Wound debridement is a key component of wound bed preparation (Wilcox et al, 2013). It involves the removal of damaged and dead tissue, debris and bacteria from the wound bed (Brown, 2013), which reduces the risk of infection and encourages wound healing by allowing healthy granulation tissue to form.

In acute wounds, autolytic debridement occurs automatically and often does not require intervention (Atkin, 2014), as during the inflammatory stage of wound healing, neutrophils and macrophages digest and remove non-viable tissue, cell debris and any cellular barriers to wound healing. However, in chronic wounds, this process can become overwhelmed and inefficient (Broadus, 2013). Wound debridement is thus an essential part of chronic wound management, as it assists the conversion of the molecular and cellular environment to resemble that of an acute wound and encourages wounds to progress to healing (Ousey et al, 2016).

When to debride

Before debriding, comprehensive holistic wound assessment and diagnosis is essential to ensure that it is suitable (Vowden and Vowden, 2011). There will be situations where a patient’s comorbidities or underlying arterial status may mean that debridement is contraindicated. For example, necrotic tissue in lower limb wounds in cases of dry gangrene and arterial insufficiency should, where safe to do so, be left to auto debride. Once a decision to debride a wound has been made, there are multiple methods to choose from, such as:
- Autolytic
- Biosurgical
- Enzymatic
- Hydrosurgery
- Mechanical/physical
- Sharp/surgical.

Method chosen will be dependent on many factors, such as:
- Clinician skill
- Location of wound
- Treatment environment
- Equipment available
- Patient choice.

Mechanical debridement involves using an external force to separate necrotic tissue from the wound bed. Historically, this was carried out with wet dressings, such as gauze, which were left to dry and then regularly changed. This mechanically removed devitalised tissues but could also strip healthy tissue away. This method is no longer common practice in the UK (Davies, 2004), and newer products have been developed to assist with mechanical debridement.

For example, mechanical debridement can be carried out with a pre-moistened debridement cloth (UCS™, medi UK). This has been found to be fast, simple and effective and requires no specialist training (Hughes, 2015). The UCS pre-moistened debridement and cleansing cloth allows for atraumatic cleansing and debridement of a wound and the surrounding skin without the use of extra water, surfactants or equipment (Downe, 2014). Debridement in this form is so simple that it can also be undertaken by patients themselves, thereby enabling and promoting self-care.

UCS™ premoistened debridement cloths

The cloth works by gently lifting and removing barriers to healing, such as slough, debris and biofilm, which are trapped in the cloth’s specially woven fabric. Ongoing, regular debridement is vital to maintain a healthy wound bed in most chronic wounds (Wolcott et al, 2009).
fibre, enabling the wound bed to prepare for healing (Downe, 2014). The physical act of using the cloth on a wound, along with the active ingredients in the UCS cloths, provide an optimum debridement solution.

The UCS cloth is premoistened with active ingredients containing a surfactant, a mild keratolytic and aloe vera. UCS is a class IIb medical device, and is therefore safe for use in deep wounds where there may be exposed bone. Surfactants are cleansers that penetrate the surface of a wound, providing deep and effective cleansing in just a few minutes.

Percival and Suleman (2015) proposed that best practice for slough removal should include the use of surfactants to disrupt the outer membrane of sloughy tissue. The surfactants used in UCS are gentle, non-allergenic cleansers, which are non-cytotoxic and so cause no harm to healthy tissue or cells. The mild keratolytic helps to soften any hardened skin or dry necrotic tissue and eschar, allowing it to lift away and shed (Gillies, 2016). The addition of the solution to the mechanical debridement aspect of the cloth is key in its efficacy (Percival et al, 2017).

WOUND ASSESSMENT

While assessment is important in the decision to debride, there are also occasions where debridement is needed to be able to fully assess a wound. Weir et al (2007) identified that devitalised tissue needs to be removed to enable visibility of the wound bed. Since Guest et al’s (2015) seminal health economics study and NHS England including ‘improving the assessment of wounds’ as a key goal of the Commissioning for Quality and Innovation (CQUIN) framework scheme for 2017–2019 (NHS England, 2016), wound assessment has been at the top of wound care priorities.

Indeed, accurate assessment is key to ensure correct diagnosis and development of the optimal treatment plan (Chamanga, 2016). The preliminary step in the assessment process should be to ensure that the wound and any surrounding skin are clean to enable a true picture of the wound to be obtained (Downe, 2014). This not only enables clinicians to assess the size, depth, and location of the wound accurately, but also to identify the tissue types present, which will help in monitoring wound progress and choosing appropriate dressings (Downe, 2014).

WOUND BED PREPARATION

When managing chronic wounds, a structured approach to wound bed preparation, such as the TIME acronym (tissue, infection/inflammation, moisture/moisture imbalance, and wound edges) is recommended (Schultz et al, 2003). Debridement plays a key role in all areas of the TIME framework (European Wound Management Association [EWMA], 2013), i.e:

- Tissue: debridement of non-viable or wound debris from the wound
- Infection/inflammation: debridement reduces the bacterial burden within a wound and controls ongoing inflammation (Ousey et al, 2016)
- Moisture imbalance: debridement can assist in wound exudate management by decreasing excess moisture (EWMA, 2013)
- Edge of wound: debridement can assist in removing senescent cells and encouraging advancement of wound edges (Cornell et al, 2010).

To achieve an acceptable rate of healing, wounds must be properly cleansed and debrided (Milne, 2015).

However, it can be difficult to cleanse wounds where pain is an issue. The ability to allow the solution in the UCS cloth to soften non-viable tissue, which can then gently be removed, is helpful in situations where patients decline cleansing due to pain (Khatun, 2016). The cloths also allow patients to control the level of pressure applied to the wound, thereby reducing anticipatory pain expectations (Khatun, 2016).

Case report one

This 83-year-old gentlemen who presented with a venous leg ulcer to the left medial malleolus (Figure 1) had a history of venous insufficiency/varicose eczema and a recent history of infection and cellulitis. He had been treated with antibiotics, which had controlled exudate volume and odour, but his wound remained necrotic with evidence of biofilm and dry, non-viable skin to the periwound area.

It was decided to use UCS debridement cloth first to soften the eschar and dry skin, and then to debride the biofilm and necrotic tissue, as well as exfoliating the periwound skin. After just one session, improvement could be seen in both the condition of the wound bed and periwound skin (Figure 2). Metal forceps and debridement scissors were also used to trim areas of attached skin, to prevent bleeding or further ulceration.

The patient’s pain level was not an issue, but he did also have a degree of neuropathy to his left lower leg. The patient was happy
weeks of conservative treatment with autolytic debridement at the general practice there was no improvement in the condition of the wound and so, after discussion with the GP, Mr A was referred to the local plastics unit for surgical debridement and to the community tissue viability service. Mr A continued to receive a further six weeks of conventional treatment of twice weekly dressing changes with hydrogel to encourage autolytic debridement, but again with little progress. He was also prescribed oral antibiotics by his GP, as the GPN identified signs of wound infection.

At presentation to the tissue viability clinic after 10 weeks’ treatment, Mr A’s wound was covered with necrotic, leathery eschar (Figure 3). As no staff were trained to remove the eschar with sharp debridement, UCS premoistened debridement cloths were used to mechanically debride the wound twice weekly. After just one week, the eschar had lifted leaving islands of granulation tissue in a sloughy wound bed (Figures 4 and 5).

Mr A’s vascular assessment showed no signs of arterial insufficiency so compression therapy was started. As he was active and wanted to continue to enjoy playing in his bowls team, he was anxious and concerned about compression bandages restricting his activity. He had little oedema in his lower limb and so was fitted with a juxtalite® compression wrap device (medi UK). This also allowed him to manage his personal hygiene needs and skin care during treatment. After two further weeks and four clinic visits, the condition of the wound bed had greatly improved — wound edges had advanced and a reduction in wound size could be seen. After three weeks of treatment at the tissue viability clinic, he was discharged back to the GPN with a self-care regimen, involving skin care and compression therapy with juxtalite, as surgical referral was no longer required.

BIOFILM MANAGEMENT

A biofilm is a complex microbial community, consisting of bacteria embedded in a protective matrix of sugars and proteins commonly found in chronic wounds (Keast et al, 2014). Recent literature has demonstrated increasing awareness of their presence in the majority of non-healing wounds (Malone et al, 2017), and the role that biofilms play in delayed wound healing (Metcalf et al, 2014; Schultz, 2015).

Biofilms provide a protective environment for microorganisms embedded within them, improving their tolerance to the host’s immune system, topical antimicrobial agents and environmental stresses, which is why they can stall wound healing. It is important to physically remove
biofilms by mechanical debridement and the use of surfactants (Phillips et al, 2010).

Surfactants are particularly useful in biofilm management, as they lower the surface tension in a wound. Their action facilitates the separation of loose, non-viable material on the wound surface and has the potential both to prevent and manage biofilms (Leaper et al, 2012). An expert panel recommended the use of maintenance-debridement for removal of tissue in the wound bed when it is colonised with excessive bacterial burden (Falanga et al, 2008). This panel highlighted the importance of frequent, ongoing mechanical debridement to help maintain the wound in a healing mode. Maintenance-debridement is also suggested for use in static and stagnant wounds where wound edge advancement is not evident, even if the wound bed appears clinically ‘healthy’ (Falanga et al, 2008).

Case report three
This 72-year-old gentleman presented with a non-healing diabetic foot wound of four months’ duration. The patient had undergone a transmetatarsal amputation. The wound had a history of recurrent infections and deterioration. The patient had been managed with various desloughing and antimicrobial dressings, but with little improvement. Due to the lack of wound edge advancement, appearance of granulation tissue and recurrent infections, the nurse suspected a biofilm to be present. The plan of care was thus re-evaluated.

Physical debridement with UCS was added to the current care plan at every dressing change, no other changes were made, i.e. the frequency and other products used remained the same. A care plan was developed for the wound to be debrided with a premoistened debridement cloth three times per week (Young, 2016), together with an autolytic debridement dressing regimen.

Figure 6 shows the wound at initial assessment in June 2016. At this stage it measured 9x4cm, with the greatest depth being 4cm. The wound bed consisted of 50% well-adhered slough. The wound was reviewed in August 2016 and at this time measured 6.5x2cm, with a greatest depth of 1.5cm. The wound bed consisted of 100% granulation tissue.

After six weeks of starting the new care plan, a 28% reduction in wound width, a 50% reduction in wound length, and a 63% decrease in wound depth was seen. These results demonstrate significant wound healing in a wound which had been non-healing for the previous four months. Exudate volume had also reduced to the point that a superabsorbent dressing was no longer required.

As said, the patient also had a history of persistent wound infection for three months, which had been treated with oral antibiotics. However, when reviewed in August, the infection had resolved. Figure 7 shows the wound four months later, well on its way to wound closure.

PERIWOUND MANAGEMENT AND SKIN CARE

While wound bed preparation is key to systematic wound care, the SIGN (2010) leg ulcer guidelines highlight the importance of assessment and management of the peri-lesional area and surrounding skin. If these areas are neglected, this not only impedes wound healing but also increases the incidence of related problems, such as further ulceration, episodes of cellulitis, or recurrent fungal infections. Patients with lower limb disorders, such as chronic oedema or chronic venous insufficiency, often have skin changes that need to be considered when planning care. Lipodermatosclerosis, hyperkeratosis or varicose eczema are all commonly seen in lower limb conditions, and can be challenging for healthcare professionals to manage, as treatment is centred on good skin care with daily application of emollients and topical corticosteroids in conjunction with compression therapy (SIGN, 2010).

Although self-care is encouraged and promoted in skin care management (All Wales Tissue Viability Nurse Forum [AWTVNF], 2014), daily emollient therapy can be problematic if the limb is in conventional compression therapy bandages. Newer options for self-care with compression wraps have provided a solution to patients who require consistent, effective compression and easy access to the limb for topical skin care regimens.

Hyperkeratosis is often associated with lower limb management and is
caused by an over proliferation of the keratin-producing cells of the skin leading to a thickening of the outer layer (International Lymphoedema Framework [ILF], 2006). Removal of hyperkeratotic scales is important to decrease the risk of skin breakdown and potential infection (Wounds International, 2012). Using sharp implements to remove thickened scales is not recommended due to the risk of bleeding and infection, but rather safe and atraumatic removal is suggested after the hard scales have been softened. This can be completed with forceps or a gloved finger, but this can be a time-consuming process (Whitaker, 2012). UCS debridement cloths can offer a solution, as the mild keratolytic in the solution softens scales and the suggested polishing motion (see manufacturer’s instructions), used in conjunction with fibres in the cloth, lift away the thickened scales of skin associated with hyperkeratosis safely and effectively.

**Case report 4**
This case involved a 63-year-old gentleman who had had bilateral lymphoedema to his legs for the past three years. He also had severe osteoarthritis to both knees and was obese, with a body mass index (BMI) above 50. His mobility was reduced due to the lymphoedema, which affected his activities of daily living as he was unable to walk any distance or climb stairs, and needed walking aids to help his mobility. He was also unable to drive his car or leave the house without a family member.

The skin below the knee on both his legs was severely hyperkeratotic (Figures 8–10). The hyperkeratosis had been present for over two years. Due to his sensitivity to a wide range of emollients, he was only able to wash using warm water and baby oil.

When assessed by a specialist nurse, it was decided to use UCS cloths to cleanse/debride the skin. Within a few weeks of using this treatment, both legs showed considerable improvement, as nearly all the hyperkeratosis had been removed (Figures 11–14). This reduced the risk of infection and provided optimal skin care.
After patch testing a variety of different creams, it was found that Dermol® lotion was suitable and this was used two to three times a week to help hydrate and improve the condition of the skin and reduce the risk of infections in the future.

CONCLUSION

Debridement is a key aspect of wound management. The use of UCS premoistened debridement cloths has been found to remove necrotic tissue, biofilm, slough and hyperkeratosis with minimal trauma and pain, while also cleansing and hydrating the periwound skin (Downe, 2014). Its skin-friendly surfactant and allantoin also soften hard, dry skin and help to cleanse the wound deeply. UCS thus facilitates improved wound care outcomes, while also enabling quick and accurate wound assessment, and speeds up the debridement process which, in turn, helps to free up clinician time (Downe, 2014).

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