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**NHS Forth Valley**

**Management of** **Leg Ulcers**

**Guidelines for Good Practice**

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This document can, on request, be made available in alternative formats.

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**Consultation and Change Record – for ALL documents**

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# Introduction

The aim of this guideline is to ensure consistent clinical practices and a cohesive approach in relation to the management of patients with lower limb ulceration.

With a particular focus in relation to the management of venous leg ulceration.

A venous leg ulcer is defined as an open lesion between the knee and ankle joint that occurs in the presence of venous disease and takes more than 2 weeks to heal (NICE 2013)

It has been based on the recommendations from [SIGN Guideline 120 (2010) – Management of Chronic Venous Leg Ulcers](http://www.sign.ac.uk/pdf/sign120.pdf) and Wounds UK. Best Practice Statement: Holistic Management of Venous Leg Ulceration (2016.) and Wounds UK Best Practice Statement – Addressing the complexities in the management of venous leg ulcers (2019)

It reflects the current service provision and facilities available within NHS Forth Valley.

The terminology within this document is specific to leg ulcer management and a [glossary of terms](#_Glossary_of_Terms) is given on page 16.

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# Scope

This guideline is for all trained nursing staff, to increase their knowledge and enable them to be more proficient and competent in the management of leg ulcers.

Undertaking a thorough, holistic assessment, in order to obtain an accurate diagnosis is the key to managing leg ulcers effectively (BPS 2016). Arterial assessment is an essential component of leg ulcer assessment and management (Vowden and Vowden 2001). The most common of these is the Ankle Brachial Pressure Index (ABPI), which should be performed, to eliminate arterial disease, by appropriately trained practitioners, who endeavour to maintain their skills (SIGN, 2010).

Following this, appropriate compression bandages/compression system should only be applied when the nurse has a good understanding of the principles of compression bandaging/systems and has had appropriate training and is competent in their application.

Although no local competencies are currently available, the practitioner should refer to the NMC codes of conduct and accountability.

It is also necessary to have knowledge of the potential problems of bandaging/compression systems and of applying compression inappropriately to legs where the circulation may already be compromised.

Nurses, proficient and competent in assessing leg ulceration can make recommendations, initiate treatment and refer to Tissue Viability service/other services as necessary.

More information on the Tissue Viability Service can be found on the [Tissue V](http://www.sid.scot.nhs.uk/index.asp)iability website via NHS Forth Valley Intranet.

# Referral to Tissue Viability Service

Follow leg ulcer treatment algorithm on page 13 for appropriate time to refer (Atkins & Tickle 2016). Patient’s consultant or GP should be made aware of the referral. Referral form is available on Tissue Viability Website via the NHS Forth Valley Intranet.

Telephone number 01324 673747

TV mailbox address – fv-uhb.tissueviability@nhs.scot

# Assessment of Leg ulceration

The key to leg ulcer management is in the assessment – where aetiology of the ulcer is ascertained. Early intervention and treatment are most beneficial (EWMA 2016)

When a patient presents with a leg ulcer of unknown aetiology a full holistic assessment should be carried out by a nurse competent in leg ulcer management, prior to the application of any compression bandage systems. The Nursing and Midwifery Council Code of Conduct and Accountability should be considered.

[Forth Valley Wound Management Formulary (2019)](http://intranet.fv.scot.nhs.uk/web/FILES/Pharmacyfiles/Wound_Mgt_formulary_Nov_11_A4%5B1%5D.pdf) should be followed for appropriate dressing choice.

It is necessary to record the following information and document on the appropriate leg ulcer assessment chart/wound recording sheet for your area, whether electronic or papaer format.

Patient history

* Co-morbidities such as diabetes, cardiac or renal disease, rheumatoid arthritis or other autoimmune diseases, obesity, malnutrition, existing medical conditions and usage of prescription drugs and Intravenous drug use, previous injury or surgery to the leg, that may influence future management, should be obtained from patient and hospital/GP health records.
* Vascular history e.g. previous deep vein thrombosis, pulmonary embolus, angina, myocardial infarct, stroke, renal/cardiac failure, previous arterial/venous surgery, previous leg ulceration.
* Presence of varicose veins, Lipodermatosclerosis, dermatitis, oedema, joint mobility
* General assessment taking into consideration lifestyle, quality of life, social and psychological factors which can influence healing (EWMA 2008)

Medications

* For example immunosuppressant’s, chemotherapy drugs, steroids, Nicorandil – amongst others that are known to delay wound healing. (Sree et al 2000) (Riddell A et al (2008)

Wound history

* Ulcer history – duration of current ulcer, number of episodes and onset of ulceration.
* Wound assessment – description of wound bed/tissue type, size, exudate levels, distribution of ulceration and position. (Refer to wound assessment chart).
* Wound measurements should be done and repeated every 4 weeks, this helps to ascertain increase or decrease in size of the ulcer.
* Photography of the wound and surrounding skin is a useful way of ensuring objective recording of the wound. For consistency the angle and position of affected limb should be in the same position each time a photograph is taken. A photograph consent form should be completed as per current Forth Valley Wound management Formulary. Photograph can be stored electronically on patients’ electronic notes system as appropriate.
* Previous dressing and management regimes

Investigations

* Hand held Doppler ultrasound assessment to confirm the presence of venous reflux and associated venous disease and to calculate the ABPI to assess arterial blood supply. ABPI should be performed by appropriately trained practitioners, who endeavour to maintain their skills (SIGN, 2010).
* Use of automated ABPI machines e.g. MESI by Medi UK can be used by clinicians trained in its use which can reduce the time needed to perform this test in comparison with hand held Doppler (Wounds UK 2019)
* Other investigations such as Duplex scanning or MRI angiograms may be carried out to assess the extent of venous/arterial disease, at the discretion of a Consultant vascular surgeon.

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# Diagnosis of leg ulceration

Leg ulcers are a common chronic condition affecting around 1.5% of the adult population at any one time. This figure increases to 36 per 1000 in the over 65 age group (SIGN 2010) Guest et al (2015) found that the number of diagnosed venous leg ulcers equated to 1 in 170 adults.

Most leg ulcers are the result of venous or arterial disease but there are many contributing factors

* Venous Disease 76 %
* Arterial and venous disease 10-20%
* Arterial Disease 22%
* Rheumatoid Arthritis 9%
* Diabetes 5%

(SIGN 2010)

Other factors associated with leg ulceration include:

* Oedema
* Malignancy
* Blood disorders
* Infection
* Burns
* Traumatic injuries

Venous Leg Ulcer

A chronic venous leg ulcer is defined as *“an open lesion between the knee and the ankle joint and occurs in the presence of venous disease and takes more than two weeks to heal” (NICE 2013).”*

Clinical signs of venous disease are normally present e.g. varicose veins, cellulitis, ankle flare, venous dermatitis, Lipodermatosclerosis, oedema, medial / lateral ulcer in lower gaiter area. ABPI would normally be 0.8 -1.3.

Arterial ulcer

Generally, there is an absence of signs of venous disease, with signs and symptoms of possible reduced arterial supply – pale /dusky discolouration, reduced capillary refill and absence or difficult to locate foot pulses, diabetes, Intermittent claudication / rest pain, pain in lower limb on elevation, foot or digital lesions, shiny/hairless skin to the leg, leg ulcer that fails to progress with appropriate treatment, significant/sudden deterioration in the leg ulcer/limb, e.g. colour change and pain/wound breakdown, cool to touch. The ABPI would normally be 0.5-0.79. If ABPI ≤ 0.5 – refer to vascular services for consideration of further investigation.

In those patients with diabetes or calcification of the arteries, calculating the ABPI is unreliable, where the ABPI may appear misleadingly high.

Mixed Aetiology

Any combination of the following, contributing to the ulcer:

* Venous disease, arterial disease, diabetes, rheumatoid disease, or other contributing factors
* ABPI between 0.8 – 1.0 (same as venous)
* Atypical ulceration

Atypical Ulceration

Frequently signs of venous or arterial disease are absent and a history of the lesion healing and recurring may be given. Consider other causes including malignancy

# Management of leg ulceration – see also Leg Ulcer Treatment Algorithm page 13 and 14.

**Venous Ulcer**

In the absence of significant arterial disease and presence of venous disease, the correct application of graduated multi-layer bandaging can be the most effective means of healing uncomplicated venous leg ulcers, to reduce venous hypertension.. Compression therapy may be safely applied in patients with ABPI of 0.8- 1.3(SIGN, 2010).

**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.

Research has indicated that a graduated pressure of 30-40mmHg at the ankle, reducing at the calf, on a normal shaped leg, to 15-20mmHg is necessary to do this (Moffat et al, 1992). The four layer bandage system has always been the bandage system of choice for first line treatment. However, it is important to remember that there are now a variety of evidence based compression systems and types that are available to respond to the varying needs of the patient population. This includes leg ulcer hosiery healing kits. The VenUS IV study showed these systems were a viable alternative to compression bandaging (Ashby et al 2014)

If a latex sensitivity is known or suspected, use a latex free bandage/compression system. Contact TVS or Dermatology Services for further advice as required

An ulcer that fails to show any reduction in size or not healed after 12 weeks of appropriate dressings and compression bandaging, consideration should be given to re-assessment and referral to an appropriate specialist for further management (SIGN 2010).(Wounds UK 2019)

The ABPI should be repeated at 3, 6 or 12 monthly intervals, to ensure the arterial status has not worsened, depending on risk factors and healing progress (Furlong 2013)(Wounds UK 2019)

* High risk: review 3-monthly
* Medium risk: review 6-monthly
* Low risk: review yearly

COMPRESSION BANDAGING SYSTEMS

The following are suggested regimen for various ulcer types. These bandage systems should only be used following a comprehensive assessment by a practitioner who is experienced in leg ulcer management.

Four Layer Bandage System

Patients with venous leg ulceration frequently have a contact sensitivity of the skin. A simple non-adherent dressing is all that is required under the multi layer bandage system. (SIGN 2010).

Graduated compression, in this system, is built up over the four layers and for treatment of venous leg ulcers can stay in place for up to one week. The compression is graduated so there is more compression around the ankle /gaiter area and slightly less towards the knee. If the ulcer is heavily exuding refer to the Wound Management Formulary for superabsorbent dressings, it may require more frequent changes and initially it is beneficial to renew it after a few days as a means of assessing the skin for pressure damage.

Prior to choosing the bandage system, it is necessary to measure the ankle circumference, as the combination of bandages varies according to the ankle measurements.

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| ANKLE CIRCUMFERENCE | EXAMPLE OF BANDAGE REGIME |
| Less than 18 cm | 2 or more rolls of wool padding, 1 Crepe, 1 light compression bandage, 1 Cohesive |
| 18 – 25 cm | 1 roll of wool padding, 1 Crepe, 1 light compression bandage, 1 Cohesive |
| 25 – 30 cm | 1 roll of wool padding, 1 high compression bandage, 1 Cohesive |
| Greater than 30 cm | Seek advice from specialist nurses |

Note that the ankle circumference may reduce slightly during treatment and should be checked at regular intervals.

Method of application

Ideally the first bandage application should be when the leg is free from any swelling, such as first thing in the morning – oedematous skin is vulnerable and prone to damage. Prior to applying the bandage system, the patient should be encouraged to maintain the foot at right angles to the leg. It is also useful at this stage of treatment to ensure the patient is well informed of the need for compression bandaging in an attempt to aid compliance

LAYER 1 - Wool Padding

This layer may be considered the most important, as its main function is protection. Padding should be applied to cover the achilles tendon and bony prominences and of the forefoot. It is not necessary to pad the underside of the foot, REMEMBER the patient needs to apply footwear! Spiral application of wool from ankle to below knee, it is good practice to apply two layers for added protection, or to apply an extra layer over the tibial crest. Regardless of the bandage regimen chosen, a layer of wool padding should always be applied.

LAYER 2 – Light Conformable e.g. Crepe

Beginning at the base of the toes, hold the bandage under the foot and apply one turn around the foot, the next turn catches the point of the heel and then fill the gap at the instep. The bandage should continue up the leg in a spiral, maintaining 50% overlap and 50% stretch. Cut off any surplus bandage and secure with tape.

LAYER 3 – Light compression (Class 3a 14-17mmHg )

Application is the same as layer 2, but after the foot turns, a figure of eight application is employed; this allows the bandage to conform to the limb shape. Maintaining a 50% extension is necessary to achieve the correct pressure.

If this layer is applied in a spiral it is sometimes known as a “modified four layer system” and allows a slight reduction in pressure.

LAYER 4 – Cohesive (Class 3b 18-24mmHg)

Once again, application is the same as layer 2. This layer also adds durability to the system (Duncan, 2000)

Alternatives

The following are alternatives to the four layer bandage system:

Long Stretch Bandages (elastic)

This type of bandage is particularly useful for the larger leg.

These bandages provide high levels of compression in one layer (40mmHg) and should be applied over a layer of wool padding. The elastic fibres of this bandage give continuous pressure whether at rest or exercise. Advice from Specialist service should be sought prior to application of this bandage type.

Example – Tensopress

Short stretch bandages

In this bandage, sustained high pressures are avoided and this may be the bandage of choice when dealing with an ulcer of mixed aetiology or those with a painful ulcer in the early stages of treatment.

Studies have shown that short stretch bandages are also capable of achieving pressures of 35 – 45 mmHg at the ankle. They offer high pressure when patient is active and low resting pressure. When patients are ambulatory, this pressure is increased by the pumping action of the calf muscles against the non-elastic short stretch bandage. The pressure is directed back to the leg where it acts on the deep venous system (SIGN 2010).

Close supervision is still required and care taken to avoid pressure damage. As with any other bandage system, a layer or more of wool padding should be applied to the leg before the bandage. Application - from base of toe to knee, 50% overlap, 50% extension.

Examples: Elastocrepe, Actico

Two layer bandage system

This type of bandage system gives compression over two layers and doesn’t have the bulk of the traditional 4 layer system. The inner and outer layers adhere to each other and reduce the likelihood of slippage. However caution should be exercised as there is minimal padding under the compression. It is a particularly useful system to use when the patient continues to work or is required to wear safety footwear.

Example- 3M Coban 2 layer bandage systems an inelastic system, Urgo K2- a layer of inelastic bandage with elastic bandage on top. Lite versions are also available providing between 18-23mmHg.

Compression Wraps

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There is increasing interest in the potential value of compression wraps in the management of Lymphoedema and other disorders of the circulatory system.

Available in a variety of forms, these devices essentially consist of fabric sheets made from one or more components with limited extensibility, which are applied to affected limbs and held in place with Velcro fastenings.

Unlike multilayer bandaging systems, wraps can be replaced or adjusted by patients themselves, which increases

their acceptability and therefore, it is assumed, improves patient compliance, while reducing the need for

professional interventions. There are multiple case studies on their use but lack of RCT’s

Compression Hosiery Kits

Hosiery remains the mainstay of prevention, but 2-layer 'strong' (40mmHg) hosiery systems/kits can also be an effective method of providing compression therapy in selected patients with small, low exudate wounds. Such patients can be encouraged to self-care under the supervision of an appropriate healthcare professional.   
  
It is important to measure the leg accurately and select appropriately sized hosiery with the correct compression level. Ensure that the patient is shown how to apply the hosiery and understands when to wear the garment. Offer patient information leaflet: Tips for Good Skin Care when wearing Compression Hosiery which includes instruction on skin care and hosiery maintenance, including washing and drying. Hosiery constituents vary and it may be necessary to consider different makes of stocking, including circular knit/flat knit if concordance is to be improved for individual patients.

Management of leg ulceration

Arterial Leg Ulcer

Arterial leg ulcer patients should be referred to vascular surgeon for further assessment. NO compression bandages should be applied until vascular assessment and management guidance is obtained from the Vascular Surgeon. These patients may benefit from angioplasty or arterial reconstruction surgery and should be referred to a vascular surgeon as soon as possible.

Patients with arterial disease have the potential for skin trauma; therefore the application of a comfortable dressing under a layer of wool padding from base of toes to knee should be applied before the bandage. A light support bandage e.g. Crepe at 50% overlap, 50% extension is sufficient.

Do not apply compression if arterial disease present, or if there is any doubt as to the aetiology of the leg ulcer, unless requested by the vascular surgeon.

Mixed Aetiology

Where there are several factors influencing the ulcer; exercise caution when applying bandages. If there is any doubt as to the aetiology of the ulcer, referral should be made to a vascular surgeon for further guidance or assessment.

**Atypical Ulceration**

Patients with atypical ulceration should be referred to vascular surgeons/dermatologist for further investigations and possible biopsy exclude or confirm a malignant lesion.

Atypical signs may include: easily bleeding tissue, rolled edges, cauliflower appearance.





**COMPRESSION STOCKINGS**

**Prevention of recurrence of venous ulceration**

When a venous leg ulcer has healed, maintenance and prevention of recurrence is vital. As soon as the patient has healed, the maintenance phase of management should commence. (BPS 2016 and 2019)

A fairly recent Cochrane review also indicated that the use of adequate compression post-healing will prevent recurrence (Nelson and Bell-Syer, 2014).

Compression hosiery is available in three classes: I, II, III. Class III being the firmest, and Class I being the lightest. They are also available in circular knit and flat knit.

* The leg should be measured around the ankle and calf and the appropriate size, type and class of stocking selected.
* Bandages should continue to be used until the compression stockings are available.
* One pair of stockings is required for each leg
* A variety of compression stockings are available on GP prescription, including Made to measure (MTM).
* If patients are out with the size selector – may require referral to Specialist Hosiery Clinic, referral criteria on NHS FV TVS Website. [specialist hosiery criteria](file:///\\antonine.local\nhsfv\dept%20folders\Wound%20Management\SAM'S%20STUFF\Referral%20Criteria%20for%20Hosiery%20Clinic.docx)

Hints for applying stockings:

* Use of rubber gloves during application, helps to grip the fabric
* ‘Applicators, such as “Actiglide” are available on GP prescription
* There is now a variety of hosiery applicators available.

Continued lifelong use of these stockings is important to prevent recurrence of leg ulcers. Patients require education on the risk of ulcer recurrence, the importance of good skin care and exercise as able, to optimise their ongoing self care. (BPS 2016)

The compression hosiery should be renewed every 4-6 months.

# Antenatal Patients

Antenatal patients with painful, troublesome varicose veins during pregnancy may be provided with compression hosiery, for relief of symptoms and prevention of further complications.

Midwife, Obstetrician or Physiotherapist can make the referral to the TV Specialist hosiery clinic. A completed TV referral should be sent to the Tissue Viability Service prior to seeing the patient.

If the patient is 28 to 36 weeks gestation, 2 pairs are issued for the affected legs; if 36 weeks or more then one pair is issued.

No assessment is necessary for the majority of these patients. However approximately 10 months following delivery of the baby, if the varicose veins are still problematic, a referral can be made to the vascular surgeon, for further assessment by the patients GP.

Management of Oedema

Chronic Oedema is a common problem particularly in venous disease. It is the responsibility of the GP and community nurse to assess and treat the oedema in the first instance.

Following a comprehensive leg ulcer assessment and definitive diagnosis, renal/cardiac failure and hypoalbuminaemia or any other cause should be excluded by venous blood sampling, history and examination.

It is helpful if the patient can elevate legs to level of hips, or to rest in bed, with foot of bed elevated slightly 6-10cm, prior to having bandaging applied.

Treatment can be initiated using reduced compression, gradually increasing to full multi-layer system. Once the oedema has significantly reduced the patient should be measured and fitted with appropriate compression hosiery.

Management of these patients frequently lies in the medical management and identifying the underlying cause, e.g. renal/cardiac disease, liver failure, venous insufficiency, dependent oedema, impaired lymphatic drainage where referral to the Lymphoedema Service would be appropriate, by completing the Lymphoedema referral form via SCI store. Available through NHS FV Intranet.

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# Glossary of Terms

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| **Term** | **Definition** |
| ABPI | Ankle Brachial Pressure Index is part of the assessment process and gives an indication of the blood flow to the feet and lower legs |
| Arterial | Pertaining to the arteries |
| Leg ulcer | Defined as an open lesion between knee and ankle joints that remains unhealed for at least 2 weeks (NICE 2013)) |
| Lipodermatosclerosis | Brownish purple discolouration around the leg ulceration |
| Oedema | Abnormal infiltration of the tissues with fluid |
| Varicose veins | Dilated veins |
| Vascular | Refers to blood vessels |
| Venous | Pertaining to the veins |

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# Reference List

Ashby RL, Gabe R, Ali S, Adderley U (2014) Clinical andcost-effectiveness of compression hosiery versus compression bandages in treatment of venous leg ulcers(Venous leg Ulcer Study IV, VenUS IV): A randomisedcontrolled trial. *Lancet* 383(9920): 871–9

Atkin L, Tickle J 2016. A new Pathway for Lower Limb Ulceration.

Wounds UK 12 (2): 40:3 in Wounds UK.

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

European Wound Management Association (2016) Management of patients with leg ulcers: challenges and current best practice. Available at <http://www.magonlinelibrary.com/pb-assets/JOWC/EWMA-venous-leg-ulcers.pdf>

Furlong W (2015) Recommended frequency of ABPI review for patients wearing compression hosiery. [British Journal of Nursing](https://www.magonlinelibrary.com/journal/bjon)[Vol. 24, No. Sup20](https://www.magonlinelibrary.com/toc/bjon/24/Sup20) Tissue Viability

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

[Mikeljevic J](https://www.ncbi.nlm.nih.gov/pubmed/?term=Mikeljevic%20J%5BAuthor%5D&cauthor=true&cauthor_uid=21564175)1, [Highet AS](https://www.ncbi.nlm.nih.gov/pubmed/?term=Highet%20AS%5BAuthor%5D&cauthor=true&cauthor_uid=21564175).(2011) Nicorandil-induced leg ulceration without mucosal involvement. [Clin Exp Dermatol.](https://www.ncbi.nlm.nih.gov/pubmed/21564175) 2011 Jun;36(4):372-3. Available on line at:

<https://www.ncbi.nlm.nih.gov/pubmed/21564175>

National Institute for Health and clinical Excellence (20130 CLINICAL KNOWLEDGE SUMMARIES: Leg Ulcer- venous. Available on line at : <http://cks.nice.org.uk/leg-ulcer-venous#!topicsummary>.

National wound Care Strategy Programme Available on line at https://www.nationalwoundcarestrategy.net/

Nelson, E.A. and Bell-Syer, S.E. (2014) Compression for preventing recurrence of venous ulcers. The Cochrane Database of Systematic Reviews..

Riddell A et al (2008) The effects of nicorandil on wound healing (case series) [Abstract]. *Wound Repair and Regeneration* 16 (6) Available online at:

<http://orca.cf.ac.uk/17672/>

Scottish Intercollegiate Guides Network(SIGN) *Management of Chronic Venous Leg Ulcers 2010 .* Edinburgh 2010.

Sree et al (2000) The effects of drugs and wound healing part 11. Available on line at:

<https://onlinelibrary.wiley.com/doi/pdf/10.1046/j.1365-4362.2000.00949.x>

Wounds UK (2016) Best Practice Statement: Holistic Management of Venous Leg Ulcers. London: Wounds UK

Wounds UK (2019) Best Practice Statement: Addressing complexities in the management of venous leg ulcers. London: Wounds UK

Wounds UK (2019) Best Practice Statement: Ankle Brachial Pressure Index (ABPI) in practice. London: Wounds UK

Vowden K, Vowden, P (2001) Doppler assessment and ABPI: Interpretation in the management of leg ulceration. Available on line at:

<http://www.worldwidewounds.com/2001/march/Vowden/Doppler-assessment-and-ABPI.html>

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