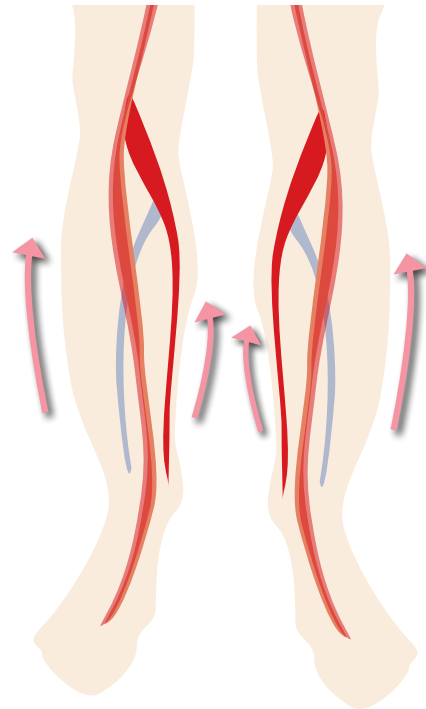


# Best Practice Statement

## Holistic management of venous leg ulceration (second edition)

2022



Assessment

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Wound and skin  
management

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Compression

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Holistic management

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Treatment monitoring and  
review

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**BEST PRACTICE STATEMENT:  
HOLISTIC MANAGEMENT OF  
VENOUS LEG ULCERATION  
(SECOND EDITION)**

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**Wounds** UK

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# Foreword

This Best Practice Statement (BPS) is an update of the *Best Practice Statement: Holistic management of venous leg ulceration* (Wounds UK, 2016). The guidance considers the National Wound Care Strategy Programme (NWCSP, 2020) Lower Limb Recommendations and updates the lower limb wound pathway (Atkin and Tickle, 2016; Wounds UK, 2016) to make it relevant for 2022 and beyond.

This document is for healthcare practitioners in all care settings who are treating patients with venous leg ulcers (VLUs). The aims of this BPS are to have a positive impact on patient outcomes, sustainability/economics and the community workforce, by:

- supporting the practical implementation of the NWCSP recommendations
- helping to ensure consistent clinical practices in relation to the assessment and management of people with VLUs
- providing guidance on when to escalate and refer to specialist services.

It will provide clear guidance based on relevant evidence and the experiences and opinions of clinicians, with a focus on practical, holistic, and person-centred strategies.

This BPS also includes '**Reflect and Be Bold**' statements, which aim to give clinicians the confidence to provide best standard of care for people with VLUs within their capabilities.

By following best practice that encompasses evidence-based holistic treatment of the wound and underlying patient comorbidities, the wound is more likely to heal.

# Introduction: holistic management of patients with venous leg ulceration

The Legs Matter coalition was founded in 2017 to raise the profile of this challenge among clinicians and awareness of the symptoms and impact of undiagnosed and unmanaged venous disease among the public. Scan the QR code below to see more of their work.



A venous leg ulcer (VLU) is defined as a break in the skin below the knee, which has not healed within 2 weeks (National Institute for Health and Clinical Excellence [NICE], 2021). A VLU occurs in the presence of venous disease (NICE, 2021). People with VLUs can present with repeated cycles of ulceration, healing, and recurrence, so it is important to diagnose and identify the patient's needs and build a sustainable relationship with the patient.

It is a common misconception that people with VLUs cannot be healed. By debunking myths and raising awareness, there is an opportunity to transform and change perspectives in lower limb management (Atkin et al, 2021).

**MYTH**

VLUs cannot be healed.

**TRUTH**

VLUs can be healed; most patients with a VLU should heal within 12 weeks.

There is huge variation in healing times and recurrence rates for VLUs across services depending on the literature (Scottish Intercollegiate Guidelines Network [SIGN], 2010; Nelson and Bell-Syer, 2014; Guest et al, 2018; NICE, 2021). Overall, only half of all people with VLUs heal within 12 months, despite best evidence suggesting a mean time to healing of 3 months (Guest et al, 2018). Therefore, timely assessment, accurate diagnosis and effective management linked with appropriate prevention of recurrence should be treated as a priority for individuals and the workforce.

The burden of wounds study estimated that the annual number of patients with a

VLU increased by 101% from 2012/2013 and 2017/2018 (Guest et al, 2020), which is associated with a substantial increase in resource use and patient management cost of 48% in real terms (Guest et al, 2020). The current provision is not sustainable, so changes must be made to VLU care to manage the increasing demand for wound care and improve patient outcomes.

VLUs also have a significant impact on patients' quality of life, with associated personal, social, and psychological effects; this has a considerable financial impact on healthcare providers, as well as a wider social and economic impact. The mean NHS cost of wound care over 12 months is estimated to be £7,600 per patient with a VLU. However, the cost of managing an unhealed VLU is 4.5 times more than that of managing a healed VLU (£3,000 per healed VLU and £13,500 per unhealed VLU; Guest et al, 2018).

**MYTH**

A wound must be present on the limb for at least 6 weeks to be classed as a VLU.

**TRUTH**

The definition of a VLU adopted by the expert panel indicates that a wound must be present for over 2 weeks. The patient should be assessed to determine a diagnosis and ensure that the appropriate clinical pathway is initiated. The presence of a lower limb wound should trigger some immediate and necessary care — i.e. the patient should be screened for the NWCSP Red Flag Symptoms and in their absence mild graduated compression can be applied (NWCSP, 2020).

In the first edition of this Best Practice Statement (Wounds UK, 2016), there was a differentiation between simple and complex VLUs. In this edition, this distinction has been removed to acknowledge that all patients with VLUs should have prompt full

holistic assessment, treatment of underlying disease and appropriate wound and skin management. For patients diagnosed with a VLU, the key component of their management must be strong compression therapy ( $\geq 40\text{mmHg}$ ) to reduce time to healing and risk of further complications.

### Primary prevention

Treating underlying venous disease prior to the occurrence of ulceration will lead to a much lower rate of ulceration and a lower impact on workload. While primary prevention of VLUs is outside the scope of this document, there is an opportunity to support primary care teams to facilitate primary prevention as part of standard health checks (e.g. reviewing both legs for lower limb oedema/swelling and haemosiderin skin staining in at-risk patients). Across the four nations, there are strategies in place (e.g. Commissioning for Quality and Innovations [CQUINs] target CCG14 in England) to support clinicians to assess and diagnose people with a VLU.

### Cause of ulceration

The main cause of ulceration is venous insufficiency, which results in increased venous pressure; over time, this leads to a chronic inflammatory response, which can result in the breakdown of skin.

The wound is just the tip of the iceberg; the underlying venous insufficiency needs to be rapidly managed to support healing.

Understanding the disease pathology (Box 1) is vital to ensuring that patients receive best practice care. It is also important to distinguish whether the pathology is caused by structural (e.g. venous incompetency, venous obstruction) or functional venous disease (e.g. calf/foot muscle pump failure, inactivity), as this helps to ensure the patient is directed to the most appropriate service (Table 1).

### Risk factors

In the presence of underlying venous disease, ulcers can occur spontaneously but can be a result of minor injury or trauma (e.g. a skin tear). Early management with compression hosiery  $\leq 20\text{mmHg}$  should be initiated in the absence of red flag symptoms (Table 2, page 10 and 11). Several factors can increase a patient's risk of developing a VLU. See Box 2 for a checklist of patient risk factors (NHS, 2016). Any signs of venous disease should trigger immediate care.

Options for applying up to  $20\text{mmHg}$  include Class 1 stockings (e.g. Activa Class 1 British Standard Hosiery). This can help prevent disease progression, ulcer development and recurrence in at-risk patients.

#### Box 1. Terminology: understanding the disease pathology

##### Venous disease: A

condition of the lower limb commonly related to venous insufficiency, which can be caused by structural or functional venous disease.

##### Venous insufficiency: A

condition that affects the return of blood from the lower limb to the heart, commonly due to failure within the valves in the veins. Venous insufficiency can affect the deep or superficial venous system.

##### Superficial venous

**incompetence:** This is the same as venous insufficiency but relates only to the superficial venous system (e.g. incompetence in the long or short saphenous vein).

##### Venous hypertension:

Abnormal increased pressure within the veins, often because of sustained venous incompetence.

##### Venous leg ulcer: The

purist definition of a VLU is a wound in an individual with venous incompetence evidenced and supported by a venous duplex ultrasound.

## MYTH

Only the leg with an ulcer requires compression.



## TRUTH

If a patient has been diagnosed with a VLU on one leg, they are highly likely to have venous disease that affects both legs. Both legs should, therefore, be assessed and, if appropriate, both legs should receive compression therapy.

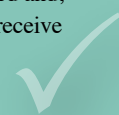




Table 1. Structural versus functional venous disease

	Structural venous disease	Functional venous disease
<b>Cause</b>	<ul style="list-style-type: none"> <li>• Venous incompetency</li> <li>• Venous obstruction</li> </ul>	<ul style="list-style-type: none"> <li>• Calf/foot muscle pump failure</li> <li>• Inactivity</li> </ul>
<b>Diagnosis</b>	 <p>All patients with a VLU should undergo venous duplex scanning to assess whether there is a requirement for venous intervention.</p> <p>Venous duplex scanning will confirm the presence of incompetency.</p> <p>Diagnosis can be achieved by excluding factors related to functional venous disease.</p>	
<b>Management</b>	<ul style="list-style-type: none"> <li>• Compression therapy as initial treatment</li> <li>• Often suitable for minimally invasive intervention as a day case under local anaesthetic</li> </ul>	<ul style="list-style-type: none"> <li>• Strong compression (e.g. <math>\geq 40</math>mmHg)</li> <li>• Increased movement/exercise</li> </ul>

© All rights reserved. All images in Table 1 belong to Mid Yorkshire NHS Trust

**MYTH**

VLUs are either simple or complex.

**TRUTH**

Defining VLUs as either simple or complex fails to recognise the impact of delayed intervention on non-healing and wound infection. All patients with VLUs should have the same prompt underlying treatment of full holistic assessment, wound and skin management and compression therapy.

**Box 2. Checklist of patient risk factors that may contribute to developing a VLU (NHS, 2016)**

- Obesity or being overweight — this increases the hydrostatic pressure in the veins of the lower limb and abdomen
- Issues with mobility and/or walking — this compromises the activation of the calf muscle pump, which aids venous return
- Previous deep vein thrombosis (DVT) — blood clots in the deep venous system can result in obstruction or damage to the valves in the veins, which will affect venous return
- Varicose veins — swollen and enlarged veins caused by malfunctioning valves, resulting in venous hypertension
- Previous injury to the leg, such as a fractured bone, which may cause changes to lymphatic drainage, make the tissue more fragile, impair walking or alter the patient's gait
- Previous surgery to the leg, such as fractures or flap surgery, which can cause damage to the veins, lymphatics, ankle mobility or gait
- Increasing age — people find it harder to move around as they get older, particularly if they suffer from arthritis
- Chronic oedema — associated with inflammatory processes, and compromises skin and tissue condition
- Familial history of VLUs
- History of intravenous drug use
- Pregnancy.

# Lower limb wound pathway

An evidence-based lower limb wound pathway was developed in 2016 to guide clinicians on VLU management with the aim of promoting early referral and access to specialist services for patients where non-healing is apparent (Wounds UK, 2016). The pathway followed the results of the Venous leg Ulcer Study IV (VenUS IV) trial, which indicated that hosiery kits can help to improve healing rates, release nursing time and have an economic benefit (Ashby et al, 2014).

The pathway (Figure 1) has been updated to include ‘immediate care’ to encompass and mirror the recommendations of the NWCSP (2020), see Box 3. The addition of an immediate care section means that everyone (e.g. healthcare assistants, nurses, podiatrists, pharmacists) who cares for people with lower limb wounds can make a difference by delivering appropriate first-aid care and identifying when a patient needs more urgent specialist attention.

Although the NWCSP is for England only, the recommendations are based on empirical evidence (e.g. ESCHAR, EVAR, VenUS studies, Cochrane reviews), so the recommendations can be applied to all of the four nations.

There may be times when it is not possible to follow national guidance — e.g. a patient who is outside the guidelines, or when resources are not available. In these situations, reporting gaps in care provision where patient safety is compromised and auditing against a standard both have an important role in identifying the challenges and barriers to creating a business case for further resources.

## Box 3. NWCSP guidance on immediate care for lower limb wounds

Immediate care includes identification of red flags (i.e. any factors that require an immediate response).

If any red flags are present (spreading infection, red hot swollen leg, limb-threatening ischaemia, suspected DVT, suspected skin cancer; see Table 2), care should be immediately escalated to a specialist.

If no red flags are present and the wound is on the lower limb (not the foot), immediate care should commence within 24 hours of the patient presenting with a wound. The clinician delivering immediate care should:

- Cleanse the wound and skin
- Apply a simple low-adherent dressing with sufficient absorbency
- Discuss with the patient why they require compression
- Apply  $\leq 20$ mmHg of compression to the lower limb (e.g. Activa Class 1 British Standard Hosiery).

## REFLECT AND BE BOLD

If best practice is not being implemented for a person with a VLU and this results in delayed care, consider this as harm to the patient and raise this as a patient safety concern. If there is a failure to implement therapeutic intervention, escalate care and use the appropriate reporting procedures.

# Lower Limb Wound Pathway

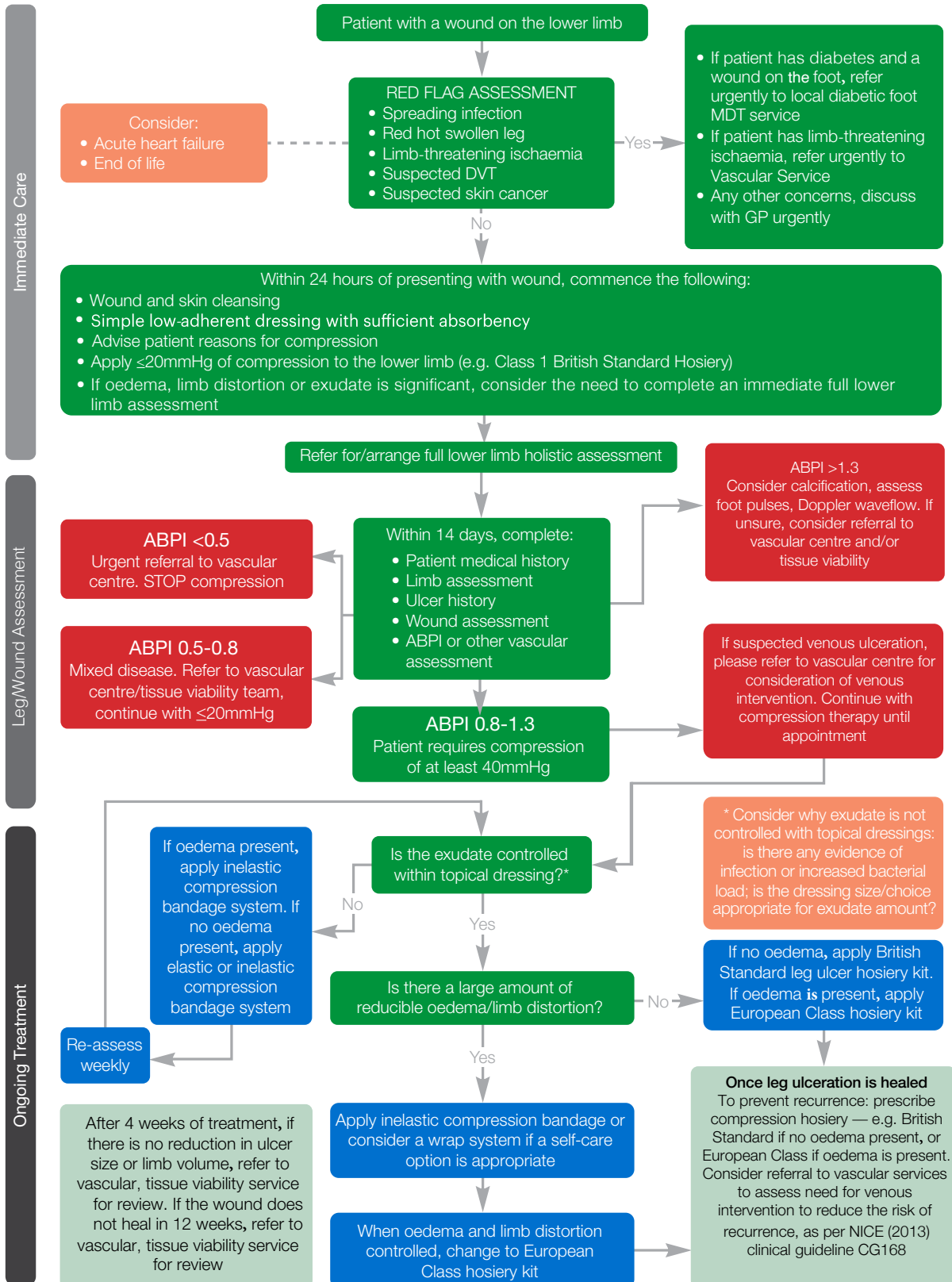


Figure 1. Lower limb wound pathway (adapted from Atkin and Tickle, 2016; Wounds UK, 2016).



## Section 1: Assessment

If any of the red flags are identified, immediate treatment or onward referral is required — early intervention and immediate care is vital to avoid patient harm and/or deterioration.

### Best Practice Statement

Local organisational assessment and referral policies in England should reflect the NWCSP (2020) recommendations.

### Best Practice Statement

There are two types of assessment for VLUs — the red flag assessment and a full lower limb holistic assessment.

#### Red flag assessment to identify immediate care

The red flag assessment identifies what immediate care is required for the patient and encourages timely referral so that the patient gets to the right clinician/specialism quickly (Box 3; NWCSP, 2020). Two of the aims of immediate care are to keep the patient safe so as not to cause harm and to provide a useful clinical intervention. See Table 2 for the main signs and symptoms of the red flags identified in the NWCSP (2020) recommendations, considerations and where/when/who to refer to.

If the patient reports any of the red flags, compression therapy should not be applied, and the patient should be immediately escalated to an appropriate practitioner.

Every patient with a suspected/confirmed VLU should undergo a venous duplex scan within a vascular service (NICE, 2021).

### Best Practice Statement

#### Full lower limb holistic assessment

The full lower limb holistic assessment will help inform the treatment for the individual who already has a wound and is based on the wound assessment minimum data set (Coleman et al, 2017). The lower limb assessment can be broadly split into three parts:

- Patient assessment
- Leg assessment
- Wound and skin assessment.

Referral and assessment (a full patient and leg assessment) to specialist services should be conducted within 14 days. Although a maximum of 14 days/within 14 days is recommended, a greater degree of urgency might be needed for some patients: for example, those with recurrent ulceration, severe oedema and/or limb distortion and/or high levels of exudate.

### REFLECT<sup>AND</sup> BE BOLD

Mild compression of  $\leq 20$ mmHg can be started if you determine that the patient has no red flags and timely referral is not encouraged.

### REFLECT<sup>AND</sup> BE BOLD

While 14 days is the maximum timeframe for a holistic assessment, the ideal is within 24 hours once a wound has been identified (NWCSP, 2020). If targets are not being met, consider this a harm: document it and escalate.

**Table 2. Key signs and symptoms of red flags as per the NWCSP (2020) recommendations**

Red flags	Key signs and symptoms	Clinical considerations	Referral
Spreading infection	<ul style="list-style-type: none"> <li>• Extending induration</li> <li>• Lymphangitis (swelling of lymph glands)</li> <li>• Crepitus (popping, clicking, or crackling sounds under the skin)</li> <li>• Wound breakdown/dehiscence with or without satellite lesions</li> <li>• Spreading inflammation or erythema greater than 2cm from the wound edge. It may be more difficult to detect inflammation or erythema in dark skin tones.</li> </ul> <p>If spreading infection is not treated, it will lead to systemic infection, in which microorganisms spread throughout the body via the vascular or lymphatic systems, evoking a host response that affects the whole body (International Wound Infection Institute [IWII], 2022).</p>	<p>This differs from local infection that is contained within the wound and the immediate periwound region (less than 2cm).</p> <p><b>Classic signs and symptoms of acute wound infection may include:</b></p> <ul style="list-style-type: none"> <li>• Erythema (which may present differently depending on the individual's skin tone)</li> <li>• Local warmth</li> <li>• Swelling</li> <li>• Purulent discharge/pus</li> <li>• Wound breakdown and enlargement</li> <li>• New or increasing pain</li> <li>• Increasing malodour (IWII, 2022).</li> </ul>	<p>Consider screening for sepsis.</p> <p>Refer to immediate care — e.g. A&amp;E, 999.</p>
Red hot swollen leg/cellulitis	<p>Painful skin, hot and swollen, blistered skin, painful swollen glands.</p> <p>Temperature, fever, flu-like symptoms. Often is unilateral — bilateral leg cellulitis is extremely rare (Clinical Resource Efficiency Support Team, 2005).</p> <p>Do not rely on 'redness' as a key symptom. Use other diagnostic methods such as touch, comparing the temperature of the affected leg with the other leg, observing for localised oedema and checking for changes in the baseline appearance of the surrounding skin (Wounds UK, 2021a).</p>	<p>This differs from bilateral 'red legs' and swelling due to lipodermatosclerosis and/or chronic oedema. In bilateral 'red legs', there can be associated warmth and tenderness but generally the individual feels well.</p> <p>'Red legs' can be attributed to varicose eczema, gravitational eczema, contact dermatitis, tinea pedis (athlete's foot), which will not respond to antibiotics and are skin-related. The treatment for 'red legs' is often compression therapy.</p>	<p>GP, urgent care centre for antibiotics.</p>
Limb-threatening ischaemia	<p><b>Acute limb ischaemia (ALI)</b> Sudden-onset cold, pale, pulseless, painful limb, especially if also developing paraesthesia or paralysis (Wounds UK, 2021b).</p> <p><b>Chronic limb-threatening ischaemia (CLTI)</b></p> <ul style="list-style-type: none"> <li>• Constant pain (arterial rest pain): worse at rest/during night</li> <li>• Non-healing wounds/gangrene/tissue loss, especially on the foot</li> <li>• Ankle pressure &lt;50mmHg or toe pressure &lt;30mmHg.</li> </ul>	<p><b>Peripheral arterial disease early symptoms</b></p> <ul style="list-style-type: none"> <li>• Pain or numbness in the feet</li> <li>• Shiny, smooth, dry skin of the legs or feet</li> <li>• Thickening of the toenails</li> <li>• Absent or diminished pulse in the legs or feet</li> <li>• Reduced peripheral hair presence</li> <li>• Intermittent claudication (pain in legs when walking that is relieved by rest; Wounds UK, 2021b).</li> </ul> <p>Hair loss and thickened, slow-growing toenails are recognised as signs of peripheral arterial disease — hair loss also occurs as part of the ageing process and thickened toenails are commonly the result of fungal nail infection.</p> <p>In the absence of any CLTI or ulceration symptoms, the patient may not require referral to vascular services. Treat initially within primary care with a focus on risk reduction.</p>	<p>If ALI is suspected, refer patient immediately to A&amp;E.</p> <p>If CLTI is present, contact GP/arrange urgent referral to vascular services.</p>

Table 2 (continued). Key signs and symptoms of red flags as per the NWCSP (2020) recommendations

Red flags	Key signs and symptoms	Clinical considerations	Referral
Suspected DVT	<ul style="list-style-type: none"> <li>• Throbbing or cramping pain in one leg (rarely both legs), usually in the calf or thigh and on flexing the ankle</li> <li>• Sudden onset oedema/swollen veins that are hard or sore to the touch</li> <li>• Warm to touch</li> <li>• Red/purple or darkened skin around the painful area*</li> <li>• Often follows surgery, a flight or a period of immobility (NICE, 2022).</li> </ul> <p>*Redness or darkened skin will be less obvious among people with dark skin tones; therefore, other symptoms should be taken into consideration (Wounds UK, 2021a).</p>	Bilateral leg swelling. Lipodermatosclerosis (hardened, tight skin), ‘inverted champagne bottle’ leg, heavy legs, aching or swelling in the legs, which are associated with signs of chronic venous insufficiency.	GP, urgent care centre to exclude DVT.
Suspected skin cancer	<ul style="list-style-type: none"> <li>• Lump, blemish or mark that changes</li> <li>• Crust, oozing or bleeding</li> <li>• Itchy, tender or painful.</li> </ul> <p>Untreated cases of Bowen’s disease may develop into squamous cell cancer. The signs of Bowen’s disease include red or pink, scaly/crusty patch on the skin. Flat or raised, can be itchy (but not all the time).</p>	An overgranulating ulcer that is not responding to treatment.	GP, urgent dermatology referral for biopsy.

### Patient assessment

The patient should be assessed holistically, taking into account their lifestyle and overall health factors, including any underlying causes or relevant medical and family history. Asking the patient “what matters to you?” can help to support self-management, understanding and engagement in the treatment.

Psychosocial and lifestyle factors are key elements in supporting patients with VLU, such as level of activity, dexterity, smoking or weight-related/nutritional issues.

The patient’s current quality of life and expectations of treatment are important issues that can be established at the assessment stage. The patient’s knowledge of their disease and interest in engagement in terms of supported self-management can also be assessed at this stage.

Pain is an issue that should also be addressed and may have a knock-on effect on the patient’s quality of life. Noting the patient’s skin tone at baseline can also help to identify changes in their skin during treatment (Wounds UK, 2021a). See Box 4 for a patient assessment checklist.

### Box 4. Checklist for patient assessment

#### Patient-related factors:

- Medical history – including previous limb surgery/trauma, family history, medication history, smoking history
- Presence of comorbidities
- Nutrition and hydration status
- Baseline skin tone (e.g. using a validated tool; Wounds UK, 2021a)
- Presenting symptoms and pain
- Dexterity and mobility
- Previous treatment and outcomes
- Knowledge and understanding.

#### Psychosocial-related factors:

- Lifestyle
- Occupation
- Quality of life
- Social activity
- Sleep activity
- Care and social support network
- Expectations of treatment
- Weight/body mass index.

**MYTH**

ABPI assessment confirms the presence of a VLU.

**TRUTH**

While a fundamental component of assessment, ABPI assessment will not diagnose venous disease — it will only identify the presence of significant peripheral arterial disease — and is solely a component of a full lower limb holistic assessment.

**Leg assessment**

The limb assessment should include clinical examination of the limb, and assessment of arterial status:

**Examination of the limb**

- Signs of venous insufficiency (e.g. oedema, ankle flare, hyperpigmentation, lipodermatosclerosis, atrophie blanche, varicose eczema)
- Presence and distribution of oedema; oedema likely to become non-pitting with chronicity due to development of fibrotic tissue
- Limb length, size and shape and muscle tone (e.g. reduction or loss of calf muscle, inverted champagne bottle shape)
- Mobility and/or ankle movement
- Skin tone and condition
- Overall hygiene and skin care, presence of hyperkeratosis, fungal infection
- Arterial assessment
- Limb temperature
- Erythema, pallor and/or cyanosis.

Assessment for arterial insufficiency is an essential component of leg ulceration management. The ankle brachial pressure index (ABPI) assessment is the most common way to assess the patient's arterial function. The ABPI assessment is not intended for the diagnosis of venous disease, but rather to exclude significant arterial disease and confirm that it is safe to use compression. The lower limb wound pathway directs the clinician on what to do depending on the ABPI, and what to do if there are clinical signs of venous disease. If the ABPI is outside of normal limits, alternative pathways should be followed as outlined in the lower limb wound pathway (Figure 1).

Despite arterial assessment being a fundamental requirement for leg ulcer management, in the UK it is estimated that only 15% of all those with a leg or foot ulcer had a Doppler ABPI recorded in their notes (Guest et al, 2020). Even when ABPI assessments are undertaken, this does not always lead to the correct interpretation. Obtaining an accurate ABPI can be difficult in some patients, such as those with severe

chronic swelling and tissue fibrosis. For these patients, other arterial assessment methods may be more suitable (see Appendix 1, page 29).

Patients wearing compression therapy should have a regular arterial assessment to ensure their arterial status has not worsened. Subsequent assessments incorporating ABPI assessment are usually completed based on their cardiovascular risk profile (NICE, 2021) — for example, 12 months for people with VLUs and 3–6 months for people with mixed ulcers.

**Types of ABPI devices**

A hand-held Doppler probe is a small, portable ultrasound machine designed to detect blood flow. The change in frequency detected by the Doppler machine is output as an audible signal, and the sound indicates the presence of blood flow. The sound can change depending on the direction of blood flow.

The Doppler signal output can be presented in many ways depending on the type of machine. For example, it may just be an audible output or be plotted on a graph so waveform shapes can be analysed (Figure 2).

Re-assessment should be completed sooner if there are concerns that ulcer deterioration could be due to changes in vascular status or the patient reports a change in symptoms — e.g. claudication or night/rest pain symptoms.

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The toe brachial pressure index (TBPI) assessment can be used in patients with diabetes, peripheral arterial disease, and where an ABPI is too painful.

There are now a growing number of handheld and automated ABPI devices. All have their advantages and disadvantages within the healthcare environment and clinical presentation. Whichever tool is used, if the reading does not match the

clinical presentation, then this needs further exploration and possible referral to specialist services.

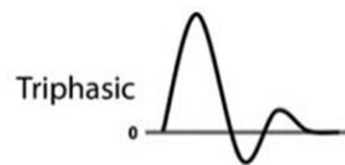
Appendix 1 includes alternative arterial assessments if it is not possible to conduct an ABPI assessment.

**Triphasic** – three components to the pulse can be heard or seen:

- Forward flow in systolic peak
- Reversal of flow in early diastole
- Forward flow in late diastole

Indicates healthy arterial blood flow

Indicates that the flow of blood is strong, unobstructed and the elasticity of the artery is normal



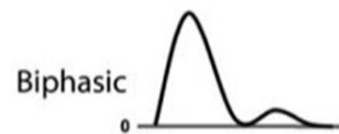
**Biphasic** – two components to the pulse can be heard or seen:

- Systolic forward flow upstroke
- Early diastolic flow reversal

Indicates loss of natural elasticity of the artery

Occurs in the elderly as part of the ageing process

Can be heard if peripheral resistance is high (e.g. in cold conditions when vasoconstriction is present)



**Monophasic** – one component to the pulse can be heard or seen:

- Delayed acceleration and deceleration – unidirectional flow

Indicates that the artery is no longer elastic

Indicates peripheral arterial disease



Figure 2. Examples of Doppler wave forms

### Wound/skin assessment

The wound and surrounding skin should be assessed using a structured assessment method, such as the TIMES principle (Schultz et al, 2004; Stephen-Haynes, 2007; Wounds UK, 2016), to allow specific considerations to be made regarding VLU assessment (Box 5).

Misdiagnosis can result in inappropriate treatment, particularly in differentiating venous disease from cellulitis (Wingfield, 2012). It is vital to recognise diagnostic features of clinical presentation, of both venous disease and cellulitis and other wound aetiologies, to ensure accurate diagnosis and correct management — see Table 3.

### Monitoring wound progression

To monitor wound progression, all patients with VLUs should be re-assessed at a minimum of 4-weekly intervals. Wound progression can be monitored by changes in wound size, the condition of the wound bed, wound edges, leg shape/oedema levels and/or presence of bacteria.

Photographing the wound is a useful way of ensuring objective recording of the wound. Photographs should be taken using equipment that your workplace has consented for you to use, and steps taken to ensure consistency in recording (see Box 6 for tips on photographing wounds). For consistency, measurements should be made at the same point in assessment each time (i.e. either before or after debridement).

If, after 4 weeks, the limb volume has not reduced, or the wound size has not decreased by 40% following best practice (Harding et al, 2015), the patient should be referred to a specialist service that cares for people with VLUs. Depending on local service provision, this may include a specialist wound management service, a community-based service (e.g. Leg Club®), or dermatology/phlebology or vascular service.

#### Box 5. TIMES principles (Schultz et al, 2004; Stephen-Haynes, 2007; Wounds UK, 2016)

- Tissue (non-viable) — assess tissue quality, slough and any necrotic tissue
- Infection or inflammation — assess for signs of infection or possible biofilm
- Moisture imbalance — any exudate should be assessed in terms of colour, viscosity, odour and volume
- Edge of wound — assess for signs of overgranulation, encrusted debris, rolled edges and possible malignancy (e.g. VLUs should have shallow/sloping edges; raised edges may be a red flag for malignancy)
- Surrounding skin — assess for inflamed surrounding skin, itchiness, blistering, hyperkeratosis or dry skin, lipodermatosclerosis, excoriation, moisture-associated dermatitis or hygiene issues.

#### Box 6. Top 10 tips for photographing wounds (Sperring and Baker, 2014)

1. Use a digital camera/ phone approved by your place of work
2. Set the time and date on the camera and ensure images are taken in high resolution
3. Get the light right — ensuring flash is on
4. Include patient data in the first photograph (name/identification number, date of birth, location and brief clinical history) to help identify images (ensuring that appropriate patient consent has been obtained and documented)
5. Make the wound the focus — remove clutter from background and use a plain backdrop where possible
6. Standardise the views taken of the wound each time you assess and record
7. Get the angle right to record proportions accurately — the camera body should be parallel to the subject
8. Establish the wound location on the patient's limb
9. Use close-up images to establish detail, placing a ruler near the wound to give an accurate indication of size
10. Securely save and store.

### MYTH

Compression should be stopped if the patient has cellulitis.



### TRUTH

Compression treatment must be continued if the patient can tolerate compression. In the case of cellulitis, compression will help resolve current symptoms fast and prevent further lymphatic damage.



### MYTH

If a wound is small, or where venous disease has not been established as a cause, then the leg ulcer will not benefit from compression during the healing process.



### TRUTH

Compression is effective for all leg wounds where safe arterially (e.g. skin tears on the leg), regardless of wound size.



Table 3. Features of venous, arterial and mixed ulcers and cellulitis (Wingfield, 2012; Mosti, 2020)

	Venous	Arterial	Mixed	Cellulitis
<b>History</b>	Varicose veins, deep or superficial obstruction/ incompetence, functional disease	Intermittent claudication (repeatable calf pain on exercise), arterial rest pain (constant severe pain worse at night/on elevation of limb)	History of both venous and arterial disease	May have pyrexia, general malaise  Rapid onset
<b>ABPI</b>	0.8–1.3  Note: ABPI does not identify venous disease, it only excludes arterial disease	>0.8–0.9 defines mild arterial disease  0.5–0.8 defines moderate arterial disease  <0.5 defines severe arterial disease	0.5–0.8	Can be any result
<b>Site</b>	Gaiter area	Toes, foot, ankle or malleolus	Ankle both in the medial and lateral aspect	Anywhere on the lower limb
<b>Wound bed</b>	Often granulating, sometimes slough is present when signs of local infection. Necrotic tissue can also be present	Necrotic tissue/gangrene are common. Ulceration may be covered in sloughy tissue. The tissue is rarely granulating	Can be granulation tissue and/or slough present	Inflamed, warmth; erythema to specific location  Surrounding skin can resemble orange peel
<b>Exudate</b>	Abundant if oedema not controlled	Low	Low to abundant, especially if oedema is not controlled	May have a very wet leg if cellulitis blister bursts
<b>Pain</b>	Often painful – while not strictly pain in the leg, the leg is often uncomfortable due to the weight of oedema and the patient may have significant itch	Pain may be absent if the patient has underlying neuropathy  Pain is often severe and is located in the foot/toes	Can be a combination of arterial and venous pain	Painful and tender to the touch  Painful on weight bearing and movement
<b>Periwound skin</b>	Venous eczema, lipodermatosclerosis, atrophie blanche, haemosiderosis	Trophic changes, possibly gangrene  Pale to the touch	Mixed skin features but no gangrene	n/a
<b>Unilateral or bilateral</b>	Symptoms of venous hypertension often seen in both legs, but can also be unilateral	Mostly unilateral, rarely bilateral	Unilateral or bilateral	Mostly unilateral. Bilateral cellulitis is very rare
<b>Treatment</b>	Strong compression therapy  Consider referral to vascular services for superficial venous ablation	Needs urgent referral to vascular services for revascularisation procedure (angioplasty/stenting, arterial bypass surgery)	Referral to the appropriate specialist for further investigation to help determine predominant cause (e.g. venous or arterial)  Consider compression therapy if clinically indicated – level of compression based on ABPI results	Oral antibiotics  Continue with compression therapy if already established/ patient can tolerate

## Section 2: Wound and skin management

All patients with VLU should have a holistic structured assessment and be managed following the principles of wound bed preparation to remove local barriers to healing through cleansing and debridement.

### Best Practice Statement

Refer the patient to specialist services if the patient is not responding after 4 weeks of best practice, if you are concerned or if one of the red flags appears (NWCSP, 2020).

### Best Practice Statement

One of the key challenges for patients with venous leg ulceration is exudate management. Venous hypertension and involvement of lymphatics make oedema and high exudate more likely. Excessive exudate is a local barrier to healing that, if not managed, increases the risk of wound infection, maceration, and deterioration of the wound edges, dressing leakage, increased odour, and discomfort for the patient. The management of excess exudate involves cleansing and debriding the wound of devitalised tissue, and using an absorbent dressing that will absorb the exudate (World Union of Wound Healing Societies [WUWHS], 2019). Unmanaged exudate may be caused by sub-optimal compression therapy that is not providing a therapeutic intervention.

### MYTH

The wound does not need to be cleansed or debrided — compression heals the wound!

### TRUTH

Cleansing and debriding remove the local barriers to wound healing and compression therapy manages the underlying venous insufficiency.

### MYTH

Superabsorbent dressings cannot be used under compression and should be used over compression if required.

### TRUTH

Superabsorbent dressings can be used under compression if the product effectively contains exudate to prevent maceration. They should not be used over compression, as sub-bandage materials and bandages soaked in exudate could result in further damage of surrounding tissues.

Wound hygiene is based on the removal of the local barriers to healing and that wound biofilm can be managed with debridement and antimicrobial control, provided that all underlying aetiologies, such as chronic venous insufficiency or peripheral arterial disease, are addressed and the patient receives gold-standard care (Murphy et al, 2020). See Table 4 for a checklist of wound management actions according to wound hygiene with specific focus on VLUs.

Where possible, a skin care regimen should form part of the patient's daily care plan, emphasising the importance of washing, cleansing and emolliating the skin. Emollients, both as leave-on skin treatments and soap substitutes, will help to maintain overall skin integrity.

### MYTH

You cannot wash the leg if there is a wound on the leg.

### TRUTH

If an individual has a wound, their leg must be washed, dried, and moisturised regularly. The leg should be cleaned, especially before an assessment is made.



Table 4. Wound hygiene (Wounds UK, 2016; Murphy et al, 2020)

Wound hygiene	Considerations specific to VLU management and healing
<b>Cleanse</b>	<ul style="list-style-type: none"> <li>• It is important to bear in mind that patients with VLUs often develop skin problems from prolonged use of products and may have skin sensitivities that need to be managed along with their VLU treatment</li> <li>• Appropriate and thorough cleansing methods should be used as a first step</li> <li>• Remove hyperkeratotic skin scales using cleansing and atraumatic exfoliation</li> <li>• Establish an ongoing emollient-based skin care regimen.</li> </ul>
<b>Debride</b>	<ul style="list-style-type: none"> <li>• Care should be taken to assess the wound pre- and post-debridement</li> <li>• Consider taking photographs before and after</li> <li>• Mechanical, physical debridement should be used in the first instance (e.g. using a monofilament debridement pad)</li> <li>• Consider autolytic debridement dressings to hydrate, soften and debride the slough in between compression reapplication</li> <li>• A high proportion of people with a VLU also have an active biofilm present, which should be identified and managed using disruption methods (e.g. mechanical debridement) and antimicrobial control.</li> </ul>
<b>Refashion the edges</b>	<ul style="list-style-type: none"> <li>• Rolled edges may indicate a static wound that should be reassessed</li> <li>• Rolled edges or encrusted exudate may require debridement to remove local barriers to wound healing</li> <li>• If the edge of the wound raises suspicions of skin cancer, the patient should be referred immediately for biopsy.</li> </ul>
<b>Dress</b>	<ul style="list-style-type: none"> <li>• Consider the need for ongoing antimicrobial dressing to manage the bioburden/infection (Wounds UK, 2013).</li> </ul>
<b>Compress</b>	<ul style="list-style-type: none"> <li>• Compression therapy will aid debridement of devitalised tissue due to the control of underlying inflammation. If slough remains persistent, mechanical debridement is indicated for people with VLUs (see the European Wound Management Association [EWMA] Document; EWMA, 2013)</li> <li>• The correct dose of compression should manage and control the exudate, preventing maceration and improving healing</li> <li>• Management of oedema should be undertaken using appropriate compression systems and selection of an appropriate absorbent dressing to retain exudate effectively, to remove fluid and reduce the levels of harmful proteases at the wound bed.</li> </ul>

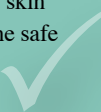
## MYTH

The surrounding skin does not require management if the wound is healing.



## TRUTH

Outcomes associated with compression will be improved if the surrounding skin is managed effectively (including the safe removal of hyperkeratosis).



## Section 3: Compression therapy

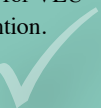
### MYTH

Compression therapy is optional.



### TRUTH

Compression is the most important element for VLU healing and prevention.



See Wounds UK (2019) Best Practice Statement: Addressing complexities in the management of VLUs for more information.



Clinicians should always aim to use strong compression systems (e.g. at least 40mmHg) when the vascular assessment deems it appropriate to do so. Sub-therapeutic compression will lead to ineffective care and delays in wound healing.

### Best Practice Statement

Compression is the first-line treatment for VLU healing (Ashby et al, 2014; O'Meara et al, 2012). Compression is essential to manage the underlying pathophysiology of the VLU.

### Best Practice Statement

Venous hypertension is a treatable condition and venous ablation intervention can remove the source of the venous hypertension, in effect curing the patient of venous disease. Strong compression therapy will treat the local effects of venous hypertension and aid wound healing. Compression is essential to:

- Control the internal inflammation, which is the cause of the venous ulceration
- Reduce venous hypertension and control the underlying pathophysiology of the VLU. Level 1 evidence shows that VLUs heal more quickly and recur less often with compression therapy (Ashby et al, 2014)
- Aid short- and long-term pain management
- Reduce and control oedema.

See Table 5 for details of different compression options.

Compression treatment should be started upon immediate presentation when a wound is present in the absence of red flags. Most people with VLUs will go on to heal if compression is used promptly and correctly. If compression therapy is delayed:

- The patient is receiving no effective treatment
- There is likely to be more exudate and more frequent dressing changes will be required
- The wound will not start to heal until

compression is applied and, as such, the overall time to heal will be longer, resulting in increased suffering for the patient

- There will be an increase in workload, as the wound will become chronic and there will be a higher risk of complications if the wound remains unmanaged.

See Box 7 for some truths about compression therapy. Seek advice prior to applying/continuing compression in these instances.

#### Box 7. Truths about compression therapy

You **can** put compression on:

- Someone with cellulitis
- Someone with diabetes
- Someone with cardiac failure, if there is not acute decompensated heart failure
- Patients with recent DVT if anticoagulation therapy has started.

### REFLECT <sup>AND</sup> BE BOLD

Check and challenge treatment: you can make a difference. Stop a VLU from becoming chronic by putting the patient in compression (40mmHg) as soon as it is safe to do so.

### REFLECT <sup>AND</sup> BE BOLD

Anybody can apply compression, as long as they have the appropriate capability. Keep up to date with your skills — a treatment can only be successful if it is used properly!

**Table 5. Details of the different compression systems available**

Compression system	Evidence of VLU healing	Advantages	Considerations	Patient perspective	Current best practice
Leg ulcer hosiery kit (first-line treatment where possible)	Multi-centre randomised controlled trial (RCT) included 457 patients. Proven to be as effective as multicomponent bandaging in healing venous ulceration. Additional advantage as less expensive and reduced risk of recurrence of ulceration (Ashby et al, 2014).	Does not require a high level of skill to apply. Delivers known and consistent compression levels. Allows for patient self-care.  Cost-effective.  Delivers compression to the foot.	Not suitable for rapidly decreasing limb sizes or unusual limb profiles.  Exudate needs to be maintained within dressings.	Low profile — no limits to footwear/ clothing.  Facilitates supported self-management (i.e. can be removed for showering and bathing).	First-line option when exudate is controlled within the dressing and there is no reducible oedema/limb distortion.
Multi-layer compression (e.g. 2-layer or 4-layer compression bandage of at least 40mmHg)	Meta-analysis of many trials including RCTs, proving that multi-component bandages are effective in the treatment of venous leg ulceration (O'Meara et al, 2012).	Adaptable so permits good anatomical fit in unusual-shaped limbs.  Suitable for most limb shapes/sizes.  Inelastic compression bandages can facilitate volume reduction/reshaping. High-stiffness systems (e.g. inelastic bandages) produce the greatest improvements in venous blood flow (Mosti et al, 2008; Harding et al, 2015).  Some elastic component systems incorporate sub-bandage pressure level guides that may be useful.	Compression value dependent on application technique — high level of skill required to apply. Some bandage systems do not involve compression from the foot upwards to prevent pooling of oedema in the foot, impacting on mobility and potentially delaying healing of wounds around the malleolus.  Consider using wadding to high-risk areas only, thereby reducing footwear issues.  Requires increased amount of clinician time for application.	Can be warm or bulky — may limit footwear and clothing.  Supported self-management may be appropriate for some individuals and/or their carers if they are trained in the application.  Increases length of appointment time and may be deemed inconvenient.	For the management of people with VLUs when exudate is not controlled within a topical dressing, or there is a large amount of reducible oedema/limb distortion.

Table 5 (continued). Details of the different compression systems available

Compression system	Evidence of VLU healing	Advantages	Considerations	Patient perspective	Current best practice
Compression wraps	Over 65 articles published but only one RCT (Blecken et al, 2005) that the authors concluded was of low quality.  VenUS 6 is an ongoing RCT, with one of the aims to compare compression wraps with evidence-based compression in terms of the time to healing of VLUs (Dumville, 2020).	Compression value adjustable — value dependent on application technique.  Allows for easy adjustment as limb volume decreases.  Facilitates supported self-management.  Can deliver compression to the complete limb using foot, calf, knee and thigh pieces.	Not practical if VLU is highly exuding.  Not useful if ulcer site is behind the malleolus.	Can be adjusted to adapt to limb circumference changes and improve comfort.  Low profile — minimal impact on footwear/clothing.  Allows self-care/family care.	Until the venUS 6 study data is published, the group recommend compression wraps as a second-line option when exudate is managed within a topical dressing or for supported self-management.

## MYTH

Reduced compression is therapeutic for patients with VLUs.

## TRUTH

A low level of compression therapy is better than none for immediate first aid to prevent further deterioration. However, to effectively treat a VLU and progress healing, strong compression is required and should be used when vascular assessment deems it appropriate to do so.

When describing the level of compression applied to a limb, whether by hosiery or bandages, the following terminology should be used (WUWHS, 2008):

- Mild (less than 20mmHg)
- Moderate (20–40mmHg)
- Strong (40–60mmHg)
- Very strong (greater than 60mmHg).

Once the clinician has established that compression is safe to use for the individual, the first line of treatment for a patient with a VLU should be either a hosiery kit or compression bandage systems, both of which are designed to provide strong compression of at least 40mmHg. When determining the most appropriate compression option, it is important to consider:

- Presence of oedema (Table 6)
- Presence of exudate (Table 6)
- Limb shape
- Ulcer site
- Pain management
- Severity of venous disease
- Location of oedema/ulceration/skin changes
- Height of the individual
- Obesity
- Psychosocial or lifestyle issues, including suitability to self-care.

### Hosiery kits

In view of the strength of evidence, the cost-economic benefits and the potential

positive implications for the patient, hosiery kits should be used as the first compression option except in those patients who do not meet the criteria for hosiery kit use (Table 5).

Compression hosiery kits are all designed to deliver 40mmHg at the ankle. There are hosiery kits with stiffer fabrics (e.g. Actilymph EU Classification Hosiery) that are designed to control oedema, and those with less stiff fabric (e.g. Activa British Standard Hosiery) that are designed for limbs with less oedema.

### Bandage compression system

There are two main types of bandages that can be used for compression: inelastic/short-stretch bandages and elastic/long-stretch bandages. In general, strong compression (40–60mmHg) is recommended for the treatment of VLUs whenever the vascular assessment deems it appropriate. For some patients with severe neuropathy/foot deformity or decompensated cardiac failure, strong compression could be harmful or painful, and mild or moderate compression may be required (Wounds UK, 2019).

### Ongoing treatment

Prescription of compression hosiery is advised to prevent leg ulcer recurrence after healing and referral to vascular services for venous intervention has been considered

## MYTH

The compression system used determines the frequency of reapplication required.



## TRUTH

The decision as to how frequently the limb needs to be reviewed should not depend on the compression system, rather the patient and the presentation. Wound bed preparation principles should be considered in decision-making, as factors such as tissue condition, presence of biofilm, level of exudate, potential for oedema reduction, education and surrounding skin condition should all be considered. Lifestyle factors should also be considered where possible, utilising self-care solutions to enable frequency of change and improve quality of life.

(NICE, 2021). It is important to re-measure and replace compression hosiery according to the manufacturer's guidelines, usually every 3–6 months (Wounds UK, 2021c).

**Table 6. Compression choice is dependent on exudate and oedema levels**

	Exudate controlled in the dressing	Exudate not controlled in the dressing
<b>Oedema/limb distortion present</b>	European Class hosiery kit <ul style="list-style-type: none"> <li>• Prevention/early intervention for mild swelling (flat-knit hosiery is recommended)</li> <li>• When the patient is applying it themselves</li> </ul>	Inelastic compression bandage system
<b>Oedema/limb distortion not present</b>	British Standard leg ulcer hosiery kit <ul style="list-style-type: none"> <li>• For venous insufficiency</li> </ul>	Elastic or inelastic compression bandage system

Currently, there is no empirical data to support the use of compression wraps; however, they may be beneficial depending on the location of the wound, patient preference and patient dexterity to apply compression hosiery. Although the VenUS 6 study is ongoing to investigate their clinical/cost-effectiveness (Dumville, 2020).

## Section 4: Holistic management

Compression is the gold-standard treatment of patients with VLU and can dramatically increase the healing rates of VLUs as well as reduce their risk of recurrence.

### Best Practice Statement

A holistic, person-centred approach will take into account medical history, patient mobility, pain levels and nutritional status, living environment, level of family and/or informal carer involvement and any patient concerns. This approach is crucial to improve acceptability of care.

#### Mobility

Patient mobility is key to optimising compression therapy and helps to minimise complications (Harding et al, 2015). Reduced ankle mobility has a direct impact on healing rates (Barwell et al, 2004). Sometimes words like ‘exercise’ can be overwhelming for patients and seen as a barrier. Therefore, it is important to encourage patients to be as mobile as possible within their individual capabilities.

Evidence suggests that hosiery kits are favourable to bandaging in terms of not restricting mobility (Atkin et al, 2016). Walking (if possible), maintaining ankle flexibility, and selecting a compression system that allows patients to wear their

own shoes will help patients to remain active — see Box 8.

#### Nutrition

Nutrition plays an important role in the prevention and treatment of VLUs (Johnston, 2007). It may be an issue if patients are either overweight or underweight, and malnutrition can impair the wound healing process.

Consuming a healthy and balanced diet and maintaining a suitable weight can reduce the risk of developing several conditions that predispose an individual to ulcers, as well as encouraging healing in patients with existing wounds.

Obesity or being overweight increases the risk of developing a VLU and can add to the complexity of existing ulceration, but the patient receiving the correct dietary nutrients regardless of weight status is also a vital issue in healing (Johnston, 2007).

Nutritional status has a direct influence on the health of body tissue and its ability to heal. During the healing process, the body needs increased amounts of calories, protein, vitamins A and C, and sometimes the mineral zinc (Food Standards Agency, 2002). It is the role of healthcare professionals to promote a healthy lifestyle that includes eating a healthy, varied diet, which should include at least five portions of fruit and vegetables daily, and should be (Food Standards Agency, 2002):

- High in fibre
- Low in salt
- Low in refined carbohydrates
- Low in fat (especially saturated and trans fats).

In some cases, it may be necessary to refer patients within the multidisciplinary team (MDT) to deal with nutrition and weight issues. However, patients dealing with VLUs may benefit from general nutritional advice — see Box 9.

#### Box 8. Tips for patient mobility

- Try to keep active by walking regularly if possible
- Encourage venous return by regularly exercising your legs — moving your feet up and down, and rotating them at the ankles
- Avoid sitting or standing still with your feet facing downwards — elevate your feet at least every hour
- Whenever you're sitting or lying down, keep your affected leg elevated — ideally with your toes level with your heart.

#### Box 9. Patient tips to aid compliance with dietary advice

- Set SMART goals: Specific, Measurable, Achievable, Realistic, Time-specific
- Offer praise and encouragement
- Review diet regularly
- Change diet gradually
- Offer consistent messages from all healthcare professionals
- Enlist social support — e.g. family, friends and carers
- Use a multidisciplinary approach.

### MYTH

Inelastic bandages are not suitable for immobile patients.

### TRUTH

Inelastic bandages can be used on both mobile and immobile patients, as fluctuations in pressure can be achieved even with small or passive movements to facilitate venous return.

## Pain management

People with VLUs can experience pain due to:

- **Poor exudate management, leading to macerated skin:** consider a skin barrier, an absorbent dressing and a review of compression dosage
- **Oedema causing ‘heavy’ legs, resulting in a dull but persistent pain:** consider reviewing the compression therapy dosage and technique
- **Infection:** consider antimicrobial therapy and efficacy of compression to manage exudate
- **Compression application:** check that compression has been applied correctly.

While strong compression in the long-term will reduce the patient’s wound pain through its anti-inflammatory properties, it is important to inform the patient that they may, at first, find compression therapy firm and supportive. Within 14 days, wound pain should dissipate. Over-the-counter pain relief that the patient can purchase themselves may help the patient to be more comfortable in the early stages of wearing compression.

The pain level experienced by a patient should be monitored and documented regularly; for example, at each dressing change, ideally using a simple and objective system such as a visual analogue scale (Harding et al, 2015). Keeping a patient

diary can identify what type of pain is experienced at certain times of the day (e.g. during dressing change and exercise).

Clinicians need to ensure that pain is not exacerbated by poor compression application techniques or ineffective dosage of compression; neuropathic pain management may be essential for compression to be tolerated. Pain management using analgesia and/or dressings with pain-managing properties may be required (SIGN, 2010).

Ensure the effect of the analgesia is also monitored: ask the patient what their pain level is after taking analgesia, as well as their pain level at the current time. Pain in VLU patients has been found to fluctuate and may be difficult to control (Flanagan et al, 2006), so selecting appropriate pain management strategies will depend on the individual patient.

## Section 5: Treatment monitoring and review

Patients should be re-assessed on a 4-weekly basis to see if their symptoms/wound are improving and if the current care plan is effective and remains appropriate.

### Best Practice Statement

The patient's care plan should be the responsibility of a named clinician and all practitioners involved with VLU care should have undergone appropriate education and training.

### Best Practice Statement

Patients with VLUs should be reviewed and reassessed every 4 weeks at a minimum (Harding et al, 2015), see 'check and challenge' (Box 10). More frequent reassessments may be required depending on the individual's assessment. The patient should also be monitored at each dressing change and patient outcomes should be assessed at each intervention. Encouraging patients to monitor any changes in their wound is key, so they can become a stakeholder in their own care.

The longer the wound is present, the greater the risk of deterioration — so it is important that the treatment plan is reassessed and changed if objectives are not being met, or the patient is referred if necessary. Triggers for reassessment should include:

- Current compression choice does not suit the patient
- Compression therapy applied but not delivering improvement
- Wound deteriorating
- Wound remaining static despite treatment
- Deterioration of general skin condition or maceration and exudate damage
- Increase in wound size
- Increase in exudate levels
- Increase or change in pain
- Decrease in mobility
- Malodour
- Depression or patient quality of life issues
- Inability to deliver consistent management.

It is important to explore why the treatment may not be working, involving the patient in

the decision-making process, and investigating possible tolerance issues or other causes. The issues should be resolved by developing an action plan and offering the patient alternative options if possible. It may be necessary to try a different method of compression treatment rather than just the dressing. If the wound is not progressing, it is necessary to trigger multidisciplinary discussion and involvement. If the VLU has not healed after a maximum of 12 weeks of treatment, the patient should be referred to an appropriate specialist.

### Responsibilities and continuity of care

Continuity of care is vital to successful outcomes of treatment; the patient's care plan should be the responsibility of a named clinician. All practitioners involved in VLU care should have undergone appropriate education and training in relevant skills — it is the practitioner and their organisation's responsibility to ensure this. When the MDT is involved, competencies and responsibilities should be set according to local guidelines. Patients should be referred to a specialist wherever necessary.

## REFLECT AND BE BOLD

Referral to specialist services is not a failure of care — it is a measure of good care and that patient safety is being addressed.

### Box 10. Check and challenge: reflection on management every 4 weeks

#### 1. Is your treatment working?

#### 2. Are you following best practice?

At each review, the appropriateness and effectiveness of the current system should be assessed against the following aims, as well as any specific patient-agreed objectives:

- Reduction of oedema
- Reduction of surrounding inflammation
- Reduction in fluid/exudate
- Ideally 30–40% reduction in size (Harding et al, 2015)
- Reduction in pain
- Improvement in mobility
- Improvement in general skin condition
- Improvement in patient-reported outcomes
- Improvement in patient's overall quality of life
- Success in managing infection/exudate/oedema if appropriate.

#### 3. Should you escalate?

If there has been no wound healing or exudate isn't effectively managed after 4 weeks, check with a more senior colleague, review efficacy and consistency of the compression and consider referring to specialist services in your area. If the wound has not healed after 12 weeks, the patient should be referred to specialist services in your area.

#### Factors to consider for non-healing:

- Fixed ankle, deformity or reduced range of motion: refer for biomechanical review
- Size of limb and height of patient may influence the strength of compression required
- Unusual wound bed/wound bed not progressing as expected: consider other impacting aetiology — e.g. vasculitis, auto-immune disorders. Consider referral to the appropriate specialist
- Presence of infection.



## Section 6: Language and patient–practitioner dialogue

If the patient has the capacity and capability, discuss and involve the patient in supported self-management.

### Best Practice Statement

#### Tolerance rather than concordance, adherence or compliance

One of the roles of the clinician in VLU care is to help patients tolerate compression. Most patients can tolerate this important therapy. Labelling a patient non-concordant, non-adherent or non-compliant is dismissive to the patient and must be avoided.

#### Patient engagement and patient education

To achieve positive outcomes, the patient (and their families and carers) must be engaged in their care to a level that is suitable for their capacity and capability. During assessment, the patient's view,

priorities, and expectations around care should be considered and discussed. Using motivational interviewing to establish objectives and consider their choices regarding their care can help to assess their interest and suitability in supported self-management (Box 11). Supported self-management is one part of the NHS Long Term Plan's Comprehensive Model for Personalised Care to make personalised care standard across the health and care system (NHS England, 2020).

If they are able and willing, involve the patient in supported self-management. Supported self-management should be encouraged in suitable patients, but not forced — the patient must be able and willing to be involved in their own care (e.g. depending on skill level, dexterity and mobility). The patient should be prescribed a wound and skin care regimen, exercises and a compression system that fits both their clinical and personal needs. Family and carer involvement should also be considered.

### MYTH

All patients are suitable for supported self-management.

### TRUTH

Not all patients are suitable for supported self-management. The individual's capabilities — including their ability to communicate and their understanding of their diagnosis, the level of family and neighbourhood support available to them, and their preferences — must all be considered, see Box 11.

### MYTH

Supported self-management means that the patient will never see the clinical team again.

### TRUTH

Supported self-management means that the clinician and patient work in partnership to manage their leg ulcer. Some patients are able to engage in their own care with support and help to promote a continuity of care between services. Patients who are self-managing should still be seen on a 4-weekly basis to review their condition and ensure that their treatment plan remains appropriate and effective. Patients, carers or willing family may also play a vital role in supporting care delivery.

#### Box 11. Supported self-management

1. Assess capacity and capability
2. Assess their willingness/desire to provide supported self-management
3. Assess whether there are any safeguarding issues
4. Talk to them about previous experiences of supported self-management
5. Before encouraging supported self-management, ensure the patient is informed of the following information:
  - Treatment plan, practicalities of wound care and using compression garments — in the form of a care contract or leg ulcer passport
  - Hand-washing and limb hygiene
  - Reasons for treatment
  - Signs of deterioration and improvement
  - Signs and symptoms of infection
  - Contact details of who to contact if the patient is concerned.
6. Review every 4 weeks in line with NWCSP (2020) recommendations.

#### When self-supported management may not be appropriate for people with VLUs

- Safeguarding issues (e.g. mental health patients in the community living alone)
- Patients who do not, or struggle to, understand
- Patient who are not able to tolerate compression (once they can tolerate compression, they could be more involved in self-supported management)
- Where hygiene levels are not appropriate
- Where there are problems accessing required products.

When a treatment regimen has been agreed with the patient and the aspects of supported self-management have been negotiated (i.e. frequency of clinic visits, skin care regimen and exercises), agreed outcomes should be recorded (e.g. care contract, leg ulcer passport) and measured in order to track treatment and progress.

See Box 12 for tips on patient education and encouraging patient involvement.

## REFLECT <sup>AND</sup> BE BOLD

Have a conversation with your patient about supported self-management. If the patient says no the first time, it does not mean that their answer will not change. You can explore further in a few weeks' time when they might be in a different place mentally or physically, or may have built trust in their relationship with you.

## REFLECT <sup>AND</sup> BE BOLD

Do you think labels such as non-concordant, non-adherent or non-compliant are helpful? Patients who are traditionally labelled as such require extra support to help them tolerate compression and VLU treatment. When colleagues use these powerful terms, do not step back but lean into the conversation and explore the impact these terms are having on you, the wider team and the patient's care.

### Box 12. Tips for patient education and involvement

- Involve the patient in the decision-making process
- Be aware that a patient's view on supported self-management may change over time
- Use positive language and avoid terms like non-concordant, non-adherent and non-compliant
- Explain treatment and rationale at all stages, establishing patients' and carers' long- and short-term expectations
- Use information leaflets and resources
- Use telemedicine (e.g. online video calling, apps, smartphone support)
- Suggest patient support groups where appropriate
- Involve friends, family and carers where possible
- Encourage continuity of care with consistent messages.

## MYTH

Hosiery kits and compression wraps are only for people who can participate in self-management.

## TRUTH

Hosiery kits and compression wraps can be applied by the patient, carer or healthcare professional. In each of these scenarios, using a hosiery kit or compression wrap facilitates time-efficient care delivery as well as potential quality of life improvements.

## Section 7: Prevention of recurrence

Implement an agreed and ongoing self-management plan with the patient, including movement/exercise and a skin care regimen (plus ongoing maintenance debridement if required).

### Best Practice Statement

Compression is often a lifelong treatment for many individuals who have had a VLU even after it has healed.

### Best Practice Statement

When the VLU has healed, maintenance and prevention of recurrence is vital. As soon as the patient's wound has healed, the maintenance phase of management should be commenced. If they have not already done so, they should be referred to a vascular service for review of minimally invasive treatment options to treat the cause of the venous hypertension. If the ulcer originally developed spontaneously, then it is not about *if* but *when* the ulcer will recur if preventative strategies are not put in place.

### Maintenance compression

The patient should be maintained in compression hosiery wherever possible and educated on the risk of ulcer recurrence to optimise their ongoing supported self-management — compression should be a lifelong option for patients at risk of recurrence (Box 13).

### Surgical correction

All patients with VLUs that have healed in compression therapy should be assessed for suitability of corrective endovenous ablation surgery to reduce the risk of recurrence and treat the cause of the disease (Box 14; NICE, 2021). The Early Venous Reflux Ablation RCT concluded that early venous intervention resulted in faster healing of VLUs, and more time free from ulceration than deferred intervention (Gohel et al, 2018).

### Ongoing review and monitoring

The patient should be reviewed depending on the wound history and the patient's level of cardiovascular risk (e.g. every 12 months; Harding et al, 2015). Patients should also be educated on keeping vigilant for any signs that they need to contact their clinician for reassessment — e.g. further trauma or changes to the lower leg, concerns about circulation or increasing oedema.

At review, it is also important to gauge how the patient is tolerating maintenance compression, and to represcribe/resupply compression therapy as required.

#### Box 13. Lifelong compression

##### Who may require lifelong compression?

- Individuals with venous disease where vascular or surgical correction is not possible
- Individuals with oedema/lymphoedema where the underlying condition has not been corrected (e.g. valve replacement for heart failure or has undergone a gastric bypass and now has a healthy body mass index).

##### Who may not require lifelong compression?

- People with a healed traumatic wound with no signs of venous disease. If it is the individual's first episode of a traumatic wound, lifelong compression is not required
- Individuals who have had successful endovenous ablation with purely venous hypertension (i.e. structural venous disease).

**Box 14. Endovenous ablation surgery**

Endovenous ablation seals off or 'ablates' the main underlying faulty vein that is feeding the varicosities; this is done with either heat, laser or glue. Endovenous ablation has the same benefit in terms of vein function compared to traditional surgery, but it is less invasive. The procedure is undertaken as a day case under local anaesthetic and is viewed as a minimally invasive procedure. It should be considered for all patients with venous insufficiency, to reduce risk of ulceration and recurrence (NICE, 2021).

**Is compression therapy required after surgery?**

Successful endovenous ablation can eliminate the need for long-term compression in patients with purely venous hypertension (i.e. structural venous disease). If there is some functional venous disease (e.g. failure of calf muscle pump), compression may need to continue.

It is important to bear in mind that, during the maintenance period, patients and carers will have responsibility for keeping compression hosiery in good condition, so it is critical that they receive effective education to maximise the life and effectiveness of a garment until the next prescription (Wounds UK, 2021c).

The maintenance phase presents a great opportunity for the patient, their carer and/or family member to take ownership of any aspects of skin care, mobility and exercise to maintain skin integrity, general wellbeing and prevent recurrence.

**REFLECT<sup>AND</sup>  
BE BOLD**

The VenUS IV Study (Ashby et al, 2014) found that participants who became used to wearing hosiery as an ulcer treatment would be more likely to wear it as a maintenance treatment after healing. Appropriate ongoing compression therapy makes recurrence less likely; therefore, it is important to work with the patient to manage their expectations, optimise tolerance from the beginning of treatment, devise feasible long-term options and suit the patient's ongoing lifestyle. Discussion needs to be around how this can be adapted and a pragmatic approach is required.

# Appendix 1

**Table A. Investigative tools for arterial assessment (Wounds UK, 2016; 2019)**

Investigation	Purpose
Ankle Brachial Pressure Index (ABPI)	Bedside test to exclude the presence of significant peripheral arterial disease. ABPI is the calculation of the ratio of blood pressure at the ankle compared with blood pressure in the arms. ABPI <0.8 is suggestive of reduced blood supply to the legs, indicating peripheral arterial disease.
Toe Brachial Pressure Index (TBPI)	Similar procedure to ABPI but cuff is applied to great/first toe to obtain hallux pressure. This may be useful/reliable in patients where the limbs are too large to compress or where there is presence of arterial calcification (ABPI >1.3). TBPI <0.7 indicates arterial disease.
Pulse oximetry	Pulse oximetry alone is a secondary diagnostic tool to measure levels of oxygenated blood, which is unreliable in excluding peripheral arterial disease. Pulse oximetry can be used to calculate ABPI measurement; however, this should not be routine practice.
Transcutaneous oxygen tension (TcPO <sub>2</sub> )	Local non-invasive measurement to assess the amount of oxygen that has diffused from the capillaries into the epidermis. Provides useful information to assess level of potential for healing in ischaemic wounds.
Arterial duplex scan	Non-invasive ultrasound scan of the arteries. Duplex scans capture two elements of information: to assess the visual structure of the arteries and also to assess blood flow within the arteries. Useful investigation if peripheral arterial disease is suspected.
Computer Tomography Angiogram (CTA)	Technique for imaging larger sections of arteries. In the lower limb, CTA can be used to see the whole arterial system from below the level of the aorta. Requires the injection of contrast dye into the arteries. Useful if looking for larger inflow arterial disease or small vessel disease below the knee.
Magnetic Resonance Angiogram (MRA)	As per CTA but uses magnetic fields/radio waves to evaluate blood vessels and identify areas of abnormality or arterial disease; may be a preferable option for patients with poor renal function. Radiation doses are lower compared with CTA.
Angiography	Angiography is an invasive investigation, therefore should only be used where intervention is required and should not be used for first-line investigations. Contrast dye is injected into the arteries, then a series of X-rays is taken to examine for the presence of arterial disease or other abnormalities.

**Table B. Investigative tools for venous assessment (Wounds UK, 2016; 2019)**

Investigation	Purpose
Venous Duplex	Non-invasive ultrasound scan of the veins. Duplex scans capture two elements of information: to assess the visual structure of the arteries and also to assess blood flow within the arteries. Useful investigation to assess condition and functioning of veins, will assess for incompetence (failing/backflow) of both deep and superficial venous system.
Photoplethysmography	Used to assess venous refill time and investigate deficiencies of the calf muscle pump. Venous reflux time >20 indicates venous insufficiency.
Computer Tomography Venogram (CTV)	A venogram involves injecting contrast material into the veins, which then allows the veins to be imaged with a CT scanner. This allows for the assessment of obstructions, congenital issues, and provides detailed accurate assessment of the venous system.
Venogram	As CTV but images are taken using a series of X-rays. This requires continual injections into the veins, and as such is classed as an invasive investigation. Therefore, this is primarily only used for vein bypass planning or where very detailed information is required.

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