Diabetic Foot Syndrome

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Definition

Diabetic foot syndrome is understood to be all pathological changes in the foot of a person with diabetes mellitus. These include pre-ulcerous lesions such as abnormal corneal callouses. Ulcers or necroses usually develop as a result of repetitive trauma with limited sensation of pressure and pain in the context of diabetic polyneuropathy (e. g. in the form of high pressure and shear stress, especially in foot and toe deformities). In Germany, more than 50 % of all cases are characterized by a relevant peripheral arterial occlusive disease (PAOD), whose symptoms (claudication, pain at rest) are often masked by the polyneuropathy.

Epidemiology

The most significant manifestations of diabetic foot problems are ulcerations, deforming changes of the foot skeleton (Charcot foot) and amputations.

The annual rate of new cases of acute diabetic foot syndrome (DFS) is about 2 %. The probability of DFS over the entire lifetime of a person with diabetes is 19–34 %.

For many years, Germany was at the top of the European amputation rates, but a recent large nationwide study showed a decrease in major and minor amputations in the diabetic population compared to the non-diabetic population. The result of this study thus confirms a positive trend that has already been observed in smaller and regional studies in recent years [1]. 65–70 % of all amputations are still performed in patients with diabetes mellitus.

Risk Factors

Foot lesions or acquired foot deformities in people with diabetes are the result of a multifactorial event with the following major causal factors:

- Neuropathy (sensory, motor, autonomous)
- Peripheral arterial occlusive disease (PAOD)
- Limited joint mobility (LJM)
- Pressure deformities (e. g. due to unsuitable footwear, foot and/or toe deformities, obesity)
- Corn/callus formation as a sign of incorrect pressure distribution
- Biopsychosocial factors (e. g. depression, neglect, beliefs about illness, lack of social support)

Examination

All people with diabetes should have their feet and shoes examined regularly (▶ **Table 1**).

Each foot examination is an integral part of the controls in the corresponding disease management programs (DMPs) for type 1 and type 2 diabetes and must include at least the following points:

- Specific anamnesis (presence of burning or stabbing pain, paresthesia, numbness, absence of any sensation),
- Bilateral foot examination: skin status (integrity, turgor, perspiration, calluses), musculature, deformities, mobility, skin temperature etc. and
- Checking of pressure sensation with a 10 g monofilament and/or testing of vibration sensation with the Rydell-Seiffer tuning fork, palpation of foot pulses (posterior tibial artery, dorsalis pedis artery).

Pressure sensation

The filament is applied with light pressure so that it bends slightly, creating a pressure of 10 g. If this pressure is no longer perceived, the sensation of pressure is already considerably reduced, and the natural protective function is therefore no longer reliable. Scarred or callused skin is unsuitable for testing.

Foot pulses

Finding the foot pulses by touch depends on the room temperature. In the case of non-palpable pulses on the feet, the pulses of the popliteal and femoral arteries should be examined. Palpable foot pulses do not exclude PAOD! Further examinations are recommended (see evidence-based guideline "Diagnosis, therapy, follow-up and prevention of diabetic foot syndrome" of DDG, www.AWMF.de).

- Measurement of the arterial occlusion pressure over the dorsalis pedis artery and the posterior tibial artery,
- Determination of the ankle-brachial index (ABI) and
- Better: determination of the toe-brachial index (TBI).

▶ **Table 1** Control intervals of foot examinations depending on the individual risk status.

Risk category	Risk profile	Examination
0	No peripheral neuropathy	Yearly
1	Peripheral neuropathy	Every 6 months
2	Peripheral neuropathy with PAOD and/or foot deformity	Every 3–6 months (specialist)
3	Peripheral neuropathy and ulcer or amputation in the medical history	Every 1–3 months (specialist)

PAOD

The usual symptoms of PAOD (intermittent claudication, pain at rest, pathological skin temperature and color) are often absent in patients with concomitant neuropathy. The extent of the risk is therefore underestimated. ABI as a screening method is of limited use in the presence of an autonomic neuropathy with associated media sclerosis and the resulting incompressibility of the arteries of the lower leg and foot. The most reliable combination of findings for the exclusion of a relevant PAOD in DFS is a toe-brachial index ≥ 0.75 and the detection of triphasic Doppler signals [9]. Further examination procedures include color-coded duplex ultrasound (CCD), magnetic resonance imaging (MRI) of the pelvic and leg vessels and, if necessary, digital subtraction angiography (DSA) in readiness for intervention. Before and after angiography, adequate hydration must be ensured to avoid contrast agent nephropathy. Where renal insufficiency is present, MRI should only be performed after weighing the benefits and potential risk (low!) of gadolinium-induced systemic fibrosis on a case-by-case basis. In such cases, DSA using CO_2 for contrast can be performed. Computer tomographic angiography (CTA) is not suitable for people with diabetes due to the high contrast medium requirement and the low separation precision between vascular lumen and calcified plaques, especially in the arteries of the lower leg. All national/international guidelines clearly stipulate that this reduced blood flow must be corrected if vascular involvement occurs, ideally by means of minimally-invasive procedures (PTA) or vascular surgery. If both are no longer possible (non-reconstructable extremity, no-option), many alternative methods for the improvement of arterial perfusion are offered and often applied without any proof of effectiveness. This includes hyperbaric oxygen therapy [2, 3].

Good clinical practice in diabetic foot syndrome always means following interdisciplinary and multi-professional treatment paths.

These include, at minimum, the coordinated combination of wound debridement, infection treatment, stage-appropriate wound management, targeted pressure relief, and arterial revascularization and surgical measures.

If a patient is diagnosed with a lesion as part of diabetic foot syndrome, it should be classified according to the extent of tissue damage and the presence of infection and/or ischemia (Wagner classification, combined Wagner-Armstrong classification) (▶ **Fig. 1a, b**, ▶ **Tables 2**, **3**).

Treatment

Only a multidisciplinary, multi-professional and trans-sectoral approach to the treatment of foot ulcers can significantly reduce the frequency of amputations. Essential components of the treatment of diabetic foot ulcers are

- Metabolic optimization and treatment of internal underlying diseases,
- Infection control,
- Debridement of avital tissue parts,
- Effective pressure relief,
- Local wound treatment appropriate to the stage of the disease,
- Therapy of vascular diseases,
- Surgical correction of foot deformities and/or misalignments and
- Patient training.

Master Data

Foot documentation form of the DDG Working Group on the Foot

Institution:

General practitioner: .....

.....

Referring practitioner: .....

Anamnesis:

Important long-term diagnoses:

.....

.....

Previous foot lesions (year) ○ none

.....

.....

Foot operations (year) ○ none

.....

.....

Antibiotic preliminary treatment : ○ no ○ yes..... MRSA ... ○ currently ○ in the past ....

Previous orthopedic shoe provision:

○ no special shoes ○ shoe protection ○ custom-made shoes ○ orthopedic cushioning ○ DAF

○ decompression shoe

○ provision is sufficient ○ provision is insufficient because.....

Angiology:

PAOD present ○ no ○ yes critical ischemia: ○ no ○ yes

Bypass (from ... to)	R	L
PTA	R	L

Pulse status	Right	Left	Angiography right	Left
Femoral artery				
Popliteal artery				
Dorsalis pedis artery				
Posterior tibial artery				
Claudication				

Doppler/duplex findings

Last dopper / duplex on.....

Closing pressure [mmHg]							Flow profile	
	Right			Left			Right	Left
Brachial artery								
Popliteal artery								
Dorsalis pedis artery								
Posterior tibial artery								
Fibular artery								
DU/cm (pole test) Doppler sounds	○ O	○ 50	○ 70	○ O	○ 50	○ 70	Other: (e.g. $TcPO_2$)	

Chronic venous insufficiency	Right	Left
CVI classif. / PTS		

► **Fig. 1** **a** Foot documentation sheet - page 1. Source: AG Foot of DDG.

Foot findings: from:..... ○ no lesion

Lesion age: ..... ○ recurring time without recurrence ..... months

Lesion: suspected trigger .....

Localization/description/size

Right ○ **Photo**							**Left** ○ **Photo**						
Stage of wound healing													
Wagner ulcer classification system	0	1	2	3	4	5	0	1	2	3	4	5	
A							A						
B							B						
C							C						
D							D						
PEDIS	P	E	D	I	S		P	E	D	I	S		
DOAP													
Sanders													
Levin													

Deformities: ○ none

	Right	**Left**
Hallux valgus		
Claw/hammer/overriding toes		
Other		

Limited joint mobility ○ none

Hallus limitus		
Plantar fibromatosis		
Other		

Neurology: PNP with loss of sensation present ○ no ○ yes

	Right			**left**		
Vibration [x/8]	D1	Mall	Tib	D1	Mall	Tib
Achillis reflex can be triggered	No	Weak	Strong	No	Weak	Strong
10g Semmes Weinstein Filament	MFK1	MFK5	D1	MFK1	MFK5	D1
Neuropathic symptoms (score)						
Others						

Diagnoses:

.....

.....

.....

.....

.....

Date: ..... Signature: .....

► **Fig. 1** **b** Foot documentation sheet - page 2 Source: AG Foot of DDG.

▶ **Table 2** Classification according to Wagner.

Wagner	Extent	Measure
0	No ulcer but high-risk foot	Regular check-up of the feet
1	Superficial ulcer	The focus is on pressure relief and local wound treatment
2	Ulcer extend into tendon, bone, or capsule	The focus is on pressure relief and local wound treatment
3	Deep ulcer with osteomyelitis or abscess	Infection control; with systemic antibiotic treatment and consequent pressure relief, smaller osteomyelitic foci usually heal, larger foci usually have to be resected; X-ray control lags somewhat behind the actual condition of the bone; if the clinical findings are improved, the continuation of the antibiotic treatment can be made additionally dependent on signs of inflammation in the blood; normally, even small processes require antibiotic treatment of 6 and more weeks
4	Gangrene of toes or forefoot	Treatment is mainly concerned with keeping the amputation border as distal as possible and preventing ascending infection; in the case of PAOD, angiography should be performed before each amputation
5	Midfoot or hindfoot gangrene	Treatment is mainly concerned with keeping the amputation border as distal as possible and preventing ascending infection; in the case of PAOD, angiography should be performed before each amputation

▶ **Table 3** Wagner-Armstrong Classification. Possibilities for description of diabetic foot syndrome using the combined Wagner-Armstrong classification.

Warner classification	0	1	2	3	4	5
	Armstrong classification					
A	Pre or post-ulcerous foot	Superficial wound	Wound to the level of tendons or capsule	Wound to the level of bones and joints	Necrosis of parts of the foot	Necrosis of the complete foot
B	With infection	With infection	With infection	With infection	With infection	With infection
C	With ischemia	With ischemia	With ischemia	With ischemia	With ischemia	With ischemia
D	With infection and ischemia	With infection and ischemia	With infection and ischemia	With infection and ischemia	With infection and ischemia	With infection and ischemia

Metabolic optimization and treatment of internal underlying diseases

Metabolic optimization is indispensable for optimizing immune competence, improving hemorheology and thus microcirculation, and preventing progressive pathological glycation. Accompanying diseases, which impair

- Immune competence,
- Hemoperfusion or
- Tissue oxidation

should be treated appropriately.

Infection

The diagnosis of infection is made clinically in the presence of systemic or local indications. The extent of infection in diabetic foot syndrome is classified as mild, moderate and severe, and life-threatening or non-life-threatening (▶ **Table 4**). Inpatient admission is indicated in the case of severe (and possibly moderate) infection (measures: adequate fluid intake, metabolic control, calculated, if possible targeted antibiotic therapy, drainage, complete pressure relief, and further surgical measures, if necessary). Infection with multi-resistant bacteria worsens the prognosis. It is essential to prevent infections from colonization and contamination. To avoid resistance development, treatment should be carried out according to the criteria of antibiotic stewardship (ABS): the correct indication, the correct drug (targeted culture-controlled administration), the correct form of application, and the correct dose.

In patients with chronic recurring foot lesions or recurring antibiotic treatment, it is recommended that an personal antibiotic booklet is carried [9].

Wound debridement

Wound debridement is important for the effectiveness of other treatment measures.

- Mechanical debridement (e. g. using scissors, scalpels, spoon excavators, curette, ultrasound): removal of necrotic debris in the wound bed, debridement of the wound edges if necessary. Before debridement is performed, adequate arterial perfusion should be ensured. Anesthesia is rarely necessary due to the neuropathy; strictly aseptic conditions are usually not required due to the existing bacterial colonization.
- Biomechanical debridement: liquefaction of wound debris and necrotic tissue by proteases in medical maggot secretion (fly larvae).

Pressure relief

In principle, it must be clear to all those involved (patients, relatives, practitioners) that effective pressure and shear force relief suitable for everyday use is of essential importance. At the same time, this is a recurring challenge due to the loss of protective sensation

▶ **Table 4** Clinical classification of foot infections. Data according to [4, 5].

Clinical manifestation of the infection	Severity of infection	PEDIS classification
Wound without suppuration or signs of inflammation	Not infected	1
Presence of ≥ 2 signs of inflammation (suppuration, redness, (pressure) pain, warm or sclerosis), but each sign of inflammation ≤ 2 cm around the ulcer; infection is limited to the skin or superficial subcutaneous tissue; no other local complications or systemic disease	Mild	2
Infection (as above) in a patient who is systemically healthy and metabolically stable, but exhibits ≥ 1 of the following characteristics: signs of inflammation which extend > 2 cm around the ulcer, lymphangitis, spread under the superficial fascia, abscess in deep tissue, gangrene and extends to muscle, tendon, joint or bone	Moderate	3
Infection in a patient with systemic signs of infection or unstable circulation (e. g., fever, chills, tachycardia, hypotension, confusion, vomiting, leukocytosis, acidosis, severe hyperglycemia or azotemia)	Severe	4
The presence of critical ischemia shifts the severity of the infection (in terms of prognosis) towards "severe", but may reduce the clinical signs of infection. PEDIS = Perfusion, Extent/Size, Depth/tissue loss, Infection and Sensation.		

(LOPS). According to the current recommendations of the International Working Group on the Diabetic Foot (IWGDF), the following measures for effective pressure relief should be considered [9]:

1. Means of choice for neuropathic plantar ulcer: TCC, non-detachable, knee-high or walker, which is not made detachable.
2. If there are contraindications for the measures from number 1 or if these are not tolerated by the patient, then an ankle-high aid is used as a substitute. The patient should always be informed about the importance of wearing the aid.
3. If other options for biomechanical relief are not available/do not work, then consider felted foam padding, but always together with suitable footwear.
4. For non-plantar ulcerations, removable ankle-high aids, shoe fittings, etc.
5. Consider surgical measures to relieve pressure (e. g. tenotomies, position corrections, (pseudo)exostosis removal, Achilles tendon extension)!

For effective pressure relief, regular removal of corns/calluses is also mandatory.

Local wound treatment

For chronic, non-ischemic wounds, the rules of stage-oriented wound treatment (fluid and temperature management) apply. The wound surface should be thoroughly cleaned at each dressing change.

The choice of dressing in an individual case should be based on wound size, exudate volume, presence or absence of signs of infection, available evidence [6–10] and cost-effectiveness criteria.

Therapy of vascular diseases

In the presence of PAOD, the indication for revascularization procedures (surgical or endoluminal procedures) must be made aggressively if the foot lesions do not heal or if there is a risk of amputation.

Without sufficient blood circulation, wound healing is not to be expected. In particular, the possibility of arterial revascularization must be considered if a foot lesion shows no tendency toward heal within 4 weeks despite maximum wound therapy efforts [9].

Vascular surgery and endovascular interventions complement each other. Their use depends on the distribution pattern of PAOD, the length of the vascular occlusions and the expertise and equipment of the practitioner, as well as the presence of a suitable epifascial leg vein as bypass material. In most cases, percutaneous transluminal angioplasty (PTA) should initially be preferred, provided that both revascularization procedures are technically available [11].

Training

Training patients with the aim of ulcer prevention may be a short-term effective intervention option to reduce both the ulcer rate and amputations. Repeated instruction of caregivers is equally important.

Amputation

If an amputation is necessary, the extent of the amputation should be kept as small as possible in order to preserve weight-bearing areas. Prior to each amputation, a meaningful vascular diagnosis must be performed, and the necessity of revascularization must be assessed. A major amputation (amputation above the ankle) as a primary treatment measure is rarely indicated (see "Oppenheimer Erklärung" – statement with the goal of reducing the number of amputations for people with diabetes: http://www.ag-fuss-ddg.de).

Diabetic Neuro-Osteo-Arthropathy (DNOAP) (Charcot foot)

DNOAP is associated with the disintegration of single or multiple joints and/or bones (classification by stage of progression and localization pattern: ▶ **Tables 5**, **6**). In addition to the obligatory neuropathy (irrespective of its genesis), repeated unnoticed traumas are the main causes of its development. An early diagnosis in the acute phase of the disease (active Charcot's foot) is decisive for the prognosis. X-rays of the foot in 2 planes are not sufficient to detect and differentiate this early stage of DNOAP (stage 0 according to Chantelau/Edmonds). An MRI is usually the decisive method for early detection of the disease in addition to the clinical examination which includes determining the surface temperature of both sides. The primary therapy consists of a consistent immobilization of the affected foot (see section "Pressure Relief"). At the same time, it is important to ensure adequate shoe and insole care for the foot on the opposite side. There is a relevant risk for the development of DNOAP on the opposite side as well!

After the disappearance of inflammatory signs of disease and stabilization of the findings, it is considered an "inactive Charcot foot".

▶ **Table 5** Stages of DNOAP according to Levin.

Stage	Clinical indications
I	(Acute stage): foot red, swollen, warm (X-ray image may still be normal)
II	Bone and joint changes, fractures
III	Foot deformity: flat foot, later cradle foot due to fractures and joint disintegration/damage
IV	Plantar foot lesion

▶ **Table 6** Stages of DNOAP according to Sanders.

Type	Affected structures
I	Interphalangeal joints, metatarsophalangeal joints, metatarsals
II	Tarsometatarsal joints
III	Naviculocuneiform joints, talonavicular joint, calcaneocuboid joint
IV	Ankle joints
V	Calcaneus

Prevention

Prevention is of vital importance to avoid ulcers and amputations. The measures include:

- Identification of high-risk patients (past medical history: previous foot lesion or amputation; findings: clinical examination, monofilament, pulse palpation),
- Regular examination of feet and footwear including measurement of skin temperature in patients with sensory neuropathy,
- Suitable footwear,
- Treatment of other pathological changes in the foot,
- Complex podological treatment,
- Training of all participants and
- Psychosocial care.

The most important preventive measure is the regular wearing of pressure-relieving insoles in suitable footwear. In addition, the detection and timely treatment of pre-ulcerative foot lesions such as newly occurring calluses and redness is crucial. This also includes foot surgery, such as the extension of the Achilles tendon in the case of high arches or tendon cuts with claw toes. The individual risk profile of the patient must be taken into account during the examination intervals. Mechanical factors play a major role in the development of diabetic foot ulcers. Injuries occur as a result of repeated exposure to increased pressure and shear forces during walking. The most important trigger of lesions is unsuitable or unworn footwear!

Organization of care

The care provided by a multidisciplinary team of general practitioners, diabetologists, vascular specialists (vascular surgeons, angiologists, interventional radiologists), surgeons, orthopedists, diabetes nurses, shoemakers and podiatrists (shared care) significantly reduces the incidence of amputations. In accordance with the recommendations of the International Working Group on the Diabetic Foot (IWGDF), early referral of the patient to an interdisciplinary and multi-professional foot treatment center is therefore required (https://iwgdfguidelines.org/german-translation/).

For Germany, the DDG Working Group on the Foot has developed comprehensive and now widely-recognized structures that meet the requirements of shared care and, at the same time, reflect effective quality management.

Footwear

Most patients require adequate footwear for both street and home use. The principles of shoe care for patients with diabetes mellitus are based more on sufficient space and suitable insoles with even pressure distribution than on biomechanical, orthopedic correction of deformities. The shoes and especially the footbeds should be checked frequently for wear and, if necessary, replaced. The materials used to relieve pressure lose their restoring force over time. Checking pressure-relieving footbeds for their effectiveness by means of pressure measurement in the shoe leads to better prevention against the recurrence of ulcers. A practice-oriented classification of the stage-appropriate prescription of therapeutic footwear is available at www.ag-fuss-ddg.de (see ▶ **Table 7**)

Legend for ▶ Table 7, [12]

MINIMAL CRITERIA FOR THE SHOE CARE IN DFS

- Enough space for the toes in length and height,
- Sufficient width,
- Avoid pressing seams,
- Soft material over pressure-prone foot areas which move,
- No toe cap with an effect on the foot,
- Removable ready-made padded sole with pressure peak reduction in the ball area by 30 % and
- Possibility of orthopedic shoe fittings.

CRITERIA FOR A HIGHER LEVEL OF CARE

- Contralateral major amputation
- Arthropathy hip/knee/OSG or joint implant with functional impairment/contracture
- Amputation of the big toe/resection metatarsal bones
- Motor function restriction/paresis of one or both legs
- Higher degree of uncertainty when walking/standing
- Extreme obesity (BMI ≥ 35 kg/m^2)
- Renal failure requiring dialysis
- Occupation with mostly standing or walking load
- Significant visual impairment

A medical approval of the prescribed aid together with the patient is always necessary. The instruction of the aid is carried out by the supplier of the aid.

During delivery, the function must be checked for statics and dynamics and, if necessary, optimized by orthopedic fittings.

- Are the prescribed components included?
- Is the proper fit guaranteed?
- Is it safe for standing, walking and surefootedness?
- Is the proper function guaranteed in terms of protecting the foot and compensating for functional limitations?
- Were the criteria for shoe care at DFS met?

▶ **Table 7** Shoe care and risk classifications for diabetic foot syndrome and associated neuro-angio-arthropathies [12].

	Risk group	Explanation	Standard care
0	Diabetes mellitus without PNP/PAOD	Information and advice	Ready-made shoes suitable for feet
I	As in 0, with foot deformation	Higher risk of later occurrence of PNP/PAOD	Orthopedic shoe care due to orthopedic indication
II	DM with loss of sensitivity due to PNP/PAOD	Loss of sensitivity proven due to missing recognition of the Semmes Weinstein monofilament	Diabetes protective shoe with removable soft padded sole, if necessary with orthopedic shoe fitting; higher care with DAF or orth. custom-made shoes for foot proportions that do not match ready-made shoes/foot deformity leading to local pressure increase/unsuccessful adequate preliminary care/orthopedic indications
III	Condition after plantar ulcer	Significantly increased risk of ulcer recurrence compared to grade II	Diabetic protective shoe usually with diabetes-adapted foot bedding, if necessary with orthopedic shoe fitting; higher care with orthopedic custom-made shoes for foot proportions that do not match ready-made shoes/unsuccessful adequate preliminary care/orthopedic indications
IV	As in II with deformities or dysproportions	Not possible to provide care with ready-made shoes	Orthopedic custom-made shoes with DAF
V	DNOAP (Levin III)	Orthoses usually for DNOAP type IV-V (Sanders) or in case of a strong perpendicular deviation	Cross-bone orthopedic custom-made shoes with DAF, inner shoes, orthoses
VI	As in II with foot section amputation	At least transmetatarsal amputation, internal amputation also possible	Care as in IV plus prostheses
VII	Acute lesion/florid DNOAP	Always as temporary care	Relief shoes, bandage shoes, interim shoes, orthoses, TCC if necessary with DAF and orthopedic fittings

The term 'diabetic protective shoe' shall be used in the same sense as 'diabetic special shoe', 'orthopedic shoe', 'ready-made therapeutic shoe' or 'semi-orthopedic shoe'.

The verifiable documentation of targeted local pressure relief through a diabetes-adapted footbed is only possible under dynamic conditions with the help of pedobarographic measurement soles. For the documentation of zones of increased pressure due to functional deformities, dynamic pedography is superior to static methods (imprint).

For the correction or functional compensation of a higher degree of foot deformity by means of custom-made shoes, an individual special fitting must be produced manually according to a plaster cast or a comparable technique. The current state of automation technology allows custom-made production only for slightly deformed feet.

In individual cases, a deviation from the above-mentioned arrangement with more complex or simpler care as per the medical indication is possible.

The criteria for a higher level of care must be verifiably documented and the corresponding diagnoses must be included on the medical prescription.

In the case of an acute lesion (ulcer or even fluoride DNOAP), total relief with an Allgöwer walking apparatus or Thomas splint is only necessary in exceptional cases. In the case of an ulcer, pressure relief and pressure redistribution are of primary importance whereas for DNOAP, importance is placed on eliminating ankle movements.

For follow-up, outpatient examinations are required at least every 3 months from group III onwards.

ADDRESSES ON THE INTERNET

www.deutsche-diabetes-gesellschaft.de
- Current version of the evidence-based guidelines: www.ag-fuss-ddg.de
- International Working Group on the Diabetic Foot Guidelines 2019, original and German translation
- Examination form of the Foot Working Group
- Facilities for the treatment of diabetic foot syndrome
- Links to other sites that provide information about the diabetic foot syndrome
- “Oppenheimer Erklärung” (statement)

www.diabetes-cme.de
- Continuing education on diabetes mellitus in accordance with guidelines. The knowledge presented here is compiled on the basis of the evidence-based diabetes guidelines of the German Diabetes Society (DDG).

www.diabetes-deutschland.de
- Information system on diabetes mellitus

www.rki.de
- Website of the Robert Koch Institute, including recommendations for targeted antibiotic therapy

www.n-v-l.de
- National Healthcare Guideline on Type 2 Diabetes

www.AWMF.de
- S3 Guideline PAOD of the German Society of Angiology

Conflict of Interest

S. Morbach: Within the last 3 years, Morbach has served on advisory boards of URGO GmbH (National Advisory Board DFU), Novo Nordisk Deutschland (Clinical Practitioners Advisory Board) and an international advisory board of Reapplix ApS and has received corresponding fees. He was also Vice President of the International Working Group on the Diabetic Foot Implementation and of D-FOOT International. He is a visiting researcher at the Institute for Health Services Research and Health Economics, Centre for Health and Society, Medical Faculty, Heinrich-Heine-University Düsseldorf. R. Lobmann has received research funding (personally or at his personal disposal) either directly or in the form of monetary benefits (personnel, equipment, etc.): Fa. Urgo (Explorer Study, E2-SubStudy) As a speaker he received a fee or as a passive participant he received a reimbursement of costs (travel or accommodation costs, paid participation fees): Honorarium adviser: Amgen, Astra Zeneca, Biotec, Böhringer Ingelheim, GWT-TUD GmbH, Lilly, Medac MSD Sharp & Domme GmbH, Novo Nordisk, Roche, Sanofi Aventis, Sciaric, URGO, Wörwag Pharma. Reimbursement of costs: Lilly, Urgo, Wörwag. He has been a paid consultant/internal training consultant or similar for: Abbott, Biotec, Böhringer Ingelheim, Lilly, Mölnlycke, Novo Nordisk, URGO, Wörwag Pharma. Membership and position in scientific societies/professional associations and possibly other associations relevant to this training measure: Member of the board of the ADBW, spokesman of the regional societies of the DDG, member of the Diabetes Advisory Board of the State Government of Baden Württemberg, delegate for D-Foot International, member of the board of the German Diabetes Society (DDG; 2016–2020), spokesman of the DDG Working Group on the Diabetic Foot (2010–2020). A. Risse has been active within the last 3 years in advisory boards of URGO GmbH and Neubourg Skin Care and has received corresponding fees. For lecture and training activities he received fees from the company Serag Wiesner and from the Zentralverband Podologie. He is chairman of the commission for EADV of DDG. M. Eckhard has worked for the following companies within the last 5 years and has received corresponding fees: Berlin-Chemie (lectures), Boehringer-Ingelheim (lectures and consulting), Lilly Deutschland (lectures and consulting), Novo Nordisk (lectures and consulting), Sanofi (lectures). Accompanying offices: Chairman of the Hessian Diabetes Society e.V. (HDG, Regional Society of DDG), Member of the Board of Directors of the DDG Working Group on the Foot e. V., Member of the Committee of DDG Diabetologists in the DDG. Professional status: Medical Director of the university diabetes center at the University Hospital Gießen and Marburg GmbH (UKGM, Gießen site), Chief Physician of the GZW Diabetes Clinic Bad Nauheim. H. Reike discloses that the Mariannen-Hospital has received support for events organized by him from the companies Novo Nordisk Deutschland, Lilly Deutschland, Beurer, Emmerich. M. Spraul has worked for the following companies within the last 3 years and has received corresponding fees: Lilly Germany (lectures and consulting), Novo Nordisk (lectures and consulting), Abbott (consulting), Astra Zeneca (lectures), Neubourg Skin Care (lectures and consulting). M. Spraul discloses that the Mathias-Spital has received support from the companies Novo Nordisk Deutschland and Neubourg Skin Care for events organized by him. G. Rümenapf and E. Müller have no conflicts of interest.

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