



EUROPEAN ACADEMY OF
DERMATOLOGY AND VENEREOLOGY

Information Leaflet for Patients

LEG ULCERS

The aim of this leaflet

This leaflet is designed to help you understand more about leg ulcers, healing, and the prevention of recurrences. It tells you what these conditions are, what causes them, what can be done, and practical advice for managing this condition.

LEG ULCERS

Who is affected by leg ulcers and why is treatment important?

Leg ulcers are frequent; chronic wounds at the leg and foot are more common than you would think. One percent of the population develops a chronic wound (an ulcer) in the legs or feet at least once in their lifetime. Elderly people are more often concerned, however younger individuals can be affected too, for instance after a “deep vein thrombosis” (blood clot in the deep veins).

We now know that the majority of patients with leg ulcers suffer from pain and impaired sleep. They have a greater risk of becoming depressed and socially isolated. Professionally active persons can become unable to work. Treatment is time-consuming and often requires support by home care (community nurses). Chronic wounds need weeks or months to heal, and they frequently come back (recurrences). Therefore, not only many patients, but also physicians and nurses, are discouraged and give up fighting the disease.

Many of these problems could be avoided if chronic wounds were always examined and treated correctly from the beginning. This leaflet gives you insight into the key steps in the treatment of chronic wounds of the leg and foot, called “leg ulcers” and “foot ulcers.”

What are the different types of leg ulcers, what causes them, and how are they examined?

Chronic venous insufficiency (CVI) and venous leg ulcers (VLU)

Approximately 50% of all patients with leg ulcers have an underlying venous disorder. Venous leg ulcers (VLU) are commonly located above or around the inner ankle, or behind and below the outer ankle. Venous leg ulcers commonly occur in areas of predamaged skin. Venous insufficiency causes scar-like, inelastic and brownish leg skin, so-called “fibrosis” and “dermatoliposclerosis.” Spontaneous cracks within these damaged zones lead to chronic, non-healing wounds, which represent venous leg ulcers.

The leg veins can be routinely examined with ultrasound, to distinguish two major situations:

- 1) The **deep veins** are damaged, most commonly from an earlier “deep venous thrombosis” (resolving in the majority after several months, damaging the large veins deep in the leg, between bone and muscle). Until now, damaged deep veins could not be surgically repaired, with one exception. Blocked or occluded deep veins at the pelvis can often be opened with a catheter (hollow wire with balloon at the tip) and supported with an interior grid, a “stent.”
- 2) The **superficial veins** become enlarged and twisted to form varicose veins (varices). Varicose veins can lead to chronic venous insufficiency and to a venous leg ulcer. Varicose veins can be - in contrast to the deep veins - surgically treated and removed.

Mixed leg ulcers (MLU) in patients with venous and arterial insufficiency of the same leg

Another 20% of leg ulcers are also caused by chronic venous insufficiency (as explained above), however, the concerned legs also suffer from arterial disease. These wounds are called mixed leg ulcers (MLU). Atherosclerosis (degeneration and narrowing of the arteries) is most commonly caused by hypertension (high blood pressure), diabetes (raised blood sugar levels), raised blood fat levels (e.g. high cholesterol) and, last not least, by smoking. These are the four classic risk factors for heart disease and arterial disease (known as cardiovascular risk factors).

When they occur alone or together, the arteries are at risk of developing deposits of fatty material and inflammation along the inside of the vessel wall, which narrows and finally blocks the blood stream that provides the body organs with oxygen, nutrients, and also the blood supply to the legs and feet (“peripheral arterial disease”). **It is mandatory to check if there is peripheral arterial disease** in every leg with a chronic wound. The examination is easy and rapid to perform. It requires a blood pressure cuff and a “Doppler” device (a hand-held ultrasound used to check pulses), which are routinely available in clinics and offices that treat patients with wounds and circulation disorders.

Today, narrowed blood vessels can be opened with “balloon-catheters” (hollow wire with an inflatable balloon at the tip) in many instances. Repair of arterial circulation (blood flow from the heart) is the first step to treat mixed leg ulcers. If arterial blood flow can be normalized, the mixed leg ulcer is then transformed into a venous leg ulcer, and treatment follows according to guidelines. In some cases, where the arterial circulation cannot be completely restored, it is important to reduce the amount of leg compression, in order to not compromise the arterial blood flow. It is of utmost importance to control any cardiovascular risk factors (see above).

Arterial leg ulcers and hypertensive ischemic leg ulcers

Approximately 5% of leg ulcers are caused by severe arterial disease. These painful wounds are typically located above the outer ankle, over the shin or at the dorsum (top surface) of the foot. Examination of peripheral arteries is not difficult and should be part of the physical examination of all patients with chronic leg and foot wounds.

Patients with an arterial leg ulcer commonly require opening of the narrowed and/or blocked arteries. The majority of these peripheral arteries are treatable with balloon catheter-based technologies, but some may need bypass surgery. Once arterial blood flow into the leg and foot is restored, skin

grafts speed up complete wound healing.

Another 5% of patients suffer from “Martorell hypertensive ischemic leg ulcers (HYTILU).” These excruciatingly painful wounds are typically located over the calf and outer side of the legs, or over the Achilles tendon. They are caused by narrowing of tiny arteries in the fatty layer of skin (so-called “subcutaneous arteriolosclerosis”). About 50% of patients with HYTILU also have peripheral arterial disease that requires restoration of arterial blood flow. HYTILU usually does not heal spontaneously or with medication alone. Instead, it is prone to deteriorate unless the broken skin areas are surgically removed and repaired with a skin graft.

Other causes of leg ulcers (Figure 1)

Many other disorders can cause leg ulcers, besides classic venous leg ulcers (LU), mixed LU, and arterial LU. These less common types of chronic wounds also require a thorough vascular examination, in addition to more detailed blood tests and “histology” from a “skin biopsy” (small surgical sample of wound tissue, border, and surrounding skin).

Why do chronic wounds not heal normally and how does wound healing occur?

Common wounds heal spontaneously. Scrapes form a scab to heal underneath. Cuts or tears heal on their own or after a surgical suture.

In a chronic persistent wound, the natural steps of healing are disturbed. Approximately 80% of chronic leg and foot ulcers can be explained by a disturbed blood circulation of the arteries (blood flow away from the heart and towards the leg and foot), veins (return blood flow from the foot and leg towards the heart), or a combination of both arteries and veins. The remaining 20% of chronic extremity wounds have different causes (**Figure 1**). A standardised and thorough examination is key to a tailored successful treatment, and to preventing wound recurrence.

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Wound healing happens through different stages. The majority of wounds produces a lot of wound fluid (“exudate”) in the early stage of wound healing, to transform into a less humid, new “granulation” tissue in the intermediate stage, and finally close from the advancing wound edges. Some wounds, however, are very dry in the beginning. Wound moisture should ideally be balanced to allow for rapid and uncomplicated wound healing.

Removing dead (“necrotic”) *black* tissue remnants, *gray* “biofilms,” and *yellow* “fibrin layers” by so-called “debridement” reduces the risk of infection and allows the healthy *red* granulation tissue to fill the wound bed – the sooner the better. In venous and mixed leg ulcers, compression therapy (see below) also helps to reduce the amount of wound fluid.

How are leg ulcers treated?

Compression therapy

Leg compression is mandatory to treat any kind of venous disorder. **Leg compression represents the mainstay of treatment of chronic venous insufficiency and of venous leg ulcers.** It counteracts any form of venous insufficiency, both at the level of deep and superficial veins.

Compression can be accomplished either with bandages or hosiery. The so-called “four layer bandage,” “two layer bandage,” or the particularly stiff “Unna boot” represent typical techniques of leg bandages. Stockings are subdivided according to compression classes, length, round or flat knit, one or two layers, with open or closed tip. Patients with mixed leg ulcers (venous plus arterial insufficiency in the same leg) require less compression, in order to not compromise arterial circulation.

Physicians or institutions who prescribe compression hosiery should enable their patients to put on (“don”) and take off (“doff”) their stockings, because they are difficult to use without help. There are many different gliding aids and

stocking frames designed to help elderly and frail patients to don-and-doff their compression stockings without the help of health professionals. After prescription and purchasing, patients should receive supervision and training. Manual lymphatic drainage and bandage and/or intermittent pneumatic compression represent effective supplements, particularly in patients with severe leg swelling. Leg compression reduces swelling and skin damage, heals most venous leg ulcers completely, and reduces the risk of recurrence of venous disorders.

Synthetic dressings

There are a wide array of synthetic dressings, for example: (A) “fibre or foam dressings” which absorb larger quantities of wound fluid, (B) “hydrocolloids” which prevent rather dry wounds or granulating wounds from drying out, or (C) “non-adherent dressings” which protect advancing edges (epithelium) from being torn off with every dressing change. More sophisticated, “active dressings” can neutralize harmful proteins in the wound fluid or serve as a support for healthy tissues to grow in.

Most wound centres, hospital departments and offices involved in treating chronic wounds have certified wound experts in their teams with in-depth specific knowledge and skills on local wound treatment and optimal dressing choice.

Negative pressure wound treatment (NPWT)

“Negative pressure wound treatment (NPWT) “ consists of a foam to fill in the wound, which is sealed with a plastic foil and then set under negative pressure (vacuum). NPWT continuously removes toxins and harmful proteins. The relative lack of oxygen under the vacuum foil strongly stimulates the growth of very fine blood vessels («capillaries») that form a strong red granulation tissue. This can be used as an optimal wound bed for a skin graft. NPWT is particularly effective to treat infected wounds or large and deep wounds.

Most common causes of chronic wounds (leg ulcers, foot ulcers)

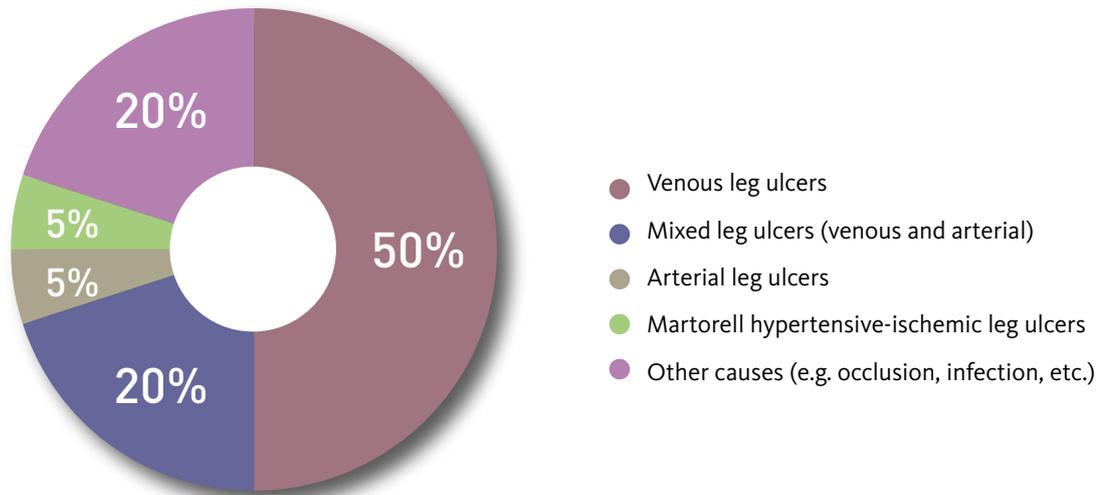


Fig. 1

Skin grafts

Skin grafts can accelerate or accomplish complete wound closure in situations where this does not take place naturally. Ideally, the wound bed is well-prepared (e.g. by NPWT, see above). However, sometimes (e.g. in patients with Martorell HYTILU, see above) a skin graft can also be applied on non-optimally prepared wounds that do not show any tendency towards spontaneous wound healing. In such situations, the skin graft may not heal (“take”) completely, however, it helps the non-healing wound to get on its way to natural healing.

Skin grafts can be removed (or “harvested”) almost anywhere on the body, but the thigh is the most common donor site of skin grafts for leg ulcers. The graft can be harvested under local anesthesia, which makes the procedure well-tolerable, even in elderly and frail patients. The donor site heals spontaneously within 1 week (punch grafts) or 2-3 weeks, respectively (split skin grafts). The graft is placed on the clean wound, without stitching, and wrapped with specific bandages. Under optimal circumstances, the graft heals within 5-10 days (“full take”). Wound pain commonly improves dramatically after skin grafting, making skin grafts one of the most effective pain killers in wound treatment.

Skin equivalents

In recent years, several tissue engineering companies have proposed an array of skin equivalents: (A) vital, semi-vital or dead, (B) human, animal-derived, or totally synthetic, (C) composed of one cell type or several layers of different cell types, and (D) originating from the patients cells or from other (tested) human sources. All these products have properties that enable them to enhance the wound closure of otherwise “hard-to-heal” (non-healing) chronic wounds. Few studies compare skin equivalents amongst each other. Most of these products are expensive and need specific training that many countries require for reimbursement.

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What is practical advice for taking care of leg ulcers?

- Compression bandages can be rather thick during the first weeks of treatment. These bandages should be applied by health professionals, in order to warrant sufficient pressure and to avoid gliding. They should be replaced 1-3 times per week.
- You can “don” your compression stockings immediately after getting up, and “doff” them as soon as you go to bed. If you cannot tolerate the stockings a whole day long, you can take them off earlier. But you should check the fit with your physician or wound centre. Perhaps, a change of prescription may enable you to wear different stockings all day long.
- As long as you receive compression bandages, you can shower directly before the dressing change. If you have to shower with the bandage, you can use waterproof protective bags. Small leg ulcers can have full contact with water and soap.
- Bandages and footwear: if you have to wear a compression bandage during the first weeks of treatment, you may use wide open sandals in summer, or wide closed boots in winter. If you buy new footwear, you can wear the bandage to check the fit.
- As soon as the leg is not swollen anymore, or as soon as a leg ulcer does not produce much wound fluid (exudate) anymore, bandages can be replaced by two-layer compression hosiery.
- A lot of patients require lifelong compression hosiery. You can try as many stockings as necessary until you find an optimal product. It takes time to get used to the regular wear of compression stockings. After a while you will realize that they are of great help, and that your legs feel uncomfortable without them.

- Donning and doffing devices can be of great help.
- You can wash your stockings once a day. Wrap and squeeze the wet stockings within a towel and hang them up to dry until the next morning.
- Do not give up because of a leg ulcer! The vast majority of patients can be healed. Select a centre, institution or office where a team of dedicated experts (physicians and nurses) treat leg and foot ulcers, and all forms of chronic wounds.
- Cultivate your friendships and keep up your social contacts. Wound care takes time every day, however, social contacts do not have to suffer.
- Talk about pain. It is not true that pain can always be completely controlled, however, pain can virtually always be alleviated.

Preventing recurrence

- Leg and foot ulcers are prone to recur. Get yourself well-fitting compression hosiery and well-fitting foot wear, and insist on individual counselling until materials fit and until you are able to put on and off your devices, ideally even without professional help.
- Get advice on daily skin care with moisturizers and medical creams (e.g. against fungus or eczema) and use them every day.
- Check your legs and feet every day, and show every skin lesion to a health care professional. ■

While every effort has been made to ensure that the information given in this leaflet is accurate, not every treatment will be suitable or effective for every person. Your own clinician will be able to advise in greater detail.

PRODUCED BY THE EADV WOUND HEALING TASK FORCE



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