Leg Ulcers

Disclaimer

Contents

Background

About leg ulcers

- *Leg ulcers are wounds on the lower limb that have been present for 4 to 6 weeks.*
- *The most common cause of leg ulcers is venous insufficiency. Arterial ulcers are less common and need revascularising.*
- *10 to 20% of leg ulcers have mixed arterial and venous insufficiency.*

Red flags

- Sepsis or acutely unwell due to infection
- Critical lower limb ischaemia with necrosis, pain or ulceration
- Suspected acute limb ischaemia
- Rapidly deteriorating ulceration or necrosis
- Suspected foreign body in the foot

Assessment

Assess using HEIDI (history, examination, investigations, diagnosis, implementation).

1. Take a history:
   - ***Lifestyle factors***

Lifestyle factors

- *Diet*
- *Obesity*
- *Prolonged standing or sitting*
- *Smoking*

- ***Relevant medical history***

Relevant medical history

- *Medication*
- *Previous deep vein thrombosis (DVT)*
- *Pulmonary embolism*
- *Surgery, fracture, or trauma to the affected limb*
- *Varicose veins*
- *Lymphoedema*

- ***Co-morbidities***

Co-morbidities

- *Diabetes*
- *COPD*
- *Chronic renal failure*
- *Cardiac disease e.g., hypertension, congestive cardiac failure*
- *Peripheral vascular disease*
- *Auto immune disease*
- *Inflammatory bowel disease*
- *Compromised nutritional and hydration status e.g., malnutrition and anaemia*
- *Sensory deficits*
- *Wound-related pain*

- ***Wound history***

Wound history

- *Duration of the wound or ulcer*
- *Previous ulcers and time to heal*
- *History of recurrent of non-healing wounds*
- *Pain*
- *Strategies used to treat previous wounds or ulcers*

- ***Factors that may affect healing***

Factors that may affect healing

Intrinsic factors:

- *Arterial and venous circulation and mobility*
- *Immune function*
- *Age-related change to skin*
- *Nutritional status*
- *Co-morbidities*
- *Medications*
- *Smoking*
- *Rest and sleep*
- *Cognition*
- *Oedema*

Extrinsic factors:

- *Pressure, friction and shearing forces*
- *Slough, necrotic tissue, scabs and debris*
- *Excessive dryness*
- *Maceration*
- *Infection*

2. Examine the patient:

- ***Assess the wound*** using the T.I.M.E model.

Assess the wound

- *Check for any red flags that require immediate referral.*
- *Set baseline criteria first and monitor progress.*
- *Record:*
  - *site.*
  - *time since wound occurred.*
  - *width, length, and depth over time intervals.*
  - *treatment response – infection, pain, and exudate.*
- *Explore all wounds. If you can probe to bone there is a 93% chance of osteomyelitis.*

T.I.M.E Model

Wound factors and examples	Wound appearance and considerations	Clinical actions and outcome
Tissue  Tissue non-viable or deficient. Reproduced with permission from: Jan White - Leg Ulcers.	Assess if the wound contains non-viable tissue i.e., necrotic tissue and slough. Ensure adequate blood supply by checking pulses, and assess local perfusion around the wound.	**Action:** Suspected ischaemia - keep dry and do not debride. No ischaemia - autolytic debridement using wound dressing products. Sharp debridement if the clinician is competent and confident. **Outcome:** Wound free of necrotic tissue and slough with a healthy granulating base.
Inflammation / infection  Infection or inflammation. Reproduced with permission from: Jan White - Leg Ulcers.	Assess if the wound is showing signs of increased bacterial load or persistent inflammation. Check for: • increased pain • exudate • malodour • discolouration • extending wound Check for evidence of cellulitis extending out from the ulcer.	**Action:** Reduce the bacterial load with an antimicrobial dressing. Review the need for systemic oral or IV antibiotics. In which case, check for MRSA colonisation or infection with wound swab. Review every 7 to 14 days. Review need for systemic treatment. **Outcome:** Bacterial load and inflammation controlled.
Moisture balance 	Assess for excess exudate or if the wound bed is dry. Avoid maceration and desiccation, except in ischaemia which must be kept dry.	**Action:** Restore moisture balance with appropriate dressing selection. Absorb excess exudate or donate moisture. Control patient urinary or faecal incontinence to avoid wound soiling. **Outcome:** The wound is optimally moist.
Edge advancement 	Assess if the epithelium is migrating across granulating tissue at the wound edge, or as islands. Check if edges appear normal e.g., rolling, hypergranulating, undermining. Further investigations may be required. Assess the state of the surrounding skin.	**Action:** Protect the newly forming epithelium. If wound edge significantly undermined, an atypical mycobacterial infection may present in this way. Seek specialist medical microbiologist or infectious diseases advice. **Outcome:** Progressing epithelial margins.

- ***Measure the healing response***

Measure the healing response

- *Venous ulcers should decrease by 25% within 3 weeks.*
- *A number of tools are available to assist:*
  - *Acetate wound tracings – The wound is traced on a grid and the area is measured using a manual square count. Acetate measurement grids may be included with some wound dressing products, e.g. Opsite, Flexigrid.*
  - *Photography can also be used to measure and compare the wound area over time.*[1]
  - *Smart phone apps are also available.*

- Assess for:
  - ***venous diseases***

Venous disease

Collective clinical signs of venous disease:

- *Dilated and tortuous varicose veins.*
- *Ankle flare – tiny varicose veins of inner aspect foot and ankle.*
- *Atrophie blanche – lacy white areas of avascular tissue with tiny red spots.*
- *Haemosiderin staining – red or brown discolouration of skin, can present as small patches or extend over most of gaiter.*
- *Lipodermatosclerosis – hard woody fibrosed skin on medial or lateral ankle. When extensive, the leg appears as an inverted champagne bottle.*
- *Varicose eczema – can be wet or dry.*
- *Venous oedema – lower limb pitting oedema.*
- *Venous ulcers – typically medial or gaiter region with irregular edges. Generally in the lower third of the limb.*

Photo courtesy of Jan Rice

- ***arterial disease***

Arterial disease

Clinical symptoms and signs of arterial disease:

- *Intermittent claudication is commonly missing.*
- *Night pain on elevation of the leg, relieved by hanging the limb out of bed*
- *Rest pain when patient sitting with legs dependent*
- *Nail atrophy*
- *Hair loss*
- *Shiny skin indicating deficient stratum corneum*
- *Feet cold to touch*
- *Pale or cyanosed feet*
- *Dependent rubor – deep red or purple hue on dependence (Buerger's test is as indicative of arterial disease as ABPI)*
- *Calf muscle atrophy and weakness*
- *Lack of pedal pulses PT and DP (greater concern if no PT)*
- *Arterial ulcer is often positioned over bony prominence on the toe or foot. Wound edges are described as "cliff-like" edges.*
- *Presence of gangrene*

Photo courtesy of Jan Rice

- ***Pressure ulcers***

Pressure ulcers

- *Most preventable chronic wound*
- *Caused by:*
  - *direct pressure on tissue over a bony prominence e.g., patient in bed, on a trolley, in a chair*
    - *Pressure > 30 mmHg will cause ischaemia in the surrounding tissue.*
    - *Extent of tissue damage will depend on the length of time and intensity.*
  - *friction e.g., simple blister or tissue oedema, open pressure wound*
    - *Top layers of skin are worn away by continued rubbing against an external surface.*
    - *Can be caused by ill-fitting footwear, or bed linen.*

- *shearing forces e.g., patient slides down chair or bed, with skin adhering to the chair or bed surface*
  - *Skin remains in place, usually unable to move, while the underlying bone and tissue are forced to move.*
  - *May injure microvasculature in a similar way to direct pressure*.

- ***Diabetic foot ulcers***

Diabetic foot ulcers

- Altered sensation.
- May have signs suggesting peripheral vascular disease.
- Pulses may be bounding or absent (neuropathic).
- Atrophy of subcutaneous tissue and muscles in foot associated with weakness.
- Prominent extensor tendons.
- Callus formation on the plantar aspect of the foot.
- Sub-keratotic haematoma beneath callus – highly suggestive of underlying ulceration.
- Hammer toes due to loss of extrinsic muscles.
- May be associated with other foot deformities:
  - Hallux valgus
  - Prominent metatarsal heads
  - Dropped arch
  - Bunionette
  - Charcot deformity
- Foot oedema due to changes in sympathetic nerve control.
- Presence of autonomic neuropathy – red, dry skin with fissures on plantar surface of foot due to loss of sweating.
- Pain described as tingling or burning in nature.

See also Prevention, Identification and Management of Foot Complications in Diabetes.

Photo courtesy of Jan Rice

- ***Atypical ulcers***

Atypical ulcers

- *Ulcer has an unusual appearance or atypical distribution e.g.:*
  - *significantly undermined or raised edge, or*
  - *multiple nodules, or*
  - *ulcers distributed along a limb lymphatic*
- *Suspicion of malignancy e.g., Marjolin's ulcer – SCC within an ulcer*
- *Pain is not consistent with wound presentation*
- *None or minimal venous and arterial characteristics*
- *Oedema*
- *Deterioration in ulcer or necrotic presentation*
- *Ulcer has not healed in 3 months*
- *Consider biopsy or referral for biopsy.*
- *Beware of some conditions where biopsy is contraindicated e.g.,* ***pyoderma granulosum.***

Pyoderma granulosum

- *Very painful*
- *Violaceous undermined edges*
- *Granulation tissue*
- *Exudate often high volumes*

Photo courtesy of Jan Rice

Photo courtesy of Jan Rice

- **Lymphoedema**

Lymphoedema

See the Lymphoedema pathway

Photo courtesy of Jan Rice

3. Arrange investigations relevant to wound type and the patient's general health to confirm cause:
   - ***Biochemicals analysis***

Biochemicals analysis

- *Auto antibodies: ANA, ENA*
- *Blood cultures*
- *BGL and HbA1c*
- *C-reactive protein (CRP)*
- *FBE and Erythrocyte Sedimentation Rate (ESR)*
- *Iron studies and zinc*
- *Lipids*
- *Liver function tests.*
- *Plasma albumin (venous ulcers)*
- *Rheumatoid factor*
- *Urea and electrolytes*
- *White cell count*

- ***Microbiology to identify infection***

Microbiology to identify infection

- *Microbiology should not be undertaken routinely. Only arrange microbiological analysis if signs of infection are present, wound are deteriorating despite antibiotics, or microbiological diagnosis will result in surgical intervention.*
- *Sampling techniques include:*
  - *Swabbing of a cleaned wound bed*
  - *Needle aspiration*
  - *Tissue biopsy*
  - *PCRs for mycobacteria*

- ***Histopathology to identify malignant or other aetiologies***

Histopathology to identify malignant or other aetiologies

- *If malignancy or other aetiology is suspected, send a second wound biopsy*
  - *Must include advancing edge of wound*
  - *Requires a minimum of 4 to 5 mm*
- *If preferred, refer patient with non-healing or atypical leg ulcer for biopsy*

- ***Diagnostic imaging***

Diagnostic imaging

- *Plain X-ray e.g., fracture, osteomyelitis.*
- *Bone scan e.g., osteomyelitis.*
- *Magnetic resonance imaging (MRI) e.g., gas gangrene, osteomyelitis.*
- *Computed tomography (CT) e.g., soft tissue infection, osteomyelitis.*
- *Sinogram and fistulagram to identify tracking.*

- ***Vascular assessment***

Vascular assessment

- *Vascular assessment distinguishes arterial aetiologies from venous and other aetiologies, and assesses the extent of venous insufficiency.*
- ***Ankle brachial pressure index (ABPI)*** for vascular status of lower limb
  Ankle brachial pressure index (ABPI)
  - *The ratio of the ankle to brachial systolic pressure.*
  - *Measured using a sphygmomanometer and hand-held Doppler device.*
  - *Substantiates the presence or absence of significant peripheral vascular disease (PVD), except in those with heavily calcified vessels where the ABPI will be > 1.3 and should be disregarded.*

An ABPI < 0.9 is abnormal. With intermittent claudication, value is usually between 0.5 and 0.9.

ABPI	Assessment
< 0.5	Unless prescribed by a vascular surgeon, compression should not be worn as severe arterial disease is likely.
0.5 to 0.8	Apply no more than light (class 1) compression, as arterial disease is likely and compression may further compromise arterial blood supply.
> 0.8	Compression is safe to wear.
> 1.3	Avoid compression, as high ABPI values may be due to calcified and incompressible arteries. Consider arranging urgent or routine vascular surgery referral.

ABPI Medicare Item 11610

- *A requirement of item number 11610 is the use of a Doppler waveform print-out showing arterial wave form.*
- *If unable to be performed at your surgery, consider a community Doppler assessment via:*
  - *diagnostic services*
  - *specialist wound management services.*

- *Angiography for arterial disease.*
- *Duplex ultrasound for venous and arterial disease**
- *Photoplethysmography for venous disease**
- *Transcutaneous oxygen for local tissue perfusion**
- *Pulse oximetry*
- *Toe Brachial Pressure Index (TBPI)**

**These tests are available at local private vascular centres.*

4. Diagnose ulcer type based on wound assessment. Seek early assistance from specialist wound management services if:
   - aetiology is unclear.
   - non-healing lower limb wounds have been present for 4 to 6 weeks.
5. Develop an implementation plan.

Management

Practice Point

Proactive management is key

Manage medical and environmental risk factors to reduce risk of further ulcers.

1. If any ***red flags***, arrange immediate vascular surgery assessment.

2. Consider ***factors that may affect healing.***

Factors that may affect healing

Factor	*Possible effects*
Co-morbidities	➢ *Consider co-morbidities that can affect healing, e.g. diabetes, peripheral vascular disease, cancers, autoimmune and connective tissue disorders including rheumatoid arthritis.* ➢ *Exclude diabetes.* ➢ *Improve control or refer if appropriate.*
Nutrition	➢ *Adequate nutrition is required for all stages of healing. For most, a well-balanced diet is sufficient.* ➢ *Poor nutrition is an independent risk factor for wound healing.* ➢ *For patients with inadequate intake of protein, vitamins, or trace elements, consider* ***nutritional supplementation*** *or dietitian referral.* **Nutritional supplementation** ○ *Arginaid – $9/day. Pressure areas only.* ○ *ENROCAL Repair – $1/day* ➢ *Patients with very large tissue loss and copious exudate will have major loss of protein.* ➢ *10% unintentional weight loss over 6 months indicates malnutrition. Consider dietitian referral.*
Mobility	➢ *Mobility is essential to maintain and improve circulation.* ➢ *Gentle exercise will improve circulation, encouraging oxygenation and nutrition to the tissues.*

	➢ *Occupation –- standing for long periods slows healing, e.g. chefs, shop workers.*
Medications	➢ *Consider medications which affect healing such as steroids, NSAIDs, antiplatelet drugs, and anticoagulants.* ➢ *Refer for medication review if appropriate.*
Smoking	➢ *Smoking affects healing and is a significant risk factor in arterial* ulcers. *Advise smoking cessation.*
Infection	➢ *Reduce bacterial load with antimicrobial dressing* ➢ *Review the need for oral or IV antibiotics.* ➢ *Review every 7 to 14 days.*
Rest and sleep	➢ *Lack of sleep and rest can impair healing.*
Cognition	➢ *Impacts on ability to care for and comply with management strategies.* ➢ *Take into consideration the effect of nutrition.*
Peripheral oedema	➢ *Oedema impacts on wound healing.*
Lymphoedema	➢ *Lymphoedema impacts on wound healing.*
Skin care	➢ *Skin care is important for all wound healing.* ➢ *Cleanse the leg at dressing change. A shower is appropriate for rinsing the wound with clean running water.* ➢ *Maintain the skin integrity of surrounding leg skin by regular hygiene with a Ph neutral cleanser, barrier creams, and moisturisers.* ➢ *Venous eczema is common. Regular emollients are important with short courses of moderately potent steroids for flare-ups.* ➢ *Avoid soap during showering.* ➢ *Apply barrier or moisturiser cream to intact leg skin before and after showering.*

3. Manage based on the type of ulcer:

- ***Venous leg ulcers***

Venous leg ulcers

1. If not healed in 12 weeks or if patient unable to tolerate compression at any time, best practice is to refer.
2. If severe pain or spreading cellulitis, refer for immediate vascular surgery assessment.
3. Any infected ulcer not responding to antibiotics requires specialist wound management.
4. Manage pain – regular paracetamol, or short-term use of paracetamol plus codeine can assist. NSAIDs are usually not helpful.
5. Provide psychological support and encourage quality of life.
6. Venous ulcers require ***compression therapy.*** Be aware, compression therapy is contraindicated in the presence of severe arterial disease. As compression can lead to necrosis resulting in amputation, perform ankle brachial pressure index (ABPI) before starting compression treatment.

Compression therapy

- ➢ *In the absence of arterial disease and diabetes, apply adequate compression aiming to reduce limb circumference within 2 weeks.*
- ➢ *Ongoing bandaging is usually carried out by specially trained nurses.*

- *In patients with mixed arterial or venous disease, lower compression may be applied with direction from the vascular specialist or specialist wound management services.*
- *See the **Compression Therapy for varicose veins**.*

About compression therapy for varicose veins

- *Particularly useful for pain, aching, or swelling in frail patients, and as a temporary measure while awaiting surgery, but 25% of patients cannot comply with regular use.*
- *Class I stockings are used for air travel and Class II knee length stockings are prescribed for the control of symptoms of varicose veins without ulceration.*
- *Useful to maintain healing of ulcers or as prophylaxis against the formation of ulcers.*
- *All compression therapy requires experience and training to increase compliance and avoid further tissue damage, and is contra-indicated in the presence of arterial disease.*
- *Patients with simple, superficial varicose veins often benefit from compression therapy by graduated elastic compression stockings.*
- *Compression bandaging is used for varicose ulceration.*

7. Skin Care

Skin care

- *Cleanse the leg at dressing change. A shower may be appropriate for rinsing the wound with clean running water, based on assessment of patient, environment, and wound.*
- *Maintain the skin integrity of surrounding leg skin by regular hygiene with a Ph neutral cleanser, barrier creams, and moisturisers.*
- *Venous eczema is common. Regular emollients are important with short courses of moderately potent steroids for flare ups.*
- *Avoid soap during showering. Use a soap substitute.*
- *Apply barrier or moisturiser cream to intact leg skin **before** and after showering.*

8. Wound bed preparation

Wound bed preparation

- *Cleanse the ulcer at dressing change.*
- *Consider removal of non-viable tissue to minimize wound infection, using autolytic debriding dressings, e.g., Flaminal, Solugel.*
- *If needed, refer to specialist wound management services for:*
  - *conservative sharp debridement.*
  - *surgical debridement.*
  - *high-pressure ultrasonic debridement.*
  - *larvae treatment.*
- *Treat clinical infection. Systemic antibiotics are only useful if there is evidence of infection.*
  - *In some specific conditions, topical antibiotics are used with discretion e.g., Kenacomb, Bactroban.*
- *Consider antimicrobial dressing or topical antimicrobials such as cadexomer iodine dressings e.g., Iodosorb. Refer to Wound Dressings.*

9. Pentoxifylline is an effective adjunct to compression bandaging and may be effective in the absence of compression. It is not subsidised and has gastrointestinal side effects in some people.[1] See Prescribing software TGA or MIMS Online (subscription required).

8. ***Preventing recurrence***

Preventing recurrence

- *Use below knee compression stockings (18 to 40 mmHg) to prevent the recurrence of venous leg ulcers once healing has occurred. Otherwise there is a very high risk of recurrence. Replace hosiery every 3 to 4 months.*
- *Consider referral for venous surgery if superficial venous system is affected.*
- *Keep mobile and regularly exercise using calf muscle pump action.*
- *Elevate legs above the heart when resting.*
- *Maintain skin hydration.*

*See **Compression Therapy for varicose veins**.*

- ***Arterial leg ulcers***

Arterial leg ulcers

1. Arterial ulcers require ***revascularisation*** where possible.

   Revascularisation

   - *Refer all patients who are surgical candidates, or if pain is significantly limiting function and impacting on quality of life, for immediate vascular surgery referral or admission.*
   - *Treatment can include angioplasty or other vascular surgery, or a walking programme.*
   - *Where no surgical intervention is possible, refer for specialist wound management.*

2. Pain may be severe and may require a complex analgesic regime
3. If the wound is dry, ensure it is kept dry to prevent secondary infection. Paint with betadine and apply padded dry dressing.
4. If the wound exudate management is a problem, use an appropriate topical antimicrobial to prevent secondary infection using the T.I.M.E. Model.
5. Prevent pressure damage.

- ***Mixed arterial and venous ulcers***

Mixed arterial and venous ulcers

1. Commence light compression, e.g., tubigrip by 2 or 3 layers (each a different length)
2. Refer for **routine assessment** if:
   - non-healing within 12 weeks.
   - arterial 75% stenosis or if < 75% stenosis plus other symptoms of ischaemia (pain or necrosis).
   - uncertain diagnosis.
3. If assistance with assessment and investigation is required, refer to specialist wound management services.

- ***Diabetic neuropathic ulceration***

Diabetic neuropathic ulceration

1. Diabetic neuropathic wounds require ***pressure off-loading.***

   Pressure off-loading

   - *Refer to a podiatrist, who may involve an orthotist.*
   - *Treatment may involve air walkers, orthopaedic felt dressings, orthotic insoles, and specially made shoes.*

2. If critical ischaemia is suspected, refer to a diabetes high risk foot clinic for urgent assessment or admission.

- ***Lymphatic leg ulcers***

Lymphatic leg ulcers

1. Manage using a combination of massage, exercise, ***compression therapy***, and pain relief.

   Compression therapy for lymphatic leg ulcers

   - *In the absence of arterial disease and diabetes, aim for 30 mmHg graduated compression at the ankle.*
   - *Ongoing bandaging is usually carried out by lymphoedema practitioners.*
   - *In patients with mixed arterial or venous disease, lower compression may be applied with direction from a vascular specialist or specialist wound management services.*
   - *See Compression Therapy for varicose veins.*

2. *See Lymphoedema*

- ***Malignant ulcers***

Malignant ulcers

1. Non-healing or atypical leg ulcers require surgical excision. See the Skin Lesion Excision pathway.
2. Once excised, carry out further assessment to exclude venous hypertension, ischaemia, or lymphoedema.

4. Refer patients for urgent or routine vascular assessment or specialist wound management if any of the following are identified:

- Non-healing ulceration present for more than one month with no reduction in size despite medical management
- Chronic ischaemic signs and symptoms with ulceration
- Excessively painful ulcers
- Red, hot, swollen foot (active Charcot foot)
- Osteomyelitis with ulceration (without sepsis or systemic illness)
- Neuropathic symptoms associated with deranged function and structure

Referral

- Arrange immediate vascular surgery assessment if:
  - any red flags,
  - severe pain or spreading cellulitis.
  - arterial ulcer and patient is surgical candidate for revascularisation.

- If aetiology is unclear, seek early assistance from specialist wound management services.
- If arterial ulcer, and:
  - patient is surgical candidate, arrange immediate vascular surgery assessment or admission for revascularisation.
  - no surgical intervention is possible, refer for specialist wound management.

- If mixed aterial and venous ulcers:
  - seek advise from a vascular specialist or specialist wound management services if assistance with assessment and investigation is required.
  - refer for routine vascular assessment if:
    - non-healing within 12 weeks.
    - arterial 75% stenosis or if < 75% stenosis plus other symptoms of ischaemia (pain or necrosis).
    - uncertain diagnosis.

- If diabetes-related neuropathic or ischaemic foot ulcers:
  - arrange referral to podiatrist if pressure off-loading is all that is required.
  - refer to specialist wound management services if assistance with management is required.
  - arrange referral to high risk foot clinic for urgent assessment, or admission.

- If considering lower compression therapy for lymphatic leg ulcer in patient with mixed arterial or venous disease, seek direction from a vascular specialist or specialist wound management services.

- Arrange urgent or routine vascular assessment or specialist wound management if:
  - ABPI > 1.3.
  - specialist level debridement is required.
  - larvae treatment needed.
  - non-healing ulceration present for more than one month with no reduction in size despite medical management.
  - chronic ischaemic signs and symptoms with ulceration.
  - excessively painful ulcers.
  - red, hot, swollen foot (active Charcot foot).
  - osteomyelitis with ulceration (without sepsis or systemic illness).
  - neuropathic symptoms associated with deranged function and structure.

- If nutrition concerns, consider dietitian referral.

Information

For health professionals

- Australian Wound Management Association and New Zealand Wound Care Society:
  - Australian and New Zealand Clinical Practice Guideline for Prevention and Management of Venous Leg Ulcers
  - Australian and New Zealand Clinical Practice Guideline for Prevention and Management of Venous Leg Ulcers: Abridged version
- RACGP – Management of Venous Leg Ulcers in General Practice: A Practical Guideline

For patients

- AIMED – Cellulitis 101: Importance of Routine Skin Care
- Australian Wound Management Association and New Zealand Would Care Society – Care of Venous Leg Ulcers
- HealthPathways Melbourne – Good Food for Wound Healing

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