# Off-loading devices in the treatment of diabetic foot: who is using what?

Fiona Murray


## Introduction

**A background survey of current practice is an essential precursor to the research that is required to build the evidence base for the use of off-loading devices in treatment of the diabetic foot. The current evidence for the use of off-loading devices and attendant problems, e.g. patient compliance, are discussed here. A number of questions arising from this analysis are posed and a questionnaire is given that, with your help, will hopefully give a starting point for answering them.**


In a number of recently published articles the use and efficacy of off-loading devices has been questioned (Armstrong et al, 2001). The failure of the off-loading strategy is cited as the reason why some new therapies have failed to produce the expected results (Boulton and Armstrong, 2003).

Moreover, it has been suggested that the use of a non-removable off-loading device should be an essential component of all future trials of new therapies for foot ulcers (Boulton and Armstrong, 2003). In their article, Boulton and Armstrong do not, however, state which device or technique should be adopted as the international standard. Others have criticised the proposal on the grounds that such a constraint might adversely affect the scientific structure and validity of the study (Jeffcoate et al, 2003). Is this really a practical suggestion? Does it negate all of the other off-loading techniques that have been developed since the inception of the technique of total contact casting (TCC) by Brand et al in 1984? While the TCC and the 'instant TCC' are now being promoted as the gold standard (for plantar neuropathic ulcers, at least), others have questioned whether they are necessarily the best option for all types of lesion, or for all people.

## The evidence

There are numerous off-loading devices available – the Hope walking sandal (Williams, 1994), the Optima slipper (Whyte 1998), Scotch-cast bootees, to name but a few. There have been few comparisons made between them. There is one published randomised controlled trial of different off-loading devices (Armstrong et al, 2001) that compares a TCC, a removable cast walker (RCW), and a Darco half shoe. It demonstrates that the TCC was associated with the best outcomes and the most effective method of off-loading (Armstrong et al, 2001). However, few other relevant studies have been undertaken.

Additionally, there is no standardised approach to off-loading, which highlights a particular weakness in other types of trials when they state 'standard off-loading techniques were used'. There is no recognised standard off-loading regimen. Off-loading techniques differ from country to country, unit to unit and clinician to clinician, and are dependent on staff availability, experience, skills and budgets. There is very little research published that effectively evaluates different techniques, or compares one method with another. A recent Cochrane review states 'there is a need to measure the effectiveness of the range of pressure-relieving interventions for the prevention and treatment of diabetic foot ulcers as there is a small amount of poor quality research in this area' (Spencer, 2000).

All techniques have the same aim, to offload or reduce the loading on an ulcerated area in order to promote healing. The use of RCWs, such as 'Aircasts' (Aircast Incorporated, USA), have grown in popularity perhaps because the technique is

**ARTICLE POINTS**

1 Efficacy and effective use of off-loading devices has been questioned recently.

2 There is no international 'gold standard' treatment, although total contact casting and instant TCC are promoted, and there is no recognised standard off-loading regimen.

3 There are numerous off-loading devices available but few comparisons have been made between them.

4 Due to the poor evidence base, there are many unanswered questions about off-loading techniques.

5 The questionnaire attached to this article aims to answer the who, why and what of off-loading to get a better picture of the currently used strategies.


**KEY WORDS**

- **Off-loading device**
- **Total contact casting**
- **Gold standard**
- **Research**
- **Questions**


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**PAGE POINTS**

1 Patient compliance can be one of the major drawback of using TCCs.

2 With the advent of newer casting materials, has the use of TCC become more acceptable to the patient?

3 We should examine the scope of off-loading strategies in common usage, their merits and effectiveness, before initiating trials of new therapies employing a non-removable off-loading device.

4 This questionnaire aims to create a better picture of the current state of off-loading strategies.

perceived to have fewer associated risks than a TCC. This is despite being reported to be less effective than TCCs (Armstrong et al, 2003). This reduction in effectiveness may be due to poor patient compliance and has lead to development of the 'instant TCC'. This combines the ease of application of a pneumatic walker combined with the permanence of the fibreglass casting tape to make the walker irremovable and therefore increase its effectiveness by addressing the issue of patient compliance (Armstrong et al, 2002).

Patient compliance can be one of the major drawbacks of using TCCs, either persuading the patient to accept the therapy initially or, once they have accepted the therapy, staying with it for the duration of the treatment. Some clinicians believe that TCC is the gold standard technique for treating various diabetic foot problems, but how many of us actually use it as a frontline treatment or offer it as the treatment of choice to patients, either due to lack of time, skills or perceived risk of patient non-compliance?

## Reason for the questionnaire

As in every sphere, technology has moved on. With the advent of newer casting materials such as the 3M soft cast tape (a flexible fibreglass tape) has the use of TCC become more acceptable to the patient? Is a TCC made from new materials less likely to cause a cast rub or is it immaterial what the cast is made of and is this aspect dependent upon the skill of the person applying the TCC? Does a cast made of new materials offer the same pressure relief as the original technique of applying a TCC? The answer to all of these questions is 'we don't know!'.

Before we can accept the suggestion that any trials of new therapies should employ a non-removable off-loading device, we should examine the scope of off-loading strategies that are in common usage in this country and have an idea of their relative merits and effectiveness.

The aim of the following questionnaire is to answer these questions:

- Who is using which treatment?
- Why are they using it?
- What are they treating?

The more people that complete the questionnaire, the better the picture we will have of the current state of off-loading strategies. Then, perhaps, we can start to build the evidence base that is required. ■

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# SURVEY OF OFF-LOADING DEVICES IN THE MANAGEMENT OF ACTIVE FOOT ULCERS AND THE ACUTE CHARCOT FOOT

## Section 1: You and your work

Please note that we are keen to receive as many replies as we can and welcome them from different members of the same team.

1. Where are you based? Please specify the main place where you manage diabetic foot ulcers

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2. Do you work in a multidisciplinary foot clinic? YES / NO

3. What is your professional training?

| | | | |
|---|---|---|---|
| Diabetologist | Vascular surgeon | Orthopaedic surgeon | Other medical specialist |
| Other podiatrist | Podiatry assistant | Diabetes specialist nurse | Clinic nurse |
| Orthotist | Occupational therapist | Physiotherapist | Diabetic specialist podiatrist |
| Plaster technician/specialist | Other (please specify) | | |

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## Section 2: Off-loading for different foot problems

What is your preferred method of off-loading for the following conditions? (Please tick one off-loading device for each clinical condition)

| Preferred method of off-loading | Acute Charcot foot without an ulcer | Acute Charcot foot with an ulcer | Chronic Charcot foot with an ulcer | Chronic Charcot foot without an ulcer | Plantar neuropathic ulcer (good blood supply) | Neuropathic ulcer elsewhere (good blood supply) | Ulcer on a foot with some degree of ischaemia |
|---|---|---|---|---|---|---|---|
| Total contact cast (unremovable, below knee) | | | | | | | |
| Removable bi-valve cast | | | | | | | |
| Unremovable 'Scotch-cast' bootee | | | | | | | |
| Removable 'Scotch-cast' bootee | | | | | | | |
| Other polymer/ fibreglass off-loading device fashioned in-house | | | | | | | |
| Newcastle Optima slipper | | | | | | | |
| Hope walking sandal | | | | | | | |
| Softcast slipper | | | | | | | |
| Darco (or other) half shoe | | | | | | | |
| Prafo | | | | | | | |
| Hexa shoe | | | | | | | |
| Crutches | | | | | | | |
| Bed rest | | | | | | | |
| Knee walker | | | | | | | |
| Other (please specify) | | | | | | | |

## Section 3: Please indicate the extent to which the following factors underlie the preference you have stated on the previous page

| Reason for preference | Not at all | A bit | Quite a lot | Definitely |
|---|---|---|---|---|
| Effectiveness | | | | |
| Availability | | | | |
| Safety | | | | |

Are there other reasons which govern your choice? If so, please specify

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## Section 4: Training

1. If you use a casting technique, please state which one:

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2. How did you learn to apply it? (Please tick/circle)

- A colleague taught me
- From an written article
- From watching a video
- Attended a TCC workshop (please state where you attended)

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- Other (please state)

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3. How long ago did you receive your training?

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4. Have you ever had an update on the technique you use? YES / NO

5. Do you feel that you need one? YES / NO

6. Have you had training in new materials that are used in casting? YES / NO

7. Do you think that a regular update every two years should be part of core CPD? YES / NO

8. Would you be interested in attending a refresher course? YES / NO

## Section 5: Frequency of changing unremovable devices

If you use an unremovable cast without a window for inspection of the ulcer, how often (on average) do you change it – assuming that the patient has no worrying symptoms? (Please tick or ring below as appropriate. If you never use such a device, tick or ring N/A)

- More often than weekly
- Weekly
- Between weekly and fortnightly
- Every fortnight
- Less often than every fortnight
- N/A

## Section 6: Infection

1. Do you regard any of the following as a *more or less absolute contraindication* to using an unremovable off-loading device that does not have a window for inspection of the appearance of the ulcer:

a) An ulcer wholly or partially covered by eschar YES / NO

b) An ulcer with surface slough or exudate but without obvious spreading infection YES / NO

c) An ulcer complicated by clinically obvious infection of soft tissue YES / NO

d) An ulcer complicated by osteomyelitis YES / NO

2. Do you use prophylactic antibiotics when using an irremovable off-loading device that does not have a window for inspection of the appearance of the ulcer? (Please tick or ring below as appropriate)

- Always
- Usually
- Sometimes
- Not unless there is clinical evidence of infection

## Section 7: Problems with, and complications of, different off-loading devices

1. Secondary ulceration (Please tick one box for each device)

***'In my experience, patients get secondary ulcers or abrasions from the device – on either foot – when they use the following off-loading device . . .'***

| Off-loading device | Very often | Sometimes | Rarely | Never |
|---|---|---|---|---|
| Total contact cast (TCC) | | | | |
| Removable below knee cast | | | | |
| RCW | | | | |
| Instant TCC | | | | |
| Irremovable Scotch-cast bootee | | | | |
| Removable Scotch-cast bootee | | | | |
| Commercial half shoe or slipper | | | | |
| Soft padded shoe crafted in-house | | | | |

2. Infection (Please tick one box for each device)

***'In my experience, patients get significant spreading infection as a consequence of using the following off-loading devices . . .'***

| Off-loading device | Very often | Sometimes | Rarely | Never |
|---|---|---|---|---|
| Total contact cast (TCC) | | | | |
| Removable below knee cast | | | | |
| RCW | | | | |
| Instant TCC | | | | |
| Irremovable Scotch-cast bootee | | | | |
| Removable Scotch-cast bootee | | | | |
| Commercial half shoe or slipper | | | | |
| Soft padded shoe crafted in-house | | | | |

3. Unsteadiness and falls (Please tick one box for each device)

***'In my experience, patients have problems with unsteadiness and falls when they use the following off-loading device . . .'***

| Off-loading device | Very often | Sometimes | Rarely | Never |
|---|---|---|---|---|
| Total contact cast (TCC) | | | | |
| Removable below knee cast | | | | |
| RCW | | | | |
| Instant TCC | | | | |
| Irremovable Scotch-cast bootee | | | | |
| Removable Scotch-cast bootee | | | | |
| Commercial half shoe or slipper | | | | |
| Soft padded shoe crafted in-house | | | | |

## Section 8: Other questions

1. Do you ever use bilateral unremovable off-loading devices? YES / NO

2. Do you usually arrange for patients to have crutches as well as an off-loading device you supply boot for other foot? YES / NO

3. Do you supply a waterproof shield such as Limbo or AquaShield? YES / NO

4. Do you supply a patient information leaflet? YES / NO

**Thank you very much for taking the time to answer these questions. Please send the completed questionnaire in an envelope marked Casting Survey to:**
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We will collate the answers and publish them in a future issue of *The Diabetic Foot* journal