

SUPPLEMENT

Wounds_{UK}



ADVANCES IN LEG ULCER MANAGEMENT

*Irene Anderson, Peter Vowden,
Hildegard Charles*



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⁽¹⁾ Meaurio S. et al. Evaluation of the efficacy and tolerance of UrgoStart and UrgoCell TLC dressings in the treatment of venous leg ulcers : double blind randomised controlled trial. UrgoStart, UrgoStart Contact. Data on file. Urgo. 2011.

Wounds UK

Wound digest <i>A look at the latest research on leg ulcers</i>	s4
Encouraging compliance and concordance in leg ulcer patients <i>Irene Anderson explains why it is vital to maintain patient concordance and compliance in the treatment of leg ulcers</i>	s6
Understanding the ankle brachial pressure index to treat venous ulceration <i>Peter Vowden discusses how calculating ABPI has become a key technique in lower limb wound management</i>	s10
The function and composition of next generation bandages <i>Hildegard Charles reviews the terms 'non-elastic' and 'elastic' following the introduction of a new generation of bandage systems</i>	s16
Early intervention for patients with chronic venous insufficiency <i>Irene Anderson considers the consequences of implementing a rapid referral time for patients with venous insufficiency</i>	s20

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INTRODUCTION

Leg ulcers continue to challenge healthcare professionals despite having been a focus for research for over 20 years. For many patients they are a source of continuing distress and reduced quality of life yet, worryingly, the care they may receive depends very much on where they live and who they are treated by. With appropriate care delivered by skilled practitioners many leg ulcers (particularly those with straightforward venous aetiology) can be healed quickly and without complication. While at first glance it may seem that little has changed — we still 'Doppler and bandage' — it is evident that our understanding of what we do, as well as how and why we do it, has advanced considerably.

In this new Wounds UK supplement, one of a series that will be available with each issue of *Wounds UK*, clinicians will find articles on the practicalities of ABPI assessment, advances in bandage technology, how to engage the patient in order to improve concordance with care, and advice on improving healing rates by early identification and appropriate referral.

The aim of this supplement is to provide an accessible update for those interested in providing patients with evidence-based care, focusing not only on the interventions delivered by the clinician, but also the role played by the patient and the importance of having clear care pathways in place. Furthermore, it is hoped that the information and resources provided will support the delivery of education in practice.

With the current strategic focus on delivering high-quality, patient-guided care, experienced clinicians need to spend more time engaging with patients to draw up care plans that place them at the centre of any treatment decisions. We hope that the information in this supplement will help you provide the care that your patients deserve.

Jacqueline Fletcher, March 2012

WOUND DIGEST

SELECTED PAPERS OF INTEREST

1. The Canadian Bandaging Trial: Evidence-informed leg ulcer care and the effectiveness of two compression technologies.

2. Efficacy and safety of a gauze pad containing hyaluronic acid in treatment of leg ulcers of venous or mixed origin: a double-blind, randomised, controlled trial.

In each Wounds UK supplement, the digest summarises, in turn, recent key papers in the areas of pressure ulcers, skin integrity, diabetic foot ulcers and venous leg ulcers.

1 The Canadian Bandaging Trial: evidence-informed leg ulcer care and the effectiveness of two compression technologies

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓	✓	✓
Novelty factor	✓	✓	✓		

▶ A study to determine the effectiveness of evidence-based practice in the community care of venous leg ulcers using two high compression systems — four-layer (4LB) and short-stretch bandaging (SSB).

▶ The study was a multi-centre, parallel-group, open-label, randomised controlled trial conducted in 10 centres.

▶ The subjects were cognitively intact adults (≥18 years) referred for community care with venous ulceration measuring ≥0.7cm and present for ≥1 week and an ankle brachial pressure index (ABPI) ≥0.8.

▶ Subjects were randomly allocated to receive either 4LB or SSB.

▶ The 424 individuals were randomised and followed until ulcers were healed (or maximum 30 months). Median time to ulcer healing in the 4LB group was 62 days, compared with 77 days in the SSB group. Analysis revealed that the difference in the distribution of cumulative healing times was not significant between the two groups. At three-months post-baseline there were no differences in pain or health-related quality of life.

▶ The most common adverse events experienced by both groups included infection, skin breakdown and ulcer deterioration.

▶ The trial revealed that in the context of trained RNs using an evidence-informed protocol, the choice of bandage system does not materially affect healing times, recurrence rates, health-related quality of life or pain.

Harrison MB, VanDenKerkhof EG, Hopman WM, et al (2011) The Canadian Bandaging Trial: Evidence-informed leg ulcer care and the effectiveness of two compression technologies. *BMC Nursing* 10(1): 20

2 Efficacy and safety of a gauze pad containing hyaluronic acid in treatment of leg ulcers of venous or mixed origin: a double-blind, randomised, controlled trial

Readability	✓	✓	✓	✓	
Relevance to daily practice	✓	✓	✓		
Novelty factor	✓	✓	✓	✓	

▶ Topical hyaluronic acid (HA) is routinely used in the treatment of chronic wounds.

▶ This 60-day double-blind, randomised, controlled superiority trial was designed to investigate the efficacy and safety of a gauze pad containing HA in local treatment of venous leg ulcers.

▶ The study included 89 patients and the primary endpoint was the percentage of wound size reduction after 45 days.

▶ Results showed that the percentage of ulcer surface reduction was significantly greater in the HA group versus the neutral control group. The number of healed ulcers was significantly higher in the HA group at day 45 and day 60.

▶ At day 30, pain intensity was significantly lower in the HA group. Tolerance of both treatments was comparable in the two groups.

▶ HA gauze pad was more effective than the neutral vehicle on wound size reduction, healed ulcers rate and pain management.

Humbert P, Mikosinki J, Benchikhi H, Allaert FA (2012) Efficacy and safety of a gauze pad containing hyaluronic acid in treatment of leg ulcers of venous or mixed origin: a double-blind, randomised, controlled trial. *Int Wound J*. 2012 Mar 8. doi: 10.1111/j.1742-481X.2012.00957.x

To compile the digest a Medline search was performed for the three months ending in March, 2012 using the search term 'leg ulcers.' Papers have been chosen on the basis of their potential interest to practitioners involved in day-to-day wound care. The papers were rated according to readability, applicability to daily practice and novelty factor.

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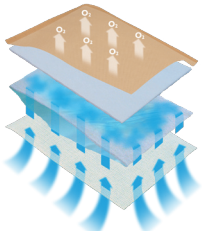
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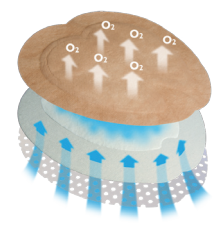
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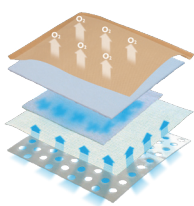
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ENCOURAGING COMPLIANCE AND CONCORDANCE IN LEG ULCER PATIENTS

Ensuring the patient's concordance and compliance is key when it comes to managing leg ulcers, yet maintaining healthy leg behaviours can be difficult. The author discusses the challenges in ensuring patients comply with their care and lists practical tips to keep them motivated.

KEY POINTS

- ▶ The Royal Pharmaceutical Society (RPS) advocated a shift from compliance to concordance to promote openness and empathy in patient/professional relationships.
- ▶ Physical and mental capacities need to be evaluated to reach manageable treatment plans.
- ▶ Patients will notice if clinicians lack skills and confidence, which will have an effect on their relationship.

INTRODUCTION

Leg ulceration is a long-term condition that has a significant impact on the people living with it. The economic cost of leg ulcer management is high and compliance and concordance are frequently highlighted as challenges.

Understanding these terms can help in developing effective strategies to help patients manage the condition. Inevitably, some patients will not be able to take control, such as those with advanced dementia, who lack the mental capacity to make their own decisions. Even so, it is important to understand the patient and any difficulties they may be experiencing with leg ulceration (Ebbeskog and Emani, 2005).

In quality of life studies (Rich and McLachlan, 2003; Ebbeskog and Emani, 2005), pain is always high on the patient's list of issues. Therefore, whatever strategies are used to engage patients in their care, acknowledging and managing pain must be prioritised to ensure those efforts are not wasted.

Compliance

Compliance describes 'the extent to which the patient's behaviour (in terms of taking medications, following diets, or executing other lifestyle changes) coincides with medical advice' (Sackett and Haynes, 1976). The Royal Pharmaceutical Society (RPS) (1997) advocated a shift from compliance to concordance in an attempt to promote openness and empathy in patient/professional relationships. Issues such as long waiting times, extended periods of treatment and complexity of treatment can lead to non-compliance.

Concordance

Clinicians are now encouraged to embrace negotiation with patients who have long-term conditions, and to embrace concordance in all aspects of health (Moffatt, 2004a). The RPS defined concordance as:

'...a negotiation between equals... a therapeutic alliance...' (RPS, 1997).

Adherence

Adherence describes the patient's decision to accept, reject or modify their treatment. Intentionally not adhering can be rational from the patient's perspective, even when it is at odds with professional rationale (Price, 2008). According to Price (2008), compliance is the nature of 'yielding to others', concordance is the process of agreeing (even if this is to disagree) and adherence is the way in which the patient makes choices and participates in his or her care.

The concordance and adherence of the patient is complicated by:

- ▶ Motivation
- ▶ Health beliefs
- ▶ Social and economic factors
- ▶ Previous experience
- ▶ The influence of those around them.

Sustaining and adhering to healthy leg behaviours can be very challenging if the patient's motivation is reduced by recurrence and other setbacks, such as pain. Therefore, clinicians need to have an understanding of what it is like to live with leg ulceration and always promote healthy behaviours even when the patient seems to be working against this.

IRENE ANDERSON

Principal Lecturer, Tissue Viability and Reader in Learning and Teaching in Healthcare Practice, University of Hertfordshire

The following is a list of important considerations that will help to encourage concordance and adherence:

1 RESPECTING AUTONOMY

By being understanding and willing to compromise, you ensure that patients feel they have some control over their treatment and can share any anxieties with you, which gives you more of an opportunity to challenge misunderstandings about ulcers.

2 KNOWLEDGE AND EXPERIENCE

Patients who find it difficult to explain their disease process are not uncommon, but most patients adhere to treatment for the majority of the time. Verbal information given to patients needs to be backed up by other media, such as leaflets and multimedia resources.

Do not assume that more education is the answer. Feed the patient small pieces of information, starting with the most important points. Link the information to the treatment and to the outcomes. For instance, discuss a leaflet about compression bandaging, apply the bandage and then involve the patient in measuring and recording the oedema and/or pain reduction or skin improvements.

It is important that patients have choices. For instance, it may be that a patient's lack of 'compliance' is due to the fact that he or she is using a bandage that does not fit properly.

3 CAPACITIES AND CAPABILITIES

Physical and mental capacities need to be evaluated in order to reach manageable treatment plans. Check for psychological/mental health or learning difficulties. Impairments of sight, hearing and manual dexterity will all impact on adherence.

Language difficulties will make explanations more challenging but resources will be well spent if patients have a good understanding of self-care, such as ankle movement, leg elevation and skin care. An interpreter will be able to clear any confusion relating to language, and cultural beliefs.

4 INSPIRING CONFIDENCE

A clinician's lack of knowledge and,

possibly, lack of confidence in explaining disease processes and the physiological effects of therapy may contribute to a lack of patient understanding.

Have you had your bandaging skills appraised? How good are you at explaining complex information? Your patient will spot any lack of skills and confidence, which will have an effect on your relationship.

5 SOCIAL ISOLATION

Social isolation is a very common problem for people living with leg ulcers (Brown, 2005a). Lack of support and encouragement impacts on whether patients will tolerate treatment (Brown, 2005a and b). It is important that family and friends are involved if possible, and if the patient is willing. Manage problems, such as wound malodour, to avoid the patient's relationships being affected. Where appropriate, work with the patient to explore social service and voluntary sector resources for community support.

6 ARE YOU ASKING TOO MUCH?

Explore the reasons why patients do not feel able to comply or adapt treatment plans to their environment. There is little point telling patients to elevate their legs if their job involves standing, but you could help them to devise prompts to remind them to put their feet up at break times or when they get home. Patients may feel unable to tolerate full compression. Reduced compression is better than none at all. Team work and clear documentation is important in reducing the risk of professional conflicts (Brown, 2005b).

7 TRAVEL

Rich and McLachlan (2003) found that cost, lack of transport and lack of confidence impacted on patient engagement. Clinics may be in areas where people feel unsafe. Late afternoon or early appointments may mean travelling in the dark or during rush hour. Do clinic times reflect the needs of your client group? Seek permission to introduce patients as they may be able to travel together. Explore whether there is a voluntary car service for more vulnerable patients. Try to make the clinic experience sociable to motivate patients.

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8 DO NOT PRE-JUDGE

In Flanagan et al's (2001) community nurse focus group there appeared to be a general pre-judgement of the patient's willingness to comply with treatment. Some nurses did not really believe in the benefits of hosiery, considering it 'uncomfortable and ugly in appearance.' Strike a balance between being optimistic and realistic based on what the patient is able to manage. Give patients time to choose options and try things out.

9 COMPASSION/EMPATHY

Clinicians do not always demonstrate understanding or empathy regarding what it is like to live with a leg ulcer. Ebbeskog and Emami (2005) asked patients about their experiences of having ulcers redressed. Patients said gentle handling and a friendly demeanour made them feel cared for. Try wearing the bandages and hosiery for a period of time and imagine what it might be like to have pain, oedema, leakage and itchy skin 24 hours a day.

10 DON'T TRY TO DO EVERYTHING AT ONCE

Here are some tips to help keep the patient motivated:

- ▶ If necessary, build compression therapy levels up gradually. Ensure bandages and hosiery are as comfortable as possible, as constriction and slippage is harmful and very uncomfortable
- ▶ Make sure ankle movement is not restricted for mobility and exercise
- ▶ Give patients advice on footwear before they are introduced to compression as the patient may be upset to find that his or her footwear does not fit after bandage application. If they have not been warned about this, they may even reject the bandage. If exudate levels are high, find out why and be prepared to change bandages more often until the problem is under control
- ▶ Manage itchy skin by instilling good skin care and using lining material to keep wool padding away from the skin
- ▶ Consider the use of elevation and exercise charts as motivation tools and reminders to patients and carers
- ▶ Resistance bands used for fitness

workouts can be useful to help with ankle exercises if looped round the foot. Such a device near the patient's usual chair can act as a reminder that he or she needs to exercise

- ▶ Involve patients in measuring and recording outcomes such as oedema reduction
- ▶ Give lots of praise and encouragement. We all respond to this if it is realistic and not patronising.

11 SEE WITH 'FRESH EYES'

Go back to the beginning of assessment to check if something was overlooked. Have you looked beyond the ulcer at factors such as co-morbidities, skin conditions, social factors, anxiety and depression (Moffatt, 2004b)? Ask an experienced colleague who does not normally see the patient to attend to his or her care from time to time. They may notice subtle changes that are less obvious to someone who sees the patient more regularly.

12 COMMUNICATION STYLES

Marks et al (2005) discuss the effect that certain phrases may have on the patient, by differentiating between the terms 'aggravated directives' and 'mitigated directives'. An example of an aggravated directive is 'you need to' or 'I want you to', which requires action rather than answers from the patient. The use of aggravated directives is less likely to result in adherence and is not in the spirit of concordance.

Think about the way you say things to patients and consider how your own beliefs influence the approach you take. Mitigated directives, such as 'maybe you can', 'maybe we ought to' or 'let me say' are more effective since they are presented as joint action.

CONCLUSION

Concordance and adherence require a sound knowledge of the condition and treatment options. They also involve the possession of excellent communication skills, compassion and empathy.

People change according to circumstances so avoid labelling and do not close the door. Allow people to change their mind without 'losing face.' To paraphrase Price (2008), we should accept that patients have 'a life not just an ulcer.' **WUK**

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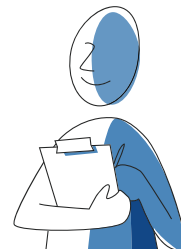
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UNDERSTANDING THE ANKLE BRACHIAL PRESSURE INDEX TO TREAT VENOUS ULCERATION

Measuring ankle systolic blood pressure and calculating an ankle brachial pressure index (ABPI) is crucial for the non-invasive assessment of peripheral vascular disease (PVD). More recently, the technique has become an important aspect of lower limb wound management, helping clinicians to assess patients with venous ulceration to establish suitable treatment options.

KEY WORDS

- ▶ Ankle brachial pressure index (ABPI)
- ▶ Venous ulceration
- ▶ Doppler principle
- ▶ Systolic pressure
- ▶ Diastolic pressure

The measurement of ankle systolic blood pressure and the calculation of an ankle brachial pressure index (ABPI) is one of the fundamental non-invasive techniques used to assess peripheral perfusion. The methodology was established in the 1960s (Vowden et al, 1996; Caruana et al, 2005) and has, for nearly 50 years, been an integral part of vascular assessment, defining the physiological consequences of atherosclerotic arterial disease, in terms of peripheral perfusion pressure.

More recently, the technique has become one of the key elements of lower limb wound management, determining treatment options for patients with venous ulceration (Royal College of Nursing, 1998; SIGN, 2010).

The technique does have limitations but when correctly applied has been shown to offer a valid, reliable and reproducible measure of lower limb arterial disease (Vowden et al, 1996; Caruana et al, 2005).

REST THE PATIENT

Before undertaking any blood pressure measurement, the room should be quiet and at a comfortable temperature and the patient should be relaxed, comfortable and have rested for at least five minutes (O'Brien et al, 2003).

When taking lower limb systolic pressure readings, the resting period may need to be longer. For patients with severe arterial disease the resting period may need to

be as long as 25 minutes (Yao, 1970), as muscle metabolic activity during exercise results in local vasodilation induced by the release of chemical mediators.

In normal individuals there is an increase in total limb blood flow without a fall in pressure. However, in the presence of arterial stenotic disease, pressure in the distal vascular bed falls and remains low until the vasodilators are cleared from the limb. Therefore, mild-to-moderate peripheral vascular disease causes a fall in the ABPI after exercise, the recovery period reflecting the severity of the arterial disease (Caruana et al, 2005). For a normal subject who has not exercised, a resting period of five minutes will usually suffice but if the systolic pressure is reduced and the ABPI of less than 1, readings should be repeated after a further period of five minutes rest or until results are stable.

CHOOSE A SENSOR

A number of different sensors can be used to detect the onset of blood movement during occlusive blood pressure measurement. These include:

- ▶ A traditional stethoscope
- ▶ An ultrasonic detector using the Doppler principle to detect blood cell movement
- ▶ A strain gauge which calculates blood flow and, hence, pressure by measuring electrical resistance changes. It uses an extendable band placed around a limb or digit to detect small changes in volume (Nielsen and Rasmussen, 1973)
- ▶ Detectors that register changes

PETER VOWDEN

Consultant Vascular Surgeon and Visiting Professor of Wound Healing Research, Bradford Teaching Hospitals NHS Foundation Trust and The University of Bradford

Figure 1. How to perform a Doppler assessment

- ▶ Explain procedure (reduce anxiety) – anxiety may falsely elevate systolic pressure
- ▶ Position subject (supine) – limb elevation or dependency in relation to heart level will affect systolic pressure
- ▶ Rest subject (20 minutes) – exercise can lower leg systolic pressure in claudicants and patients with asymptomatic arterial disease

Measure systolic pressure in both arms using Doppler ultrasound probe (8MHz) and a sphygmomanometer cuff. Remember:

- ▶ Systolic pressure can vary between arms so record both and use highest
- ▶ Inappropriate cuff size can affect accuracy
- ▶ Brachial pressure measurement method can produce slight variation in systolic reading
- ▶ An irregular pulse and/or too rapid deflation of cuff can affect accuracy of reading



Locate ankle pulses (AT/DP and PT). Measure systolic pressure in both vessels using Doppler ultrasound probe (8MHz) and an appropriately sized sphygmomanometer cuff.

Using contact gel, position probe at 60° to skin surface and in line with the artery. Record pressure for each vessel and use the highest pressure at the ankle to calculate the ABPI for that leg. Repeat the process for the other limbs. Remember:

- ▶ Systolic pressure can vary between ankle vessels so record both pressures and sound type (e.g. monophasic)
- ▶ Cuff size, position and wound padding can affect accuracy of reading – position at ankle with only film covering wound
- ▶ Non-compressible vessels will falsely elevate pressure; be cautious in diabetics and patients with renal failure
- ▶ Limb dependency will falsely elevate pressures
- ▶ Select 5MHz probe for deeper vessels and large limb size.



- ▶ Document results – record systolic pressure, calculate ABPI, using formula (right)
- ▶ Discuss results with patient – consider if patient requires healthy living advice
- ▶ Clean equipment – follow infection protocol

$$ABPI_L = \frac{\text{Highest left ankle systolic pressure}}{\text{Highest brachial systolic pressure}}$$

$$ABPI_R = \frac{\text{Highest right ankle systolic pressure}}{\text{Highest brachial systolic pressure}}$$

in tissue oxygen (pulse oximetry). These have been used to calculate the Lanarkshire Oximetry Index (LOI), which is derived from pressures recorded from cuffs at the elbow and ankle using oximetry sensors placed on the finger and toe to detect restoration of pulsatile flow as the cuffs are deflated. This method has been suggested as a possible alternative to measuring the ABPI using Doppler equipment (Khalili et al, 2002; Bianchi et al, 2008).

No matter which sensor system is used, all these methods record the occlusion pressure at the site of the cuff, not the pressure at the sensor, and all are subject to the same limitations, in terms of vessel compressibility, pulse pressure variability, patient position and the need to rest subjects before conducting readings (Vowden and Vowden, 2006).

All of the methods allow estimation of systolic pressure, but not all register diastolic pressure measurement.

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Figure 2: This image shows the location of the posterior tibial artery.

Figure 3: These markings indicate where the tibial artery continues as the dorsalis pedis in the foot.

Figure 4: This marking shows the site at which the distal peroneal artery can be accessed at the ankle.



Figure 5: Toe pressure measurement is taken by placing a cuff around the base of the toe and using a Doppler probe to detect blood flow in the digital artery.

Whichever technique is used to measure blood pressure, readings should be obtained with the sphygmomanometer equipment at heart level to eliminate the effect of hydrostatic pressure on the pressure measurement (O'Brien et al, 2003; Pickering et al, 2005).

When a comparison is to be made between upper and lower limb pressures, readings should be taken with the patient supine to eliminate pressure variations caused by the hydrostatic pressure difference between the higher and lower limbs in relation to the heart (Vowden, 2001a; Vowden, 2001b).

The difference between the blood pressure measured in the arms and that measured in the legs is normally less than 10mmHg, pressure in the lower limb generally being higher because of augmentation of the pressure by the muscular peripheral arteries and the summation of reflected pressure waves (Caruana et al, 2005). But, the difference may be increased in the presence of coarctation of the aorta (Markham et al, 2004) or occlusive lower limb arterial disease or following exercise, especially in the presence of occult or symptomatic arterial disease (Vowden et al, 1996; Vowden and Vowden, 2001b). An appropriate cuff size should be chosen for each limb when undertaking blood pressure readings (Caruana et al, 2005).

USING DOPPLER FOR SYSTOLIC BLOOD PRESSURE

When using the hand-held Doppler equipment to measure systolic blood pressure (Figure 1) the same basic methodology set out above for the conventional measurement of blood pressure using a sphygmomanometer should be followed, remembering that the pressure measured relates to the cuff position and not to the position of the sensor. Cuff position and size errors may result in inappropriate clinical decision making (Caruana, 2005).

With the subject rested, relaxed and supine, the correct size cuff should be secured around the limb in question. For the arm, the cuff should be located just above the elbow. A variety of probe types are available that emit ultrasound at a specific frequency. In general, an 8mHz probe is used to evaluate flow in peripheral arteries as they tend to be

superficial. In oedematous limbs or obese patients, a 5mHz probe may occasionally be necessary as there is greater depth penetration of the ultrasound at that frequency (Vowden et al, 1996).

The brachial pulse should first be located by palpation and ultrasonic gel placed over the identified artery. The gel acts as a coupling medium, allowing transfer of the ultrasound from the probe into the tissues. The probe should be held in contact with the skin at an angle of about 60° to the line of the vessel but no pressure should be applied. Once a good signal is obtained, the cuff should be inflated to above systolic pressure and then slowly released, the pressure at which the signal returns equates to the systolic pressure. It is important not to move the probe away from the vessel and to deflate the cuff slowly to obtain an accurate reading.

To obtain lower limb systolic blood pressure, the patient is measured at the ankle with the cuff placed immediately above the malleoli. This allows access to the posterior tibial, the anterior tibial and its continuation the dorsalis pedis, and the peroneal arteries. The peroneal can be difficult to identify and, therefore, the posterior and anterior tibial arteries are most commonly used for pressure readings (Vowden et al, 1996; Caruana et al, 2005). Figures 2-4 demonstrate the anatomical location of these vessels. Whether two or three vessels are used, pressure readings are obtained and recorded for each artery tested.

Differences in pressure of greater than 15mmHg between crural arteries can be taken as indicating significant occlusive arterial disease in the vessel with the lower pressure (Vowden and Vowden, 2001b). This may be relevant when considering a patient for compression therapy, particularly if the pressure is lowest in the anterior tibial artery, as the area over the tibialis anterior tendon is more vulnerable to pressure damage.

In some patients, lower limb systolic pressure may appear grossly elevated due to the non-compressible nature of their arteries. In such a situation it may be possible to estimate lower limb systolic pressure by performing a pole test (Smith et al, 1994; Pahlsson et al, 1999). In this test a reference pulse is identified in a resting supine patient

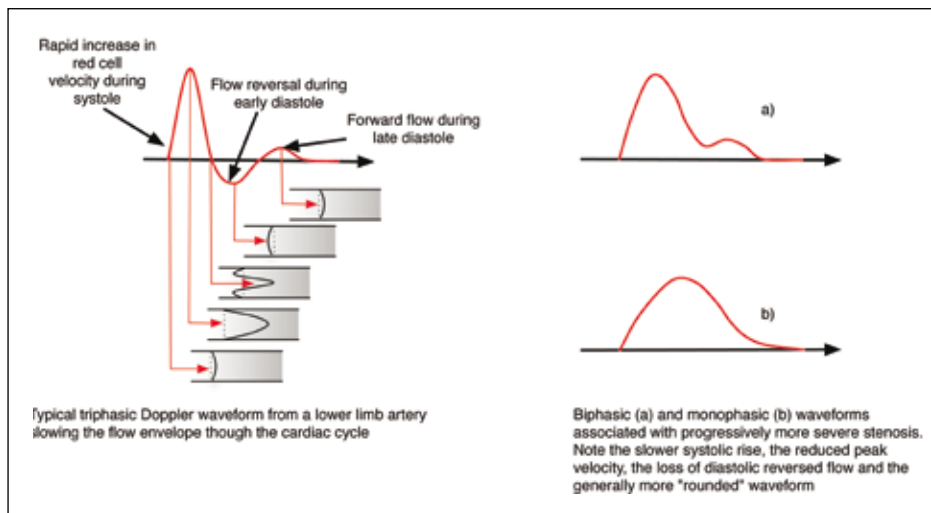


Figure 6: Increasing atherosclerotic stenotic arterial disease produces an altered waveform, producing first a biphasic and then a monophasic wave form.

and the limb elevated with the Doppler probe held over the artery. The height at which the reference pulse disappears above the neutral position in centimetres is recorded. Multiplying this figure by 0.735 (to convert from millimetres of blood to millimetres of mercury) gives the equivalent ankle systolic pressure in mmHg (Vowden et al, 1996), but the range of values is clearly limited by limb length and hip mobility. Although not frequently undertaken, pressures derived by leg elevation provide a more accurate index of severe leg ischaemia than sphygmomanometry, although the technique is limited to assessing pressures of less than approximately 60mmHg (Smith et al, 1994).

An alternative is to measure toe systolic pressure, which is regarded as a more reliable measure in diabetics as digital vessels are less likely to be non-compressible. The technique is, however, more difficult. A neonatal or penile blood pressure cuff is placed on the great toe and blood flow detected in the terminal phalanx. Figure 5 shows a Doppler probe being used to detect blood flow in the digital artery. An alternative is to place the probe over the tip of the toe. It is often useful to connect headphones to the Doppler unit to allow more accurate detection of flow onset and, therefore, systolic pressure.

Toe pressures are lower than arm or ankle systolic pressure and the 'normal' range much narrower. It has been found that cuff width can greatly affect the obtained

systolic blood pressure reading and it has been proposed that readings should be taken with a 2.5cm wide cuff (Pahlsson et al, 2007).

The definition of critical limb ischaemia and the likelihood of wound healing, particularly in the diabetic foot, have been related to absolute systolic pressure at both the ankle and toe and such readings may, therefore, have value in treatment planning (Apelqvist et al, 1989; Dormandy et al, 1991).

OBTAINING THE ABPI

Systolic blood pressure can vary widely and to compensate for this and allow a meaningful comparison of results for an individual over time, a ratio can be derived that compares the highest arm systolic pressure, taken as the best estimate of central systolic pressure, with the highest pressure obtained at the ankle. These readings should, ideally, be taken synchronously and give a separate ABPI for each leg. Table 1 highlights some of the potential sources of error in systolic pressure measurement and, therefore, in ABPI calculation.

Al-Qaisi et al (2009) have reviewed the literature relating to ABPI and provide an update for practitioners, exploring the rationale for the technique and its limitations.

Automated systems such as the Huntleigh Dopplex ABILITY (Huntleigh Healthcare), which uses an integrated pneumatic sensor system rather than traditional Doppler,

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KEY POINTS

- ▶ Before undertaking a blood pressure measurement, the room should be quiet, at a comfortable temperature and the patient should be relaxed, comfortable and have rested for at least five minutes.
- ▶ Mild-to-moderate peripheral vascular disease causes a fall in the ABPI after exercise, the recovery period reflecting the severity of the arterial disease.
- ▶ All methods allow estimation of systolic pressure but not all methods allow diastolic pressure measurement.
- ▶ Cuff position and size errors may result in inappropriate clinical decision making.

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or systems which use the oscilometric method to record systolic pressure (ABPI MD[®]; Mesi), are available to synchronously measure limb systolic pressure in all four limbs and calculate the ABPI. These have been shown to be reliable in clinical use but do not all give full information on the pulse waveform and pressure at the three ankle vessels obtained with the standard Doppler method (Lewis et al, 2010).

WAVEFORM AND SOUND, SPECTRAL ANALYSIS

Blood cell velocity varies during the cardiac cycle and across the sample zone within a blood vessel, with cells in the centre of the blood vessel moving faster than those on the periphery. Ultrasound is reflected from all these cells but as the cell velocities vary so does the frequency shift that occurs in the reflected ultrasound. The velocity profile for a normal peripheral artery produces a characteristic triphasic waveform and sound. Increasing atherosclerotic stenotic arterial disease produces an altered waveform, producing first a biphasic and then a monophasic wave profile and sound (Vowden et al, 1996). *Figure 6* illustrates this and demonstrates the waveforms produced.

Signal analysis in its simplest form involves operator interpretation of the audible signal derived from the hand-held Doppler. More complex analysis of the generated Doppler waveform can be undertaken and a Pulsatility Index (PI) derived, the lower the PI the greater the degree of proximal arterial stenosis (Sumner, 1989; Burns, 1993).

ABPI AND GENERAL CARDIOVASCULAR RISK

A reduced ABPI is associated with a general increase in cardiovascular risk (Leng et al, 1996; Jonsson and Skau, 2002) with increasing morbidity rates, and reduced survival, being linked directly to a reduction in the ABPI (Donnelly et al, 2000). Finding a reduced ABPI should, therefore, feed in to an associated cardiovascular risk assessment and management strategy and if symptoms of peripheral vascular disease are present, referral to a vascular surgeon for further assessment.

ABPI AND LOWER LIMB ARTERIAL DISEASE

In a normal subject the ABPI is usually between 1.3 and 0.95, with a ratio of <0.92 taken as indicating arterial disease. An ABPI of >1.3 is usually taken to indicate a

degree of non-compressibility in the lower limb vessels. If such a result is obtained, check for possible technical errors that may have falsely elevated the lower limb systolic pressure, such as using too small a sphygmomanometer cuff or measuring ankle pressure with the limb dependent.

In a young and otherwise fit patient with no symptoms of peripheral arterial disease such readings are unlikely to be of significance. In the elderly, in people with diabetes and in patients with possible symptoms of arterial disease an alternative technique should be used to check lower limb perfusion.

Individuals with symptoms of intermittent claudication usually have an ABPI between 0.4 and 0.9, while patients with rest pain or arterial ulceration usually have an ABPI of <0.4. In patients with mild arterial disease, particularly that involve the iliac vessels, Doppler systolic pressure measurement combined with exercise testing can be of value in revealing occult arterial disease (Vowden et al, 1996).

Segmental pressure measurements along a limb, comparing pressures in the thigh, upper calf and at the ankle can also be useful in locating the site of any significant arterial occlusive disease. The systolic pressure is usually higher in the thigh than the brachial, with a pressure gradient down the leg (Hirai and Shionoya, 1978), and a pressure difference of >30mmHg between adjacent cuffs indicating significant arterial disease (Sumner, 1989). Anderson (2002) demonstrated a statistically different systolic pressure and ABPI between measurements taken in the upper and lower calf although the differences may not have always been clinically significant. Some subjects also found the upper cuff position more uncomfortable.

Variations in systolic pressure can also influence ABPI and may be important in longitudinal measurement of ABPI. ABPI is relatively higher in hypotensive patients and low in hypertensive patients (Hugue et al, 1988; Belcaro and Nicolaidis, 1989; Carser, 2001).

ABPI, LEG ULCERATION AND COMPRESSION THERAPY

Taken in isolation an ABPI does not establish a diagnosis or define the aetiology of a leg ulcer. The role of ABPI in leg ulcer management and compression

Table 1
Sources of error in blood pressure measurement and ABPI (Vowden et al, 1996; Khalili et al, 2002; Markham et al, 2004)

Some causes of arm blood pressure error	Systolic effect	
Cuff too small	+10-40 mmHg	
Cuff too large	-5-25 mmHg	
Artery line not centered	+4-6 mmHg	
Arm above heart level	-2 mmHg/inch	
Arm below heart level	+2 mmHg/inch	
Cuff placed over clothing/bulky dressings	+/- 10-40 mmHg	
Patient not rested	+10-20 mmHg	
Patient in pain	+10-20 mmHg	
White coat syndrome	+11-20 mmHg	

	Lower limb systolic pressure	ABPI
Insufficient period of rest	Reduced	Reduced
Limbs dependent	Elevated *	Elevated
Irregular pulse	Variable	Variable but usually reduced
Leg cuff too small	Elevated	Elevated
Leg cuff too large	Reduced	Reduced
Probe errors	Reduced	Reduced

* Allowance can be made for this by taking the height difference between arm and ankle pulse in centimetres x 0.735 from the systolic pressure recorded. This should correct systolic pressure and allow more accurate estimation of the true ABPI.

therapy is two-fold. The first is to support the diagnostic process and evaluate the presence of arterial disease, and the other is to help define the appropriate level of compression therapy. In a clinimetric analysis of the measurement of ABPI by Doppler ultrasound, Keen (2008) concluded that the method was, 'valid and reliable if the practitioner is competent and able to interpret the result within the context of a full clinical assessment'

Caruana et al (Caruana et al, 2005) emphasise this need for caution in their review in which they discuss possible causes of inappropriate compression therapy in chronic venous leg ulcer patients. An ABPI of ≥ 0.8 is taken as broad indicator that a patient will tolerate high compression bandaging (sub-bandage resting ankle pressure of 40mmHg) or hosiery (European Class 2). Concern is often expressed about applying compression to limbs with an ABPI >1.3 as such readings may mean that the arterial tree is non-compressible. Male et al (2007), however, emphasise that, for the otherwise healthy adults in the 20–40 year age range a 'normal' ABPI should not be

considered a fixed figure, the mean ABPI in their study population being 1.14 (SD 0.06).

ABPI readings should, therefore, be interpreted in light of the patient's age, limb size and symptoms of peripheral arterial disease. Decisions about the appropriateness of hosiery, for example as part of post deep vein thrombosis limb management, or compression bandaging, should be made accordingly. The International Leg Ulcer Guidelines (European Wound Management Association [EWMA], 2003) describe appropriate management strategies stratified according to ABPI. ABPI readings may also indicate appropriate bandage type selection and several bandage systems having now been designed to offer compression therapy to patients with reduced ABPI (Vowden et al, 2011).

CONCLUSION

Providing the Doppler assessment principles are followed and the common pitfalls avoided, the ABPI test provides a simple method for assessing and monitoring peripheral arterial disease. **WUK**

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THE FUNCTION AND COMPOSITION OF NEXT GENERATION BANDAGES

KEY WORDS

- ▶ Compression
- ▶ Inelastic bandages
- ▶ Elastic bandages
- ▶ Sub-bandage pressure
- ▶ Components
- ▶ Stiffness Index.

In the management of venous and lymphatic disease, the beneficial effect of compression is well recognised. However, the terms ‘non-elastic’ and ‘elastic’ need to be reviewed following the introduction of a new generation of bandage systems.

Compression is the key intervention in the management of venous and lymphatic disease (Lymphoedema Framework, 2006; RCN Institute, 2006). Ongoing innovations in compression systems allow the practitioner to choose from a variety of effective systems to meet the individual requirements of the patient.

The classification of compression systems has been addressed by the International Compression Club (www.icc-compressionclub.com) and bandaging in lymphatic disease has been discussed in the European Wound Management Association (EWMA) Focus Document (EWMA, 2006).

The four properties of compression bandages, known collectively as P-LA-C-E, as suggested by Partsch et al (2006) are:

- ▶ Pressure
- ▶ Layers
- ▶ Components
- ▶ Elastic properties.

A more detailed description of each property is:

- ▶ ‘Pressure’ relates to the level of the compression applied, i.e. mild, moderate, strong or very strong
- ▶ ‘Layers’ refer to the overlapping layers of a bandage when applied, i.e. single layer or multiple layers
- ▶ ‘Components’ of a compression bandage are the different materials used to create it
- ▶ ‘Elastic’ relates to the extensibility of a bandage.

SUB-BANDAGE PRESSURE

Effective compression therapy should provide a balance between exerting too little pressure, which is ineffective, and too much pressure, which causes damage or is not tolerated by the wearer. In venous disease, compression should work on the veins and exert a therapeutic resting pressure and an intermittent high working pressure, i.e. when the calf muscle is active.

With the application of an effective compression bandage system during leg exercise, intermittent pressure peaks act as a massage and allow the superficial and deep leg veins to narrow and expand in rhythm with the exercise pressure. These intermittent pressure peaks also provide pressure in vein segments that do not have full functioning venous valves and this will help to mimic the normal closing action of damaged valves. This effect has been demonstrated using duplex scanning (Partsch and Partsch, 2005) and is beneficial in reducing venous hypertension and oedema.



Figure 1: The static-stiffness index (SSI) can be measured at the B1 point of the leg

HILDEGARD CHARLES
Independent Tissue Viability Consultant,
London

Venous pressure in the standing position (in both healthy individuals and in patients with venous insufficiency) is about 80–100mmHg in a dorsal foot vein and 50–70mmHg at calf level. In normal individuals this intravenous pressure will fall during walking to around 20mmHg (Partsch, 2006) with normal functioning valves. However, in patients with valvular insufficiency, intermittent refluxes (i.e. backflow) will occur with each step; resulting in constant venous hypertension, which, in turn, results in oedema (Arnoldi, 1966; Clark, 2010).

LAPLACE'S LAW

One of the principles for lower limb compression is derived from Laplace's Law (Thomas, 2002). The lower limb has been compared with a cylindrical object. Laplace stated that, as the radius of a cylindrical object decreases, the resulting pressure increases, i.e. the pressure at the ankle is greater than at the calf (given that the bandage is applied with constant tension and overlap on the leg). Pressure (P) is directly proportional to the bandage tension (T) and inversely proportional to the radius of the leg (r) — ($P \propto T/r$) (Thomas, 2002; EWMA, 2003).

When applying a bandage, the tension is determined by the amount of force needed to elongate or extend the bandage. For a patient with a skinny leg and, subsequently, a small radius, a lower bandage tension should be considered. For a large, or swollen leg, with a larger radius, a higher tension may be used. Practitioners must be aware that vulnerable areas, such as the tibia or dorsum of the foot, need to be protected and adequate padding has to be applied before bandage use (Beldon, 2006).

LAYERS

When a bandage is applied there is always some degree of overlap. The bandaging technique and the shape of the leg will determine how many layers are applied. If a bandage is applied spirally with a 50% overlap this produces two layers. If applying a multilayer bandage system there will be several layers. Nurses need to be aware that further overlaps may increase sub-bandage pressure. An example of a single-layer application is that of a single compression hosiery.

INELASTIC VERSUS ELASTIC

The terms 'inelastic' and 'elastic' are based on the physical properties of bandages tested in a laboratory and should only be used in defining the elasticity of a single bandage. By definition, elastic bandages can only be stretched less than 100% their original length. Elastic bandages are capable of stretching more than 100% their original length (Nelson, 2009; Todd, 2011).

COMPONENTS

Compression bandage systems use combinations of inelastic and elastic materials. These combinations of different materials will have an influence on the sub-bandage actions and pressure and these pressures need to be measured.

'When applying a bandage, the tension is determined by the amount of force needed to elongate or extend the bandage'

Compression bandage systems that are made of different components may have different functions, for example, padding, protection, retention and/or compression. Understanding the properties of a bandage being used, as well as the degree of elasticity, will help clinicians understand how different pressures can be achieved and maintained. Bandages with inelastic components contain few, or no elastomeric fibres and are made of non-stretch materials, for example cotton.

In practice, after inelastic bandages have been applied immediate drops in pressure can occur even without movement. This loss of applied bandage pressure is mainly due to the immediate reduction of oedema/leg volume. This has been demonstrated by volumetric measurements (Partsch, 2006). Therefore, when this type of inelastic/short-stretch bandage becomes loose, it is essential to

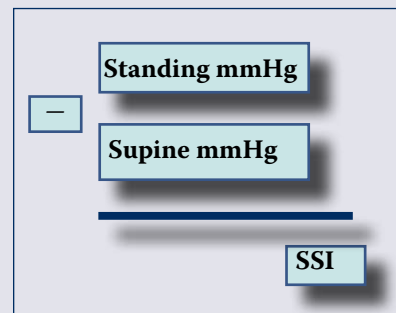


Figure 2: Static Stiffness Index formula.

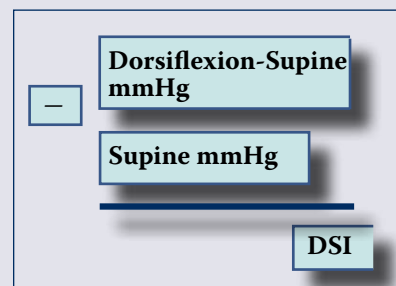


Figure 3: Dynamic Stiffness Index formula.

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KEY POINTS

- ▶ In venous disease, compression should work on the veins and exert a therapeutic resting pressure and an intermittent high working pressure.
- ▶ When applying a bandage on a patient's leg the radius needs to be considered, i.e. low tension for small and skinny legs, high tension for large or swollen legs.
- ▶ Bandages with inelastic components contain few, or no elastomeric fibres and are made of non-stretch materials, for example cotton.

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re-apply it so that it regains its full efficacy. This will mean that in the initial treatment phase when oedema is present, it may be necessary to re-apply the bandage several times each week or even every day, especially in the presence of massive oedema.

Bandages with elastic components are sometimes referred to as long-stretch bandages and are made of fibres containing synthetic yarns. They can sustain pressure for longer periods of time due to their ability to accommodate changes in limb shape and movement.

With the innovation of bandage kits and multilayer bandages, which often consist of different bandage materials and weaves, the final bandage will become increasingly inelastic. An example is the four-layer bandage system. The single components are elastic, but the final bandage application is less elastic. The reason for this change is the influence of friction between the different layers. With this ongoing change from the single non-elastic/elastic bandage to the multilayer and multicomponent bandage systems, it is more reasonable to talk about the lower or higher stiffness of the bandage system and to reserve the terms 'elastic' and 'inelastic' for single bandages (Partsch, 2006).

STIFFNESS INDEX

The stiffness of a bandage or bandaging system characterises the relationship between the resting and working pressures, i.e. when the calf muscle is relaxed (resting) and when the calf muscle is active (standing, exercising or walking). The stiffness index is defined as the increase in sub-bandage pressure based on the difference of pressure from the resting to the standing or working pressure (Spence and Cahal, 1996; CEN, 2001). This pressure difference is the result of a change in the leg's circumference. The static stiffness index (SSI) can be measured at the B1 point of the leg (Figure 1). The B1 point is at the medial aspect of the lower leg where the tendon changes into the muscular part of the gastrocnemius muscle about 12–14 cm above the medial malleolus.

A pressure increase of 10mmHg or more from the lying/supine to the standing position indicates a high SSI and is

characteristic of an inelastic bandage/system. If the pressure difference is less than 10mmHg, this is considered a low SSI and is characteristic of an elastic bandage/system (Mosti et al 2008; Partsch et al, 2008; Clark, 2010) (Figure 2).

The dynamic stiffness index (DSI) is defined as the change in sub-bandage pressure measured at B1 when a person exercises her/his leg from either a supine or standing position, i.e. dorsiflexion or walking (Figure 3).

An additional parameter of interest is the amplitude. It is measured by taking the difference between the maximal-minimal pressure during dorsiflexion and characterises the massaging effect of a bandage. It is dependent on the bandage/system and a person's ability to flex her/his ankle (Figure 4).

It is recommended by the International Compression Club that all bandage compression systems state their pressure values, including the SSI (Partsch et al, 2008).

The graph (Figure 5) details the inelastic sub-bandage pressure measurements – supine, dorsiflexion and standing. It was taken with a Pico Press pressure measuring device (Microlab Elettronica), allowing continuous monitoring of sub-bandage pressures. The bandage pressure in the supine position was 40mmHg. On the right side of the graph the pressure increase from the supine to the standing position is visible. It has increased to just below 60mmHg. In this example the SSI is calculated by subtracting supine pressure (40mmHg) from the standing pressure (59mmHg). This gives a SSI of 19. It also classifies the bandage/system as being stiff (inelastic or 'short stretch').

In a similar manner, the DSI can be calculated from the graph, i.e. 40mmHg (supine) – 76mmHg (dorsiflexion). The amplitude is derived by the difference between the maximum pressure during dorsiflexion and the minimum pressure at muscle relaxation, i.e. 76mmHg – 28mmHg.

DISCUSSION

In practice, there is no single element in making a decision about which bandage or bandage system to use in order to treat venous or lymphatic disease. Certainly

the priority will be the effectiveness that a bandage system provides in reversing venous hypertension, reducing oedema and controlling associated pain. The SSI and DSI rank high on the list of priorities. With current knowledge derived from pressure measurements and clinical experience, clinicians can expect that reputable bandage/systems have this information. The safety and ease of application are also essential elements.

Establishing patient-practitioner concordance is enhanced when the clinician has knowledge and confidence in the effectiveness of the product. This might mean choosing a bandage/bandage system that is acceptable in terms of comfort, mobility and/or appearance. During the treatment period the dynamics of the intervention might change, for example there may be infection, oedema reduction or wound healing. The compression treatment needs to be adapted accordingly.

Other considerations include the skill and knowledge of the practitioner. Training is essential and this certainly needs to be specific for the type of compression used. The specific nature of training and knowledge are often required in conjunction with clinical guidelines developed within the practitioner's setting. Furthermore, it is of great importance to consider the overall cost

implications of materials and time for the total treatment. Ongoing reassessment is essential for monitoring the treatment process.

Selecting a compression system for venous disease

10 elements to consider in the decision making process and use

- ▶▶ The SSI
- ▶▶ Clinical effectiveness
- ▶▶ Concordance and acceptability of the patient
- ▶▶ Comfort and appearance
- ▶▶ Knowledge and training
- ▶▶ Safety issues and ease of application
- ▶▶ Guidelines — manufacturer and local/national
- ▶▶ Cost in time
- ▶▶ Material cost
- ▶▶ Ongoing assessment.

CONCLUSION

The above list of elements gives the practitioner a guide when selecting a compression system. They address the efficacy, practical use, patient acceptability, clinical compliance and cost. These elements are based upon overall positive results in the selection of a compression bandage system.

It is the clinician's responsibility to choose an effective bandaging system that combines scientific findings with the skilled art of bandage application. **WUK**

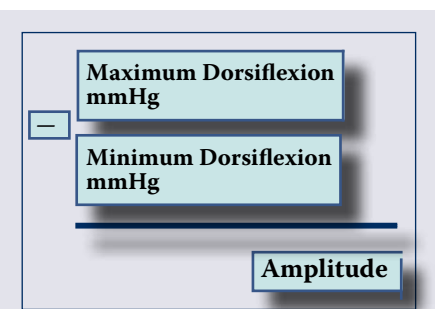


Figure 4: Amplitude formula.

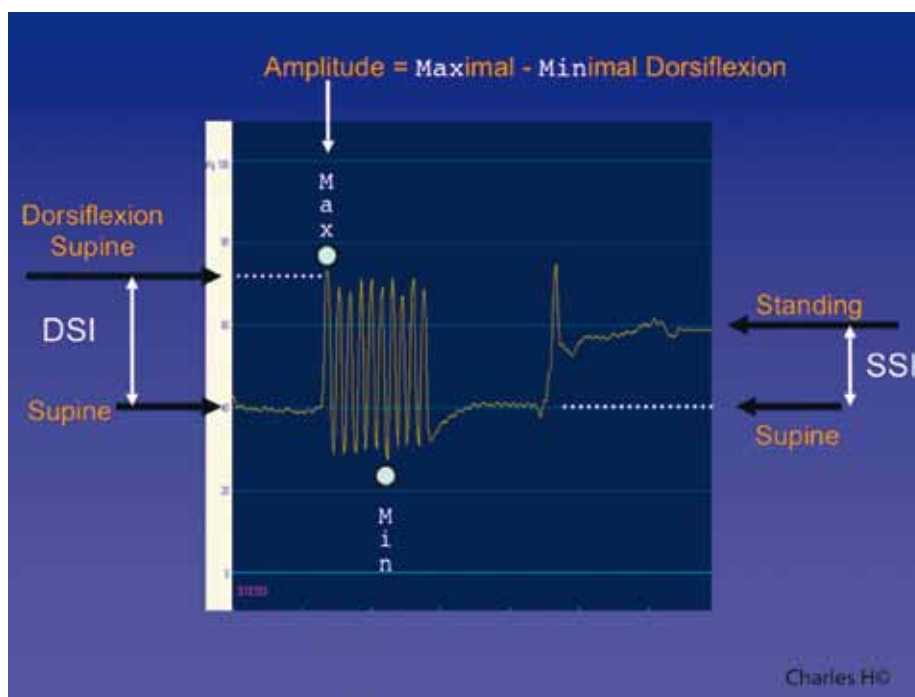


Figure 5: Inelastic sub-bandage pressure measurements — supine, dorsiflexion and standing

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EARLY INTERVENTION FOR PATIENTS WITH CHRONIC VENOUS INSUFFICIENCY

Abstract

The recommendation by the Venous Forum for rapid referral for patients with venous insufficiency would encourage a proactive approach to preventing and managing chronic venous ulceration. This article looks at the consequences of implementing a two-week referral time.

KEY WORDS

- ▶ Venous insufficiency
- ▶ CEAP
- ▶ Venous Forum
- ▶ Referral.

In December 2010, the Venous Forum of the Royal Society of Medicine (RSM) published recommendations for the referral of people with venous insufficiency to vascular surgeons within a two-week time frame (Berridge et al, 2010). This article explains the classification system used for referrals and discusses some of the potential benefits and challenges of the recommendations.

BACKGROUND

In 1994, the CEAP classification system for venous insufficiency was devised by a large group of surgeons and physicians at an American Venous Forum meeting in Hawaii and was widely adopted in vascular services. The system was acknowledged to be flawed due to its complexity but was a useful means of identifying the clinical state of a limb (Bergan, 1999). The classification system was updated in 2004 (Eklöf et al, 2004). CEAP stands for:

- ▶ Clinical signs
- ▶ Aetiology (etiology in the US)
- ▶ Anatomic distribution
- ▶ Pathophysiological dysfunction.

In the new referral recommendations, published by the Venous Forum of the RSM (Berridge et al, 2010), the 'C' category includes criteria for referral for assessment and treatment by a vascular surgeon. This section is divided into seven categories that range from C0 to C6 (*Table 1*). The recommendations aim to ensure that all patients within categories C4 to C6 are assessed for possible intervention by a vascular surgeon. Some people in categories C1 to C3 may also benefit from

a vascular referral, especially those with persistent oedema and venous symptoms that impact on health-related quality of life (HRQOL). Categories C4 to C6 are classed as 'complicated disease' and it is this group of patients that are most at risk of venous ulceration (Rabe and Pannier, 2010).

A rapid referral process constitutes a proactive approach to the prevention and management of chronic venous ulceration and, if implemented, could radically change the way patients are managed. The recommendations have been presented as a means of reducing the impact on patients' quality of life in relation to health and, ultimately, reducing costs to health services (Berridge et al, 2010; Rabe and Pannier, 2010). The consensus team responsible for the guidelines point to the inconsistency caused by the rationing of venous services and geographical variations at a time when non-surgical techniques have been increasing. They call for equitable access to expert services for those with chronic venous insufficiency who are suitable for venous procedures and are desirous of treatment.

RECOMMENDATIONS

The management of venous leg ulceration centres on the following:

- ▶ Exercise
- ▶ Leg elevation
- ▶ Weight management
- ▶ Skin care
- ▶ Compression therapy.

These aspects need to continue to be managed post healing to reduce the risk

IRENE ANDERSON
Principal Lecturer, Tissue Viability
and Reader in Learning and Teaching
in Healthcare Practice, University
of Hertfordshire

of ulcer recurrence, although this remains significantly high, even with intervention (Gillespie, 2010). Therefore, interventions that deal with the underlying disease may present significant benefits for patients. The guidelines refer specifically to treatments such as:

- ▶ Ablation, either with laser or radiofrequency
- ▶ Foam sclerotherapy using ultrasound
- ▶ Surgery.

These treatments are all useful for superficial venous reflux. Even if some deep venous disease exists, patients may still benefit from the active treatment of the underlying condition (Vowden and Vowden, 2007). For some, the use of compression therapy will continue to be the best option but Vowden and Vowden indicate that there is a need for ongoing research to establish which interventions best match specific clinical circumstances. The National Institute for Health and Clinical Excellence (NICE) referral advice (2001) suggests that people should have a vascular referral when they have the following:

- ▶ Bleeding from a varicosity
- ▶ An active or healed ulcer
- ▶ Recurrent superficial thrombophlebitis

- ▶ ‘Troublesome’ symptoms, such as pain or restless legs.

The NICE referral guidance has been superseded by a referral database but varicose veins do not appear on it. There is, however, a guideline for varicose vein management under development although ulceration management will not be part of the remit (NICE, 2011).

Most patients who fall under categories C1 to C3 in the RSM guidance will be managed with lifestyle advice and compression hosiery. However, some do not respond to conservative treatment (including hosiery). For others, their symptoms are clearly related to venous insufficiency and are problematic to the patient, including unresolving oedema (Table 1). This group of patients may benefit from a referral. There is no clear evidence that this patient group will go on to develop leg ulcers but those with leg ulcers do report no response to conservative treatment, indicating that, for some, a more proactive approach may be needed.

A key feature of the new recommendations is for referrals in categories C4 to C6. It is recommended that all C4 and C5 patients should be referred to a vascular consultant

Table 1
(Berridge et al, 2010)

Classification (C category)	Description	Recommendations
C ₀	No visible or palpable signs of venous disease	No intervention
C ₁	Telangiectasias or reticular veins	Lifestyle advice and conservative management, except in the case of impaired HRQOL, ‘troublesome symptoms’, no response to treatment, clear signs of chronic venous insufficiency, non resolving oedema
C ₂	Varicose veins (>3mm)	As above
C ₃	Oedema	As above
C ₄	Changes in skin and subcutaneous tissue; pigmentation, eczema, lipodermatosclerosis or atrophie blanche	Referral on the grounds that there is a significant risk of chronic venous ulceration
C ₅	Healed venous ulcer	As above
C ₆	Active venous ulcer	Urgent referral within two weeks

Note: Urgent referrals also apply when there is bleeding varicosities or superficial thrombophlebitis.

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KEY POINTS

- ▶▶ A rapid referral process constitutes a proactive approach to the prevention and management of chronic venous ulceration.
- ▶▶ Early intervention might reduce the complications that come with chronicity and prevent or delay recurrence.
- ▶▶ Many interventions for chronic venous insufficiency can be carried out in outpatient settings rather than in an operating theatre.

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for a clinical and colour duplex assessment complemented by other diagnostics as appropriate. A further important recommendation is that all patients with an active venous ulcer (C6) should be referred urgently to a vascular consultant if there is failure to heal within a two-week period and the patient should then be seen within two weeks of the referral (Berridge et al, 2010). This is potentially controversial since, currently, most patients with venous ulcers are managed in community services or leg ulcer clinics and do not see a vascular consultant during or after healing. The recommended change would result in much higher referral rates.

In contrast, national leg ulcer guidelines (SIGN, 2010) define a venous leg ulcer as an open lesion of at least four weeks' duration (with the presence of venous disease). However, definitions vary and, if there are clear signs of chronic venous insufficiency, it is a source of frustration that some practitioners will wait four to six weeks before intervening with leg ulcer-specific assessment and interventions.

BENEFITS

A two-week referral time for vascular intervention opens up exciting possibilities for patient care. Ulcers which have been open for a long time inevitably take longer to heal (RCN, 2006) and are more likely to become complicated by other factors, such as:

- ▶▶ Pain
- ▶▶ Prolonged inflammation
- ▶▶ Prolonged infection.

Early intervention may reduce the complications that come with chronicity and offer the patient the best chance of healing and preventing or delaying recurrence. Clear guidelines will also reduce the risk of patients being kept in suboptimal treatment for long periods of time because their condition is being managed by inexperienced personnel (Knight, 2008).

CHALLENGES

There may be challenges in putting this guidance into practice. Key to the process will be the GP or practice nurse recognising the problem and making a referral. Community services, especially in leg ulcer clinics, would need to have different working practices to ensure patients are assessed and referred in a timely manner. However, in some services, vascular consultants run

outreach services to bring primary and secondary care closer together, resulting in a more streamlined service for patients.

The use of portable duplex scanning devices and immediate access to the consultant or vascular specialist nurse could dramatically change current models of working. There are costs involved in referrals and diagnostics which will have to be met, but the Venous Forum group assert that their recommendations will lead to more clinically-focused patient care and cost-effective use of resources.

Increased referrals and interventions will need to be subjected to scrutiny and evaluation to establish economic and quality of life benefits. Any increase in waiting list times would need to be managed, especially so that the two-week target can be met. However, this presents exciting opportunities for practice and for people living with chronic venous insufficiency and ulceration. Even enhanced access to duplex scanning would ensure a more accurate diagnosis of the site and the extent of chronic venous disease, which would aid the targeting of resources in primary and secondary care.

In a recent editorial (Zimmet, 2011), the recommendations were welcomed as an initiative that would use NHS resources effectively. The editorial was based on a wealth of published evidence and expert opinion. Zimmet points out that many interventions for chronic venous insufficiency can be carried out in outpatient settings or other clinic settings rather than in a hospital operating theatre.

CONCLUSION

At the moment, and according to national leg ulcer guidelines (RCN, 2006; SIGN, 2010), urgent referral is confined to severe arterial disease. Applying this to venous insufficiency may meet some resistance but venous disease management has everything to gain from early intervention if it can be shown to make a measurable difference to patients and leg ulcer services.

Early intervention could help avoid progression to tissue changes and deteriorating skin integrity, possibly leading to venous ulceration (Gillespie, 2010). It will be interesting to evaluate the uptake and impact of these recommendations on resources and patient experience. **WUK**

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