KERRY SKIN CLINIC
SKIN, HAIR + NAILS SPECIALISTS

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Leg ulcers

What are leg ulcers?

Leg ulcers skin loss on the leg or foot due to any cause. They occur in association with a range of disease processes, most commonly with blood circulation diseases. Leg ulcers may be acute or chronic. Acute ulcers are sometimes defined as those that follow the normal phases of healing; they are expected to show signs of healing in less than 4 weeks and include traumatic and postoperative wounds. Chronic ulcers are those that persist for longer than 4 weeks and are often of complex poorly understood origin.
Ulcers may be provoked by injury or pressure such as from a plaster cast or ill-fitting ski boot. They may also be caused by bacterial infection, especially impetigo, ecthyma and cellulitis and less often tuberculosis or leprosy.
Chronic leg ulceration affects about 1% of the middle-aged and elderly population. It most commonly occurs after a minor injury in association with:

- Chronic venous insufficiency (45-80%)
- Chronic arterial insufficiency (5-20%)
- Diabetes (15-25%)

Chronic leg ulcers may also be due to skin cancer, which may be diagnosed by a skin biopsy of the edge of a suspicious lesion. There are also many less common causes of ulcers including systemic diseases such as systemic sclerosis, vasculitis and various skin conditions especially pyoderma gangrenosum.

What causes leg ulcers?

Venous insufficiency refers to improper functioning of the one-way valves in the veins. Veins drain blood from the feet and lower legs uphill to the heart. Two mechanisms assist this uphill flow, the calf muscle pump which pushes blood towards the heart during exercise, and the one-way valves which prevent the flow of blood back downhill. There may be reflux through the valves, obstruction of the veins and/or impaired calf pumping action result in pooling of blood around the lower part of the leg to just below the ankle. The increased venous pressure causes fibrin deposits around the capillaries, which then act as a barrier to the flow of oxygen and nutrients to muscle and skin tissue. The death of tissue cells leads to the ulceration.
Arterial insufficiency refers to poor blood circulation to the lower leg and foot and is most often due to atherosclerosis. In atherosclerosis the arteries become narrowed from deposits of fatty substances in the arterial vessel walls, often due to high levels of circulating cholesterol and aggravated by smoking and high blood pressure (hypertension). The arteries fail to deliver oxygen and nutrients to the leg and foot resulting in tissue breakdown.
Diabetic ulcers are caused by the combination of arterial blockage and nerve damage. Although diabetic ulcers may occur on other parts of the body they are more common on the foot. The nerve damage or sensory neuropathy reduces awareness of pressure, heat or injury. Rubbing and pressure on the foot goes unnoticed and causes damage to the skin and subsequent 'neuropathic' ulceration.

Who is at risk of leg ulcers?

Certain conditions have been linked with the development of venous and arterial leg ulcers.

Venous ulcers

- Varicose veins
- History of leg swelling
- History of blood clots in deep veins, i.e. deep vein thrombosis (DVT) causing post-thrombotic syndrome (in 5% of cases)
- Sitting or standing for long periods
- High blood pressure
- Multiple pregnancies
- Previous surgery
- Fractures or injuries
- Obesity
- Increasing age and immobility

Arterial ulcers

- Diabetes
- Smoking
- High blood fat/cholesterol
- High blood pressure
- Renal failure
- Obesity
- Rheumatoid arthritis
- Clotting and circulation disorders
- History of heart disease, cerebrovascular disease or peripheral vascular disease

Diabetic ulcers are more likely if diabetes is not well controlled by diet and/or medication. Ulcers are also more likely if there is poor care of the feet, badly fitting shoes and continued smoking.

What are the signs and symptoms of leg ulcers?

The features of venous and arterial ulcers differ somewhat.

Venous ulcers

Characteristics of venous ulcers include:

- Located below the knee, most often on the inner part of the ankles.
- Relatively painless unless infected.
- Associated with aching, swollen lower legs that feel more comfortable when elevated.
- Surrounded by mottled brown or black staining and/or dry, itchy and reddened skin (gravitational or venous eczema).
- May be associated with varicose veins due to incompetence of the superficial venous system (50%).
- May be associated with lipodermatosclerosis, in which the lower part of the leg is hardened
- Often associated with swelling, which may be caused by local inflammation. Chronic inflammation destroys underlying lymphatic vessels, causing lymphoedema. This increases the pressure in the lower leg.
- Thickened skin, hyperkeratosis (scaliness), papillomatosis (tiny rough bumps on the lower legs and feet), fissuring, oozing.

Venous ulcers

Arterial ulcers

Characteristics of arterial ulcers include:

- Usually found on the feet, heels or toes.
- Frequently painful, particularly at night in bed or when the legs are at rest and elevated. This pain is relieved when the legs are lowered with feet on the floor as gravity causes more blood to flow into the legs.
- The borders of the ulcer appear as though they have been 'punched out'.
- Associated with cold white or bluish, shiny feet.
- There may be cramp-like pains in the legs when walking, known as intermittent claudication, as the leg muscles do not receive enough oxygenated blood to function properly. Rest will relieve this pain.
- Clinical assessment measures the Ankle Brachial Pressure Index (ABPI) by using a Doppler probe to measure pressure in the arm and the ankle. The normal value 0.92 to 1.3. If the ABPI is less than 0.9, there is likely to be arterial disease. Levels of less than 0.5 indicate severe arterial disease.

Diabetic ulcer

Neuropathic ulcer(Spina bifida)

More images of leg ulcers ...

Diabetic ulcers have similar characteristics to arterial ulcers but are more notably located over pressure points such as heels, tips of toes, between toes or anywhere the bones may protrude and

rub against bedsheets, socks or shoes. In response to pressure, the skin increases in thickness (callus) but with a minor injury breaks down and ulcerates.
Infected ulcers characteristically have yellow surface crust or green/yellow pus and they may smell unpleasant. There may be surrounding tender redness, warmth and swelling (cellulitis).

What is the treatment for leg ulcers?

Where possible, treatment aims to reverse the factors that have caused the ulcer. As ulcers are often the result of both arterial and venous disease, careful assessment is needed first.
Venous leg ulcers, in the absence of arterial disease, are usually treated with exercise, elevation at rest, and compression. Compression must not be used if there is significant arterial disease, as it will aggravate an inadequate blood supply. Surgery, ultrasound guided sclerotherapy or endovascular laser treatment of superficial and perforator leg veins may also help, particularly if the deep venous system is intact.
A vascular surgeon should also assess patients with arterial leg ulcers as they may require surgery to relieve the narrowing of the arteries. Revascularisation is particularly important if the ABPI is less than 0.5.
It is also very important to treat underlying diseases such as diabetes and to stop smoking.

Cleaning the wound

No matter what the cause of the ulcer, meticulous skin care, and cleansing of the wound are essential. The removal of surface contamination and dead tissue is known as debridement. Surgical debridement or medical debridement using wet and dry dressings and ointments may be used. Maggots and larval therapy are occasionally recommended. Debridement converts the chronic wound into an acute wound so that it can progress through the normal stages of healing.

Treating tissue infection

Antibiotics are not necessary unless there is tissue infection. This is likely if the ulcer becomes more painful and/or the surrounding skin becomes red, hot or swollen (cellulitis). Cellulitis may also result in fever and sickness. It should be treated with oral antibiotics such as flucloxacillin – the choice will depend on the causative organism. Topical antibiotics are best avoided because their use may result in increased antibiotic resistance and allergy.
Longstanding leg ulcers are frequently colonised by micro-organisms in a biofilm. The biofilm may be composed of bacteria, fungi or other organisms, which are embedded in and adherent to the underlying wound. The biofilm may contribute to the failure of the ulcer to heal but at this time the best way to diagnose and control biofilm is unknown. The organisms are protected from the effect of conventional antibiotics; unnecessary prescription of antibiotics may in fact select more resistant organisms.

Wound dressings

There is a whole range of specialised dressings available to assist with the various stages of wound healing. These are classified as non-absorbent, absorbent, debriding, self-adhering and other. Consult an expert in wound healing to determine the most suitable; this will depend on the site and type of ulcer, personal preference and cost.
Dressings are usually occlusive as ulcers heal better in a moist environment. If the ulcer is clean and dry, occlusive dressings are usually changed weekly; more frequent changes are avoided as dressing changes remove healthy cells as well as debris. Contaminated or weeping wounds may require more frequent dressing changes, sometimes every few hours. Honey dressings can be helpful.

Surgical management of the ulcer

Surgery may be considered if the ulcer fails to heal with conservative measures, particularly if it is very large or painful. First, the state of the venous and arterial systems should be assessed, infection eliminated, and underlying associated diseases such as diabetes, thrombophilia (tendency to blood clots) or malnutrician should be controlled.
Clean chronic ulcers may be treated by various types of skin graft. The wound needs to be carefully prepared. A shave procedure to remove surrounding lipodermatosclerosis may be worthwhile prior to applying the skin graft.

Accelerate wound healing
Wound healing requires adequate protein, iron, vitamin C and zinc. Supplements may be prescribed if they are deficient in the diet.
New products to aid wound healing are available but require further research to determine their effectiveness. These include:

- Growth factors and cytokines
- Hyperbaric oxygen to increase tissue oxygen tension
- Skin graft substitutes (bioengineered skin)
- Connective tissue matrix
- Expanded epidermis
- Epidermal stem cells
- V.A.C. (vacuum assisted closure) device
- Maggot debridement therapy

In some patients, the ulcers fail to heal by themselves and require surgery. The procedure typically involves taking skin from elsewhere on the patient's body and placing it over the ulcer (skin grafting). Despite this procedure, it is not uncommon for the ulcer to recur.
Compression therapy
Compression therapy is an important part of the management of venous leg ulcers and chronic swelling of the lower leg. Compression results in healing of 40-70% of chronic venous ulcers within 12 weeks. Compression therapy is achieved by using a stocking or bandage that is wrapped from the toes or foot to the area below the knee. This externally created pressure on the leg helps to heal the ulcer by increasing the calf muscle pump action and reduce swelling in the leg.
Compression is not used if the ABPI is below 0.8.
Several options are available to achieve compression:

- Several layers of bandage (3 or 4-layer bandage compression system)
- Shaped tubular bandage
- Elastic graduated compression hosiery (stockings)
- Unna boot (gauze bandage impregnated with zinc oxide)

Can leg ulcers be prevented?

To prevent leg ulcers and to promote healing of ulcers:

- Be very careful not to injure your legs, particularly when pushing a supermarket trolley. Consider protective shin splints.
- Walk and exercise for at least an hour a day to keep the calf muscle pump working properly.
- Lose weight if you are overweight.
- Stop smoking.
- Check your feet and legs regularly. Look for cracks, sores or changes in colour. Moisturise after bathing.
- Wear comfortable well-fitting shoes and socks. Avoid socks with a tight garter or cuff. Check the inside of shoes for small stones or rough patches before you put them on.
- If you have to stand for more than a few minutes, try to vary your stance as much as possible.

- When sitting, wriggle your toes, move your feet up and down and take frequent walks.
- Avoid sitting with your legs crossed. Put your feet up on a padded stool to reduce swelling.
- Avoid extremes of temperature such as hot baths or sitting close to a heater. Keep cold feet warm with socks and slippers.
- Consult a chiropodist or podiatrist to remove callus or hard skin.
- Wear at least Grade 2 support stockings (compression hosiery) if your doctor has advised these. This is particularly important for post-thrombotic syndrome,leg swelling or discomfort, and for long-distance flights.
- Have vascular ultrasound assessment and consult a vascular surgeon to determine whether any vein treatment should be carried out.

For more information:

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