Diabetic Foot Ulcers: Treatment & Prevention

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Introduction

Diabetic foot ulcers (DFUs) occur when diabetic neuropathy is accompanied by repetitive forces—such as pressure, friction, and shear—leading to damage to the foot. This damage often goes unnoticed in its early stages and can quickly progress to ulceration.[2-5]

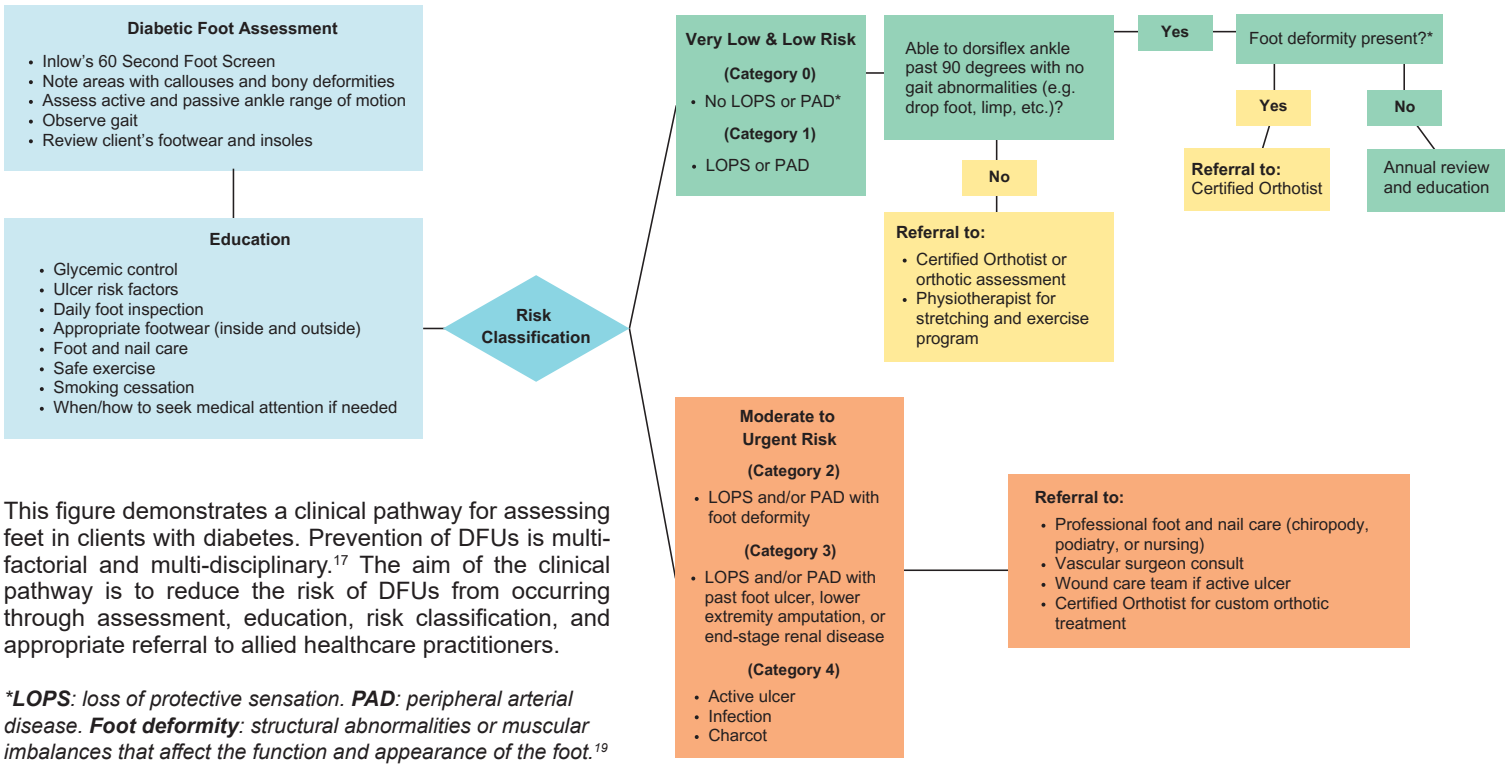
Screening for early detection of diabetic neuropathy and subsequent protection of the feet is a critical and effective measure for DFU prevention.[2] If a DFU has developed, pressure offloading, or redistribution, can be optimized using appropriate orthoses and footwear. Certified Orthotists (CO(c)) are healthcare professionals who are educated and clinically trained in the provision of comprehensive orthotic treatments including offloading.[6] From preventative care, to offloading an existing ulcer, and managing the foot once an ulcer is healed, a Certified Orthotist is an asset to any healthcare team managing DFUs.

- 30% of Canadians live with diabetes or prediabetes.
- People with diabetes are twenty times more likely to have a lower extremity amputation.
- 85% percent of amputations are preceded by a DFU.
- 15-25% of people with diabetes will have a DFU in their lifetime.[1]

Example of a diabetic foot ulcer.

Prevention of Foot Ulcers

The Diabetic Foot Clinical Pathway:



This figure demonstrates a clinical pathway for assessing feet in clients with diabetes. Prevention of DFUs is multi-factorial and multi-disciplinary.[17] The aim of the clinical pathway is to reduce the risk of DFUs from occurring through assessment, education, risk classification, and appropriate referral to allied healthcare practitioners.

**LOPS: loss of protective sensation. PAD: peripheral arterial disease. Foot deformity: structural abnormalities or muscular imbalances that affect the function and appearance of the foot.[19]*

Short term goals of managing foot ulcers

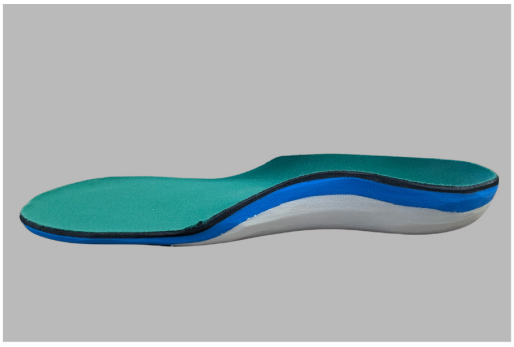
Wound closure or remission is the goal of short term ulcer treatment. Determining the underlying cause of the ulcer is a critical first step.[15] The three main reasons for slow or non-healing DFUs are compromised vascular flow, infection, and excess pressure.[16] Pressure distribution is a complicated process that depends on the patient's quality of life issues and ability to adhere to the care plan.[15]

Options for short term offloading are well described in the Best Practice Guidelines published by Wounds Canada.[16] When access to a Certified Orthotist is delayed, initial offloading done by another team member is necessary to get them through until the referral can be made. Options for initial offloading include a Wound Care Shoe with pixelated insert (ex. Darco, Tera Diab) and Removable Cast Walker (RCW) with pixelated insert.[16] A total contact insole must be added to both options by a Certified Orthotist as soon as possible.[15]

Left: Darco International DARCO WCS Wound Care Shoe System.
Right: Rebound Diabetic Walker removable cast walker.

Long term goals of managing foot ulcers

Treatment is not complete once a DFU has closed. There is a 40% recurrence rate in the first year after closure, and 65% in the three years following closure.[20] Ninety percent of DFUs are linked to excessive pressure.[15] Areas of past ulceration and bony plantar surfaces require continued protection to reduce the risk of recurrence and future ulceration.[16]



Left: Footwear that provides sufficient width, depth, and roll over.
Right: Custom foot orthoses with multilayered structure.

The use of custom orthotic devices has been shown to reduce the recurrence of diabetic foot ulcers by redistributing plantar pressures, reducing shear forces against the skin, and optimizing biomechanics to reduce undesirable forces.[6,21,22] It is important that the patient always wear their prescribed orthotic device for all weight bearing activities, both indoors and out. Unprotected ambulation and standing can lead to the wound reopening.

Left: Ankle-foot orthoses (AFO)
Right: Charcot Restraint Orthtoic Walker (CROW)

Treatment options a Certified Orthotist can provide include:

- Footwear that provides sufficient width, depth, and roll over during walking. Footwear can be off-the-shelf, modified, or custom.[23,24]
- Custom foot orthoses with a multilayered structure.[21,22,25–27]
- Ankle-foot orthoses (AFO) or Charcot Restraint Orthotic Walkers (CROW) may be indicated if there is deformity or joint instability present in the foot.[6,28]

Along with orthotic treatment, it is recommended to reduce weight bearing exercise (ex. swimming or biking).[13,15] An Occupational Therapist can assess the home and assist with installation of grab bars and poles to help with transfers, minimizing weight bearing, and reduce fall risk.

In the event an ulcer does reoccur, the patient should be instructed to resume wearing the off-loading device they were previously using during the active treatment and book a follow up with the provider of this device to ensure it remains appropriate.[7,20]

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