

# Case report on a non-healing venous ulcer utilising a cellulose / super polymer dressing for exudate control

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## Abstract

Controlling exudate is a key issue in the management of large venous leg ulcers. Dressings need to provide sufficient absorbency to prevent local tissue maceration, to remove inflammatory fluids from the wound bed and to limit strikethrough onto retentive dressings and clothing. These same dressings need to perform these tasks under some form of limb compression. In this case report, DryMax dressings were used to contain the persistent drainage of a non-healing ulcer and to assist in improving the patient's quality of life.

## Introduction

Healthcare professionals are increasingly being challenged by the complex pathologies of 'aged' individuals experiencing chronic wounds. Many institutional and community services are being confronted with escalating incidents of wound breakdown, skin lacerations, pressure ulcers and leg ulcers. In people aged over 70 years, Friedberg *et al.* found that the prevalence of venous ulceration is close to 13%<sup>1</sup>.

Whilst clinicians recognise that limb compression, debridement, skin grafting and/or dressing therapies are effective interventions in the treatment of venous leg ulcers, reports still indicate that around 20% of these wounds remain unhealed after 50 weeks or more of therapy<sup>2</sup>. Reasons for this failure to progress stem from the degradation of the extracellular matrix, reduced growth factor activity, fibroblast senescence and restricted angiogenesis<sup>3</sup>. 'Hard to heal' wounds may have a large surface area, a duration of months or years, and the presence of fibrin on more than 50% of the wound surface area<sup>4</sup>.

Numerous authors suggest that the patient's history may demonstrate deficits which influence the chronicity of venous leg ulcers. Factors thought to be significant include age, immobility, high body mass index, history of venous ligation or vein stripping, hip or knee replacement surgery, venous

thrombosis, an ankle brachial index below 0.8, diabetes, social/economic factors and living alone<sup>5-7</sup>.

Enoch & Price state that "it is important to appreciate and acknowledge that some chronic wounds are resistant to all efforts and treatments aimed at healing"<sup>8</sup>. This allows the clinician to focus on the negative impact that the chronic wound has on the patient's quality of life. Some noteworthy quality of life issues raised in several studies were frequency and regularity of dressing changes; chronic fatigue due to inadequate sleep; restricted mobility; pain; wound infections; and social isolation<sup>9-11</sup>.

Recent advances indicate that non-healing chronic wounds may respond to technologies involving growth factors, skin substitutes, gene therapy and stem cell therapy<sup>12</sup>. However, a substantial amount of clinical research is still required to prove efficacy, following which the issues of accessibility and affordability will need to be addressed. In the interim, Enoch & Price suggest that the goal of clinical intervention should be "wound stabilisation", pertaining to actions which prevent physical trauma, minimise oedema, reduce exudate, limit bacterial burden, eliminate malodour, lessen pain, and decrease the frequency of dressing changes<sup>8</sup>.

## Case study

Daphne [pseudonym] was an 82 year old widow and the sole carer of a son with cerebral palsy. Her income was derived from a war-widow pension and a carer's allowance. She was a small woman in stature and weighed 41kgs, less than her ideal body mass index. Due to their (mother and son's) combined medical and living expenses, Daphne would regularly only have one small meal per day, which raised the possibility of insufficient nutrition to sustain wound repair. Her leg ulcer began in 2005 through minor trauma in the garden.

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Daphne's history featured an old deep vein thrombosis in the ulcerated limb. Both legs had been subject to vein stripping. In recent years she had undergone two episodes of skin grafting (one procedure utilising vacuum assisted closure), only to encounter failure of each graft within weeks. Throughout the majority of her treatment she had had her leg encased in multi-layered compression bandaging. In 2007, she had had 6 weeks of hyperbaric oxygen treatment, only to demonstrate continuing recalcitrance of the ulcer. Further, the wound's bioburden had been problematic. Earlier cultures had demonstrated methicillin-resistant *Staphylococcus aureus* (MRSA), whilst more recent pathology had revealed *Pseudomonas aeruginosa*.

On presentation at the Sydney Adventist Hospital's wound clinic in March 2008, the ulcer was seen to be largely circumferential, encompassing ankle to lower calf (Figure 1). A dense, 'slimey' and offensive biofilm covered the entire wound surface area. The ulcer was very painful to touch (8 out of 10 on analogue scale) but was otherwise described as "sore". She infrequently used Panadeine Forte for analgesia. A moderate peri-wound erythema was present. Exudate levels were heavy, requiring dressing change 2-3 times per day.

### Wound management

Wound clinic staff and the attending vascular consultant sought to admit Daphne into inpatient care for the purposes of intravenous antibiotics, wound debridement, bed rest and nutritional support. Sourcing respite care for her son, however, proved problematic due to a 3 month waiting list. Consequently, a 'holding' strategy was required which centred on home-based management until both a respite bed and a hospital bed were available.

Primary objectives and actions at this time were chosen to coincide with Enoch & Price's "wound stabilisation" concept<sup>8</sup>, namely:



Figure 1. Wound on presentation at the Sydney Adventist Hospital.

- **Adequate pain control** – oxycodone 10mg orally BD [Mundipharma], paracetamol 500mg orally q6h [Sanofi-Synthelabo], lignocaine 2% gel [Pfizer] topically at dressing.
- **Nutritional support** – Arginaid (containing arginine) fluid supplements [Nestlé]; two drinks per day recommended.
- **Antibiotic cover** – commenced an extended series of ciprofloxacin 500mg orally BD [Bayer Schering].
- **Dressings** – algisite M [Smith & Nephew] to the wound surface then DryMax dressing [Absorbest AB, Sweden; distributed by Reliance Medical, Queensland]; daily dressing change. Dressings were retained with a multi-layered, short-stretch compression bandaging system.
- **Monitoring** – community nursing personnel would attend to Daphne on a daily basis, with the exception of twice weekly wound clinic visits.

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Figure 2. First stage wound dressing.



Figure 3. Second stage wound dressing.



Figure 4. Final bandaged wound.

Fundamental to the effectiveness of the 'holding' strategy was the selection of a dressing regime with the qualities of high absorbency, a thin sub-bandage profile and large surface area. The desired outcomes of the dressing regime were a daily dressing change, reduced strikethrough, haemostasis

(due to the ulcer's friability), minimal bandage bulk, easy application and non-traumatic removal. Consequently, the combination of an alginate and DryMax dressing were chosen for the task (Figures 2, 3 & 4).

Alginates are a highly absorbable, biodegradable dressing, containing building blocks of mannuronic and guluronic acid. As well as controlling exudate by ion exchange, alginates can activate macrophages, and act as an adjunct in the treatment of infected wounds. The dressing can be readily removed from the wound by irrigation without causing damage to the lesion or pain to the patient<sup>13</sup>.

DryMax is a super absorbent dressing, possessing a core made from a cellulose and polymer blend, contained within a polypropylene cover. Wound exudate is drawn vertically into the dressing where it alters the core to a gel consistency (Figure 5). Fluid is bound within the gel, which both prevents peri-wound maceration and yet retains a humid surface environment necessary to facilitate tissue repair. Absorption is not compromised under compression<sup>14</sup>.

## Discussion

The healthcare team discussed the leg ulcer with Daphne, after which it was accepted by all parties that the wound would most likely remain a non-healing entity. The immediate priority, however, was gaining control over pain, infection and exudation. Having been presented with a difficult home/social situation, patient management proceeded in less than ideal circumstances.

Daphne's concordance with oral analgesia was reasonably poor. She stated that she was not at ease taking so many "pain killers". She also found the sedating side effects unwanted, as she felt less capable to look after her son. She did, however, experience good pain relief from the topical lignocaine gel, although this would usually only last 3-4 hours.

Daphne initially found the arginine fluid supplements distasteful, describing them as "too thick and sweet". She was shown how the tetra-pack contents could be divided and diluted over a few separate drinks. This made the fluids more palatable. The experience was improved further when she was introduced to the freeze-dried sachets which allowed her to make the drink concentrations more to her liking. Despite the oral supplementation, the quality and quantity of her food intake remained quite poor. This was in part contributed to by the loss of appetite associated with the prolonged use of the oral antibiotics.

The alginate / DryMax dressing regime, in combination with multi-layered compression bandaging, achieved a number of its objectives. Frequency of dressing change was reduced.





Figure 5. DryMax Super absorbent dressing.

Malodour was minimised. The dressings were relatively easy to apply and were removed with minimal wound bed trauma or bleeding, although the dressing procedure produced the most intense episode of pain prior to the topical anaesthesia taking effect. No limb oedema was evident throughout the treatment period.



Figure 6. Peri-ulcer erythema and excoriation.

The DryMax dressing performed well under compression. It maintained its low profile and did not become bulky or excessively heavy when filled with liquid. Leakage from the dressing margins was observed, however, when the DryMax core reached maximum saturation. At this juncture strikethrough would manifest itself on the bandage outer layers. Notwithstanding the bandage surface moisture, the wound-dressing interface was not wet. Peri-wound maceration remained minimal.

During the passage of time, the wound presentation altered. The dense yellow surface film was slowly lysed, demonstrating a cleaner ulcer base. In spite of this, overt granulation tissue deposition was not apparent and keratinocyte activity leading to epithelial replication was not evident. The wound surface area gradually extended in size. Exudate levels also progressively increased, causing some concern regarding the systemic losses of protein and electrolytes. Although maceration did not prove problematic, the actions of proteases in the wound fluid caused peri-ulcer erythema and excoriation to become more pronounced (Figure 6).

Efforts were renewed to gain priority respite care for Daphne's son. His successful placement allowed her to be admitted for inpatient intervention. Consequently, at the time of writing this report, Daphne was responding to treatment – her pain had lessened, the volume of exudate had significantly reduced, the wound base was clean and she was putting on some weight.

## Conclusion

Although Daphne's immediate well-being is being managed, it is important that the clinical team plan for long-term care. The non-healing wound requires the team to adjust their treatment goals from objectives designed to facilitate repair to the patient-centred ambitions of maintenance of function, relief from suffering and the prevention of social isolation<sup>8</sup>.

Subsequently, Daphne's interests were best served by the inputs of a multi-disciplinary group. Both a pain management consultant and microbiologist were invited to participate in the creation of her care plan. The admitting vascular specialist continued to review her every 6-8 weeks in his rooms. The social work team investigated avenues for additional home support for Daphne and her son. Community nursing staff provided the majority of the wound care, with the ongoing assistance and supervision of wound clinic personnel.

DryMax dressings remained an integral component of conservative therapy. It was anticipated that the product's absorbency would reduce the frequency of dressing changes to twice per week. This was aimed to provide the advantages

of less disruption to the home routine, less dressing-change related wound pain and reduced product expense. Commensurate with dressing application was the ongoing use of compression therapy in order to reduce persistent venous hypertension.

## Declaration of interest

Financial sponsorship and product supply were not sought nor obtained from Reliance Medical Pty Ltd nor any other distributor for this case report.

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