

Diabetic Foot Ulcers



These guidelines have been developed for health professionals caring for clients with diabetic foot ulcers. Diagnosis of the aetiology of a leg or foot ulcer should be undertaken by health professionals with expertise in the area.

For this summary, all recommendations have had their levels of evidence classified using the National Health and Medical Research Council levels of evidence, as follows:

Level I	Evidence from a systematic review or meta-analysis of at least two level II studies
Level II	Evidence from a well designed randomised controlled trial (for interventions), or a prospective cohort study (for prognostic studies)
Level III	Evidence from non-randomised studies with some control or comparison group (pseudo-randomised controlled trial; non-randomised experimental trial, cohort study, case-control study, time series studies with a control group; historical control study, retrospective cohort study)
Level IV	Evidence from studies with no control or comparison group

An additional rating of Expert Opinion (EO) has been added, for guideline recommendations which are consensus statements provided by a National or International Panel of experts in the area.

This is a summary of guidelines from the following sources, which should be accessed for further details as required:

1. Steed DL et al. Guidelines for the treatment of diabetic ulcers. *Wound Repair and Regeneration* 2006.14:680-692.
www3.interscience.wiley.com/cgi-bin/fulltext/118605280/PDFSTART
2. Steed DL et al. Guidelines for the prevention of diabetic ulcers. *Wound Repair and Regeneration* 2008. 16:169-174.
www3.interscience.wiley.com/cgi-bin/fulltext/119413543/PDFSTART
3. National Evidence-Based Guideline on Prevention, Identification and Management of Foot Complications in Diabetes. Melbourne Australia 2011.
<http://t2dgr.bakeridi.edu.au/LinkClick.aspx?fileticket=anrL23t3ADw%3d&tabid=172>
4. Scottish Intercollegiate Guidelines Network, *Management of diabetes. A national clinical guideline*. Edinburgh, Scotland: SIGN 2010.
www.sign.ac.uk/pdf/sign116.pdf
5. Registered Nurses' Association of Ontario, *Assessment and Management of Foot Ulcers for People with Diabetes*. Toronto, Ontario: RNAO 2005.
<http://rnao.ca/bpg>
6. Botros M et al. Best practice recommendations for the prevention, diagnosis and treatment of diabetic foot ulcers: Update 2010. *Wound Care Canada* 2010. 8:6-70.
<http://cawc.net/images/uploads/resources/BestPracticeDFU2010E.pdf>
7. McIntosh A et al. *Prevention and Management of Foot Problems in Type 2 Diabetes: Clinical Guidelines and Evidence*. Sheffield: National Institute for Health and Clinical Excellence 2003.
www.nice.org.uk/nicemedia/pdf/CG10fullguideline.pdf



Assessment

1. Assess all clients with diabetes for the risk of developing a foot ulcer, including:
 - screening for peripheral arterial disease (PAD), by identifying strong pedal pulses and measuring an Ankle Brachial Pressure Index (ABPI). An ABPI less than 0.9 indicates arterial disease. An ABPI over 1.2 is unreliable and requires further investigation^{1,2} (I)
 - screening for neuropathy, by testing with a 10g Semmes-Weinstein monofilament, in combination with clinical assessment of sensory, autonomic and motor changes^{3,4} (II)
2. Assessment of feet and diabetic foot ulcers should be undertaken by health professionals with training in this area⁵ (II)
3. Assess for risk factors (neuropathy, PAD, foot deformity) and classify foot ulcer risk as:
 - low-risk: no risk factors and no history of foot ulcer/amputation;
 - intermediate risk: one risk factor and no history of foot ulcer/amputation; or
 - high risk: 2 or more risk factors and/or history of foot ulcer/amputation^{3,4} (III)
4. All Aboriginal and Torres Strait Island people with diabetes should be considered to be at high risk of developing foot complications³ (EO)
5. Consider use of ulcer grading systems (e.g. the University of Texas wound classification system) to predict probability of ulcer healing or complications^{3,6} (III)

6. Referral for medical or specialist assistance is needed when:
 - there is uncertainty in diagnosis
 - there is a low or high ABPI
 - the client would benefit from revascularisation
 - there are signs of infection or inflammation
 - there is no progress in epithelialisation from the margin within two weeks of debridement and commencement of offloading therapy
 - the wound can be probed to bone
 - the wound deteriorates or new ulceration occurs^{1,7} (II)
7. Document regularly wound characteristics and progress in wound healing;¹ (II) including location, length, width, depth, ulcer bed characteristics, exudate, odour and peri-ulcer skin condition⁶ (EO)

Management

8. Care of a diabetic foot ulcer should be undertaken by a multidisciplinary team, including podiatrist, orthotist, GP, wound care nurse, and endocrinologist^{3,4} (III)
9. Consider use of remote expert advice with digital imaging for people living in remote areas who are unable to attend a multidisciplinary foot care service³ (III)
10. Offloading of pressure points is necessary. Acceptable methods to relieve pressure on the wound include crutches, walkers, wheelchairs, custom-made shoes or inserts, shoe modifications, custom relief orthotic walkers, diabetic boots, forefoot and heel relief shoes, total contact casts^{3,4,6} (I)



11. Adequate oxygenation of the wound environment will promote healing, and should be promoted through avoidance of dehydration, smoking, cold, stress and pain¹ (III)
12. Topical antimicrobial dressings may be beneficial when wounds are chronically or heavily colonised¹ (II)
13. The ulcer should be irrigated with a neutral, non-irritating solution, e.g. warmed sterile water or saline, and cleansed with minimal chemical or mechanical trauma¹ (IV)
14. Removal of necrotic and devitalised tissue should be undertaken through mechanical, sharp, autolytic or biological debridement, unless revascularisation is necessary^{1,7} (II)
Sharp debridement should only be undertaken by health professionals with experience and training in the area⁵ (EO)
15. Dressings should:
- maintain a moist wound-healing environment (except where dry gangrene or eschar is present)¹ (III)
 - manage wound exudate and protect peri-ulcer skin¹ (I)
16. Treatment should be re-evaluated when there is failure to achieve ulcer size reduction of 40% after 4 weeks of therapy¹ (II)
17. Optimising glucose control improves wound healing¹ (III)
18. In some clients, additional therapy may be helpful, as follows:
- topical negative pressure wound therapy promotes healing of diabetic wounds^{3,4} (II)
 - cultured skin equivalents may be of benefit in healing diabetic foot ulcers³ (I)
 - hyperbaric oxygen therapy reduces risk of amputation in patients with ischemic diabetic foot ulcers³ (I)
- Prevention**
19. Offer a foot protection program for people who are assessed as having intermediate or high risk for foot ulceration, including foot care education, podiatry review and appropriate footwear³ (II)
20. Protective footwear should be prescribed for all at risk clients, i.e. those with PAD, neuropathy, previous foot ulceration and/or amputation, callus, foot deformity¹ (II)
21. Acceptable methods of offloading include crutches, walkers, wheelchairs, custom shoes or inserts, shoe modifications, custom relief orthotic walkers, diabetic boots, forefoot and heel relief shoes, total contact casts¹ (I)
22. Good foot care and daily inspection of the feet will reduce recurrence of foot ulceration¹ (II)
23. A foot examination should be undertaken by a health professional with skills in the area:
- annually in people with low risk feet^{2,7} (I)
 - at least every 3-6 months in people with intermediate-risk or high risk feet³ (EO)
24. Glucose levels should be monitored regularly^{1,2} (II)
25. Potential modifiable risk factors for diabetic foot ulceration include peripheral vascular disease, neuropathy, foot deformities, plantar callus and smoking⁷ (IV)