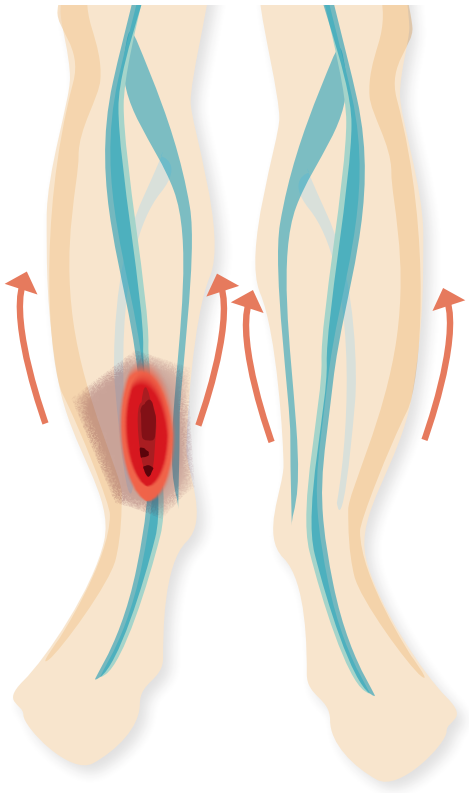
WUK BPS

# Best Practice Statement

## Addressing complexities in the management of venous leg ulcers

2019



Factors of complexity

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Referral

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Promoting continuity of care and self-care

Recurrence and prevention

Wounds UK

**BEST PRACTICE STATEMENT: ADDRESSING COMPLEXITIES IN THE MANAGEMENT OF VENOUS LEG ULCERS**

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# Developing best practice

This document builds on the *Best Practice Statement: Holistic Management of Venous Leg Ulcers* (Wounds UK, 2016) to address complexities in the management of venous leg ulcers (VLUs). This guide is written for healthcare professionals who have the appropriate level of skills and knowledge to assess and treat patients with (or at risk of developing) VLUs.

The aim of this document is to help ensure consistent clinical practices in relation to the assessment and management of people with VLUs who are outside the scope of the leg ulcer treatment pathway (Atkin and Tickle, 2016). It will provide guidance based on relevant evidence and the experiences and opinions of clinicians, with a focus on practical, holistic and patient-centred strategies.

The Best Practice Statement document was derived from a one-day meeting of the Expert Working Group, which convened to discuss the complexities in VLU management. Myths and truths of VLU management were also developed. The document was further developed by the Expert Working Group during an extensive review process involving a Review Panel.

**GUIDE TO USING THIS DOCUMENT**

Each section offers advice about best clinical practice for patients with or at risk of venous ulceration.

Tables, figures and boxes are included to guide best practice. The best practice statement is supported by key references where possible.

There is a glossary of terms used in this document on pages 22–23.

# Introduction and evidence update

VLUs are believed to be the most common chronic wound in the UK. In the Burden of Wounds study, there were 278 000 patients with VLUs in the study period, equating to 1 in 170 adults having a VLU. However, this is thought to be an underestimation as there were 420 000 patients with unspecified leg ulcers, some of which will be venous in origin (Guest et al, 2015).

VLUs pose a challenge as they are recurrent and may persist for months or years (Harding et al, 2015). NHS England (2017) has highlighted that, for many, the management of patients with lower leg ulceration is sub-optimal, with unwanted variations increasing cost and lengthening healing times. The mean cost is currently estimated at £7600 per VLU a year, with the cost of managing an unhealed VLU 4.5 times higher than managing a healed VLU (£3000 per healed VLU and £13 500 per unhealed VLU) (Guest et al, 2017).

Findings from a recent retrospective cohort analysis of 505 patients suggest that compression therapy is not being initiated or used correctly; only 53% of all VLUs healed within 12 months, and the mean time to healing was 3 months (Guest et al, 2018). Possible reasons suggested by the group were that patients were predominantly managed in the community with minimal clinical involvement of specialist clinicians; up to 30% of all the VLUs may have been clinically infected at the time of presentation; and only 22% of patients had an ankle brachial pressure index (ABPI) documented.

Patient-, wound-, healthcare professional-, resource-/treatment-related factors contribute to the sub-optimal use of compression. Compression therapy may not be initiated or maintained due to lack of clinician skill and resource, time and confidence. The inadequate use of compression therapy leads to mistargeted use of human and financial resources that may not aid healing of the wound, and can lead to increased chronicity, infection and other complications (Mullings, 2018). The use of therapeutic compression should be improved and made more consistent throughout the UK.

Since the *Best Practice Statement: Holistic Management of Venous Leg Ulcers* (Wounds UK, 2016), further evidence for VLU management has been published. The Early Venous Reflux Ablation (EVRA) randomised controlled trial (RCT) investigated the impact of early endovenous ablation in patients with venous ulceration (Gohel, 2018). The study concluded that early venous intervention resulted in faster healing of VLUs, and more time free from ulceration than deferred intervention.

## Multidisciplinary team approach

A multidisciplinary team (MDT) approach is an important feature for VLU management to promote continuity of care (Kjaer et al, 2005; Harding, 2006). However, the findings from the Burden of Wounds study suggest that the MDT approach is not always available or implemented (Guest et al, 2015), impacting on patient care and outcomes.

A 'seamless service' through integration, coordination and the sharing of information between different specialists and teams can promote continuity of care (Gulliford et al, 2006). An MDT approach improves healing, can protect at-risk patients and prevent VLU recurrence. Additionally, patients who are part of a continuous care plan can benefit from education that allows them to self-manage (Wounds UK, 2015).

## Leg ulcer treatment pathway

Following an established, evidence-based pathway for the management of VLUs provides consistency and continuity of care. The leg ulcer treatment pathway (*Figure 1*) was developed by Atkin and Tickle (2016), and adopted in the *Best Practice Statement: Holistic Management of Venous Leg Ulcers* (Wounds UK, 2016). It guides first-line clinicians on the most appropriate VLU management with the aim of earlier referral and access to specialist services for patients where non-healing is

apparent. It highlights the requirement of an MDT approach to VLU management (including the requirement for venous imaging). Additionally, it promotes the use of compression hosiery kits to be used first line, and, where possible, encourages

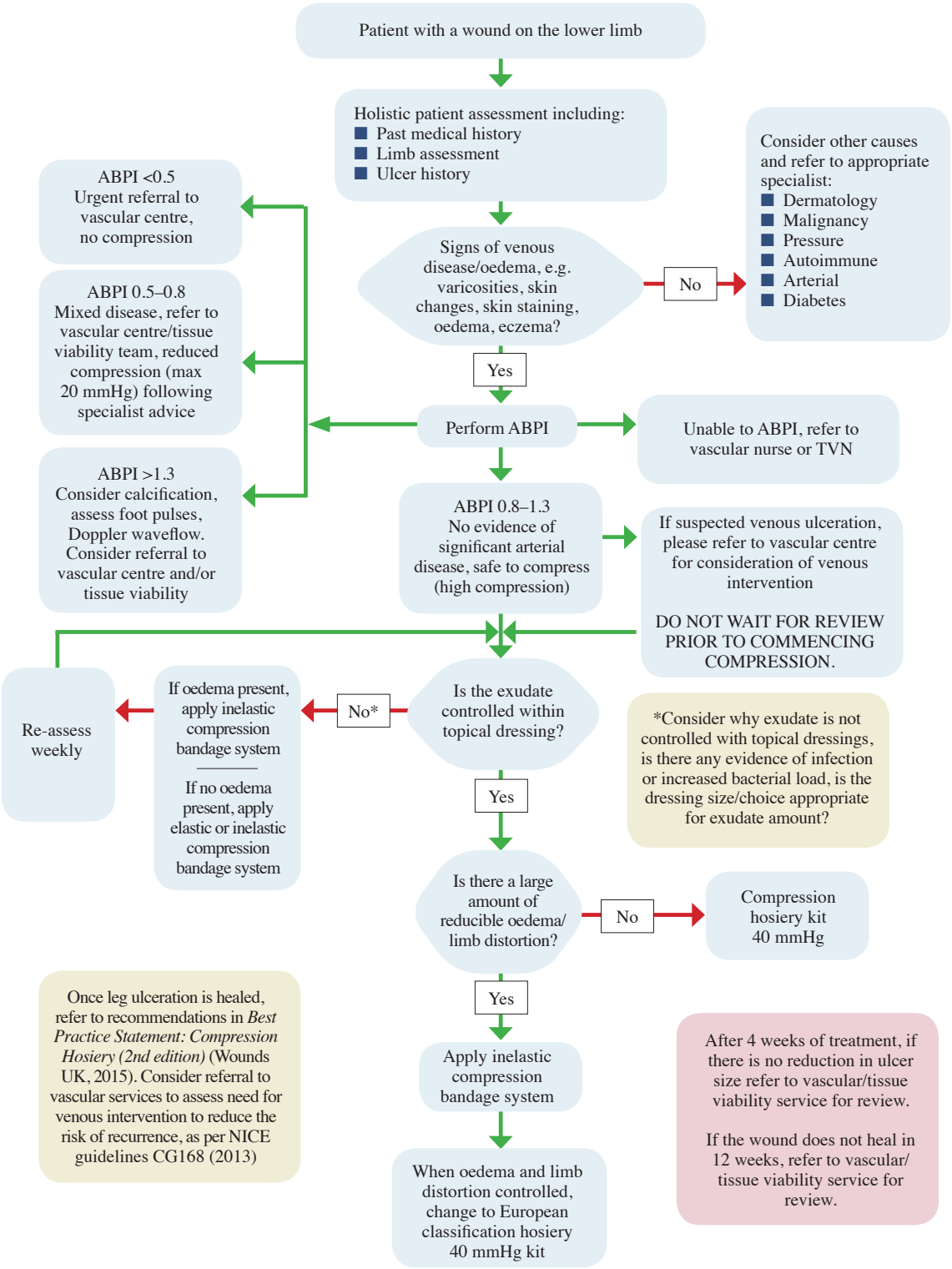



*Figure 1. Leg ulcer treatment pathway (Atkin and Tickle, 2016; 2018; Wounds UK, 2016)*

patients to self-care and be monitored by non-registered practitioners.

## Complexity in VLU management

Complexity tends to refer to four key factors in VLU management (European Wound Management Association [EWMA], 2008):

- *Patient-related*, e.g. comorbidities, medication, pain, concordance
- *Wound-related*, e.g. high exudate, infection (Vowden, 2005), biofilm (International Wound Infection Institute [IWII], 2016)
- *Healthcare professional-related*, e.g. clinical skills and knowledge
- *Resource/treatment-related*, e.g. healthcare systems, availability, cost (*Figure 2*).

The term complexity to describe a wound is not the same as chronicity or a hard-to-heal wound. A chronic or hard-to-heal wound is defined as a wound that has not healed in 12 weeks, or if the wound has not improved/not reduced in area by 40% in 4 weeks of standard care following the leg ulcer treatment pathway (Wounds UK, 2016).

Wound complexity increases the likelihood of wound chronicity and can make a wound hard-to-heal. When considering wound complexity, it may be useful to determine the factors contributing to wound complexity and if the wound is:

- Hard-to-assess
- Hard-to-manage
- Hard-to-heal.

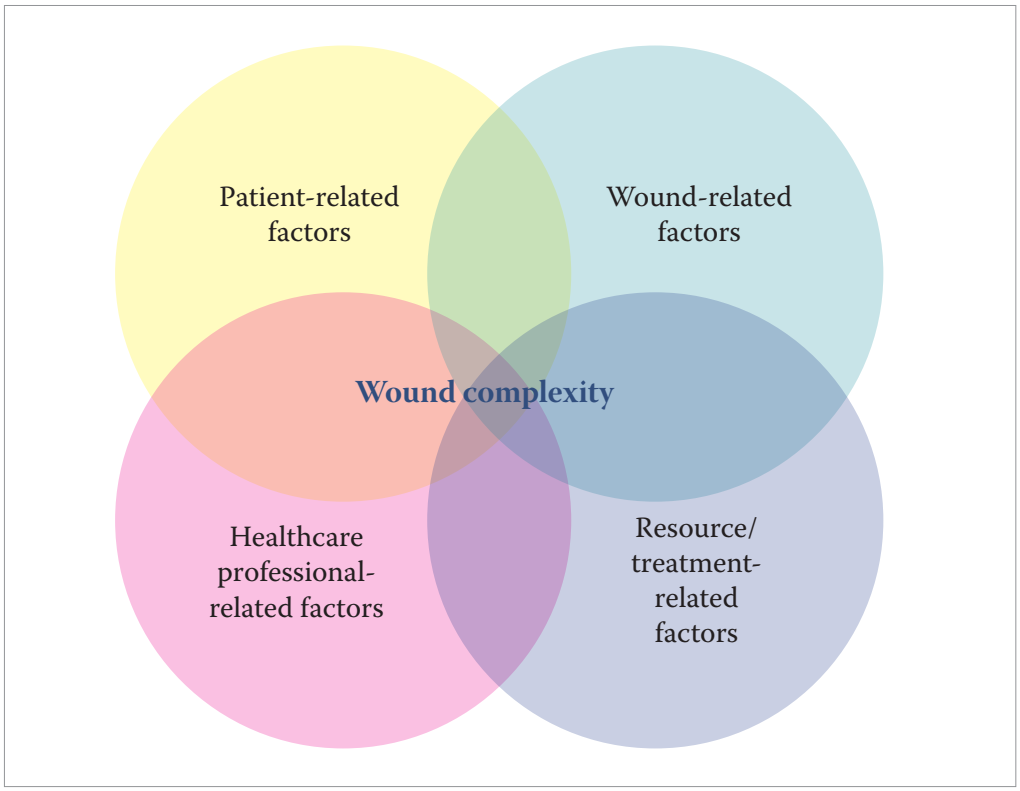



*Figure 2. Complexity in VLU management*

# SECTION 1: FACTORS OF COMPLEXITY

Recognising, understanding and addressing the factors that contribute to wound complexity will help direct treatment and management and impact on healing progression (*Figure 3*).

## Patient-related factors

Patient-related factors that impact on wound complexity are varied. Physical factors, such as older age (over 60) or comorbidities, such as peripheral arterial disease or diabetes impact on healing (EWMA, 2008). Medications may also impact on wound healing (*Box 1*).

Psychosocial factors, such as social isolation, gender, economic status and pain experience, have also been found to influence healing (EWMA, 2008). Concordance (or non-concordance) is often used to describe a patient's engagement in care. Examining and determining the root of a patient's non-concordance is vital, as it may be manageable, i.e. patient's lack of understanding of the importance of treatment, or clinicians' lack of knowledge or experience leading to poor patient education (Stanton et al, 2016).

**Box 1. Medication that can affect wound healing (Beitz, 2017).**

**Delay healing**
Cytotoxic antineoplastics, e.g. hydroxycarbamide; immunosuppressive agents; antipyschotics; corticosteroids; nonsteroidal anti-inflammatory drugs (NSAIDs); and anticoagulants.

**Increase oedema**
Calcium channel blockers, e.g. amlodipine; NSAIDs.

**Cause ulceration**
Nicorandil (Rix and Bull, 2017); hydroxycarbamide.

**Affect surrounding skin**
Systemic and topical steroids.

**Positive effect**
Penoxyifylline is an effective adjunct to compression bandaging for treating VLUs (off-label indication) and may be effective in the absence of compression (Jull et al, 2012). High doses are required and major gastrointestinal side effects are common. Caution when prescribing penoxyifylline is recommended as there are many possible drug interactions.

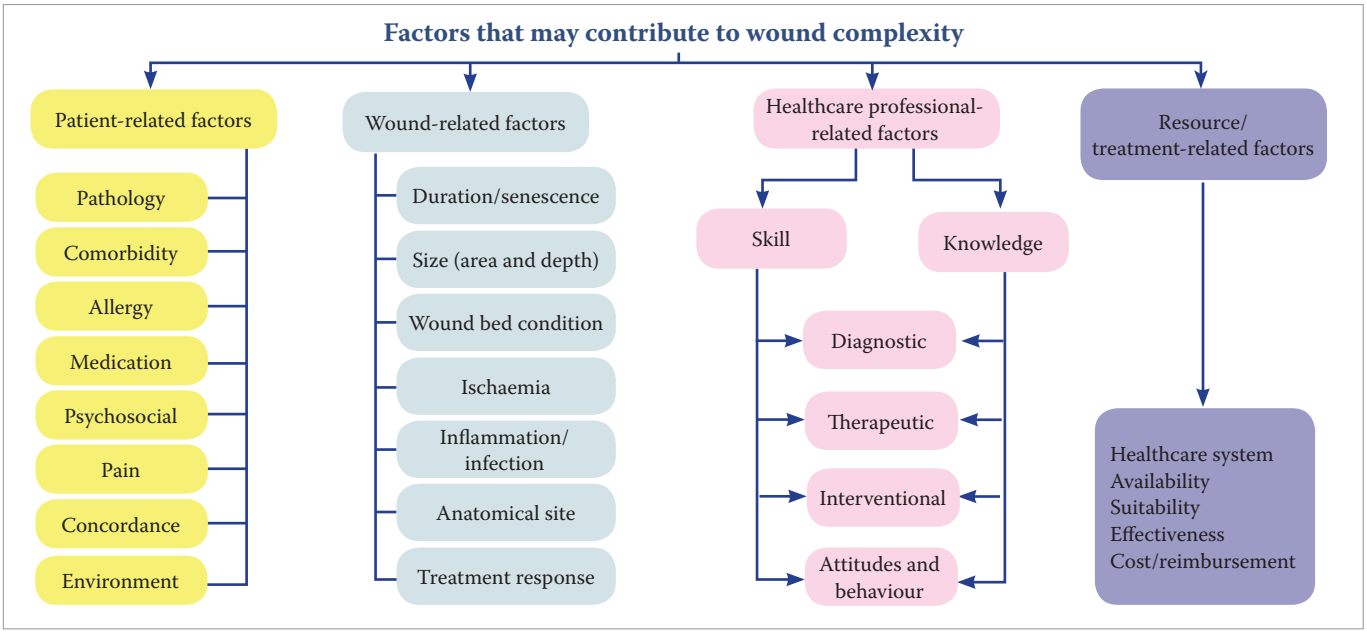



*Figure 3. Factors that may contribute to wound complexity (adapted from EWMA, 2008)*

## Wound-related factors

Increased wound duration and changes to the wound size and wound bed condition are all indicators of healing, and may indicate a failure in care or sub-optimal compression. If there has been no improvement or reduction in wound size in 4 weeks of treatment, this is an indication that the wound healing environment is not optimal and the patient should be referred to specialist services. The initial response to treatment can be an indicator of subsequent healing time (EWMA, 2008), healing potential and wound complexity.

The main cause of venous leg ulceration is venous insufficiency. Increased venous pressure leads to a chronic inflammatory response and local thrombosis (atrophie blanche), which can result in the breakdown of skin and ultimately ulceration (Chapman, 2017). However, it is important that the presence of peripheral arterial disease is assessed; reduced perfusion deprives tissue of effective gas and metabolic exchange required for wound healing.

Inflammation is part of the normal wound healing response, but a prolonged inflammatory response is detrimental to wound healing. Wound complexity may be influenced by infection, such as a high bacterial load, and the presence of more than one bacterial strain or biofilm (EWMA, 2008).

The location of the wound will also affect wound healing and management can be more difficult, e.g. it may impact on the ability to apply effective compression. The selection of wound dressings and compression therapy should preserve dressing performance and limb function, and avoid secondary problems, such as bandage damage on the leg and exacerbation of oedema on dorsum of foot.

## Healthcare professional-related factors

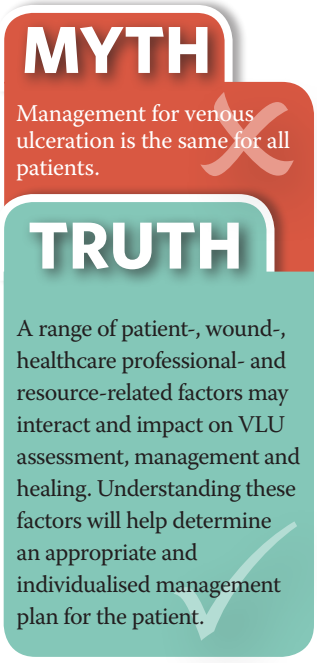
The skills, knowledge and attitudes of healthcare professionals can have a major impact on their ability to assess wound complexity, to control a patient's symptoms and to manage associated problems (EWMA, 2008). If treatment is unsuccessful, a healthcare professional may feel they have failed or may lead to defensive behaviour or patient-blaming. Education tools are available to help clinicians provide consistent, accurate care (e.g. Leg ulcer treatment pathway [Atkin and Tickle, 2016] *Figure 1*). *Box 2* provides strategies that may help the clinician to focus on the patient's needs when a wound is not healing (EWMA, 2008).

## Resource/treatment-related factors

Healthcare resources should always be used efficiently and effectively. The basic equipment needed to assess a patient for venous ulceration should be available to ensure early diagnosis and timely treatment interventions. If the basic equipment needed to carry out a leg ulcer assessment is not available, such as equipment to perform ABPI testing, this should be escalated to clinical managers and a referral made in line with local policy. Training should be provided if there is a lack of competency to perform leg ulcer assessments.

**Box 2. Checklist for patient-centered strategies for wound healing (EWMA, 2008).**

- Identify the patient's needs and concerns.
- Identify and discuss potential barriers to healing.
- Provide support, calling on other healthcare professionals or agencies when necessary.
- Manage the whole patient within their care environment.
- Develop a therapeutic relationship between clinician and patient.



# SECTION 2: ASSESSMENT AND MANAGEMENT

Any potential signs and symptoms of venous disease should be identified so that an appropriate management plan can be started as soon as possible (Atkin and Tickle, 2016). The factors that impact on complexity should also be considered.

For all VLUs, assessment should include elements of the generic wound assessment minimum data set (Coleman et al, 2017) and:

- General assessment.
- Limb and vascular assessment.
- Vascular assessment.
- Venous assessment (including venous duplex scan by vascular service [see page 12]).
- Wound and surrounding skin assessment.

## General assessment

The patient should be assessed holistically with consideration for patient-related factors, such as lifestyle, quality of life, and overall health factors, i.e. underlying causes or relevant medical history. Consider if any current medication will have a detrimental effect on wound healing (*Box 1*).

## Limb and vascular assessment

Assessment of peripheral perfusion is a fundamental requirement for leg ulcer management. An ABPI provides an assessment of the patient's peripheral arterial system and is often a first-line test in limb assessment. Despite this, in the Burden of Wounds Study, only 16% of all patients with a leg or foot ulcer had an ABPI in their records (Guest et al, 2015). The omission of an ABPI assessment can lead to an unconfirmed diagnosis, treatment potentially sub-optimal, and delayed healing resulting in increased patient and economic costs.

ABPI testing can be completed with a hand-held Doppler machine and sphygmomanometer, or an automated ABPI device. The results of an ABPI can help determine whether arterial disease is present, therefore, assessing the patient's suitability for compression therapy. ABPI values should always be interpreted in the context of signs and symptoms. For example, if the ABPI is within the normal range but the patient has symptoms of peripheral arterial disease, e.g. intermittent claudication or rest pain, a clinical review should be undertaken and an onwards referral to a vascular service considered (NICE, 2018a). *Table 1* includes common ABPI assessment challenges and solutions.

It can be difficult to obtain an accurate ABPI in some patients, such as those with severe pain or chronic swelling, increased limb size, high BMI or those physically unable to reach a supine position. If the ABPI is elevated (>1.3), arterial calcification may be present and alternative assessment modalities may be necessary. In these cases, further assessment skills by specialist practitioners are required to determine the patient's suitability for compression therapy, e.g. pulse oximetry, pulse palpation, Toe Brachial Pressure Index (British Lymphology Society [BLS], 2018). See also *Appendix 1* (Wounds UK, 2016).

**MYTH**

Patients with a confirmed VLU and an ABPI outside of the 0.8–1.3 range can not receive compression therapy.

**TRUTH**

Patients with a confirmed VLU, no symptoms of arterial disease and an abnormal ABPI may benefit from compression under supervision of a competent healthcare professional who is able to use other clinical skills to assess patient suitability, e.g. pulse oximetry, pulse palpation, Toe Brachial Pressure Index.

**MYTH**

ABPI assessment confirms the presence of venous disease and a VLU.

**TRUTH**

While a fundamental component of a full holistic assessment, ABPI assessment will not diagnose venous disease. It will only assess for the presence of significant arterial disease and, therefore, assess the patient's suitability for compression therapy.

**Table 1. Challenges, immediate actions and solutions of ankle-branchial pressure index (ABPI) assessment and readings.**

| | Immediate action | Solutions |
|---|---|---|
| **Abnormal ABPI result** | ■ Re-check with a hand-held Doppler machine, if an automated ABPI machine has been previously used. | ■ **Repeat assessment.**<br>■ Check clinical signs and symptoms as per BLS (2018) guidance.<br>■ Assess arterial supply with another tool, e.g. pulse palpation, waveforms, toe pressure, and consider risks versus benefits of compression therapy.<br>■ Assess sensation.<br>■ Consider unusual pathologies, e.g. malignancy or pyoderma gangrenosum.<br>■ If ABPI results remain abnormal or still unable to complete, refer to leg ulcer service. |
| **Unable to do an ABPI** | ■ Receive advice from leg ulcer service, tissue viability or local leg ulcer champions (as per local policy) in-person, telephone or email. | |
| **ABPI <0.5** | ■ Arterial rest pain and/or ulceration could suggest severe peripheral arterial disease or critical limb ischaemia (CLI) (Harding et al, 2015).<br>■ If CLI present, arrange urgent referral to vascular out-patient services – patient should be seen within 2–14 days.<br>■ If there is concern regarding acute limb ischaemia, arrange urgent (within 4 hours) consultation with GP to establish a hospital admission.<br>■ If sudden deterioration of patient or limb, arrange urgent discussion with GP for pain relief and optimisation of perfusion. Consider referral to vascular services. | ■ **Repeat assessment.**<br>■ No compression unless advised by vascular clinic.<br>■ Continue to conservatively manage the patient and wound as per local policy. |
| **ABPI 0.5≤0.8** | ■ May suggest a degree of peripheral arterial disease (Harding et al, 2015).<br>■ Receive advice from leg ulcer service, tissue viability or local leg ulcer champions (as per local policy) in-person, telephone or email. | ■ **Repeat assessment.**<br>■ Establish predominate factor, i.e. venous or arterial insufficiency.<br>■ Consider modified compression: may be applied with frequent reassessment and monitoring for signs and symptoms of peripheral arterial disease and pressure damage (Harding et al, 2015).<br>■ Identify predominant factors:<br>■ Presence of oedema<br>■ Peripheral arterial disease (severity, progression or change)<br>■ Review presence or extent of venous disease.<br>■ Refer to specialist for further investigation and care. |
| **ABPI >1.3** | ■ May suggest arterial calcification is present (Harding et al, 2015).<br>■ Receive advice from leg ulcer service, tissue viability or local leg ulcer champions (as per local policy) in-person, telephone or email.<br>■ Check methodology for performing ABPI, e.g. cuff size, cuff and patient position, appropriate Doppler probe. | ■ **Repeat assessment.**<br>■ See solutions for "Abnormal APBI result/Unable to do an ABPI".<br>■ Identify predominant factors:<br>■ Presence of oedema<br>■ Presence of peripheral arterial disease (severity, progression or change)<br>■ Review presence or extent of venous disease.<br>■ Increase frequency of arterial assessment.<br>■ Refer to specialist for further investigation and care.<br>■ In the absence of diabetes and/or renal failure, patients with no signs of arterial disease and an ABPI of >1.3 may require high compression, e.g. 40 mmHg.<br><br>**When ABPI is abnormally high, future repeat ABPI testing would not be useful.** |

## Wound/surrounding skin assessment

Studies estimate that up to 79.7% of leg ulcers have a vascular aetiology of either venous, peripheral arterial disease or mixed, while 20–23% of patients have wounds from other aetiologies, i.e. vasculitis, pyoderma gangrenosum and autoimmune diseases (Körber et al, 2011). It is important to determine wound cause and to be aware of alternative causes of ulceration that may affect wound healing and complexity.

The wound and surrounding skin should be assessed using a structured assessment method, such as the TIMES principle (Wounds UK, 2017), which was expanded from the TIME principle (EWMA, 2004). *Box 3* is a checklist of considerations for wound and surrounding skin assessment for patients with a VLU.

## VLU classification

Following thorough holistic assessment, the underlying diagnosis should be established, e.g. venous, mixed or arterial, and documented. If the wound is diagnosed as a VLU, then it should be classified as either 'simple' or 'complex' in order to direct care and onward referral (*Box 4*). There is ongoing academic debate whether the classification of a 'simple' or 'complex' wound is suitable, or if it focuses too heavily on the wound and does not take into account other factors (Vowden, 2005). The knowledge, skills and competencies of the clinician will also impact on what is defined as a 'complex' wound.

**MYTH**

If a VLU is defined as 'simple', compression therapy is not required during the healing process.

**TRUTH**

'Simple' venous leg ulcers can become complex if they do not receive appropriate compression therapy.

**Box 3. Checklist of additional wound-related considerations during wound and surrounding skin assessment for patients with venous ulceration.**

**T (Tissue viability, perfusion and vascularisation):**

- If the wound is not progressing and the patient is optimised for healing, consider taking a biopsy to discount malignancy.
- Debride to ensure slough, necrotic tissue and fibrous material is removed.
- Do not debride necrosis in patients with arterial disease without discussion with the vascular service.
- Debridement by the podiatry team may be required, particularly if the patient has diabetes.

**I (Infection or inflammation):**

- Assess and reduce the risk of cellulitis.
- Assess and reduce the presence of fungus.
- Consider biofilm management wound care.

**M (Moisture imbalance):**

- Assess levels of fluid, e.g. oedematous fluid, lymphorrhoea or exudate.
- Assess the type and viscosity of exudate, e.g. serous, purulent or haemoserous.

**E (Edge of the wound):**

- Assess for altered perfusion.
- Assess the wound edge for abnormal inflammation or abnormal appearance.

**S (Surrounding skin):**

- Assess skin health and hygiene.
- Consider skin care management, i.e. debridement and emollient use.

**MYTH**

A wound must be present on the limb for at least 6 weeks to be classed as a VLU before compression therapy can commence.

**TRUTH**

Patients with a wound that has been present for over 2 weeks should be assessed for suitability of compression therapy (NICE, 2013). Immediate treatment of a lower limb wound with compression, particularly if signs of venous disease are present, will prevent ulcer development and reduce the burden to the patient and to healthcare delivery.

**Box 4. Checklist for a 'simple' and 'complex' VLU (Wounds UK, 2016).**

**Simple** A 'simple' VLU is defined when the following patient or wound characteristics are present:
- ABPI 0.8–1.3
- Wound area <100 $cm^2$
- Wound present for less than 6 months.

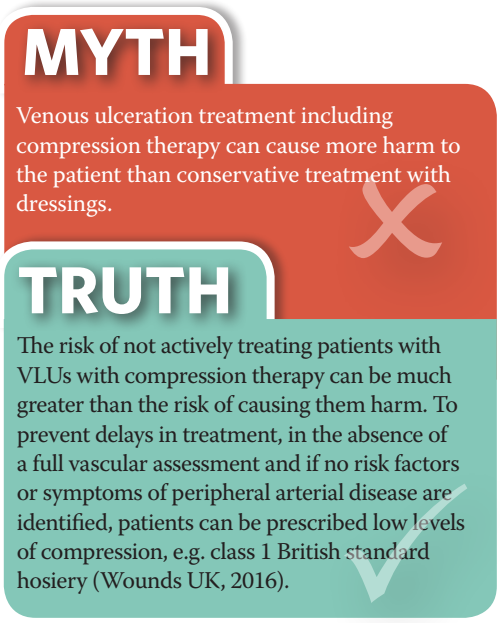
A simple VLU should be managed in a primary care or a community-based environment by clinicians who are competent to administer compression therapy (Harding et al, 2015).

**Complex** A 'complex' VLU is defined when the following patient or wound characteristics are present:
- ABPI outside of 0.8–1.3 range; unable to obtain ABPI
- Wound area ≥100 $cm^2$
- Wound present for more than 6 months
- Controlled/uncontrolled cardiac failure
- Current infection and/or history of recurrent infections
- Patient has a history of non-concordance with treatment
- Wound has failed to reduce in size by 20–30% at 4–6 weeks despite best practice
- Fixed ankle or reduced range of motion
- Foot deformity
- Unmanaged pain
- Severe lymphoedema.

A complex VLU should be managed by a specialist service designed to care for patients with complex lower limb ulceration depending on local service provision. This may include a specialist leg ulcer service, tissue viability service, local leg ulcer champions, community-based service (e.g. Leg Club®), or dermatology/phlebology or vascular service. Further investigations, such as arterial or venous duplex scans may be required (Harding et al, 2015).

## Initiating compression therapy

Patients who present with venous ulceration should be considered for immediate compression therapy in order to reduce the risk of chronicity (Wounds UK, 2016). Compression therapy can be perceived as painful, and, in practice, healthcare professionals often avoid using compression in patients with painful ulceration (Wounds UK, 2016). Compression can relieve pain associated with venous disease, and delaying treatment can cause patients more harm. The risks of not actively treating with compression include delayed healing, increased pain and discomfort and increased costs. The risk of harm from compression therapy must be based on individualised risk assessment of the patient.



## Common skin complexities

### 'Wet leg' syndrome

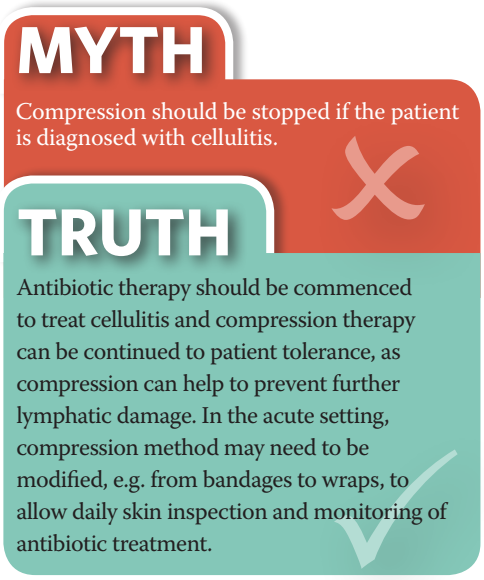
Unmanaged lymphorrhoea can cause skin maceration and increase the risk of infection and chronicity. The underlying cause of lymphorrhoea should be investigated and addressed, and treatment may require referral to the MDT. High compression therapy is often needed, dressing change frequency should be increased, and effective skin care and hygiene promoted. It may be helpful to consider referral and collaboration with local tissue viability service for advice and support on dressings.

### Cellulitis

For the management of cellulitis, refer to the BLS and Lymphoedema Support Network (LSN) (2016) consensus. It is essential that the patient's response to treatment is monitored. The patient should seek further medical attention by the GP, at a walk-in centre or out-of-hours service if the symptoms or cellulitic margins are not responding within 48 hours. If cellulitis is present, compression can be continued if tolerated by the patient. Compression can be temporarily reduced to patient tolerance to ease pain and then returned to high compression, e.g. 40 mmHg, as soon as possible (BLS and LSN, 2016).

### 'Red legs'

Symptoms of red legs include bilateral lower limb redness, warmth and tenderness in the absence of raised systemic temperature or malaise, following from eczema or other skin conditions. It is important for clinicians to be aware of red legs, a condition often misdiagnosed as cellulitis, which can lead to patient distress and use of unnecessary resources. Appropriate skin care, which may include corticosteroid creams, and long-term compression therapy should be implemented. Patients most at risk of developing red legs are usually those who are unable to self-care (Elwell, 2014).



# SECTION 3: REFERRAL

VLUs should be reviewed and reassessed at four-weekly intervals (Harding et al, 2015). At each dressing change, a less formal intermediate review should be undertaken to monitor current objectives, dressing and bandage performance and determine if the wound or patient has improved, deteriorated or are unchanged (Wounds UK, 2018).

If after 4 weeks of treatment, there is little or no reduction in ulcer size, or after 12 weeks the wound has not healed, consider referral to an appropriate service based on local availability. Before referral, a full holistic reassessment should be completed. Where possible, seek advice and review from an appropriate colleague, such as a team leader or link nurse. Consider the reason(s) for referral, i.e. hard-to-assess, hard-to-manage or hard-to-heal.

Once referral to a specialist team is confirmed to be the best next step and the reason(s) confirmed, the following information should be included in the referral request:

- Up-to-date patient and wound history.
- The reason(s) and main concern for referral, i.e. hard-to-assess, hard-to-manage, hard-to-heal.
- The patient-, wound-, healthcare professional- or resource/treatment-related factors impacting on wound complexity.

While awaiting referral, continue to manage the patient and wound symptoms. *Box 5* is a checklist for referral.

**Box 5. Checklist for referral.**

- Complete full holistic reassessment.
- Seek advice from an appropriate colleague, e.g. a team leader/link nurse/local leg ulcer champion, for advice.
- Determine reason(s) for referral: is the wound hard-to-assess, hard-to-manage or hard-to-heal?
- Continue management while referral is in progress or awaiting.

## Early endovenous intervention

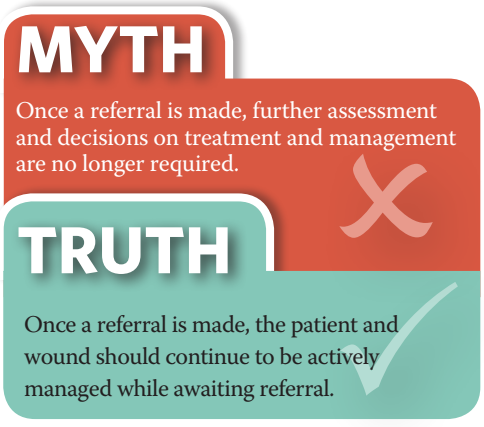
Early endovenous intervention has been shown to not only reduce the rate of recurrence, but also shorten the time to heal (Gohel et al, 2018).

All patients with the clinical signs and symptoms of venous disease require an assessment of the venous system to identify areas of venous insufficiency that may be suitable for endovenous intervention (Gohel et al, 2018). Referral to vascular services that are able to complete imaging of the venous system and offer appropriate endovenous intervention is vital, e.g. venous duplex scan and possible endovenous ablation. A referral to vascular services should not delay treatment. Treatment can begin or continue while referral is in progress or awaiting, e.g. high compression therapy providing there are no signs of peripheral arterial disease, such as intermittent claudication or rest pain.

Vascular services must respond to the findings of the EVRA trial (Gohel et al, 2018) with the provision of interventions. Where available, all patients with a VLU should be referred to vascular services for intervention to prevent recurrence and accelerate healing.

## Conditions that require urgent care or referral

Conditions that require urgent care or referral to the appropriate specialist at an early stage of management (Scorrish Intercollegiate Guidelines Network [SIGN], 2010) as per local policy are in *Table 2*.



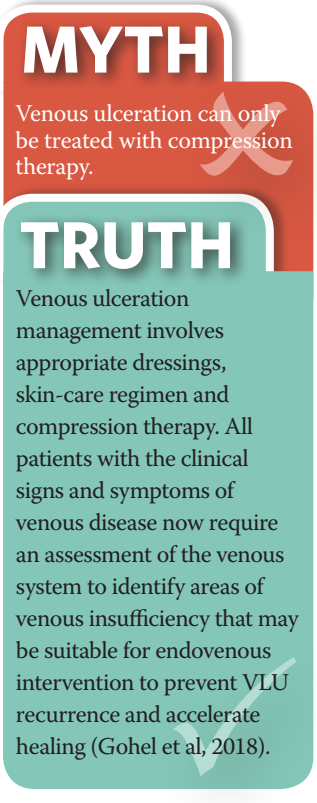



**Table 2. Conditions that require urgent care or referral and examples of where to refer as per local policy.**

| Conditions that require urgent care | Conditions that require referral to the appropriate specialist at an early stage of management (SIGN, 2010). |
|---|---|
| ■ Critical limb ischaemia (CLI) → refer urgently to vascular outpatient services. Patient should be seen within 2–14 days. | ■ Peripheral arterial disease (ABPI <0.5) → refer to vascular service. |
| ■ Acute limb ischaemia → refer urgently within 4 hours of consultation to the GP to establish a hospital admission. | ■ Suspected diabetic ulcer (location: plantar aspect of the foot, over metatarsal heads, or under the heel; even wound margins; deep ulcers with red or pale granular wound beds. Slough is common) → refer to GP or MDT. |
| ■ Suspected acute cellulitis, osteomyelitis, cellulitis not responding to oral treatment → liaise with GP. | ■ Rheumatoid arthritis or vasculitis → refer to rheumatology service. |
| ■ Sepsis or necrotising fasciitis → refer urgently to A&E as patient will need admission for treatment (NICE, 2017). | ■ Atypical distribution of ulcers → refer to tissue viability service. |
| ■ Significant sudden deterioration in health, e.g. Modified Early Warning Score (MEWS; Gardner-Thorpe et al, 2006) → refer urgently to A&E. | ■ Suspected contact dermatitis or dermatitis resistant to topical steroids → refer to dermatology service. |
| ■ Pyoderma gangrenosum → refer urgently to dermatology service or plastic surgery service depending on local policy. | ■ Lymphoedema → refer to lymphodema service. |
| ■ Suspected malignancy (rapidly deteriorating ulcer, atypical appearance or distribution of ulcers) → refer urgently to dermatology service for diagnosis and treatment. | ■ Pressure ulcer → refer to tissue viability service. |
| ■ Calcinosis, e.g. calciphylaxis → refer urgently to dermatology or specialised leg ulcer clinic. Debridement may be necessary. | |

## Non-concordance and non-adherence

The term concordance has become synonymous with compliance and adherence; however, this is incorrect. Concordance relates to the patient's relationship and interaction with the clinician to work towards treatment objectives (Horne et al, 2005). Developing an effective clinician–patient relationship to maintain patient concordance with treatment, especially compression therapy, can result in effective healing (Stanton et al, 2016).

A patient may not adhere to treatment for a number of reasons, such as pain, impact on lifestyle, or insufficient understanding of their condition. If patients feel unsupported, consider suggesting support groups, such as Leg Club®. A change in compression system may help improve concordance.

Before referring to a specialist service due to 'patient non-concordance', consider the questions in *Box 6*. If the answers are mostly 'no', this may indicate that concordance could be improved. *Box 7* includes tips to improve concordance.

**Box 6. Questions to consider before referring for "patient non-concordance" (Mandal, 2006; Stanton et al, 2016).**

- Is there a trusting, therapeutic patient–clinician relationship, where the patient believes the clinician has a sustained interest in understanding their problems?
- Has treatment, including compression modalities, so far fitted into the patient's everyday life without much disruption to their lifestyle?
- Is there a family member who has a shared interest in the patient's progress?
- Does the patient perceive their condition as serious, but accepts that treatment can control the symptoms?
- If applicable, have steps been taken to manage pain?

**Box 7. Tips to improve concordance (Stanton et al, 2016).**

- Take a patient-centred approach during consultation and when developing care plans.
- Create a relaxed, non-judgemental clinic environment.
- Assess the patient's educational abilities, willingness to learn and understanding of their condition.
- Implement motivational interviewing strategies and techniques, i.e. RULE: **R**esist the righting reflex; **U**nderstand the patient's own motivations; **L**isten with empathy; and **E**mpower the patient (Hall et al, 2012).
- Reinforce knowledge with verbal information and leaflets aimed at the patient's educational level.

# SECTION 4: COMMON PATIENT-RELATED COMPLEXITIES

Once the signs and symptoms of venous disease have been established, it is important to identify the reasons for wound complexity. In this section, common patient-related complexities are discussed.

## Patients with high BMI or large limbs

According to Guest et al (2018), the mean BMI for people with a VLU is 34.9 kg/m$^2$. High BMI may be caused by:

- Obesity
- Oedema
- Systemic organ disorders, e.g. cardiac, renal or liver.

The main challenges when managing a person with a obesity and/or oedema are to overcome immobility and venous hypertension in the lower limb and abdomen. The solution is often to commence and/or continue high compression. For patients with systemic organ disorders, such as congestive heart failure or kidney failure, the main challenge is peripheral oedema; here, compression must be considered more cautiously. Note these individuals may not have a high BMI, but may have heavy, swollen limb(s).

*Table 3* includes some of the challenges and potential solutions to managing people with high BMI. Some of the solutions may be appropriate for people with VLUs who do not have a high BMI.

## Very tall people

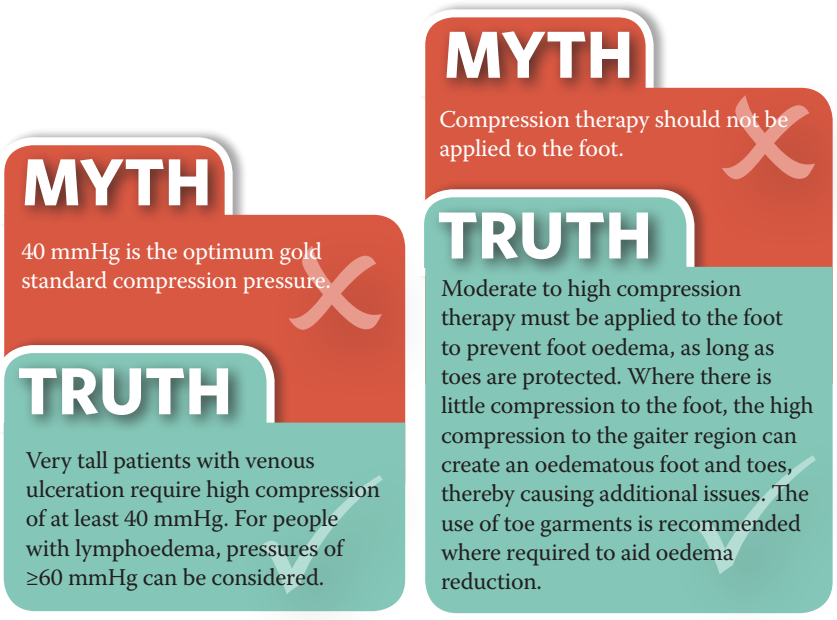
Very tall people (defined as over 6 foot/182 cm) can pose a challenge for venous ulceration management as they often have higher hydrostatic pressure, which can make achieving effective compression difficult (Hopkins et al, 2017). For very tall patients, the aim is to combat a higher hydrostatic pressure with a higher sub-bandage pressure. This can be achieved with high compression, i.e. at least 40 mmHg. A compression kit (which may need to be custom fit) or longer bandage may be needed if the length between ankle to knee is longer than average. Advanced bandaging techniques, including padding and shaping, may be required to build up the calf muscle.

## Patients with abnormal shaped limb

For patients with abnormal shaped limb or very slim legs, advanced bandaging techniques may be used to normalise limb shape (Coull, 2002). Alternative forms of compression, such as compression wraps, may be useful. For very slim legs, the leg shape may have to be reconstructed with additional pads made from sub-bandage padding and stockinette.

## Patients with VLUs in challenging anatomical locations

VLUs in unusual anatomical locations, e.g. retromalleolar ulcers, ulcers in skin folds, and dorsum of the foot or toes, can be a challenge to provide appropriate focussed compression (Hopkins et al, 2013). The protection of skin folds to avoid fungal infections can be a management and healing challenge. These patients require high compression on the foot and toes, for which advanced compression techniques may be required.



| Table 3. Challenges and potential solutions to managing people with a high BMI. | |
|---|---|
| **Challenges** | **Potential solutions** |
| Lymphovenous disease | ■ Specialist bandaging techniques using inelastic compression may be required, to accommodate unusual limb shape or to treat toe swelling.<br>■ Refer to lymphoedema service if available, and the skills/competencies are not availably locally.<br>■ Skin care should be a priority because of increased risk of infection. |
| **Assessment challenges** | |
| Difficult to obtain an ABPI, e.g. procedural challenges | ■ See solutions for "Unable to obtain an ABPI" (*Table 1*, page 8).<br>■ Obtain appropriately sized equipment cuff and probe.<br>■ A non-formulary or non-catalogue item may be required.<br>■ For complex oedema, consider assessing thigh or toe pressures and refer to lymphoedema service. |
| Manual handling challenges | ■ Risk assessment and consider necessary additional equipment, e.g. hoist. |
| Differentiating skin changes | ■ Inspect skin and record changes and previous history.<br>■ Consider an individualised skin care plan as a preventative measure.<br>■ Refer to dermatology as appropriate. |
| **Management challenges** | |
| Atypical VLU location, e.g. posterior lower leg | ■ Implement additional strapping, offload and redistribute pressure. |
| Increased risk of pressure ulcers | ■ Appropriate risk assessment and pressure relief, it is vital to offload to prevent pressure ulcer on heel. |
| Reduced patient mobility | ■ Provide appropriate activities, activity diaries, mobility equipment to facilitate increased activity, such as exercise bands.<br>■ Gait analysis and referral.<br>■ Refer to services as per local policy, e.g. healthy lifestyle, weight management, occupational therapy, physiotherapy. |
| Challenge achieving effective therapeutic compression, e.g. in application, due to abnormal shaped limbs | ■ Consider adapted other compression systems:<br>  ■ Type.<br>  ■ Width based on ankle circumference.<br>■ Consider advanced bandaging techniques. e.g. use of padding, normalise limb shaping, tension layers.<br>■ If abnormal shape is due to lymphoedema, refer to lymphoedema service. |
| Skin folds of the leg | ■ Consider inelastic compression bandaging with additional sub-bandage padding to address skin folds.<br>■ Once distortion lessens, step down to inelastic wrap systems or flat knit hosiery. |
| Venous obstruction due to large panniculus (dense layer of fatty tissue) | ■ Encourage mobilisation to accommodate panniculus, e.g. a riser recliner chair. |
| **Healing challenges** | |
| Malnutrition | ■ Refer to dietetics, provide guidance for resources and education as per local policy. |
| Skin hygiene/inability to self-care | ■ Ensure appropriate skin hygiene protocols, provide guidance for resources and education as per local policy. |
| Increased risk of fungal infection, increased risk of cellulitis | ■ Ensure appropriate skin hygiene protocols, provide guidance for resources and education as per local policy.<br>■ Treat underlying/existing conditions e.g. tinea pedis.<br>■ Consider prophylactic antibiotics and refer to BLS and LSN recommendations (2016). |

### Patients with a VLU who also have a pressure ulcer on the heel

ABPI testing should be repeated in patients with pressure ulceration on the heel. A risk versus benefit assessment should be undertaken to assess if it is suitable to continue compression therapy, or if it has contributed to the development of the pressure ulcer.

The compression system and method of application may need to be adapted if compression can be continued. If the patient is in a compression bandage, a wrap compression system may be more appropriate, particularly if the patient is in a care setting and requires daily inspection of the skin and/or pressure ulcer. For patients in the community, compression therapy can be continued as before as the limb and pressure ulcer will be reviewed at each appointment, e.g. 2 to 3 times a week.

### People who use wheelchairs long-term

People who use wheelchairs long-term include those who have spina bifida or paralysis. This group of patients are at increased risk of pressure ulceration and may experience muscle wastage, leading to abnormal limb size and shape. Poor lymphatic return and venous congestion may be present, leading to discolouration of the legs, toes and feet and oedema that needs to be managed.

Compression can be useful to control dependency oedema in immobile patients; moderate to low forms of compression may be sufficient to maintain skin integrity. Elevation, passive exercise and frequent re-positioning should be considered based on individual patient ability.

### Patients with insensate limbs

It is important to determine whether lack of sensation is due to neuropathy, e.g. diabetes, neurological disorders, multiple sclerosis, or whether it is associated with a motor disease, such as paralysis. Neurological assessments should be part of the holistic assessment to determine the extent of lack of sensation. Sensation can be assessed by the Ipswich Touch Test (Rayman et al, 2011), a 10 g monofilament, vibration (tuning fork), neurosthesiometer or with a piece of cotton wool.

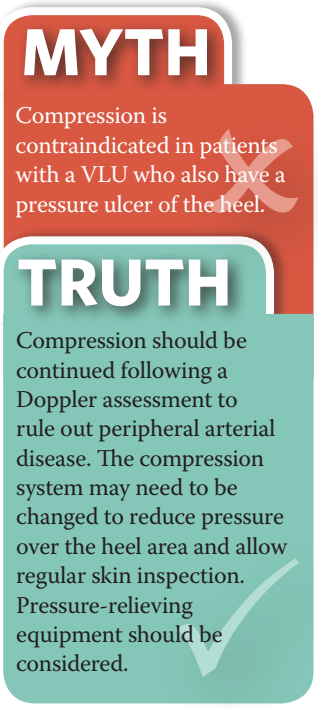
For this patient group, advanced bandaging techniques should be utilised and more regular assessments conducted. Patients with insensate limbs will be unable to feel changes in pain, which indicate improvements or deteriorations. This is an opportunity to engage the patient and provide education on how to conduct visual inspections of their lower limb.

### Patients with an active lifestyles

An active lifestyle should be promoted among people with venous disease as it promotes venous return. However, it is important to remember that occupations that involve standing for long periods of time require high compression of at least 40 mmHg. Some patients in this group may not be able to attend appointments due to work commitments so self-care, e.g. limb elevation, should be enabled and encouraged.

Different compression modalities, which may incorporate a varied compression regimen, should be considered (*Appendix 2;* Wounds UK, 2016).

This group may be particularly suitable for early surgical intervention (Gohel et al, 2018).



# SECTION 5: COMPLEXITIES: CONSENT, CAPACITY AND UNDERSTANDING

Central to maintaining patient engagement and concordance with VLU management is the development of an effective therapeutic relationship between clinician, patient, carer(s) and their family (Stanton et al, 2016). Patient consent, capacity and understanding are key to this and the patient journey through care. If possible, facilitate that the same clinician provides VLU management for a patient who may have difficulties in consent, capacity and understanding.

## Consent

For patient groups, such as those with a learning disability, cognitive decline and mental ill health, gaining informed consent can be difficult. It is essential that any material provided is in a format relevant to the patient.

It is important to remember that people have the right to make 'unwise decisions' (Mental Capacity Act, 2005). Where there is concern a patient with capacity is choosing to self-neglect and there is a risk of serious harm and/or death, all clinicians have a responsibility to consider calling a Vulnerable Adult Review Meeting under local safeguarding procedures.

Clinicians should only make patient best-interest decisions when all avenues to gain informed consent have been explored.

An individualised management plan is key, and actions and referrals may be subject to local policy. To provide continuity of care, the MDT and patients' support network should be engaged, e.g. learning disability team, community psychiatric nurse, family/carer(s), care or case worker.

In addition, longer appointments will be required to support patients with illnesses that affect information processing, such as schizophrenia and dementia.

## Capacity and understanding

Generic statements, such as 'patient lacks capacity', are poor practice and not supported by the principles of the Mental Capacity Act (Department of Health, 2005). The assessment of mental capacity is the remit of all healthcare professionals (Department of Health, 2005).

It is important to remember that mental capacity can change over time and should be re-assessed regularly. Where capacity is complex, members of the wider MDT, i.e. registered mental health nurses and clinical psychologists, may be able to assist if the patient is receptive to them.

Patients with impaired capacity or understanding may not understand the need for compression therapy and try to remove compression bandages. *Box 8* includes tips to reduce the likelihood of patients removing bandages.

**Box 8. Tips to reduce likelihood of patients removing compression bandages.**

- Finish bandage at the back of the leg.
- Normalise clothing, e.g. use thigh length/tights.
- Encourage the patient to wear trousers rather than skirts, and wear loose socks over compression bandaging.
- Use distraction techniques while applying compression.
- Apply a tubular bandage on top of bandage and tape in place.

# SECTION 6: COMPLEXITIES AND OTHER CONDITIONS

Other underlying conditions that can impact on wound complexity are described below.

## Heart failure

In the first instance to rule out heart failure, an NT-Pro BNP (brain natriuretic peptide) test can be requested (NICE, 2018a). The results will help inform the practitioner as to the likelihood of heart failure being a cause of their oedema. If patients are presenting asymptomatic of heart failure and not in the acute stage, reduced or modified compression can be applied with caution, one leg at a time (NICE, 2018b). Where heart failure is uncontrolled, extreme caution is recommended.

## Previous deep vein thrombosis

Blood clots in the deep venous system can result in damage to the valves in the veins, which will affect venous return and can lead to long-term complications, i.e. post-phlebitis limb/post-thrombotic syndrome. For patients who have a VLU and a confirmed acute deep vein thrombosis (DVT), there is often confusion whether an ABPI assessment can be performed or compression is suitable. An ABPI assessment can be performed on a patient who has confirmed DVT or who is receiving DVT treatment, having had the first dose of anticoagulation therapy (Vowden and Vowden, 2002).

Patients with unexplained or multiple DVT should be referred for investigations for thrombotic disease, i.e. thrombophilia, Factor V Leiden deficiency (Peus et al, 1997).

## Autoimmune disorders

Autoimmune diseases and vasculitis play a role in a fifth of patients with chronic lower limb ulcers (Körber et al, 2011). It is important to be aware that autoimmune disorders may prolong the inflammation phase of wound healing. In particular, people with rheumatoid arthritis may have multiple, small (0.5–2 cm) ulcers, which suggests vasculitis. This group may also be at increased risk of calciphylaxis. For these patients, seek multidisciplinary working with autoimmune specialists, such as rheumatologists.

## Haematological disorders

Leg ulcers are a common complication in sickle cell disease, affecting 2.5% of patients over 10 years of age with the condition (Koshy et al, 1989). For this group, an extended healing time of up to 6 times longer should be expected. Patients with sickle cell disease experience high levels of pain; therefore, pain should be managed appropriately so high compression can be applied (Rivolo, 2018).

Some cancer and sickle cell disease medications delay wound healing. In some circumstances, the dose can be reduced or stopped for a period to allow wound healing; however, this should be under the guidance of the oncology or haematology team. Multidisciplinary working is recommended.

For all patients with haematological and bleeding disorders, caution is required during debridement.

## Patients at risk of self-harm or harm to others

When managing patients who are at risk of self-harm or harm to others who have a VLU, it is important to be aware of the potential ligature risk with compression bandages, wraps and hosiery treatment kits. Completing a risk assessment may suggest compression therapy is not suitable.

For some patients who are at risk of self-harm, the risk is not of ligaturing but restricting blood supply to the foot by pushing their bandages or hosiery kit down the leg, a compression wrap system is a good option to consider for these patients.

## Chronic pain

Pain is, in general, inadequately controlled in people with VLUs (Briggs et al, 2012). The nature and intensity of pain should be

**MYTH**

Compression is contraindicated in patients with heart failure.

**TRUTH**

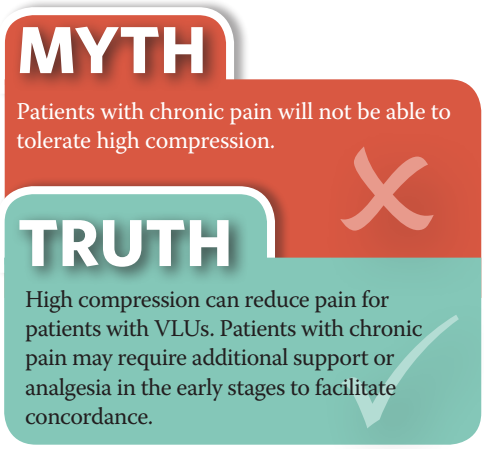
If patients are presenting asymptomatic of heart failure and not in the acute stage, reduced or modified compression can be applied with caution, one leg at a time (NICE, 2018b). Where heart failure is uncontrolled, extreme caution is recommended.

**MYTH**

A patient with DVT should not have an ABPI assessment or high compression therapy.

**TRUTH**

An ABPI assessment can be performed on a patient who has confirmed DVT and has commenced treatment, having had the first dose of anticoagulation therapy. Where appropriate, compression may be applied or continued.




monitored and documented regularly at assessment and dressing change. VLUs are very painful and compression can be hard for some patients to tolerate. Pain needs to be managed to allow compression to be applied in the early stages to allow healing progression. Compression, in time, may help pain levels to decrease, as issues such as oedema and inflammation are resolved and venous return improves (Wounds UK, 2016).

For chronic pain, it is important to use a full assessment to identify cause, nature and severity, e.g. pain toolkit (www.paintoolkit.org). Patients who find compression painful require assessment of the compression type and application technique. Analgesics should be prescribed. For underlying disease- and wound-related pain, analgesia support may be appropriate. For chronic pain, consider liaising with pain team.

## People who inject drugs into the lower limb

People who have a history of injecting substances in the lower veins whether illicit or not are at high risk of developing complications in the legs. Repeated injecting into the lower limb veins results in chronic venous insufficiency (CVI). CVI can present as varicose veins, leg swelling or oedema, heaviness of the legs and/or ulceration (Fiddes et al, 2010). CVI persists in people who inject drugs (PWIDs) even after injecting ceases and ulceration may occur at any time, again, even after prolonged periods free from injecting (Pieper et al, 2009).

For this patient group, prevention of leg ulceration is key. With consent, patients with any history of injecting should have their legs and feet regularly checked for the early signs of oedema, venous hemosiderin staining, venous eczema and ulceration. Unless there are significant arterial risk factors that reflect the ABPI reading, the majority of patients in this group can tolerate and should have high compression therapy, at least 40 mmHg. Harm reduction and working closely with the MDT and key workers, i.e. relevant mental health, substance misuse and homeless teams, is vital. *Box 9* includes advice for working with people who inject drugs.

**Box 9. Advice for working with people who inject drugs .**

- It may be helpful to ring and remind patients or their social worker of the upcoming appointments either the day before or morning of.
- For some people, particularly those who may be experiencing homelessness, realistic options of dressings and compression to suit footwear and clothing may be required.
- Avoid negative discussions in terms of "blame" in regard to non-attendances at clinic, dressing removal and potential deviant behaviour.
- Maintain positivity, reassure the patient and continue treatment as planned.

# SECTION 7: PROMOTING CONTINUITY OF CARE AND SELF-CARE

In the recently launched NHS Long Term Plan (2019), prevention and proactive working are priorities to keep patients well for longer. Leading from the *NHS Five Year Forward View* (NHS England, 2014), patient empowerment and involvement are key to this plan. Patients who feel empowered with their care are more likely to adhere to treatment (Moore, 2016). Some patients with complex VLUs or complexities that make assessment, management and healing difficult are competent to self-care but require tools to do so.

Many issues that increase complexity in wound care are due to patient lifestyle choices, and enabling self-care can be difficult. Suitable patients should be encouraged to take ownership of their health. A good patient–clinician relationship enables provision of consistent delivery of care as the patient moves through services. This may be achieved using digital or print patient support, e.g. patient passport (*Box 10*) and patient contracts.

Telecommunication technology has the potential to improve patient care and reduce healthcare costs (Gray et al, 2010; van Houwelingen et al, 2016). Digital support, such as telephoning, emailing and video calling, may be appropriate for some patients who require advice or for monitoring. Telecommunication technology can be particularly useful when the patient is in a remote location or has difficulty travelling, perhaps due to immobility or lack of transport (Santamaria and Kapp, 2013).

*Box 11* includes a checklist when considering self-care solutions for patients with venous ulceration.

Monitoring quality of life with a recognised tool, e.g. Quality of Life Wound Checklist (Green et al, 2018), can be helpful to gauge how patients are coping with their wound and how this may impact on self-care.

## Continuity of care and treatment

Continuity of care with consistent messaging is a key component to best practice and may help to develop a strong therapeutic patient–clinician relationship. While the patient's care plan should be the responsibility of a named clinician, the patient may move between services. When the MDT is involved, it is helpful for everyone's roles and responsibilities to be clearly communicated and the patients treatment plan agreed according to local policy.

**Box 10. Patient passports.**

Patient passports include the prescribed treatments and can be used for transferring information between services. They may be useful to engage self-care and encourage patient ownership for suitable patients. They can also be used as a safety tool during self-care, with a list of red flags.

**Box 11. Checklist when considering self-care solutions for patients with venous ulceration (Wounds UK, 2015).**

- Self-care should be encouraged in suitable patients, not forced.
- Patients must be willing and able to be involved, depending on skill level, mobility and dexterity.
- Patients should be prescribed a compression system that fits both their clinical and personal needs.
- Family and carer involvement should also be taken into account.
- Flexible healthcare solutions may be required, e.g. different levels of compression.
- Patients should be provided with information and red flags for when to seek medical help.

# SECTION 8: RECURRENCE AND PREVENTION

Every effort should be made to prevent ulceration and reulceration in patients with complexities in assessment, management and healing. For all VLUs, once healed, skin maintenance and prevention of recurrence is vital. The factors of complexity may remain, even if the wound has healed, so closer monitoring than usual may be required for these patients.

When wound care no longer requires specialist input, the patient can be referred back to the leg ulcer treatment pathway (Atkin and Tickle, 2016; *Figure 1*). These patients will require ongoing maintenance, such as compression therapy. A step up/step down approach of compression modalities may be appropriate to facilitate concordance, but it is important to maintain the therapeutic level of compression to reduce reulceration risk.

Utilise advanced compression techniques that are simple and practical for patients to use on an ongoing daily basis (Wounds UK, 2015), such as flexible hosiery and compression systems. Consideration should be given to how the patient will apply and remove compression systems independently.

Once healed, patients should be reviewed at 3, 6 or 12 months depending on need and risk of recurrence. It is important to monitor how the patient is coping with the maintenance phase of treatment and to re-prescribe or re-supply compression therapy when required. Education for patients, carers or family is critical to maximise the life and effectiveness of a garment until the next prescription (Wounds UK, 2015). Patients should also be educated on keeping vigilant for any signs or red flags that require clinician attention, e.g. trauma or changes to the lower leg, and concerns about DVT or oedema (Wounds UK, 2016).

Along with a focus on compression maintenance, the importance of ongoing holistic care should not be ignored. As such, a simple skin-care regimen, along with exercises, where suitable, will help to maintain skin integrity and prevent recurrence.

### Surgical correction

The ESCHAR study demonstrated that varicose vein surgery reduced the risk of recurrence from 28% to 12% (Barwell et al, 2004). Minimally invasive vein procedures are undertaken as a day case under local anesthetic. All patients with a VLU that has healed in compression should be assessed for suitability of corrective venous surgery to reduce the risk of recurrence (NICE, 2013).

**MYTH**

Once healed, patients with venous ulceration no longer require specialist support.

**TRUTH**

Once healed, patients with additional complexities may require specific bespoke devices to maintain intact skin as part of a self-care regimen. Ongoing maintenance and monitoring may be required depending on need and risk of recurrence.

**MYTH**

Venous hypertension is always repairable by endovascular intervention.

**TRUTH**

All patients should be assessed for suitability for endovascular intervention, such as venous duplex scanning. However, venous hypertension may be as a result of functional failure of the calf muscle pump, rather than venous system incompetence; therefore, surgery would not be appropriate for these patients. Endovascular intervention is highly appropriate for structural superficial venous incompetence; intervention for deep venous incompetence technically requires consideration.

# GLOSSARY

### Adherence
The degree to which patients follow the instructions they are given for prescribed treatments (Bissonnette, 2008). The term is preferred compared to compliance.

### Advanced compression techniques
Advanced compression techniques may include chevron strapping or changing from spiral to figure-of-eight method to alter pressure (Coull, 2002). A figure-of-eight method may be more appropriate with additional strapping to enable focused compression (*Figure b*). It may also include use of additional padding to protect the toes (*Figures c&d*), shape the leg and to manage retromalleolar ulcers. Advanced compression techniques should be completed by clinicians who are competent in assessment for appropriateness and application of these techniques.

### Biofilm
Classic definitions often describe biofilms as bacteria attached to surfaces, encapsulated in a self-produced extracellular matrix and tolerant to antimicrobial agents (this includes antibiotics and antimicrobials) (World Union of Wound Healing Societies, 2016). They are estimated to be present in up to 100% of wounds. Biofilms are not visible to the naked eye and can only be decisively diagnosed by biopsy.

### Calciphylaxis
Build-up of calcium and phosphate causing narrowing of small blood vessels. It is diagnosed by tissue biopsy or X-ray. Presents as mottled skin (retiform purpura), purple blood blisters, nodules, skin necrosis and ulcers with a violaceous edge (Young, 2018). Calciphylaxis can also result in hard, calcium deposits in the wound bed.

### Cellulitis (erysipelas or lymphangitis)
An acute, spreading inflammation of the skin and subcutaneous tissues characterised by pain, warmth, swelling and erythema (BLS and LSN, 2017).

*Advanced compression techniques:*
*(a): Retromalleolar ulcer position.*
*(b): Chevron strapping applying focused compression suitable for retromalleolar ulcers.*
*(c): Toe bandaging*
*(d): Toe bandaging with padding. Extra padding may be required for protection to reduce the risk of trauma for patients who have neuropathy.*
*Photos a,b & d, courtesy of Karen Staines. Photo c, courtesy of L&R.*

*Wound with calciphylaxis.*
*Courtesy of Sarah Gardner.*

**Chronic venous insufficiency (CVI)**
Venous wall and valves in the leg are ineffective, so blood pools in the legs. May be caused by high blood pressure in the leg veins, lack of exercise or smoking.

**Compliance**
The degree to which patient behaviour matches a healthcare provider's advice. The term is no longer used as it is considered to come from a punitive viewpoint (Horne et al, 2005). The term adherence is preferred.

**Concordance**
The degree to which the relationship and treatment regimen decision-making between patient and provider results in the desired treatment outcomes. The term is preferred because it emphasises the factors that affect patients' choices (Horne et al, 2005).

**Critical limb ischaemia (CLI)**
Severe form of peripheral arterial disease, which leads to tissue loss or arterial rest pain due to markedly reduced blood flow. CLI can lead to amputation if left untreated.

**Hydrostatic pressure**
The pressure produced by fluid in the capillaries or tissues. For example, increased capillary hydrostatic pressure due to hypertension or venous stasis will increase filtration of fluid out of the capillary.

**Osteomyelitis**
Bacterial infection of the bone. Patients are at increased risk of osteomyelitis if ulcer located over bony prominence or if bone exposed. Symptoms include fever, disproportionate pain, local malodour, non-healing sinus and oedema around wound, especially in digits. Can be resolved with early use of antibiotics.

**Pyoderma gangrenosum (PG)**
Rare skin condition that causes painful ulcers. The cause is unknown, but is likely a disorder of the immune system. PG is not related to gangrene. The condition is usually treatable but can take some time to heal and may leave some scarring.

**Sepsis**
Serious complication of an infection. Without rapid and aggressive treatment, sepsis can lead to multiple organ failure and death.

**Sub-bandage interface pressure**
Sub-bandage interface pressure is measured between the compression therapy system and the skin, and is used as a proxy for the pressure within the leg (Harding et al, 2015).

**Venous leg ulcer**
An open skin lesion that usually occurs on the medial side of the lower leg between the ankle and the knee as a result of chronic venous insufficiency (CVI) and ambulatory venous hypertension, and that shows little progress towards healing within 4–6 weeks of initial occurrence (Harding et al, 2015).

# APPENDIX 1

| Table A: Investigative tools for arterial assessment (Wounds UK, 2016) | |
|---|---|
| **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 ($TcPO_2$) | Local non-invasive measurement to assess the amount of oxygen that has diffused from the capillaries into the epidermis. Provides useful information used 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: used 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) | |
|---|---|
| **Investigation** | **Purpose** |
| Venous Duplex | Non-invasive ultrasound scan of the veins. Duplex scans capture two elements of information: used to assess the visual structure of the veins and also to assess blood flow within the veins 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. |

# APPENDIX 2

**Table C: Details of the different compression systems available (Wounds UK, 2016)**

| Compression system | Evidence | Advantages | Disadvantages | Patient perspective |
|---|---|---|---|---|
| Compression hosiery kits (first-line treatment where possible) | ■ Multi-centre randomised controlled trial included 457 patients.<br>■ Proven to be as effective as multi-component bandaging in healing venous ulceration.<br>■ 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.<br>■ Delivers known and consistent compression levels.<br>■ Allows for patient self-care.<br>■ Cost-effective.<br>■ Delivers compression to the foot.<br>■ Some kits have zips to ease compression and some can be custom fit. | ■ Not suitable for unusual limb profiles.<br>■ Not suitable for rapidly decreasing limb sizes.<br>■ Exudate needs to be maintained within dressings. | ■ Low profile – no limits to footwear/ clothing.<br>■ Allows self-care/ family care. |
| Compression wraps | ■ Over 65 articles published, no randomised controlled trial relating to venous ulcer healing.<br>■ Small (28 patient) comparative study showed faster healing compared to Unna Boot (DePalma et al, 1999). | ■ Compression value adjustable – value dependent on application technique. Allows for easy adjustment as limb volume decreases.<br>■ Facilitates self care.<br>■ Delivers compression to the foot only if foot piece supplied. | ■ Not practical if ulcer is highly exuding. | ■ Low profile – minimal impact on footwear/ clothing.<br>■ Allows self-care/ family care.<br>■ Can be adjusted to adapt to limb circumference changes and improve comfort. |
| Compression bandages | ■ Meta-analysis of many trials including randomised controlled trials, 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.<br>■ Suitable for most limb shapes/ sizes. Inelastic compression bandages can facilitate volume reduction/reshaping.<br>■ High-stiffness systems (e.g. inelastic bandages) produce the greatest improvements in venous blood flow (Harding et al, 2015).<br>■ Good for high levels of exudate/ lymphorrhoea. | ■ Compression value dependent on application technique – high level of skill required to apply.<br>■ Some bandage systems do not involve compression from the foot upwards to prevent pooling of oedema in the foot and toes, impacting on mobility and potentially delaying healing of wounds around the malleolous. | ■ Can be bulky – may limit footwear and clothing.<br>■ Does not facilitate self-care. |

# REFERENCES


Atkin L, Tickle J (2016) A new pathway for lower limb ulceration. *Wounds UK* 12(2): 32–6

Atkin L, Tickle J (2018) Best practice statement leg ulceration pathway: revision required to reflect new evidence. *Wounds UK* 14(4): 58–62

Barwell JR, Davies CE, Deacon J et al (2004) Comparison of surgery and compression with compression alone in chronic venous ulceration (ESCHAR study): randomised controlled trial. *Lancet* 363: 1854–9

Beitz J (2017) Pharmacologic Impact (aka "Breaking Bad") of Medications on Wound Healing and Wound Development: A Literature-based Overview. *Ostomy Wound Management* 63(3):18–35

Bissonnette JM (2008) Adherence: a concept analysis. *J Adv Nurs* 63(6): 634–43

Briggs M, Nelson EA, Martyn-St James M (2012) Topical agents or dressings for pain in venous leg ulcers. *Cochrane Database Syst Rev* 11:CD001177

British Lymphology Society (2018) *POSITION PAPER FOR ANKLE BRACHIAL PRESSURE INDEX (ABPI). Informing decision making prior to the application of compression therapy.* BLS. Available at: https://thebls.com/public/uploads/documents/document-20621539855354.pdf (accessed 21.01.19)

British Lymphology Society and Lymphoedema Support Network (2016) *Consensus document on the management of cellulitis in lymphoedema.* BLS and LSN. Available at: http://www.thebls.com/the-bls/professional-and-patients/cellulitis-inlymphoedema (accessed 06.01.18)

Chapman S (2017) Venous leg ulcers: An evidence review. *Br J Community Nurs* 22(9)

Coleman S, Nelson EA, Vowden P et al (2017) Development of a generic wound care assessment minimum data set. *J Tissue Viability* 26(4): 226–40

Coull A (2002) Bandages and bandaging techniques for compression therapy. *Br J Comm Nurs* 7(3): 134–42

Department of Health (2005) *The Mental Capacity Act 2005*. London: HMSO

Elwell R (2014) Developing a nurse-led integrated 'red legs' service. *Br J Community Nurs* 19(1 Suppl): 12–9

European Wound Management Association (2004) *Wound bed preparation in practice*. London: MEP Ltd. Available at: www.woundsinternational.com

European Wound Management Association (2008) *Position Document: Hard-to-heal wounds: a holistic approach.* London: MEP Ltd. Available at: www.woundsinternational.com

Fiddes R, Khattab M, Abu Dakka M et al (2010) Patterns and management of vascular injuries in intravenous drug users: a literature review. *Surg* 8: 353–61

Gardner-Thorpe J, Love N, Wrightson J et al (2006) The value of Modified Early Warning Score (MEWS) in surgical in-patients: a prospective observational study. *Ann R Coll Surg Engl* 88(6): 571–75

Gohel MS, Heatley F, Liu X et al (2018) A randomized trial of early endovenous ablation in venous ulceration. *N Engl J Med* 378(22): 2105–14

Gray LC, Armfield NR, Smith AC (2010) Telemedicine for wound care: current practice and future potential. *Wound Practice Res* 18(4): 158–63

Green J, Corcoran P, Green L, Read S (2018) A new quality of life wound checklist: the patient voice in wound care. *Wounds UK* 14(4): 40-5

Guest JF, Ayoub N, McIlwraith T et al (2015) Health economic burden that wounds impose on the National Health Service in the UK. *BMJ Open* 5(12): e009283

Guest JF, Fuller GW, Vowden P (2017) Venous leg ulcer management in clinical practice in the UK: costs and outcomes. *Int Wound J* 15(1): 29–37

Guest JF, Fuller GW, Vowden P (2018) Venous leg ulcer management in clinical practice in the UK: costs and outcomes. *Int Wound J* 15(1):29–37

Gulliford M, Naithani S, Morgan M (2006) What is 'continuity of care'? *J Health Serv Res Policy* 11(4): 248–50

Hall K, Gibbie T, Lubman DI (2012) Motivational interviewing techniques Facilitating behaviour change in the general practice setting. *Australian Family Physician* 41(9)

Harding KG (2006) Trends in wound care – the development of a specialty. *Int Wound J* 3:147

Harding K, Dowsett C, Fias L et al (2015) *Simplifying venous leg ulcer management. Consensus recommendations*. London: Wounds International. Available to download from www.woundsinternational.com

Hopkins A, Worboys F, Partsch H (2013) Using strapping to increase local pressure. *Veins Lymphatics* 2(12): 37–8

Hopkins A, Bull R, Worboys F (2017) Needing more: the case for extra high compression in the UK. *Veins and Lymphatics* 6(6630): 16–9

Horne R, Weinman J, Barber N et al (2005) *Concordance, adherence and compliance in medicine taking.* London: National Co-ordinating Centre for NHS Service Delivery and Organisation R & D (NCCSDO)

International Wound Infection Institute (IWII) Wound infection in clinical practice. *Wounds Internationa*l 2016. Available at: https://www.woundsinternational.com/resources/details/iwii-wound-infection-clinical-practice (accessed 12.04.19)

Jull AB, Arroll B, Parag V, Waters J (2012) Pentoxifylline for treating venous leg ulcers. *Cochrane Database Syst Rev* 12: CD001733

Kjaer ML, Sorensen LT, Karlsmark T et al (2005) Evaluation of the quality of venous leg ulcer care given

# REFERENCES


in a multi disciplinary specialist centre. *J Wound Care* 14: 145–50

Körber A, Klode J, Al-Benna S et al (2011) Etiology of chronic leg ulcers in 31, 619 patients in Germany analyzed by an expert survey. *J Dtsch Dermatol Ges* 9(2):116–21

Koshy M, Entsuah R, Koranda A et al (1989) Leg ulcers in patients with sickle cell disease. *Blood* 74(4):1403-8

Mandal A (2006) The concept of concordance and its relation to leg ulcer management. *J Wound Care* 18(8): 339–41

Mental Health Act (2007) The Stationary Office, London

Moore Z (2016) Patient empowerment in wound management. *Wounds Essentials* 11(1): 32–5

Mullings J (2018) *MESI ABPI Made Easy*. London: Wounds UK. Available at: www.wounds-uk.com/made-easy (accessed 23.01.19)

NHS England (2014) *NHS Five Year Forward View*. Available at: https://www.england.nhs.uk/publication/nhs-five-year-forward-view (accessed 22.01.19)

NHS England (2017) *NHS RightCare scenario: The Variation Between Sub-Optimal and Optimal Pathways*. NHS England. Available at: https://bit.ly/2tjMhKF (accessed 21.02.19)

NHS Long Term Plan (2019) *NHS Long Term Plan*. Available at: www.longtermplan.nhs.uk (accessed 22.01.19)

National Institute for Health and Clinical Excellence (2013) *Varicose veins: Diagnosis and management (clinical guideline)*. London: NICE. Available at: https://www.nice.org.uk/guidance/cg168 (accessed 13.12.2018)

National Institute for Health and Clinical Excellence (2017) *Sepsis: recognition, diagnosis and early management*. London: NICE. Available at: https://https://www.nice.org.uk/Guidance/NG51 (accessed 13.12.2018)

National Institute for Health and Clinical Excellence (2018a) *Managing intermittent claudication in people with peripheral arterial disease*. London: NICE. Available at: https://pathways.nice.org.uk/pathways/lower-limb-peripheral-arterial-disease (accessed 22.01.19)

National Institute for Health and Clinical Excellence (2018b) *Chronic heart failure in adults: diagnosis and management*. London: NICE. Available at: www.nice.org.uk/ng106 (accessed 04.04.19)

Peus D, Heit JA, Pittelkow MR (1997) Activated protein C resistance caused by factor V gene mutation: common coagulation defect in chronic venous leg ulcers? *J Amer Acad Dermatol* 36: 616–20

Pieper B, Templin TN, Kirsner RS, Birk TJ (2009) Impact of injection drug use on distribution and severity of chronic venous disorders. *Wound Repair Regen* 17(4): 485–91

Rayman G, Vas PR, Baker N et al (2011) The Ipswich Touch Test. *Diabetes Care* 34(7): 1517–8

Rivolo M (2018) SICKLE as a holistic treatment approach to sickle cell disease related ulcers. *Br J Nursing* (27): 20

Rix H, Bull R (2017) *Nicorandil and the effects on leg ulceration: Is there a link?* Poster presented at: Tissue Viability Society Conference, Warwickshire, 5–6 April 2017

Santamaria N, Kapp S (2013) TeleWound care – providing remote wound assessment and treatment in home care setting: current status and future directions. *Smart Homecare Technol TeleHealth* 1: 35–41

Scottish Intercollegiate Guidelines Network (2010) *Management of chronic venous leg ulcers: A national clinical guideline 120*. London: SIGN. Available at: http://www. sign.ac.uk/pdf/sign120.pdf (accessed 12.01.2019)

Stanton J, Hickman A, Rouncivell D et al (2016) Promoting patient concordance to support rapid leg ulcer healing. *J Community Nurs* 30(6): 28–35

van Houwelingen CTM, Moerman AH, Ettema RGA et al (2016) Competencies required for nursing telehealth activities: a Delph-study. *Nurs Educ Today* 39: 50–62

Vowden P, Vowden KR (2002) ABPI Dopplers and DVT. *J Wound Care* 11(2):56

Vowden K (2005) Complex wound or complex patient? Strategies for treatment. *Br J Commun Nurs* Suppl: S6, S8, S10

World Union of Wound Healing Societies (WUWHS) (2016) *Florence Congress, Position Document. Management of Biofilm*. London: Wounds International. Available at: www.woundsinternational.com

Wounds UK (2015) *Best Practice Statement: Compression Hosiery (2nd edition)*. London: Wounds UK. Available at: https://www.wounds-uk.com/resources/details/compression-hosiery-second-edition (accessed 25.02.19)

Wounds UK (2016) *Best Practice Statement: Holistic management of venous leg ulceration*. London: Wounds UK. Available at: https://bit.ly/2u3VSUT (accessed 26.11.18)

Wounds UK (2017) *Quick Guide: Times Model of wound bed preparation*. London: Wounds UK. Available at: https://www.wounds-uk.com/resources/details/quick-guide-times-model-of-wound-bed-preparation (accessed 12.04.19)

Wounds UK (2018) *Best Practice Statement: Improving holistic assessment of chronic wounds*. London: Wounds UK. Available at: https://www.wounds-uk.com/resources/details/best-practice-statement-improving-holistic-assessment-chronic-wounds (accessed 13.02.19)

Young T (2018) Understanding calcinosis and calciphylaxis. *Wounds UK* 14(3): 40–5

Wounds UK