

Draft Guideline for Pressure Relief Treatment

5-7% of people with diabetes suffer from foot ulceration at any one time (*Boulton 1992, Walters 1992.*)

Up to 15% will suffer from ulceration at some point in their life.

Any patient with an active foot ulcer must be assessed / considered for a managed programme of pressure relief.

Podiatrists should use some form of (research based where possible) pressure relieving device to offload from the ulcer site

'Total contact' methods of pressure relief are aimed at increasing the area of contact between the foot and the supporting surface thus redistributing the same force over a larger area, which results in a decrease in pressure.

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}} \quad (\text{Force} = \text{Mass} \times \text{Acceleration})$$

Prevention of ulcers

Education

The diabetes team has a responsibility to provide the appropriate education to enable patients to acquire the necessary knowledge and skill to take responsibility for managing their own foot health care and to alter their lifestyle in such a way as to maximise their foot health and reduce the risk of complications.

Patients at risk of ulceration need to know how foot ulcers are caused, how footwear can precipitate them and what the patient's role is in preventing and healing them. Education should be given written and verbally and should be reinforced at regular intervals.

Education does make a difference – Boulton AJ 1994, Barth R 1991

Footwear

low to moderate risk

Patients assessed as being of low to moderate risk (SIGN 55) should:

1. Receive verbal and written advice on suitable footwear and fitting, appropriate to their activity. eg Cushioned soles, foot shaped shoe and insole, leather uppers, adequate depth, adjustable fastening, correct size.
2. A daily foot care routine including checking footwear daily for anything that could cause injury to the foot

Moderate to High Risk

Patients who are higher risk of foot ulceration, due to abnormal foot shape, loss of protective sensation, limited joint mobility and who cannot be fitted with appropriate over-the-counter shoes in the shoe shops should receive stock/bespoke footwear depending on their level of risk/deformity.

Insoles

Patients own footwear must be assessed carefully for depth and width before considering the suitability of the shoes for insoles.

'Cushioning' insoles, with open cell polyurethane foam, decrease vertical plantar pressures by a mean 18% (Smith et al 1989, Diabetic Medicine)

Patients who are provided with stock/bespoke footwear should be provided with insoles appropriate to their risk/deformity.

Callus

Good Podiatric care is essential because removing callus reduces high foot pressures by up to 26% (Young et al, 1992)¹

Current Ulceration

All patients with a foot ulcer should be referred urgently for assessment at a specialist multidisciplinary diabetic foot ulcer clinic.

Total Contact Casts

A total contact cast is a non-removable cast which is very efficient at redistributing plantar pressure however it is not without complications and should be limited to plantar ulcers, which have not responded to other casting techniques. It is close fitting plaster of Paris cast reinforced fibreglass plaster

over minimal felt padding. A rocker is applied. Skilled, trained practitioners should only apply a total contact cast. The TCC controls oedema and sheering stress, alters cadence, velocity and reduces activity.

The cast is removed first in 3-4 days then weekly for inspection of the ulcer. Patients must be given written and verbal instructions on how to care for the foot and the cast. An emergency contact number is essential

TTCS can achieve mean healing time of 6 weeks and up to 85% reduction in plantar pressures (Myerson 1992, Mueller 1989, Armstrong 1998)

Air casts

Aircast walker is a removable prefabricated walking cast, which is close fitting with 4 inflatable cells. These cells are easily inflated and deflated using a hand pump and gauge provided with the Aircast. Oedema can be controlled if the cells are inflated correctly. A rocker sole distributes pressure evenly and sheering stress is limited. The Aircast can be used with the plastazote insoles supplied or a total contact insole can be inserted. The walker alters cadence and velocity, reduces activity and can achieve 85% reduction in plantar pressures (San Antonio Gait Study)

Issues

- Rigid shell may not accommodate certain deformities e.g. ankle or rearfoot Charcot joint.
- Visual impairment- the wearer may have difficulty in reading the gauge
- Contra lateral limb may require a shoe raise

Scotch cast boots

The Scotch Cast Boot (Burden et al, 1983; Jones et al, 1989) Is a lightweight, well padded fiberglass cast that extends from just beyond the toes to the ankle and is worn with a cast sandal.

Have expected healing times of 8-12 weeks
(Boulton/Knowles study to be completed)

Hope Walking Cast

The Hope Walking Cast (Williams 1994²) is constructed of Hexalite (a heat mouldable material) which is built around a total contact insole with a rubber

sole. It is fastened with Velcro straps and is quite durable. The skills of a podiatrist or orthotist are needed to make the casted orthosis. It has been successfully used to heal plantar- neuropathic ulcers.

Orthowedge/Orthoheel Shoes

IPOS

An IPOS is an orthoses which provides either forefoot or rear foot pressure relief. Plantar pressure reduction of up to 66% can be achieved (San Antonio). The device can help to reduce mean healing times of neuropathic ulcers to 10 weeks (Chantelau 1993³). The upper section is a foam lined nylon mesh, which incorporates a padded dorsal flap with Velcro fastenings. This is designed to accommodate bulky dressings. The sole section provides either fore foot or rear foot pressure relief in the form of a wedge.

- Fore foot IPOS; The short 10 degree wedged sole redistributes weight behind the metatarsal heads giving greater pressure to the hind foot whilst relieving pressure from the fore foot.
- Rear foot IPOS These orthoses relieve pressure to the hind foot by avoiding any ground contact to the posterior aspect of the foot through a 10-degree plantar flexed wedge.

Both IPOS will alter cadence, velocity and activity therefore careful assessment of the patient's ability is needed. Extreme caution is needed where the patient's balance may be compromised.

PRAFO (Pressure Relief Ankle Foot Orthoses)

This is a custom made ankle foot orthoses which will control dorsi-flexion and plantar-flexion. In addition the device provides complete pressure relief around the heel and ankle. The sole is non-slip. The PRAFO can be worn in bed the toe extension prevents pressure on the toes from bedding. The liner encloses the foot and calf areas but leaves the calcaneal area free. The liner is washable. The PRAFO alters cadence, velocity and activity.

NB: Indoor use only

Suitable deflective/cushioning pads

It is not generally advisable to use adhesive padding because of the risk of trauma on removing dressings and the risk of infection however in some circumstances where other effective methods are not available its use is acceptable for short periods with close monitoring.

The above measures should be employed until foot ulcer is healed, prevention of reoccurrence is essential and pressure relief must be continued.

Prevention of Recurrence

Prevention hinges around Education and regular review of feet and footwear.

Every patient should be assessed for orthopaedic footwear with insoles (moulded total contact orthotics) to prevent recurrence and should receive specific advice on the initial usage.

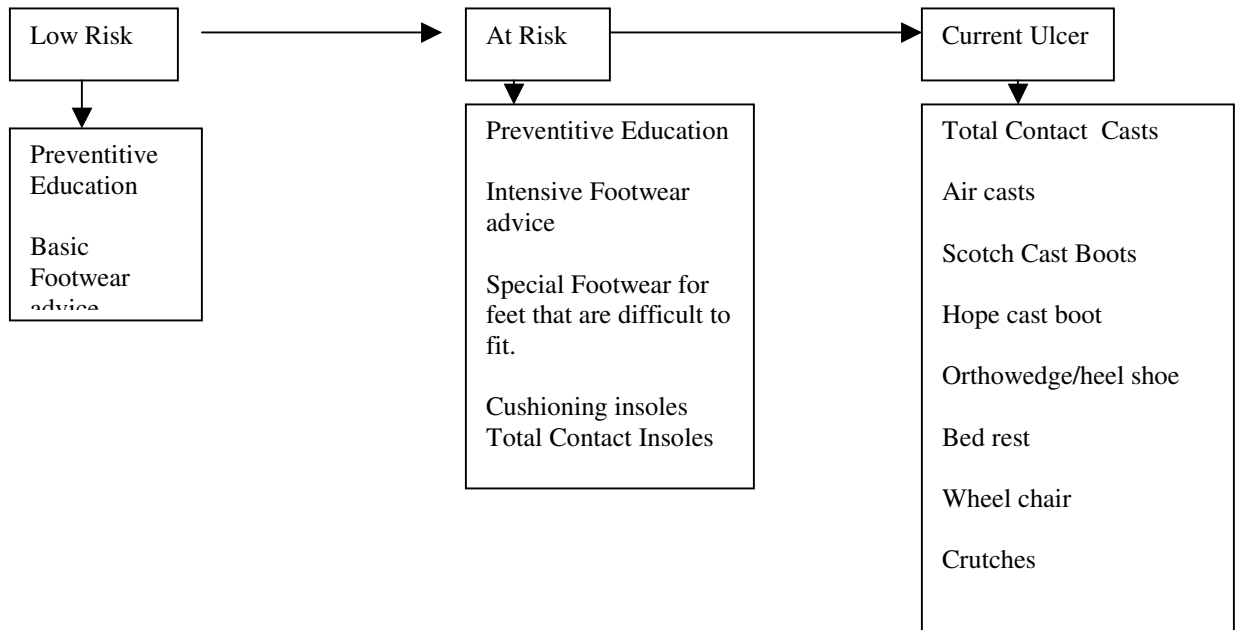
Patients should be recalled for footwear and orthotic review:

1. 1st Review approx 4-6 weeks after original fitting
2. Podiatry review as appropriate to risk level
3. Orthotic review 6 Months after 1st review

Pressure relief is one of the most essential elements in the prevention and treatment of diabetic foot ulcers.

Patient knowledge, motivation and participation is essential.

Summary



¹ Young MJ, Cavanagh PJ, Thomas G, Johnson MM, Murray HJ, Boulton AJM (1992) Effect of Callus Removal on dynamic foot pressures in diabetic patients. *Diabetic Medicine* **9**: 55-57

² Williams A (1994) The Hope removal walking cast: a method of treatment for diabetic/neuropathic ulceration. *Practical Diabetes* **11**(1) 20-23

³ Chanteleau E, Breuer U, Leisch AC, Tanudjaja T, Reuter M (1993) Outpatient treatment of unilateral diabetic foot ulcers with 'Half Shoes' *Diabetic Medicine* **10** 267-270.