Using an innovative dressing to balance wound moisture

Joy Tickle

Exudate management in chronic wounds and hard-to-heal wounds is a vital process and community nurses need to be aware of the best practice evidence as well as correct product choice. This is particularly important when attempting to provide the optimum moist healing environment and achieve a balance of moisture in the wound bed. Another important element in chronic wounds is the promotion of autolytic debridement, which helps to ensure that healing is not complicated by any devitalised tissue, which can harbour bacteria and impede new tissue growth. This article investigates best practice in the treatment of chronic wounds, with a focus on the management of moisture in the wound bed. The author also looks at one dressing in particular, Cutimed HydroControl® (BSN medical, an SCA company), which uses an osmotic effect and a high moisture vapour transmission rate (MVTR) to ensure that excessive wound exudate is drawn away from the wound bed, while also ensuring that fresh exudate is produced to promote autolytic debridement and maintain moisture levels in dry wounds. Cutimed HydroControl is able to avoid inappropriate dressing use by facilitating the needs of both exuding and dry wounds, thereby ensuring an optimum moist wound environment.

KEYWORDS:
- Wounds
- Exudate
- Autolytic debridement
- Dressing choice
- Moisture balance

Wounds generally follow a predictable healing trajectory that has three main stages: inflammation, proliferation and maturation. Chronic wounds are wounds that fail to heal after 4–6 weeks despite appropriate treatment (White et al, 2015), becoming stuck in the inflammatory stage and failing to progress to the next stage. This can be caused by many factors including the presence of comorbidities such as diabetes or heart failure, poor circulation and nutrition, age, and lifestyle choices such as cigarette smoking and drug misuse.

Slow wound healing can also be exacerbated by poor wound management and the failure to maintain an optimal wound healing environment.

In 2008, Posnett and Franks estimated that the NHS spent approximately £2.3–3.1 billion on chronic wounds. It has also been estimated that chronic wounds account for 66% of community nurses’ workloads (Bale, 2004). A more recent analysis of the cost of wound care in the NHS estimated that the annual cost of managing wounds, after adjustment for comorbidities, was between £4.5 billion and £5.1 billion (Guest et al, 2015).

Chronic wounds have a massive effect on the economy in general in terms of lost work days but, more importantly, also have a tremendous effect on the health-related quality of life of patients who can feel socially isolated, depressed and anxious because of associated problems such as malodour, pain, excessive exudate, reduced independence and the need for prolonged episodes of care (Price, 2009; Upton, 2014).

EXUDATE AND THE HEALING TRAJECTORY

Wound exudate is initially produced during the inflammation stage and is vital to the healing process. It leaks from the blood capillaries and contains essential nutrients that can help the body to heal after wounding, such as electrolytes and growth factors. It also contains matrix metalloproteinases (MMPs), which are protein-digesting enzymes which assist autolytic debridement by removing necrotic and sloughy tissue from the wound bed.

In an acute wound, exudate will nourish epithelial cells, repair damaged cells and stop the wound from drying out. The volume of exudate produced should gradually reduce when a wound follows the expected wound-healing journey, but in chronic wounds, the volume will often increase and actually delay wound healing.

Chronic wound exudate

Chronic wound exudate has a completely different make-up, as the inflammatory response becomes over-stimulated. The inflammatory mediators that keep protein-digesting enzymes in check in acute wounds are found in much higher numbers in chronic wound exudate. There

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are higher numbers of proteases and inflammatory mediators in chronic wounds and MMPs are activated, blocking the proliferation of keratinocytes and attacking the extracellular matrix and healthy periwound skin (White et al, 2015). Excessive exudate slows or prevents cell proliferation, and interferes with the availability of growth factors (Romanelli et al, 2010).

An excessive volume of exudate in chronic wounds can result in maceration of the surrounding skin, as healthy tissue is broken down by enzymes contained in the wound fluid. Here, chronic wound exudate effectively becomes a 'wounding agent', rather than a healing factor (Chen et al, 1992).

Moist wound healing
It is essential that an optimum moist wound environment is maintained. If a wound is too dry, it will be unable to progress and will take two to three times longer to heal (Swezey, 2014). Without a moist wound environment, the wound will not have the nutrients and growth factors needed to promote cell growth.

Necrotic tissue
Healing may also be complicated by the presence of necrotic tissue or slough, which interrupt granulation and can be a focus of infection, allowing bacteria to thrive (White and Cutting, 2008). It can also present an ideal environment for biofilms to form, which will need to be disrupted so that healing can continue (Davis et al, 2006). The presence of slough can also result in an increased volume of exudate.

WOUND MANAGEMENT

It is important to maintain a moist wound environment when managing chronic wounds, creating a balance between ‘wet’ and ‘dry’ and ensuring that the wound is free of the devitalised tissue that can hinder healing. Autolytic debridement, where the body’s own enzymes remove devitalised tissue, occurs if exudate is present in the optimal volume. Using wound care products that encourage this optimal environment is essential for successful healing.

Another crucial factor in healing is the moisture vapour transmission rate (MVTR), the rate at which moisture is drawn through a substance. The MVTR is a measure of the ability of a dressing to control water loss and maintain an optimal moist wound bed. Products need to be able to respond to the volume of exudate being produced, and draw away excess fluid while maintaining optimal moisture levels in the wound bed.

Hydroactive wound dressings are essential for the achievement of this optimum environment, including:

- Alginates
- Hydrocolloids

Foams
- Superabsorbent polymers
- Antimicrobials
- New hydropolymer gel dressings.

Dressings can promote autolytic debridement by donating or removing moisture from the wound and removing excess exudate. This process can be promoted by dressings that use hypertonic saline and/or honey, and semi-occlusive dressings containing hydrocolloids or hydrogels, which are able to hydrate a dry wound. Hydration response technology, e.g. Cutimed® Sorbion® Sachet S, negative pressure wound therapy (NPWT), and self-adaptive wound dressings can all be used to encourage the autolytic process (Reyzelman and Vartivarian, 2015).

When choosing a dressing, it is important to consider its ability to protect the periwound skin from damage caused by enzymes contained within wound fluid, as well as by substances such as sweat, faeces and urine, all of which can contain similar corrosive enzymes. For this to occur, any dressing needs to ‘lock away’ excess exudate from the outer layer of healthy skin.

CUTIMED® HYDROCONTROL
Cutimed® HydroControl (BSN medical, an SCA company) is a sterile, self-adhesive dressing that
combines a hydropolymer gel matrix with a semi-permeable polyurethane backing (Figure 1), which is designed to provide the optimum balance of moisture in the wound.

The dressing promotes healing by creating an optimal moisture balance. It donates moisture to the wound bed in wounds that are dry and not producing enough exudate, or when the action of the exudate is being blocked by the presence of slough or devitalised tissue. It also absorbs excess exudate, which can hinder healing and damage the surrounding skin. The combination of the dressing’s unique flexipores, polyurethane film and hydropolymer gel matrix provides an ideal environment to support healing (Table 1). These qualities mean that Cutimed HydroControl satisfies the needs of both exuding and dry wounds, contributing towards the optimum moist wound environment.

The dressing also promotes autolytic debridement, which prepares the wound bed for healing and which can be impeded by moisture imbalance. Debridement is vital for removing slough from wounds and the removal of chronic wound exudate allows for fresh fluid to assist the process of healing, as the wound bed can be nourished with the nutrients and growth factors needed to kick-start healing.

The dressing has an osmotic effect by drawing excessive moisture into the hydropolymer gel matrix and stimulating the production of new exudate that promotes autolytic debridement. The improved supply of nutrients, enzymes and growth factors allows for the optimal support of new tissue proliferation (Figure 2) (Tickle and von Hallern, 2016).

The dressing has apertures (flexipores) in its hydropolymer gel that increase the MVTR and provide additional space for the hydropolymer to swell and boost the dressing’s flexibility. This helps to manage fluid volume, as the gel matrix absorbs excessive exudate vertically, keeping it away from wound margins and preventing leakage onto the surrounding skin, stopping maceration and damage to the delicate periwound area (Tickle and von Hallern, 2016). In this way, the dressing helps to provide a wound healing environment that is neither too wet, nor too dry.

### **Conformable**

Cutimed HydroControl is very flexible and can conform to areas of the body that usually present a challenge when applying dressings. It adheres to body contours and joints and does not require secondary fixation. It is comfortable for patients and is suitable for those with allergies. The dressing is also easy to remove, with some case studies reporting a lack of pain on removal and does not leave any residue on the skin (Tickle and von Hallern, 2016). The low friction surface of the dressing’s polyurethane film also helps to protect vulnerable skin when patients are being moved.

The dressings can be cut to fit and can remain in situ for up to seven days, which means fewer dressing changes and less disruption to the wound bed. Unlike some hydrocolloids, the dressing will not break down in the wound bed, even when saturated with excess exudate (Tickle and von Hallern, 2016). The dressing also has a cooling effect that can be soothing to the patient and help to relieve pain.

Cutimed HydroControl is designed for dry-to-moderately exuding chronic wounds, such as leg ulcers, diabetic foot ulcers and diabetic foot ulcers.

### **Evidence**

One prospective, multicentre, non-interventional observational study looked at 30 cases of routine wound

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<tr>
<th>Table 1: How does Cutimed HydroControl work?</th>
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<td><strong>Hydropolymer gel matrix</strong></td>
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<td>- Keeps wounds sufficiently hydrated as moisture is donated to a dry wound bed</td>
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<td>- Maintains an optimal moist wound environment by absorbing excess exudate</td>
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<td>- Allows vertical fluid absorption, keeps exudate away from wound margins and prevents leakage onto the periwound area, thus protecting against maceration</td>
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<td>- Stimulates and supports autolytic debridement (by donating fluid and exerting an osmotic effect on the wound bed), resulting in a prepared wound bed and removal of barriers to healing</td>
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<th>The polyurethane top film and flexipores</th>
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<td>- Provide a high MVTR and thereby support optimal fluid handling</td>
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<td>- Are highly flexible and breathable, but impermeable to water and bacteria</td>
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**Figure 2.**

Cutimed® HydroControl promotes wound stimulation.

1. **Absorption of exudate**
   - Exudate from the wound bed is absorbed into the hydropolymer gel matrix

2. **Movement of fluid into the wound**
   - Fluid moves from the interstitial tissue into the wound due to the osmotic effect

3. **Autolytic debridement**

4. **Tissue proliferation**
   - Due to the osmotic effect supporting autolytic debridement, the wound bed is prepared for wound healing. Improved supply of nutrients, enzymes and growth factors allows for the optimal support of new tissue formation
HydroControl dressing for nine days, followed by four days with a silicone foam. The wound improved during the first nine days (day 1, Figure A; day 9, Figure B) and continued producing granulation tissue even after the dressing was changed (Figure C).

This 74-year-old male patient presented with an arterial ulcer on his right forefoot. He had a medical history of peripheral artery occlusive disease and renal insufficiency and the wound had been present for 10 months. He was treated with the Cutimed HydroControl dressing over a six-month period in dry-to-moderately exuding wounds (Hallern and Struensee, 2016).

Each case was followed for up to 14 days, after which clinicians were asked to rate the dressing against the following parameters:
- Course of wound healing
- Absorption of exudate
- Dressing handling during application and removal
- Gentle adherence to periwound areas without trauma
- Pain at dressing change

In all cases product handling was rated as ‘good’ (77%) and ‘very good’ (83%) during the initial application and the wound handling was considered sufficient in 97% of cases. The majority of the clinicians (93%) said that exudate was absorbed vertically into the hydrogel matrix and securely retained. Patient satisfaction was rated as very high by 90% of the patients and the dressing’s comfort and conformability were commented on, as was the fact that most (87%) dressing changes were described as pain-free (the remainder were described as ‘tolerable’).

In 70% of cases, the clinicians said that Cutimed HydroControl had accelerated the wound healing process and case reports from the study suggested that the dressing can be used effectively over longer time intervals, adapting well to all parts of the body, while preventing maceration.

**Implications for practice**

As Cutimed HydroControl can be left in situ for up to seven days without causing damage to the periwound skin, it is an excellent tool for nurses, cutting down on the number of dressing visits required.

It can also accelerate wound healing by creating an optimal moist wound-healing environment in the wound bed. It encourages autolytic debridement by using its osmotic effect to draw excess exudate vertically into the hydrogel where it is retained, stimulating the production of fresh exudate that can debride slough and devitalised tissue, which can otherwise slow healing.

The dressing is comfortable and can control excessive exudate, which can help to improve quality of life while a patient is undergoing treatment. As there is often a reduction in the number of dressing changes required, the fragile periwound skin is at less risk of accidental damage from skin stripping. Cutimed HydroControl has also been found to promote pain-free removal, so that dressing changes are not uncomfortable for patients (Tickle and von Hallern, 2016). Its dynamic effect on the healing process can also reduce the duration of the wound and cut down on prolonged episodes of care.

**CONCLUSION**

It is crucial to pay attention to exudate management when treating people with hard-to-heal wounds. It is also important to encourage autolytic debridement so that healing is not complicated by the presence of devitalised tissue.

Cutimed HydroControl uses an osmotic effect and high MVTR to ensure that excessive chronic wound exudate is drawn away from the wound bed, while also ensuring that fresh exudate is produced and can assist with autolytic debridement. It is an important tool for nurses, cutting down on the number of dressing visits required.

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CASE STUDY THREE

This 52-year-old male patient had been treated for squamous epithelium cell carcinoma on his lower jaw, and presented with a skin graft donor site which was not healing well and exhibited a partly open tendon. The wound had been present for two months. At initial presentation, the wound demonstrated granulation tissue and the open tendon was visible (Figure A). The wound was treated with Cutimed HydroControl for several dressing changes (Figure B), and after six days of treatment (Figure C) it showed an improvement in granulation tissue formation that continued until the final examination at 17 days (Figure D). At the end of the treatment period, the wound was fully granulated and the tendon was completely covered. Wound healing was rated by clinicians as ‘accelerated’.

comfortable and easy to use, even on awkward locations and can improve patients’ quality of life by stimulating healing in a stalled wound, requiring fewer dressing changes and protecting the periwound skin (Figure A). The wound was treated with

the UK. Available online: http://bmjopen. bmj.com (accessed 12 November, 2016)

Hallem BV, Struensee B (2016) Challenges posed by chronic and secondary healing wounds: Cutimed HydroControl with its new hydropolymer technology provides an innovative therapeutic approach. Medizin & Praxis March


REFERENCES


Guest J, Ayoub N, Mellwraith, et al (2015) Health economic burden that wounds impose on the National Health Service in


KEY POINTS

- Cutimed HydroControl is able to avoid inappropriate dressing use by facilitating the needs of both exuding and dry wounds and thereby ensuring an optimum moist wound environment.

- The combination of the dressing’s unique flexipores, polyurethane film and hydropolymer gel matrix provides an ideal environment to support healing.

- The dressing helps to provide a wound-healing environment that is neither too wet, nor too dry.

- The dressing can be cut to fit and can remain in situ for up to seven days, which means fewer dressing changes and less disruption to the wound bed.

- Exudate management in chronic and hard-to-heal wounds is a vital process and community nurses need to be aware of best practice evidence, as well as correct product choice.

- Another important element in chronic wounds is the promotion of autolytic debridement, which helps to ensure that healing is not complicated by any devitalised tissue.
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1. **Conforming to the wound bed**
   - Maintains an optimal moist wound healing environment.
   - Reduces the risk of exudate pooling and infection.

2. **Locking away exudate**
   - Absorbs exudate *vertically* to reduce the risk of maceration and excoriation.
   - Reduces risk of damage to the periwound skin.

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References:
2. Anderson, M., Marburger, M.

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