HSE National Improvement Programme for Wound Management

Clinical Resource Pack: Lower Limb Ulcers

Date: June 2025

Reader Information

Document Control

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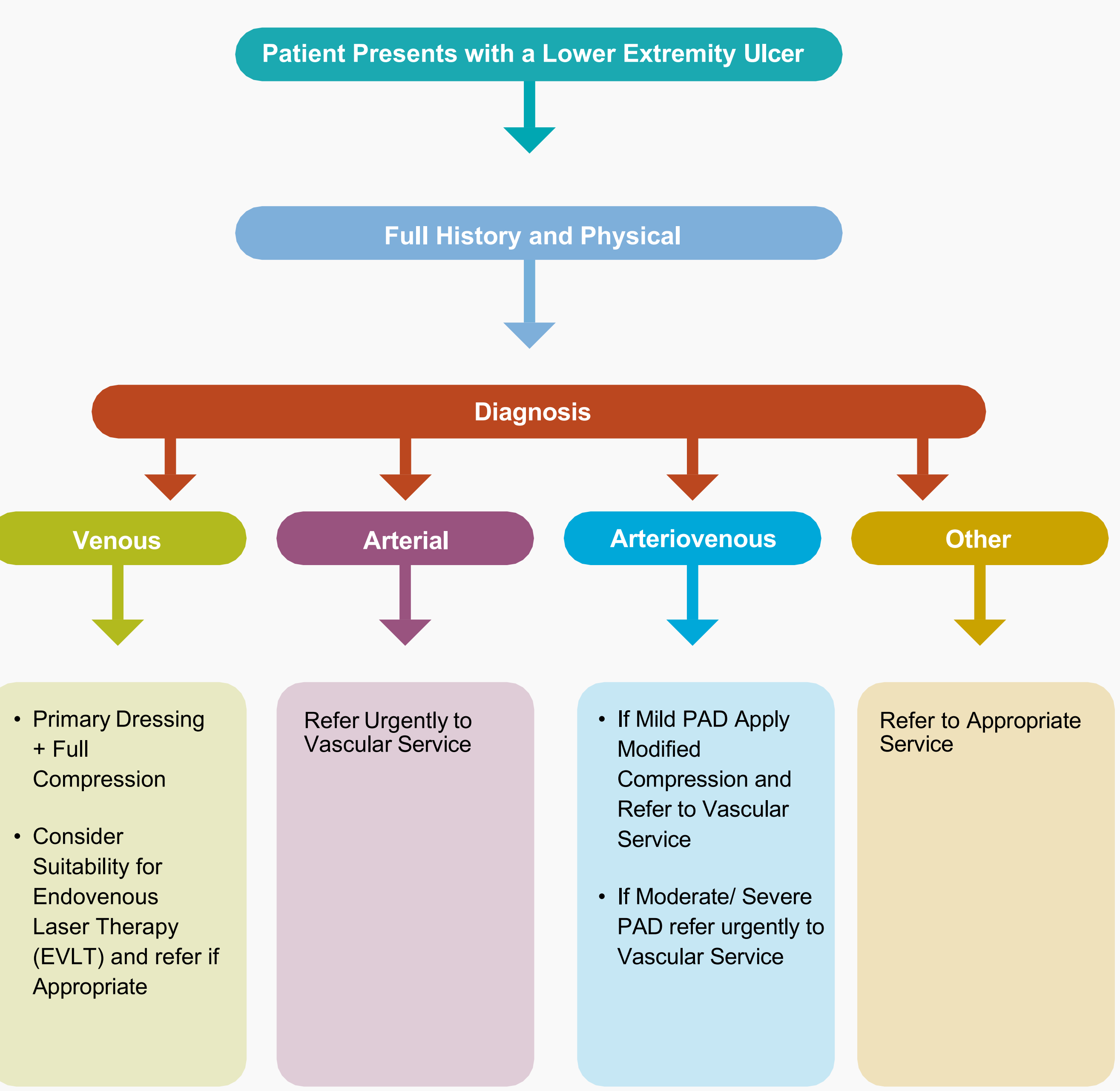
Endorsements

This document has been endorsed by the Tissue Viability Nurses Association of Ireland and the Irish Vascular Society June 2025.

Lower Limb Ulcer Management



1.0 Background

This Lower Limb Ulcers Resource Pack was designed by the HSE National Improvement Programme for Wound Management (NIPWM), a collaboration between National Quality and Patient Safety and the Office of the Nursing and Midwifery Services Director.

This Lower Limb Ulcer Resource Pack provides an evidence-based standard of care and recommendations for healthcare professionals in the diagnosis and management of patients at risk of, or with lower limb ulceration.

1.1 Scope of this Resource Pack

This Clinical Resource Pack includes recommendations that describe best practice for care in all HSE Health Care Settings. Clinicians should work within their individual scope of practice and adhere to local policies, procedures, protocols and guidelines when using this resource pack.

1.2 Development and Update of this Resource Pack

These recommendations were developed using an evidence-informed approach, with consideration of research studies including systematic reviews, healthcare resources, consensus documents, best practice documents, international standards and guidelines. Expert opinion was sought followed by wider consultation from the NIPWM Oversight Group.

1.3 Note on the term “Patient”

Different terms are used for people who attend health and social care services in different settings. The terms “patient”, “service-user”, “client”, ”resident”, “person supported by healthcare services”, “consumer”, “the public” and “people who use healthcare services” are used across our health and social care services. The NIPWM has chosen to use the word “patient” as it was felt this term makes it clear that these Clinical Resource Packs are for use in healthcare services. When we use the term “patient” we are referring to people who use, or are supported by healthcare services, their personal support network, communities and anyone who may use healthcare services in the future. When reading this document, please substitute the word “patient” with the term most appropriate for your healthcare setting (HSE, 2022a).

1.4 Consent

Consent must be sought from all patients, parents or legal guardians prior to undertaking assessments/interventions in line with the HSE National Consent Policy (2024).

2.0 Lower Limb Ulcers Overview

A lower limb ulcer or leg ulcer is defined as “a break in the skin between the malleolus (bony prominence on each side of the ankle) and the knee, which has not healed within two weeks” (HSE 2018, NICE 2021). Lower Limb Ulcers are often referred to as chronic wounds. A chronic wound is defined as a wound that has failed to progress towards healing within four weeks despite receiving an appropriate standard of care (Eriksson 2022). Chronic lower limb wounds include multiple and often mixed aetiologies compounded by chronic disease co-morbidities. Acute lower limb ulcers can quickly become chronic wounds, particularly if the patient has not been assessed and treated by a competent practitioner as soon as possible after the wound occurs. A complete holistic assessment is essential for all lower limb ulcers, as making a correct and timely diagnosis and implementing appropriate treatment is paramount to the successful management of these wounds. Failure to identify and rectify key risk factors that may inhibit healing will further compound the chronicity of the wound and cause poor patient experience.

Lower limb ulcers affect 1.5 % of the adult population. The majority of these ulcers are venous in origin and these have a high risk of recurrence (Stanek *et al*. 2023). The European Wound Management Association (EWMA) (2023) highlights the importance of diagnosis and referral pathways when assessing lower limb ulcers. The lack of differential diagnoses in lower limb wound assessment was evidenced in a retrospective review of 505 patients’ notes undertaken by Guest *et al*. (2018). The authors reported a lack of clinical expertise in assessment of these wounds, with only 22% of this cohort having had an ankle brachial pressure index (ABPI) (Appendix I: Ankle Brachial Pressure Index) recorded.

ABPI is a diagnostic test used to determine if a patient has arterial disease. It is important to note that the diagnosis of venous disease is based on clinical assessment. ABPI may be required where there is a need to determine whether the patient has co-existing arterial disease based on the clinical assessment findings. The presence of significant arterial disease would preclude full-strength compression therapy and should prompt referral to specialist vascular services. Compression therapy (bandaging, hosiery kits, stockings or wraps) is the first-line treatment for venous leg ulcers. However, Guest *et al*. (2018) reported that 13% of the patient cohort they examined were not prescribed any form of compression therapy. A UK study (Hopkins 2020) reported that failure to use compression in lower limb wounds increased nursing visits by 45% compared to patients who were managed in compression. There exists some evidence to suggest that clinicians may be reluctant to commence compression therapy due to concerns relating to adverse complications in case the patient has con-comitant arterial disease (Bernatchez *et al*. 2017).

There is much research on the costs associated with venous leg ulcers (Arundel *et al*. 2023, Guest *et al*. 2018, Stanek *et al*. 2023) however, there is a paucity of studies that addressed the effect or cost of diagnostic delay (Isoherranen *et al*. 2023). Having a lower limb wound exposes patients to developing complications such as infections or inflammatory conditions that require frequent treatments. Correctly diagnosing these conditions can be difficult for clinicians particularly differentiating between inflammatory and infective skin conditions (O’Brien & White 2021, Moore Z., O’Brien G *et al*. 2022). Failure to reach an accurate diagnosis leads to inappropriate antibiotic prescription and poor patient outcomes. This can be compounded by lack of access to trained personnel who can make accurate diagnoses and initiate appropriate treatment plans (O’ Brien & White 2021).

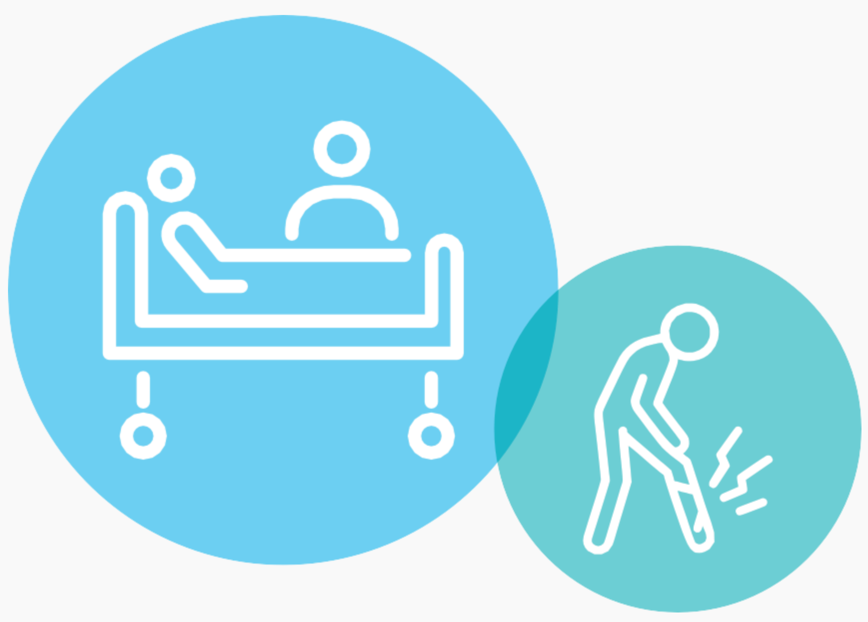
Unmanaged chronic oedema is also a risk factor for lower limb ulceration. Factors that influence this are thought to be diagnostic and management challenges and a lack of understanding of the influence of chronic oedema on health (Nairn *et al*. 2019).

2.1 Features of lower limb wounds (these features are also seen in other wounds)

Lower limb ulcers may have the following features depending on their aetiology:

- Prolonged or excessive inflammation Persistent or recurring infections
- Formation of drug resistant microbial biofilms
- Dermal and epidermal cells are unable to respond to reparative stimuli Pain
- Oedema
- Friable granulation tissue Malodour
- Redness to the peri-wound area.

These factors can result in wound breakdown or delayed healing (Plant 2019, Bowers



3.0 Lower Limb Ulcers – getting the diagnosis right

Accurate diagnosis is the foundation of lower limb ulcer care and requires assessment by a competent practitioner. Appropriate assessment includes taking a full history, undertaking a physical examination and includes a thorough holistic and wound assessment to identify wound aetiology and local/systemic factors, which can affect wound healing. The findings of this assessment are key to successful wound management. In order to achieve optimal management and wound healing, patients require the right care the first time in the appropriate service. Misdiagnosis may result in mismanagement, which may at best delay wound healing, but can also result in failure to heal or more serious consequences. For example if an arterial ulcer is mistakenly diagnosed as a venous ulcer and treated with compression therapy, it may have devastating consequences. Conversely, failure to apply appropriate compression therapy will lead to wound chronicity and its associated risks such as infection. Referral to specialist services such vascular or dermatology may be required to assist in making the correct diagnosis and to facilitate interventions, for example surgical procedures, vascular diagnostics and other diagnostic tools such as wound biopsy (Appendix II: Lower Limb Ulcer Diagnostic Pathway and Appendix III: Lower Limb Conditions requiring Urgent Medical Attention). The quality of the information provided on the referral will assist clinicians in triaging the patient referral, further supporting the need for competent practitioners to undertake wound assessment and management.

3.1 Venous Leg Ulcers

Venous leg ulcers are the most common type of leg ulcer accounting for the majority of lower limb ulcers (Wounds UK 2024). They are often chronic in nature, painful and frequently recur. Venous leg ulcers occur because of chronic venous insufficiency in the lower limbs. Chronic venous insufficiency may be caused by valvar incompetence (failure), reflux, venous obstruction or a combination of these resulting in venous hypertension, which precedes the formation of leg ulceration (Figure 1). In healthy leg veins, the valves work with the calf muscle pump to lower the ambulatory venous pressure. These valves prevent blood from flowing backwards and help keep blood moving through the veins. When the valves become damaged, the venous pressure in lower limb veins will rise. This causes fluid leakage which leads to swelling, irritation of the skin, skin changes including varicose eczema, haemosiderin staining, lipodermatosclerosis and atrophie blanche. This eventually leads to lower limb ulceration. Venous ulcers are typically shallow, irregularly shaped wounds in the gaiter area and they may have heavy exudate. Pain is often but not always an issue in venous leg ulcers and requires clinical assessment and management (Leren *et al*. 2020). However, if pain is a prominent feature, there may be significant coexistent arterial disease which requires specialist vascular assessment (European Society for Vascular Surgery (ESVS) 2022).

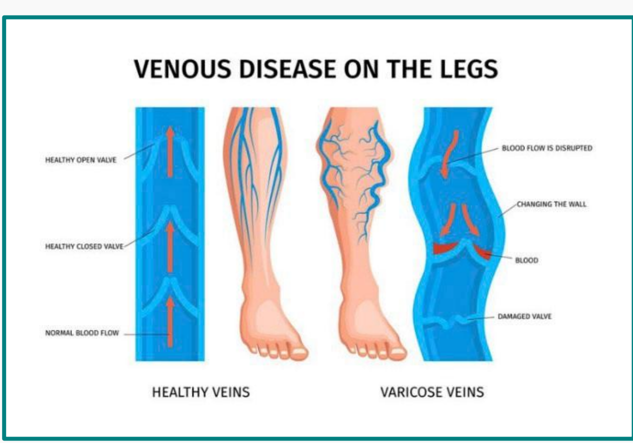


Figure 1: Venous Disease on the Legs

3.0 Lower Limb Ulcers – getting the diagnosis right

Risk Factors for chronic venous disease (Nair *et al*. 2024)

- Family history of venous disease
- History of deep venous thrombosis
- Multiple pregnancies in women
- Obesity
- History of ankle fracture or injury which has affected ankle movement
- History of fractures, joint replacement, surgery
- Older age
- Limited mobility or immobility
- Vascular malformations
- History of smoking
- Post thrombotic clotting disorders
- History of certain surgeries such as Coronary Artery Bypass Graft, hernia repair in men
- Lifestyle and occupational factors.

Features of chronic venous leg insufficiency (Nair *et al*. 2024)

- Phlebolymphoedema
- Skin changes
- Haemosiderin staining (Skin discolouration due to release of iron into the tissues)
  Venous eczema (Inflammatory skin condition as a result of venous insufficiency)
- Lipodermatosclerosis (Subcutaneous fibrosis and skin induration caused by chronic inflammation associated with venous hypertension)
- Epidermal lichenification (Thick scales on skin due to overproduction of keratin)
- Atrophie blanche (White patches on lower leg or foot, resulting from blockage of capillaries in the dermis)
- Shallow/superficial ulcerations Sloped wound edges
- Wounds present on gaiter area.
- High exudate levels

See table below for more information on limb skin changes associated with venous disease.

Oedema		Swelling of the limb that may indent if finger pressure is applied (pitting oedema); due to increased capillary permeability
Ankle flare		Fan-shaped pattern of dilated veins around the malleoli on the medial or lateral aspects of the ankle and foot; due to dilation of veins in these areas because of venous hypertension
Hyperpigmentation		Reddish brown discolouration of the skin; due to the deposition of haemosiderin in the skin
Lipodermatosclerosis		Areas of painful, tight skin with hardened subcutaneous tissues just above the ankle; due to the infiltration of fibrin and inflammation and result in the leg shape resembling an inverted champagne bottle
Atrophie blanche		White areas with decreased capillary density, often associated with lipodermatosclerosis
Varicose eczema		Itchy, erythematous, weeping and scaled areas of skin that may be painful; due to inflammation triggered by oedema resulting from venous hypertension

Table 1: Lower Leg Skin Changes with Venous

Diagnosis

The diagnosis of venous ulcers is made following a holistic and clinical assessment on clinical presentation.

Clinical assessment

Manual Pulse Palpation

Manual palpation of foot pulses is an important element of the clinical assessment. The femoral pulse is felt in the groin and the popliteal pulse is felt behind the knee. The posterior tibial pulse is felt lateral to the medial malleolus at a point about a third or halfway to the heel. The dorsalis pedis pulse may be felt two thirds of the way up the foot and lateral to the extensor hallucis longus tendon. Palpation of peripheral pulses requires a degree of clinical experience because inexperienced observers may inadvertently and erroneously feel their own pulse when the patient's pulse is absent. Therefore caution is advised for inexperienced clinicians in this part of the assessment and inexperienced clinicians may consider ABPI as a more reliable measure of perfusion (ESVS 2022). However, if a foot pulse can be easily felt, this effectively rules out significant arterial disease and compression may be commenced if necessary (Hannon 2021). Clinical examination and full holistic assessment must be undertaken and an appropriate plan of care developed based on the assessment results, including application of compression therapy, pain management, exudate management and recognising signs or symptoms of infection and treating it (Hannon *et al.* 2021).

Ankle Brachial Pressure Index

If arterial disease is suspected or cannot be out ruled, an Ankle Brachial Pressure Index (ABPI) is required (ESVS 2022). Currently ABPI is measured manually in people with leg ulcers as part of an initial clinical assessment (Appendix VII Venous Leg Ulcer Treatment Pathway). Systolic blood pressure is measured using a handheld Doppler ultrasound probe and a sphygmomanometer with a manually inflated cuff (Appendix I Ankle Brachial Pressure Index). It is important to note that ABPI may be falsely elevated in patients who have calcified arterial disease as these arteries are not compressible. Patients with diabetes frequently have arterial calcification and ABPI should therefore not be considered reliable in diabetics (ESVS 2022). Clinicians with specialist knowledge may perform Doppler Waveform Analysis (Tehan *et al.* 2022).

Toe Pressure Index

Toe pressure measurement (TBI), may be performed in specialised vascular laboratories or by trained specialists elsewhere with the appropriate equipment. Doppler Waveform Analysis and toe pressure assessments are thought to be more reliable in patients with calcified arteries because often the foot arteries are spared from calcification. However, each method described above has limitations and if there is concern for arterial disease, referral to vascular surgery services is advised (European Society for Vascular Surgery (ESVS) 2022).

Venous Duplex Scan

A venous duplex scan uses ultrasound to visualise blood flow and assess the health of veins in the legs. In the case of chronic venous disease, venous duplex is used to determine if the venous disease is correctable and to define the need for surgery such as endovenous ablation.

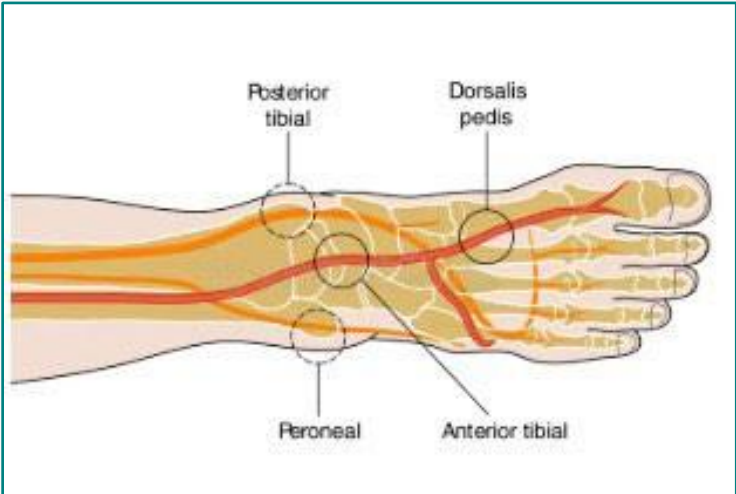


Figure 2: Location of Pedal Pulses

Treatment

Compression Therapy

Compression therapy uses external pressure often with specialised bandages or stockings to help prevent blood from pooling and reduces swelling. It is considered the gold standard of treatment for leg ulcer management. Patients may undergo vascular procedures such as endovenous ablation of varicose veins where deemed suitable (EWMA 2023). If interventional correction of venous hypertension is not undertaken, compression therapy is considered a lifelong treatment option. Compression therapy comes in different types and strengths. The compression therapy prescribed is based on the results of clinical assessment and results of diagnostic investigations. Compression therapy is available in different forms such as bandages, wraps or hosiery. The choice of therapy should include patient preference.

Surgical Treatment Options for Venous Insufficiency

Surgical options for treating varicose veins include:

- Endovenous laser treatment (also known as Radio Frequency Ablation). Laser (Radio frequency energy) is used to heat and destroy the vein. The procedure is carried out under local anaesthetic.
- Sclerotherapy involves injection of a liquid chemical sclerosant to seal the affected vein.
- Foam sclerotherapy consists of injecting a foaming chemical sclerosant agent into larger veins to seal them shut.
- Phlebectomy (Microphlebectomy, Ambulatory Phlebectomy or Stab Avulsion) is a technique used to remove varicose veins using small incisions to remove the affected varicose veins.

Venous leg ulcers frequently recur after they have healed, or new ulcers can develop in a different location on the limb, particularly when patients have not had or cannot have correctional surgery. They are also chronic and recurrent in nature and are often become complex as patients get older because of additional comorbidities. Treatment of superficial venous incompetence lowers the risk of ulcer recurrence and patients who are surgical candidates should therefore be referred to vascular services. Continued use of compression therapy after healing may reduce the chance of ulcer recurrence. Patients or their carers need to be able to identify when a leg ulcer is recurring and a mechanism of re-referral to the appropriate service at the earliest time is paramount in their management. See Venous Leg Ulcer Patient Information Leaflets (Appendix IV (a): Patient Information Leaflet, and Appendix IV (b): Patient Information Leaflet and Appendix IV (c): Patient Information Leaflet).

3.2 Arterial Leg Ulcers

An arterial ulcer refers to an ulcer caused by a reduction in arterial blood flow, leading to decreased perfusion of the tissues and subsequent poor healing.

Clinical Assessment and Diagnosis

They often form as small deep “punched-out” lesions with well-defined borders and a necrotic base. They commonly occur in the toes, distal foot and instep. They may occur at sites of trauma and arterial disease is commonly implicated in ulceration that occurs in pressure areas (for example the heel) (Nair *et al*. 2024). A patient with a suspected arterial ulcer is likely to give a preceding history of intermittent claudication (pain in a muscle group when they walk) or rest pain (pain in the foot at night when they lie flat).The ulcer may be painful and often develops over a long period of time, with little to no healing (therefore little or no granulation tissue). Other associated signs include cold limbs, thickened nails, necrotic toes and hair loss. On examination, the limbs will be cold in temperature and have reduced or absent pulses. In arterial ulcers, sensation is maintained (unlike in neuropathic ulcers in diabetes). This requires expert vascular assessment (ESVS) 2022.

Risk Factors for Arterial Limb Ulcers (Zemaitis *et al*. 2023)

History of:

- Smoking Diabetes Hypertension
- Hypercholesterolaemia/Abnormal lipid levels Intermittent claudication
- Increasing age, particularly over 50 years of age Obesity (a body mass index over 30)
- Family history of peripheral artery disease, heart disease or stroke

Features of peripheral arterial disease (Nair *et al*. 2024)

Physical Examination:

- Pathological skin changes Cool/Cold limb(s)
- Skin atrophy (Shiny, thin, taut skin) Hair loss (unintentional)
- Nail changes
- Muscle atrophy in the calf Absent pedal pulses.

Features of severe arterial insufficiency (Nair *et al*. 2024)

Physical Examination:

- Dependent rubor Elevation Blanching
- Gangrene or digital necrosis Ischemic rest pain
- Deep punched out wound(s) Well defined wound edges

  Wound on foot or toes
- Signs of peripheral neuropathy (Loss of sensation).

Investigations:

Non Invasive Diagnostic Tests include:

- Pedal and Leg pulses
- Ankle Brachial Pressure Index (ABPI) Toe

  Brachial Pressure Index (TBPI)
- Transcutaneous Oxygen Pressure (TcPO2)
- Arterial and/or Venous Duplex Scanning
- Photoplethysmography

Invasive Diagnostic Tests include:

- Blood profiles
- Wound Tissue Biopsy
- MRI/MRA

Results of Investigations indicative of arterial disease

- Ankle brachial pressure index <0.8
- Capillary refill >3 seconds
- Monophasic arterial waveform
- (TcPO2) pressure of oxygen level ≤60mmHg

Treatment

Treatment for arterial leg ulcers includes measures to improve arterial flow to the lower limb. These include:

- Medical management including risk factor modification, medications, for example statins, aspirin, anti-coagulants.
- Surgical revascularisation options, for example lower limb bypass, stenting and angioplasty

3.3 Arteriovenous Leg Ulcers

Arteriovenous leg ulcers occurs in patients presenting with advanced, chronic venous insufficiency (CVI) and concomitant peripheral arterial disease (PAD). The majority of arteriovenous ulcers are primarily venous with mild concomitant arterial disease. These wounds may cause pain but often pain is not be a prominent feature. The features are in keeping with a venous ulcer but foot pulses are not palpable and ABPI's are reduced. Often, there may be no sign of healing and therefore these wounds may appear sloughy (in contrast to venous ulcers which often have pink granulation tissue at the base of the ulcer). The ability of arteriovenous leg ulcers to heal is determined mainly by the severity of the coexisting arterial insufficiency. These ulcers cause considerable distress for patients and are difficult to heal from a wound management perspective. Many of these patients are elderly with co-morbidities. If the co-existent arterial disease is mild, the majority can be treated with light compression (Bernatchez *et al*. 2022). If compression is not tolerated or the ulcer does not improve or the patient has significant arterial disease, then arterial intervention is needed.

Clinical Assessment and Diagnosis

Accurate diagnosis of arteriovenous leg ulcers is essential, as compression bandages may not be suitable if there is significant arterial disease. Holistic, wound and vascular assessment is carried out to determine the correct aetiology. Lower limb arteriovenous leg ulcers will have clinical features of both arterial and venous disease.

An Ankle Brachial Pressure Index (ABPI) is required to assess for any arterial component to the ulcers and to determine whether compression therapy will be suitable (Appendix I: Ankle Brachial Pressure Index). The pathophysiology of mixed aetiology leg ulcers can be attributed to a combination of venous hypertension, primary or post-thrombotic (long-term complication of deep venous thrombosis) venous reflux and/or obstruction, and a reduction in blood inflow due to peripheral arterial disease. The tissue damage occurs because of low oxygen partial pressure and the activation of inflammatory pathways.

Assessment of mixed leg ulcers involves determining whether the venous or arterial component is predominant and requires expert vascular assessment (European Society for Vascular Surgery (ESVS) 2022).

Treatment

Management initially centers on compression because compression treats the venous component. Compression is advised provided that the arterial component is thought to be mild. Often, light compression is used initially. We emphasise that arterial intervention is needed if compression is not tolerated or if the ulcer does not improve or if significant arterial disease is suspected.

3.4 Atypical Leg Ulcers

The term atypical ulcer refers to a broad range of ulcers that are caused by inflammatory, neoplastic, vasculopathic, hematologic, infectious or drug-induced aetiologies. Inflammatory, hematologic, and vasculopathic ulcers are associated with conditions such as rheumatoid arthritis, systemic lupus erythematosus, scleroderma, mixed connective tissue disease, pyoderma gangrenosum, vasculitis, calciphylaxis, antiphospholipid syndrome, and genetic prothrombotic states. Neoplastic aetiologies include Marjolin's ulcer, basal cell carcinoma, and squamous cell carcinoma, along with ulcerative malignancies such as non-melanoma skin cancers, lymphomas, and sarcomas. Infectious causes can include bacteria, mycobacteria, fungus, protozoa, skin parasites, or arthropods.

Clinical Assessment and Diagnosis

Clinical features of atypical ulcers include a wound bed that is not healing which may have over granulation tissue or necrosis present. The ulcers may have a violaceous border, surrounding inflammation, or adjacent satellite lesions. They may present in/at unusual locations, be asymmetrical in shape, have rolled edges, have an ulcer in the centre of a pigmented lesion, rapidly progress to ulceration, or cause severe pain that is difficult to treat or manage (Table 2: Samples of Typical and Atypical Ulcers and Suspicious Skin Lesions).

3.5 Diabetic Lower Limb Ulcers

Diabetic foot disease is one of the most common, serious, feared and costly complications of diabetes. Patients with diabetes are at a 15 to 40 fold higher risk of a lower limb amputation than a non-diabetic patient. Eighty percent of lower limb amputations in diabetes are preceded by the development of a foot ulcer and it is estimated that the annual incidence of lower limb ulceration in patients with diabetes varies between 2.2% to 7.0%. Diabetic foot disease is costly, with patients frequently needing hospital admission, multiple investigations, surgery and a prolonged hospital stay (HSE 2021 Model of Care for the Diabetic Foot). All patients presenting with a diabetic foot ulcer should be referred to a diabetic foot clinic.

Clinical Assessment and Diagnosis

Neurological assessment, vascular assessment and assessment for deformity and callus are critical to the evaluation of the diabetic foot. Vascular examination, including palpation of the dorsalis pedis and posterior tibial pulses, as well as general inspection of the extremities, should be performed. Patients with evidence of ischemia should be further investigated with vascular studies and all patients presenting with diabetic lower limb ulcers with absent pulses should be referred for expert vascular assessment. Podiatry input is crucial as well and regular podiatric care can prevent many diabetic foot complications. Toe pressures are often recorded in this patient cohort to gain an accurate picture of blood flow as medial arterial calcification is common in patients with diabetes and renal disease (NWCSP 2024). Inclusion of this ulcer type is for information purposes only for further advice and guidelines on the management of patients with diabetic lower limb ulcers please refer to the HSE Model of Care for the Diabetic Foot (2021).

3.6 Red Leg Syndromes (Inflammation versus Infection)

Cellulitis is a common acute infective condition, which can affect the lower limb, causing redness, pain and symptoms of infection. Erythema or redness may be more difficult to identify in darker skin tones. Other visual cues such as temperature and change in skin texture may be observed (Dhoonmoon *et al*. 2021).

The treatment for cellulitis is antibiotics, skin care and leg elevation usually followed by compression therapy. It is important to check for tinea between the toe web spaces and treat it effectively, as this may sometimes be the cause of cellulitis. However, although infection causes inflammation, other pathologies can also cause lower limb redness due to non-infectious inflammatory processes. Whilst these presentations may not necessarily have co-existing lower limb ulcers, if managed inappropriately they have the potential to develop ulceration. Therefore, it is important for clinicians to differentiate between infective and inflammatory lower limb conditions (Appendix V: Common Causes of Red Leg Presentations). Compression therapy is recommended for the management of both inflammatory and infective lower limb syndromes (O'Brien & White 2021, Moore, O' Brien, Collier *et al*. 2022, EWMA 2023, Wounds UK 2023, Wounds UK 2024).

3.7 Lymphoedema/Chronic Oedema

"Lymphoedema is an accumulation of fluid containing proteins and other elements in the tissue spaces due to an imbalance between interstitial fluid production and transport capacity. It arises from congenital malformation of the lymphatic system or from damage to the lymphatic vessels and/or lymph nodes" (BLS 2019, HSE 2018 Lymphoedema and Lipoedema treatment - A Model of Care).

Chronic oedema presents as swelling of the tissues in the body. It occurs because of excess fluid accumulation in the interstitial spaces, which persists for longer than three months. It can occur in the presence of primary or secondary lymphoedema, or may be because of lymphatic capacity overload (Moore, O'Brien *et al*. 2022). All secondary lymphoedemas will result in oedema and non-cancerous causes are more frequent. Compression therapy is the treatment for lymphoedema and chronic oedema, following vascular assessment and once any underlying aetiologies have been treated.

3.8 Peripheral Oedema in Heart Failure

Heart failure reduces the ability of the heart to pump blood around the body effectively. It usually happens because the heart has become weakened or stiff because of a heart attack, high blood pressure, cardiomyopathy or problems with the valves in the heart (NICE 2018). It is a clinical condition characterised by the following symptoms: shortness of breath, fatigue and weakness and peripheral oedema. These symptoms will vary in severity depending on the extent of heart failure. The prevalence of heart failure is increasing due to the rising incidence of cardiovascular disease and ageing populations (Urbanek *et al*. 2020). There are different degrees of heart failure with associated symptoms. From a lower limb perspective, severe uncontrolled oedema can occur which may result in lymphorrhea (wet, leaky legs) and ultimately chronic ulceration. Compression therapy plays an important role in its management (Montero *et al*. 2020, Wounds UK 2023). This will be discussed in more detail in section 4.3.

Typical Leg Ulcer Samples	Description
Venous Leg Ulcer	A venous leg ulcer is the most common cause of leg ulceration. They occur because of chronic venous insufficiency (CVI) in the lower limbs. CVI may be caused by valve failure, reflux, venous obstruction or a combination of these resulting in venous hypertension and the eventual formation of a leg ulcer. Venous leg ulcers are typically shallow, irregularly shaped wounds, often located in the gaiter area of the leg and they may have heavy exudate. (Leren *et al*. 2020).
Arterial Leg Ulcer	An arterial leg ulcer occurs due to inadequate blood supply to the affected area (ischaemia). Arterial ulcers tend to occur to the lower legs, feet and toes and may be acute, recurrent or chronic in nature. They are typically very painful, have well demarcated edges and often have underlying ischaemic eschar. (Nair *et al*. 2024).
Arteriovenous Leg Ulcer	Arteriovenous leg ulcers are leg ulcers with advanced, chronic venous insufficiency and concomitant peripheral arterial disease. They have features of both venous and arterial disease. (Dissemond *et al*.2023).

Atypical Leg Ulcer Samples	Description
Vasculitic Leg Ulcer	Vasculitic leg ulcers occur as a result of inflammation of the small and medium sized cutaneous blood vessels. The characteristic presentation is palpable purpura which may develop an overlying necrotic vesicle or large blister that ulcerates. A skin biopsy is used to confirm the diagnosis. (Todhunter 2019).
Pyoderma Gangrenosum Leg Ulcer	Pyoderma Gangrenosum (PG) is a neutrophilic dermatosis often associated with an underlying systemic disorder such as inflammatory bowel disease, arthritis or hematologic disease. PG presents as single or multiple, rapidly progressive, painful ulcers with necrotic borders and surrounding erythema. They start as a pustule which then develops an overlying necrotic blister that ulcerates. (Todhunter 2019).
Calciphylaxis Leg Ulcer	Calciphylaxis leg ulcers present as painful indurated purpuric plaques that progress to necrosis and ulceration. Calciphylaxis leg ulcers are most commonly seen in patients with renal failure. (Todhunter 2019).
Bullous Pemphigoid Leg Ulcer	Bullous Pemphigoid (BP) starts as a red rash before turning into blisters that are large and filled with clear fluid but, can contain blood. Biopsy may be taken to confirm diagnosis but, treatment consists of topical steroids, mainly ointments or creams. If the skin is very wet, as this helps heal the skin and prevent new blisters from appearing. Itch is a common complaint. Lower Limbs can ulcerate if not recognised or treated appropriately and require compression therapy to heal lower limb ulcerations. (Todhunter 2019).

Suspicious Skin Lesion Samples	Description
Bowen's Disease	Bowen's disease looks like a red scaly patch on the skin. It is caused by abnormal growth of cells on the outer layer of the skin called keratinocytes. It is diagnosed on histological examination post-biopsy. It is often referred to as Bowen's disease or squamous cell carcinoma in situ (SCCIS). Treatment usually involves prescription and application of topical applications or surgery. (Moore, O' Brien *et al* 2022).
Basal Cell Carcinoma	A Basal Cell Carcinoma can start as a reddish patch or irritated area that may crust or develop into a shiny bump or nodule that can be pearly, pink, clear, red or white. It can also be black, tan or brown in dark skin tones. It may or may not cause itch, pain or discomfort. Tiny blood vessels may be visible but, this is less evident on darker skin tones. Diagnosis is made on histological reports from biopsy and excision is undertaken to fully remove. (Moore, O' Brien *et al* 2022).
Squamous Cell Carcinoma	Squamous Cell Carcinoma is usually as a result of UV ray damage or sun-exposed sites and is frequently found on the lower limb. It is a slow-growing skin cancer that can appear as thick, rough, scaly patches that may crust or bleed. They can also be sore or painful to touch. They can also resemble an open sore that never fully heals. Sometimes they can look like a small volcano with raised edges and a depression or hole in the centre. They are not life-threatening but, can be aggressive and if not excised, they can grow quite large and spread to other parts of the body. Diagnosis is confirmed on histology from either a biopsy or excision. Further excision is required post- biopsy to ensure it has been fully removed. (Moore, O'Brien *et al* 2022).
Malignant Melanoma	Malignant melanomas present as raised or flat lesions with irregularly shaped borders, sometimes on an existing or a new mole. They can be brown, black, blue and even white, often a shade darker than a person's normal skin tone. Undetected, they can metastasise to the lymph nodes, liver, brain, lungs and less commonly the bone. It can be cured if caught early but, is the most invasive skin cancer with the highest risk of death if undetected. Patients with melanoma require extensive excision, scanning =/- treatments with regular screening. (Moore, O' Brien *et al* 2022).

Table 2: Samples of Typical and Atypical Ulcers and Suspicious

4.0 Leg Ulcer Assessment and Management

The following infographic describes the fundamentals of care for patients who present with a lower limb ulcer. (Appendix VI: Components of Lower Limb Ulcer Pathway A to H). Each aspect is described in detail in section 4.

Components of Lower Limb Ulcer Pathway A to H

A	Assessment	• Holistic patient assessment • Vascular assessment of the limb • Leg ulcer wound assessment
B	Best Practice	• Skin care • Wound care • Treat underlying cause/co-morbidities
C	Compression	Following assessment, if appropriate apply: • Compression bandaging or • Compression hosiery kits or • Compression stockings/wraps
D	Documentation	Record: • Findings of assessment and diagnosis • Care Plan and follow up • Education provided
E	Evaluate	At each patient contact reassess • Limb • Ulcer • Patient/carer(s) concerns
F	Follow up care	If ulcer fails to progress/heal with evidenced based treatment, refer to vascular/tissue viability/other specialist service as appropriate
G	Give/Get Information	• Provide education to patients with lower limb ulcers and involve them in their care plan. • Ensure clear communication between health care professionals who are treating the patient.
H	Healed Wound	• Skin care • Compression Stockings/Wraps for life (if appropriate) • Monitoring for skin changes/recurrence of ulcer • Provide contact details of healthcare provider

4.1 Assessment and Diagnosis

- Assessment aims to determine the aetiology of the wound and underpins the leg ulcer treatment plan.
- A leg ulcer is a symptom of another condition and therefore it is important for clinicians to ascertain the cause by implementing differential diagnostic procedures (Meyer *et al*. 2011, Moore, O'Brien *et al*. 2022).
- Begin with a thorough assessment of the:
  - Patient
  - Leg
  - Ulcer/Wound.

Holistic assessment

- Past medical and surgical history
- Presence of co-morbidities including chronic obstructive pulmonary disease, diabetes, deep vein thrombosis/blood clotting disorders, heart failure, immunosuppression, lymphoedema, peripheral arterial disease, rheumatoid arthritis, renal disease, transient Ischaemic attack, stroke, skin conditions/infections, history of joint replacement surgery, limb trauma or fractures and previous use of compression therapy
- Mobility status
- Nutritional status
- Medications, allergies to medications, dressings, compression therapy systems
- Pain assessment

Limb Assessment

- Skin and ulcer inspection
- Presence of oedema – compare both legs Joint mobility
- Use the 'Lower limb conditions requiring urgent medical attention' below as a guide to patients who require urgent referral to an appropriate specialist

Skin assessment includes: assessment for erythema, skin changes associated with venous or arterial disease, temperature, capillary refill and any co-existing skin conditions, lesions or new concerns (Stephen-Haynes *et al*. 2015, Moore, O'Brien *et al*. 2022) which may warrant onward referral for specialist assessment. Assess for any differences in skin tone which may be more difficult in dark skin tones (Dhoonmoon *et al*. 2021).

Vascular Assessment of Lower Limbs

Signs of venous/arterial disease (see Table 3: A Guide to Lower Limb Ulcer Differential Diagnosis below and (Appendix II: Lower Limb Ulcer Diagnostic Pathway). Compare both limbs as part of the assessment.

- Physical assessment of lower limb vascular status (assessment of arterial supply) including palpation of pedal pulses and Ankle Brachial Pressure Index measurement
- ABPI Result 0.8-1.3 Suggests venous aetiology – Suitable for full compression therapy/ Hosiery Kit
- ABPI Result >1.3 – Refer to TVN/Vascular. Clinicians with specialist knowledge may perform Doppler waveform analysis (Tehan *et al*. 2022) and toe pressure measurement may be done in specialised vascular laboratories or by trained specialists elsewhere with the appropriate equipment.
- *Patients with ABPI <0.8 – indicative of arterial disease and should be referred for vascular assessment. Clinicians with advanced competencies may initiate light compression as appropriate.
- ABPI Result 0.6-<0.8 – Mixed arterial/venous aetiology(Arteriovenous) – Suitable for light compression and referral to vascular surgery is needed
- ABPI Result <0.6 – Urgent Vascular Referral – No compression should be applied
- Patients with an ABPI <0.6 have severe peripheral arterial disease and warrant urgent vascular referral. (See Table 2 – A Guide to Lower Limb Ulcer Differential Diagnosis).

** European Society for Vascular Surgery (ESVS) 2022 Clinical Practice Guidelines on the Management of Chronic Venous Disease of the Lower Limbs.*

N.B: Clinicians should work within their scope of practice, reflective of their level of competence and refer onwards if outside of an individual's scope of practice

Wound assessment includes:

- Location, duration, wound measurement (length, width, depth)

  Wound bed assessment
- T – tissue, I – Infection, M – Moisture, E – Exudate, R – Regeneration/Repair, S – Social and patient related factors (TIMERS principles) (Atkin *et al*. 2019)
- Peri-wound skin
- Reassess at each dressing change
- Observe for any wound indications requiring more frequent reviews or urgent specialist referral at each assessment

The holistic and wound assessments are recorded in the patient's health care record. Diagnosis is based on the findings of the holistic, vascular and wound assessments (see Lower Limb Ulcer Diagnostic Pathway).

Treatment

- Agree the goal and plan of care and realistic timeframes for healing to include reasons for treatment changes
- A multi-disciplinary approach is essential to manage complex cases.

N.B. A clinician who is competent in lower limb assessment should carry out the assessment

Table 3: A Guide to Lower Limb Ulcer Differential Diagnosis

Leg Ulcer	Location	Risk Factors	Leg assessment	Wound Characteristics	Management
Venous	Lower gaiter/ malleolus	• Deep vein thrombosis • Varicose veins • Previous surgery/ trauma • Obesity	• Previous ulceration • Skin staining • Inverted champagne bottle shaped leg • Lipodermatosclerosis • Eczema • Oedema • Reduced ankle mobility	• Granulation or sloughy tissue	• Compression therapy • Refer for duplex scan • Varicose vein interventions, for example laser treatment
Arterial	• Foot • Ankle • Distal Tibia	• Cardiac disease • Intermittent claudication • Diabetes • Rest pain, • Smoking, • Hypertension	• Reduced Ankle Brachial Pressure Index (ABPI) • Absent Pedal Pulses • Pale, poorly perfused limb • Hairless limb	• Sloughy/necrotic/pale wound bed • Low level of exudate • Deep, punched out appearance	• Urgent vascular referral for further investigations • Treatment includes: angioplasty, bypass surgery, anti-platelet and statin therapies
Arterio Venous	Lower Limb	• Venous hypertension • Post thrombotic limb (Post DVT) • Peripheral Arterial Disease	• Holistic, wound & vascular assessment • Reduced ABPI (0.6 to <0.8) • Vascular specialist assessment to determine whether the arterial or venous component is predominant	• Clinical features of both arterial & venous disease	• Treatment of arterial component • Treatment of venous component • May be suitable for light compression if venous component is predominant following vascular assessment of the limb

Lower Limb Conditions Requiring Urgent Medical Attention

All the conditions listed below require urgent attention and escalation / referral to the appropriate specialty.

Acute Infection

- Increasing unilateral redness
- Swelling
- Wound breakdown or dehiscence
- New or increasing pain
- Pus/Purulent Exudate Heat
- Pyrexia +/- Malaise
- Signs of spreading/ evolving infection (crepitus, lymphangitis)
- Induration (extending induration)
- Deteriorating Charcot foot (Diabetes)

Symptoms of Sepsis

- Confused, slurred speech, not making sense
- Blue, pale or blotchy skin, lips or tongue
- A rash that does not fade when you roll a glass over it
- Difficulty breathing/ breathlessness/breathing very fast

*the patient may not present with all of the symptoms of sepsis

Acute or Chronic Limb Threatening Ischaemia

Acute

- Pain
- Pulseless
- Pallor
- Power loss/paralysis
- Paresthesia/reduced sensation/ numbness
- Cold to touch

Chronic

- Chronic rest pain
- Dependent rubor, pallor on elevation, reduced capillary refill
- Skin changes including ischaemic ulcers, non-healing foot wounds and gangrene
- Absent foot pulses

Suspected acute deep vein thrombosis

- Localised tenderness along the distribution of the deep venous system
- Entire leg swollen
- Calf swelling at least 3cm larger than the asymptomatic leg

Suspected skin cancer

- Does not heal within 4 weeks Looks unusual
- May be painful and/or itchy, bleeds, crusts or scabs for more than 4 weeks
- A change in a mole or freckle

Bleeding Varicose Veins

- Weakening or thinning of varicose veins
- Localised/direct trauma or skin injury to varicose veins

Lower Limb Ulcer Diagnostic Pathway

Patient presents with Lower Limb Ulcer

Holistic assessment including

- Risk factors for peripheral arterial disease
- Previous history of leg ulcers to include compression therapy used

Lower limb conditions requiring urgent specialist referral

- Acute spreading infection
- Suspected skin cancer
- Limb threatening Ischemia
- Bleeding varicose veins
- Suspected DVT

Refer for urgent specialist assessment as appropriate

- Perform holistic and vascular assessment of lower limb/s including risk for arterial disease
- If pedal pulses palpable and no risk factors present commence compression and monitor the patient
- If pedal pulses are weak or absent or presence of risk factors for peripheral arterial disease undertake Ankle Brachial Pressure Index measurement (ABPI)

Interpretation of ABPI results

ABPI <0.6

Arterial Disease

Urgent referral to vascular specialist

Not suitable for compression

(Monophasic or absent waveform)

ABPI 0.6- <0.8

Arteriovenous (Mixed Disease)

*Initiate light compression

Urgent referral to vascular specialist

(Monophasic waveform)

ABPI 0.8-1.3

Treat as a venous ulcer

Apply full compression

Monitor patient and wound

(Biphasic/Triphasic waveform)

ABPI >1.3

Arteries may be calcified

Assess foot pulses and toe pressures

*Initiate light compression with close monitoring

Refer for vascular assessment

Once healed follow the Healed Leg Ulcer Pathway

Caution**

Waveform interpretation should only be used as a diagnostic tool by appropriately trained clinicians within their scope of practice

If <20% reduction in ulcer size within four weeks refer for specialist assessment as appropriate

***Initiate compression therapy in line with clinician level of competence and ensure the patient/ carer is provided with patient information leaflet on Compression Therapy and its removal if the patient experiences pain, numbness or skin changes in the toes**

4.2 Best Practice Wound, Skin and Limb Care

Administer analgesia if necessary prior to dressing changes and performing wound and skin care.

Wound care

Use the principles of wound bed preparation to provide evidence based wound care

- **Tissue** – debride non-viable tissue, for example slough, necrosis using sharp or autolytic (moist wound healing), in line with level of competence
- It is very important to note that moist wound healing is contra-indicated in patients with peripheral arterial disease
- **Wound Cleansing** – Thoroughly cleanse the wound and peri-wound skin at each dressing change to remove devitalised tissue, debris and biofilm. Debride any sloughy or necrotic tissue (Murphy *et al*. 2020). The type of debridement is dependent on the skill of the clinician
- **Infection/Inflammation** – assess for signs of infection at each episode of care.

Signs of infection include:

Pain, heat, erythema,oedema, loss of function, bleeding, malodour, increased wound size/ exudate, hypergranulation/friable tissue or delayed healing.

- **Wound biofilm** consists of a collection of different bacteria and fungi, which can cause chronic infection (IWII 2016, IWII 2022). Biofilms form in a matter of hours, reaching maturity in 48-72 hours (Wolcott *et al*. 2010) and can protect themselves from the host's immune response and are resistant to antibiotics and antiseptics (IWII 2016, IWII 2022)
- **Inflammation** – Other venous conditions, for example Eczema or acute inflammatory conditions, for example Lipodermatosclerosis can cause erythema to lower limbs. It is important to differentiate between inflammation and infection using a thorough holistic assessment, clinical examination and history taking (Fletcher *et al*. 2018, World Union of Wounds Healing Societies 2020a, Moore, O'Brien *et al*. 2022).
- **Moisture** – Moist wound healing promotes autolysis (removal of devitalised tissue) and promotes granulation tissue. It is important to correct a moisture balance at the wound bed, using appropriate wound dressings. Lower limb wounds may be associated with oedema, which can increase exudate. Management of oedema through limb elevation and compression bandaging can address this and help to reduce exudate in lower limb wounds
- **Edges** – Assess wound edges. Debride any crusty, necrotic or unhealthy edges, unless contra-indicated to promote epithelialisation (Murphy *et al*. 2020). Record wound measurements at baseline and at weekly intervals thereafter
- **Regeneration/Repair** – Advanced therapies may be indicated for leg ulcers which fail to heal with evidenced based treatments. This will be guided by vascular/tissue viability specialists (Atkin *et al*. 2019)
- **Social/Patient Related Factors** – Social and patient related factors should be considered as part of every holistic care plan (Atkin *et al*. 2019).

Wound Dressings

- Wound dressings are used to promote wound bed preparation; however, compression therapy is the most important factor in reducing exudate and oedema
- Choose a simple, non-adherent absorptive dressing to protect the wound
- Higher exudate levels may require gelling fibres or superabsorbent dressings under compression therapy
- Anti-microbial dressings are indicated to manage wound infection (IWII 2022)
- Advanced therapies, for example growth factors, extra cellular matrices, engineered skin, negative pressure wound therapy, among others may be recommended by specialists for complex unhealed wounds, which have not responded to standard care.

Properties of an ideal wound dressing

- Maintains a moist wound environment
- Absorbs and retains exudate under compression therapy
- Low profile (does not indent the skin)
- Conforms to the wound bed
- Non adherent/Atraumatic
- Low allergy
- Remains intact on removal
- Cost effective.

Immediate care for lower limb wounds

For lower limb (not foot) wounds, following holistic assessment, immediate care should commence once no condition requiring urgent medical attention has been identified. (Appendix II: Lower Limb Ulcer Diagnostic Pathway, Appendix III: Lower Limb Conditions Requiring Urgent Medical Attention, Appendix VIII: Guide to Compression Therapy and Appendix IX: Infected Leg Ulcer Pathway)

- Record history of leg ulcer
- Note any previous allergies to dressings/compression therapy
- Document history of previous compression therapy if appropriate
- Cleanse wound
- Wash and dry skin and apply emollients (advise patients of potential fire hazard with use of paraffin gel)
- Send wound swab if infection suspected or in line with local policy Appendix IX: Infected Leg Ulcer Pathway)
- Treat infection and refer as appropriate
- Record baseline wound measurement
- Follow HSE guidelines if using digital photography
- Apply wound dressing appropriate to the assessment findings and care plan
- Educate patient re compression therapy, and advise re care of bandages/hosiery kits/ stockings/wraps (Appendix IV (a): Patient Information Leaflet and Appendix IV (b): Patient Information Leaflet and Appendix IV (c): Patient Information Leaflet).

Venous Leg Ulcer Management

- Wound Care – clean the wound and peri wound skin, removing any dry flaky skin or hyperkeratosis with forceps, gauze or monofilament pads
- Skin Care – use emollients in the water to wash the limb, pat dry and apply simple topical emollients. Avoid applying emollients to the toe web spaces and ensure they are dried well after washing to prevent excess moisture and reduce the risk of fungal infections
- Treat venous eczema with appropriate prescribed topical steroid therapy and compression therapy, for example hosiery
- Observe for signs of infection Appendix IX Infected Leg Ulcer Pathway)
- Use compression therapy (compression bandaging/hosiery kits/stockings/wraps) to manage oedema once suitability has been determined. Observe for signs of pressure damage from compression bandages. Advise patient to remove compression bandages if they have increased pain, altered colour, sensation or temperature to toes or feet
- Provide Venous Leg Ulcer Patient Information Leaflet to patients/carers (Appendix IV (a): Patient Information Leaflet and Appendix IV (b): Patient Information Leaflet and Appendix IV (c): Patient Information Leaflet).
- Monitoring – measure at baseline assessment and weekly thereafter. If reduction ≥ 20% in ulcer size after four weeks of treatment, continue current treatment until the ulcer has healed.
- If there is ≤20% reduction in wound size after four weeks of compression therapy, or there is devitalised tissue/slough or biofilm present or if the patient has co-morbidities (Appendix IX: Infected Leg Ulcer Pathway), the patient and wound care plan should be reassessed. Treat biofilm and consider a differential diagnosis. Refer to a vascular/tissue viability service
- Assess contralateral leg to see if compression is required to reduce the risk of developing a leg ulcer
- Consider referral to vascular services for surgical intervention (consider frailty, co-morbidities and patient's wishes).
- Provide healed leg ulcer care (Appendix XI: Healed Venous Leg Ulcer Pathway).

Venous Leg Ulcer Treatment Pathway

Complete Diagnostic Pathway - Venous ulcer diagnosed

Clean and dress wound

Apply Compression Bandages/Hosiery Kit/Compression Wraps

Monitor Progress

If ≥ 20% reduction in ulcer size in 4 weeks, continue treatment until healed

Consider referral to vascular services for potential surgical intervention if appropriate (consider frailty/co-morbidities and patient's wishes

≤ 20% reduction in ulcer size in 4 weeks of compression therapy

Or

If devitalised tissue/slough/ biofilm present or if co-morbidities below present

Ulcer recurrence

Refer to Vascular/Tissue Viability service for assessment +/- further investigations

Co-Morbidities

- Chronic Obstructive Pulmonary Disease
- Diabetes
- Deep vein thrombosis/Blood clotting disorders
- Heart Failure
- Immunosuppressed
- Lymphoedema
- Peripheral Arterial Disease
- Rheumatoid arthritis
- Renal disease

4.3 What is Compression Therapy and how does it work?

Compression therapy consists of application of a compression device in the form of bandages, hosiery kits, stockings or wraps which, when applied to a leg provide graduated compression from toe to knee. Compression therapy is standard treatment for any lower limb wound with oedema or that has the potential to become chronic unless contraindicated following a full holistic clinical assessment and diagnosis (Partsch 2010, Isoherranen *et al*. 2019; Shavit & Alavi 2019; Burian *et al*. 2022).

The functions of compression therapy are:

- It helps to increase blood circulation in the lower legs, ankles and feet
- It promotes venous return and reduces venous reflux and venous hypertension
- Treatment of pain and swelling caused by conditions associated with poor circulation, for example chronic venous insufficiency and varicose veins
- It decreases capillary filtration, increases local lymphatic drainage, reduces inflammation and increases arterial flow
- Maximised calf muscle pump
- Assists with improving skin condition.

Compression therapy is also indicated for the management of lower limb oedema. Non-venous conditions that can result in lower limb oedema see table below:

Non-Venous Conditions that can cause Lower Limb Oedema (Nair *et al*. 2024)	
Cardiovascular disease and heart failure	Lymphoedema (primary or secondary to cancer)
Dependent oedema	Orthopaedic surgery
Hyponatraemia	Pelvic malignancy with inguinal lymph node obstruction
Liver failure	Prolonged dependency due to impaired mobility (wheelchair user, continual armchair sleeper)
Renal failure	Trauma
Systemic disorders	

Table 4: Non Venous Conditions that can cause Lower Limb Oedema (Nair *et al*. 2024)

Compression therapy is also a powerful anti-inflammatory device and the earlier that compression therapy can be started, the better the outcome is likely to be (BLS 2019, NWCSP, 2020). The chosen type will depend on multiple factors and generally requires a prescription. Compression therapy comes in the form of bandages, adjustable wraps and hosiery or hosiery kits. The chosen type will depend on multiple factors and requires a prescription from their healthcare provider (Appendix X: Guide to Compression Therapy Selection). As compression is a long-term treatment in venous disease where venous hypertension remains untreated, patients need to be made aware of this and encouraged to participate in self-care (Appendix VIII: Information Leaflet for healthcare professionals and Appendix IV (a): Patient Information Leaflet and Appendix IV (b): Information Leaflet for patients/carers and Appendix IV (c): Patient Information Leaflet.

If a patient has pre-existing heart failure and is not experiencing acute decompensated heart failure, initiate or continue to wear compression if indicated for limb oedema, leaking legs or other associated skin conditions (Atkin *et al*. 2022). Compression is contraindicated in patients with decompensated heart failure where the patient is very symptomatic and requiring immediate medical intervention (Wounds UK 2023). If patients are in established compression and experience an episode of acute heart failure, the recommendation is to remain in compression and refer to heart failure services (Atkin *et al*. 2022).

Guide to Compression Therapy Selection

Does the patient have any of the following?

- **Large wound site**
- **Exudate leaking through dressings**
- **Lower limb oedema not reduced by elevation**
- **Abnormal leg shape**

YES → **Use Compression Bandaging**

NO ↓

Consider using Compression Hosiery Kits, Stockings or Wraps

YES → **Recommend appropriate application aid if needed**

- **Ensure the patient is educated on the management of their compression therapy**
- **Provide the Patient Information Leaflet on caring for compression therapy**

Compression therapy options

Full compression bandages, once applied as per the manufacturer's guide; provide 35-40mmHg compression at the ankle. Compression hosiery kits (usually consisting of two stockings worn on the affected leg) provide graduated 35-40mmHg compression at the ankle similar to full compression bandages. Hosiery kits may be a suitable option for self-caring patients, for low exudative ulcers, or those who do not tolerate bandages for different reasons. Light compression bandages provide (reduced) 20-30mmHg compression at the ankle. The most appropriate level of compression for a patient is determined following a holistic and vascular assessment of the lower limb.

It is recommended that compression hosiery is worn for life once a venous leg ulcer has healed, unless otherwise advised by a Vascular Consultant. Medical grade hosiery is divided into classes based on the amount of compression applied at the ankle. European class standard and British class standard are the most commonly used. European class hosiery provides greater compression and is generally recommended for patients with oedema. It is important to specify which compression class a patient requires when prescribing hosiery.

NB: In Ireland, the European Class is the most frequently used compression standard.

Classification	BRITISH: Level of mmHg	EUROPEAN: Level of mmHg
Class 1	14 – 17 mmHg	18 – 21 mmHg
Class 2	18 – 24 mmHg	23 – 32 mmHg
Class 3	25 – 35 mmHg	34 – 46 mmHg

Table 5: Compression Hosiery Standard

4.4 Documentation

How Do You Document a Wound Assessment Properly?

Wound documentation is important for the following reasons:

- It supports the delivery of effective wound care
- Clear and consistent documentation facilitates continuity of wound care
- It facilitates both health data collection and coding
- Inaccurate wound documentation can negatively affect the delivery of evidence based wound care resulting in failure to heal or wound chronicity.

Wound care documentation should reflect the following elements:

- Wound aetiology or cause (lower limb ulcer, venous, arterial, arteriovenous (mixed) etc.,)
- Vascular assessments such as ABPI, TBPI, TCPO2, duplex scanning, CT angiogram and MRA (Magnetic Resonance Angiogram)
- Wound location, described with correct anatomical terms (right medial malleolus, right anterior tibial gaiter etc.,)
- Wound size measured in centimeters to include length, width and depth
- Depth of wound superficial or deep wounds (visible or palpable bone, tendon or muscle etc.)
- Wound bed characteristics, including tissue amounts and types (granulation, slough, eschar, epithelialisation, tunneling, undermining, etc.)

- Periwound characteristics (maceration, fissures, scale, hyperkeratosis, rolled wound edges, callus, presence of oedema, tissue consistency and temperature, indurated, boggy etc.)
- Wound exudate (volume, type colour and consistency, monitor changes in volume, odour colour and consistency)
- Wound malodour (noted before or after dressing removal)
- Indication/presence of infection, including fever, erythema, increased drainage, malodour, warmth, oedema, induration, and pain
- Swabs taken (date, location, culture and sensitivity or fungal elements)
- Wound Treatment
- Debridement (Use appropriate method, for example sharp or autolytic based on clinical competence)
- Biopsy taken (date, location, post biopsy wound care, differential diagnosis)

(Appendix XII: Sample Wound Assessment Document #1) and (Appendix XIII Sample Wound Assessment Document #2) for sample wound and leg ulcer assessment document.

- Reports of pain, including location, causative factors, intensity, duration, etc.,
- Patient refusal of care or non-adherence to treatment plans
- Interventions to promote healing, such as dietary supplements, vitamins, laboratory tests and skin care
- Conditions that negatively affect healing, such as impaired mobility and nutritional status
- Patients participation in care plan
- If clinical photography is used, practice should be in line with the HSE Clinical Photography
- PPPG Referral to multi-disciplinary team
- Patient/carer information given.

Wound care documentation plans and provides for continuity of care for a patient's medical treatment. It also demonstrates compliance with best practice recommendations and adherence to current regulations (NMBI 2015). For these reasons, clinicians must provide adequate and accurate documentation of all relevant wound characteristics, interventions, and responses to treatment plans.

4.5 Evaluate

It is important to evaluate whether the wound care intervention or treatment plan was appropriate to the patient and wound care needs. The patient and the wound should be evaluated at every wound care treatment. This involves assessing for:

- Reduction in the wound size (record weekly)
- Reduction of oedema
- Reduction in exudate levels
- Resolution of infection when present
- Improvement in wound bed appearance
- Reduction in pain.

This should be documented clearly in the clinical notes with care plans amended appropriate to the patient's needs.

4.6 Follow up

Wound care follow up will be dictated by response to treatment, specialist follow up requirements and the need for specialist intervention. A specialist clinician may assess the patient initially and follow up care managed in the community/residential/acute care setting. Clear communication between all caregivers is essential for clarity around treatment plans. In general venous leg ulcers should heal within three months of initiation of evidence based practice. If a patient's wound is failing to heal (<20% reduction in overall wound size in four weeks) or deteriorates then they should be referred back to appropriate specialist services (ESVS 2022).

4.7 Give/Get information

The receipt and passing on of information is vital to allow for integrated patient care. This is particularly important when dealing with leg ulcer care as the patient's care often spans across multiple sites and services. Therefore, clinicians must take every opportunity to make every contact count and ensure that all interventions and reports are documented clearly and accessible to all. It is vital to share all information with patients and their carers' in a clear, accessible and understandable manner.

4.8 Healed Leg Ulcer

Leg ulcer wounds frequently recur; therefore, it is important to provide education and advice to patients to prevent recurrence.

Compression Therapy

- Once a leg ulcer has healed, compression therapy (bandaging or hosiery kit) is continued for four weeks (Appendix VIII: Guide to Compression Therapy)
- Measure the patient for class 2 stockings or compression wraps – which may be required for life if the underlying cause of venous ulceration has not been effectively treated (Appendix X: Guide to Compression Therapy Selection)
- Self-management with shared care is encouraged if possible and application aids are available to assist patients. Otherwise, carers /family members may be taught how to don and doff garments and care for the skin
- Washing and drying of hosiery/wraps is in line with the manufacturer's instructions
- Compression hosiery/wraps are replaced in line with the manufacturer's guidelines and at least every six months. Hosiery/Wraps which are loose, damaged or older than six months should be discarded as they will not provide effective compression
- Educate the patient re care of their limb and to check their skin on removal of hosiery to check for any damage
- Hosiery is worn during the day and removed at night
- Advise patient to return if their stockings/hosiery is not fitting correctly and to remove the stocking if it is too tight or if they have altered colour, sensation or temperature to their toes.

Skin Care

- Patients should use an emollient to wash their legs regularly and apply a moisturiser daily
- Dry between the toe web spaces post cleansing
- Keep the skin well moisturised
- Know the signs and symptoms of infection and encourage them to attend their GP service if they are experiencing any of these symptoms
- Provide contact details for patient to contact their healthcare provider in the event of recurrent ulceration (Appendix IV (a): Patient Information Leaflet and Appendix IV (b): Patient Information Leaflet) and Appendix IV (c): Patient Information Leaflet

General Health Advice

- Advise the patient to stop smoking and provide contact details for smoking cessation services
- If the patient has diabetes encourage them to maintain their blood sugar levels as advised by their diabetes team
- Encourage patients to exercise, eat healthy foods and get plenty of sleep at night
- Encourage the patient to maintain a healthy weight
- Encourage patients to visit their healthcare provider regularly to monitor their blood pressure and cholesterol levels.

Healed Venous Leg Ulcer Pathway

Continue existing compression therapy for four weeks once the ulcer has healed before changing to life-long compression stockings or wraps based on patient assessment.

Ensure the patient is measured for the correct size compression stocking/wrap.

Advise the patient to wear their stocking/wrap during the day and to remove at night time.

Educate the patient and/or their carer(s) about the importance of skin care:

- Use emollients instead of soap to
- wash the legs
- Moisturise legs frequently

Advise the patient who they need to contact if they develop another ulcer on their leg.

Advise patients on how to care for their compression stockings/wraps as per the manufacturer's guidelines.

Replace the stockings/wraps three to six monthly as per the manufacturer's guidelines or of the stockings/wraps become damaged.

Consider referral to vascular services for surgical intervention (consider frailty, co-morbidities and patient wishes).

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Appendix I: Ankle Brachial Pressure Index

Conducting and interpreting Ankle Brachial Pressure Index (ABPI) and Toe Pressure Studies

An ankle brachial pressure index (ABPI) is a simple non-invasive method of identifying arterial insufficiency within a limb. It compares the ankle and brachial systolic blood pressures. An important factor determining the rate of healing of any wound is adequate arterial blood supply. In the management of leg ulcers, the ABPI forms a fundamental part of the assessment. This procedure should be used in conjunction with a holistic assessment, and a medical and clinical examination of the limb.

If the assessment and management of the patient falls outside the scope of practice of the clinician, refer the patient to the appropriate service.

Equipment Required

- A hand held Doppler with 8mmHg probe (5mmHg probe may be required in oedematous limbs)
- Sphygmomanometer
- Ultrasound Gel.

Procedure

- Explain the procedure to the patient
- Ask the patient to remove any tight clothing
- Remove any dressings around the ulcer and protect with a light film dressing
- Ask the patient to lie flat and rest for a minimum of 10 minutes to obtain a resting pressure. If the patient is unable to lie flat elevate the legs to the level of the heart, this reduces the hydrostatic pressure to the legs
- Select a sphygmomanometer cuff of appropriate size and wrap around the patients arm, just above the elbow
- Palpate the brachial pulse and apply ultrasound gel
- Angle the Doppler probe at 45 degrees (towards the heart) and adjust the position to locate the best signal
- Inflate the cuff until the signal disappears then deflate the cuff slowly and record the pressure at which the signal reappears
- Repeat this procedure on the other arm
- Use the higher of these two readings to calculate the ABPI unless the patient has an arteriovenous (AV) fistula
- Select a sphygmomanometer cuff of appropriate size and wrap around the patient’s leg just above the ankle
- Palpate the posterior tibial artery, apply ultrasound gel and locate the best signal
- Inflate the cuff until the signal disappears then deflate the cuff slowly and record the pressure at which the signal reappears
- Repeat this procedure with either the anterior tibial or peroneal artery
- Use the higher of these two readings to calculate the ABPI

The ABPI is calculated using the following equation:

$$\text{ABPI} = \frac{\text{A = highest ankle systolic pressure}}{\text{B = highest brachial systolic pressure}}$$

Interpretation of ABPI

ABPI values should be interpreted in the context of any signs and symptoms of peripheral arterial disease (for example intermittent claudication or rest pain). If the ABPI is within normal range but the patient is symptomatic, it should be assumed that peripheral arterial disease is the underlying pathology and referral to the vascular consultant arranged for further investigations.

An ABPI of 0.8-1.2 is considered normal and implies that the patient is suitable for compression. However, there are numerous factors that may interfere with these results, for example. diabetes, end stage renal disease, peripheral neuropathy, rheumatoid arthritis and cardiac failure which need to be considered in the interpretation of results before considering compression. In these circumstances, reduced compression would be a more suitable option.

An ABPI of 0.6-<0.8 is suggestive of mixed aetiology ulceration. After holistic and vascular assessment reduced compression (15-25mmHg) may be prescribed.

An ABPI of <0.6 implies significant arterial disease and urgent referral to the vascular service is recommended. Compression therapy is contraindicated in this cohort.

In the event of suspected deep vein thrombosis, severe ischaemia or cellulitis an ABPI should only be conducted under vascular advice.

For most patients ABPI is a reliable method of detecting arterial insufficiency. However, in some cases such as diabetes, the results may be falsely elevated due to calcification of the vessels. For these patients Toe Brachial Index Pressures (TBI) is a more reliable method of assessment.

Position of Pedal Pulses

Note: The dorsalis pedis pulse is congenitally absent in up to 12% of individuals.

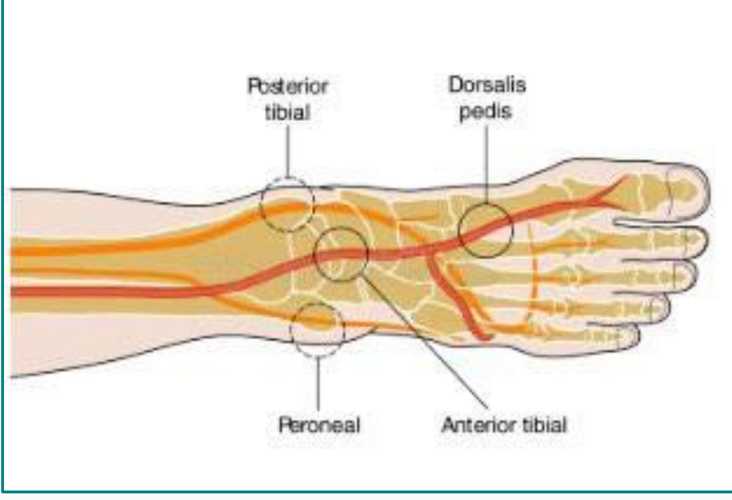


Figure 1: Location of Pedal

Appendix I

Toe Pressure Index

A Toe Brachial Index or TBI is performed when the ABPI or Ankle Brachial Pressure Index is abnormally high (>1.3) due to plaque and calcification of the arteries in the leg. This is caused by atherosclerosis and is most often found in diabetic patients. Prior to undertaking, the patient should be in a supine position with arms and legs at heart level. Keep feet warm with a blanket or towel if needed.

The Procedure: Select the appropriate sized cuff for each limb. You will need one cuff for each upper arm and for each large toe. Measure the cuff width to the diameter of the limb; the cuff width should be 20% larger than the limb diameter to compress all of the soft tissue evenly. The cuff should be put on straight and fit snugly but not tight. You must use vascular cuffs, which have long bladders to completely encircle the limb and compress all of the soft tissue. The toe cuff should be wide enough to apply pressure over a large enough area to avoid becoming too tight and long enough to overlap the bladder. Place the cuffs on the arms and toes once the patient is supine. Have the sphygmomanometer, patient chart, etc. in the room ready to use. The rest period should be at a minimum of 10 minutes. This time can be used for taking a patient history interviewing the patient, listening to the heart, palpating the abdomen, checking the neurological reflexes and sensation in the feet. After the rest period, take the first brachial pressure. Find the brachial pulse with your fingers, and apply then put some ultra-phonic gel on that place. Obtain a good Doppler signal (sound) and waveform to establish a base line. Inflate the cuff until the sound and waveform disappear and then inflate from 20-30 mmHg above that number (super systolic). Slowly deflate the cuff (around 2-3 mmHg at a time) until the sound reappears (Korotkoff sound) the waveform will follow immediately after the sound. The pressure reading when the first sound appears is the correct systolic pressure. Deflate the cuff completely and record the systolic pressure.

After you have recorded the first brachial systolic pressure, record the second systolic pressure or the first toe pressure. Check to see if the cuff is well placed. Put the photo plethysmograph (PG) on the pad of the large toe and not touching the cuffs. Make sure the Velcro will hold the PG in place but not too tight, as that will compress the blood vessels. You should see the patient's pulse as a waveform on the chart recorder. Connect the sphygmomanometer to the toe pressure cuff and inflate slowly until you see the waveform disappear. Note the pressure and continue to inflate until 20-30 mmHg above that pressure (super systolic). Now slowly release the pressure in the cuff at about 2-3 mmHg until the waveform reappears. This is the systolic pressure. Make a note of it. Deflate the cuff completely. Repeat the toe and brachial pressures on the other side.

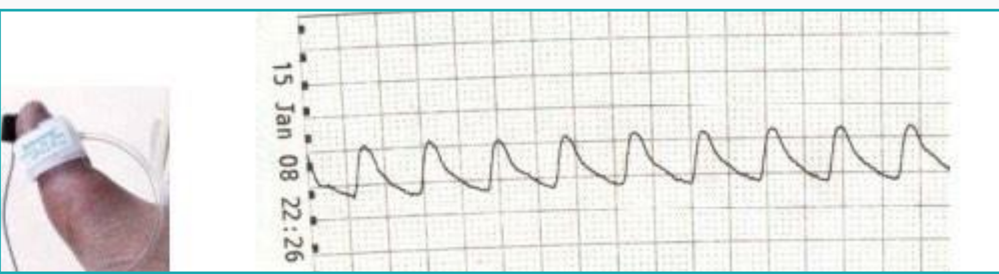


Figure 2: Toe Pressure

How to calculate the TBI.

Divide the highest toe pressure by the highest brachial pressure the result is the TBI.

$$\textbf{TBI} = \frac{\textbf{Toe Svstolic Pressure}}{\textbf{Brachial Systolic Pressure}}$$

Interpretation:

0.64 +/- .20 limbs normal

0.52 =/- .20 claudication in limbs

0.23 =/- .19 limbs with ulcers or ischemic rest pain

A toe systolic pressure greater than 30 mmHg may be an indicator that there is healing potential in a foot with ulcers. A normal TBI differs from a normal ABPI because the normal blood pressure in the big toe (hallux) is expected to be less than at the ankle or the arm. The normal range for a TBI is considered to be an index > 0.65. It the TBI is below 0.65 there is reduced blood flow to the small vessels in the big toe and an index below 0.30 equates to poor wound healing in the absence of vascular surgical intervention. Absolute toe pressure is another important result from this test and is carried out by an appropriately trained clinician.

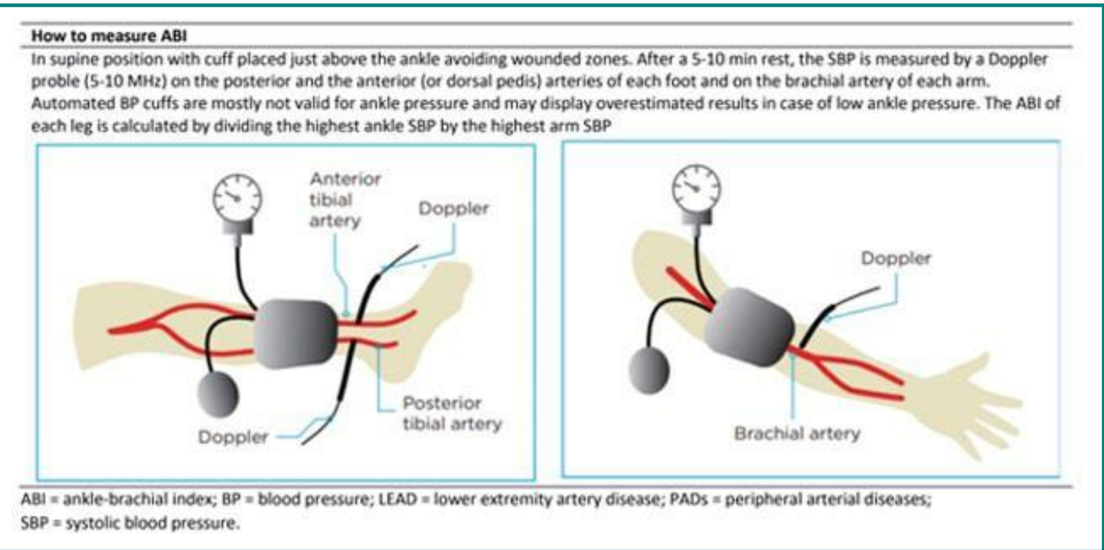


Figure 3: The Ankle-brachial Index. Modified with permission from Aboyans V. *et al.*, Editor's Choice – 2017 ESC Guidelines on the Diagnosis and Treatment of Peripheral Arterial Diseases, in collaboration with the European Society for Vascular Surgery (ESVS). Eur J Vasc Endovasc Surg. 2018;55(3):313. (82)

Appendix II: Lower Limb Ulcer Diagnostic Pathway

Lower Limb Ulcer Diagnostic Pathway

Patient presents with Lower Limb Ulcer

Holistic assessment including

- Risk factors for peripheral arterial disease
- Previous history of leg ulcers to include compression therapy used

Lower limb conditions requiring urgent specialist referral

- Acute spreading infection
- Suspected skin cancer
- Limb threatening Ischemia
- Bleeding varicose veins
Suspected DVT

Refer for urgent specialist assessment as appropriate

- Perform holistic and vascular assessment of lower limb/s including risk for arterial disease
- If pedal pulses palpable and no risk factors present commence compression and monitor the patient
- If pedal pulses are weak or absent or presence of risk factors for peripheral arterial disease undertake Ankle Brachial Pressure Index measurement (ABPI)

Interpretation of ABPI results

ABPI <0.6

Arterial Disease

Urgent referral to vascular specialist

Not suitable for compression

(Monophasic or absent waveform)

ABPI 0.6-<0.8

Arteriovenous (Mixed Disease)

*Initiate light compression

Urgent referral to vascular specialist

(Monophasic waveform)

ABPI 0.8-1.3

Treat as a venous ulcer

Apply full compression

Monitor patient and wound

(Biphasic/Triphasic waveform)

ABPI >1.3

Arteries may be calcified

Assess foot pulses and toe pressures

*Initiate light compression with close monitoring

Refer for vascular assessment

Once healed follow the Healed Leg Ulcer Pathway

Caution**

Waveform interpretation should only be used as a diagnostic tool by appropriately trained clinicians within their scope of practice

If <20% reduction in ulcer size within four weeks refer for specialist assessment as appropriate

***Initiate compression therapy in line with clinician level of competence and ensure the patient/ carer is provided with patient information leaflet on Compression Therapy and its removal if the patient experiences pain, numbness or skin changes in the toes**

Appendix III: Lower Limb Conditions requiring Urgent Medical Attention

Lower Limb Conditions Requiring Urgent Medical Attention

All the conditions listed below require urgent attention and escalation/referral to the appropriate speciality.

Acute

- Increasing unilateral redness
- Swelling
- Wound breakdown or dehiscence
- New or increasing pain
- Pus/Purulent Exudate Heat
- Pyrexia +/- Malaise
- Signs of spreading/evolving infection (crepitus, lymphangitis)
- Induration (extending induration)
- Deteriorating Charcot foot (diabetes)

Symptoms of Sepsis

- Confused, slurred speech, not making sense
- Blue, pale or blotchy skin, lips or tongue
- A rash that does not fade when you roll a glass over it
- Difficulty breathing/ breathlessness/breathing very fast

*the patient may not present with all of the symptoms of sepsis

Acute or Chronic Limb Threatening Ischaemia

Acute

- Pain
- Pulseless
- Pallor
- Power loss/paralysis
- Paresthesia/reduced sensation/ numbness
- Cold to touch

Chronic

- Chronic rest pain
- Dependent rubor, pallor on elevation, reduced capillary refill
- Skin changes including ischaemic ulcers, non-healing foot wounds and gangrene
- Absent foot pulses

Suspected acute deep vein thrombosis

- Localised tenderness along the distribution of the deep venous system
- Entire leg swollen
- Calf swelling at least 3cm larger than the asymptomatic leg

Suspected skin cancer

- Does not heal within 4 weeks
- Looks unusual
- May be painful and/or itchy, bleeds, crusts or scabs for more than 4 weeks
- A change in a mole or freckle

Bleeding varicose veins

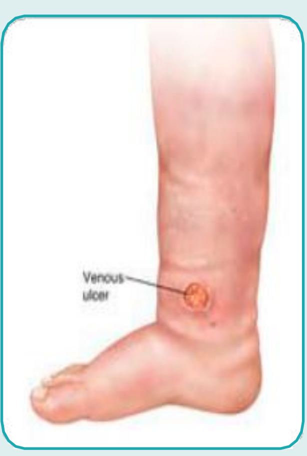
- Weakening or thinning of varicose veins
- Localised/direct trauma or skin injury to varicose veins

Appendix IV (a): Lower Limb Ulcers – Patient Information Leaflet

Venous Leg Ulcers Patient Information Leaflet

What is a Venous Leg Ulcer?

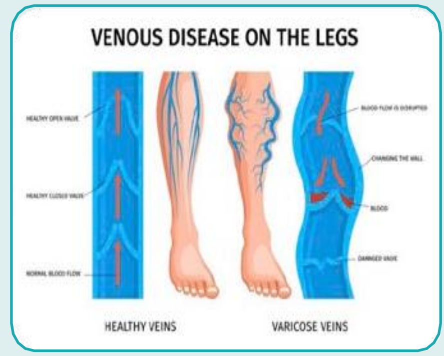
A venous leg ulcer is a wound between the knee and ankle that is slow to heal because of vein problems. The medical term for vein problems is Chronic Venous Insufficiency, or CVI. A venous leg ulcer commonly occurs after an injury to the leg. The injury (wound) fails to heal or heals very slowly. Even a minor injury can lead to a venous leg ulcer.



The body has two types of blood vessels:

The **arteries** carry blood, oxygen and nutrients around the body from the heart. Once the oxygen and nutrients are delivered to the body, the veins carry the blood back to the heart.

When walking properly, the muscles in the foot and the calf help to pump the blood in the veins (venous blood) back to the heart. There are also one-way valves in the veins that open and close to stop the venous blood flowing back down the legs.



What Causes a Venous Leg Ulcer?

If the calf muscle pump in the leg doesn't work properly and/or the valves in the veins become damaged, blood collects in the veins of the lower leg. Problems with the veins in the lower legs are very common, but only a small number of people with vein problems will develop a venous leg ulcer.

Vein problems are caused by:

- Lack of ankle movement for any reason including not walking properly (for example shuffling).
- Previous blood clot in a vein of the lower leg (deep vein thrombosis).
- Veins may be damaged following surgery or a fracture (broken bone).
- Having a family history of ulcers or varicose veins (a sign of damaged veins).
- Being overweight, constipated or having multiple pregnancies.
- Standing or sitting for long periods.

You may have a venous leg ulcer if you have a wound that:

- Is wet (oozes a lot)
- Is shallow (not deep)
- Looks red and/or yellow (not black)
- Is irregularly shaped
- Seems to not get better or worse
- Is painful (although some venous leg ulcers might not be painful)

Other signs of vein problems include:

- Swelling of the leg/s that is usually worse in the evening or after standing or sitting for a while
- Varicose veins visible on your leg
- Skin changes that most commonly occur on the lower third of the leg including:
- Brownish discolouration
- Dry, itchy, scaly or flaky skin Firmness
- Small whitish patches

What is the Treatment for Venous Leg Ulcers?

Compression Therapy

Compression bandaging is the best treatment for a venous leg ulcer. The bandages work by helping push the blood in your leg veins back up to your heart. This allows the skin to heal.

Your nurse will put a dressing on your wound, and cover this with a compression bandage. Your compression bandages will be changed at least once a week or you may be fitted for leg ulcer kits or compression wraps. Your plan of care will be explained and discussed with you.

Pain Management

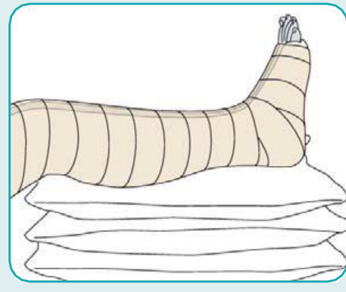
You may or may not experience pain from your leg ulcer. If you do have pain and it prevents you from carrying out your normal daily activities, you should speak to your doctor or nurse about this. You may experience some pain when your dressing and compression bandage is changed but this should settle down. If you experience severe pain, if your toes change colour or feel cold then remove the bandage immediately and contact your healthcare provider as soon as possible.

Skin Care

Dry scaly skin is common in venous leg ulcers. It is important to keep your skin clean and well moisturised. Wash your skin around the leg ulcer with a moisturising wash and rub a fragrance free moisturiser into the skin. If you are unsure of which products are best discuss this with your local pharmacist or healthcare provider.

Elevation

When resting or sleeping, you should try to keep your ankles up higher than your heart. This allows the fluid to drain from your legs.



Exercise

Try to keep active and continue with your everyday activities.

Walking can help as it pumps blood from your lower leg up to the heart.

You should avoid standing still for more than a few minutes, but if you have to stand you could exercise the muscles in your lower leg by moving your toes inside your shoes or moving your feet. You can also do some exercises when you are sitting.

Preventing Recurrence of Venous Leg Ulcers Once Healed

You can help to prevent new ulcers by wearing compression stockings/wraps. These stockings/wraps provide constant pressure to your leg to improve the circulation through your veins. Your healthcare provider will measure you for compression stockings/wraps. They should be worn for life to help prevent recurrence.

Compression stockings

It is important that you put your stockings on first thing in the morning and remove them before going to bed at night.

Applicators to help you apply the stockings are available. Please discuss this with your healthcare provider.

Follow manufacturer's guidelines to care for your compression stockings.

Compression wraps

These can also be applied first thing in the morning and remove them at night before going to bed.

Compression wraps have Velcro which makes them easy to apply.

Follow manufacturer's guidelines to care for your compression wraps.

Caring for compression stockings/wraps

Further information on caring for compression stocking/wraps are usually supplied with the garment, or your health care professional will advise you about this.

To get the best out of your compression stockings/wraps the following is recommended:

- Hand wash using mild soap or machine wash at 30 degrees and avoid using fabric softener
- Lay flat to dry. Do not dry in direct sunlight, on heated rails or in clothes driers. Do not iron.

When to get help from a healthcare professional

Tell your healthcare professional if you have any of the following problems:

- Broken skin/new wound/ulcer
- Skin irritation or redness
- New or increasing swelling of the leg
- New pain or pain that has worsened
- Compression stocking/wrap becoming worn or torn or not fitting comfortably

Appendix IV (b): Overview of Lower Limb Ulcer Management – Patient Information Leaflet

Overview of Venous Leg Ulcer Management – Patient Information

What is a Venous Leg Ulcer?

A venous leg ulcer is a wound between the knee and ankle that is slow to heal because of vein problems which is also called chronic venous insufficiency. Chronic venous insufficiency needs to be treated to prevent and manage leg ulcers.

Recommended treatment for a Venous Leg Ulcer

Medical-grade compression therapy is the primary treatment for venous leg ulcers, as it promotes healing by improving circulation and vein function. Compression supports vein valves, prevents venous blood backflow, and helps return blood to the heart. It also reduces leg swelling and enhances oxygen and nutrient delivery to the skin. While wound dressings can manage wound exudate and improve comfort, compression therapy is essential for effective healing and prevention of recurrent venous leg ulcers. There are surgical treatment options which if appropriate, your vascular surgeon will discuss with you.

Compression therapy explained

Compression therapy can be delivered through various methods:

- Multi-layer compression bandage systems with options for elastic or non-stretch designs Compression hosiery kit systems
- Medical-grade compression stockings
- Pneumatic compression devices

A trained health professional will determine the most suitable type and ensure proper application, extending from the toes to just below the knee.

Wearing compression

- Compression should feel firm yet comfortable; slight discomfort or throbbing may occur initially but subsides as leg swelling reduces.
- Compression bandages must remain dry and protective devices for showering can help. Shoes with adjustable straps or clog-style designs with non-slip soles are recommended to prevent foot injury, ensuring the foot isn't squeezed.
- Compression stockings/wraps should be replaced as per manufacturer's guidelines.

Potential complications and what to report to your health professional

Seek medical advice if you experience:

- Tingling, numbness, or pins and needles in the toes, foot, or leg
- The compressed foot becoming unusually cold, pale, or blue
- Persistent pain unrelieved by pain medication and leg elevation
- Slippage or ridges forming in the compression bandages
- Compression bandages getting wet (or hosiery, which should be replaced with a dry garment)
- Accidental removal of the wound dressing
- If you cannot promptly contact a healthcare professional, consider removing the compression until you receive further guidance.

Overview of Venous Leg Ulcer Management – Patient Information

Maintaining Leg Health – The importance of leg health

The following recommendations are beneficial for anyone with vein problems (Chronic Venous Insufficiency), whether or not they currently have a venous leg ulcer.

These practices are essential during the treatment of a venous leg ulcer, after healing, and for preventing ulcers in individuals with vein problems.

Exercise

Exercise, particularly walking with a heel-to-toe action, supports the calf muscle in pumping blood back to the heart and is a key part of treatment. Walking while wearing compression therapy may further enhance healing. For those with limited mobility, foot and ankle exercises like heel raises are beneficial.

Consult your doctor, nurse, or physiotherapist for personalised advice. Avoid prolonged standing, as it can worsen vein problems.

Leg Elevation

Elevating the legs to hip level while seated, using a footstool, another chair, or a recliner, helps reduce swelling. When in bed, elevate the legs with a pillow under the calves. Lying on a couch or bed with legs elevated for a few hours daily is also beneficial.

Key recommendations:

- Walk as much as possible.
- Avoid prolonged standing.
- Regularly elevate legs to manage swelling
- If walking is difficult perform foot and ankle exercises

Consult your doctor, nurse, or physiotherapist for personalised advice.

Diet and Nutrition

Maintaining a healthy diet and normal weight is crucial for managing vein problems. Excess weight can slow venous blood flow to the heart. A balanced diet supports overall health, reduces the risk of conditions like diabetes, and promotes energy for an active lifestyle.

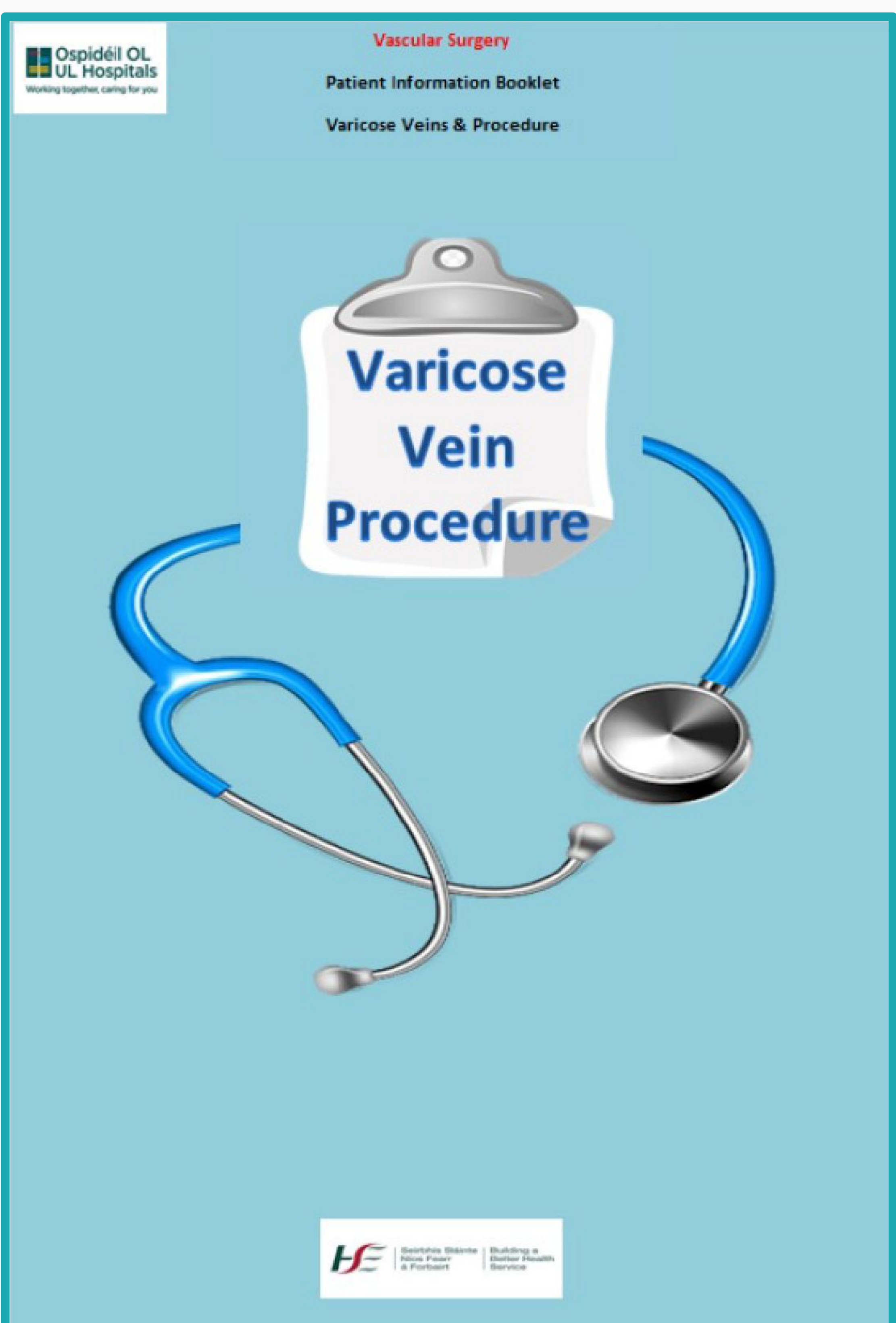
If appetite issues or weight concerns arise, consult your doctor or health professional, who may refer you to a dietician for further assessment.

Skin Care

Skin around a venous leg ulcer may become dry, flaky, or develop eczema.
Proper skin care includes:

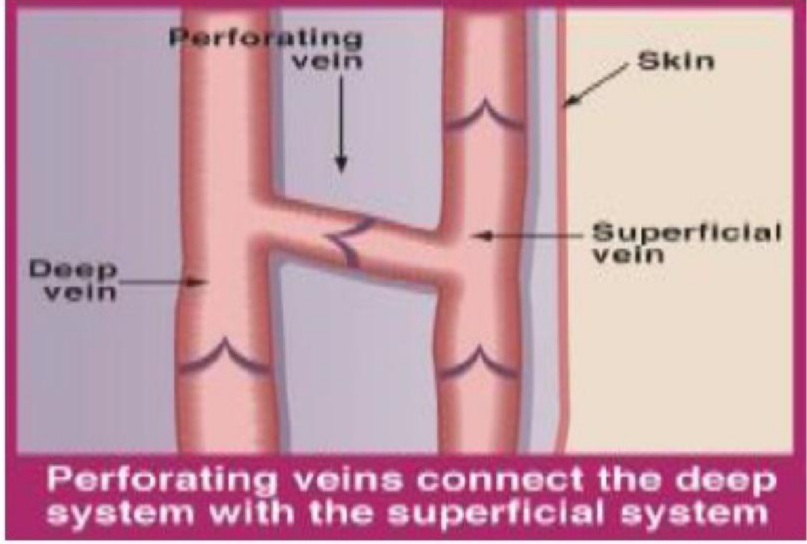
- Gentle washing of the leg with a non-soap cleanser (emollient)
- Gently pat the skin dry and apply moisturiser (do not apply the moisturiser on the ulcer or between the toes)
- If wearing compression stockings/wraps, you may remove them to wash or shower. The compression stockings/wraps must be reapplied once the legs are patted dry and moisturised
- For eczema or persistent dryness, specialised treatments like zinc-infused bandages or stockings and short-term use of steroid creams may be recommended by your healthcare professional.

Appendix IV (c): Varicose Veins Patient Information



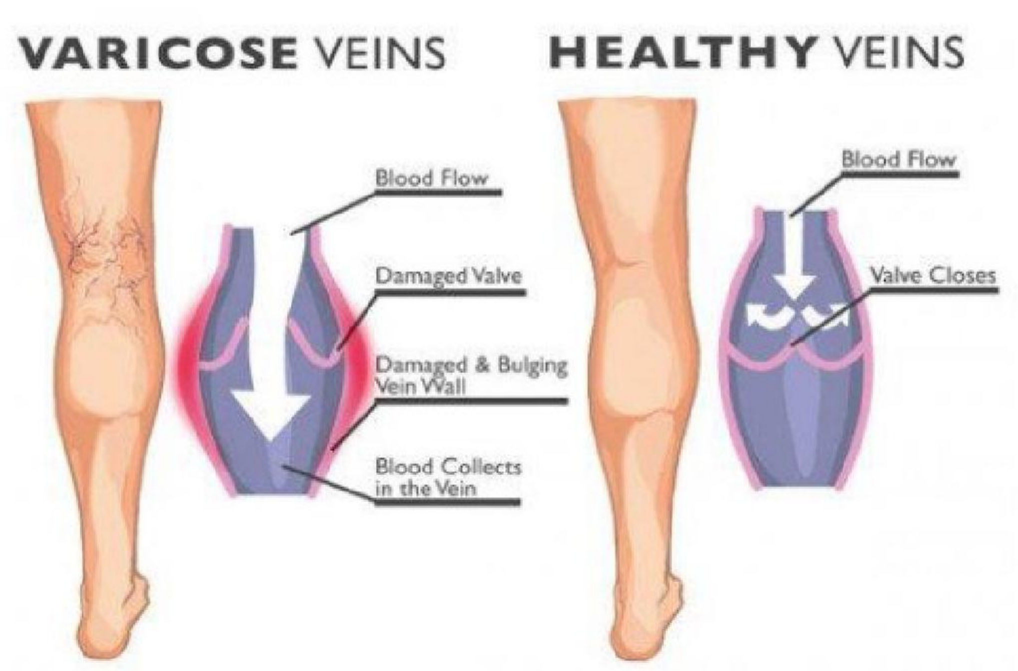
What are varicose veins and how are they caused?

There are three sets of veins in the leg, superficial veins under the skin, another deep in the leg (deep veins) and perforators that connect the superficial veins to the deep veins. Varicose leg veins are swollen superficial veins just under the skin that look lumpy and bluish through the skin. Leg veins transport blood back to the heart. Within the veins there are valves, which stop blood from flowing backwards down the leg. If the valves weaken or are damaged, the blood can flow in the wrong direction; that is away from the heart and back down the leg thus collecting in the vein, extra blood in the vein puts pressure on the walls of the vein eventually causing it to be swollen and enlarged (varicose). These veins serve no purpose and merely become a reservoir for extra blood.



Perforating veins connect the deep system with the superficial system

Varicose veins are a sign of underlying venous reflux and are very common affecting 20–30% of adults. Symptoms from varicose veins include fatigue, heaviness, aching, throbbing, itching and cramps in the legs. Chronic venous insufficiency can lead to skin discolouration (lipodermatosclerosis), inflammatory dermatitis and ulceration. Spider veins— a type of varicose vein, are very common and can present as thread veins or vein clusters; are simply a cosmetic concern.



There tends to be an inherited predisposition to developing varicose veins although other factors may influence whether or not they actually develop.

- Increase in age may be a risk factor, as you age, your veins may decrease in elasticity causing them to stretch.
- Occupations that require people to stand for prolonged periods of time put people at a greater risk of developing varicose veins if they have a genetic predisposition.
- Females that have had multiple pregnancies.
- Being overweight puts increased pressure on the legs and can increase the likelihood of developing varicose veins.
- A history of deep vein thrombosis (DVT)

Varicose veins don't always need surgical treatment, however it may be required to ease symptoms and to treat complications.

What tests are performed to investigate varicose veins?

Most varicose veins originate from the incompetent valves at groin level or behind the knee. It is important to accurately locate the site of the incompetent valves.

- A venous duplex is an ultrasound that provides clear images of the affected veins and the amount of blood flow present. This specialised examination will examine all the veins in your legs to determine which superficial and deep veins are competently functioning or not, and will help decide which intervention is appropriate.

How are varicose veins treated?

I. Compression stockings can be used to alleviate many of the symptoms of varicose veins and can be useful for people in whom surgery is not advisable, for example, pregnant women. The stockings work by exerting pressure on the superficial veins to force blood into the deep veins of the leg and then back to the heart. They stop the blood from pooling and relieve the swelling of the veins.

There are different classes of pressure ranges in the compression stockings: class 1, class 2 and class 3. The appropriate class is chosen according to the severity of the problem. They are available in different sizes and colours with a prescription to ensure that the degree of support is chosen and that they fit correctly.

II. Varicose veins may not be prevented but certain measures may be taken in order to reduce your risk of developing varicose veins or getting additional ones.

- Exercising, weight control, elevating your legs, passive movements of the ankle when lying or sitting and changing your sitting or standing position regularly have been shown

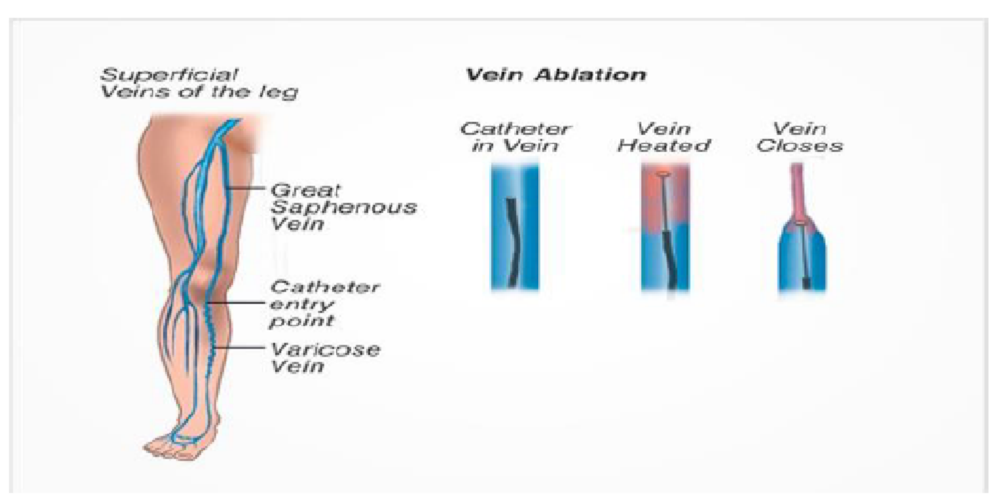
to be helpful; these may also help treat the discomfort you may experience.

III. Surgical intervention

Surgical interventions

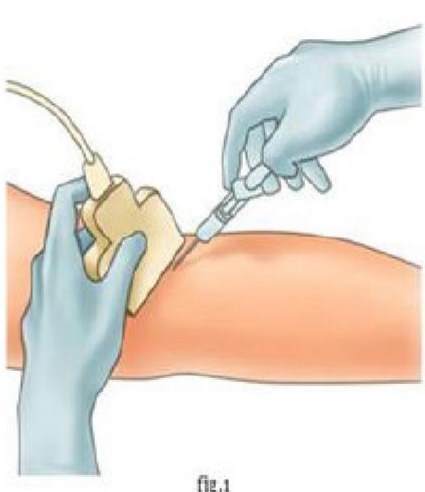
Having surgery to treat the varicose veins will be discussed by your Vascular Surgeon. The type of treatment you will receive will depend on your general health and the size, position and severity of your veins.

- **EVLT (EndoVascular Laser Treatment) or RFA (Radio frequency Ablation) for varicose veins –** laser or radio frequency energy is used to heat the vein in order to ablate it. After a local anesthetic is injected into your leg, a laser fiber or RFA is inserted into the vein under ultrasound guidance and advanced to the end of the vein. Additional local anaesthetic is then injected surrounding the area of the vein to be treated. The heat from the laser or radio – energy seals the walls of the vein so that no blood can flow through it and the vein is destroyed as the catheter is removed, forcing the body to remove the vein with natural healing processes. EVLT and RFA avoid the need for an incision in the groin or anywhere in the leg and causes less bruising than other surgeries.



- **Sclerotherapy** – is a treatment that involves small injections which are part of a procedure. Sclerotherapy treatment is quick and pain-free. It begins where the affected leg is elevated to drain blood away from the treatment site. Your doctor will then use a tiny needle to inject a liquid chemical called a sclerosant into the affected vein. Your vascular surgeon might find that using only a very small amount of the liquid chemical is all that's needed for your fine vein issues.

Sometimes, larger veins require "foam sclerotherapy" where the solution is made into a foam. In this procedure varicose veins are treated by injecting with a sclerosing agent forcibly mixed with air into the vein. This turns the liquid into a foam consistency, like shaving foam. This chemical works as an irritant to the vein, causing the vein wall to swell, stick together and seal shut. The flow of blood to that vein harmlessly stops, over time the vein is reabsorbed by the body and fades away. Foam Sclerotherapy can be performed during the same session to close off varicose veins.



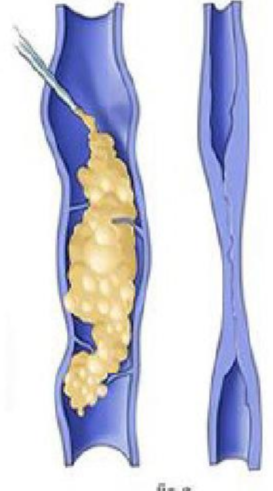
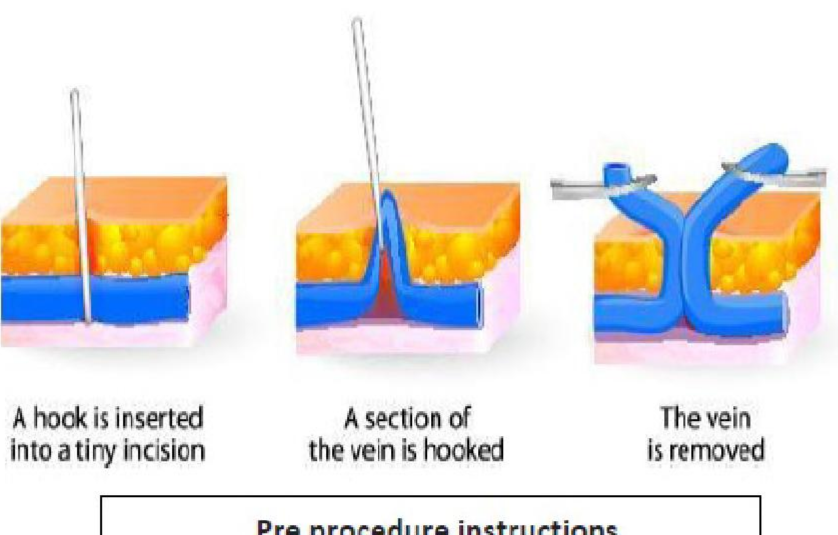


FIG 1:
Utilizing ultra sound technology, the varicose vein is located to allow for precision injection of the sclerosant agent.

FIG 2:
Once the sclerosant agent is injected into the vein, it causes the varicose vein to collapse.

- **Phlebectomy (also known as microphlebectomy, ambulatory phlebectomy, or stab avulsion)** is a technique to remove varicose veins. In this procedure, several tiny cuts (incisions) are made in the skin through which the varicosed vein is removed. Stitches are not usually required.



Pre procedure instructions

You will have a pre-operative assessment prior to your procedure date; this will determine which anaesthetic will be most suitable. Your anaesthetist will discuss this with you.

You will be fasting from midnight before surgery. You may be permitted to take your regular medications that morning however this will be discussed during your pre-operative assessment. If you are on blood thinners (anti-platelets or anti-coagulants) your surgeon will discuss whether they need to be stopped or taken as regular on the days prior to surgery. If required, you will be given a blood thinner injection on day of procedure to prevent a blood clot.

Be sure to arrange transport home after surgery, as we will NOT permit you to drive yourself even if the procedure is done under local anaesthetic.

The surgeon who will be performing your operation will visit you immediately before the procedure. He will mark up your veins with a waterproof pen.

Wear loose, comfortable clothing such as long pants, shorts or a skirt.

If you already wear compression stockings bring them along with you as you will be wearing them post procedure. Do not wear them on day of surgery.

Side effects from the procedure

- Infection – Any operation carries a small chance of wound infection. If indicated, you may be given an intravenous antibiotic, just before the start of the operation.
- Pain over the vein.
- Bleeding – there is a small risk of bleeding after the surgery. This usually happens in the first couple of hours and is very minor. An extra bandage may have to be applied.
- Bruising – depending on the type of surgery, there is usually extensive bruising in the leg, particularly down the inside of the thigh. This bruising usually lasts for 4 – 6 weeks, but can last longer. Removal of the superficial veins means that blood returns to the heart through the deep veins more efficiently than before the operation.
- Nerve damage – the superficial veins that have to be removed lie close to some nerves. There is a small chance that the process of removing the vein may damage these nerves, resulting in a numb leg or foot. This, can rarely lead to chronic pain.
- Redness or swelling (inflammation) of the vein.
- Blood clots – Deep vein thrombosis (DVT) or clots on the lung (Pulmonary Embolism) may on rare occasions develop following varicose vein surgery. The risk is extremely low. The risk of DVT is 1

in 300. The risk of PE is approximately 1 in 1000. All patients receive an injection in their abdomen just before surgery to reduce the risk of deep vein thrombosis or clots on the lung.

- Changes in skin colour over the treated vein.
- Recurrence – With any treatment for varicose veins, there is a chance that more varicose veins may develop over time. This may be due to new veins developing or leaky valves developing in veins elsewhere in your leg. Sometimes further treatment may be required.

Post Procedure instructions

Anaesthesia – The local anaesthesia will last for approximately 1-2 hours after the procedure is over. General anaesthetic will take longer. You will usually be taken to the theatre recovery area after the operation where you will wake up. When you are fully awake (usually 20-30 minutes) you will be returned to the ward. Arrange for a lift home after the procedure as it is unsafe to drive. Do not drive until you feel confident that you can perform an emergency stop without discomfort.

Pain – You may experience mild discomfort after the anaesthesia wears off. Most patients experience the greatest discomfort within the first week after the procedure as the treated vein begins to contract. This is generally described as a pulling sensation with tenderness along the treated vein. It should ease once you take analgesia.

Day Case – You will normally be discharged home the evening of your operation. A small number of patients who are admitted for day-surgery require an overnight stay because of nausea or drowsiness after general anaesthesia.

Wound dressing – After your procedure, you will have a dressing on your leg and you will be fitted with a compression stocking. Some of the smaller incisions may bleed a little over the first 24-48 hours. Do not get the dressing wet. After that you should continue to wear the stocking day and night for

the next 14 days, removing it only to shower and washing purposes. On rare occasions bleeding through the bandages may occur. Lie down, elevate your leg and apply direct pressure until bleeding has stopped.

If there is concern, an appointment will be arranged at 6 weeks with your Vascular Surgeon. This will be arranged by the appropriate secretary.

Activity – Avoid strenuous exercise such as aerobics, weight training, bicycling, and running for 2 weeks. Light exercise is encouraged. Avoid prolonged sitting or standing for the first week. You may elevate your leg throughout the day to alleviate discomfort. Walking during the first week is highly encouraged and will help with your healing and discomfort. It is recommended that you walk a minimum of 5-10 minutes, 2-3 times a day. We expect you to resume nearly all of your pre-procedure activities, including work. It is important to keep moving and maintain a normal activity level.

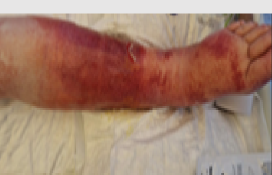
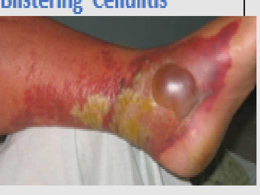
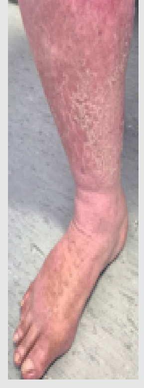
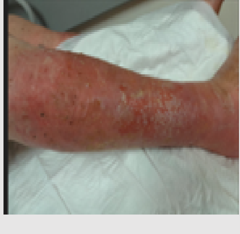
Work – Your surgeon will advise on a suitable day for returning to work.

Flying – is not advisable for at least 6 weeks following surgery due to increased risk of clotting (deep vein thrombosis).

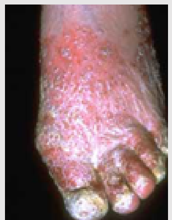
If you have any questions or queries you can contact your GP, or alternatively the secretary of your consultant surgeon

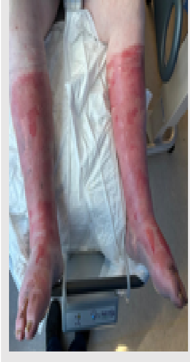
This booklet has been developed by Vascular Surgery, UHL Group

Appendix V: Common Causes of Red Leg Presentations

Common Causes of Red Leg Presentations		
Cellulitis  **Blistering Cellulitis** 	**Clinical presentation:** Acute spreading infection of soft tissues/skin in the lower limb, which is usually unilateral. **Symptoms include:** • Pain, inflammation, hot to touch & swelling • Sudden onset • May feel unwell with flu like symptoms +/= pyrexia • May have elevated inflammatory markers (WBC, CRP) • May develop blisters • Check for source of entry (trauma, insect bite, athletes foot)	**Management:** • Elevation • Antibiotics (iv/po) as appropriate based on degree of infection and in line antimicrobial guidelines • Swab for culture and sensitivity • Treat fungal infection if present • Initiate compression therapy once the patients vascular status has been established and it is safe to do so • Provide the patient or their carer where appropriate with a patient information leaflet including advice on management and how to recognise signs of deteriorating / worsening infection
Dry Varicose Eczema  **Wet Varicose Eczema** 	**Clinical presentation:** Occurs in patients with venous insufficiency. Can be unilateral or bilateral. Symptoms include: • Pink/red itchy dry flaky skin • May become crusty • May have skin changes associated with excessive scratching(lichenification) • Wet eczema is associated with the above symptoms plus oozing /weeping /burning sensation	**Management:** Encourage use of emollients to improve the barrier function of the skin (where appropriate taking patient safety issues into consideration) Encourage the use of emollients as soap substitutes Based on holistic assessment the following treatments may be prescribed: • Topical Steroids • Medicated soaks/bandages • Superabsorbent dressings for wet eczema Consider the use of compression therapy once the patients vascular status has been established and it is safe to do so

Appendix V: Common Causes of Red Leg Presentations (Continued)

Infected Varicose eczema (similar in appearance to impetigo)	Clinical presentation:	Management:
	Eczema can become infected with staphylococcus which appears red and is itchy. Can be unilateral or bilateral. As the infection progresses weeping and a yellow/gold crusting or pustules can occur and there may be yellow/orange/ green tint visible on the skin Fungal infection can also develop which worsens the eczema symptoms causing burning, pain, swelling and inflammation. A scaly rash with a defined border is a common feature of fungal infections.	Encourage use of emollients to improve the barrier function of the skin (where appropriate taking patient safety issues into consideration) Encourage the use of emollients as soap substitutes Send a swab for culture & sensitivity if there is a wound/pustules or skin crusting present Based on holistic assessment the following treatments may be prescribed: • Topical steroids • Systemic or topical antibacterial agents • Systemic or topical antifungal agents (systemic antifungal agents are rarely used due to effects) Consider the use of compression therapy to manage oedema and exudate once the patients vascular status has been established and it is safe to do so Provide the patient or their carer where appropriate with a patient information leaflet including advice on management and how to recognise signs of deteriorating / worsening infection

Allergic contact dermatitis/stasis dermatitis	Clinical presentation	Management:
	This may present as unilateral or bilateral well demarcated stasis depending on exposure as it is a localised reaction to a skin irritant/allergen Patients report dry, irritated, itchy, weepy or blistered skin. The extent of symptoms depends on the reaction to the allergen and the length of exposure	Remove the source of irritant/allergen once known. Based on holistic assessment the following treatments may be prescribed: • Emollients • Topical steroids +/- oral steroids • Medicated bandages

Adapted from Naas General Hospital - Red Legs RATED (Rapid Assessment & Management Tool) 2021

Appendix VI: Components of Lower Limb Ulcer Pathway A – H

A	**Assessment**	• Holistic patient assessment • Vascular assessment of the limb • Leg ulcer wound assessment
B	**Best Practice**	• Skin care • Wound care • Treat underlying cause/co-morbidities
C	**Compression**	Following assessment, if appropriate apply: • Compression bandaging or • Compression hosiery kits or • Compression stockings/wraps
D	**Documentation**	Record: • Findings of assessment and diagnosis • Care plan and follow up • Education provided
E	**Evaluate**	At each patient contact reassess • Limb • Ulcer • Patient/carer(s) concerns
F	**Follow up care**	If ulcer fails to progress/heal with evidenced based treatment, refer to vascular/tissue viability/other specialist service as appropriate
G	**Give/Get Information**	• Provide education to patients with lower limb ulcers and involve them in their care plan. • Ensure clear communication between health care professionals who are treating the patient.
H	**Healed Wound**	• Skin care • Compression stockings/wraps for life (if appropriate) • Monitoring for skin changes/recurrence of ulcer • Provide contact details of healthcare provider

Appendix VII: Venous Leg Ulcer Treatment Pathway

Venous Leg Ulcer Treatment Pathway

Complete Diagnostic Pathway - Venous ulcer diagnosed

Clean and dress

Apply compression bandages/hosiery kit/compression wraps

Monitor progress

If ≥ 20% reduction in ulcer size in 4 weeks, continue treatment until healed

Consider referral to vascular services for potential surgical intervention if appropriate (consider frailty/co-morbidities and patient's wishes

≤ 20% reduction in ulcer size in 4 weeks of compression therapy

or

If devitalised tissue/slough/ biofilm present

or

if co-morbidities below present

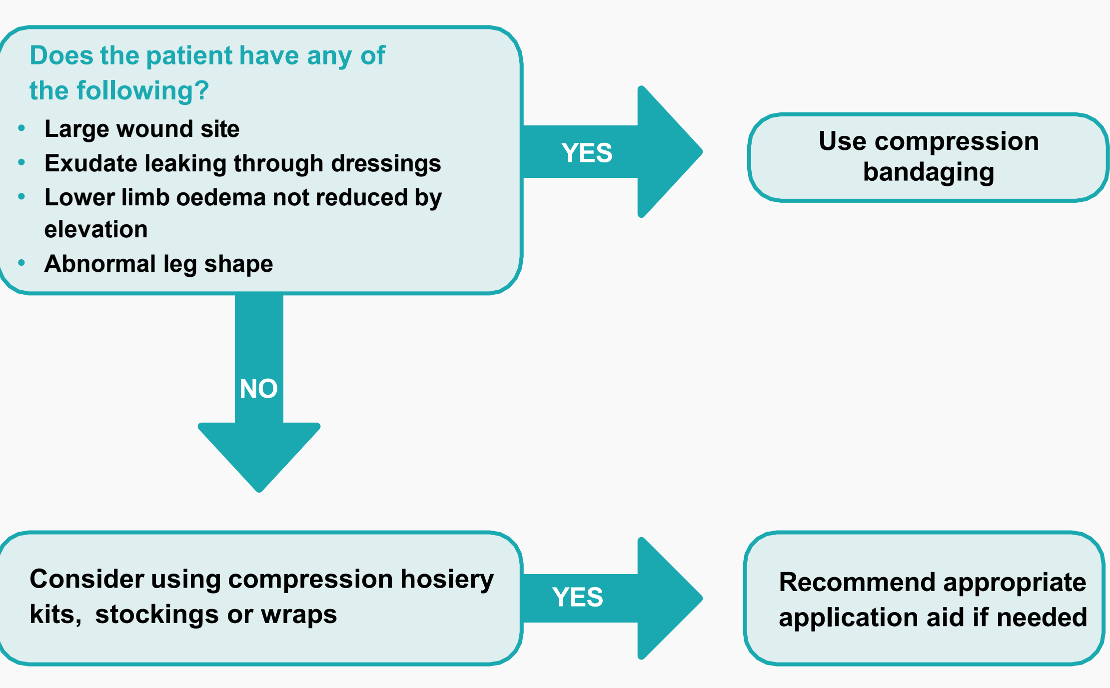
- Ulcer recurrence

Refer to Vascular/Tissue Viability service for assessment

Co-Morbidities

- Chronic obstructive pulmonary disease
- Diabetes
- Deep vein thrombosis/blood clotting disorders
- Heart failure
- Immunosuppressed
- Lymphoedema
- Peripheral arterial disease
- Rheumatoid arthritis
- Renal disease

Appendix VIII: Guide to Compression Therapy



- Ensure the patient is educated on the management of their compression therapy
- Provide the Patient Information Leaflet on caring for compression therapy

Appendix IX: Infected Leg Ulcer Pathway

Infected Leg Ulcer Pathway

Wound infection/Biofilm

Consider oral antibiotics with anti-microbial dressings if patient is unwell or has signs of spreading infection/cellulitis

Signs of Infection

- Pain
- Heat/Erythema
- Oedema
- Loss of function
- Bleeding
- Malodour
- Increased wound size
- Exudate, hypergranulation/ friable tissue
- Delayed healing

- Assess for signs of wound /systemic infection/cellulitis
- Assess for and treat Biofilm and send wound swab
- Wound cleansing and debridement and skin care
- Antibiotics if systemic infection present
- Treat infection with topical anti-microbial solutions and dressings
- Monitor response to treatment

Reassess after 2 weeks

Infection resolved

Discontinue anti-microbial dressings
Continue to monitor

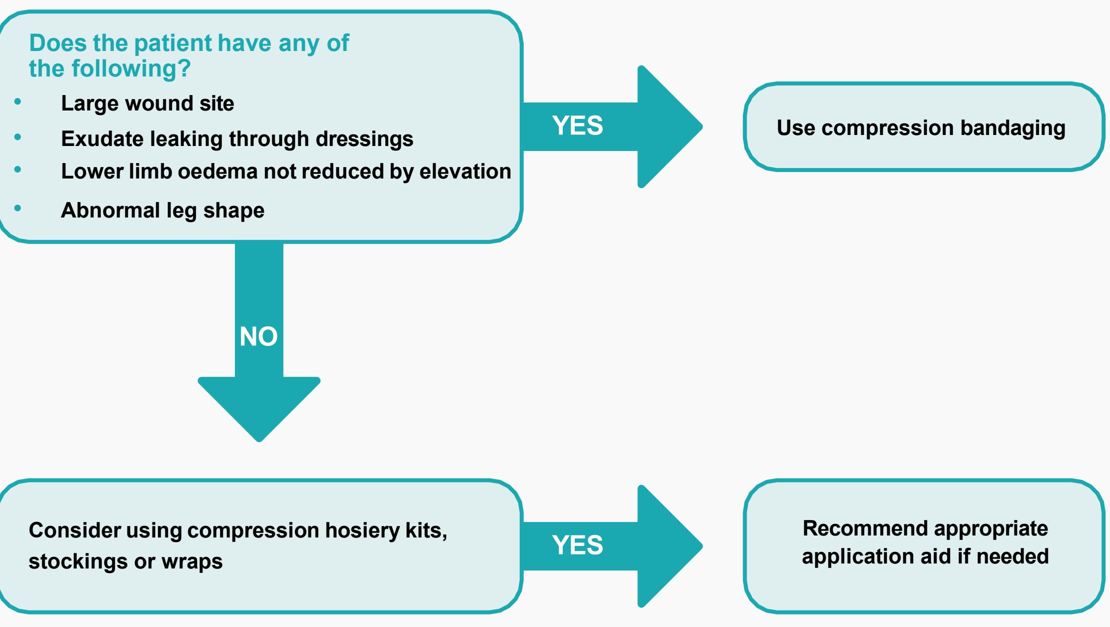
Signs of infection persist.
Repeat swab and continue anti-microbial dressing for 2 more weeks

Refer to GP/ TVN/Specialist Team if persistent/recurrent infection

Note if the patient is in compression, continue with compression therapy unless it is too painful.

If compression is stopped for treatment of infection, recommence it as soon as possible.

Appendix X: Guide to Compression Therapy Selection



- **Ensure the patient is educated on the management of their compression therapy**
- **Provide the Patient Information Leaflet on caring for compression therapy**

Appendix XI: Healed Venous Leg Ulcer Pathway

Healed Venous Leg Ulcer Pathway

Continue existing compression therapy for four weeks once the ulcer has healed before changing to life-long compression stockings or wraps based on patient assessment.

Ensure the patient is measured for the correct size compression stocking/wrap.

Advise the patient to wear their stocking/wrap during the day and to remove at night time.

Advise the patient to remove their stocking/wrap if they are too tight or if they have altered colour, sensation or temperature to their toes/foot or if it causes any damage to their skin.

Educate the patient and/or their carer(s) about the importance of skin care:

- Use emollients instead of soap to wash the legs
- Moisturise legs frequently
- Check the skin daily on the removal of the stocking/wrap and report any changes/ concerns to their healthcare provider.

Advise the patient who they need to contact if they develop another ulcer on their leg.

If the patient develops a new ulcer, complete a holistic lower limb assessment and recommence compression bandaging or compression hosiery kit.

Advise patients on how to care for their compression stockings/wraps as per the manufacturer's guidelines.

Replace the stockings/wraps three to six monthly as per the manufacturer's guidelines or of the stockings/wraps become damaged.

Consider referral to vascular services for surgical intervention (consider frailty, co-morbidities and patient wishes).

Appendix XII: Sample Wound Assessment Document #1

Nurse Led Leg Ulcer Clinic- Client Assessment
Meath Public Health Nursing Service

Doppler Clinic attending: ____________________ Date of assessment: ____________

Client Name: ____________________ DOB: ____________
Address: ____________________
Eircode: ____________________ Contact No.: ____________
Contact Person: ____________________ Contact No.: ____________
GP Name: ____________________ Contact No.: ____________
GP Address: ____________________
PHN/CRGN Name: ____________________ Health Centre: ____________
Infection Status ____________________ Tick if Unknown: ☐
Allergies/Sensitivities : ____________________

Client Consent
Client given written and verbal information re Doppler Assessment: Yes ☐ No ☐
Verbal Consent to: Nursing Assessment Yes ☐ No ☐ Doppler Assessment Yes ☐ No ☐
Consent to sharing of information with others as appropriate to support treatment: Yes ☐ No ☐
GP/PCT: ☐ Hospital Consultant: ☐ Family Member: ☐ Other: ☐ ____________
Client Consent to photography for purpose of tracking wound progress: Yes ☐ No ☐
Client Consent to photography for purpose of education and training purposes: Yes ☐ No ☐

Lower Limb History	**Lifestyle**
Previous Ulceration: Left ☐ Right ☐ No ☐	Reduced Mobility: Yes ☐ No ☐
Details: ____________	Prolonged standing/sitting occupation: Yes ☐No ☐
Diagnosis of Lymphoedema: Yes ☐ No ☐	No. of pregnancies: ____________
Details: ____________	Partakes in regular exercise: Yes ☐No ☐
D.V.T: Left ☐ Right ☐ No ☐	Adequate Nutrition/fluid intake: Yes ☐No ☐
Details: ____________	Nutritional Supplements: Yes ☐ No ☐
Phlebitis: Left ☐ Right ☐ No ☐	Social Day Care: Yes ☐No ☐ Home Help Yes ☐ No ☐
Fracture: Left ☐ Right ☐ No ☐	
Varicose Veins/vein surgery: Left ☐ Right ☐ No ☐	Sleeps in: Chair ☐ Bed ☐
Cellulitis: Left ☐ Right ☐ No ☐	
Details: ____________	
Family History leg ulcer/varicose vein: Yes ☐ No☐	
Previously attended LUC: Yes ☐ No ☐	
Review by Vascular Specialist: Yes ☐No ☐	
Details: ____________	

General Health and Wellbeing / Activities of Daily Living
Communication, Pain, Breathing/Circulation, Nutrition, Mobility & Safety, Elimination/Continence, Personal Grooming/Skin Integrity, Sleeping. Social Interaction and Psychological Care (**Record any relevant information**

Patient Medications
Medication List/Blister pack provided by client: Yes ☐ No ☐ If yes, document medication below as provided:
____
____
____
Medication list provided by GP: Yes ☐ No ☐ If yes, insert list into chart.

Meath PHN Department 2024 Page 1

Cardiovascular Risk Factors	Tick box Y= Yes N= No	Other Risk Factors	Tick box Y= Yes N= No	Measurements /Screening	Right	Left
Hypertension	Y ☐ N ☐	Osteoarthritis	Y ☐ N ☐	Blood Pressure		
C.V.A.	Y ☐ N ☐	Rheumatoid Arthritis	Y ☐ N ☐	Capillary Refill Secs.		
T.I.A	Y ☐ N ☐	Anaemia	Y ☐ N ☐	Ankle Circ./cm		
Hx Pulmonary Emboli	Y ☐ N ☐	Smoker Ex-Smoker	Y ☐ N ☐ Y ☐ N ☐	Calf Circ./cm		
MI	Y ☐ N ☐			Thigh Circ./cm		
Angina	Y ☐ N ☐			Ankle Movements-Full/fixed/limited		
Diabetes	Y ☐ N ☐					
Hypercholesterolemia	Y ☐ N ☐			Blood Sugar		
Past Arterial Surgery	Y ☐ N ☐					

Signs of Arterial disease

Do you have pain in legs when elevated in bed?	Yes ☐ No ☐
Are you awoken from sleep by leg pain?	Yes ☐ No ☐
Do you need to get out of bed/sit on edge of bed to get relief from leg pain?	Yes ☐ No ☐
Do you take medication at night before bedtime?	Yes ☐ No ☐
Details : ____________________	
Nursing assessment based upon above questions:	Rest pain: Yes ☐ No ☐
When walking a distance do you ever get pain in your calf that would cause you to stop?	Yes ☐ No ☐
If yes, does this pain resolve with rest?	Yes ☐ No ☐
Nursing assessment based upon above questions:	Intermittent Claudication: Yes ☐ No ☐
Cold Foot	Left ☐ Right ☐ No ☐
Pale, shiny, hairless skin	Left ☐ Right ☐ No ☐

Signs of Venous Disease Tick box Y= Yes N= No	Right Leg	Left Leg
Stasis Oedema	Y ☐ N ☐	Y ☐ N ☐
Eczema	Y ☐ N ☐	Y ☐ N ☐
Brown Pigmentation	Y ☐ N ☐	Y ☐ N ☐
Atrophe Blanche	Y ☐ N ☐	Y ☐ N ☐
Visible Varicose Veins	Y ☐ N ☐	Y ☐ N ☐
Induration/Lipodermatosclerosis	Y ☐ N ☐	Y ☐ N ☐
Ankle Flare	Y ☐ N ☐	Y ☐ N ☐
Client position during Doppler		
Unable to complete ABPI. Comment :		

Pedal Pulses Tick Y= Yes N= No	Right Leg	Left Leg
Palpable	Y ☐ N ☐	Y ☐ N ☐
Reduced	Y ☐ N ☐	Y ☐ N ☐
Doppler Assessment		
Pressure	**Mm/hg**	**Mm/hg**
Dorsalis Pedis		
Posterior Tibial		
Brachial/Radial		
Ankle Pressure		
÷	÷	÷
Arm Pressure		
ABPI Result		

Diagnosis

Venous Ulcer: ☐ Mixed Ulceration: ☐
Severe Arterial Disease: ☐

Recommendations/outcomes

Suitable for compression	Full compression ☐ Modified compression ☐ Not suitable ☐ Details:
Referrals:	TVN ☐ GP ☐ Vascular ☐ PHN☐ Podiatry ☐ Other ☐ ____________

Is a lower limb wound present Yes ☐ No ☐ If yes proceed to leg ulcer assessment and management section (p3-4)

Review Day/Month/Year:

Signature/Grade/NMBI PIN:

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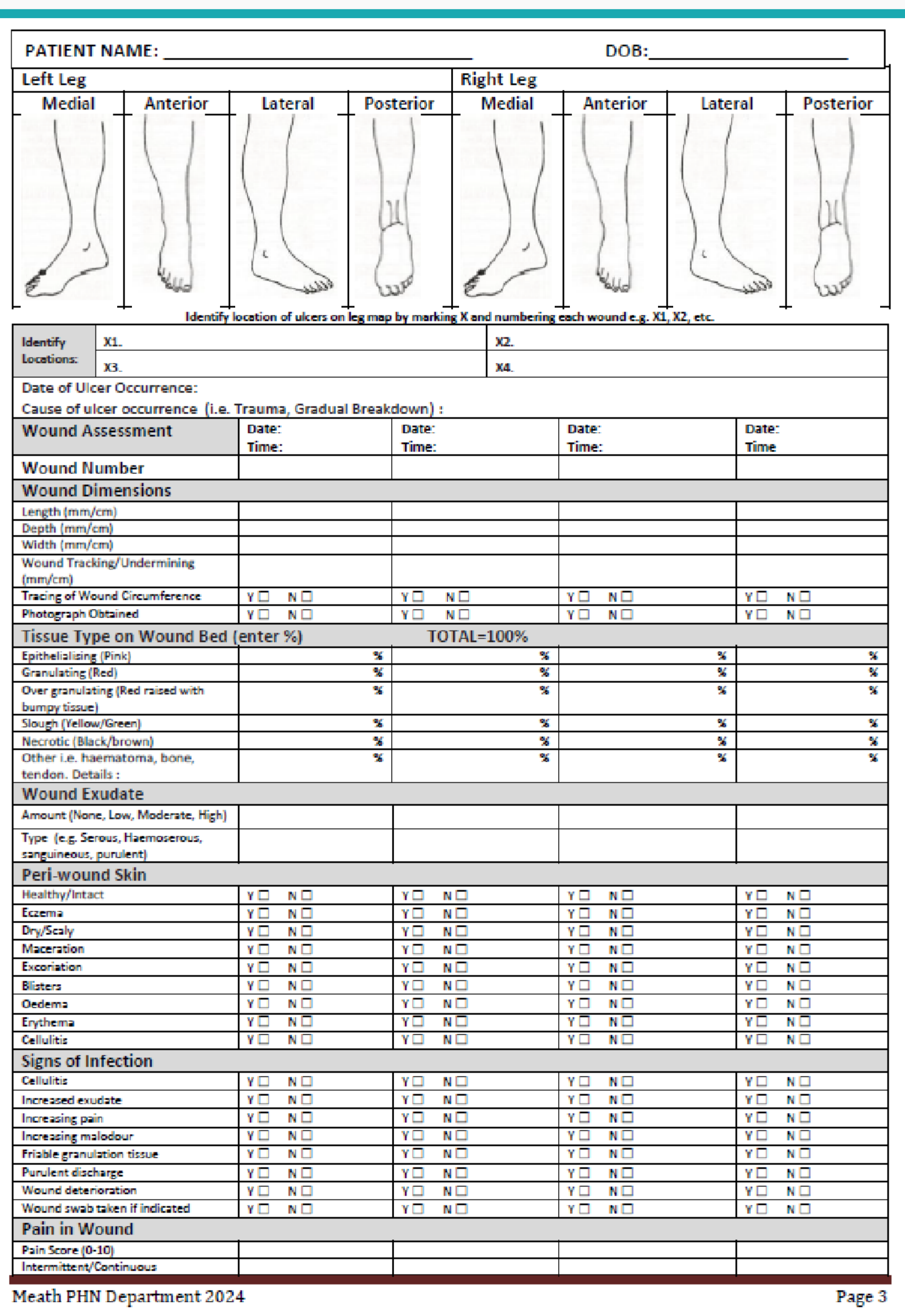
Appendix XII

Appendix XII



PATIENT NAME: ______________________________ DOB:________________

Left Leg				Right Leg			
Medial	Anterior	Lateral	Posterior	Medial	Anterior	Lateral	Posterior

Identify location of ulcers on leg map by marking X and numbering each wound e.g. X1, X2, etc.

Identify Locations:	X1.	X2.
	X3.	X4.

Date of Ulcer Occurrence:

Cause of ulcer occurrence (i.e. Trauma, Gradual Breakdown) :

Wound Assessment	Date: Time:	Date: Time:	Date: Time:	Date: Time
Wound Number				
Wound Dimensions				
Length (mm/cm)				
Depth (mm/cm)				
Width (mm/cm)				
Wound Tracking/Undermining (mm/cm)				
Tracing of Wound Circumference	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Photograph Obtained	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Tissue Type on Wound Bed (enter %)	TOTAL=100%			
Epithelialising (Pink)	%	%	%	%
Granulating (Red)	%	%	%	%
Over granulating (Red raised with bumpy tissue)	%	%	%	%
Slough (Yellow/Green)	%	%	%	%
Necrotic (Black/brown)	%	%	%	%
Other i.e. haematoma, bone, tendon. Details :	%	%	%	%
Wound Exudate				
Amount (None, Low, Moderate, High)				
Type (e.g. Serous, Haemoserous, sanguineous, purulent)				
Peri-wound Skin				
Healthy/Intact	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Eczema	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Dry/Scaly	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Maceration	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Excoriation	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Blisters	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Oedema	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Erythema	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Cellulitis	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Signs of Infection				
Cellulitis	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Increased exudate	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Increasing pain	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Increasing malodour	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Friable granulation tissue	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Purulent discharge	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Wound deterioration	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Wound swab taken if indicated	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐	Y ☐ N ☐
Pain in Wound				
Pain Score (0-10)				
Intermittent/Continuous				

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Signature/Grade/NMBI PIN				

PATIENT NAME: ______________________ **DOB:**

Wound Management Plan	Date: Time:	Date: Time:	Date: Time:	Date: Time:
Wound Number				
Type of Cleansing Solution				
Treatment of surrounding skin				
Primary Dressing				
Secondary Dressing				
Method of securing dressing				
Compression therapy used				
Frequency of dressing change				
Referrals (document all that apply)				
1. GP 2. Tissue Viability Nurse 3. Dietician 4. Vascular/Surgical 5. Smoking Cessation 6. Podiatry 7. Other (please state				
Client Education (All information should be provided verbal and written (Document V=verbal, W=written)				
Compression Therapy	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐
Elevation & Exercise	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐
Skin Care	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐
Nutrition	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐
Sepsis Information	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐
Offloading	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐	V ☐ W ☐
Sharing of information				
Information sent and shared with:	PHN ☐ GP ☐	PHN ☐ GP ☐	PHN ☐ GP ☐	PHN ☐ GP ☐
Signature/Grade/NMBI PIN				

PATIENT NAME: ________________________________ **DOB:**_________________________

NURSING NOTES			
DATE	TIME	COMMENT	SIGNATURE/Grade/ NMBI PIN

Appendix XIII: Sample Wound Assessment Document #2

NGH Naas General Hospital

Lower Limb Ulcer Assessment and Diagnosis Chart

Date of assessment:		Attach Addressograph
Location of Assessment:		
Allergies:		

Predisposing Factors					
Arterial Disease	**Yes**	**No**	**Venous Signs and Symptoms**	**Left**	**Right**
Ischaemic heart disease			Ulceration		
Cerebrovascular accident			Deep Vein Thrombosis		
Transient ischaemic attack			Fracture		
Auto Immune Disorder			Vein surgery		
Rheumatoid arthritis			Joint surgery		
Hypertension			Cellulitis		
Diabetes			Oedema		

History
Duration of current Ulcer:
Date of onset of first ulceration
Social issues affecting ulcer healing:

Contributing factors to non-healing								
Obesity	Y	N	Self-neglect	Y	N	Limited mobility	Y	N
Poor Nutrition	Y	N	Intravenous drug user	Y	N	Chair sleeper	Y	N
Smoking	Y	N	Non-compliance	Y	N	Poor insight of condition	Y	N

Leg Measurements (cm)	**Left**	**Right**	**Dexterity**	**Left**	**Right**
Calf (widest)			Fixed Ankle Joint	Yes No	Yes No
Ankle (narrowest)			Poor Ankle Mobility	Yes No	Yes No
Foot Length					

Pain Assessment		
	Score 0-10	Description of Pain: Intermittent/constant
Day		
Night		
At dressing change		
Exacerbating/Relieving Factors		

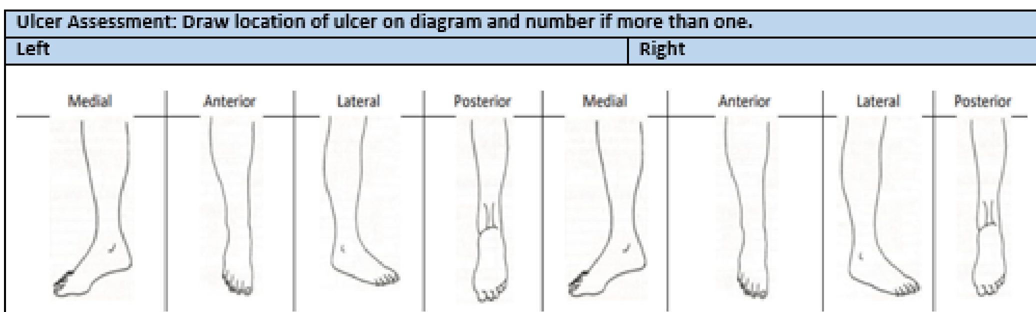
Presenting signs and symptoms – tick if present					
Venous	**Left**	**Right**	**Arterial**	**Left**	**Right**
Ankle flare			Cold foot		
Varicose veins			Pale, shiny, hairless skin		
Hemosiderin staining			Capillary refill > 3 seconds		
Varicose eczema			Intermittent claudication		
Lipodermatosclerosis			Ischaemic rest pain		
Oedema			Dropping leg over bed edge		
Atrophie blanche			Limb elevation pain		
Hyperkeratosis			Positive Buerger's sign		

Results of vascular ABPI/TBI assessment by competent practitioner, in conjunction with clinical assessment	**Left**	**Right**	**Date**
Ankle Brachial Pressure Index (ABPI)			
Toe Brachial Pressure Index (TBI)			
	Location		**Date**
Referred to Vascular Service for assessment			
Referred to other specialist service eg. dermatology			

Developed by RANP Tissue Viability and Dermatology Dept. NGH, February 2024 V1

Lower Limb Ulcer Assessment and Diagnosis Chart

Ulcer Assessment: Draw location of ulcer on diagram and number if more than one.	
Left	**Right**



Complete Wound Care Chart with the following:

- Size – length x width x depth
- Tissue type – necrotic, sloughy, granulation, epithelialisation, hyper granulation
- Infection/inflammation signs – High exudate levels, increase in pain, erythema, friable tissue
- Moisture/exudate – level, consistency, serous, purulent, Haemoserous
- Edge of wound – punched, shallow, rolled edge
- Peri wound area – macerated, erythematous (may look blue/purple in darker skin tones), intact
- Swab – Document date, location and type.

Leg Ulcer Diagnosis :

Venous ABPI 0.8-1.3	**Arterial ABPI < 0.6**	**Arteriovenous (mixed) ABPI 0.6-0.8**	**Atypical**
Initiate full compression Consider referral to Vascular service if suitable for surgical intervention or for non-healing despite evidence based treatment	Vascular referral. No Compression Keep necrotic heel eschar dry and off load	Vascular Referral Initiate reduced/light Compression	Specialist input as appropriate

Care Plan:

Details and Date of next assessment:	
Signature & Registration Pin	

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Appendix XIV: My Patient Has A Lower Limb Ulcer - What Do I Do? - Healthcare Professional Leaflet

My patient has a lower limb ulcer, what do I do?

- Examine the patient's lower limbs and note the current dressing or compression system that the patient has. Discuss with a colleague and check the clinical notes if you are unsure of the aetiology of the limb ulcer or type of compression system if one is in situ
- Take a history where appropriate from the patient or their carer to determine whether they are aware of their lower limb ulcer diagnosis. If they are unsure check with the public health nurse as soon as possible
- Remove the compression or dressing carefully, paying attention to fragile skin
  Clean the wound and the periwound area
- Wash and dry skin and apply emollients/moisturiser (avoid applying between the toe web spaces)
- Record baseline wound measurement
- Follow HSE guidelines if using digital photography
- Swab the wound as per local policy or if infection is suspected
- Note previous dressing allergies/sensitivities, compression therapy history
  Apply wound dressing appropriate to the assessment findings and care plan
- If the patient was in compression on admission this should be maintained (Ensure the compression therapy applied is correct)
- If the patient is not in compression ascertain the rationale for the same?
- Did the patient have a previous holistic vascular assessment? (When and where was it completed and can you access the results of the same)?
- Had the patient previously worn compression therapy and if yes why was it discontinued?
  Has the patient refused compression therapy and if yes why?
- Can you assess the patient and apply compression therapy? If you cannot, can a colleague undertake the assessment or can they be referred to specialist services?
- Once the level of compression therapy is established, and there are no lower limb conditions requiring urgent medical attention, apply the compression therapy system
- Check the patient's limb/s after application of compression
- Document the date and type of compression applied in the clinical notes
- Advise the patient that increased pain may occur when compression bandages are first applied to a leg ulcer but this should improve over time. If it is extremely painful or there is altered colour, sensation or temperature to the limb remove the compression therapy
- The frequency of dressing changes will depend on exudate levels and infection status of the wound
- If a patient is in full compression, they usually have the compression therapy changed once weekly

- If a patient is in light compression therapy they usually have the compression therapy changed twice weekly
- The wound and periwound should be examined at each dressing change with weekly wound measurements documented
- The volume, colour and consistency of strikethrough/exudate (exudate sitting on the outer layer of the compression therapy) should be noted and documented before removal of the compression therapy
- The volume, colour and consistency of exudate should be noted and documented on removal of the dressing
- The condition of the skin should be noted and documented with attention to skin conditions such as varicose eczema or lipodermatosclerosis (Appendix V)
- If the leg ulcer is showing signs of healing continue with the current treatment regime
- If the leg ulcer is showing signs of deterioration, repeat a full assessment and discuss any concerns with the medical/vascular team
- If a patient's wound is failing to heal (<20% reduction in overall wound size in four weeks) or deteriorates then they should be referred to the appropriate specialist service
- Refer all cases of suspected arterial ulceration to vascular services urgently
- Venous ulceration may benefit from varicose vein treatment and vascular referral for this should be considered
- Refer all cases of active foot ulceration in diabetics to the hospital-based Multidisciplinary Foot Team
- Document lower limb assessment and timing of review in the clinical record. Ensure
- The timing of the next wound review is communicated at clinical handover, to the relevant MDT team and on transfer of the patient both internally and externally to the service.

Oifig an Stiúrthóra Seirbhísí Altranais & Cnáimhseachais | Office of the Nursing & Midwifery Services Director