Lower limb ulceration is a common, debilitating and costly condition that accounts for over one third of chronic wounds in the UK. The most common underlying causes of leg and foot ulceration are venous insufficiency, arterial insufficiency, lymphoedema and diabetic neuropathy. More than half of leg ulcers do not have a recorded diagnosis and are unlikely to receive appropriate care. Poor care can cost up to ten times as much as appropriate care. The Legs Matter campaign aims to change this situation through a public health campaign supported by a website: http://legsmatter.org. The website provides clearly written, easily accessible information for patients, the public and generalist healthcare professionals along with signposts to reputable sources of information. In this way, the campaign aims to raise awareness that leg and foot conditions can be improved with the right care.

KEYWORDS:
- Arterial ulcer
- Compression
- Legs Matter
- Foot and leg ulcers
- Lymphoedema
- Peripheral arterial disease

Lower limb ulceration is a common, debilitating and costly condition. For example, it is estimated that the annual cost to the NHS of managing chronic wounds is between £4.5 and £5.1 billion. Over one third of these wounds affect the lower limb such as leg and foot ulcers (Guest et al, 2015). However, inappropriate care of a leg ulcer can cost up to ten times more than it should (NHS England, 2017). In recent years, evidence has emerged pointing to difficulties in the way that patients with lower leg ulcers are being managed in the UK. Many people with leg ulcers and their generalist clinicians, such as GPs and practice nurses, community nurses, nursing home staff, and acute nurses, are unaware of the appropriate prevention and treatment options. Half of the people receiving treatment for leg ulcers do not have a recorded diagnosis and are unlikely to be receiving the correct treatment (Guest et al, 2015). Overall in the UK, care of the lower leg is too often suboptimal and started too late.

CAUSES OF LOWER LIMB ULCERATION

Issues with the lower leg can be due to a number of causes. The arteries carry oxygenated blood from the heart to the organs. Peripheral arterial disease narrows or blocks the arteries, which reduces blood flow to the skin of the lower limbs resulting in areas of non-viable tissue. Peripheral arterial disease has a number of causes, including:
- Atherosclerosis: the formation of plaques that narrow the lumen (the inside space of the artery)
- Arteriosclerosis: when arteries lose their elasticity, smooth blood blow becomes more turbulent, which increases the risk of thrombosis
- Vasculitis: inflammation of the blood vessels associated with inflammatory conditions such as rheumatoid arthritis, Crohn’s disease and systemic lupus erythematosus (an autoimmune condition).

The venous circulation transports deoxygenated blood back to the heart. There are three main systems. The superficial veins, which are situated outside muscle and often visible, contain valves that ensure that blood is transported towards the heart while preventing backflow. The deep veins, which penetrate the fascia and have fewer valves, carry blood under much higher pressure back to the heart. The perforators are the communicating veins and contain valves permitting blood flow from the superficial to deep veins. Each leg has around 90 connections between the superficial veins and deep veins.

In a healthy leg, when the calf muscle (known as the calf muscle pump) contracts, blood is pumped towards the heart, with the valves in the veins preventing backflow. The foot pump muscle also contributes to venous return as do the intra-abdominal and intra-thoracic pressures, which vary on respiration. Chronic venous hypertension can develop where patients are immobile or have reduced mobility, where the veins are obstructed following deep vein thrombosis or injury, or

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in patients who have an inherited disposition to incompetent veins such as varicose veins. Chronic venous hypertension occurs when a backflow of blood (reflux) causes a rise in pressure in the superficial veins and capillaries so that they become engorged. The pores of the capillaries enlarge and fluid leaks through into the tissue of the skin causing oedema. Oedema contains proteolytic enzymes, red blood cells and fibrinogen that can irritate the skin. Fibrin is thought to form a cuff around leaking capillaries, which acts as a barrier to efficient transfer of gases and nutrients between the skin and the blood supply. Therefore, the skin becomes friable and prone to varicose eczema and ulceration (Doughty et al, 2000).

**Lymphoedema**

Another contributing factor that can lead to lower limb conditions is lymphoedema (chronic condition resulting in tissue swelling following damage to the lymphatic system). Congenital primary lymphoedema is very rare but lymphoedema praecox is more common and predominantly affects adolescent females. Lymphoedema tarda affects older adults with weak immune systems. Secondary lymphoedema can result from trauma or tissue damage (such as breast cancer surgery or burns), malignant disease, chronic venous insufficiency, infection and inflammatory conditions (such as rheumatoid arthritis and endocrine disease).

Lymphoedema is a form of fluid imbalance in the skin, which can result in cellulitis and skin breakdown.

**Neuropathy**

Another well-known condition that affects the lower leg and foot is diabetic neuropathy. Neuropathy can affect all the peripheral nerve fibres, pain fibres, motor neurones and the autonomic nervous system.

Motor neuropathy can lead to weakness of the intrinsic foot muscles causing deformity, which in turn leads to areas of increased pressure, which are in turn at increased risk of tissue damage.

Advanced neuropathic joint disease or ‘Charcot foot’ is a particularly aggressive, severe form of osteoarthritis, which, if untreated, can result in extensive joint destruction and deformity.

There are some other much rarer causes of ulceration on the lower leg, including inflammatory conditions such as rheumatoid arthritis and systemic lupus erythematosus, unusual vascular and arterial diseases such as vasculitis and Raynaud’s disease, dysfunctions of the immune system such as *pyoderma gangrenosum*, haematological diseases such as sickle cell anaemia, infections such as tuberculosis and tropical infections, and malignancy (King, 2004).

**DIAGNOSIS AND TREATMENT OF LOWER LIMB ULCERATION**

Diagnosis of the underlying cause of lower limb ulceration is essential to correct any underlying contributory factors and provide the most appropriate treatment.

**Arterial and diabetic involvement**

Lower limb ulcers that originate on the foot are usually caused by peripheral arterial disease or diabetic neuropathy and usually indicate advanced disease, which can be limb-threatening. Diabetes is the most common cause of non-traumatic limb amputation and diabetic foot ulcers precede more than 80% of amputations in people with diabetes. After a first amputation, people with diabetes are twice as likely to have a subsequent amputation as those without diabetes (National Institute for Health and Care Excellence [NICE], 2015). Mortality rates following diabetic foot ulceration and amputation are high, with up to 70% of people dying within five years of having an amputation and around 50% dying within five years of developing a diabetic foot ulcer (NICE, 2016).

Patients with limb- and life-threatening foot ulceration should be urgently referred to secondary care. Urgent cases include ulceration with fever or any signs of sepsis, ulceration with limb ischaemia, signs of a deep seated soft tissue or bone infection, or gangrene (with or without ulceration).

Standard care for foot ulceration that is not limb- or life-threatening includes offloading, control of foot infection, control of ischaemia, wound debridement and appropriate dressing selection. Any patient with an ‘at-risk’ foot should be under the care of a podiatry specialist (NICE, 2016).

The signs of arterial insufficiency include limbs that are cool to touch even in a warm environment. The leg will remain pale when elevated and there may be ‘sluggish’ capillary refill and dependent rubor (redness due to inflammation). The patient may report numbness or ‘tingling’ in the limb, and hair loss or shiny taut skin may also be visible. The patient may have trophic skin and nails, gangrenous toes or muscle wastage, and they may also report cramping on exercise brought on by obstructed arteries (intermittent claudication).

The risk factors for peripheral arterial disease include a past medical history of conditions such as diabetes, high cholesterol, hypertension, angina, stroke, myocardial infarction, cardiac surgery and trans-ilaemic attacks. Personal factors such as smoking also contribute. Doppler assessment of ABPI is required to assess the extent of arterial insufficiency. An ankle brachial pressure index (ABPI) of 0.5 or below should prompt an immediate referral for a vascular assessment.

The treatment of leg ulceration due to arterial insufficiency or a mixture of arterial and venous insufficiency can be challenging. Patients with significant arterial insufficiency are likely to require surgery; however, other interventions may lead to some improvement in
healing and quality of life. Effective analgesia will be required to manage pain. If required, patients should be offered support with smoking cessation and healthy eating. Meticulous foot care should be encouraged and a referral to a podiatry specialist may be required. Patients should be encouraged to continue to exercise but to learn to live within their claudication limits (i.e. to stop exercising when they experience cramping pain on exercise) (Scottish Intercollegiate Guidelines Network [SIGN], 2010).

If the ulcer is very wet, it is important to try to avoid maceration – reduced compression may help but specialist advice should be sought to establish whether such an intervention will do more good than harm.

Venous insufficiency
Ulceration on the lower leg is most likely to be due to chronic venous insufficiency. It is estimated that around 60% of leg ulcers are due to venous insufficiency, with 30%–40% due to arterial insufficiency or a mix of venous and arterial insufficiency (Callam et al, 1987; Cornwall et al, 1986; Srinivasiah et al, 2007; Vowden and Vowden, 2009). Around 5% may be due to more unusual causes, such as skin cancers, pyoderma gangrenosum or other dermatological conditions (King, 2004).

Risk factors for venous leg ulceration include (SIGN, 2010):
- Past medical history of venous disease including vein trauma, deep vein thrombosis (DVT), thrombophlebitis, or vein surgery
- A family history of venous disease
- Personal factors such as being overweight, an occupation that involves long periods of standing or sitting, limited ankle function, chronic constipation, multiple pregnancies or being very tall.

The clinical signs of venous disease in the lower leg include varicose veins, ankle flare, varicose eczema, oedema, haemosiderin deposition (haemosiderin is a yellowish-brown pigment formed by the breakdown of haemoglobin), lipodermatosclerosis (inflammation of subcutaneous fat), atrophie blanche and venous rush pain (i.e. pain experienced by venous blood ‘rushing’ down the leg when the limb is lowered).

There is strong evidence to support the use of graduated high compression therapy to promote healing in venous leg ulceration (O’Meara et al, 2012). Recent evidence suggests that, for those who prefer and can tolerate it, compression hosiery is as effective as multilayer compression bandaging (Ashby et al, 2014). However, high compression should only be used in patients who have an adequate arterial supply. The most reliable way to assess arterial supply is through the use of Doppler assessment to calculate the ABPI (Callam et al, 1987). In the UK, an ABPI of 0.8 and above is generally regarded as indicative of an adequate arterial supply (SIGN, 2010).

In addition to compression, patients with venous leg ulceration should be offered adequate analgesia to address any pain and discomfort. Underneath the compression, a simple wound contact layer (such as a low-adherent knitted viscose dressing or similar with built-in absorbency if under hosiery) is usually adequate and reduces the risk of allergic reactions (SIGN, 2010). Weekly dressings should become possible as exudate levels reduce. A simple emollient should be applied to the surrounding skin to maintain the skin elasticity and skin barrier function. There is also evidence to suggest that oral pentoxifylline (a drug used to combat leg pain or weakness due to arterial obstruction) may promote healing both in the presence and absence of compression (Jull et al, 2012).
information to be able to take the next best step for themselves or their patient.

The Legs Matter campaign is a public health campaign supported by an online website (http://legsmatter.org). It aims to increase awareness of conditions that affect the lower leg and foot among the general public, including patients, carers and those at risk, both male and female, and across all ages, from young pregnant women to the elderly. Crucially, the campaign aims to outline the importance of seeking the right treatment at the right time, as well as educating people as to the type of care they can expect from healthcare professionals.

The campaign also aims to educate healthcare professionals who are not tissue viability specialists on the signs and implications of lower leg and foot conditions, and the importance of considering the lower leg and foot when assessing and treating patients. It recognises the hard work of the many tissue viability specialists who are seeking to improve care of the lower leg and aims to support them in their work, championing improved lower leg and foot care in their clinical setting.

The Legs Matter website brings together the information and services that already exists to signpost people to reliable information, so that those with lower limb conditions can get the timely advice and treatment they need. If, as hoped, the campaign raises patients’ expectations this will probably increase demands on clinicians; therefore, the website gives equal priority to the information and support needs of both the general public and clinicians.

The website is divided into sections. The ‘Help and information’ area includes a section for people with lower limb issues and another for clinicians. Both sections include information on signs and symptoms, treatment and practical information on how to look after the skin and prevent future issues. The information in each section is presented in a way designed to be suitable for its particular audience. For example, the ‘public’ section is written in plain English with diagrams and links to existing high-quality online relevant patient information such as that on the NHS Choices website.

The healthcare professional patient section presents similar information but with a much greater emphasis on how to deliver optimal quality care. There are links to topics such as how to undertake a Doppler and apply compression therapy, as well as online sources of information to support evidence-based practice such as clinical guidelines, research studies and Department of Health publications. The website also gives an overview of the Legs Matter campaign, explaining who is involved and offering news, updates and case studies to show how accessing the right care has helped people with lower limb conditions.

The website also contains information for policymakers and care commissioners, including links to NHS England’s (2017) Betty’s Story (a fictional patient’s wound care pathway). The recent NHS England ‘Improving wound care project’ which is part of the Leading Change, Adding Value nursing and midwifery framework (NHS England, 2016) has used Betty’s Story to illustrate how suboptimal treatment can increase care costs tenfold.

At Legs Matter we agree and, unusually perhaps, do not think that improving leg ulcer care can be achieved by simply investing more money. Improving care of the lower limb is about greater awareness of what is needed among clinicians and the general public, and a reorganisation of services to achieve better outcomes. Improved care should bring financial, as well as patient benefits.

REFERENCES


