

# SAFE DEBRIDEMENT IN THE COMMUNITY SETTING

It is widely accepted that wound debridement is necessary for optimal wound healing (Haycocks and Chadwick, 2012). Debridement has become an accepted part of wound bed preparation with the ultimate aim of achieving a clean, healthy, granulating wound bed (Benbow, 2011a,b). This article examines the way in which debridement can be conducted safely in the community setting.

**H**aycocks and Chadwick (2012) define debridement as the removal of dead or necrotic tissue or foreign material from and around a wound to expose healthy tissue. This includes the hyperkeratotic skin that often surrounds venous leg ulcers and the callus found on the feet of diabetic patients with motor neuropathy.

Debridement removes potential obstacles to healing, including slough and necrotic tissue (Benbow, 2011a,b). Additional reasons for removing non-viable tissue from a wound include:

- ▶ Reducing the bacteria count in the wound bed (Best Practice Statement, 2011)
- ▶ Reducing wound malodour (Vowden and Vowden, 1999)
- ▶ Promoting advancement of epithelial cells and thus restoring the epidermis (European Wound Management Association [EWMA] 2004)
- ▶ Facilitating the absorption/action of topical preparations e.g. topical antimicrobial agents (Weir et al, 2007)
- ▶ Allowing a thorough wound assessment (Stephen-Haynes and Callaghan, 2012)

- ▶ Shortening the extended inflammatory phase of the healing process and thus preventing wound chronicity (Baharestani et al, 1999).

### *Identifying the wounds that need debridement/ debridement assessment*

Any assessment should be systematic and comprehensive. The patient's underlying medical conditions and current state of health should be determined. The presence of any localised or systemic infection should be diagnosed along with issues such as peripheral arterial disease, which would complicate and even preclude debridement wounds of the lower limb. The assessment may result in the correction or alleviation of the factors responsible for the necrotic wound (Benbow, 2011a,b).

In certain circumstances, the function of debridement is symptom control, for example, in individuals with malignant wounds in a palliative care setting. Wound healing is not usually the aim of wound management for people with malignant wounds and debridement of the non-viable tissue

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will help to remove any offensive odour emanating from the dead tissue. For individuals with malignant wounds, the debridement process may take place on consecutive occasions due to the skin failure that accompanies the progression of the disease process (Young, 2011).

### Tissue type

It is important that non-viable tissue is recognised and not confused with other tissue types, such as exposed tendon. Gray et al (2011) described six different manifestations of devitalised tissue likely to require debridement in a wound bed — wet slough, superficial wet slough, dry slough, wet necrosis, dry necrosis and haematoma. Hampton (2011) suggests that the slough may be either soft and easily removed or thick and tenacious. Necrotic eschar is where the tissue has dried out and has a thick, leathery, brown or black texture (Benbow, 2011a,b).

In certain circumstances, necrotic tissue should not be debrided, such as in gangrenous toes or necrotic pressure ulcers on the heel of patients with ischaemic limbs. Diabetic patients who have wet necrotic tissue (wet gangrene) require immediate debridement to prevent the rapid spread of infection (Haycocks and Chadwick, 2012).

### Amount of tissue to be debrided

A factor that will influence the choice of debridement method is the amount of non-viable tissue to be removed. If a large amount of non-viable tissue is present, serial debridement may be indicated. However, if the non-viable tissue is placing the individual at risk of a systemic infection, the consequences of not immediately debriding the tissue may be catastrophic and an urgent surgical referral is necessary (Young, 2011).

### Hyperkeratosis

Hyperkeratosis is the presence of dry scales found on the surrounding skin of patients with venous leg ulcers.

A common way of removing this is soaking the leg in a bucket of water containing an emollient, followed by the application of a variety of treatments, including paste bandages, hydrocolloid dressings and wiping with gauze. The time taken to complete this procedure can range from 10–30 minutes.

The disadvantages of these methods are the time taken to complete the procedure and the potential for cross infection and trauma. There is no standard practice for dealing with hyperkeratosis and the current methods are not ideal, therefore, there is the potential to develop a more patient and nurse-friendly method of de-scaling the legs (Young, 2011).

Clinicians cannot assess a wound properly until they have removed all necrotic devitalised tissue (Haycocks and Chadwick, 2012). This is extremely important in tissue viability when trying to accurately establish the stage/category of pressure ulcers (Stephen-Haynes and Callaghan, 2012).

### Method

A clear understanding of the need for debridement and available options is necessary for the clinician to be able to make the appropriate choice of debridement technique.

Unlike acute wounds, which usually only require debridement once if at all, chronic wounds may require repeated maintenance debridement (EWMA, 2004).

Therefore, the choice of debridement technique is a risk assessment process that takes into account the following factors:

- ▶▶ Safety
- ▶▶ Patient choice
- ▶▶ The amount of devitalised tissue to be removed
- ▶▶ The environment in which the debridement will be undertaken
- ▶▶ The availability of debriding equipment

- ▶▶ The time/speed that is required to remove the devitalised tissue
- ▶▶ The pain caused during the debridement process
- ▶▶ The skill and knowledge of the person undertaking the debridement (Young, 2011).

The practitioner, in conjunction with the patient, should set short- and long-term objectives for the debridement process. The setting of debridement objectives should lead to the development of a debridement treatment plan (Gray et al, 2011).

### Frequently-used methods of debridement in the community setting

#### Autolysis

Autolytic debridement will occur naturally if a passive stance is taken as an individual's immune system will phagocytose the non-viable tissue (Ayello et al, 2004). Phagocytic cells, such as macrophages and the destructive (proteolytic) enzymes in the wound bed, liquefy and separate necrotic tissue from the wound bed. Evidence of the separation is usually seen at the wound edges (*Figure 1*) (Haycocks and Chadwick, 2012).



**Figure 1. Necrotic heel separating at the edges.**

This debris is then cleared either by the dressing or by macrophages and neutrophils (Hampton, 2011).

Wound dressings, such as hydrogels and hydrocolloids facilitate the autolytic process by providing a moist environment at the wound bed and externally softening the issue. Wet sloughy wounds do not require additional moisture and alginate and Hydrofiber® (ConvaTec) dressings are examples of dressings that are more suited to aid autolysis in this situation.

The main advantage of autolytic debridement is that it is generally painless, however, the major disadvantage is the length of time needed to achieve the desired result, the increased exudate levels as the wound debrides and, if not protected, the maceration that can occur in the periwound skin (Benbow, 2011a,b). It is important that practitioners undertake autolytic debridement to achieve the optimal outcome for the patient within an acceptable timeframe. However, it can be argued that this method is commonly chosen because of its simplicity, rather than to meet the needs of patients. When choosing autolytic debridement, the practitioner may be confusing activity (autolytic debridement) with achievement (removing the non-viable tissue).

It is important that clinicians question whether autolytic debridement will result in the removal of the non-viable tissue in the most efficient and timely manner (Young, 2011). Also, the perceived safety of this method must be balanced with the risk to the patient of not removing the non-viable tissue quickly enough, which could lead to infection and an extended period of malodour and exudate as the non-viable tissue slowly debrides.

### *Sharp debridement*

Conservative sharp debridement (CSD) is the removal of non-viable

tissue using a scalpel or scissors, but without a general anaesthetic. For this reason, unlike surgical debridement, the practitioner only removes non-viable material and halts the procedure before living tissue is reached. CSD is often used by specialist podiatrists when debriding non-viable tissue in the diabetic foot (Young, 2011).

It is imperative that clinicians who perform CSD have the knowledge and skills to do so safely and effectively. These include a sound knowledge of the anatomy of the area being debrided to prevent damage to local tendons, arteries, veins or nerves (Haycocks and Chadwick, 2012). For many clinicians, this is difficult to achieve with few post-registration courses on debridement available (an example is the MSc module in debridement available at Bradford University). Once competence is achieved, the clinician may have difficulty maintaining the skills if CSD is not regularly undertaken.

Clinicians need to have confidence in their ability to deal with any complications, such as, uncontrolled bleeding in the absence of surgical and anaesthetic support in the community setting (Haycocks and Chadwick, 2012). A subgroup of the North West Clinical Effectiveness Group developed an information leaflet identifying the risks and benefits of sharp debridement so that written informed consent can be obtained (Haycocks and Chadwick, 2008).

Sharp debridement is not recommended in the following situations:

- ▶▶ Debridement of the hand or face, foot (excluding heel region)
- ▶▶ Debridement in patients with unstable clotting mechanisms
- ▶▶ In the presence of localised wound infection
- ▶▶ In malignant wounds due to the propensity of the tissue to bleed
- ▶▶ In areas that involve or are

near vascular structures, grafts, prosthesis, dialysis fistula or joints (Fairbairn et al, 2002).

Therefore, in the community setting, alternative debridement methods are viewed as a safer option.

### *Chemical debridement*

Chemicals that debride devitalised tissue include topical antimicrobials and honey, which can also be used for this purpose (Thomas, 2010).

Honey is available on prescription in a variety of formats, e.g. combined with calcium alginate or in a gel format. It is important to realise that the type and amount of honey varies between dressing products. In the presence of wound exudate, the honey dilutes and as a consequence the enzyme glucose oxidase is activated and hydrogen peroxide is produced. The hydrogen peroxide component was thought to work alongside the natural osmotic pull of the honey to debride non-viable tissue.

However, there is thought to be an additional non-peroxide debriding element to honey (Thomas, 2010). Honey may appeal to patients due their perception of the product as a natural remedy. Following a review of the literature, Gethin (2008) recommends honey as an effective de-sloughing agent for chronic wounds.

This is in opposition to a Cochrane Review, which stated that there was insufficient evidence to guide the use of honey in wounds other than superficial and partial thickness burns (Jull et al, 2008).

Antimicrobial dressings are chosen for their ability to debride and lower the bacterial load in the wound bed. The antiseptic agents that are incorporated into antimicrobial wound dressings include polyhexamethyl-biguanide (PHMB), chlorhexadine, povidone and cadexomer iodine, honey, silver sulfadiazine, ionic silver and

nanocrystalline silver (Wound Care Handbook, 2011).

The practitioner will have to ascertain if the chosen antimicrobial debriding dressing will also be able to manage other wound problems, e.g. hydrate the wound bed, absorb exudate, remove wound odour (Vowden et al, 2011). Long-term use of antimicrobial dressings is not usually recommended and they should be discontinued once the wound infection has been successfully treated (Best Practice Statement, 2011).

### *Larval debridement therapy*

Maggots from the *Lucilia sericata* green bottle fly are used as debriding agents, although Paul et al (2009) report on the Malaysian experience of larval therapy using *Lucilia cuprina*. The larvae produce secretions containing collagenases that break down the non-viable tissue into a semi liquid form that the maggots subsequently ingest along with bacteria present in the wound bed (Thomas, 2010). The maggots come in a free-range format or are contained within a dressing or bags (i.e. BioBag; BioMonde®).

The opportunity for clinicians to use maggots in the community has increased since their addition to the Drug Tariff. The practitioner may previously have had concerns about sending a patient home with maggots *in situ*, however, the BioBags ensure the maggots remain contained, making the application and removal an easier process. The maggots are quick-acting and stay in place for 3–5 days (Mennon, 2012). There is plenty of evidence that larvae are an effective debriding agent (Ahmad et al, 2012, Gilead et al, 2012).

A review of the evidence also suggests that larval debridement therapy should be used in practice for the treatment of infected chronic wounds (Blueman and Bousfield, 2012). However, a recent study reported pain as a major issue for patients receiving larval

therapy. This may have been influenced by informing the patients that the therapy may be painful, as well as a lack of systematic assessment of pain levels (Mumcuoglu et al, 2012).

Larval debridement is not suitable for all patients, especially those with dry necrotic tissue, highly exuding wounds, patients with clotting issues and wounds requiring occlusion. Larvae are temporarily incompatible with hydrogel dressings containing polyethylene glycol.

### *A new debridement therapy for the community setting — Debrisoft®*

Debrisoft (Activa Healthcare) is a new method of mechanical debridement for superficial wounds that removes debris, necrotic material, slough and exudate (Haycocks and Chadwick, 2012). The advantage of this method is that it is extremely simple and easy to use causing little or no pain (Collarte et al, 2011; Johnson, 2011; Flinton, 2011; Hampton, 2011; Prouvost, 2012).

Debrisoft consists of soft, polyester fibres, which are secured and knitted together into a pad. The fibres are cut at a special angle, length and thickness to ensure flexibility (*see patient information here: <http://www.activahealthcare.co.uk/debrisoft>*).

Debrisoft has a wound contact side that is fleecy in appearance and, once wetted, is gently wiped over the surface of the wound. In the case of thick tenacious slough and hard necrosis, it is recommended that the tissue is softened prior to using the pad (Benbow, 2011a,b). The debridement process is also quick (ranges from 2–12 minutes) (Bahr et al, 2011; Shepherd, 2011; Johnson, 2011; Whitaker, 2011; Fumarola, 2012; Prouvost, 2012).

Debrisoft has been described in case studies as effective in debriding a variety of wound types including venous leg ulcers, diabetic foot ulcers (neuropathic and neuro-ischaemic),

arterial ulcers, mixed aetiology ulcers, pressure ulcers and traumatic wounds (Haemmerle et al, 2011; Johnson, 2011; Sharpe and Concannon, 2011; Green, 2011; Fumarola, 2012; Alblas and Klicks, 2012).

A number of smaller prospective pilot, non-comparative studies and case series indicate good debridement results after single use on a variety of tissue types, such as slough and necrosis (Hamemmerle et al, 2010).

The removal of hyperkeratosis as discussed earlier can be a long and protracted process, however, Debrisoft has been shown to be a speedy and effective method of removing hyperkeratotic scales (Collarte et al, 2011; Van den Wijngaard and Andriessen, 2012).

A larger study of 60 patients with chronic wounds, of which 57 were included in the analysis, found that the monofilament fibre pad was effective in 93.4% (142/152) of debridement episodes (Bahr et al, 2011).

An advantage of mechanical debridement is that it can remove the non-viable tissue quickly. A debridement technique that removes non-viable tissue rapidly is an attractive option to the patient and the practitioner. It is reassuring to know that a product is available on prescription in the UK that allows clinicians to simply wipe the wound bed and immediately remove the devitalised tissue without causing pain and trauma (Bahr et al, 2011).

### *Patient choice and involvement*

It is important to involve the patient in any decision regarding debridement of his or her wound. Informed consent requires qualified professionals to discuss the nature, indications, benefits and risks of debridement with patients. This conversation should include a discussion



**Figure 2. Case study 1 — hyperkeratosis.**



**Figure 3. Five minutes after using Debrisoft.**

of various debridement options and potential outcomes for debridement techniques, e.g. reduction in risk of wound infection and the possibility of the wound becoming larger in size (Haycocks and Chadwick, 2012).

All too often, the choice of debridement technique is made by the practitioner and is limited by their past experience, skill-set and availability. Rarely is the patient an active participant in the debridement process, however, with the new debridement option — Debrisoft — the patient and/or carer is able to undertake the debridement process themselves, allowing for full participation in the procedure. However, this will not be feasible for all patients, but offers an exciting development in self-care (a video showing Debrisoft in action can be accessed at <http://www.activahealthcare.co.uk/products>).

### Case Studies

#### Case study 1 (courtesy of Collarte A, Loty L, Alberto A, et al, 2011)

This woman suffered from very thick hyperkeratosis and also had a small ulcer (Figure 2). She applied her own emollients on a daily basis, but did not

wash them off thoroughly enough. As a result, there was a build-up of skin and emollients and when she removed her compression hosiery at night she experienced severe itching.

Because the hyperkeratosis was so thick, the emollients were not getting through. Following consent,

Debrisoft was used to try and remove the hyperkeratosis and this was very successful (Figure 3), causing no pain or discomfort (according to a visual analogue pain assessment — score 0) while the skin and wounds were being cleansed.

#### Case study 2 (courtesy of Rosie Callaghan)

Mrs M is a 72-year-old woman with a history of heart and renal failure. She has also suffered for some years with swollen oedematous legs that ‘weep’ on occasions. She is mobile with the aid of a Zimmer frame and at the time of writing was on warfarin following a deep vein thrombosis some months previously.

The injury featured here was caused when Mrs M banged her shin on the Zimmer frame, resulting in a haematoma that ran almost the full length of her shin (Figure 4).

One option was to transfer Mrs M to A&E to have the wound debrided. However, this would have been costly and traumatic, with increased risk of infection. Also, to use conventional debriding methods involves



**Figure 4. Case study 2 — Haematoma caused by trauma.**



**Figure 5. The wound during debridement with Debrisoft.**



**Figure 6. The wound following debridement with Debrisoft.**

significant cost and time.

Instead the team used Debrisoft to debride the haematoma, which took under 10 minutes. The pad was easy to use, caused no pain to the patient and successfully lifted the haematoma (Figures 5 and 6).

Before commencing the procedure, the team checked Mrs M's warfarin levels and there was no further bleeding during the debridement procedure.

### Conclusion

Debridement has become part of the recognised wound care routine. However, autolytic debridement has become routine practice and this requires revisiting as it may not always be the best option for the

patient. Patients should have access to the most appropriate method of debridement at the time they require removal of devitalised tissue from their wound.

The previous hierarchy of debridement, which placed surgical debridement at the top of the 'pecking order', is now under question and the speed of debridement in the community setting is becoming a priority to prevent patients having extended periods with non-viable tissue in their wound, which ultimately delays healing and puts them at an increased risk of developing a wound infection.

However, for certain clients autolytic debridement might suit their individual needs following an open discussion and exploration of potential methods.

There is the need for practitioners to revisit their skill-set to ensure they are equipped to offer patients the appropriate debridement method for their needs.

Periwound skin and wound bed preparation are essential components of wound management. These need to be undertaken as soon as possible by the assessing health clinician, without the delay of referral to a specialist team.

The new debridement system highlighted in this article can be applied to many sloughy and necrotic wounds and hyperkeratotic skin. This makes it ideal for use in the non-specialist area and it has been shown to be fast, safe and effective at wound and periwound skin debridement. **WE**

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