Understanding compression: part 2 — holistic assessment and clinical decision-making in leg ulcer management

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Holistic assessment and accurate diagnosis are the first steps in the clinical decision-making process in leg ulcer management and should be undertaken by a suitably experienced nurse who is competent in wound and limb management (National Institute for Health and Care Excellence [NICE], 2015; Atkin and Tickle, 2016). Holistic assessment should identify the causes of the leg ulcer, incorporating a whole-person approach to discover what the patient regards as important in terms of their care. This approach fits with NHS England’s ‘Leading Change, Adding Value’ framework (NHS England 2016, 2018), which strongly encourages partnership working with patients and asking the question: ‘What matters to you?’. Holistic assessment is essential when planning care with the patient to achieve successful management of the lower limb.

Holistic assessment should be completed in all patients who have a break in the skin of the lower limb between the foot and the knee if the wound has not healed within two weeks (NICE, 2015). This can be undertaken in three stages, as discussed by the Scottish Intercollegiate Guidelines Network (SIGN, 2010):
- Assess the patient
- Assess the leg
- Assess the ulcer.

This framework has been used as a foundation for the assessment pathway outlined within this article. However, first the authors explore the importance of appropriate early intervention and shared decision-making.

EARLY INTERVENTION

It has been suggested that people in the UK who have experienced loss of skin below the knee on the leg or foot are currently waiting longer than two weeks for a holistic leg assessment and ankle brachial pressure index (ABPI) measurement (Guest et al, 2017). In the authors’ clinical experience, during this two-week wait patients are often managed using wool and crepe bandages and, while they wait for a full assessment, including ABPI measurement, there is a significant risk of wound deterioration. ABPI readings can exclude arterial disease, meaning that any lower limb symptoms may be due to venous disease, which, in turn, indicates the use of compression therapy (see below for a full explanation of ABPI).

According to Guest et al (2017), it is quite possible that only 16% of patients who have a lower limb ulcer receive ABPI assessment, which could mean that many patients are sustaining significant harm while healthcare professionals attempt to identify the appropriate treatment. Without ABPI assessment and the provision of appropriate compression therapy, lower limb ulcers will not heal and may even deteriorate. There is emerging evidence that, in some patients, rather than waiting for ABPI measurement, a light compression of up to 17mmHg should be applied until an ABPI measurement is available, which could prevent deterioration of the wound (Wounds UK, 2015). To be considered for this form of early intervention, patients would require a diagnosis, intact sensation of the lower limb, absence of signs of critical ischaemia and a normal limb shape. Similarly, one best practice statement recommended that all patients who...
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present with lower limb wounds, for example, a pre-tibial laceration, may be suitable for immediate light compression (Wounds UK, 2016). In practice, this means that, in appropriate patients, British Class 1 standard hosiery stockings could be provided without a full vascular assessment, providing that a full assessment was undertaken at the two-week point if the wound had not healed. Any intervention of this type should always be carried out at the practitioner’s discretion. Many patients, however, would be excluded due to multiple comorbidities such as diabetes and heart failure until after a full assessment has been undertaken.

SHARED DECISION-MAKING

Shared decision-making between the nurse and patient is vital for effective leg ulcer management, and adopting a ‘what matters to you’ approach is recommended as an important method of ensuring that patients remain at the centre of care (NHS England, 2016). NICE (2018) states that when a nurse and patient work together to design and agree a treatment plan, the outcome is usually more successful in terms of concordance and effectiveness than if the nurse dictates the treatment. This concept is particularly important within the field of leg ulcer management, where ongoing care is required for a lifelong condition. Subsequently, the relationship between nurse and patient may extend over a long period of time and so mutual trust and respect is vital (Green et al, 2017).

Concordance with compression therapy is fundamental to the successful healing of venous leg ulcers. However, the discomfort which may be experienced by wearing compression therapy or issues with application can make concordance difficult. Stanton et al (2016) proposed that concordance can be achieved by ensuring that the patient is central to any decision-making or planning that effects their care. In practical terms, this might mean patients being involved in decisions about treatment options, for example whether to choose multilayer bandage systems, hosiery or wraps (Stanton et al, 2016). Jin et al (2008) stated that factors which affect concordance with treatment frequently include the patient’s knowledge of their condition, their health literacy (for example, their understanding of the implications if they choose not to concord with their treatment plan), and whether they believe that the therapy will be beneficial. Therefore, patient education is a key element in concordance and should not be overlooked by nurses.

For nurses themselves, balancing their professional judgment and expertise with the needs and wishes of patients receiving care is the first principle of shared decision-making (NICE, 2018).

ASSESSMENT PROCESS

Assess the whole person

As discussed previously in this series, it is important to remember that lower limb ulceration is a symptom of the patient’s underlying pathophysiology (Ritchie and Warwick, 2018). Therefore, undertaking a full clinical history is vital to developing a diagnosis of the causal problem and ruling out any differential diagnoses (Neighbour, 2005). Gathering information about potential comorbidities, such as diabetes mellitus, rheumatoid arthritis, and peripheral arterial disease (PAD) is important in making an assessment of the patient’s overall health and suitability for compression therapy (SIGN, 2010). Mobility, nutrition, hydration, smoking status and body mass index (BMI) are also important and can contribute to the development of a leg ulcer. These factors may also affect how quickly the patient heals and their susceptibility to infection, both of which will affect the choice of treatment options open to them (Wounds UK, 2013).

Taking an ABPI measurement forms part of comprehensive holistic assessment and assists the nurse in identifying or excluding the presence of arterial disease by assessing if the limb has sufficient arterial blood supply. This contributes to the overall clinical picture, which assists in making a safe decision about the underlying pathophysiology (Vowden and Vowden, 2001). ABPI does not test for venous disease; however, if significant arterial disease is excluded by ABPI, it is assumed that the presenting complications are due to either venous disease or a mixed aetiology (a combination of venous and arterial disease). ABPI provides a comparison between the highest ankle systolic pressure in each leg and the central systolic pressure as indicated by the higher of the two brachial (upper arm) pressures. It is calculated using the equation below:

\[ \text{ABPI} = \frac{\text{highest ankle systolic pressure}}{\text{highest brachial systolic pressure}} \]

This calculation is then used to assist the nurse in identifying the underlying aetiology and preparing a treatment plan, as seen in Table 1.

Timely ABPI measurement is crucial in diagnosis of the underlying pathophysiology of the leg ulcer. A delay in ascertaining ABPI may lead to a delay in implementing optimal treatment. If the nurse can accurately diagnose and begin treatment as soon as possible, they can prevent...
Atkin and Critchley (2017) reported service improvements through implementing the Best Practice Statement leg ulcer treatment pathway.

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leg ulcers becoming chronic, thus reducing the quantity of wound care products used and nursing time spent managing the ulcer, as well as minimising the human cost associated with leg ulcers (European Wound Management Association [EWMA], 2017a).

In the presence of venous disease or a mixed aetiology, the patient is suitable for compression therapy; the level of which will be indicated by the ABPI score (Table 1) and holistic assessment (Vowden and Vowden, 2001). Normally in the UK, clinical practice guidelines state that patients diagnosed with a mixed aetiology ulcer can receive reduced compression therapy. However, this must be applied under the direction of a specialist and the patient may need more investigations before further compression can safely be instigated (Harding et al, 2015). For those identified as having a venous leg ulcer, compression therapy is usually a suitable option (EWMA, 2017b).

Since the 1990s, when it was agreed that palpation of the ankle pulses alone was not sufficient to exclude arterial disease (Moffatt and O’Hare, 1995), hand-held portable ABPI machines have been regarded as best practice. However, measuring ABPI using a hand-held machine can be hindered by the time required to undertake the procedure and the skill levels and experience of the operator. The Five Year Forward View (NHS England, 2014) acknowledged that technological advances are important in improving patient care, and that healthcare services should take this into account. In terms of leg ulcer management, this can be interpreted in practice to mean that clinicians and service providers should keep abreast of developments in technology and ensure that staff are educated to use new equipment so that current and high quality care is offered. To provide high-quality interventions and to maintain patient safety, it is imperative that all investigations are undertaken using equipment that is effective and safe.

Recent clinical practice has seen the emergence of automated systems, which calculate ABPI as well as pulse volume waveform, which is useful as a second-level assessment for suspected peripheral arterial disease (Huntleigh, 2015). As well as improving patient’s access to care by reducing the time it takes to acquire their ABPI (Beldon, 2011), this technology potentially reduces nurses’ workload as taking ABPI can be delegated to non-registered staff as the training required is minimal. However, this technology is still new to the market and due to budgetary constraints portable ABPI measurement systems are still the main product used in the NHS.

**Assess the leg**

A visual assessment of both lower limbs is important in identifying the cause of any ulceration as well as informing clinical decisions about which type of compression therapy is suitable. In addition, assessing the mobility of the limb and the general condition of skin are important factors, which will be discussed in more detail later in this series.

The shape and size of the patient’s limb, and the presence or absence of oedema, are important factors in assessing the lower limb and require a thorough review by the nurse. Compression therapy should aim to reduce oedema and restore normal limb shape as far as possible (Brown, 2017). Patients with long-term oedema which has not been managed can be challenging to treat due to changes in the subcutaneous tissue of the leg, such as lipodermatosclerosis — a hardening and thickening of the tissue (Brown, 2017). In addition, nurses should consider any abnormal limb shapes when planning treatment, as this may affect the patient’s suitability for certain compression therapy systems, such as two-layer hosiery. Patients with very large limbs which have been distorted by oedema or who have deep skin folds on their legs should be initially excluded from hosiery until the oedema is reduced and a more normal limb shape has been regained (Wounds UK, 2016).

Limb size is important when considering the use of compression bandages (Stephen-Haynes, 2009). The patient’s ankle circumference should be measured to ensure the correct bandaging technique and size and quantity of bandages are used. In addition, with both inelastic (Stephen-Haynes, 2009) and elastic bandages (Moffatt, 2005), a woollen bandage layer should be used to protect and shape the leg before compression bandages are applied.

Further pathophysiological indicators of venous disease that are important for the nurse to be aware of include varicose veins, itching at the site of varices (dilated blood vessels), hyperpigmentation or venous staining of the skin, atrophie blanche, lipodermatosclerosis, and ankle flare. Patients may also report a sensation of ‘heavy’ and/or ‘aching’ legs, which can be relieved with elevation and compression therapy (Hopkinson, 2005), although it is important for nurses to understand that there are always exceptions to these rules.

In the presence of arterial disease, the limb may feel cold to the touch and palpation of the pedal pulses will be difficult. Frequently, there will be hair loss on the leg and the skin will appear shiny. Muscle wasting in the calf or thigh is often present and nurses may observe changes to the toenails, such as thickening. The foot and toes may also be poorly perfused, which may cause the limb to appear dusky in colour. Arterial ulcers are widely reported as painful, particularly when the
Ankle Brachial Index
Why it is essential to measure both arms

Example a) One Arm

<table>
<thead>
<tr>
<th>Right Arm Pressure</th>
<th>Right Ankle Pressure</th>
<th>Left Ankle Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>105</td>
<td>105</td>
</tr>
</tbody>
</table>

Ankle Brachial Pressure: \( \frac{105}{110} = 0.96 \)  **\( \times \)**

You would INCORRECTLY compress

Example b) Both Arms

<table>
<thead>
<tr>
<th>Right Arm Pressure</th>
<th>Right Ankle Pressure</th>
<th>Left Ankle Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>105</td>
<td>105</td>
</tr>
</tbody>
</table>

Ankle Brachial Pressure: \( \frac{105}{140} = 0.75 \)  **\( \checkmark \)**

You would NOT compress

Current guidelines specify you should measure both arm pressures and take the highest. (NICE, ESC, ACC/AHA, TASC2 and Aboyans et al*)

Otherwise:

- You could misdiagnose PAD (Vowden & Vowden; 2018)**
- You could apply compression to a patient with PAD which could lead to an adverse incident (Vowden & Vowden; 2018)**
- You should always follow evidence based practice
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* NICE, CG147 (Peripheral arterial disease: diagnosis and management 2018); ESC - European Society of Cardiology (Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery, European Heart Journal, 2017); ACC/AHA - American College of Cardiology/American Heart Association (Guideline on the management of Patients with Lower Extremity Peripheral Artery Disease, Circulation, 2017); Measurement and Interpretation of the Ankle-Brachial Index (Aboyans et al, Circulation, 2012); TASC2 - Inter-Society Consensus for the Management of Peripheral Arterial Disease (Journal Of Vascular Surgery, 2007)

** Vowden P & Vowden K (The importance of accurate methodology in ABPI calculation when assessing lower limb wounds, BJCN, 2018)
Leg is positioned at the same level as the rest of the body or above, for example, when sitting with the leg elevated or resting in bed (Grey et al, 2006). This kind of pain can be relieved through ‘dependency’, which involves the patient arranging the leg so that it sits lower than the rest of the body, for example, the leg can be supported so that it rests out of the bed at night.

Assess the wound
The final step in the holistic assessment is to assess the ulcer itself, including the wound bed (SIGN, 2010). In recent years, the TIMES acronym has re-emerged as an effective framework for holistic wound assessment (Wounds UK, 2016). TIMES stands for (Stephen – Haynes, 2007):

- Tissue viability
- Infection or inflammation
- Moisture imbalance
- Edge of wound
- Surrounding skin.

A full exploration of the TIMES principle is beyond the scope of this article, however, further reading is recommended to enhance nurses’ clinical practice and understanding of wound assessment.

Hopkinson (2005) outlined that in venous disease, ulcers frequently develop in the gaiter area of the lower leg and often cover a large surface area while being superficial in terms of depth. They may be sloughy and appear as necrotic and the damage does not normally involve underlying structures such as tendons.

Wounds UK (2016) provide guidance on the classification of venous leg ulcers and whether they should be termed ‘complex’ or ‘simple’. A simple leg ulcer is defined as:

- Having an ABPI of 0.8–1.3
- Having a wound surface area of 100 cm² or less
- Being present on the leg for a period of less than six months.

Complex venous leg ulcers may be classified by:

- An ABPI outside the range of 0.8–1.3
- A wound surface area of 100 cm² or more
- Having been present on the limb for longer than six months
- Unmanaged pain
- Foot deformity
- Fixed or reduced range of motion in the ankle.

Venous leg ulcers can also be classified as complex if the patient’s history indicates any of the following:

- The wound has not reduced in size by 20–30% at 4–6 weeks despite optimum clinical practice interventions
- A history of non-concordance with treatment
- A history of infection or recurrent infection
- A history of controlled/uncontrolled cardiac failure (Wounds UK, 2016).

In contrast, Grey at al (2006) discussed the clinical manifestations of arterial ulceration and explained that arterial ulcers frequently occur on the foot or lateral aspect of the leg, although they can develop outside these classic areas. An arterial wound will appear ‘punched-out’ and the wound edges normally have a regular shape. Arterial ulcers frequently have a dark, dry base with little signs of healing (Grey et al, 2006).

CONCLUSION

This article has proposed holistic assessment based on a three-step approach to the management of ulcers on the lower limb: assess the person, assess the leg and assess the ulcer. The authors have outlined the importance of early intervention in leg ulcer management and emerging new technology that supports ABPI assessment. In addition, the article revisits the existing principles of ABPI assessment as an integral aspect of the clinical decision-making process. It has been established that once a patient’s suitability for compression therapy has been confirmed, a treatment plan can be developed in partnership with them. Shared decision-making is an integral part of the process and an important factor in encouraging concordance with compression therapy.

REFERENCES


Having read this article, reflect on:

- Why it is important to assess the patient, their leg and wound
- How you would involve patients in the decision-making process
- The benefits of taking timely ABPI measurements
- When light compression might be suitable without an ABPI reading

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KEY POINTS

- Holistic assessment and accurate diagnosis are the first steps in clinical decision-making in leg ulcer management.
- Adopting a ‘what matters to you’ approach is recommended as an important method of ensuring that patients remain at the centre of care.
- The relationship between nurse and patient may extend over a long period of time and so mutual respect and trust is vital.
- Timely ABPI measurement plays a crucial part in diagnosing the underlying pathophysiology of leg ulcers.
- Without ABPI assessment and the provision of appropriate compression therapy, lower limb ulcers will not heal and may even deteriorate.

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