



## Clinical specialties in orthotics and prosthetics

# Pressure off-loading orthoses to prevent ulceration and amputation in people with diabetes related foot disease

### What is diabetes related foot disease?

- Diabetes is the fastest growing chronic disease in Australia affecting nearly 1.7 million Australians or 7% of the population
- Diabetes related foot disease is a common complication involving compromised sensation, circulation and increased risk of infection
- In 15% of people with diabetes - or a quarter of a million Australians - diabetes foot disease will lead to foot ulceration.
- Ulcers can be caused by trauma or from consistent high pressure from inappropriate footwear or altered foot biomechanics
- Foot ulcers take a long time to heal, are often recurrent, and in Australia are the leading cause of lower limb amputation

### What treatment options are there?

Effective prevention and healing of diabetes related ulceration requires a team approach with the best results achieved by utilising a range of interventions across different health disciplines. A multi-disciplinary health care team may include an orthotist, podiatrist, wound nurse, dietician, endocrinologist, orthopaedic specialist, vascular specialist and an infectious disease specialist. Collectively this group provides treatment including pressure-offloading orthoses, foot care, wound care, medical care and on-going education.

### Pressure-offloading orthoses – how do they work?

Orthotic management for people with diabetes related foot disease will usually involve a custom-made lower limb orthosis in combination with customised footwear. Some examples of pressure-offloading orthoses include:

- Custom-made foot orthoses
- Custom-made ankle foot orthoses
- Prefabricated or custom-made removable walkers
- Non-removable casts or walkers (such as Total Contact Casts)

### Custom-made foot orthoses

Foot orthoses are worn in the shoe against the sole of the foot. Foot orthoses can be made from a variety of materials including hard plastic and varying densities of foam. Foot orthoses are made to follow the contours of the foot and include specialized design features to redistribute pressure thereby off-loading areas of high pressure which are at risk of ulceration. Foot orthoses may be appropriate for someone at risk of developing an ulcer.



*Example custom-made foot orthosis*

### Custom-made ankle-foot orthoses

Ankle-foot orthoses are made of thermoplastic or carbon fibre and encompass the ankle joint and the whole or part of the foot. An ankle foot orthosis is worn inside the shoe and extends above the ankle, enclosing the foot, ankle joint and calf area. Ankle-foot orthoses may be used to support and control foot position in cases of muscle weakness, partial foot amputation or if abnormal foot posture or deformity is causing high pressure and skin breakdown, beyond what can be supported using a foot orthosis.

### Prefabricated or custom-made removable walkers

Orthotic walkers (sometimes referred to as 'moon boots') are a type of ankle-foot orthosis. They can be prefabricated or custom-made to the individual. These walkers immobilize the ankle and include a custom-made foot orthosis to relieve pressure across the sole of the foot. Walkers include a unique sole designed to ensure a smooth walking pattern and good pressure distribution. Prefabricated



*Example prefabricated removable walker<sup>1</sup>*



Image Courtesy of Orthotics Plus

## Orthotists – supporting the Australian community

walkers may be worn in the short term and where the ulceration is expected to heal quickly. Custom-made walkers are more appropriate for longer term when wounds have healed and limb volume has stabilized. Custom-made walkers are fabricated from a cast (or impression of the limb) and include an internal foot orthosis, cushioned liner and hard outer bi-valved shells. Removable walkers may be appropriate to aid ulcer healing in situations where a non-removable treatment option is not suitable.

### Non-removable casts

A Total Contact Cast is usually non-removable and made using plaster bandage with synthetic fibre tape reinforcement. A Total Contact Cast may be used if an ulcer is already present on the sole of the foot. According to Australian and International Diabetic Foot Guidelines, Total Contact Casts are the gold standard treatment for ulcer healing in diabetic feet. Weekly or fortnightly replacement of a Total Contact Cast allows dressing changes, wound monitoring and ensures an ongoing intimate fit between cast and limb. This is essential at a time when the limb is at high risk of further skin breakdown or wound deterioration.



Example Total Contact Cast

### What is the evidence for pressure-relieving orthoses?

Total Contact Casts are the best way to redistribute pressure away from areas of ulceration on the sole of the foot. Total Contact Casts effectively off-load areas of high pressure and reduce healing time when compared to other treatment modalities (such as accommodative footwear, removable walkers and wound dressing alone). Removable orthotic walkers have been found to reduce peak pressure as effectively as a Total Contact Cast, but the efficacy of healing may be compromised because they are removable.

### Who provides pressure-offloading orthoses?

An **orthotist** (pron. or-tho-tist) is a tertiary qualified Allied Health Practitioner who is trained to assess and treat the physical and functional limitations of people, using orthoses. Orthotists combine clinical and biomechanical expertise with their knowledge

of current evidence, materials and product developments to prevent and heal foot ulcers in people with diabetes related foot disease. Orthotists conduct an assessment to help determine the cause of a wound or ulcer and may prescribe an orthosis to off-load pressure at the ulcer site. Orthotists will also provide ongoing client education and monitoring to ensure the most appropriate intervention is used as the ulcer heals. Orthotists typically work within a multi-disciplinary team when treating clients with diabetes related foot ulcers.

### How do I access treatment for diabetes related foot disease?

There are many multi-disciplinary high-risk foot clinics in operation around the country. If pressure-offloading orthoses are required for management of diabetes related foot disease, your doctor may refer you to a high-risk foot clinic where the decision to use offloading orthoses will be made in consultation with a range of health professionals. **Certified orthotist/prosthetists** cOP-AOPA can be located using the 'Find a practitioner' search function on the AOPA website ([www.aopa.org.au](http://www.aopa.org.au)).

### Orthotic management of diabetes related foot disease:

- Diabetes is the fastest growing chronic disease in Australia and is associated with severe complications including foot ulceration and lower limb amputation
- Pressure off-loading orthoses effectively reduce peak pressure, promote healing, prevent ulceration and reduce the risk of lower limb amputation
- Orthotists are allied health professionals who support clients with diabetes related foot disease by providing comprehensive and evidence based orthotic care and interventions

<sup>1</sup> [http://www.orthotape.com/cam\\_walker Inline\\_Walker.asp](http://www.orthotape.com/cam_walker Inline_Walker.asp)



*Disclaimer – This fact sheet does not replace clinical advice. If you require orthotic services AOPA recommend speaking to your practitioner. This fact sheet was developed based on interpretation of current evidence as of August 2016. References available on request.*