
TITLE **Guidelines for the Assessment & Management of Patients
Suffering from Venous Leg Ulcers**

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PURPOSE OF THIS GUIDANCE

To ensure that all patients presenting with a leg ulcer receive a timely holistic assessment and accurate diagnosis by a healthcare professional trained in leg ulcer management.

To ensure all staff that are responsible for leg ulcer management are competent in the management of these patients including the application of compression bandages and hosiery.

To ensure a standardised approach to leg ulcer management:-

- To correct the underlying cause of the ulcer where possible
- To create the optimum local environment at the wound site
- To select the most suitable compression system to promote healing and aid patient concordance to treatment
- To improve all the wider factors that might delay healing
- To prevent avoidable complications
- To minimise the risk of recurrence

To provide a benchmark for leg ulcer management and enable care to be audited in order to ensure quality evidenced based care is provided.

The guidelines **do not** provide detailed management of patients with chronic leg ulcers due to diabetes, arterial disease or rheumatoid disease.

INTRODUCTION

These guidelines are grounded in evidenced based practice to promote the most effective care for patients requiring leg ulcer management.

A leg ulcer is a wound on the leg that fails to heal normally. It is a symptom of an underlying disorder that is preventing normal healing from taking place. Unless the underlying disorder is diagnosed and managed, healing is unlikely to occur.

A chronic venous leg ulcer is defined as an open lesion between the knee and the ankle joint that remains unhealed for at least four weeks and occurs in the presence of venous disease (Scottish Intercollegiate Guidelines Network 2010).

In the absence of any underlying disorders, most wounds on the leg should close within 4 weeks. Failure to do so suggests a possible underlying disorder. If the wound appears spontaneously it may indicate a venous or arterial ulcer or rarer ulcer aetiology such as pyoderma gangrenosum or a skin cancer. Accurate diagnosis of the underlying ulcer aetiology is the key to effective management. If the diagnosis of the ulcer aetiology is incorrect, the treatment is also likely to be incorrect.

DIFFERENTIAL DIAGNOSIS

Types and causes of leg ulceration (Aetiology)

Venous ulcers arise from venous valve incompetence and calf muscle pump insufficiency, which leads to venous stasis and hypertension. This results in microcirculatory changes and localised tissue ischaemia and possible ulceration. Venous insufficiency is the most common cause of chronic lower extremity ulceration and accounts for around 70% of ulcers.

Peripheral arterial disease: approximately 22% of patients with a leg ulcer will have arterial disease. A history of intermittent claudication, cardiovascular disease, or stroke may indicate that the patient has arterial disease. Absence of symptoms does not exclude the presence of peripheral arterial disease. This may be excluded by performing the ankle brachial pressure index (ABPI). Arterial Ulcers tend to have a punched-out appearance, with ischaemia and necrosis. This is typical in a person with atherosclerosis; they may have pale or blue, mottled, shiny, cold skin; prolonged capillary refill; nail dystrophy; reduced hair growth; and calf muscle wasting of the limb.

Combined/Mixed arterial and venous insufficiency - seen in 10–20% of leg ulcers.

Rheumatoid arthritis and systemic vasculitis: around 9% of patients with leg ulcer have rheumatoid arthritis. These patients may have venous, arterial or vasculitic ulcers. Those with vasculitic ulcers will have clinical features of established disease, which may be associated with systemic vasculitis. If this is the case there will be evidence of vasculitic lesions elsewhere, for example nail fold infarcts or splinter haemorrhages. Rarely, ulceration will be due to Felty's syndrome or pyoderma gangrenosum. Systemic vasculitis occurs as a feature of several collagen vascular diseases when leg ulcers will often cause multiple leg ulcers that are necrotic, deep, well demarcated and punched out on the dorsum of the foot or calf. This may be associated with systemic lupus erythematosus, scleroderma, polyarteritis nodosa, or Wegener's granulomatosis. People with rheumatoid arthritis might also have venous disease due to reduced mobility, neuropathy, and possibly impaired healing due to systemic corticosteroids.

Diabetes mellitus: approximately 5% of patients will have diabetes. These patients may have venous, arterial or neuropathic ulcers, or may have diabetic bullae, which subsequently ulcerate. Necrobiosis lipoidica may be present, and can also ulcerate. Diabetic Ulcers are typically on the foot over a bony prominence. This may have neuropathic, arterial, or venous components

Malignant Ulcer: basal or squamous cell carcinoma, melanoma, or Bowen's disease must be considered if ulceration does not respond to conventional treatment or if the appearance is unusual.

Other Possible Causes include traumatic ulcer, sarcoidosis, tropical ulcer, or pyoderma gangrenosum (Patel et al, 2006)

Education, Training and Competencies

Limited knowledge can lead to lack of appropriate clinical assessment of patients with limb ulceration which can often lead to long periods of ineffective and even inappropriate treatment. Serious damage to the limb can occur if arterial insufficiency in the leg is not properly diagnosed and the leg receives compression. It is essential that only competent trained staff apply compression bandages.

Training and Competency Recommendations for Registered Nurses

A healthcare professional trained in leg ulcer management should undertake the care of patients with leg ulceration (RCN 2006).

Staff undertaking initial holistic leg ulcer assessments (including Doppler ultrasound) and applying compression bandages should attend a University accredited leg ulcer management course and be able to demonstrate competence in practice. They are also required to undertake at least 40 Doppler assessments/ABPI calculations per year in order to maintain skill and competence in this procedure.

Staff who have undergone this level of training will practice as Leg Ulcer Link Nurses and act as a resource to colleagues.

All other registered nurses that undertake leg ulcer management (not including Doppler ultrasound) and apply graduated compression should undertake a minimum of a 2-day Leg Ulcer Management course. Following attendance at the course they should achieve assessment of competence in the application of graduated compression in clinical practice within 3 months.

All staff will require ongoing review of competence in the application of graduated compression by a leg ulcer link nurse and annual attendance at a 1-day leg ulcer management study day update.

Registered nurses new to the area, who have gained competence elsewhere or who have already attended training courses, will need to be familiarised with these guidelines. Evidence of previous education, training and competence will be required before providing this care.

Assessment and Diagnosis

Patients may present with any of the following symptoms,

- Ulceration
- Infection
- Cellulitis
- Pain
- Swelling of the leg
- Pigmentation of the skin
- Eczema

If an ulcer is present for more than 4 weeks a full assessment including history and clinical examination of the patient should be undertaken by a healthcare professional trained in leg ulcer management.

History should focus on confirming venous disease (particularly venous insufficiency) and excluding non-venous causes of ulcers.

Therefore, all patients with a leg or foot wound with duration of greater than 4 weeks will receive a comprehensive assessment, within 2 weeks of first contact with a healthcare professional.

A detailed assessment of the patient's general health and past medical history is essential when diagnosing and determining treatment of the ulcer. It is paramount that underlying disease processes are addressed and stabilised to ensure maximum potential to heal.

Assessment should include venous and arterial risk factors as described below

Venous Assessment

Include risk factors for venous disease and clinical evidence of venous disease.

Risk factors for venous disease:-

Family history of:-

- Varicose veins
- Venous leg ulcers

Medical history of:-

- Varicose veins
- Vein trauma – leg injury, deep vein thrombosis (DVT) in the affected leg harvesting of veins for arterial bypass
- IV drug use can cause permanent vein damage
- Phlebitis in the affected leg
- Leg fracture/surgery
- High risk of deep vein thrombosis (DVT) – it is important to be aware that many people have silent DVTs so consider your patients overall risk of DVT for example due to major surgery, swollen leg after surgery, pregnancy, trauma, long distance travel, clotting disorder or prolonged immobility/period of enforced bed rest, haemoptysis or pulmonary embolus
- Chronic constipation – increases downward pressure on the veins and can lead to valve failure
- Obesity – increases downward pressure on the veins can lead to valve failure
- Reduced mobility and reduced ankle joint mobility – an important component of calf muscle pump function which promotes venous return

Personal factors:-

- History of standing/sitting occupation – damage to valves due to prolonged downward pressure on the veins
- Previous pregnancies – hormonal changes and abdominal pressure on the veins can lead to valve failure
- Being tall – increased height of column of pressure from legs to the heart raises venous pressure and can lead to valve failure

Venous history:-

- DVT – leads to permanent vein damage
- Thrombophlebitis – indicates damage to veins
- Venous Ulcer – indicates underlying venous disease; if so, past successful and unsuccessful treatments, previous use of compression and compression hosiery
- Vein surgery – previous varicose vein surgery is unlikely to have permanently eradicated all venous disease

Venous skin changes:-

- Varicose veins – assess the whole leg up to the groin, whilst the patient is standing
- Ankle flare – tiny varicose veins on the inner aspect of the ankle
- Atrophy blanche – venous congestion causes swollen congested capillaries, sometimes visible as tiny red “dots” under the skin. Where the capillaries cannot sustain this pressure they atrophy, leaving white “lacy” areas of avascular tissue
- Haemosiderin staining – a red/brown discolouration caused by leakage of haemoglobin from the engorged capillaries into the skin
- Lipodermatosclerosis – a hard layer of fibrosis tissue below the skin’s surface caused by leakage of fibrin from the engorged capillaries. It can be localised around the ulcer, but often collects around the ankle, preventing the ankle from swelling, causing any swelling to collect in the calf and giving rise to the “inverted champagne bottle shaped leg”. In the active stage of lipodermatosclerosis it can appear red, inflamed and painful
- Varicose eczema – caused by irritation from blood by-products that have leaked into the skin
- Venous oedema – tends to be pitting and to go down when the patient elevates their legs at night, may be unilateral. Should not be confused with cardiac or renal oedema which are also pitting, but will always affect both legs
- Venous ulcers – typically occur in the gaiter region, ankle to mid calf, and are often shallow and irregular in shape

Venous pain:-

- Tired dull pain – may develop during the course of the day due to build up of congestion. Generally relieved at night or with leg elevation
- Neuropathic pain – may occur due to inflammation of the congested capillaries and tissue. If patients report sharp, shooting stabbing sensation it is likely to be neuropathic in nature
- Venous rush pain – may occur when putting feet to floor

Peripheral Arterial Assessment

Include risk factors for arterial disease, clinical evidence of arterial disease and a Doppler/ABPI calculation.

Risk factors for arterial disease:-

Family history of:-

- Arterial leg ulcers
- Conditions which suggest a non venous aetiology
 - Peripheral vascular disease

Past Medical History of:-

- Diabetes
- Hypercholesterolaemia
- Hypertension
- Angina / MI
- Cardiac bypass/angioplasty
- Stroke/TIA
- Intermittent claudication

Personal Factors: -

- Smoker/ex-smoker
- Lack of exercise
- Poor mobility

Clinical evidence of peripheral arterial disease:-

- Bypass/angioplasty
- Ischaemic-related amputation
- Arterial ulcer

Ischaemic Tissue Changes:-

- Ulcers with a 'punched out' appearance
- Base of wound poorly perfused and pale
- Cold legs/feet
- Shiny, taut skin
- The colour of the limb may range in colour from pallor, to a bluish hue to dusky red/purple otherwise known as dependent rubour. Dependent rubour is a dusky red/purple colour and may occur when the leg is in dependent position due to the capillaries dilating as much as possible in order to get as much blood to the foot as possible. However, on elevation, the foot will turn pale
- Pale or blue feet
- Gangrenous toes
- Sluggish capillary refill – press lightly on the tip of the big toe and observe how quickly it returns to its normal colour after blanching

- Numbness/tingling
- Hair loss
- Trophic skin/nails – unhealthy appearance due to prolonged hypoxia
- Muscle wastage – due to prolonged hypoxia

Arterial Pain:-

- Intermittent claudication – a cramp ('angina in the leg') in the calf, thigh or buttock brought on by exercise such as walking. Relieved by stopping and resting. **Indicates moderate arterial disease**
- Ischaemic night pain – a cramp during the night when legs are elevated in bed, due to tissue hypoxia. Relieved when the legs are hung down onto the floor and gravity improves blood flow. **Indicates severe arterial disease**
- Ischaemic rest pain – a cramp even when legs are dependent at rest, due to tissue hypoxia. **Indicates very severe arterial disease**

General Examination/Clinical Investigations

Examination of the Ulcer

The Ulcer size – this should be recorded at least monthly intervals and include either a tracing of the ulcer with length, width and depth measurements in centimetres and/or a photograph incorporating a measure to give accurate ulcer size with the patients consent

The Ulcer edge – stating for example if the ulcer has shallow or punched out appearance or if it is epithelialising

The base of the ulcer – stating whether it is granulating, sloughy, necrotic, epithelialising or over-granulating

The location of the ulcer – for example medial, lateral, anterior, posterior, within the gaiter area, over the malleolus, gaiter area, dorsum of the foot or toes

The presence of infection – such as purulent discharge, odour, induration, erythema or cellulitis

The amount of exudate – is the wound bed dry, moist, wet, saturated

The colour of exudate – yellow, green, brown, grey

The following clinical investigations are recommended in order to aid an accurate diagnosis to be made and in order to address any underlying factors that may delay healing.

Blood pressure – to detect hypertension

Pulse – detect irregularity and may indicate arrhythmias

Malnutrition – All patients should be screened for 'risk of' or actual malnutrition and be advised on a well balanced diet.

Patients considered as 'malnourished' or 'at risk' of malnutrition should be considered for referral to the Dietician for further assessment, advise and supplementation if appropriate.

Weight, height and body mass index (BMI) should be recorded at initial assessment, and then regularly throughout the treatment phase.

Blood Tests

- *Blood glucose* – possibility of undetected diabetes
- *Haemoglobin* – low haemoglobin will impede healing
- *White Cell Count* – raised WCC is usually indicative of the presence of infection
- *Lipid Profiling* – raised cholesterol is associated with atherosclerosis
- *U&E* – may highlight renal abnormalities which may impede healing
- *Serum Albumin and Protein* - reduced level will impede healing. Reduction may be due to heavy wound exudate loss or poor nutritional intake
- *Erythrocyte Sedimentation Rate (ESR) or C-reactive protein (CRP)* – markers for inflammation and infectious causes of ulceration

Other Investigations – dependent upon clinical history

Wound Swabs - swabs should not be taken routinely but should be taken when clinical signs of infection are present to identify the nature and antibiotic sensitivity of the causative organism.

Signs of clinical infection include:

- Inflammation/redness/Cellulitis
- Increased pain, redness and swelling
- Purulent exudate
- Pyrexia
- Foul odour
- Rapid deterioration of the ulcer
- Pyrexia
- Foul odour
- Enlarging ulcer
- Cellulitis

NB Take a swab for all suspected infected ulcers before prescribing an antibiotic.

Clean the infected ulcer with tap water or saline prior to taking the swab.

Microbiology advice should be sought if the clinical condition is not improving

Tissue biopsy – if malignant changes are suspected

Patch testing – patients with dermatitis

X-Ray/Bone Scan – to exclude Osteomyelitis

Remember patients with mixed venous/arterial ulcers may present with a combination of venous and arterial features in their history.

Handheld Doppler ultrasound assessment – to establish arterial status.

Examination of peripheral pulses is not adequate enough to exclude peripheral arterial disease; therefore it is essential to perform an Ankle Brachial Pressure Index measurement.

Interpreting Doppler Sounds

Doppler Sound	Status of Vessel	Characteristics	Comments
Triphasic	Healthy	Sound has three parts; is pulsatile (bouncy in nature) and is heard at a higher frequency than that of a diseased vessel.	
Biphasic	Vessel has become less elastic. This may be part of the normal physiological process of aging or due to stenosis	Sound has two parts, it is more dampened than the tri-phasic and heard at a lower frequency	Oedema may distort a tri-phasic sound so that it is heard as bi-phasic. If the optimum position for the probe has not been found a pulse may appear bi-phasic because the best possible location for the artery has not been determined
Monophasic	Diseased Vessel	Sound has a simple component and is in the lower frequency. Sound descriptors include "Whoosy", "roaring wind" or "soldiers marching". In a very diseased vessel the sound can be similar to a vein which appears as an almost continuous "whoosh".	Arterial sounds can be distinguished from venous as the latter modulate with the respiratory cycle by mirroring the breathing pattern

Interpreting the Results

0.9 – 1.25	Normal Range
0.80 – 0.89	Mild arterial disease – can compress but check ABPI every 3-6 months
0.50 – 0.79	Moderate arterial disease – refer to vascular.
Over 1.5	Query calcification – identify Doppler sound, if triphasic or biphasic proceed with caution or seek specialist advice if monophasic or unsure.

Limitations of ABPI and Factors to Consider

ABPI Determination	Limitation	Rationale	Management Implications
The ABPI is a calculation of ankle pressure by determining the pressure within the major arterial vessels in the lower limb	It does not assess micro-vessel status. It therefore cannot assess micro-vessel disease in diabetes, vasculitis and rheumatoid arthritis.	Microvascular disease occurs in diabetes, vasculitis and rheumatoid arthritis.	Causation with high compression bandaging and hosiery. Refer to medical history and presenting clinical symptoms. Doppler sounds may be helpful. Further investigations may be needed.
Elevated ABPI above 1.5		The elevated ABPI may be due to incompressibility of the artery (arteriosclerosis, atherosclerosis).	In general proceed with caution as too high a reading, compression bandaging may not be suitable. Refer to medical history and presenting clinical symptoms and discuss with more senior colleague or refer to vascular for more detailed assessment.
ABPI is inversely related to the patient's blood pressure status	ABPI may be calculated as low where hypotension is found.		Refer to medical history and presenting clinical symptoms. Doppler sounds may be helpful.
Practitioners Inexperience	Results will be affected by; deviation from the procedure, difficulties associated with carrying out the procedure and difficulties in interpreting the results.		If unsure, refer to a more senior colleague

Take care when measuring an ABPI in patients with heavily calcified vessels, for example in those with diabetes and advanced chronic renal failure – for results above 1.5, the vessels are likely to be incompressible and the result cannot be relied upon to guide clinical decisions

Also be aware the ABPI may decrease after the initial assessment due to the development of arterial disease or advancing age

Frequency Of Doppler Assessments

Doppler ultrasound to measure ABPI should be conducted when:

- An ulcer is deteriorating
- An ulcer is not fully healed by 12 weeks
- Patients present with ulcer recurrence
- Before initiating or recommencing compression therapy
- Patient is to commence wearing compression hosiery as a preventative measure
- There is a sudden increase in size of ulcer
- There is sudden increase in pain
- Foot colour and/or temperature of foot change
- Performing routine assessment – every 3-6 months

By combining the information collected and Doppler assessment the nurse should be able to attempt a diagnosis of ulcer type.

If the diagnosis is inconclusive refer to a more senior colleague. Consider the referral criteria for further assessment to ensure an accurate diagnosis is made.

Leg ulcer care should be based on the differential diagnosis and leg ulcer care pathway for further intervention

MANAGEMENT OF ARTERIAL LEG ULCERS

Aim of treatment for arterial ulceration is to enhance arterial blood flow and maintain effective healing environment. Full assessment including ABPI will determine the arterial element of the leg ulcer. If there is a change in the colour of the foot and/or temperature, or symptoms suspicious of claudication such as pain in buttocks when walking short distances, referral for further vascular assessment should be processed.

The aim of management is to enhance arterial blood flow and maintain effective healing environment.

Patients with an ABPI of less than 0.8 require referral to a vascular surgeon for appropriate assessment and interventions.

An ABPI of less than 0.5 requires urgent referral to vascular surgeon.

Once any underlying cause has been addressed, the ulcer should heal rapidly.

Management includes

- Local wound management
- Management of surrounding skin
- Encouraging patients to mobilise to the limits of their capabilities
- Patient education and the need for advice on how to have a healthier lifestyle (for example to stop/reduce smoking) should be identified by members of the MDT involved in the patient's management and appropriate action and referrals made.
- Conducting a full pain assessment using a validated pain assessment chart and appropriate action taken to achieve pain control.

Securing Dressings

The methods used to secure dressings for non-venous ulcers should be non-restricting and should not apply compression or damage to surrounding skin.

Compression bandages or compression hosiery are contraindicated for arterial leg ulcers.

Debridement of arterial ulcers is contraindicated in cases of gangrene or stable, dry, ischaemic wounds

MANAGEMENT OF MIXED AETIOLOGY LEG ULCER

The aim of treatment for mixed aetiology ulcers is to increase the venous return and maintain an effective healing environment. The degree of arterial insufficiency will decide whether or not it is safe to apply compression. Full assessment by the Vascular team will determine the arterial element of leg ulcer and what interventions are required. Reduced compression can be applied for the venous element of the leg ulcer following full Vascular assessment and as directed and under the supervision of the Vascular surgeon.

MANAGEMENT OF VENOUS LEG ULCERS

The aim of treatment for venous ulceration is to improve venous return by increasing velocity flow in the deep veins and to reduce any oedema by decreasing the pressure difference between capillaries and the tissue using compression therapy to promote healing. As well as compression these other elements of wound management need to be considered and managed appropriately prior to applying compression.

Standard Care for Venous Leg Ulcers

Cleansing Of The Ulcer

RCN (2006) guidelines suggest cleansing of the affected leg should be kept simple using warm tap water or saline.

Irrigate in the shower or bathe in buckets/bowls (buckets/bowls should be lined with a clean plastic bag to reduce the risk of cross infection).

Skin Care

Gently remove dry skin scales from the legs particularly around the ulcer edge to allow new growth of epithelium.

A soap substitute such as aqueous cream should be used to cleanse and moisturise the skin.

Moisturise skin under bandages using a simple emollient e.g. Liquid and white soft paraffin (50/50 ointment).

Exercise

In addition to bandaging, patients should be encouraged to take frequent (more than once a day) exercise. Exercise should include lower leg exercises. Exercise improves the function of the calf pump and improves circulation.

Smoking

Smoking should be discouraged. Refer to stop smoking programme if appropriate.

Elevation of legs

When not exercising, patients should keep their legs elevated, with feet above the heart level, as much of the time as is practical. This will help reduce oedema and aids venous drainage from the limb. Patients should be warned that sitting with legs dependent might cause swelling and make the bandages tight and uncomfortable. Sitting in a chair with legs on the foot stool will not help as there will continue to be venous hypertension in the foot, and puts additional pressure on the sacrum and buttocks increasing the risk of pressure ulceration.

Pain

All patients with leg ulceration should be assessed regularly for pain and an appropriate management plan formulated to gain adequate and acceptable pain control.

Pain can be a sign of some underlying pathology such as arterial disease or infection.

Exercise and leg elevation (legs should be elevated as high as their buttocks) may relieve pain in people with venous ulcers.

Compression therapy used for patients with confirmed venous leg ulceration improves pain over time, as the ulcer heals, however pain levels in the first few weeks may raise and patients may require increased analgesia initially.

Effective analgesia must be tailored to meet the needs of the service user. Opioid analgesia may be required in some cases (RCN 2006).

Dressing Selection

Dressings alone do not heal the leg ulcer. Diagnosing and treating the underlying cause is the key to successful treatment.

Allergies may develop at any stage. To reduce the risk of this occurring, avoid where possible: creams, adhesives, topical antibiotics, perfumed lotions and perfumed emollients, paste bandages, lanolin, phenol alcohol and latex gloves.

The type of dressing used on a venous ulcer has little influence on healing when adequate compression is achieved (Bradley 1999). Wound dressings that create and maintain a clean, moist microenvironment are now considered optimal for wound healing.

Dressings used should be:-

- Kept as simple as possible
- Acceptable to the patient
- Low adherent
- Appropriate for phase of healing
- Keep the wound bed moist which allows for more efficient healing, in contrast to drying out or making wet

Under compression a low adherent contact layer should be sufficient e.g. Atrauman dressing, changed weekly. The main function of the dressing is to allow exudate to pass through into a secondary dressing while maintaining a moist wound bed to facilitate healing.

Wound dressings aid healing, improve comfort and control exudate. Their role in maintaining moisture facilitates autolytic debridement and promotes healing. There is insufficient evidence to show that any wound dressing (including those impregnated with silver) is better than a simple low-adherent dressing for the healing of venous leg ulcers. Alternate dressings may be considered if the clinical condition indicates, such as critical colonisation, localised or spreading infection.

If the wound has heavy exudate, more frequent bandage changes may be required.

A clean dressing technique aimed at preventing cross infection is recommended rather than strict asepsis, which is unnecessary.

Compression Therapy for Venous Ulceration

The first line treatment for uncomplicated venous leg ulcers (ABPI>0.8) should be graduated multilayer compression bandage systems, short stretch systems with adequate padding or compression hosiery leg ulcer kits, capable of sustaining graduated compression for at least a week

A competent trained practitioner must apply the compression system.

The key to the successful healing of chronic venous ulcers will be to correct the underlying venous hypertension using graduated compression therapy. Compression therapy is the most effective treatment for uncomplicated venous ulcers.

The aim of compression is to improve venous return by increasing the velocity of flow in the deep veins and to reduce any oedema by decreasing the pressure difference between the capillaries and the tissues and providing the calf muscle with a supportive casing which improves its efficiency as a pump.

NB Compression is palliative rather than curative and must be worn as long as the venous disease is present.

Indications

Compression bandages must only be applied if the:

- Venous leg ulceration has been diagnosed and documented in the patients notes
- Ankle /brachial pressure index (ABPI) is between 0.8 and 1.3
- Patient consents to treatment

Contraindications

Bandages will not be applied in the following circumstances:

- If the cause of leg ulcer is unknown
- If the leg ulcer is due to arterial disease
- If the patient has a Deep Vein Thrombosis (DVT)
- If the patient has acute cellulites
- If the patient has unstable or uncontrolled heart failure

Compression may also be appropriate for the treatment of some other aetiology ulcers however caution should be taken where patients have evidence of the following conditions - arterial disease, diabetic ulceration and rheumatoid arthritis.

Compression therapy should only be applied after full assessment and when a healthcare professional trained in leg ulcer management has carried out Doppler studies.

Always adhere to bandage manufacturers recommendations regarding limb circumference.

Compression bandaging should not be applied until Doppler ultrasound has been performed and the blood flow to the limb confirmed as being sufficient.

Applying compression bandage or compression hosiery to a limb that has arterial insufficiency could lead to pressure damage, limb ischaemia, and even amputation.

Advise The Person To Remove The Compression Bandaging Or Hosiery If They Notice Any Adverse Effects (Such As Numbness, Tingling, Pain, Or Dusky Toes) And Seek Advice.

Patient And Carer Knowledge And Education

Patient education and knowledge has an influence on the effect of the care given and is the responsibility of the multi-disciplinary team.

Education for patients and carers should include:

- What is a leg ulcer and what causes a leg ulcer
- How the presence of a leg ulcer can affect patients lives
- Treatment options
- Avoiding self treatment
- Skin care including use of emollients, even after ulcer has healed
- How patients can help themselves to prevent reoccurrence of leg ulceration including examining own legs for broken skin, blisters swelling or redness.
- The importance of complying with compression bandages/hosiery
- Importance of keeping mobile with regular walking
- Elevate legs when immobile
- Avoiding trauma and wearing appropriate (well-fitting) footwear
- When and how to get further advice and information
- Advise on adopting healthy lifestyle choices, lose weight if appropriate and drink alcohol in sensible levels
- Stop smoking: if the person is willing to quit refer for smoking cessation advice
- Optimise their nutritional status to facilitate wound healing and decrease the risk of infection
- Encourage exercises that improve the function of the upper ankle joint and calf muscle pumps
- Avoidance of products likely to be sensitisers

Information leaflets should be available for patients to reinforce their understanding of leg ulcer management issues.

Poor compliance with compression therapy can be due to heat, discomfort, and the impractical nature of the bandaging. The healthcare professional should be aware of these issues and explain the importance of compliance.

Education regarding ulcer diseases, rationale for treatment, and lifestyle strategies should be delivered at every possible occasion, and should be appropriate to the persons stage of treatment.

Care Pathway Allocation

After 4 weeks of standard care a review should be undertaken by a health care professional trained in leg ulcer management and the patient should be put on either care pathway one or two based on the criteria detailed below. Patients placed on care pathway one are deemed to have Venous leg ulcers without complication and the wound is expected to heal within 18 weeks. Patients with Venous leg ulcers assigned to care pathway two are complex and the wound is expected to heal within 24 weeks.

Criteria for inclusion in Care Pathway 1 – Simple Venous Leg Ulcers

- Venous leg ulcer(s) with ABPI greater than 0.8 and less than 1.3
- Wound area is less than 100 cm²
- Ulcers will not have been present for more than 1 year

Criteria for inclusion in Care Pathway 2 – Complex Venous Leg Ulcers

- Venous leg ulcer with ABPI greater than 0.8 and less than 1.3
- Ulcers with some degree of Lymphoedema in the limb
- Larger ulcers greater than 10cm in any dimension or greater than 100cm²
- Ulcers already present for more than 1 year at point of referral
- Current or recurrent infection
- Not healed by 20 – 40% within the 4 weeks
- Non-concordance

Additional Care Recommendations

Sensitivities/allergens

Patients may become sensitised to products at any time during management.

Signs and symptoms include:

- Eczema
- Weeping eczema
- Erythema
- Irritation
- Pruritis

Eczema can also be an indication of uncontrolled chronic venous insufficiency. Careful assessment is required. Exclude Cellulitis if there is worsening venous eczema and signs suggestive of infection.

Products known to cause skin sensitivity, for example those containing lanolin and topical antibiotics should not be used. A referral to dermatology should be considered for patch testing for patients with suspected skin sensitivity reactions.

Management of the Surrounding Skin

Use an emollient and a mild to moderate potency topical corticosteroid ointment to treat varicose eczema. If compression bandaging is being used, consider replacing bandages more frequently than once weekly to apply topical treatment (CKS 2008).

Skin Condition	Examples of treatment Preparation	Comment
Severe varicose eczema	Dermovate	For 3 days
Moderate to severe varicose eczema	Elocon	Daily for 1 week
Mild to moderate varicose eczema	Eumovate	Daily for 1 week
Dry skin	Emollient	Very dry skin – 50/50 ointment

Patients will require ongoing emollient therapy

Steroid ointments are generally better than creams – however in case of severe skin maceration or moisturise, a cream may be easier to apply initially.

Reduce the dose of steroid cream/ointment gradually and replace with emollient.

If there is no improvement with emollient and topical steroid, or there are concerns about allergic contact dermatitis (worsening rash with topical treatment at any stage), refer to dermatology for patch testing, and advise them to avoid any allergens subsequently identified (CKS 2008).

Treatment and Management of Infection

Bacteria can usually be grown from a leg ulcer but in most circumstances they can be ignored. Routine wound swabbing is not recommended, as a swab will only examine the pathogenicity of the wound fluid. Moreover, previous studies have shown that even heavily colonised wounds will continue to heal. Infection is clinically significant when there are signs of cellulitis (increased pain, redness, swelling, exudates and odour), often with enlargement of the ulcer. There may be fever, malaise and neutrophil leucocytosis and high white cell count.

Antibiotics are needed for infections with surrounding cellulitis of the leg and surrounding tissue, which involves exhibiting some of the following features.

- Pyrexia
- Increasing pain
- Increasing erythema
- Surrounding skin
- Purulent exudate

- Rapid increase in ulcer size
- For severe infections and/or complicated by critical limb ischaemia consider hospitalisation

Do not start compression therapy if the venous ulcer is infected. If the ulcer becomes infected and compression is being used, use a reduced level of compression or remove bandaging, and restart compression therapy once infection has resolved. Usually restart within 24-48 hours.

Topical antibiotics are not recommended.

Ideally, people with infected venous leg ulcers should be followed up daily or every 2-3 days until a clinical improvement is seen and ensure the infected ulcer is responding to treatment.

Inspect and compare the ulcer and surrounding skin for signs of improvement; suggested by reduced inflammation, development of healthy pink granulation tissue, reducing exudate, and improving symptoms of pain, oedema and pyrexia.

If the infection is not responding, check swab results and consider changing the antibiotic based on sensitivity information. Consider possible complications or allergic contact dermatitis as a cause for ongoing symptoms.

If the infection is sensitive to the empirical antibiotic but slowly responding and not deteriorating, review after 7 days and consider continuing the antibiotic for a further 7 days.

If there are signs of worsening infection (spreading redness, increased pain, and systemic upset) consider osteomyelitis or septicaemia, and the need for intravenous antibiotics.

Pharmacological treatment

Pentoxifylline should be considered for patients on care pathway 2

Systemic antibiotics should not be used unless there is evidence of clinical infection

What To Do If The Ulcer Does Not Heal

Review the person's compliance with compression therapy and lifestyle strategies and determine whether they have on-going risk factors for venous ulceration.

Refer to secondary care a person with a non-healing venous leg ulcer (if there is no signs of improvement after 2-3 months of standard care) to exclude other causes of ulceration and complications.

After assessment by a specialist and the exclusion of alternative causes of ulceration, aim to optimize the persons quality of life (as healing of the ulcer may not be an achievable outcome) by controlling symptoms, encouraging mobility, and providing long-term psychological support (if needed).

When To Refer Someone With A Venous Ulcer

A referral to other services (secondary care) is often only necessary if there is an uncertain diagnosis, or a person does not respond to treatment offered in primary care, or a complication develops.

Consider referral to secondary care before treatment if there is

- Treatment of underlying medical problems
- An uncertain diagnosis
- Rapid deterioration of ulcers
- Healed ulcers with view to venous surgery
- Ulcers of an atypical distribution
- An ulcer with a suspected non-venous aetiology
 - Arterial or mixed venous/arterial ulcer: refer people with an ABPI of less than 0.8 for further assessment of arterial disease. If the ABPI is less than 0.5 refer urgently.
 - Ischaemic foot
 - Suspected malignant ulcer, or rapidly deteriorating ulcer. An atypical appearance or distribution of ulcers may require biopsy by dermatology
 - Rheumatoid ulcer, or ulcers associated with systemic vasculitis
 - Diabetic Ulcer, or newly diagnosed diabetes in a person with an ulcer

Refer to secondary care during treatment if there is:

- A complication related to the ulcer treatment
- Signs of contact dermatitis or dermatitis resistant to corticosteroids, refer to dermatologist for patch testing
- Cellulitis requiring intravenous antibiotics or worsening with treatment
- Pain management which is uncontrolled: consider referral to specialist pain team
- Ulcers which have not responded to 3 months of adequate treatment
- Recurring ulcers
- Abnormal ABPI Measurements
- All chronic ulcers for assessment of arteries and veins and to plan future treatment

Prevention Of Recurrence In Venous Ulceration

In order to aid in the patients prevention and recurrence of venous ulcers, once the ulcers are healed, it is important that patients are measured and fitted with compression hosiery and given appropriate advice. Compression hosiery supports the superficial veins and counteracts raised capillary pressure. It also reduces oedema thereby preventing deterioration in the leg. The cautions in place with regard to

compression bandaging and arterial disease also apply to the use of the hosiery. It is important to ensure that patients are managing the hosiery and subsequent advice and support are given to ensure concordance.

Compression Hosiery

Patients should not be prescribed compression hosiery until their skin is sufficiently robust to enable the stocking to be drawn over the ulcer site, unless the area is covered with an appropriate dressing.

Types of Hosiery

- Open or closed toe
- Below knee or thigh length
- Round knit and flat knit
- Made to measure stockings for patients whose limb measurement do not fit the standard manufactured shapes and sizes
- Hosiery with zips and various aids to allow easy application are available for those patients who are unable to apply conventional compression hosiery due to conditions such as arthritis
- British and RAL standard

There are currently two standards of compression hosiery each comprising of 3 classes of stockings: British and RAL Standard.

Class	Sub-Hosiery Pressure		Indications for Use
	UK	RAL	
Class 1 Light support	14-17mmHg	18-21mmHg	Mild varicosities, mild oedema
Class 2 Medium support	18-24mmHg	25-32mmHg	Moderate/severe varicosities, treatment and prevention of ulcers
Class 3 Firm support	25-35mmHg	36-46mmHg	Gross varicosities, venous leg ulceration, prevention of venous leg ulceration, post-thrombotic venous insufficiency, Lymphoedema

NB RAL standard compression hosiery is the preferred choice of hosiery for patients with associated oedema in the lower limbs as long as arterial circulation is adequate.

There are Leg Ulcer compression hosiery kits that achieve up to 40mmHg pressure at the ankle, and are comprised of a liner stocking and an over stocking. Depending on the make of the ulcer kit the liner stocking can apply between 10-20mmHg and the over stocking between 20-3mmHg. These systems can be useful for treating patients with smaller ulcers with low exudate levels that can be managed with an adhesive dressing.

These kits may also be useful for those patients whose ulcers reoccur when they finish their treatment with bandages and commence standard hosiery.

Selection of the correct size of stocking is very important. The patient's legs must be carefully measured and ideally a class selected that will give the level of compression required preventing further venous ulceration. Made to measure stockings are available for those whose measurements fall outside the ranges catered for.

Ideally legs should be measured for stockings whilst still in compression bandages or first thing in the morning where bandaging has not been necessary, so that the legs are less swollen.

N.B: The restrictions with regard to arterial disease and compression bandages also apply to the use of stockings

All patients requiring hosiery will need to be seen at regular intervals to ensure that their ulcer continues to remain healed, and for them to be assessed for new compression hosiery. Patients will need to be reassessed on at least a 6 monthly basis (including Doppler Ultrasound) or sooner if clinically indicated, to ensure continued suitability of the hosiery and to rule out deterioration in the arterial supply. New hosiery should be issued.

Follow-up

Regular ulcer assessment is essential to monitor treatment effectiveness. This should include review and documentation of the ulcer dimensions, the tissue type, signs of infection, moisture levels, wound edges and surrounding skin. During wound healing weekly follow up is recommended to ensure the wound is progressing towards healing and in order to identify any deterioration in the ulcer or limb.

If the ulcer is responding to treatment perform a full routine reassessment at 6 months, which should include

- Physical assessment
- Ankle brachial pressure index measurement
- Replacement of compression stockings
- Reinforcement of patient education

If there is no improvement in the signs/symptoms

- Reassess the patient, which includes performing an ABPI, at 12 weeks and then every 12 weeks thereafter – reassess sooner if there is deterioration
- Consider referral to specialist vascular surgeon

Whenever a new ulcer appears, carry out a full assessment

If the ulcer remains refractory to treatment, consider the following questions

- Is the aetiology of the ulcer confirmed
- Are there new co-morbidities?
- Should the ulcer be biopsied?
- Is the management consistent and appropriate?
- Is the patient complying with treatment?

Recurrence of Ulceration

Despite the availability of compression hosiery venous ulcer recurrence rates run at high levels.

The reasons for this include

- Non-compliance
- Poor fitting compression hosiery
- Trauma
- Severe pathology – (total deep vein incompetence or arterial disease)

Lifelong compression therapy - Practitioners fitting hosiery should have undertaken training in the measurement, selection and application of hosiery. This is essential in order to ensure maximum comfort and subsequent concordance from patients. Patients should be encouraged to wear the highest grade of compression they can tolerate

Care of Patients presenting with reoccurrence of ulceration.

It is important to re-assess the patient including a repeat Doppler assessment.

Remember that new disease processes may have developed, such as deterioration in arterial competence in a patient who previously had a venous ulcer.

Patients whose ulcers recur may require additional psychological support, as depression is a common factor in ulcer reoccurrence

For some patients particularly susceptible to reoccurrence it may be appropriate to refer to a vascular surgeon for venous investigation and invasive surgery if indicated.

Audit

The Provider is to deliver a high quality service to patients comprising safe clinical practice, clinical effectiveness and positive patient experience.

It is essential that the care provided be monitored to ensure that the prevention /management strategies recommended in the guidelines are effective. Audits will review standards of care, and help identify areas of further improvement and staff development.

Key Service Outcomes are:

Healing rates based on the number of patients and the length of time they take to heal

- To heal 70% of venous leg-ulcers on care pathway 1 within an 18 week period

- To heal 70% of venous leg- ulcers care pathway 2 within a 24 week period

To achieve access and appointment targets

- For 98% of initial assessments - Patient to have a full leg ulcer assessment and treatment commenced for patients diagnosed with a venous leg ulcer within 10 working days of initial contact.

Other Outcomes / Measures / Reporting Requirements may include:

Patient satisfaction/complaints

Time to complete healing

Recurrence rate at one and three years.

% of nurses who have completed University level module in leg ulcer management

% of nurse who have attended 2 day leg ulcer management course

% of nurse who have attended yearly update in leg ulcer management

% of nurse who have reached the required standard of performing 40 Doppler/ABPI calculations per year