



NATIONAL CLINICAL GUIDELINE FOR ASSESSMENT AND TREATMENT OF PATIENTS WITH DIABETIC FOOT ULCERS

Quick Guide

Consider ulcer biopsy rather than ulcer swab on clinical suspicion of infection, as the diagnostic precision of a swab is poorer.

Weak recommendation

Before initiation of antibiotic treatment, a specimen should be obtained for microbiological diagnostics. The first choice is an ulcer biopsy, as this method has the best microbiological diagnostic precision. It is important that the clinician arrives at the choice of diagnostics in consultation with the patient. On suspicion of an infection requiring deep revision, an ulcer biopsy should always be done. A chronically infected diabetic foot ulcer is infected with biofilm-forming bacteria. The biofilms are located in the ulcer and not on the ulcer surface, which means that they can only be ascertained by biopsies.

The ulcer must be cleaned prior to sampling. This is done using the standard ulcer cleaning procedure, where necrotic tissue, pus and fibrin are removed, and the ulcer is rinsed with sterile saline or tap water. In connection with a biopsy, a tissue piece is removed after revision to vital tissue with a scalpel, biopsy forceps, biopsy stance or curette. The specimen is placed in a suitable container and must be transported to the department of microbiology as soon as possible. A little amount of sterile saline may be added if there is a risk of desiccation. The specimen is stored in a refrigerator until collection.

If it is not possible to take an ulcer biopsy, a swab of the ulcer may be done instead using the Levine technique, as the ulcer swab sensitivity is clinically acceptable. An ulcer swab has a sensitivity of 88% in relation to identifying patients with disease-producing bacteria (pathogens) relative to an ulcer biopsy.

On clinical suspicion of diabetic foot ulcer infection, it is essential that empirical antibiotic treatment be commenced without delay. It is important that the clinician does not wait for the test result or that the clinician does not postpone antibiotic treatment because no sample has been taken.

It is good practice to use compression treatment for patients with diabetic foot ulcers, lower extremity oedema and long-term complications in the form of neuropathy and ischaemia.

Good practice (consensus)

In Denmark, a compression bandage is used for lower extremity oedema in the form of a bandage applied to the leg with a continuous pressure or a stocking that applies compression to the lower leg.

Compression treatment is divided into two main types: elastic and inelastic compression.

It is important to assess the patient's neuropathy status as well as perfusion in the foot before deciding what pressure the compression bandage is to apply to the leg.

Daily inspection must generally be performed for pressure marks and ulcers as well as reapplication of the bandage in patients with diabetic long-term complications in the form of neuropathy and ischaemia.

The patient must be offered therapeutic footwear with enough space for the feet when a compression bandage is applied.



Consider non-removable offloading device rather than removable offloading device for patients with plantar diabetic foot ulcers.

Weak recommendation

The recommendation applies to patients with plantar diabetic foot ulcers based on pressure and neuropathy.

The recommendation does not apply to patients with treatment-requiring ischaemic and infected foot ulcers as well as a foot with significant malalignments.

A non-removable offloading device can be in the form of a plaster cast (e.g. fibre glass, plastic) or a locked air cast. When applying the bandage, the ulcer must also be decompressed with an individually adjusted insole. The non-removable bandage must typically be changed at an interval of 1-2 weeks.

If there is a need to inspect the ulcer at more frequent bandage change intervals, a removable bandage may be used. A window may, if necessary, be created in the non-removable bandage. A removable bandage may, for example, be a walker/air cast bandage or individually customised shoes or insole. It is important that the clinician assesses the type of bandage that will be best for the patient in consultation with the patient. Patients who cannot be instructed in how to use a removable bandage in all types of load on the foot may benefit from wearing of a non-removable bandage.

Consider negative pressure wound therapy for patients with diabetic foot ulcers.

Weak recommendation

Negative pressure wound therapy can be offered to diabetes patients with an uninfected foot ulcer. The treatment should be given in addition to standard ulcer treatment. The ulcer must be clean before application of the dressing. This means that necrotic tissue, pus and fibrin must be removed.

The treatment can be offered to both outpatients and inpatients, as the dressing is portable.

Prior to application of a negative pressure wound therapy dressing, it is important to ensure that the blood flow (perfusion of the foot) is sufficient. Treatment duration and bandage change frequency may vary. No supporting evidence has been found to document the optimal pressure to be used. However, a higher negative pressure increases the risk of pressure damage, which must be taken into consideration. Care must also be shown in applying a negative pressure wound therapy dressing to a bleeding ulcer or an exposed spongiosa bone.



Consider surgical offloading procedures for patients with foot/toe malalignment and non-healing diabetic foot ulcers.

Weak recommendation

Patients with a foot/toe malalignment and non-healing diabetic foot ulcers should be referred for surgical assessment.

It should be considered offering surgical offloading by Achilles tendon lengthening to adults with plantar diabetic foot ulcers and concurrent malalignment and lack of healing after standard ulcer treatment and offloading.

It should be considered offering surgical offloading by metatarsal osteotomy to adults with diabetic forefoot ulcers and concurrent malalignment and lack of healing after standard ulcer treatment and offloading.

It should be considered offering surgical offloading by flexor tenotomy to adults with diabetes and toe deformity and non-healing diabetic ulcers corresponding to the pulp or dorsally on the toes.

Before the procedure is performed, it is important to ensure that the blood flow (perfusion of the foot) is sufficient to achieve healing of the surgical wound. This is best performed by toe pressure measuring.

Achilles tendon lengthening should be considered for patients with diabetes and a plantar forefoot ulcer with concurrent non-healing in standard ulcer treatment. One or more of the following factors should also be present:

- Increased pressure/load on the plantar part of the forefoot
- High risk of recurrence of the ulcer if the foot deformity is not changed
- Tight Achilles tendon with reduced dorsal flexion in the foot joint
- Lack of dorsal flexion over the neutral position.

If the patient has good mobility in the ankle joint with dorsal flexion of more than 10 degrees, another form of treatment should be considered.

Metatarsal osteotomy should be considered for patients with diabetes and a plantar forefoot ulcer with concurrent lack of healing in standard ulcer treatment. One or more of the following factors should also be present:

- Increased pressure/load on the plantar part of the forefoot over caput of the metatarsal tendons
- High risk of recurrence of the ulcer if the foot deformity is not changed

The following deformities, and concurrently non-healing diabetic foot ulcer on toes, should trigger consideration of a surgical offloading procedure by flexor tenotomy:

- Claw toe formation (hyperextension in the MTP joint and flexion of the PIP and DIP joints)
- Hammer toe formation (hyperextension in the MTP joint and flexion of the PIP joint without concurrent flexion of the DIP joint)



Consider training for patients with diabetic foot ulcers.

Weak recommendation

Non-weight-bearing training should be considered as the first choice to ensure proper ulcer healing.

The choice of training must be assessed in relation to the location of the foot ulcer, so that the training does not entail a risk of foot ulcer deterioration. The training must also be adapted to the patient's physical ability and possible comorbidities.

The foot ulcer must have been sufficiently offloaded before the training can be initiated. Offloading may be in the form of different types of footwear, therapy sandals, orthoses or aids such as crutches.

The training must be accompanied by thorough instructions by a healthcare professional with knowledge about and competences in training for the patient group.

The training should generally be supervised and be provided in close collaboration with the interdisciplinary team. Supervised training is defined as training with physical or virtual guidance by a healthcare professional.

Consider telemedical management for patients with a diabetic foot ulcer.

Weak recommendation

Telemedical management may replace some onsite check-ups with the healthcare professional, but should not stand alone. The type of follow-up with the patient should be decided with due consideration for the patient's needs, preferences and resources.

In a situation in which the patient is highly immobile, chronically distressed or mentally fragile, the healthcare professional can, to advantage, use telemedical management.

Offloading adjustments in the patient's own home cannot be performed by telemedical management, as access to special equipment is required.



About the quick guide

This quick guide contains the key recommendations from the national clinical guideline for assessment and treatment of diabetic foot ulcers. The guideline was prepared under the auspices of the Danish Health Authority.

The guideline is expected to support a more uniform and evidence-based assessment and treatment offer for patients with diabetic foot ulcers in those parts of the course of the patient's treatment that are covered by this guideline.

The national clinical guideline contains recommendations regarding selected parts of the field, and it cannot stand alone but must be seen in conjunction with other guidelines, recommendations, process descriptions etc., in this field.

Further information at www.sst.dk

A full-length version of the national clinical guideline is available at the Danish Health Authority's website (www.sst.dk), including a detailed review of the underlying evidence for the recommendations.

About the national clinical guidelines

This national clinical guideline is one of the national clinical guidelines prepared by the Danish Health Authority during 2017-2020.

Further information about the choice of subjects, method and process is available at www.sst.dk
