Drawtex Hydroconductive Dressing – Removing All the Barriers – A 10 patient Evaluation in the Acute Care Setting

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Introduction

Wound bed preparation is a concept which was initially introduced by Falanga (2000) and is now established within clinical practice at an international level. It originally focused on improving the healing of chronic wounds which failed to progress normally by reducing identified barriers to wound healing. These barriers to wound healing are described individually as, the presence of devitalised tissue, an imbalance of moisture and an increase in the bioburden in the wound. (Falanga, 2000).

From the original concept of wound bed preparation, the TIME acronym was developed in 2003 to simplify this framework (Schultz et al, 2003). This summarised the four main components of wound bed preparation as T- Tissue management, I – Control of infection and inflammation, M – moisture balance and E – advancement of epithelial edge of the wound (Dowsett and Newton, 2005). This development gave further structure and clarity to the process.

The benefits of using wound bed preparation and TIME in clinical practice are clearly evident. It not only provides a framework in which clinicians can, through the process of assessment, recognise the factors which impair healing and implement strategies to create an optimal wound healing environment. It has also been recognized as a tool for wound care training and education, and has proved that it can be used with developments and new therapies in wound care (Schultz and Dowsett, 2013). It is now integrated into the management of acute wounds such as post traumatic abrasions, lacerations, high energy explosive wounds and burns, where bacterial contamination is common at the early stage of healing and the risk of infection is high (Halim et al, 2013).

Despite the success of wound bed preparation, some clinicians experience difficulty when selecting the most appropriate wound care product to control the identified problem, especially when more than one barrier is identified. Although the barriers to wound healing are described individually in the literature, often, in the wound bed itself more than one is observed. In fact they are interdependent and can exacerbate each other. Devitalised tissue can exacerbate moisture levels and increase the bioburden in the wound. Slough and necrosis can harbor bacteria, making this an ideal environment for bacteria to multiply, increasing the risk of infection (White and Cutting, 2008). They can also lead to raised exudate production as a result of the increased inflammatory response (Sibbald et al, 2007).

Removing devitalised tissue from the wound bed requires a rapid and safe technique. While there are a number of methods available, the faster methods such as sharp, ultrasound or hydrosurgical debridement may not be available to the generalist nurse because of skill, competency or cost (Gray et al, 2011). As a result, autolytic debridement, where moist interactive dressings are applied to the wound to soften and liquefy hard eschar and slough is often the method of choice (Vowden and Vowden 1999). Although it is considered safe it may be slow, increasing the risk of complications associated with chronic wounds such as infection and maceration (Gray et al, 2011).

As a result of these two concerns, an evaluation of Drawtex Hydroconductive Dressing with LevaFiber™ Technology was undertaken. This was to explore if the current practice in wound bed preparation could be improved, by identifying a dressing which could be used easily by generalist nurses to quickly and safely debride wounds, where devitalised tissue was present in conjunction with preventing infection and managing exudate. An additional benefit would be if this could be undertaken within the existing cost of wound care products purchased by the Trust.

Drawtex Hydroconductive Dressing with LevaFiber™ Technology.

Drawtex Hydroconductive Dressing with LevaFiber™ Technology is a product which can be used for wound bed preparation. The manufacturer's claim that it is the only dressing which can remove all three barriers simultaneously, using the patented LevaFiber™ Technology to draw large quantities of exudate and debris from the wound.

Recent studies undertaken in the UK demonstrate Drawtex to be effective at sequestering and retaining microorganisms (Edwards-Jones et al, 2013), which suggests that it may contribute to effectively managing the wound bioburden. When used to manage exudate it is described as being able to absorb five times its own weight in fluid. It was compared to other products commonly used in wound bed preparation in vitro, and was found to have a greater absorbency.(Edwards-Jones et al, 2013)

The ability of Drawtex to remove devitalised tissue was observed by Johnson et al (2013), and Wolvos (2012). It was described as "hydroconductive debridement", because the rapid absorption of fluid from the wound into the dressing also gently helps to pull devitalised tissue away from the wound bed. As a result the "undesirable tissue is selectively removed, leaving healthy tissue intact" (Wolvos, 2012).

Having reviewed the evidence an evaluation of Drawtex was undertaken. The aim of the evaluation was to observe whether the dressing was effective at removing all of the barriers to healing as described within the wound bed preparation framework simultaneously. It was also used to identify the speed and cost of debriding a range of wounds which were being treated within the hospital.

Evaluation

Process

The study design was a product evaluation, where Drawtex was applied to replace the current dressing regime used to prepare the wound bed. It was applied according to the Manufacturer's instructions for a maximum of four weeks or until the clinician assessed that the wound bed was adequately prepared, with the removal of devitalised tissue, effective exudate management and no signs and symptoms of infection present. Patient comfort was also assessed during the evaluation and if requested by the patient, the dressing would be discontinued.

Prior to the evaluation, consent was obtained from the patient and the patient's Medical Practitioner by the Tissue Viability Nurse, and this was recorded in the evaluation documentation.

The evaluation was undertaken on ten patients with a range of wounds, who were treated initially in a ward environment within an acute hospital. While the wounds varied in aetiology, size and duration:-

- They were all assessed as requiring preparation of the wound bed to remove a high proportion of devitalised tissue.
- They were all at risk of wound infection either because of their existing co-morbidities or the nature of their wound.
- All of the patients were observed to have some damage to the periwound skin. In seven patients this was maceration or inflammation from excess exudate.
- Six patients were complaining of high levels of pain in the wound. This was measured using a visual analogue scale (0 being no pain, 5 being worst pain), and ranged from 3 to 5, with a mean score of 4.2.

At the initial assessment the size of the wound was measured and the percentage of healthy and unhealthy tissue was estimated by the clinician observing the wound bed. These were recorded in addition to the level of exudate, infection status, condition of the periwound skin and wound pain (using a Visual Analogue Scale). These parameters were re-assessed and recorded at each subsequent dressing change.

The wound was photographed before Drawtex was applied. An initial layer of the dressing was used to conform to the wound bed, and 1 or 2 additional layers were added, depending on the amount of fluid exuding from the wound. This was then covered with a secondary dressing or retention bandage at the discretion of the Clinician. The ease of use and number of nurses required to apply the dressing was recorded.

The endpoint of the evaluation was to observe how Drawtex could effectively prepare the wound bed by removing devitalised tissue, manage the exudate and inhibit an increase in the bacterial bioburden, which may lead to infection.

Outcomes

The evaluation took place over a 6 month period on 10 patients (8 males and 2 females) with an ages ranging from 27 to 78 years with a mean of 61.7 years. Table 1 demonstrates the aetiologies of the wounds treated and the time (in weeks) that they had been present before using Drawtex. Unfortunately, 1 patient did not complete the evaluation as he became acutely unwell (non-device related episode) and was lost to follow-up, therefore the information included was only to the first dressing change.

Table 1 – Aetiology of Wounds and Duration

Patient No.	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10
Wound type	Pressure Ulcer Grade 3	Venous leg ulcer	Venous Leg Ulcer	Pressure ulcer Grade 4	Bilateral legs necrosis following cellulitis	Abscess	Venous Leg Ulcer	Crush injury	Haematoma	Haematoma
Duration of the wound in weeks prior to treatment with Drawtex	20	>52	16	>52	5	12	12	2	1	2

Debridement

Devitalised tissue presents as necrosis (eschar) or slough which are defined by their physical appearance as described by Dowsett and Newton(2005). Necrosis is usually black or dark grey tissue, which when dry may be hard and leathery. Slough is generally creamy yellow in colour and depending on the amount of moisture it contains can be stringy, or adhere to the wound surface when dry.
Devitalised tissue can impair healing by being a physical barrier to epidermal cell migration (Young, 2011) and wound contraction (Dowsett and Newton 2005). It can also prevent an accurate assessment of wound size and depth and can hide other complications such as abscess formation.

Moore (2012) reviewed the literature on wound debridement and indicated that the rapid removal of devitalised tissue from the wound bed is necessary both to facilitate healing and to prevent further complications. While there are a range of debridement techniques available to the clinician, they are dependent on a number of factors including the expertise of the clinician, the time taken, patient acceptability and ease of use (Gray et al,2011).

The results of the evaluation suggest that the hydroconductive debridement action of Drawtex was effective in removing slough and eschar from the wound bed. Table 2 demonstrates the outcomes pre and post Drawtex on all ten patients, demonstrating that there was a substantial improvement in promoting healthy tissue and reducing the percentage of devitalised tissue which may inhibit wound healing. However, within this patient population there were five patients who, in the initial assessment, where there was 100% devitalised tissue (slough and necrosis) recorded in the wound bed, were observed to have 100% granulation tissue after Drawtex was used. For these patients an average of 3.2 dressing changes was required to achieve this outcome.

The time to debride was also considered an important aspect of the study, and this ranged from 1 day to 29 days with a mean time of 3 days across all patients (N=10). However in the sub group which presented with 100% devitalised tissue at the start of the study this period ranged from 3 to 29 days with a mean of 11 days (See Table 3)

Table 2:Comparative Tissue in Wound Bed Pre and Post Drawtex

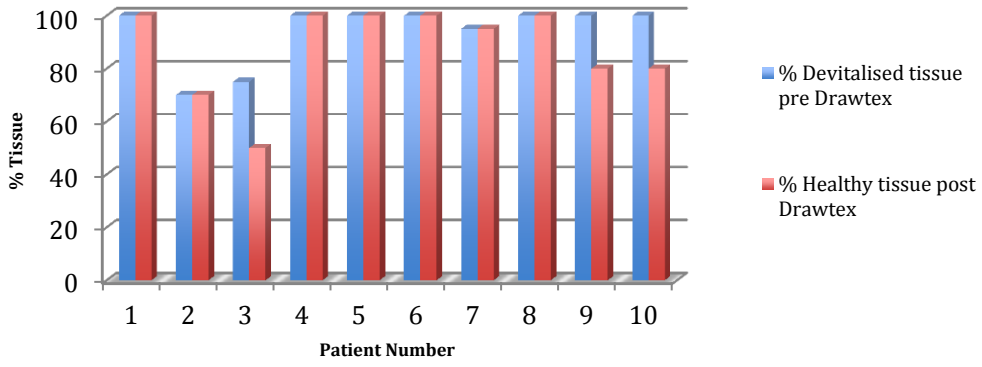


Table 3 – Time To Debride and number of Dressing Changes

Patient No	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10
Time to debride (days)	14	5	8	5	3	4	9	29	12	5
Number of dressing changes to debride	4	1	3	2	1	1	4	8	6	1

Cost of Debriding.

In addition to the speed of debridement, the total cost of the dressings used to debride these wounds was also calculated, using the prices listed in the Drug Tariff (August 2013). The cost of the dressings included primary and secondary dressings and methods of fixation e.g. retention bandage.
Table 4 shows the cost to debride when using Drawtex.

Table 4 – The Cost to Debride when using Drawtex

Patient No	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10
Cost of debriding	£13.04	£13.01	£15.99	£13.04	£32.48 £7.24 (left leg) £25.24 (right leg)	£1.97	£13.04	£44.16	£21.80	£13.01

In Table 5 the comparative costs are recorded, demonstrating that in this patient group there were actual cost savings of £264.48 per week.

Table 5 – Comparative Dressing Costs

Patient No	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5	Patient 6	Patient 7	Patient 8	Patient 9	Patient 10
Weekly dressings cost. (Previous treatment)	£30.03	£91.07	£35.77	£26.88	£104.52 £52.26 per leg	£6.52	£44.52	14.31	No information	£13.02
Weekly dressings cost (Drawtex)	£6.52	£13.01	£10.66	£6.52	£32.48 £7.24 (left leg) £25.24 (right leg)	£1.97	£7.33	£10.66	£10.90	£13.01
Potential weekly cost savings	£23.51	£78.06	£25.11	£20.36	£72.04	£4.55	£37.19	£3.65	-	£0.01

The outcome of the evaluation suggests that the hydroconductive action of Drawtex is a rapid and safe method of removing devitalised tissue from the wound bed. The following case studies demonstrate this in detail.

Patient A was a 35 year old male who was paraplegic. He was admitted with a longstanding pressure ulcer (Grade 4) which had been present for more than 52 weeks.

The wound measured 3 centimeters (cm) by 2cm, and was recorded as tracking into a cavity by 7cm (Photo 1). It was highly exuding and the periwound skin was macerated. The wound contained 100% slough. Drawtex was used in the 7cm track and 2 layers were placed over the wound opening. It was secured with a semi-permeable film dressing.

Photo 1

This was reviewed after 2 days, the wound bed was improving with 70% granulation tissue observed and the wound measurements had reduced (Photo 2). Drawtex was reapplied and reviewed after 5 days (Photo 30. The wound bed had fully granulated and the wound reduced to 0.5cm x 1.0 cm. The patient was then discharged home. 100% granulation was achieved in 5 days. Only 2 dressing changes where required with a total dressing cost of £6.52

Photo 2

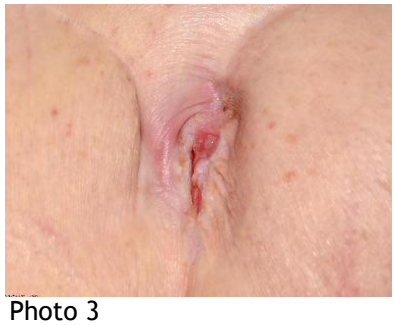


Photo 3

Patient B was a 62 year old female with a history of type 2 diabetes, hypertension and hypothyroidism. She had been admitted with cellulitis of both legs, which had resulted in circumferential necrosis of the superficial tissue, with dry periwound skin (Photo 4 and 5).

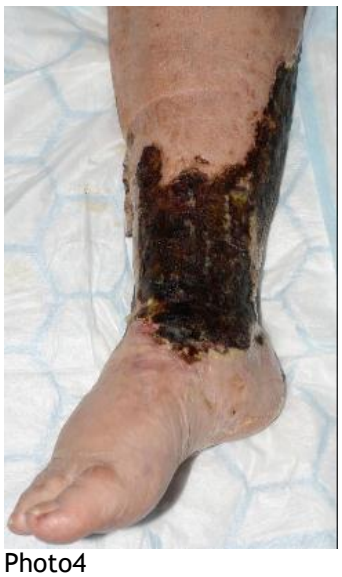


Photo4

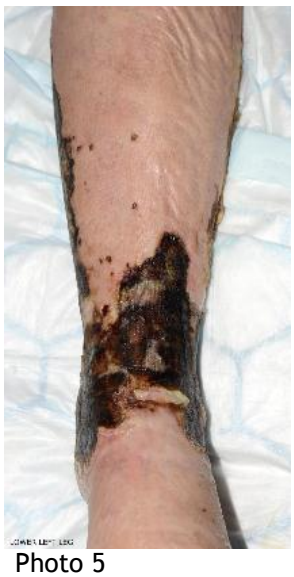


Photo 5

Drawtex was applied to the wound in two layers, and secured with a retention bandage. When the wound was reviewed after 3 days the necrotic tissue had been fully removed leaving 100% granulation tissue at the wound bed. The wound had been debrided in 3 days with 1 dressing change, the total cost being £32.48 (Photo 6 and 7).

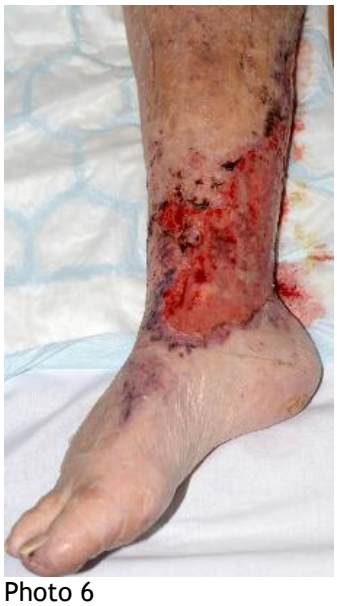


Photo 6

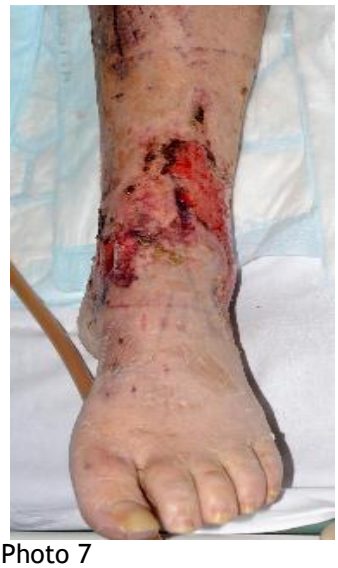


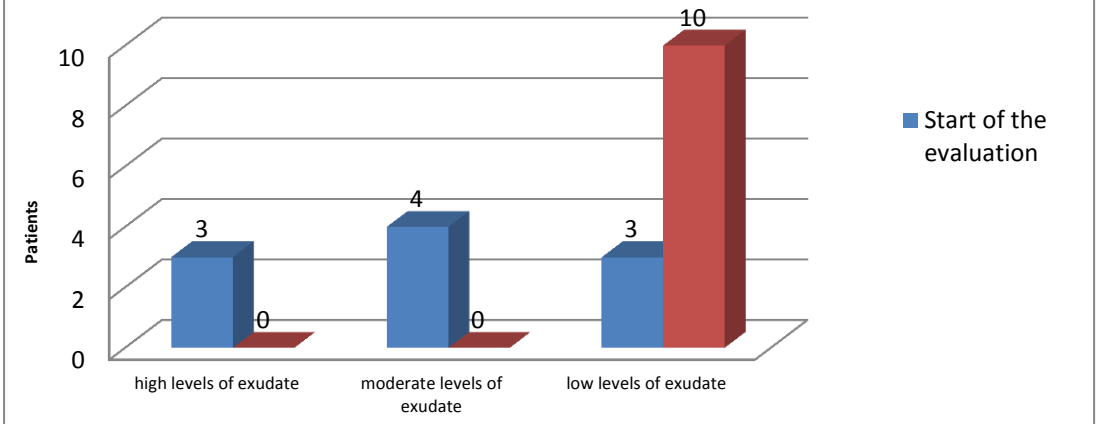
Photo 7

Exudate Management.

Chronic wounds which are stuck in the inflammatory stage of healing can produce large amounts of exudate (Enoch and Harding, 2003), which can require frequent dressing changes and may cause complications such as periwound skin damage. It has been suggested that the content of chronic wound exudate can inhibit cell proliferation (Schultz 2003), and contribute to a poorly developed extracellular matrix (Dowsett and Newton, 2005), both of which impair wound healing.

Excess exudate is managed by identifying and treating underlying contributing factors, debriding devitalised tissue and addressing an increase in wound bioburden. A number of techniques can be used to manage excess exudate including negative pressure wound therapy and wound manager collection devices, but absorptive dressing products are most commonly used. The choice of absorptive dressing is usually at the discretion of the clinician treating the wound. Drawtex is recommended for moderate to highly exuding wounds and during the evaluation process, Drawtex was applied on wounds with lower levels of exudate with no problems identified. Table 6 demonstrates how effective the dressing performed in managing exudate in the wound with all patients observed to have sufficient exudate levels in the wound for Drawtex to absorb, yet still maintain a moist wound environment.

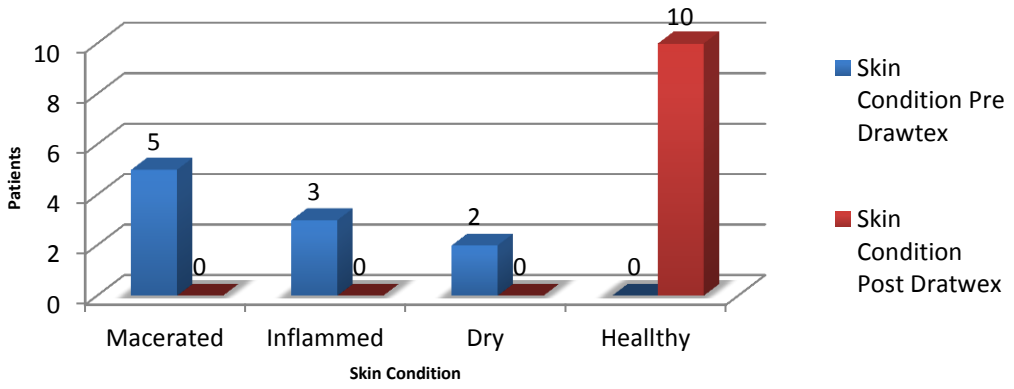
Table 6 : Management of Exudate Using Drawtex



Periwound skin damage is often a consequence of poor exudate management but it can also be attributed to trauma caused by inappropriate use of dressing products and frequent dressing changes. Prior to evaluating Drawtex all of the patients were recorded to have some degree of periwound skin damage with 80% of the patients (n=8) requiring daily dressing changes. The reason for this was because the current regime was not managing the wound exudate effectively.

No additional barrier creams or skin protectants were used with Drawtex and at the end of the process the periwound skin of all of the patients was recorded as healthy. (See table 7)

Table 7: Periwound Skin Condition Pre and Post Drawtex



Infection.

All the patients within the evaluation were at risk of wound infection due to their co-morbidities. In fact, nine patients had experienced a wound infection in the past. However none of the patients redeveloped a wound infection whilst being treated with Drawtex despite clinical indication of colonization.

Patient Satisfaction.

All of the patients in the evaluation reported the dressing to be comfortable. Six patients reported pain to the wound but stressed that this was not associated with the dressing or dressing change. Where pain had been reported, this was resolved by the end of the study when all patients were pain free.

Clinician Satisfaction.

All of the generalist nurses who were involved in the evaluation recorded that the dressing was quick and easy to use. They observed improvement in the wound bed at each dressing change and were highly satisfied with the capability of the dressing to manage the wound exudate.

Discussion.

The role of debridement within wound bed preparation is worth further discussion as it has already been identified as essential to wound healing. The method of debridement is regularly debated with the UK Consensus Document 2013 suggesting that it should be selected as “most effective for the patient and not limited by the skills of the clinician”. However, in clinical practice rapid and safe options are limited, with autolysis and mechanical debridement being the only options for generalist nurses.

This evaluation has demonstrated that there is a role for hydroconductive debridement within the current debridement options available, particularly for generalist nurses. Hydroconductive debridement differs from autolysis in that it absorbs rather than donates fluid, and from mechanical debridement in that it is selective by only removing devitalised tissue.
In comparison to other methods of removing devitalised tissue, hydroconductive debridement as delivered when using Drawtex, has the added benefits of absorbing excess exudate and sequestering harmful pathogens from the wound surface.

This evaluation has also highlighted that the cost of treatment when using Drawtex resulted in a reduction in expenditure on wound care products. Even so, it is acknowledged that further investigation and examination is necessary through a structured health economic analysis to support this data.

Conclusion

This ten patient evaluation has shown that Drawtex hydroconductive debridement dressing was effective at simultaneously removing all of the barriers to wound healing as described within the wound bed preparation framework. Drawtex was reported to be quick and easy to use, safe, effective, and resulted in positive patient outcomes. The speed in which the condition of wound bed improved was encouraging, and the associated simple cost comparisons indicate that the use of Drawtex may provide the trust with cost savings when deciding which debridement regime to choose in the future.

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