Prevention and early identification of lower limb skin injuries: **The role of the podiatrist**

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Foreword

Maintaining healthy skin on the lower limb is crucial in preventing a range of complications, particularly for individuals with conditions that increase the risk of skin injuries, such as diabetes or skin conditions. Podiatrists, as specialists in the foot and ankle, play a vital role in early identification and prevention of lower limb skin injuries.

Historically, there has been some debate – or a lack of clear understanding – over where 'responsibility' lies for issues relating to the lower limb. Definitions of where the lower limb ends and the foot begins may vary and cause confusion over the role of different clinicians in prevention and management.

As such, a multidisciplinary group of experts met online on 30th May 2024 to discuss the role of the podiatrist and how their expertise can benefit patients who are at risk of all types of lower limb skin damage (not only the foot). This document reflects the discussion of the experts and how the findings can be applied to practice.

This document aims to:

- Clarify definitions of the lower limb, the foot and related terminology
- Identify risk factors common for both lower limb and foot-related changes
- Encourage effective communication and a multidisciplinary team (MDT) approach to promote early identification and continuity of care for patients
- Explore ways in which prevention and early identification of lower limb changes can be optimised as part of the existing practice of podiatrists
- Increase awareness and confidence for all clinicians involved with the foot and lower limb to deal with issues promptly as they arise and know who to speak to for further advice or if a referral is needed.

Podiatrists have a wide range of skills such as assessing skin and musculoskeletal (MSK) conditions, identifying risk factors, and implementing targeted interventions, which are instrumental in mitigating the risk of developing an issue with the foot and associated complications. Through regular comprehensive foot examinations, podiatrists can detect early signs of skin damage, such as calluses, blisters, or areas of increased pressure, and promptly address these issues before they progress to more serious ulcerations.

This in turn means podiatrists may also be ideally placed to be more involved in the prevention and early identification of skin damage affecting the lower leg (as opposed to the foot), such as venous hypertension, skin tears, oedema and venous leg ulcers (VLUs), to reduce patients' cumulative risk of such injuries and their associated complications if left untreated.

The growing prevalence of chronic wounds, such as DFUs and VLUs, and the significant strain placed on healthcare services, necessitate the need for the early identification and prevention of lower leg injuries, with a clear MDT approach wherever possible so that early signs are not missed.

Karen Ousey, Chair

The role of the podiatrist: overview

NICE guidance (2019) states that the multidisciplinary foot care service should be led by a named healthcare professional, and consist of specialists with skills in the following areas:

- Diabetology
- Podiatry and podiatric surgery
- Diabetes specialist nursing
- Vascular surgery
- Microbiology
- Orthopaedic surgery
- Biomechanics and orthotists
- Interventional radiology
- Casting
- Wound care.

Podiatrists support primary care by providing expertise in foot and ankle health. Key areas of responsibility include management of the high-risk foot; diagnosis of new problems; support of people living with long-term conditions such as arthritis, diabetes, or cardiovascular disease; maintaining physical activity and wellbeing (NHS England, 2024).

Ultimately, a podiatrist's role includes crucial health elements. These generally fall under three broad categories: wound care, MSK-related and podiatric surgery. These may also include diagnosis of conditions such as peripheral arterial disease and atrial fibrillation.

Key skills of the podiatrist working in primary care include diagnosis of new lower limb problems; plus diagnosis, monitoring, and management of systemic disease that manifests within the lower limb (RCPod, 2024). Podiatrists are trained to request and interpret a range of diagnostic tests, such as imaging and blood tests, to inform diagnosis of conditions, which affect the foot and lower limb (RCPod, 2024), as well as prescribing and medicine management.

The Royal College of Podiatry (RCPod) expands the definition of the podiatrist's role to encompass the foot, ankle and leg (RCPod, 2024). This definition notes that the podiatrist's role may vary, as they may work in the NHS or in independent/private practice, and this may form part of a MDT with other clinicians, such as doctors, nurses and physiotherapists.

The RCPod recommends that a more rigorous and robust approach to mapping the skills, attributes and knowledge of the 21st century podiatrist should be conducted, with as much reduction in practice variation as possible (RCPod, 2023). This will involve reforming podiatrist education and training to align with the ever-changing healthcare landscape and the trajectory set by the NHS Long Term Plan.

It is acknowledged that in the current health landscape, podiatrists have a key role to play in patients' health and wellbeing, and in preventing issues and complications within the lower limb, which may extend beyond the foot.

Taking a joined-up approach to care is essential, to ensure there is a healthcare professional responsible and accountable for the patient's care and that no early signs are missed in any patient; see **Figure 1** for a representation of the multidisciplinary approach to wound prevention and management.

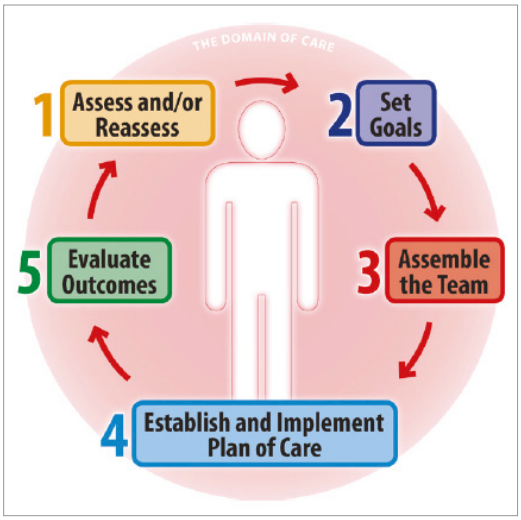


Figure 1: The Wound Prevention and Management Cycle (Bassett et al, 2019, taken from WUWHS 2020)

The current healthcare landscape

The prevalence of wounds managed by the National Health System (NHS) has significantly increased over recent years. A cohort study found that in 2017/2018, an estimated 3.8 million patients had a wound managed by the NHS, representing an increase of 71% from 2012/2013 (Guest et al, 2020).

These figures are set to increase further, as the UK's population is predicted to increase by 3.2% in the next 10 years, placing significant staffing and economic pressures on an already stretched healthcare service (Cowley et al, 2023).

The ageing population means that overall rates of long-term health conditions are increasing and with these the risk of damage to the skin relating to skin fragility and comorbidities (LeBlanc et al, 2018).

In the current landscape of increased prevalence of chronic conditions, along with overstretched services, podiatrists have a key role to play, particularly in prevention, early identification and management of lower limb conditions. Podiatrists are ideally placed to use their expertise in primary care settings by developing and embedding services that extend the ability of GPs and primary care teams to provide a focus on prevention and early intervention (RCPod, 2024).

There is a need for MDT/cross professional working – a collaborative approach is everyone's business in terms of coping with increased health demands and promoting early identification and continuity of care for patients. The plan should be to focus heavily on prevention as opposed to treatment.

Defining the lower limb

Agreement is required over the definition of the 'lower limb', how it relates to both the leg and the foot, and what this means in terms of clinicians' individual roles and responsibilities.

The National Wound Care Strategy Programme (NWCSP) includes both the leg and the foot within their lower limb guidelines (NWCSP, 2024).

For the purposes of this consensus, the expert group agreed on the following definitions:

- Lower limb: the entire length of the leg, originating at the hip and ending at the toes
- Upper leg: the region of the lower limb that begins at the hip and ends at the knee
- Lower leg: the region of the lower limb that begins at the knee and ends at the malleolus
- Foot: the region of the lower limb which begins at the malleolus and ends at the top of the toes.

What constitutes skin damage?

A wound is a breakdown in the protective function of the skin (skin breakdown); the loss of continuity of epithelium, with or without loss of underlying connective tissue (i.e. muscle, bone, nerves) following injury to the skin or underlying tissues/organs caused by surgery, a blow, a cut, chemicals, heat/cold, friction/shear force, pressure or as a result of disease, such as leg ulcers or carcinomas (Leaper and Harding, 1998).

Before a wound occurs, the skin may become impaired by both intrinsic and extrinsic factors (Callaghan et al, 2018). Impaired skin integrity is defined as an 'altered epidermis and/or dermis, destruction of skin layers (dermis) and disruption of skin surface (epidermis)' (North American Nursing Diagnosis Association, 2018).

When the skin becomes impaired, it is no longer able to withstand mechanical stress, balance homeostasis, or maintain its immunological function (Moncrieff et al, 2015). This makes early identification of potential issues that may affect the skin or lower limb crucial. Ideally, preventative action should be taken before skin damage occurs. If damage does occur, the focus should be on early intervention.

Lower leg ulcers

A leg ulcer is defined as any wound on the lower leg (below the knee and above the foot) that fails to progress to healing within 2 weeks (Ousey et al, 2021; NWCSP, 2024).

See **Figure 2** for identifying the location of a leg ulcer and foot ulcer.

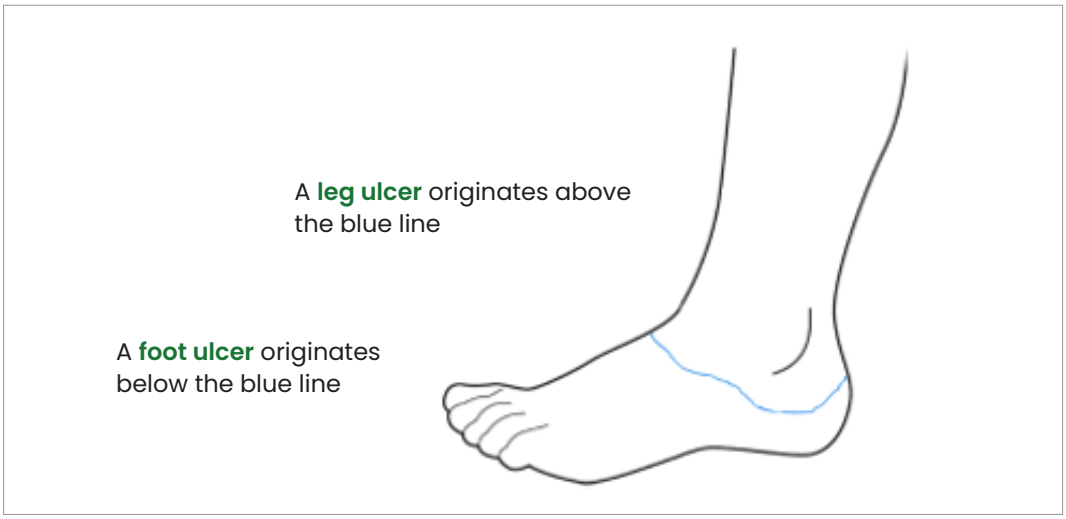


Figure 2: Location of leg ulcer versus foot ulcer (NWCSP, 2024)

The role of the podiatrist

Podiatrists are particularly well positioned – with the necessary skills and knowledge – to identify issues that might affect the leg, as well as the foot and ankle. A drive to increase awareness of common risk factors and looking beyond the foot, encouraging a joined-up way of thinking, is needed.

There are many guidelines for the prevention and management of foot ulcers and the podiatrist's role in all aspects of the foot is very clear; however, this consensus document will explore the role of podiatrists in early identification and management of leg ulcers, potentially looking at ways in which the scope can be expanded where appropriate, improving patient outcomes without making radical changes that may increase podiatrists' workloads.

First point of contact

To facilitate early identification and appropriate action, it is important those clinicians who are the first point of contact for patients who may be at risk of lower limb damage are trained in early identification of risk factors. This may include pharmacists, nurses and GPs, as well as podiatrists. Early intervention can significantly improve patient outcomes and reduce the burden on clinicians and healthcare systems.

In recent years, pharmacy teams have increasingly become the first point of contact for patients, serving as a key pillar in patient information and education (Ousey et al, 2021). Depending on the care setting, pharmacists are often expected to deal with a wide variety of conditions and health questions, so can be responsible for effectively diagnosing some conditions and signposting, as well as prescribing (NHS England, 2015).

It is important that all clinicians who may be a first point of contact for patients with, or at risk of, lower limb skin damage are aware of risk factors and the signs to look out for to enable timely and appropriate intervention.

Risk factors and the importance of prevention

A range of factors can put patients at increased risk of skin damage, which may lead to ulceration. With a focus on prevention, it is important to identify risk factors and act as soon as possible, to prevent skin damage from either occurring or from worsening. In this section, common risk factors are highlighted, along with preventative action required to avoid skin damage when these risk factors are present.

It is imperative these risk factors are identified in a timely manner (see page 13 for more information on assessment) and, crucially, that appropriate action is taken. In this section, suggested preventative actions are given with each potential risk factor.

Risk factor: fragile skin

The normal ageing process causes changes in the skin that make it more fragile and therefore more vulnerable to damage, including skin tears (LeBlanc et al, 2018). If a patient has comorbidities or other conditions affecting the skin, these may be exacerbated; with a reduced ability of the skin to regenerate and a less efficient protective immune system, patients are at an increased risk of skin breakdown from even minor force or trauma (Voegeli, 2007).

It is important to note that, while skin frailty may be associated with ageing, it does not only apply to older individuals, nor should it be seen as purely a result of ageing (Beeckman et al, 2020). The skin may be affected by chronic illnesses (e.g. renal, liver, cardiovascular), or due to medications, malnutrition, stomas and devices, or psychosocial issues (Callaghan et al, 2018).

See **Table 1** for examples of groups that may be at risk of skin frailty, and how this may impact the individual and their health.

Table 1: Patient groups at risk of skin frailty (adapted from Wounds UK, 2018)

Patient group	Skin changes	Potential problems
Older adults	Becomes thinner, loses elasticity, reduced blood supply, subcutaneous fat decreases, skin hydration decreases, reduction of the dermal-epidermal layer (diminishing adherence of epidermis on dermis; Moncrieff et al, 2015; Levine, 2020)	Skin tears, pressure ulcers, infection, inflammation, dryness/flaking, itching, cellulitis, possible nutrition issues; possible issues relating to dementia
Individuals with mobility issues/ paralysis	Alterations to blood supply, temperature control, loss of collagen, lack of muscle/atrophy, impaired sensation due to damaged nerves in the skin (Rappl, 2008)	Skin tears, pressure ulcers, infection, inflammation, oedema, venous hypertension
Children/neonates	Immature skin; intrinsic changes due to pressure duration, shear and friction, poor perfusion and maceration (Inamadar and Palit, 2013)	Nappy/diaper dermatitis, skin tears, pressure ulcers
Individuals with spina bifida and cerebral palsy	Decreased skin perfusion, cutaneous reaction to drugs, perineal dermatitis and inflammation due to incontinence (Inamadar and Palit, 2013)	Pressure ulcers; possible incontinence-associated dermatitis
Bariatric patients	Altered epidermal cells, increased water loss, dry skin, maceration, increased skin temperature, and reduced lymphatic flow and perfusion (Shipman and Millington, 2011)	Pressure ulcers, skin tears, venous leg ulcers, psoriasis, intertrigo
Oncology patients	Radiation leads to inflammation, epidermis damage, decreased perfusion (NHS, 2010)	Pressure ulcers, reduced wound healing, skin infections, cellulitis, radiodermatitis
Chronic illness and other issues	Skin changes due to chronic illnesses - e.g. renal, liver, cardiovascular; medications; malnutrition; stomas and devices; psychosocial issues (Wounds UK, 2018)	Skin tears, pressure ulcers, infection, inflammation, moisture lesions; other related issues

Preventative action: structured skincare regimen

Emollient therapy should be seen as a vital part of skincare in patients with fragile skin. Use of emollients promotes general skin health and twice-daily application has been proven to reduce incidence of skin damage by 50% (Carville et al, 2014).

Emollient products are available as moisturisers (creams, ointments and lotions), bath oils, gels and soap substitutes (NICE, 2015; 2019). The patient should be advised on their bathing regimen, with emollient products including soap substitutes and pH-balanced products used where required.

Frequency of bathing should be minimised where possible (although, again, patient choice must be considered). The water temperature should not be too hot, and care should be taken to pat the skin dry (not rub), and soft cloths and towels should be used that will not be abrasive on the skin (LeBlanc et al, 2018).

A skin damage prevention regimen should include holistic elements considering the patient's general health, such as optimising the patient's nutrition and hydration. Patients at extremes of weight (bariatric, cachectic or excessively thin) will require extra guidance. Polypharmacy issues should be taken into consideration where necessary, and appropriate extra care taken (LeBlanc et al, 2018).

Risk factor: skin conditions

Dermatological conditions such as eczema and dry skin may also put the patient at risk of skin damage, so early signs need to be recognised in a timely manner.

Venous eczema and lipodermatosclerosis are skin changes of the lower legs in people with chronic venous insufficiency that will need to be identified and monitored (NICE, 2022). See page 10 for more information on venous hypertension.

Venous eczema (also known as varicose, gravitational, or stasis eczema) is an inflammatory condition characterised by red, itchy, scaly, or flaky skin, which may have blisters and crusts on the surface (NICE, 2022).

Lipodermatosclerosis (which may be acute or chronic) is primarily associated with chronic venous insufficiency and venous hypertension, i.e. when the heart cannot pump blood from the leg veins back to the heart. Lipodermatosclerosis results from chronic inflammation and fibrosis of the dermis and subcutaneous tissue, and often presents as an inflamed, warm and tender lower leg (Moore et al, 2022). Symptoms can also include swelling from oedema – increased fluid in the leg. This excess fluid may cause swelling that leads to lymphoedema, causing lack of mobility.

Skin changes relating to common conditions such as the human papillomavirus (HPV) may also cause issues that increase risk of damage or complications (NHS, 2022). Venous skin changes are caused by sustained venous hypertension, which results from chronic venous insufficiency due to venous valve incompetence or an impaired calf muscle pump.

Preventative action: establish the cause and treat

To prevent skin damage or complications that may arise from skin conditions, it is necessary to establish the cause so that the risk of harm can be reduced.

If inflammation is present, this is the body's natural immunue response to harmful stimuli, which can be physical, biological or chemical in nature (Hurlow and Bowler, 2022). Inflammation in lower limb skin conditions occurs in response to a trigger causing tissue injury.

For example, venous eczema/stasis dermatitis is an inflammatory response to cell damage that has occurred due to venous hypertension (Harding et al, 2015).

Scan the QR code above to access the Lower Limb Inflammatory Pathway

Risk factors and the importance of prevention *(Continued)*

With irritant/contact dermatitis, erythema, warmth and blistering may occur due to the inflammatory immune response to the irritant or allergen. The goal of treatment is to eradicate or reduce the effect of the harmful agent (Moore et al, 2022).

A structured skincare regimen may be required and, in some cases, treatments such as corticosteroids; if the skin is broken, there may be risk of infection, particularly in patients who have comorbidities or may be immune compromised (Moore et al, 2022). It is important to be alert and notice signs of infection, especially cellulitis in the lower limb, and to act promptly.

Risk factor: oedema and lymphoedema

All forms of oedema relate to swelling, which can result in damage to the skin. Chronic oedema has an ongoing effect on the viability of the skin leading to complications, such as infection, cellulitis, fluid leakage and ulceration (Bianchi et al, 2012; Harding et al, 2015; Ousey et al, 2021).

'Chronic oedema' is a term used to describe a group of conditions characterised by the presence of swelling within tissues of the body, caused by the accumulation of excess fluid within the interstitial space of the affected area and lasting more than 3 months (Moore et al, 2022).

Lymphoedema results from a failure of the lymphatic system. Consequences are swelling, skin and tissue changes and predisposition to infection. It most commonly affects the lower or upper limbs but may also affect midline structures such as the head and neck, trunk, breasts or genitalia (BLS, 2022). Chronic oedema and lymphoedema are interchangeable terms meaning the same thing (Fletcher et al, 2021).

Preventative action: compression therapy

Treatment should begin in the absence of red flags if safe to do so – it is important that the underlying cause of oedema is identified and treated as soon as possible. Bilateral oedema is indicative of systemic conditions such as cardiac failure, protein reduction and venous insufficiency, standing or sitting in the same position for too long, being overweight, being pregnant, malignancy or taking certain medicines; unilateral oedema is more often due to local causes, such as deep vein thrombosis (DVT) or cellulitis (Fletcher et al, 2021).

Patients with signs and symptoms of lymphatic insufficiency should be prescribed appropriate compression as early as possible to manage the underlying condition and prevent disease progression (Anderson and Smith, 2014), and to reduce risk and incidence of cellulitis. Without appropriate treatment to reduce the oedema, the affected tissues become progressively hard, fibrosed and non-pitting, and the oedema fails to reduce on elevation. Patients with oedema will have an altered leg shape, which may include large skin folds (especially around the ankle and knee), making it difficult to ascertain where the knee joint is. This can be exacerbated if the individual is overweight.

In patients with chronic oedema, the key function of compression is ongoing maintenance (Harding et al, 2015). Compression combined with exercise increases lymph flow and venous return, thus reducing the volume of oedema. In addition, compression increases the blood flow into the microcirculation, which may improve wound healing and help soften thickened or 'woody' tissues (Elwell, 2014). See page 18/**Box 2** for more information on the NWCSP red flags for treatment of leg ulcers.

Risk factor: symptomatic venous insufficiency

Venous insufficiency because of incompetent vein valves or functional venous disease (lack of activation of calf/foot muscle pump) can lead to venous hypertension. Patients with venous hypertension may have symptoms such as pain, aching, discomfort, swelling, heaviness and itching in the lower leg, whereas some may have no obvious symptoms.

Scan the QR code above to access Guidelines on the Management of Cellulitis in Lymphoedema

Varicose veins are dilated, often palpable subcutaneous veins with reversed blood flow, which are commonly found in the legs. Estimates of the prevalence of varicose veins vary but are estimated to affect at least a third of the population. Risk factors for developing varicose veins are unclear; however, they are hereditary, often develop during pregnancy and prevalence rises with age (NICE, 2013).

Varicose veins may increase the likelihood of other issues developing in the leg, such as DVT, skin changes, leg ulcers, bleeding and thrombophlebitis (NICE, 2013).

Preventative action: specialist referral

NICE guidance (2013) states that patients must be referred to a specialist vascular service if they have any of the following:

- Symptomatic primary or symptomatic recurrent varicose veins
- Lower limb skin changes, such as pigmentation or eczema, thought to be caused by chronic venous insufficiency
- Superficial vein thrombosis (characterised by the appearance of hard, painful veins) and suspected venous incompetence
- A VLU (a break in the skin below the knee that has not healed within 2 weeks)
- A healed VLU.

Overall wellness and prevention of complications

General health and wellbeing should be encouraged in all patients where appropriate. This may include factors such as nutrition, movement for patients where this is possible, and health-related lifestyle factors (e.g. smoking, weight management).

Individual patient ability and capacity will have a huge effect on their care, along with their unique needs and preferences. Psychosocial and socioeconomic factors relating to the patient's overall health and wellbeing, support systems and living environment will also influence care and outcomes. As such, establishing the individual's capacity, needs and preferences for their care is key (WUWHS, 2020).

Early identification through assessment

Thorough and effective assessment is the foundation of all management and treatment, underpinning all decision-making; unless treatment is tailored to the individual based on holistic assessment, it is unlikely to be successful.

Crucially, accurate assessment may also mean that key preventative measures can be put in place that reduce a patient's risk of requiring further care (Dhoonmoon et al, 2023).

In the lower limb, holistic assessment should consist of three components:

- Assessment of the patient and their overall health/wellbeing
- Assessment of the limb
- Assessment of the wound/skin condition.

Assessment should help form a full picture of the patient so that, in collaboration with the patient, prevention and management can progress through timely decision-making and action.

Assessment of the patient

Holistic wound assessment considers the entire patient, including their health, environment, physical, psychological and psychosocial factors. It is critical that the assessment and any subsequent care are tailored to the individual patient and their needs from the beginning; for example, considering the patient's baseline skin tone and monitoring any changes (Dhoonmoon et al, 2023).

Holistic assessment of the patient should include (Dhoonmoon et al, 2023):

- The patient's skin including their baseline skin tone so that any changes can be monitored
- Their overall health and mobility level
- Their medical history, any comorbidities and medications
- Their skin condition or wound
- Their lifestyle and environment
- Their socioeconomic status, including factors such as support networks and help available
- Their education/awareness of their own condition, and capacity to follow information and guidance, especially when self-caring for a wound or skin condition at home.

When assessing the 'whole' patient, it is important to listen to any concerns they have or any issues that affect their quality of life; for example, the patient may report pain, difficulties with maintaining activities of daily living and/or working, finding suitable clothing and footwear, and may be reluctant to socialise and/or have symptoms of anxiety or depression (Fletcher et al, 2022a).

Assessment of the skin

The patient's skin should be assessed to identify risks for skin damage and other issues that may affect skin integrity (Callaghan et al, 2018).

It is important not to rely solely on appearance when assessing the patient's skin, full use of the senses – particularly touch – is valuable in skin assessment; for example, in cellulitis, the affected skin feels different from the surrounding skin, with tightness apparent to the touch. Temperature can also be a useful marker in assessment and diagnosis. Touch can be used to assess for warmth, or to compare temperature (for example, in two limbs; Dhoonmoon et al, 2023).

It is important to obtain the patient's perspective, asking them how their skin feels and whether they have noticed any changes to their own skin, such as pain, itchiness or changes in sensation, as well as the appearance of the skin. Patients should be encouraged to familiarise themselves with their own skin so that they can notice any changes and take action. This may be particularly important if a patient is at risk of foot damage. People with diabetic foot issues, for example, should be educated on the risks and changes to look out for (Dhoonmoon et al, 2023).

See **Box 1** (from Callaghan et al, 2018) for more information on the components that should be considered as part of a comprehensive holistic skin assessment.

Box 1. Key components of a comprehensive skin assessment

- Patient medical history
- Skin assessment
- Does the patient have intrinsic risk factors for vulnerable skin, such as old age, diabetes, atopy (heightened immune response to allergens) or thin skin?
- Does the patient have wound-related risk factors such as varicose eczema, infection, high exudate levels, oedema or pitting?
- Is there a skin condition present? Is there anything unusual, such as a rash or dryness, or is the skin sore or itchy? How does the skin feel to the patient?
- Assessment of the patient's knowledge about his/her skin condition
- Skin condition history:
  - How long have they had the condition?
  - How often does it occur?
  - Are there seasonal variations?
  - Is there a family history of skin disease?
  - Could the patient's occupation/hobbies affect their skin (e.g. chemical exposure, repeated hand washing)?
  - Any medications/known allergies
  - Previous and past treatments and effectiveness
  - Are there any treatments, actions or behaviours that influence the condition?
  - Is there any odour present?
- Apply gentle touch/pressure to the skin to gather information about the skin's texture
- Using your fingertips, check the temperature of the skin
- In the foot, check for footwear issues or structural abnormalities that may cause pressure damage
- Ensure that the skin examination is carried out in a warm, private room.

Assessment of the lower limb

When assessing the leg, it is important to examine for the following factors (Fletcher et al, 2022b):

- Signs of venous and/or lymphatic insufficiency (e.g. oedema, ankle flare, hyperpigmentation, lipodermatosclerosis, atrophie blanche, varicose eczema)
- Presence and distribution of oedema; oedema likely to become non-pitting with chronicity due to development of fibrotic tissue
- Limb length, size and shape and muscle tone (e.g. reduction or loss of calf muscle, inverted champagne bottle shape)
- Mobility and/or ankle movement
- Skin tone and condition
- Overall hygiene and skin care, presence of hyperkeratosis, fungal infection
- Arterial assessment
- Limb temperature
- Erythema, pallor and/or cyanosis.

Patients who are at risk of foot damage and complications are likely to have risk factors throughout the lower limb; therefore, at every visit, it is important that the lower limb is checked as well as the foot for signs of potential damage, to ensure early identification and action. As defined earlier in this document, 'lower limb' refers to the entire leg (from hip to toe), and 'lower leg' refers from knee to toe. As such, it is important that as much of the leg as possible is considered – i.e. not just a focus on the foot.

If, for example, there is reduced ankle mobility, next steps should include: starting an exercise programme, and a referral to physiotherapy and orthotist. It is important that limb temperature is checked (e.g. is the limb cold and pale?) and for an outcome to be reached based on this. In such instances, conditions such as heart failure, respiratory diseases, should be considered. Like arterial disease, if peripheral arterial disease is diagnosed, appropriate medical management is needed.

A podiatrist could start such management to help reduce risk factors and administer appropriate medication. Importantly, patients with asymptomatic peripheral arterial disease

Scan the QR code to see Wounds UK (2023) Best Practice Statement: The use of compression therapy for peripheral oedema: considerations in people with heart failure.

Early identification through *(Continued)*

do not require referral to vascular services but are at high risk of developing foot ulcers so need appropriate risk reduction including cardiovascular disease risk reduction in line with NICE (2012).

Outcome of assessment

A proactive approach is needed, so that assessment leads to action. Any new risk or damage should be discussed with the patient as part of their assessment, documented, and action taken wherever necessary with clear and achievable evaluation dates. Specialist referral should be made where needed.

Every patient should be informed about their risk factors and condition and given information highlighting how to reduce their risk and monitor their own limb, knowing who to contact in case of concern or deterioration. Monitoring with the clinician should be ongoing, with a plan adapted to the individual patient's needs.

Taking responsibility

It is essential all clinicians who assess patients take action in line with 'Every contact counts.' This was an initiative that focused on prevention of pressure ulcers (Fletcher, 2023), but can be applied to other aspects of care.

When reflecting on prevention and early intervention, every contact with a clinician, healthcare professional, carer, patient/client can help to reduce the patient's risk of damage occurring, or worsening, and significantly improve outcomes. It is important to see every contact as an opportunity, and to ensure this opportunity is not missed.

As such, when examining and assessing the feet, it is important to ensure that the lower limb does not become a missed opportunity, and a proactive approach is taken at every stage.

Types of lower limb skin damage: wound aetiologies

When damage to the lower limb has occurred, it may be chronic or acute, dependent on a range of factors. This section outlines common acute and chronic wound aetiologies, with tips for managing these in practice.

Acute wounds

Acute wounds result from injury or trauma to the skin and may be more common in patients with fragile skin, which increases vulnerability to damage. An acute wound can turn into a non-healing wound and, therefore, risk factors should be identified and immediate and necessary care given in line with the NWCSP. An acute wound should be considered a non-healing wound if healing has not occurred within 2 weeks.

Wound aetiology: skin tears and pretibial lacerations

Skin tears can occur anywhere on the body, but most commonly occur in the extremities (Harding et al, 2015; LeBlanc et al, 2018). Prevalence of skin tears in the lower limb has been reported at 36–45%, with the majority occurring over the tibia (Rafter et al, 2016; Bermark et al, 2018); however, skin tears over the tibia are often classified as a pre-tibial laceration, therefore figures are unreliable (Wounds UK, 2020).

Pretibial lacerations are common injuries that are usually caused by direct minor blunt trauma, such as striking the area against an object (e.g. the side of a table or dropping an object on the pretibial region). They have a significant yet underestimated association with morbidity and mortality. Currently, 5.2 in 1000 patients per year present to the emergency departments in UK hospitals due to pretibial lacerations (Jefferies et al, 2023).

Despite the significant burden, there is a lack of evidence on the optimal management of such injuries. There is also a lack of clear evidence on prevalence, as pretibial lacerations and skin tears in the lower limb are often recorded interchangeably (Fletcher et al, 2020).

Acute wounds in the lower limb are more common in patients with reduced mobility (Rayner et al, 2015; Wounds UK, 2020), and/or those who also have multiple comorbidities (Le Blanc et al, 2018).

Lower limb wounds are more likely to develop complications, particularly in individuals who also have multiple comorbidities (Le Blanc et al, 2018). Therefore, lower limb skin tears and pretibial lacerations require specific guidance for management in practice. Specifically, this relates to the use of compression in conjunction with general skin tear management principles (Fletcher et al, 2020). The International Skin Tears Advisory Panel (ISTAP) provide more information regarding management of skin tears.

There is an acknowledged lack of awareness around skin tears, which have been referred to as 'the underappreciated enemy', particularly in older patients or those with at-risk skin (Le Blanc and Baranoski, 2018). As both skin tears and pretibial lacerations are often observed in individuals at the extremes of age, or who are critically and chronically ill, an increased understanding – of both wounds themselves, and the factors that put patients at risk of wounds developing – is required (Le Blanc and Baranoski, 2018).

Tips for management: lower limb skin tears and pretibial lacerations

- *If a patient presents with a lower limb skin tear or pretibial laceration, a standardised management pathway should be initiated; while this should be tailored to the individual and their wound where necessary and appropriate, the correct steps for best practice must be included (Fletcher et al, 2020)*
- *There may be an initial need to control bleeding, in which case pressure should be applied to the wound and the limb elevated. Where controlling bleeding is a priority, dressings to assist with haemostasis may be used. Pain may also be an issue that needs to be managed appropriately (LeBlanc et al, 2018)*

Types of lower limb skin damage: wound aetiologies *(Continued)*

- *The skin tear or laceration should be classified after the wound has been cleaned and the flap repositioned (if it appears to be viable) or debrided (if it is clear the flap is not viable), not before. This will help to establish whether the flap is viable, which is a key part of classification and ongoing management (Fletcher et al, 2020)*
- *An appropriate dressing should be selected, with care taken in application and removal to prevent further damage, and the wound left undisturbed if possible (Fletcher et al, 2020)*
- *Compression should be considered to expedite healing (Fletcher et al, 2020). The patient's safety should be the main consideration in any use of compression: up to 20mmHg can be used in all patients with lower limb wounds (excluding those with red flags, as compression may be contraindicated), which can be increased to up to 40mmHg in patients who have had a full vascular assessment (Vernon et al, 2019; Fletcher et al, 2020).*

Orthopaedic wounds

Wounds in the lower limb from open fracture or orthopaedic surgery can become complex in at-risk patients (Morgan-Jones et al, 2019). Infection is a key consideration, particularly in patients that have comorbidities.

Traumatic, open fractures are usually contaminated on arrival at the hospital, whereas contamination of incisional orthopaedic wounds can occur in the hospital environment (Sochen, 1994).

Surgical site infection (SSI) is a significant issue, affecting approximately 500,000 surgical patients each year in the US, and leading to around 8,000 deaths annually (Najjar and Smink, 2015). In the UK, SSI is estimated to affect 6.4% of all surgical procedures (Leaper, 2015).

Tips for management: orthopaedic wounds

- *Considering the patient's infection risk is key to treatment, as lower limb orthopaedic wounds tend to be at high risk. Where possible, leaving the wound undisturbed through dressings with a long wear time is optimal; however, the wound should still be monitored for signs of infection or those that indicate dressing change may be needed; the patient should know who to contact if they are concerned about infection (Morgan-Jones et al, 2019)*
- *While selecting a dressing that facilitates longer dressing wear time may be beneficial, criteria for dressing change include (Morgan-Jones et al, 2019):*
  - *Saturation of the wound dressing material*
  - *Excessive bleeding*
  - *Suspected local/systemic infection (e.g. local wound pain, redness, swelling)*
  - *Potential dehiscence.*
- *Protecting the surrounding skin and preventing further damage should also be considered through skin care and use of protective products if necessary*
- *Oedema in fractures and lower limb orthopaedic surgery is common – consider the use of compression therapy to control oedema and prevent wound breakdown.*

Chronic wounds

If the wound fails to heal within a 2-week period, a full holistic assessment, incorporating an arterial assessment, should be carried out, focusing on a 'VIP' approach (vascular, infection, pressure offloading). These wounds may be referred to as chronic, non-healing, hard-to-heal or complex. Non-healing wounds develop due to an interruption in the body's natural healing processes (Fletcher et al, 2022a). From a patient's perspective, living with a non-healing wound can often mean experiencing a decrease in quality of life, with the potential of increased pain and anxiety (Olsson et al, 2019).

Lower limb ulcers

In a cohort study of patient records in England (Guest et al, 2020), 1 million of the 3.8 million patients presenting with wounds were found to have lower limb ulcers. The most common lower limb ulcers were found to be VLUs and DFUs, which mainly affect older individuals and people with comorbidities such as diabetes and peripheral arterial disease (PAD).

In at-risk individuals, such as older people or those with comorbidities, a leg ulcer can develop from a minor injury and easily become hard-to-heal. VLUs are believed to be the most common chronic wound in the UK (Fletcher et al, 2019).

VLUs pose a particular challenge, as they are likely to be recurrent and may persist for months or years (Harding et al, 2015), with repeated cycles of ulceration, healing, and recurrence (Fletcher et al, 2016). Twelve-month recurrence rates are estimated at between 18% and 28%, so ongoing management and prevention of recurrence should be treated as a priority (Ashby et al, 2014).

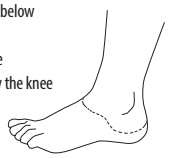
NHS England (2017) highlighted that, for many patients, management of lower leg ulceration is suboptimal, with unwanted variations in care lengthening healing times and increasing workload and cost. Therefore, there is a need to make sure that MDT care is optimised, and early signs are not missed.

Tips for management: lower limb ulcers

➤ *A full holistic assessment, incorporating an arterial assessment, should be carried out within 14 days. Identification of the underlying aetology is needed to confirm the diagnosis*

Immediate and necessary care

For people with one or more wounds below the knee.
Leg wound - originating on or above the malleolus (ankle bone) but below the knee
Foot wound - originating below the malleolus



RED FLAGS
- ➤ Acute infection of the leg or foot (e.g. increasing unilateral redness, swelling, pain, pus, heat)
- ➤ Symptoms of sepsis
- ➤ Acute or chronic limb-threatening ischaemia
- ➤ Suspected acute deep vein thrombosis (DVT)
- ➤ Suspected skin cancer
- Treat infection
- Immediately escalate
- For people in the last few weeks of life, seek input from their other clinicians

Immediate care
- Cleaning and emollient
- Simple low-adherent dressing
- Leg wounds, first-line mild graduated compression
- Supported self-care (when appropriate)

Assesment time for diagnosis and treatment
- In hospital with diabetic foot wound - refer to MDT **within 24 hours**
- Any other type of foot wound - refer to MDT **within 1 working day**
- Leg wound - assess **within 14 days**

Wounds on the foot
One or more wounds below the malleolus

Diagnosis and treatment

1 Assess and identify contributing causes for non-healing

2 Diagnose cause of non-healing and formulate treatment plan

People with confirmed or suspected diabetic foot ulceration
- Refer to diabetic foot team
- Provide care in line with NICE Guidelines for Diabetic Foot Problems

People with confirmed or suspected peripheral arterial disease
- Refer to vascular surgical opinion
- Provide care in line with NICE Guidelines for Peripheral Arterial Disease

Ongoing care and review

Review at each dressing change and at weekly intervals
- Monitor healing at **4-week intervals** (or more frequently if concerned)
- In unhealed at 12 weeks, reassess

Wounds on the leg
One or more wounds below the malleolus

Diagnosis and treatment

1 Assess and identify contributing causes for non-healing

2 Diagnose cause of non-healing and formulate treatment plan

Leg wounds with an adequate arterial supply and no aetiology other than venous insufficiency
- Refer for venous surgical/endovenous interventions
- Strong compression therapy

Leg wounds with signs of arterial disease
- Refer for venous surgical/endovenous interventions and advice on compression
- Pending vascular opinion, if no symptoms of arterial insufficiency, continue with mild graduated compression

Leg wounds of other or uncertain aetiology
- Refer for dermatology opinion (or other specialist depending on symptoms and service arrangements)
- Pending specialist opinion if no symptoms of arterial insufficiency, continue with mild graduated compression

Lymphoedema
- Refer for expert diagnosis and advice about lymphoedema

Ongoing care and review

Review at each dressing change and weekly intervals

Monitor healing at 4-week intervals (or more frequently if concerned)
- If deteriorating or no significate progress towards healing, escalate

If unhealed at 12 weeks, reassess
- If progressing to healing but still unhealed, undertake comprehensive re-assessment
- If deteriorating or no siginificant progress towards healing, escalate

Following healing

Venous leg ulceration
- Compression hosiery
- 6-monthly review for replacement of compression garments and ongoing advice
- If changes in lower limb symptoms or skin problems relating to hosiery, undertake comprehensive re-assessment

Figure 3: Lower limb care pathway (NWCSP, 2020)

Types of lower limb skin damage: wound aetiologies *(Continued)*

- *Patients with leg ulcers may need immediate care and a wound dressing that considers factors such as exudate (Ousey et al, 2021). See **Figure 3** for the NWCSP lower limb pathway*
- *Those without red flag symptoms and at low risk of pressure damage over bony prominences should be offered first line mild graduated compression (20mmHg or less at the ankle - class 1 BS/RAL, see explanatory notes; NWCSP, 2024). Closely monitor for skin integrity and sign of vascular insufficiency if there is known or suspected impaired sensation*
- *Those with red flag symptoms should be escalated to the clinical specialist and/or service immediately and be considered for first line mild graduated compression (20mmHg or less at the ankle - see explanatory notes; NWCSP, 2024) in line with clinical assessment. Compression therapy is likely to be beneficial to most EXCEPT those with acute or suspected chronic limb threatening ischaemia (see **Box 2** for NWCSP red flags for treatment of leg ulcers).*

Box 2. NWCSP red flags for treatment of leg ulcers (NWCSP, 2024)

Immediately escalate to the relevant clinical specialist and/or service, those with the following 'red flag' symptoms/conditions:

- Acute infection (e.g. increasing unilateral erythema, swelling, pain, pus, heat)
- Symptoms of sepsis
- Acute or suspected chronic limb threatening ischaemia (e.g. PAD in combination with rest pain, gangrene, or lower limb ulceration >2 weeks duration)
- Suspected acute DVT
- Suspected skin cancer
- Bleeding varicose veins.

Summary and conclusions

It is evident that a joined-up and proactive approach is needed, to benefit patients and improve outcomes. With the burden of wounds growing year-on-year, a focus on prevention and early intervention is required, to improve patient outcomes and experiences, as well reduce the workload on overstretched clinicians and healthcare systems.

Every contact with a patient is an opportunity to act and prevent damage. Therefore, a focus is needed on prevention wherever possible, or early intervention if a wound has already developed. The earlier management can begin, the better the outcome is likely to be.

With their expertise in the foot and lower limb, the podiatrist is often best placed to begin preventative measures and management with the patient, as well as often being their first point of contact if they are at risk of foot damage.

There has been some debate over roles and responsibilities, often based on changing definitions of the 'lower limb' and what this anatomically includes. It should be emphasised that the lower limb includes the entire leg (from hip to toe), and that 'lower leg' is from the knee to the toe.

As such, podiatrists are ideally placed to make sure that assessment of the patient's skin and limb does not only focus on the foot, and includes assessment of the lower leg, which is a common site for potential damage or early evidence of risk factors, management of which may aid prevention.

Thorough and accurate assessment must be the foundation of all treatment, and – crucially – assessment must result in action, whether that takes the form of a structured prevention or management regimen, close monitoring and patient education, or specialist referral.

Remember that every contact with a patient represents an opportunity, and it is crucial that no opportunity is missed (i.e. patients with oedema that are struggling to get their shoes to fit should be referred to orthotics).

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Notes

The Diabetic Foot Journal