



## Complete Summary

### GUIDELINE TITLE

Leg ulcer guidelines: a pocket guide for practice.

### BIBLIOGRAPHIC SOURCE(S)

Smith & Nephew Ltd. Grace P, editor(s). Leg ulcer guidelines: a pocket guide for practice. Dublin (Ireland): Smith & Nephew Ltd.; 2006 Jan. 39 p. [36 references]

### GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Smith & Nephew Ltd. Grace P, editor(s). Guidelines for the management of leg ulcers in Ireland. Dublin (Ireland): Smith & Nephew Ltd; 2002. 44 p.

### COMPLETE SUMMARY CONTENT

#### SCOPE

METHODOLOGY - including Rating Scheme and Cost Analysis

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#### INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT

#### CATEGORIES

#### IDENTIFYING INFORMATION AND AVAILABILITY

#### DISCLAIMER

### SCOPE

### DISEASE/CONDITION(S)

Leg ulcers, including:

- Venous ulcers
- Arterial ulcers
- Mixed arterial/venous ulcers
- Other types of leg ulcers (e.g. diabetic ulcers, malignant ulcers, rheumatoid ulcers, vasculitis, hypertensive [Martorell] ulcers, Raynaud's phenomenon)

### GUIDELINE CATEGORY

Diagnosis  
Evaluation  
Management  
Prevention  
Treatment

## **CLINICAL SPECIALTY**

Dermatology  
Endocrinology  
Family Practice  
Geriatrics  
Internal Medicine  
Nursing  
Surgery

## **INTENDED USERS**

Advanced Practice Nurses  
Nurses  
Physician Assistants  
Physicians  
Public Health Departments

## **GUIDELINE OBJECTIVE(S)**

To provide practical, evidence-based guidelines on the management of leg ulcers in the Irish setting

## **TARGET POPULATION**

Patients in Ireland with leg ulceration

## **INTERVENTIONS AND PRACTICES CONSIDERED**

### **Diagnosis/Assessment**

1. Medical history
2. Physical examination
3. Ulcer examination (site, size, presentation)
4. Clinical investigations
  - Blood pressure, weight, urinalysis
  - Ankle brachial pressure index (ABPI) using Doppler probe
  - Investigations to exclude other causes
5. Wound measurement
6. Identifying hard-to-heal ulcers using "rule of six"

### **Management/Treatment/Secondary Prevention**

1. Cleansing and debridement
2. Appropriate dressing choice

3. Wound bed preparation
4. Appropriate use of topical antimicrobials
5. Compression therapy
  - Below-knee graduated multi layer compression
  - Reduced compression
  - Compression stockings
  - Intermittent pneumatic compression
6. Surgery (e.g., varicose vein surgery, subfascial endoscopic perforator surgery, skin grafting)
7. Appropriate management of associated complications (e.g., oedema, infection, dermatitis, allergic contact dermatitis)
8. Referral to vascular or other disease-specific specialist
9. Patient/family education
10. Follow-up with reassessment

## **MAJOR OUTCOMES CONSIDERED**

- Morbidity
- Health care costs
- Early detection
- Healing rates

## **METHODOLOGY**

### **METHODS USED TO COLLECT/SELECT EVIDENCE**

Hand-searches of Published Literature (Primary Sources)  
Searches of Electronic Databases

### **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

The evidence base for these guidelines came from reviewing several existing guidelines (CREST, 1998; SIGN 1998 and RCN, 1998, 2000). Where there is limited evidence available guidelines are based on current best clinical practice.

### **NUMBER OF SOURCE DOCUMENTS**

Not stated

### **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Not stated

### **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

Not applicable

### **METHODS USED TO ANALYZE THE EVIDENCE**

Review

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Not stated

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Not stated

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

Not applicable

## **COST ANALYSIS**

The guideline developers reviewed published cost analyses.

## **METHOD OF GUIDELINE VALIDATION**

Peer Review

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

The guidelines were peer reviewed by a group of vascular consultants and nurses.

## **RECOMMENDATIONS**

### **MAJOR RECOMMENDATIONS**

#### **Assessment**

Accurate assessment is the key to effective ulcer treatment. Comprehensive assessment identifies ulcer aetiology and factors, which may delay healing.

Assessment consists of:

- Medical history
- Physical examination
- Clinical Investigations

#### **Medical History**

Although most ulcers fall into the category of venous (81%), arterial (10%) or mixed arterial/venous (7%), other causes such as diabetes, rheumatoid arthritis or malignancy may be responsible. History taking should record any aspects of past medical history which may suggest venous disease or non-venous disease, such as previous cardiac surgery, diabetes, and rheumatoid arthritis (see Table 1 below).

Ulcer history to be recorded may include: previous history of leg ulcers, sites of previous ulcers, number of recurrences and past treatment methods.

**Table 1. Past Medical History Suggestive of Venous or Non-venous Disease**

<b>Venous Disease</b>	<b>Non Venous Disease</b>
Varicose veins	Ischaemic heart disease, stroke, transient ischaemic attack
Deep vein thrombosis in the affected leg	Peripheral vascular disease/Intermittent claudication
Phlebitis in the affected leg	Cigarette smoking
Previous fracture, trauma, or surgery	Diabetes mellitus
Family history of venous disease	Rheumatoid arthritis
Symptoms of venous insufficiency: leg pain, heavy legs, aching, itching, swelling, skin breakdown, pigmentation, and eczema	Hypertension

### **Physical Examination**

It is important that both legs are examined lying and standing. Reduced ankle joint movement is associated with slower healing rates. General signs and symptoms of venous, arterial and mixed arterial/venous are outlined in Table 2 below.

**Table 2. Signs and Symptoms of Leg Ulcers**

<b>Venous</b>	<b>Arterial</b>
Varicose veins	Cold, shiny, hairless skin
Pigmentation (brown staining of skin)	Absent pedal pulses
Eczema	Poor capillary refilling time
Oedema	Dependent oedema
Ankle flare (dilation of the small vessels on the medial aspect)	Dependent rubour

<b>Venous</b>	<b>Arterial</b>
of the foot)	
Lipodermatosclerosis (leg assumes the shape of an inverted champagne bottle – wide at knee narrow at the ankle)	Foot pulses absent or difficult to find
Atrophie blanche (avascular areas of white tissue within the gaiter region)	
Foot pulses present	
<b>Mixed Arterial/Venous</b>	
These will have signs and symptoms associated with both venous and arterial disease.	

#### *Ulcer Examination*

Assessment of the site, size and presentation of the ulcer is very important. The condition of the ulcer base and the surrounding skin will determine treatment.

**Table 3. Ulcer Examination**

	<b>Venous</b>	<b>Arterial</b>
<b>Site</b>	Gaiter region, lateral or medial malleolus	Anywhere on leg, especially toes, feet or heel
<b>Size</b>	Varying size - Size may vary from small to full circumference of the leg	Small punched out ulcers
<b>Presentation</b>	Shallow in appearance Granulation tissue evident	Deep ulcers with sloughy base; tendon or bone may be visible

#### *Assessment of Ulcer: Using Wound Bed Preparation Acronym TIME*

The concept of TIME incorporates the pathophysiology of chronic wounds such as leg ulcers.

- **T is for Tissue:** non-viable tissue in the wound delays healing through providing a focus for infection and impeding wound closure.
- **I is for Infection:** a continued inflammatory response leads to sustained high levels of inflammatory cytokines and proteases, along with diminished growth factor activity.
- **M is for Moisture:** chronic wound fluid is biochemically distinct from acute wound fluid and contains components, which interfere with wound healing.
- **E is for Edge** of wound, advancing or non advancing: non-responsive wound cells and excessive protease activity prevent migration of the epidermal margin.

Wound Bed Preparation is the management of the wound to accelerate endogenous healing or to facilitate the effectiveness of other therapeutic measures.

**Tissue** - Remove non-viable or deficient tissue - may be episodic or continuous

- Necrotic Tissue: Sharp surgical debridement if adequate arterial supply - alternatively autolytic methods
- Sloughy Tissue: Autolytic, enzymatic, mechanical or biological debridement

**Moisture imbalance** - Correct desiccation and avoid maceration

- Intervention: Rehydrate/debride (Revisit T)
- Address Cause: Control oedema by appropriate means. Use moisture balance dressings (e.g. foams, alginates, hydrofibres)

**Infection** or inflammation - Diagnose and treat infection or inflammatory diseases

- Infection - Diagnosis of infection can be difficult. The interpretation of swab results needs to be done with care and always consider clinical features. Management of infection may require intravenous or oral therapy. Consider the use of modern topical anti-microbials. If infection is not resolving after 2 weeks of therapy, consider referral or seek advice.
- Inflammation - Consider inflammatory diseases in ulcers that have unusual presentations/appearances and are not responding to first line treatment. Confirmation of diagnosis may require specific blood tests, biopsy or if in doubt, consider referral.

**Edge** - Consider surgical intervention or advanced therapies if edge is not advancing and T, I & M have been addressed.

- Intervention: Surgical debridement
- Intervention: Reassessment. Consider biological agents, advanced therapies or skin grafting.

Selection and interventions will be based on clinician's knowledge, skills, resources, patient choice and cost-effectiveness.

*Identifying the Hard to Heal Ulcer*

Accurate assessment of venous leg ulcers needs to identify patients with ulcers which may be slow to heal so individual treatment may be planned to accelerate the rate of healing. It is appropriate to refer these patients for further vascular assessment. To identify "slow healers" the "Rule of Six" may be employed; this rule states that venous ulcers larger than six centimetres squared, present for six months or more when treated with compression are unlikely to heal within six months.

<b>Rule of Six</b>
Ulcer >6cm <sup>2</sup> in size
Ulcer present for >6 months
Unlikely to heal with compression in six months

### **Clinical Investigations**

Blood pressure, weight, urinalysis and Doppler ankle brachial pressure index (ABPI) measurements should be recorded in all patients. Additional blood and biochemical investigations may also be carried out depending on the patient's clinical history (e.g. blood glucose, full blood count [FBC]).

The absence of pedal pulses may indicate arterial insufficiency; however, palpation alone is inadequate assessment. Doppler ABPI is an objective assessment in identifying arterial disease and should be carried out by staff trained in the area.

#### *Procedure for ABPI Measurement*

- Patient should be supine and resting in warm room for 10-15 minutes.
- The procedure should be explained to the patient.
- A blood pressure cuff is placed around the upper arm and the brachial artery insonated with a Doppler probe.
- The cuff is inflated until the arterial signal disappears and is slowly deflated. The pressure at which the arterial signal returns is the systolic pressure.
- The procedure is repeated on the other arm.
- A cuff is placed on the lower leg above the ankle protecting the ulcer site.
- The dorsalis pedis and posterior tibial arteries are insonated and the systolic pressure recorded for both arteries, as for the arm.

The ABPI is calculated by dividing the highest ankle pressure by the higher of the two arm pressures.

ABPI =

A = Highest ankle systolic pressure

B = Highest brachial systolic pressure

### **Caution!**

- ABPI measurements in patients with diabetes and/or atherosclerosis may not be reliable. Patients with these conditions may have falsely high readings due to calcification of the vessels.

### *Significance of ABPI Results*

- ABPI of between 0.92 and 1.30: are considered normal
- ABPI of greater than 1.30: suggests a non-compressible calcified artery and is not an accurate reflection of arterial function (e.g. diabetes).
- ABPI of between 0.5 and 0.92: \*\*It is usually considered safe to apply graduated compression bandages on patients with venous leg ulcers with an ABPI of greater than 0.8. However, if patients cannot tolerate the compression there may be greater arterial disease than the ABPI indicates and the patient requires referral to a vascular clinic for further investigations.
- ABPI between 0.00 and 0.5: indicates severe peripheral arterial disease and requires urgent referral to a specialist vascular clinic. Any type of compression treatment is contraindicated in these patients.

\*\* Ulcer aetiology may be mixed if symptoms of venous disease are also present. Mixed venous arterial ulcers with an ABPI of between 0.5–0.8, may, with careful supervision, be treated with reduced compression of 15–25 mmHg. However, compression bandaging can further compromise arterial blood supply, and should be avoided until after specialist vascular assessment.

### **APBI**

<b>&gt;1.3</b>	<b>Suggest non compressible calcified artery</b>
0.92 - 1.3	Normal
0.5 - 0.92	Mild/Moderate claudication
0.35 - 0.50	Severe claudication
<0.35	Critical ischaemia

### **Venous Leg Ulcers: Treatment**

#### **Cleansing**

Cleansing of the ulcer should be kept simple and take the form of irrigation with warmed tap water or saline.

Best practice is to soak the affected leg(s) in a bucket of warm water lined with a plastic bag. This facilitates the removal of wound debris and de-scaling of dry skin. In clinical practice the use of an emollient, such as Hydromol™ or Oilatum™, may be added to the warm water to help moisturise the leg and facilitate the removal of dry scaly skin. Occasionally Potassium Permanganate may be used.

#### **Appropriate Dressing Choice**

A clean dressing technique is acceptable for chronic leg ulcers and should be aimed at preventing cross-infection, strict asepsis is unnecessary.

The emphasis of dressing choice is placed on allergen avoidance and based on simple nonadherent dressings that do not cause damage to the wound bed. Patients with leg ulcers are prone to contact sensitivity particularly from wool, alcohols and rubber mixes. Dressings containing these products should be avoided in clinical practice. Products containing lanolin and topical antibiotics should also be avoided.

*In uncomplicated ulcers*, simple non-adherent dressings are recommended as no specific dressing has been shown to improve healing rates.

*In exuding ulcers*, it may be appropriate to choose an absorbent dressing to help reduce dressing changes (e.g. foam/alginate dressings).

*In painful ulcers*, a hydrocolloid or foam dressing is appropriate.

*In malodorous wounds* there are a variety of dressings that can help eliminate odour and absorb exudate including charcoal dressings and alginate dressings. Consider the use of antimicrobial dressings such as, Cadexomer Iodine dressings (Iodoflex) and dressings impregnated with silver (e.g. Acticoat, Acticoat Absorbent).

*In macerated wounds* avoid hydrocolloids and film dressings. Choose absorbent dressings such as foams (e.g. Allevyn foam). Select an appropriately sized dressing (5 cm larger than the wound to facilitate absorption) and carefully position so that exudate does not run below the wound. Use paraffin-based products or zinc paste as a skin barrier. Silver or Iodine based products can be used if excess exudate is caused by infection.

*In difficult to heal leg ulcers*, topical antimicrobials should be considered in wounds that exhibit local signs of infection or show failure to progress despite appropriate care. Silver and iodine dressings may be considered. In a recent study, a number of new sustained slow-release formulations of iodine and silver were found to reduce bacterial burden safely and efficiently. (See section above titled "Identifying the hard to heal ulcer")

*Infected wounds:* If signs and symptoms of systemic infection are present choose systemic antibiotics. If signs of local infection only, consider topical antimicrobials such as silver or Iodine (see chart below)

#### *Topical Antimicrobials: When and Where to Use Them in Clinical Practice*

Your choice of topical antimicrobial dressings in wound management is a clinical decision and will depend on the bacterial burden of the wound and the level of exudate. Topical antimicrobials are most appropriate when used to decrease the bacterial burden in chronic wounds with active but localised infection.

**Table: Antimicrobial and Dressing Choice**

			Treatment Options	
Wound	Clinical Observation	Management Aims	No – Low Exudate	Moderate to High Exudate

			Treatment Options	
Wound	Clinical Observation	Management Aims	No – Low Exudate	Moderate to High Exudate
<b>Contaminated Organisms present</b>	No visible changes in wound bed – wound healing	Maintain clean wound  Prevent infection	No action required	Chose absorbent dressing
<b>Colonised</b>  Organisms present & multiplying, but no host reaction	No visible changes in wound	Prevent infection  Reduce bacteria  Prevent bacterial growth  If wound progresses towards healing <i>No treatment</i>  If wound FAILS to progress, consider ANTIMICROBIALS	Thorough cleansing and debridement  Consider topical antimicrobials  <i>Chlorhexidine</i>  Bactigras  Silver Dressing  ACTICOAT  ACTICOAT 7	Thorough cleansing and debridement  Consider topical antimicrobials  <i>Chlorhexidine</i>  Bactigras  Cadexomer iodine  IODOFLEX  Exudate Management  ALLEVYN RANGE
<b>Critical Colonisation</b>  Organisms increasing and causing failure of wound to progress	Pain  ↑ Exudate  ↑ Odour  Discoloration of to healing Granulation Tissue  Delay in wound healing	↓ Bacterial Burden  Prevent bacterial proliferation  Remove barriers  Granulation Tissue  Delay in wound healing	Thorough cleansing and debridement  Consider topical antimicrobials: <ul style="list-style-type: none"><li>• Iodine</li><li>• Silver</li></ul> Exudate management: ALLEVYN RANGE  Acticoat Moisture Control	Cadexomer Iodine IODOFLEX  Silver dressing ACTICOAT ABSORBENT  Exudate management: ALLEVYN RANGE  Acticoat Moisture Control
<b>Infection</b>  Superficial  Infection confined to level of dermis,	Wound description as above*  + ↑ PAIN*  OEDEMA*	Reduce bacterial burden  Prevent bacterial proliferation  <i>Topical</i>	Thorough cleansing and debridement  <i>Consider topical antimicrobials:</i> <i>SSD</i>	Cadexomer Iodine IODOFLEX  Silver dressing

			Treatment Options	
Wound	Clinical Observation	Management Aims	No – Low Exudate	Moderate to High Exudate
erythema <2cms around wound margin	WOUND BREAKDOWN*  FRIABLE TISSUE*	<i>antimicrobials indicated when:</i> Ischaemia Devitalised tissue Superficial infection Resistant organisms	<i>FLAMAZINE</i> Silver dressing - E.g. ACTICOAT ACTICOAT 7 Iodine dressings	ACTICOAT ABSORBENT  <i>Exudate management</i> ALLEVYN RANGE Acticoat Moisture Control
<b>Infection – Deep</b>  INFECTION - systemic  Fever, rigors chills, hypotension Multiple organ failure	Cellulitis  <i>Erythema &gt; more than 2 cms around wound, pain, oedema</i>  HOST RESPONSE: Pyrexia Inflammation ↑ Exudate, pus ↑ Odour Probes to bone New areas of wound breakdown Failure to heal	Treat systemically  Resolve deep infection Reduce bacteria Treat symptoms Remove barriers to healing	<i>Systemic Antibiotics</i>  Debridement Thorough cleansing	CONSIDER topical antimicrobials in wounds with ischaemia or multi- resistant organisms  <i>Exudate management</i> ALLEVYN RANGE ACTICOAT ABSORBENT ACTICOAT Moisture Control Smith & Nephew

### Measuring Wounds

Wound area measurements can help practitioners to monitor the progression of healing and help to identify the slow to heal leg ulcer early in the consultation process. The most effective way to do this is to calculate the percentage reduction of wound area over time, particularly within the first four weeks. A recent review suggests that a percentage reduction of 30% to 40% over the first two to three weeks is predictive of healing. Percentage area reduction is also a useful parameter for assessing a wound's response to treatment. Precise wound

measurements will help to improve the predictive value of healing rates, facilitate more effective clinical decision-making and ultimately improve patient outcomes.

### *Ways to Measure Wound Surface Area*

- Approximation of surface area: using contact tracing or ruler to measure; length x width.
- Precise area measurements: using planimetry, mechanical or digital (e.g. VISITRAK Wound Measurement System)
- Planimetry is the precise measurement of the area contained within the wound margin tracing or the traced outline of a digital image of the wound.

### **Compression Therapy**

The mainstay of *conservative* treatment for uncomplicated venous ulcers (ABPI of >0.8) is compression bandaging.

- Appropriate dressing choice
- Compression therapy
- Multilayer Bandaging System
- Reduced Compression
- Compression Stockings

Compression applied correctly works to:

- Reduce hypertension in the superficial veins
- Improve venous return by increasing flow velocity in the deep veins
- Reduce leg oedema
- Accelerate blood flow in the microcirculation, reducing tissue fibrosis and the resultant lipodermatosclerosis.

#### *Types of Compression:*

- Below-knee graduated multi layer compression
- Reduced compression
- Compression stockings
- Intermittent pneumatic compression

Below-knee graduated multi layer compression is the mainstay of treatment to improve venous return. Graduated compression delivers the highest pressure at the ankle and gaiter area, gradually reducing towards the knee.

Reduced compression may be used in patients with mixed arterial/venous ulcers under specialist supervision.

Compression stockings are recommended for use in treating some ulcers and after the ulcer has healed to avoid recurrence.

Intermittent pneumatic compression (IPC) is delivered by a pump device which inflates and deflates bladders incorporated into sleeves that envelop the ulcerated leg. There is no evidence to demonstrate better healing rates using IPC when

compared to compression alone. However, IPC may be considered for use in conjunction with compression bandaging or in patients who cannot tolerate compression bandaging.

Refer to the original guideline for a pictorial guide on leg bandaging.

## **Surgery**

Effective ulcer management centres both on local wound care and on treating the underlying cause of ulceration, venous hypertension. Surgical interventions for venous ulceration focus either on varicose vein surgery and subfascial endoscopic perforator surgery (SEPS), or on specifically treating the wound bed, as in skin grafting. Skin grafting is usually only considered in long term ulcers which fail to heal with conservative treatment. Patients with venous leg ulcer(s) and obvious varicose veins should be referred for evaluation of suitability for surgical intervention. The ESCHAR study has shown the significant benefit of superficial venous surgery in reducing ulcer recurrence.

## **Follow-Up Care during Treatment**

- The patient should be holistically re-assessed each week and progress recorded.
- Regular wound measurement will give an accurate indication of ulcer progress.
- Reassess the appearance of the ulcer: its edge (shallow, punched out, rolling), base (granulating, sloughy, necrotic), position, surrounding skin, odour, and signs of infection.
- Reassess the ankle brachial pressure index at 12 weeks if the ulcer is not fully healed or if it is deteriorating.

Patient education is the key to compliance and both patients and family need be educated on leg ulcer care. In addition to verbal information written patient information should be provided. Patients are more likely to comply with treatment if they are fully informed of the rationale and options for their management.

Topics for education should include:

- Compliance with treatment.
- Good skin care.
- Care of limbs and avoidance of trauma.
- Importance of mobility and exercise.
- Leg elevation when immobile.

## **Management of Associated Venous Ulcer Complications**

- Oedema
- Infection
- Dermatitis
- Allergic contact dermatitis

### *Leg Oedema*

Leg elevation encourages venous return and may reduce pain and oedema. Either elevate the foot of the bed at night or place several pillows under the bed mattress to assist leg elevation.

### *Infection*

Refer to anti-microbial chart above for signs and symptoms of infection.

If there are clinical signs of active infection or cellulitis (e.g. pyrexia, increasing pain, enlarging ulcer, or cellulitis) wounds should be swabbed. Antibiotics have little effect on wound healing generally, and should not be used to treat organisms that have colonized a wound but are not causing clinical signs or symptoms of infection. Antibiotics are recommended only if there is evidence of cellulitis or active infection.

Topical antibiotics are frequent sensitizers and should be avoided if possible.

Avoid using compression bandaging if there is evidence of cellulitis.

Reapply dressings daily or on alternate days to allow assessment of the infected area. (See dressing choice and antimicrobial chart above)

### *Dermatitis*

Venous eczema is commonly associated with chronic venous ulcers and may present as diffuse erythema, scaling, haemosiderin pigmentation, and exudate with crusting if there is superadded infection. Frequent emollient application (e.g. 50%/50% white paraffin/soft paraffin gel) plus a short course of mild topical corticosteroid ointment are the mainstay of treatment.

### *Allergic Contact Dermatitis*

Allergic contact dermatitis may complicate venous eczema in a number of patients.

Common sensitizers include wool, alcohols, topical antibiotics, topical corticosteroids, cetylstearyl alcohols, parabens, and rubber mixes. Referral for dermatological patch testing may be appropriate if the dermatitis does not settle, or if there are concerns about sensitivity to a topical agent, dressing, or bandage used. Ideally a specific leg ulcer patch-test series should be used.

## **Treatment Outcomes**

### *Ulcer Heals – Follow-up*

Compression stockings

- Measure and fit patients with class 2 graduated compression stockings.

### *Measuring the Patient for Compression Hosiery*

Measurements should be taken, with the patient's feet flat on the ground. As a general rule the circumference of both legs should be measured so that any discrepancies between the two legs can be taken into consideration.

- **For thigh length stockings:** with patient standing, Measure the thigh mid-region
- Measure the widest part of the calf
- Measure the narrowest part of the ankle, above the ankle bone
- Measure foot length (closed toe hosiery only)
- To approximate length: measure the length from the thigh to the floor/heel
- **For knee high stockings** measure widest part of calf and narrowst part of the ankle
- Measure from the back of the knee to the floor.
- Replace stockings every six months

Encourage patients to:

- Maintain good skin care
- Remain active
- Elevate limbs when resting
- Present early to their general practitioner (GP) or public health nurse (PHN) for assessment if ulcer recurs.

#### *Ulcer Fails to Heal (No Reduction in Ulcer Size after 1 Month)*

- Re-assess ulcer (Refer to TIME acronym above to assist in re-assessment)

Reasons for referral to a vascular specialist:

- No reduction in ulcer size after one month
- Ulcer duration of greater than six months
- Unable to tolerate compression
- Uncontrolled pain
- Frequent recurrence

If there is any doubt about the cause of the ulcer, specialist assessment is recommended.

## **Arterial Ulcers**

Arterial ulcers: Account for approximately 10% of all ulcers.

### **Signs & Symptoms**

- Cold, shiny, hairless skin
- Absent pedal pulses
- Poor capillary refilling time
- Dependent oedema
- Dependent rubour
- Foot pulses absent or difficult to find
- Multiple "punched cut ulcers"

## **When to Refer**

Patients with a suspected arterial ulcer with an ABPI of <0.8 need to be referred for further assessment by a vascular specialist.

Patients with an ABPI of <0.5 require urgent referral. These patients may require surgery or angiography. Compression is contra-indicated in patients with an ABPI of <0.5 and ulcer care should concentrate on implementing good wound care practices and appropriate dressings (see *Significance of ABPI Results* above).

## **Mixed Arterial/Venous Ulcers**

*Mixed arterial and venous* insufficiency may be seen in approximately 7% of leg ulcers. Mixed arterial/venous ulcers with an ABPI of between 0.5 - 0.8 may be treated with *reduced compression* of 15-25 mmHg.

Referral is also appropriate if the ulcer fails to progress to healing. Mixed ulcers with ABPI of <0.5 must *not be treated with compression* and require urgent vascular referral.

Patients with peripheral arterial disease need to be educated on lifestyle modification to reduce risks associated with atherosclerotic disease. This includes education on: smoking cessation, the benefits of exercise and the importance of a well balanced low fat diet. Aspirin daily and statins to reduce cholesterol may be considered in medical therapy.

## **Other Causes of Leg Ulceration**

### **Diabetic Ulcers**

Diabetic ulcers are typically located on the foot over a bony prominence. This ulcer may have neuropathic, arterial, and/or venous components. People with diabetes with an ulcer on the foot require referral to the specialist diabetic foot clinic or for vascular consult.

### **Rare Causes of Ulceration**

- *Malignant ulcers* on the leg are rare and are usually either squamous cell carcinoma, basal cell carcinoma or malignant melanoma. Malignancy needs to be considered if the ulcer is unusual in its site or appearance and does not respond to conventional treatment. These ulcers may require biopsy.
- *Rheumatoid ulcers* (vasculitic) typically are deep, well-demarcated and punched-out on the dorsum of foot or calf. People with rheumatoid arthritis might also have venous disease due to reduced mobility, neuropathy, and possibly impaired healing due to systemic corticosteroids.
- *Vasculitis* may cause multiple leg ulcers that are necrotic and deep. They may present as purpura, erythema, urticaria, nodules or bullae.
- *Hypertensive (Martorell) ulcer* can develop in patients with poorly controlled hypertension. This type of ulcer is painful with necrotic edges, and is usually sited on the lateral aspect of the lower leg.

- *Raynaud's phenomenon* affects the distal extremities and may cause very painful ulceration of the extremities. Scleroderma which may be associated with Raynaud's can also result in leg ulceration
- *Other possible causes* include pressure ulcers, traumatic ulcer, sarcoidosis, tropical ulcer, or pyoderma gangrenosum.

### **Summary on Criteria for Referral for Specialist Consult**

- Suspected malignancy
- Arterial/mixed ulcer
- Diabetes mellitus and ulcer
- Sepsis
- Absent pulses with reduced ABPI measurements
- Failure to heal with standard regime
- Underlying co-morbidity
- Deterioration
- Recurrent ulceration
- Need for surgery
- Identified as slow-to-heal ulcer
- Pain management

If there is any doubt about the cause of the ulcer, specialist assessment is recommended.

### **Challenges in Leg Ulcer Management**

Leg ulcer management is improving as health professionals become more aware of the importance of early and appropriate treatment. However, despite improvements there remain many challenges in the care of patients with this chronic debilitating condition. The core challenges the guideline authors would identify are:

1. Improved healing rates among the slow-to-heal group
2. Greater community hospital links to ensure speedy referral time
3. Ongoing education.

Refer to the original guideline document for a detailed discussion of each of these challenges in leg ulcer management.

### **CLINICAL ALGORITHM(S)**

An algorithm is provided in the original guideline document for assessment, diagnosis, treatment/management and outcomes of leg ulcers.

### **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

The type of supporting evidence is not specifically stated for each recommendation.

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

- Accurate assessment of leg ulcers is the key to effective ulcer treatment. Comprehensive assessment identifies ulcer aetiology and factors which may delay healing.
- Appropriate management of leg ulcers in Ireland can help promote healing and prevent recurrence.

### POTENTIAL HARMS

*Caution:* Ankle brachial pressure index (ABPI) measurements in patients with diabetes and/or atherosclerosis may not be reliable. Patients with these conditions may have falsely high readings due to calcification of the vessels.

## CONTRAINDICATIONS

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- Ankle brachial pressure index between 0.00 and 0.5 indicates severe peripheral arterial disease and requires urgent referral to a specialist vascular clinic. Any type of compression treatment is contraindicated in these patients.
- Patients with leg ulcers are prone to contact sensitivity particularly from wool, alcohols and rubber mixes. Dressings containing these products should be avoided in clinical practice. Products containing lanolin and topical antibiotics should also be avoided.

## QUALIFYING STATEMENTS

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The guidelines are not intended to replace any existing protocols or institutional policies.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided

### IMPLEMENTATION TOOLS

Clinical Algorithm

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Living with Illness  
Staying Healthy

### IOM DOMAIN

Effectiveness  
Patient-centeredness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Smith & Nephew Ltd. Grace P, editor(s). Leg ulcer guidelines: a pocket guide for practice. Dublin (Ireland): Smith & Nephew Ltd.; 2006 Jan. 39 p. [36 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2002 (revised 2006 Jan)

### GUIDELINE DEVELOPER(S)

Smith and Nephew, Ltd. - Private For Profit Organization

### SOURCE(S) OF FUNDING

Smith and Nephew, Ltd.

### GUIDELINE COMMITTEE

Leg Ulcer Guidelines Development Group

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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## **FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

## **GUIDELINE STATUS**

This is the current release of the guideline.

This guideline updates a previous version: Smith & Nephew Ltd. Grace P, editor(s). Guidelines for the management of leg ulcers in Ireland. Dublin (Ireland): Smith & Nephew Ltd; 2002. 44 p.

## **GUIDELINE AVAILABILITY**

Print copies and CD-ROM: Available from Smith & Nephew Limited, Carraig Court, George's Avenue, Blackrock, Co. Dublin, Ireland; Phone: +353-1-217-0444, Fax: +353-1-217-0455; Web site: <http://www.smith-nephew.com/ie/wound>; E-mail: [sandra.barrett@smith-nephew.com](mailto:sandra.barrett@smith-nephew.com).

## **AVAILABILITY OF COMPANION DOCUMENTS**

None available

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

This NGC summary was completed by ECRI on February 2, 2004. The information was verified by the guideline developer on February 16, 2004. This NGC summary was updated by ECRI Institute on May 2, 2007.

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