Communications GmbH
Leimenrode 29
60322 Frankfurt am Main
Telefon: 069 61998-0
Telefax: 069 61998-10
E-Mail: info@dkcommunications.de
Internet: www.dkcommunications.de

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Your advice is extremely valuable to diabetics!

Doing something good for the feet

Do your patients suffer from diabetes? Do you know that you are in charge of your treatment success? Aside from regular metabolism checks and visits to a specialist, foot care pro or orthopaedic shoemaker, measures which you carry out yourself are most important. Patients can protect their skin against dehydration, and therefore further damage, with daily care measures.



Good for the feet, important protection in diabetics – care with rich foot creams for a healthy, stable skin barrier

Dry skin is a widespread problem. It is more common in children, elderly persons and particularly in diabetes. Complaints can occur particularly on the feet, which tend to be drier. The skin may crack. Diabetics often do not feel smaller injuries, since diabetic nerve disorders impair sensitivity. Wound healing is usually disturbed as well. Small tears become larger wounds. Impaired barrier functions allow pathogenic microbes to enter. This results in inflammation, right up to and including „diabetic foot“.

Prevention protects against foot syndrome

- Inspect the feet daily with a mirror, paying special attention to injuries, foreign bodies, blisters and fine cracks!
- Feel your shoes for foreign bodies before putting them on! (risk of injury!)
- Regularly check your ability to sense temperatures and touch!
- Get help if you have visual problems or other difficulties!
- Foot baths should not take longer than three minutes. Always check the tem-

perature of foot baths with a thermometer (max. 35 °C), for your ability to sense temperatures with your hands may also be impaired.

- Avoid hot water bottles, heating cushions and other sources of heat.
- Thoroughly dry the feet with a towel after washing them, including between the toes (e.g. with a cotton swab).
- Care for your feet with lipid and moisture containing products! As a foot care pro, help with the selection. For instance, GEHWOL med Lipidro Cream, GEHWOL FUSSKRAFT BLUE or FUSSKRAFT Hydrolipid Lotion are suitable for the care of dry skin and to avoid excess callus.
- If the feet are brittle and cracked and already have tiny injuries, so called rhagades or cracks, GEHWOL med salve for cracked skin with medicinal special soap and panthenol which encourages healing is suitable.
- Due to the risk of fungal infections, the spaces between the toes must be kept dry and clean. Very tight spaces between the toes can be cleaned using a cotton swab

soaked in GEHWOL med Nail and Skin Protection Oil.

- See a doctor if you get foot fungus, change your socks daily, and spray the insides of your shoes with GEHWOL Foot + Shoe Deodorant! But fungal infections don't have to occur in the first place. When selecting a foot care cream, check to make sure that it also provides protection against foot fungus. This is the case in most GEHWOL foot care creams.
- There are special nail protection products to prevent nail fungus, such as GEHWOL med Nail and Skin Protection Oil with the proven antifungal active substances bisabolol and clotrimazole. Antifungal protection with these active substances is also available in spray form (GEHWOL FUSSKRAFT Nail and Skin Protection Spray) and in the GEHWOL med Nail Protection Pen for on the go.
- Do not use sharp instruments for home foot care. They may cause injuries.
- File your toe nails so that the edge is always straight and flush with the tip of the toe.
- Absolutely avoid pressure spots! Diabetics should preferably wear soft, comfortable and sufficiently wide shoes with no inner seams. Callus weals can be prevented effectively using special pressure relief cushions, such as GEHWOL pressure relief articles made from highly elastic polymer gel.
- In foot malpositions, it is best to see an orthopaedist who will prescribe suitable insoles and shoe customisations. An orthopaedic shoemaker will make them to measure and adapt them to the patient's individual needs.
- Socks should ideally also have no inside seams, be made from cotton or wool, and fundamentally be changed every day.
- Never go barefoot if possible, not even at home! There is a risk of injuries.
- Routine check-ups with a foot specialist, including professional nail and callus treatment, are especially advisable.
- On the other hand, see your family doctor or specialist immediately if you have wounds, inflammation or blisters.

A healthy state

Consequential disorders on the feet can be prevented with special attention, prevention, early diagnostics and required therapies in diabetes mellitus. Attaining this and generally achieving optimal care of patients requires interdisciplinary cooperation.



Strong pressure, e.g. in excessively tight shoes, acts on the feet. In diabetes, this can lead to massive damage.

The objective of diabetic foot care is always to preserve the foot. With an annual amputation rate of approx. 30,000 in Germany, however, there are still considerable requirements. But there are many approaches for avoiding amputation before it occurs. Knowledge about possible consequential disorders is the foundation - for instance:

- Macro/microangiopathy: the disorder of large and small blood vessels;
- Polyneuropathy: disorder of the peripheral nervous system by reducing or nullifying pain, temperature and vibration sensations; motor disorders such as muscle imbalance, formation of hammer or claw toes; also autonomous disorders not subject to will, such as the nullification or reduction of sweat secretion with dry skin, hyperkeratosis, corns, callosities (weals) and rhagades (cracks) as well as tears, which are common entry ways for bacterial infections;
- Fatty tissue atrophy: Atrophy of fatty tissues, especially on the foot sole, leading to a lack of pressure redistribution and vibration buffering;
- Myatrophy: Atrophy of foot muscles with functional impairments;
- Neuro-osteo-arthropathy - diabetic Charcot foot - with damage to the nerves, joints and bones; demineralisation of the bones often means spontaneous fractures when minor trauma occurs; these lead to

flat foot (pes planus) and lastly to the foot soles developing a plantar convex (outward) bend.

Other consequential disorders are also possible, such as gout (hyperuricaemia), lipid metabolism disorders (hyperlipidaemia), degenerative joint disorders (arthritis), skeletal disorders with reduced bone mass and a tendency to develop fractures (osteoporosis) and high blood pressure.

Preventing diabetic foot syndrome requires a team of specialists, podologists, diabetes specialists, physiotherapists, orthopaedic technologists, orthopaedic shoemakers, ergotherapists, psychologists and health insurance funds. The patient's cooperation is decisive; however it appears unmotivated or insufficient in many cases (figure 1).

Foot experts

Affected persons receive important tips for home foot care to prevent foot problems during the necessary and medically prescribed podological treatment. This ranges from the use of sandpaper files to nail trimming to using a natural pumice stone to remove hyperkeratosis or clavi. Skin care is provided with fatty creams which contain five to ten percent urea. When the skin is intact, foot baths should not exceed a temperature of 35 degrees Celsius (bath thermometer) and be used for three to

max. five minutes. Home foot exercises according to instructions or illustrated exercises as well as home foot massages are recommended to strengthen the foot muscles and encourage the circulation.

Professional podological treatment with grinders, polishers or trimmers contributes significantly to preventing the consequences of diabetic foot syndrome. This includes: Nail trimming, brace treatment if required - especially in nail deformities or threatening ingrown nails (unguis incarnatus), removal of hyperkeratosis, clavi, callosities which may lead to ulcers, infection, gangrene, tissue death (necrosis) and finally amputation due to increasing pressure. Ulcers are treated by a doctor.

Prevention includes regularly participating in trainings for diabetics, and also for relatives if applicable. Here, affected persons receive important information about the principles and associations of the glucose metabolism disorder with its consequential disorders, dietary recommendations, instructions for independent mandatory daily foot examinations and knowledge about home foot care.

Well shoed

Individual care with orthopaedic footwear is also required, depending on the severity of peripheral nerve damage (neuropathy) or peripheral arterial occlusion disease. Parallel to specific orthopaedic shoe care, existing pressure points on the foot sole are identified with a computer supported electronic measuring procedure (dynamic pedography) to perform required pressure redistribution.

Since most ulcers are due to pressure spots due to internal (inner) or external (outer) mechanical causes, pressure redistribution on the foot sole is required. It is the doctor's task to prescribe care with orthopaedic shoes. A regular check-up of diabetes adapted foot beds, confectioned diabetes protection footwear, interim footwear such as bandage, therapy or frontal foot relief shoes, customised confectioned shoes, orthopaedic custom shoes or orthotics is provided by the doctor and orthopaedic shoemaker (figure 4).



Figure 1: 60 year old diabetic with polyneuropathy (peripheral nerve damage) declines podological treatment and consultation despite massive hyperkeratosis, dry skin and several small skin lesions.



Figure 2: 65 year old diabetic with pressure ulcer on the apex (tip of the last segment) due to excessively short shoes. The patient wears the diabetes adapted foot beds and orthopaedic measures only sporadically.



Figure 3: This 80 year old diabetic with polyneuropathy and peripheral arterial occlusion disease has a pressure ulcer between the toes due to orthopaedic custom shoes which were made too short.



Fig. 4: Example of a custom orthopaedic shoe which was adjusted to the needs of a diabetes patient. The various layers of the insoles are easily recognisable.

Decisive details

Serious errors in shoe care must be corrected at an early time. Among other things, this includes: insoles which are too thin or provide too little pressure redistribution, missing shoe customisations (on the heel, walking sole, tab or shaft), insufficient distance from the longest toe to the frontal edge of the shoe (which should be about seven millimetres while standing), insufficient shoe height in the frontal foot region, insufficient pad width (distance from the first metatarsal protuberance to the fifth metatarsal protuberance), inner seams which apply pressure, and a lack of actively breathing shoe materials (figures 2 and 3). Diabetic shoes must be felt daily for foreign bodies such as pebbles, wood splinters and other particles, which must be removed.

Taking required medications, regular trainings, treatment by a foot specialist, suitable shoes, daily age-appropriate exercise and consultations with the doctor and orthopaedic shoemaker are also part of the catalogue of preventive measures. This allows the multidisciplinary team to provide optimal care and treatment to the diabetic. Minimising risk factors makes it possible to reduce the rate of amputations, hospital stays and consequential costs, and improve the patient's quality of life.

Rare foot disorders

The new book by Dr. Renate Wolansky does not show the classic foot deformities, such as hallux valgus, but strongly concentrates on the specific foot illnesses: Berndorf syndrome, Friedrich ataxia, Raynaud's syndrome, erysipelas. Genetic predisposition or infections are regarded as the cause. The illnesses are illustrated with many clear figures. Medical therapies as well as possible treatment options for podologists and foot care pros and orthopaedic footwear treatment options are described.



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Dr. med. Renate Wolansky

The licensed orthopaedist, sports physician and medical foot care provider teaches in the field of podology at several educational institutions. The expert has also published numerous books and writes for recognised expert organs.

Health Report

DIABETES

2014

Despite dropping numbers of major amputations, the risk of an amputation is still about 20 times higher in persons who have diabetes. This warning was issued by the recently published German Health Report on Diabetes 2014. FOOT CARE CURRENT has summarised the most important results.

Diabetic foot syndrome (DFS) is among the most common consequential disorders in persons with diabetes. It refers to foot injuries - regardless of the type of diabetes or the nature of the injury. According to an evaluation of international prevalence studies, the frequency is at about eight percent of all diabetics, while the rate of new illnesses is at about three percent, wherein the risk of becoming ill increases with higher age. Approximately every fourth diabetes patient suffers DFS in their life.

Patients with low social status are primarily affected. In a British study, 670 diabetics out of 15,983 examined patients developed a new foot ulcer, wherein the risk was about 1.7 times higher with an unfavourable social status. The reduction of major amputations in Germany by 15.2 percent between 2005 and 2010 is pleasing. More women than men tended to profit from this reduction. But this is opposed by a constant rate of minor amputations in women and a clear increase among men. These and elderly patients (65 years and up) therefore still have a significantly increased risk of amputations in diabetes in Germany.

Neuropathy and angiopathy

Significant risk factors for DFS include diabetic neuropathy and impaired peripheral circulation. Two thirds of all type 2 diabetics in the Western industrial nations suffer from nerve function disorders. Polyneuropathy favours the additional development of angiopathy. The risk of skin lesions and amputations is also higher. Therefore diagnostics of a nerve disorder (using monofilament) are an important indicator for better predicting the prognosis of patients with DFS and initiating suitable treatment strategies

at an early time. The same applies to functional examinations of the leg blood vessels using non-invasive procedures (ankle or toe pressure measurement, duplex sonography, measurement of oxygen and nutrient supplies to the tissues). Other indicators to determine risk refer to the diagnostics of foot deformities as well as determining earlier foot lesions and amputations.

Improved circulation

In patients with peripheral angiopathy (atherosclerotic change of the outer blood vessels, vascular occlusion) - also when combined with nerve damage - rapid arterial revascularisation is regarded as being part of the most important treatment measures to improve circulation. However it is still unclear whether the surgical intervention (e. g. vascular bridging) or endovascular treatment (e. g. expanding the blood vessels) is the method of choice. Since the intervention is lesser, the endovascular procedure is initially preferred, provided that it is technically feasible. Special problems apply to patients who also have kidney problems. Their chances of healing are much lower even if revascularisation is achieved, and amputations occur significantly more often. The risk of mortality is also higher in diabetics with kidney problems.

Consistent pressure relief

When it comes to wound treatment, the health report also criticises the sparse data situation for assessing

evidence and the clinical benefits of certain treatment procedures. However a current study from 2012 showed that adapted insoles lead to pressure redistribution. This not only favours healing, but can also contribute to reducing the risk of another foot wound (recurrence) from 87 to 42 percent. Complete soft foam bedding was shown to be superior to shoes without a bed or with only a partial bed.

The healing prognosis is decisively worse in the case of an infection, wherein multi-resistant pathogens (MRSA, MRGN) are an additional significant problem. Chronic wounds usually have gram positive pathogens, primarily *Staphylococcus aureus*. Diagnoses are primarily clinical, with temperature measurements and thermography. Final treatment is oriented to the clinical signs and the pathogen status. Oral therapy with antibiotics is recommended for mild infections; intravenous treatment is initially recommended for severe infections. It is possible to change to oral treatment as needed in the progression. In the presence of a moderately severe infection, a decision as to whether therapy will start orally or intravenously must be made based on the overall clinical impression.



Much more than shoe repair

Optimal patient care is only possible in a dialogue between all involved persons. Orthopaedic shoemakers make aids and shoes to measure. Aside from doctors, physiotherapists and foot care providers, they thereby play an important role in the care and advice to patients with foot problems.

Mr. Becker, your orthopaedic technology company has now been successful in the market since nearly ten years. You are regarded as a contact with good service in all fields of orthopaedic care. Patients are the central focus of your work. You are service oriented and use modern technology. First-class employee training is especially important to you.

How does one become an orthopaedic shoemaker?

The profession of orthopaedic shoemaker is a profession which starts with training and ends with a journeyman's examination. No special school education is required as a prerequisite. But good school education is very helpful. The training takes three years. Aside from the craftsmanship aspect, the profession of orthopaedic shoemaker requires a special level of empathy and customer friendliness. A good orthopaedic shoemaker excels by seeing his profession as a calling and paying attention to constant further training.

What are the main tasks in your profession?

We make orthotics as aids for non-functional lower legs, custom orthopaedic shoes, and inlays. We also make changes to confectioned shoes. Herein, it is important to take the patient's anatomy and statics into account to prevent illnesses in time. For instance, a shortened leg of which the patient is not aware can cause damage in the spinal and hip regions during life. We intervene in time here to prevent this.

What are the most common problems which patients bring to you?

The most common problems are bent, sunken and spread feet as well as pain in the talocalcaneal joints. They are often corrected by inlays and changes in confectioned shoes. The rising number of changes in children's feet is an alarming development. The changes are often due to children constantly wearing shoes which are too small, resulting in developmental disorders and massive malpositions. Care of patients with diabetic foot syndrome is gaining significance. This is due to rising problems such as obesity, lack of exercise and a wrong diet. Diabetic foot problems



Shoe adjustments: Changes to confectioned shoes by orthopaedic elements.

often result in partial amputations which require orthopaedic care.

What requirements does your workplace have to meet?

Creativity, craftsmanship skills, medical understanding and the ability to deal with people are significant requirements for an orthopaedic shoemaker. Aside from the workbench, specialised tools and specialised machines, his workplace is increasingly marked by the technology used to determine a patient's orthopaedic state. For instance, the so called pedography - the digital foot pressure measuring system - allows for precise and rapid measurements of the stress points under the feet. This allows us to definitively detect problem zones.

How has your job changed in recent years?

Health reforms and decreasing income of

health insurers have meant that services covered by health insurance funds have decreased in recent years. This development will probably continue. This particularly affects socially weaker population groups and families with several children. Even though absolutely necessary measures are currently still secure, it is not possible to provide optimal care in all cases. Economic pressure due to lower payments and changed services puts pressure on the company, forcing further optimisation and saving measures. This is a constant challenge which we have to meet in order to ensure care at a high quality level. One option to optimise patient care surely consists of making the cooperation between the individual related disciplines even more efficient. For example, we would certainly welcome an even more direct cooperation with foot care pros and podologists.

Norbert Becker, Albert Weitner, Rainer Bornschein: CEOs of Orthopädietechnik Weitner GmbH, Marienburgstraße 5-7, 60528 Frankfurt am Main, Telephone: 069 678001-0, Fax: 069 678001-40, www.ot-weitner.de.

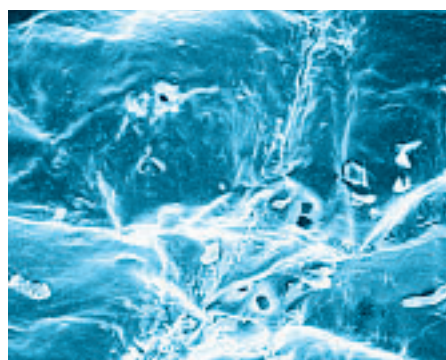
Maintaining healthy skin

The skin is our largest organ and has numerous tasks. It can absorb or release substances, store fat, and react like a thermostat in heat and cold. A hydrolipid film of water and fat forms a protective shield, protects the skin against dryness and keeps it supple. Only healthy skin can sufficiently repair occurring damage. But the protective function of the skin is at risk in many diabetics.

Our skin is comprised of several layers - the epidermis, dermis and subdermis. Depending on the region, it contains various cells, sweat and sebaceous glands, hairs, nerves and blood vessels. As a separating wall between the body and the environment, it manages functions such as protection, defence, reporting dangers, but also absorption, transmission and storage. It can regulate our temperature. If it's hot, our skin ensures a cooling effect by expanding blood vessels and excreting sweat. The skin reacts to cold by constricting blood vessels. It protects against mechanical damage by buffering it with the collagenic, elastic fibres of the dermis or meeting it with the fatty reserves of the subdermis. If pressure persists for longer periods, it increasingly forms callus, which can also grow towards the inside as a corn.

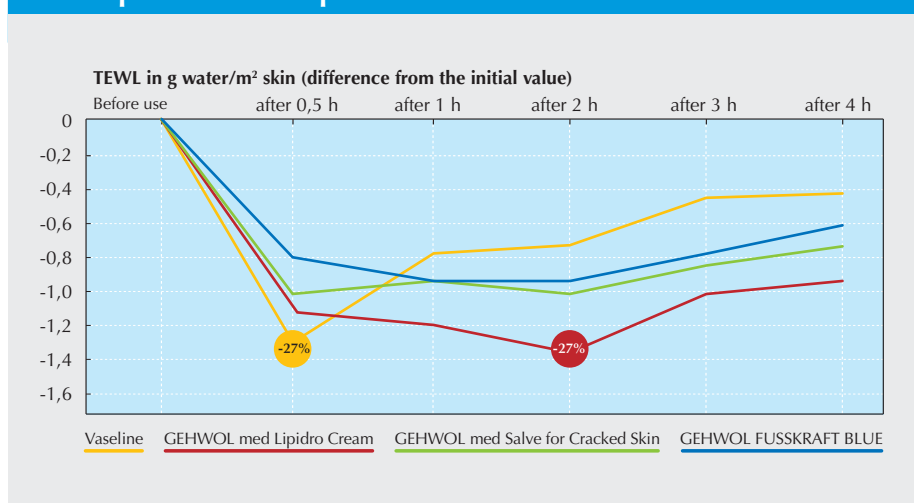
Hydrolipid film and the fats of the epidermis – a biochemical defence system

The skin surface is covered by an invisible hydrolipid film. It consists of a mixture of sweat and sebaceous gland fats. Other components include water in the deeper skin layers, protein splitting products of callusing processes, and dead callus cells. Since the hydrolipid film rejects pathogens as a mildly acidic environment, it is also called the acidic protection mantle. The amount of the hydrolipid film is inherited, and its distribution depends on the body region. For instance, skin fat content is re-



The injuries to coarse skin which are not visible with the naked eye are entry ports for pathogenic microbes. Specifically in diabetics, they can cause the feared diabetic foot syndrome.

Development of transepidermal water loss TEWL



Fatty emulsions and pure fat salves reduce water loss in the desired manner; that is, without bringing about complete occlusion. This has positive effects on the barrier function of the skin.

duced in places where there naturally are fewer sebaceous glands. This, for instance, is on the arms, legs and feet. The composition varies by the time of year, hormonal household, age, hygiene habits, diet or illness. Sweat production which decreases in winter or with increasing age also reduces the fat content of the acidic protection mantle. The protective mantle and the so called permeability barrier form a clever biochemical defence system.

The permeability barrier consists of fats of the epidermis which are combined with callus cells. As in a model of bricks with mortar, the permeability to foreign substances and the body's own fluids is reduced. Water from the lower skin layers cannot reach the skin surface unhindered and be lost by evaporation. Transepidermal water loss (TEWL) is reduced. The skin is better moisturised, more supple and firm. The epidermal fats of the epidermis are also able to store water.

When skin is dry or ages

Aging processes, altered environmental conditions, allergies or hormonal changes are clearly recognisable in the skin. Normal skin appears thin, transparent, with good circulation, rosy, and not too fat or dry. Dry skin appears rough, brittle, cracked, scaly and dull. Children and elderly or ill people in particular suffer from dry skin. Sebaceous and sweat glands lose their function with increasing age. Lower fat production and reduced water storing capacity are the consequence. The body's own urea which occurs in sweat can be reduced and is an important moisturising factor. The effects of the time of day and year also influence the lipid and moisture content of the skin. Temperature and wind speed can dehydrate the skin. Unlike normal or fatty-moist skin, dry skin is marked by a reduced fat content and higher moisture loss. The lower skin fat content weakens the natural barrier function, so that the skin loses moisture in an uncontrolled manner. At the same time, it reacts more strongly to stimuli. There is no protection against penetrating pathogenic microbes, allergens or chemical substances. The risk of infection or allergic reaction is increa-

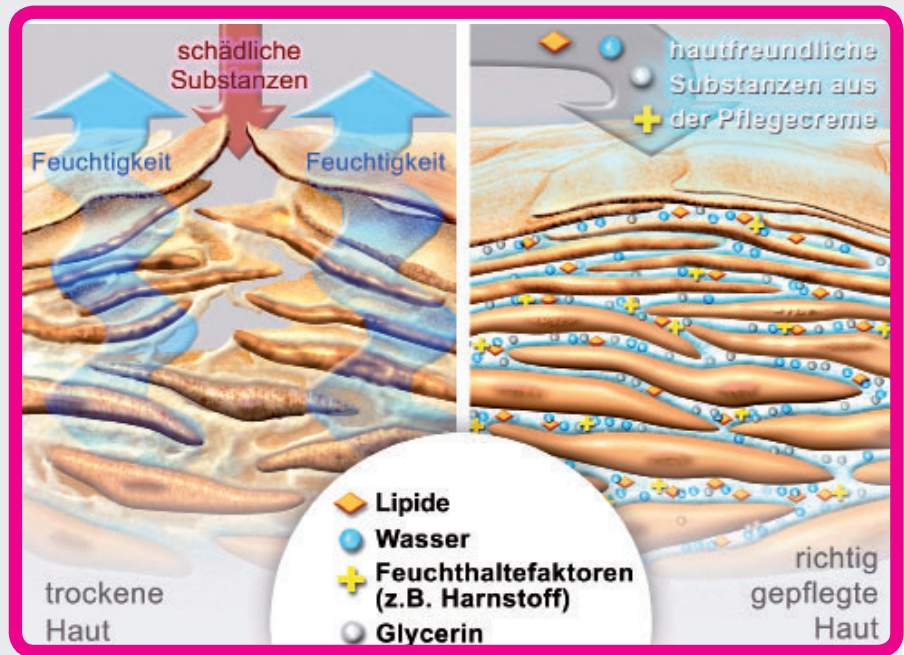
sed. The body regions most commonly affected by dryness include the face, the outsides of the arms as well as the hands, shins and feet. Painful cracks and rhagades may occur, particularly on the feet.

Specific care for dry skin

The function and therefore the defences of dry skin should be regularly supported with suitable care products. Supplying water always has only temporary effects. After all, it is not moisture content alone, but primarily moisture loss which causes dry skin. Care products with a high share of skin related fats or lipids specifically balance the fat deficiency of dry skin. They are rapidly absorbed into the skin and leave no nuisance fat film behind. The care products should also contain moisturising substances such as urea or glycerine. Urea can be understood as an independent moisturising system of the skin. It reacts with proteins in the skin and develops the ability to attract water and bind moisture. It moisturises the superficial layer, forms an external moisture barrier and thereby reduces moisture loss through the skin. Urea softens the callus and counteracts excessive callus formation.

When skin is dry and diseased

Not all types of skin are the same. Hairy skin covers the entire body apart from the undersides of the fingers, palms, soles of the feet and undersides of the toes. These areas are covered by hairless skin, which has unique patterns in every person. The epidermis, dermis and subdermis consist of different layers. Skin attachments such as hair, nails, sweat and sebaceous glands are distributed differently. Large sweat glands, the scent glands, only occur in specific hairy body regions. Sebaceous glands do not exist on the palms and soles. It is precisely here that pressure leads to excess callus formation. To keep the palms and soles supple, the fats of the epidermis together with sweat must work hard. If interfering factors such as age or diabetic neuropathy occur, with decreasing sweat production and a lower fat content of the skin, it increasingly becomes dry. Measurements in diabetics with neuropathy showed 60 percent lower skin fat content for the foot soles and 24 percent reduced skin moisture content. Up to 80 percent of all diabetics have dry foot skin. There is a higher risk of cracks, infections and diabetic foot syndrome. To prevent these possible effects, special attention should be given to the care of dry foot skin. The basis treatment should supply the callus layer with fats and moisture binding substances in a suitable emulsifier system. This leads to the desired partial occlusion. Transepidermal water loss is measurably reduced.



Left: Lipids and moisturising factors as a hydrolipid barrier form a solid wall against damaging substances and also prevent water from being lost.

Right: An intact barrier of lipids and moisturising factors ensures well moistened and therefore supple skin.

The proDerm study - no skin seal

An investigation at the proDerm Institute of Applied Dermatological Research was able to show that GEHWOL med Lipidro Cream cuts back water loss from the skin (transepidermal water loss - TEWL) longer than other products. Twenty women were treated with known foot products in defined test areas. Moisture loss was measured before and after treatment. All products reduced water loss. However this was only pronounced with vaseline after 30 minutes and with GEHWOL med Lipidro Cream after 120 minutes. The effect lasted longest with GEHWOL med Lipidro Cream. Both products reduced water loss by a maximum of 27 percent (see the graphic). Study results therefore also show that skin occlusion only occurs to the desired extent. As a result, there is no need to fear complete occlusion and therefore sealing of the skin due to lipid-rich products. Even vaseline did not lead to complete occlusion. The frequently stated reservation that fat-rich care products might hinder important skin functions such as skin respiration or heat regulation is therefore unfounded and not scientifically proven. The role of skin respiration in particular is also overestimated. The skin only makes a tiny contribution to the oxygen supply. Even with complete occlusion of all skin areas on the body, respiration would not be impaired. And the body's own heat regulation by sweat evaporation on the feet is also of subordinate importance as compared to heat regulation over the entire body surface due to radiati-

on, heat conduction, convection and moisture loss. Foot care products with variously high fat shares reduce moisture loss without impairing heat regulation. The goal - especially for diabetics - must be to keep our skin healthy. They can only prevent dry skin, callus, cracks, infections and diabetic foot by regularly looking after their feet with suitable products.

Little awareness of risk

Positives first: Diabetics trust their foot care pros with consultation tips. According to the GEHWOL Diabetes Report 2014, this is what 84 percent of patients say. But by far not every patient uses podological services for prevention or performs their own foot care measures. The report shows this as well. Therefore risk awareness has scarcely improved since its first edition in the year 2009.



Foot complications are among the most common consequential complications of diabetes. The most significant consequences of diabetic foot problems include ulcers and small (minor) as well as high (major) amputations. According to the German Health Report on Diabetes 2014, approx. 250,000 persons with diabetes have a foot lesion within the Federal Republic; one million diabetics have a higher risk of suffering foot injuries.

Prevention requires information

Even though major amputations have decreased in recent years, especially in women, the relative risk of a high amputation is still about twenty times higher for diabetics. Prevention strategies are needed to avoid foot complications and the associated physical and emotional suffering of affected persons. Among other things, this requires greater patient awareness of foot care measures. Corresponding information

and advice herein refers both to the field of home foot hygiene and to podological services for inspection, early risk detection and foot treatments. But to what degree are diabetics aware of foot care? To find out, Gerlach again surveyed 3459 patients out of a treatment pool of 369 doctors' practices.

Consultation tips for foot care at home

- During the daily foot inspection (with a mirror), pay special attention to injuries, foreign bodies, blisters and fine cracks.
- Bathe the feet for no longer than three minutes, and not too hot (maximum water temperature 37 to 38 degrees Celsius, check the temperature with a bath thermometer).
- Dry the feet with a soft towel, and use a cotton swab between the toes. Blow dryers, heating pillows or heating bottles are taboo. There is a risk of burns.
- For self-care of the feet, do not use sharp instruments which may cause injuries. It is best to use a fine sand file to trim the nails instead of pointed shears or other instruments which are likely to result in injuries.
- Always file the toe nails only so that the nail edge lines up with the tip of the toe. Treat the nails with nail protection oil.
- Apply cream to the feet daily. Use a urea-containing cream or lotion with a sufficiently high fat and moisture content so that the skin barrier does not dry out and remains resistant. Pay attention to products with effective antifungal protection.
- Avoid pressure spots and only wear soft, comfortable and sufficiently wide shoes with no inner seams. Regularly feel the shoes and socks for foreign bodies.
- To protect against infection, always wear shoes with clean, freshly washed socks. Regularly have an expert check the socks and shoes for pressure spots.
- Special pressure relief cushions made from highly elastic polymer gel provide relief and prevent callus weals.
- Never walk barefoot, not even in your own home. See a doctor immediately if you have wounds, inflammation or blisters.



Jupiterimages | Emmanuel Faure



You can find the results of the GEHWOL Diabetes Report 2014 as a download at www.gehwol.de/service/diabetes_und_fusspflege.

Patients' problem awareness

	Frequency in percent
Patients don't think that they have to pay attention to their feet	63
Patients feel insufficiently informed	63
Patients do not use regular preventive care	53
Patients do not use regular foot care	45
Patients don't know what an ulcer is	17

Common foot problems in diabetes

	Frequency in percent
Dry skin	31
Excess callus	31
Foot or nail fungus	28
Rhagades (cracks)	21
Inflammation	16
Foot malpositions	15
Current ulcer treatment (repeated)	12
Multiple ulcer treatments in the past	12
Single ulcer treatment in the past	10
Gait changes	9
Current ulcer treatment (first time)	8

Implementation of care recommendations

	Frequency in percent
Inspection	47
Using moisturising cream	29
Removal of skin with pumice stone	27
Using suitable shoes	27
Blunt nail care (shortening the nails with a file)	21
Paying attention to suitable socks	17
Wearing orthopaedic insoles or orthotics	16
Disinfecting foot baths (maximum 3 minutes)	15
Pressure relief with pressure relief products	15
Using products with antifungal protection	11
Wearing custom orthopaedic shoes	10
Toe and foot exercises	10

N = 3459 patients

The results of the survey are provided by the GEHWOL Diabetes Report 2014, which provides information about the frequency of foot problems, problem awareness and patient know-how about recommended measures for foot care and prevention for the second time since 2009.

Numerous risk factors

Foot ulcers develop out of an interplay of various factors in which diabetic polyneuropathy plays a central role. This was present in about one quarter of the usually elderly patients. Nerve damage reduces secretions of the sebaceous and sweat glands, rendering the skin dry, brittle and cracked. One third of diabetics actually confirmed that they had dry foot skin. The skin also had rhagades in 21 percent. The nerve damage also often results in coordi-

nation problems, which may lead to foot deformities and wrongly applied strain. This was the case in 15 percent. The wrongly applied strain then changes pressure conditions on the foot. Persistent pressure leads to strong callus formation. One third of surveyed persons were affected by this as well.

At the same time, a sensory orientation of the neuropathy may mean that patients are less pain sensitive. Painful skin tears are not noticed and may develop into ulcers if untreated. Wound healing is also impaired if there is macroangiopathy. 18 percent of diabetics confirmed this in the survey.

At the time of the survey, eight percent of diabetics were receiving ulcer treatment; 12 percent of them not for the first time. This means that the prevalence is even higher than the frequency of two to ten percent of the diabetic population which is stated in the German Health Report.

Many patients underestimate the risk

Despite objectively present risk factors including acute ulcers, a large share of diabetics is barely informed about the problems. Two out of three diabetics did not believe that they had to pay special attention to their feet. 53 percent stated that they did not have regular preventive visits with a podologist. Even at home, nearly half of those surveyed (45%) care for their feet only occasionally (if at all), and only rarely with consistency.

The overall recipe is decisive

Unlike medicinally active substances, cosmetic active ingredients are only allowed to influence the skin organ. They serve to clean, care for and protect healthy or problem skin. More than the individual substance, however, the quality of the overall recipe always decides the efficacy and benefits of a care product.

The official INCI list (INCI: International Nomenclature of Cosmetic Ingredients) of the European Union includes approximately 8000 cosmetic ingredients. Generally, more than just one effect is ascribed to the active substances. The acting spectrum of the individual substances is usually multi-layered and comprehensive. There are often various effects which complement each other and build on one another in order to obtain optimal care results together.

All ingredients count

Active substances can improve the efficacy of a cosmetic product. However they cannot do it alone. Rather, one of the most important principles in cosmetics is the fact that the efficacy of a care product always depends on its overall recipe. It is not the individual substance that decides the benefit, but the interplay of all substances and the way in which they are processed into a specific care base (emulsion).

Care substances can complement each other's efficacy. Urea, for instance, is a multiactive active substance with numerous effects. It is used in many products, particularly as a moisture-holding substance. The skin moistening effects of urea can be further optimised if other moisturising substances are contained in the recipe. This may be a mineral-rich algal extract, aloe vera or even tapioca starch, which deposits itself in the skin relief, improving skin plasticity and contributing to moisture regulation between the skin and the environment as a moisture regulator. Specific alcohols such as glycerine, sorbitol and propylene glycol which are contained in recipes as solvents also have hygroscopic properties and improve skin moisture.

Callus reduction

Of course optimised care effects due to synergy effects among the ingredients are not only found in skin moisturisation. Fruit acids or substances which are similar to them are often used to reduce callus. However their use is not uncritical. Even with correct use, they can cause skin irritation. It is true that this irritation can be avoided



Healthy and beautiful nails: Cosmetic active substances support skin care.

by increasing the pH level of the product or by reducing the concentration. However the scrub effect is then also lessened. After the most recent amendments to the cosmetics regulations, salicylic acid may now only be used in cosmetic products in concentrations up to two percent. In this dosage, keratolytic effects are rather unlikely.

Alternatively, recipes which contain higher urea concentrations are also suitable for callus reduction; other ingredients improve the efficacy. Allantoin, for instance, is a well proven, multiactive ingredient which is used in skin and hair care products due to its favourable toxicological and dermatological properties. This substance, which is found in horse chestnuts, can have a longer lasting keratoplastic effect on the callus layer which shows itself in a softening effect, smoothed skin surface and correction of a skin state which involves more noticeable scaling. The tested keratoplastic effect of an 0.2 percent allantoin solution on the callus layer corresponds to that of a 10 percent urea solution. Scientific assessments also show a definite keratoplastic effect for a combination of urea in high concentrations, glycerine, lipids, allantoin and silk extract (GEHWOL med Callus Cream). The use of the cream leads to complete regeneration of callus thickness within four

weeks.

Antibacterial and deodorising

Micronised zinc oxide is an active substance which provides protection against foot odour due to its antimicrobial properties. The substance acts against bacteria which decompose sweat and trigger foot odour. Here as well, the effect can be boosted. It has been proven for a combination of micronised zinc oxide and an extract of manuka oil, which is also antimicrobial (proDerm2007) that it significantly reduces foot odour for at least 24 hours. Alternatively, zinc oxide can also be combined with zinc ricinoleate (DEOZINC®).

Zinc ricinoleate is a salt of ricinolic acid. Due to its molecular structure, it forms multiple bonds to the decomposition products in decomposed sweat. It practically coats them and neutralises the odour. In foot care products against excessive sweating, zinc ricinoleate similarly complements the effects of antitranspirant substances such as aluminium chlorohydrate. While the antitranspirant active substance narrows the lumen of the sweat channels and thereby reduces sweat secretion, the ricinolic acid salt neutralises foot odour.

Skin regeneration

Regenerating and skin-soothing effects play an important role in care cosmetics. One of the best known active substances with this function is panthenol. In the skin, it is transformed into pantothenic acid (vitamin B5) which participates in building new skin cells in the living epidermis in a bound form as coenzyme A. It also plays a role in detoxification processes. It is particularly in inflamed, cracked skin as in rhagades that panthenol provides excellent wound healing support and boosts the barrier properties of the care base. Oat or chamomile extracts or the substances gained from their oil (avenanthramides, bisabolol) also soothe and can therefore effectively complement the healing properties of panthenol.

This also applies to vitamin E (INCI: tocopherol). Cosmetic products usually contain the esters of the vitamin, generally acetate. In the skin, the pure vitamin E is released through splitting. It primarily has cosmetic significance as a radical trap. Radicals are molecules which react easily and are formed in the organism through extreme external influences such as UV radiation. They trigger damaging metabolic processes which also take place in the skin cells and disturb cell vitality. Vitamin E stops these processes, protects the cell bond of the epidermis, and in this way, just like panthenol, supports its barrier function.

As an active ingredient, vitamin E also has the advantage that aside from its cosmetic efficacy, it also has a stabilising effect on the care base. Bases frequently consist of plant oils which sometimes contain multiple unsaturated fatty acids. These fatty acids decay under the influence of oxygen; the oil becomes rancid. Vitamin E stops this decay process. The benefit is that when using vitamin E as an active substance, the shelf life is improved at the same time.

Active substances need a vehicle

Penetration ability is a decisive factor for the efficacy of cosmetic ingredients. In order to obtain the desired care results, it is

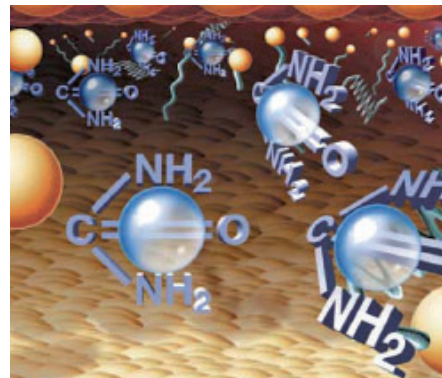
important for the utilised active substances to penetrate the individual target layers of the epidermis to the degree permitted by law. Herein the state of the skin influences penetration just as much as the physical and chemical properties of the active substance and its concentration. The care basis and the emulsion type of the cosmetic product are also of great significance.

Plant oils which are used as bases have a vehicle function. They carry the active substances into the individual skin layers. Additives which improve penetration may further improve this process. Depending on the skin consistency at the application site and their emulsion type, the active substances are more or less easily absorbed into the skin. The skin on the foot is low in fat. A hydrophile base (oil in water emulsion) therefore increases the penetrating abilities of the ingredients. They are then released in the individual skin layers.

The speed at which the release takes place depends on the affinity of the active substance to the vehicle. Depending on the skin layer in which the substance should unfold its effects and its chemical properties, it is necessary to choose a higher or lower fat content of the base. Urea, for instance, is water soluble (hydrophile); that is, it has a high affinity to water / to the aqueous phase of fatty vehicles. A low fat oil/water base would mean that urea would be released relatively rapidly in the upper callus layer, briefly increasing its hydration. On the other hand, a water/oil base with a higher fat content transports urea more slowly, but deeper into the callus layer. The advantage is that the moisturising substance can produce more even and longer lasting hydration in this manner.

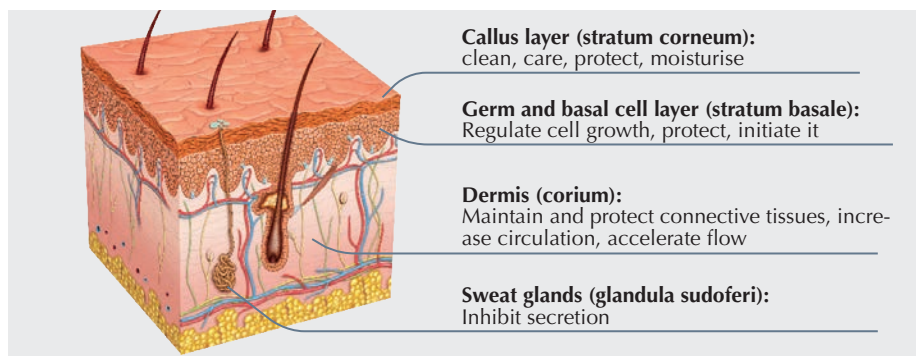
Summary

The efficacy of a care product cannot simply be explained from the perspective of a single active substance. It is always necessary to look at the entire recipe. Herein it is necessary to understand the interplay of all active substances as well as their penetration kinetics in the respective base – and this



Multiactive: Urea binds moisture, and has keratoplastic and antimicrobial effects.

always with regard to the state of the skin, the desired care goal and the skin state at the application site. It is understandable that consumers – who are generally laypersons – cannot perform this examination. They state their care desires. Trained expert personnel helps them to select the correct recipe. They have the necessary dermocosmetic knowledge to assess the quality of a recipe. Where foot skin care is concerned, this is usually the foot care professional.



Cosmetic ingredients unfold their effects in various skin layers.

Cosmetic foot care

From A as in algal extracts to Z as in zinc oxide: You can find proven active substances for foot care products on the internet at www.gehwol.de/wirkstoffe/gehwol-wirkstoffe. Further research options can be found at the page www.haut.de. It has an extensive INCI database. INCI is the abbreviation for the international nomenclature of cosmetic ingredients.

Rhagades and hyperkeratosis on diabetic feet

Podologist Andreas Schmidt of the Collm Clinic in Oschatz reports about a type 2 diabetes patient with pronounced rhagades and definite hyperkeratosis on painful feet. He also explains how he was able to correct the problems with professional medical foot care and supporting home therapy using GEHWOL med Lipidro Cream.



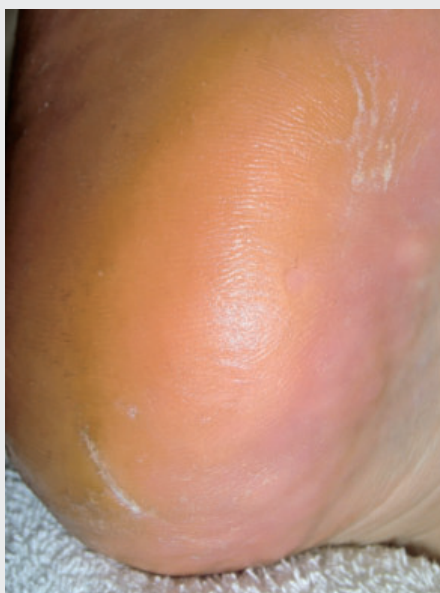
Andreas Schmidt

After two years of training in podology in Dresden and a paedagogical diploma at the IHK, Andreas Schmidt became the specialised head and podologist at the podological focal practice and the specialised consultant at the Collm Clinic Oschatz. He is also a lecturer and provides education and continued training in podological themes and other specialist contributions both within the country and in foreign countries.



Findings

Pronounced hyperkeratosis, rhagades and plantar fissures in the calcaneus region. The callused regions were softened, removed, the rhagades ground out and treated with GEHWOL med Salve for Cracked Skin.



after 2 weeks

The ground-out cracks have healed, and the hyperkeratosis has subsided. The patient has used GEHWOL med Lipidro Cream twice daily since the clinical treatment.



after 3 weeks

The cracks and fissures have completely subsided. The hyperkeratosis has subsided to a normal degree. The foot skin is soft, supple, elastic and has a healthy, vital colour.

Foot care is seen as a significant contribution to avoiding diabetic foot lesions. GEHWOL is one of the best known brands to meet this claim. In a survey by INSIGHT Health among 3375 diabetics, all patients knew the products from the product range, which is available solely from the specialist trade. They particularly praised its good to very good skin tolerability (100%) and care performance (96%). GEHWOL med Lipidro Cream is a suitable care option from the foot care practice. A study published in the International Journal of Cosmetic Science (2011) shows: One application of the cream is enough to significantly increase

the skin's moisture content within only one hour, and obtain significantly improved hydration over 24 hours. The cream also reduces excess callus, reduces moisture loss and improves the barrier function without impairing natural transpiration. The overall recipe with urea, glycerine, allantoin and a mineral-rich algae extract in a balanced base of skin friendly, skin regenerating lipids is responsible for the effect of the cream.



MULTIMEDIA



You can read the complete study text in German. Simply scan the QR code or surf on www.gehwol.de/service/fachwissen/studien

A 55 year old patient came in to my practice with drawing pain in the calcaneus and antetarsal plantar regions on both sides. The affected person is a metal worker in shift work. His job leads to an irregular life-style. He is overweight and was diagnosed with type 2 diabetes eight years ago. He has been treated by a diabetologist since that time.

The patient has to stand in uncomfortable shoes at work for several hours, which is increasingly difficult for him due to his foot problems. He found the foot pain almost unbearable. Based on these statements, I closely inspected his work shoes: The shoes have a very hard inner sole and very hard areas in the shoe tip.

Findings

This strain on the patient's feet resulted in the following changes: Hyperkeratosis is very pronounced bilaterally in the plantar regions. It is less pronounced in the antetarsal regions than in the calcaneus region. There are definite rhagades bilaterally in the calcaneus region which are accompanied by smaller fissures.

Progression

I first cleansed the feet with a foot bath and softened the skin. I used a urea containing foot bath which also contains an active substance combination of essential oils of mountain pine, rosemary and lavender (GEHWOL FUSSKRAFT Herbal Bath). I then used a scalpel to remove the hyperkeratotic sites on both feet and ground out the painful rhagades. I then immediately treated them with a bisabolol and panthenol containing salve (GEHWOL med Salve for Cracked Skin).

For further care every day at home, I recommended a medical foot cream with urea to the patient, which is dermatologically tested and suitable for diabetics, since the patient also has sensitive skin. I

regarded GEHWOL med Lipidro Cream as suitable here; the patient was to apply it regularly in the mornings and evenings from now to the next appointment in three weeks.

The cream convinces with its high fat share and a hydrating active substance complex which supports the skin barrier (see information box). The combination softens the hyperkeratosis and inhibits epidermal proliferation (cell growth). Consequently the excess new formation of hyperkeratosis is reduced. Sea buckthorn oil and avocado oil add missing lipids with a high share of unsaturated fatty acids.

Situation after 3 weeks

After three weeks, the patient no longer had pain in the plantar regions on either side. The skin was very soft and elastic. I was able to find neither fissures nor rhagades.

The patient regularly uses the recommended cream, and described his experiences to me at the appointment as follows: It is very rapidly absorbed. He was surprised by the very short time in which callus subsided to normal levels. He also told about

many salves and foams which he had already tried without success. For him, the other products only became sticky during application, and did not bring about the desired success.

Conclusion

From my perspective as a therapist, I am very happy with the treatment success. It once again shows that home foot care also makes an important contribution. I regard it as a major benefit for the patient that GEHWOL med Lipidro Cream is rapidly absorbed and leaves behind no residue. It is also important for me that the cream is not sticky during application. This also encourages patient compliance. Lastly, it is important that there are products which help the patient with regular use and bring about the promised effects with their care ingredients.

NEW: GEHWOL Diabetes Manual

On 16 pages, the manual provides information about the risks of diabetic foot, how it occurs, what cosmetic problems are associated with it and how symptoms such as dry skin and callus can be avoided. It focuses on tips for home foot care, the choice of the care product and information about shoe care. Diabetics can check the appearance of their feet using a checklist. The manual was produced with the involvement of renowned authors from science and practice. Starting immediately, foot care pros can specifically use this manual for their diabetic information needs.



More moisture. Less callus.

Effective protection for sensitive feet!

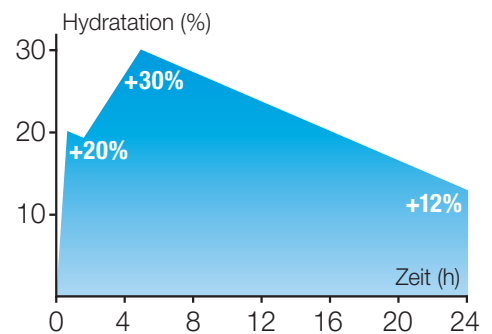


A confirmed recommendation for foot care in your diabetes patients

- noticeably increased skin moisture after one hour one use
- lasting effect throughout 24 hours
- definite reduction of excess callus
- improves the skin's physiological barrier performance unscented
- performance unscented, dermatologically tested, suitable for diabetics
- protects against foot fungus, anti-inflammatory action



Current study results on GEHWOL med Lipidro Cream are available on the internet:
www.gehwol.de/service/fachwissen/studien



Deutliche 24-Stunden-Hydratation
mit nur einer Anwendung

Quelle: Studienbericht proDerm 30, September 2002 | Literatur: Cream or foam in pedal skin care: towards the ideal vehicle for urea used against dry skin. C. Borelli, S. Bielefeldt, S. Borelli, M. Schaller und H. C. Korting, International Journal of Cosmetic Science 2011; 33(1): 37-43 (N = 17 Diabetiker)

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Apotheken und Fußpflegepraxen.*



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