

# Treatment of Chronic Lower Limb Wounds and Limb-Salvage Surgery in Diabetic Patients

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## ABSTRACT

Etiology of chronic lower limb ulcer is diversified. Untreated or not correctly treated wounds lead mostly to an unnecessarily high number of amputations. This paper is an audit of care. Our aim was to summarize the efficient treatment of lower extremity wounds in patients with diabetes at a Hungarian hospital when we use all available facilities, experience, information and knowledge. For many cardiology pathologies, it is important that the patient does not have an infection or wound. Therefore, it is important to cure chronic leg ulcers or amputate the lower limb as soon as possible. Peripheral arterial disease and diabetes are the major causes of lower limb amputations worldwide. Hungary has the highest amputation rate among European countries according to a recent survey therefore it is of great importance to diagnose the primary disease and to form an individual, complex therapy in time. Training of the population and general practitioners could help patients visit specialists in time. Training of patients/relatives is necessary to continue the proper wound management at home.

**Keywords:** Chronic Wounds; Diabetes; Amputation; Complex Treatment; Training; Cardiology

**Key Messages:** Chronic lower limb wounds with different etiology need complex, individual, persistent treatment to avoid major limb amputation. This paper summarizes the importance of ulcer treatment. Patient at least satisfactory cooperation is also essential to start the treatment in proper time to save extremities. Our mission is to educate patients and relatives.

## Introduction

Chronic lower extremity ulcers are those that do not progress through the healing process in a timely manner [1]. Etiology of chronic lower limb ulcer is diversified. Chronic wounds can be classified as vascular ulcers (e.g., venous and arterial ulcers), diabetic ulcers, and pressure ulcers (PUs) [2]. Peripheral arterial disease and diabetes are the major causes of lower limb amputations worldwide. The underlying pathophysiology of diabetic foot ulcers is a complex interplay between the body's persistent hyperglycemic state and the neuropathic, vascular and immune system components. Foot ulcers in patients with diabetes are common and frequently lead to lower limb amputation unless a prompt, rational, multidisciplinary approach to therapy is taken [3]. Another considerable fact that foot ulcers and lower extremity vascular diseases are related to higher risk of death [4]. For many cardiology pathologies, it is important that the patient does not have an infection or wound. Therefore, it is important to cure chronic leg ulcers or amputate the lower limb as soon as possible. First of all, prevention is the first step to decrease

the number of patients with chronic lower extremity wounds. It is important to train foot care to all persons with diabetes carefully and completely. The recommendation should be reinforced whenever a physical examination is performed [5]. Several studies have reported reduction in lower extremity complications when prevention and treatment programs were instituted [6]. Informing of physicians about foot problems of persons with diabetes, clinical examination and paraclinical assessment, regular foot examination, patient training, simple hygienic practices, and provision of appropriate footwear combined with prompt treatment of minor injuries can decrease ulcer occurrence by 50% [7].

## Aim

This paper's aim was to summarize the efficient treatment of lower extremity wounds in patients with diabetes at a Hungarian hospital when we use all available facilities, experience, information and knowledge. Nevertheless, the number of amputations will not decrease.

## Discussion

According to our experience, we offer the treatment method listed below:

Treatment of the primary disease is essential, and it includes arterial reconstruction (intervention or open surgery), varicose vein removal, compression therapy, cure of metabolic changes, and treatment of renal insufficiency. Another important factor is to get supplement of trace elements and protein with different types of nutrients. Diabetic and nephritic patients need special nutrients. Extensive debridement of wounds and removal of devitalized tissue is the first and most important therapeutic step leading to wound closure and limb salvages [8]. If the infection is superficial, the patient should be treated with oral antibiotics for 1–2 weeks. If necrosis, gangrene, and osteomyelitis are not present, the lesion should be debrided, if necessary, and treated as deep bacterial infection, starting with intravenous antibiotics. If necrosis, gangrene, and osteomyelitis are suspected, immediate surgical consultation should be requested for debridement or local amputation and revascularization or angioplasty if possible [9]. Smart bandages can locally improve conditions of wound healing. Among different types of dressings the one should be chosen which is convenient for the patients and the wounds' state. Vacuum-assisted closure is a good treatment supplement for wound healing [10,11]. Compression therapy is necessary for better circulation by every ulcer of the lower extremity except for severe peripheral arterial disease. Shoes, foot orthoses help to decrease the pressure around the wound because of the deformed foot structure and avoid forming new wounds. After the first care, regular control is essential, initially by each bandage change, then weekly, monthly, after complete healing three-monthly, later half-yearly. General practitioners are informed in detail, they are involved in the therapy as consultants. When a patient has got any complaint, either the general practitioners or the wound specialists are called. Through the training of patients and relatives we firmly improved the tertiary prevention.

## Implication for Clinical Practice

### What Shall we do for General, Not Only Individual Limb Rescue?

First of all, patients should visit the doctor in time. For this aim, we think we should give a wide range of information to the youths in schools as well as systematic training for general practitioners. Secondly, when the patient arrives at the GP, is he/she needs to raise an exact diagnosis as soon as possible thereby in case of uncertainty the patient is directed to a specialist. Complex and individual treatment is needed to start as soon as possible. The wound treatment contains management of the primary disease and concomitant diseases, a supplement of protein, vitamins, and trace elements, using

smart bandages suited to the wound condition, using compression therapy for better circulation, using special shoes and foot orthoses to decrease the pressure around the wound because of the deformed foot structure or the location of the wound and avoid forming a new one. Due to deep infection, hospitalization is necessary for the patient. By this time the certain physician could realize the progression of the wound state or general condition. Psychological lability recognized in time and the availability of psychologists are needed. In Hungary psychologists are not available crucially. Aftercare is as important as the start of the therapy. Patients arrive at the Outpatient Clinic in the hospital for wound control every other day, later weekly, monthly. We can give multiple help with home wound management. Institutional home care assistants look after the patient. The surgeons explain wound management for patients or relatives in detail before leave for home. Wound specialists keep training for general practitioners. Patient documentation is necessary for multidisciplinary teamwork and to confirm patient safety procedures. The possibility of telephone consultation by wound specialists is open for the patient, for nurses and for GPs, too. It is emphasized by every control at the specialist that progression of wound state is a required condition by proper documentation system to appear either by the general practitioner or wound specialist without any loss of time.

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