Effective Management of Wound Infection and Quality of Life

with Suprasorb® X+PHMB

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Infection is a significant problem for people with wounds, as it can delay healing, result in unpleasant symptoms such as exudate and pain, increase length of treatment, and result in hospital admissions with prolonged stays, raising the costs of care. It can be responsible for turning acute wounds into chronic ones, and, unchecked, has serious consequences such as osteomyelitis, amputation, sepsis, multiple organ failure and death.

From a clinical point of view, difficulties often arise with recognising when chronic wounds are displaying signs of an increased bioburden that may lead to infection (Gray et al, 2006). Therefore, it is important that the clinician can recognise the signs and symptoms in a wound that precede wound infection and understand how to intervene to prevent infection from occurring. Clinicians must also be aware of the actions to take once wound infection is diagnosed.

Knowledge of the treatment options for patients at high risk of, or with actual wound infection is also required, as there are numerous antimicrobial products currently available on the market. The selection of an appropriate dressing is necessary to reduce bioburden and to alleviate local wound symptoms, so that the patient does not suffer unnecessarily from pain and excess exudate that can impact upon quality of life and psychological health.

Knowing when to stop and start treatment with antimicrobial products is crucial for correct use and cost control. Inappropriate use is currently leading to problems with availability in some trusts; antimicrobial products, in particular silver, are being used indiscriminately and for prolonged periods of time, resulting in a high expenditure on these dressing types. As a result of the increased spend, restrictions are put on their availability.

This document aims to provide guidance on understanding the signs and symptoms of infection, how and when to initiate and stop antimicrobial therapy, so that dressings are used appropriately. It will also introduce Suprasorb® X+PHMB (Activa Healthcare), an antimicrobial product that has a good clinical efficacy and safety profile (Moore and Gray, 2007) and which has been used successfully to reduce bioburden and pain in patients of varying ages and with different wound types. Finally, case studies in which Suprasorb X+PHMB is used will be presented, which support the existing literature, and highlight Suprasorb X+PHMB as an alternative first-line dressing for the management of infected or at risk of infection wounds.

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Gray D, White R, Cooper P, Kingsley A (2006) Using the Wound Infection Continuum to assess bioburden. In: Gray D, Cooper P, Timmons J (2006) *Essential Wound Management: An Introduction for Undergraduates*. Wounds UK, Aberdeen: 87

Moore K, Gray D (2007) Using PHMB antimicrobial to prevent wound infection. *Wounds UK* 3(2): 96–102

Assessment, diagnosis and treatment of infection

David Gray

Infected wounds are associated with symptoms such as increased pain, exudate volume and malodour, all of which can negatively impact on the patient and may result in social isolation and depression. Thus, it is crucial that healthcare professionals promptly diagnose infection in order to initiate rapid intervention and reduce bioburden to return the wound to a healing trajectory. Recent developments in antiseptic/antimicrobial therapies have led to advanced wound care dressings that are both clinically and cost-effective when used appropriately.

Key words

Wound healing
Infection
Pain
PHMB

The normal process of wound healing is disrupted by the development of wound infection. Infection may result in delayed healing, symptoms such as pain and exudate or, in some cases, may be limb- or life-threatening (Gethin, 2009).

All wounds, whether acute or chronic, are contaminated with micro-organisms from the environment or the patient (Schultz et al, 2003). Most bacteria enter the wound bed through external contamination from the environment, dressings, the patient's body fluids, or the hands of the patient or healthcare provider. If the surface organisms attach to the tissue and multiply, colonisation is established but a bacterial balance remains (Sibbald et al, 2007). However, if circumstances permit, this colonisation can open the way for the wound to become infected (Stotts, 2007), with organisms invading the tissues and triggering an immune response (Stotts and Whitney, 1999).

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The normal process of wound healing is disrupted by the development of wound infection.

While a minor, acute wound will go on to heal normally, allowing time for only a small number of microorganisms to reproduce, chronic wounds, especially those containing devitalised tissue, heal slowly, allowing the micro-organisms to multiply and thus increasing the likelihood of infection (Bowler et al, 2001).

Table 1 describes the different states of wound bioburden (or the number of organisms present within the wound).

Wound infection results when the balance between the host's resistance and the microorganisms present in the wound are disrupted and the organisms overwhelm the immune defences (Robson, 1997; European Wound Management Association [EWMA], 2006; World Union of Wound Healing Societies [WUWHS], 2008).

What happens when a wound becomes infected?

Following colonisation, immuno-competent individuals react with an acute, inflammatory response that leads to the ingress of immune cells, including antibodies, white blood cells, growth factors, enzymes and blood proteins into the wound bed (White, 2009). This leads to an increase in exudate volume and the surrounding skin needs to be monitored for signs of maceration. It is at this stage that the characteristic signs of inflammation can be seen, namely:

- Erythema
- Heat
- Oedema
- Pain
- Functional disturbance.

The predominant immune cells at work during this inflammatory phase are the phagocytic cells, neutrophils and macrophages, which mount a host response and autolyse any devitalised 'necrotic/sloughy' tissue. This response removes tissue debris and microorganisms present in the wound, and is the body's natural response to injury.

During proliferation, the next stage of wound healing, the wound is 'rebuilt' with new granulation tissue made up of collagen and extracellular matrix (ECM) and into which a new network of blood vessels develop (angiogenesis). Healthy granulation tissue is granular, uneven

Table 1

The different states of bioburden

Contamination	Bacteria are present on the surface of the wound but do not multiply and do not cause an immune response
Colonisation	A normally healing wound will be colonised with bacteria. Colonisation is a stable state where the growth and death of microorganisms within a wound is balanced, or is kept in check by the immune system of the patient, thus, it does not interfere with wound healing and does not damage wound tissue or trigger an immune response
Critical colonisation	The presence of bacteria in the wound results in delayed healing
Local infection	Bacteria multiply, disrupt healing and result in damage to wound tissue

in texture, does not bleed easily and is pink/red in colour. Its development is dependent upon the fibroblast receiving sufficient levels of oxygen and nutrients supplied by the blood vessels. The colour and condition of the granulation tissue is often an indicator of how the wound is healing. Dark granulation tissue can indicate poor perfusion, ischaemia and/or infection. Epithelial cells finally resurface the wound in a process known as 'epithelialisation'. During epithelialisation, keratinocytes cover the wound from the edges and in islands.

Maturation, sometimes known as the remodelling stage of healing, is the final phase of wound healing and occurs once the wound has closed. This phase involves remodelling of collagen from type III to type I. Cellular activity reduces and the number of blood vessels in the wounded area regress and decrease.

This healing sequence is stalled or arrested in the inflammatory and proliferative phases with the development of infection. The multiplication of bacteria in the wound robs natural tissues of vital nutrients and oxygen, and may result in the production of toxins that can have a negative effect on healing. This can lead to wound degradation and extension. In this way, an acute wound can become chronic.

Early recognition of infection is essential if delays in wound healing and complications are to be avoided.

Within the chronic wound, the usual immune response is upset leading to a continual influx of neutrophils that release damaging substances such as free radicals, inflammatory mediators and cytolytic enzymes. These tissue-damaging effects can promote ongoing bacterial proliferation and tissue destruction. As the immune response becomes more self-destructive in chronic infection, a down-regulation of the immune response develops, particularly in overwhelming infection (Landis et al, 2007). This results in a spectrum of effects ranging from delayed healing to symptoms such as pain, swelling and discharge, systemic disease and potentially life-threatening sepsis (Department of Health [DH], 2005; Collier, 2004; White, 2009).

Early recognition of infection is essential if delays in wound healing and complications are to be avoided.

How to identify wound infection

Clinicians currently have to rely on clinical signs and symptoms to detect infection, since there are few readily available bedside tests that can identify the presence or absence of bacteria in the wound. There is little clinical evidence to support the role of swabs in identifying wound infection, a subject of ongoing debate. Using a wound swab may identify some or all of the bacteria within a wound, but may not always indicate the clinically significant species (European Wound Management Association [EWMA], 2006; Dow, 2008; Best Practice Statement [BPS], 2011).

Different wound types may produce different signs and symptoms of infection. Thus, it is important that the clinician is familiar with the signs and symptoms characteristic of infection in the wound types they see most frequently (WUWHS, 2008; Young 2010).

Acute wounds are those that result from surgery or trauma and usually have a short and uneventful healing time. These wounds are usually described as healing by primary intention, e.g. have been closed using clips, sutures, glue or staples. In this wound type, infection usually arises from contamination during surgery, e.g. in bowel surgery the abdomen may become contaminated with faecal matter or lengthy surgery leaves the wound exposed to contaminants in the environment for a prolonged period (Reilly et al, 2006; Leaper, 2010). In these wound types, the development of infection is usually obvious.

Burns, due to the area of tissue damage, often behave like chronic wounds. Cooling is an important part of burn management as inflammation spreads from the burn to the surrounding tissue causing additional pain. Chronic wounds, such as leg, pressure and diabetic foot ulcers, as well as malignant wounds, are usually left open to heal from the base upwards — described as healing by

secondary intention — and contain bacteria due to their open nature. These wounds may have prolonged healing times, are prone to episodes of infection, and may have increased levels of exudate due to inflammation (Timmons, 2006).

Key signs and symptoms of infection in patients with acute and chronic wounds are outlined in *Table 2*.

Assessment for wound infection should include evaluation of the patient, the tissues around the wound, and the wound itself for these signs and symptoms, as well as for factors that may increase the risk of infection or its severity.

Pain, described as increased pain, unexpected pain, or change in the nature of pain, is a key factor pointing to the presence of infection (Gardner et al, 2001), as is breakdown of the wound.

Cellulitis, erythema, swelling and malodour are also indicative of wound infection across all wound types (Cutting and Harding, 1994).

Other criteria which may help with the early identification of wound infection include:

- Oedema
- Increased exudate
- Appearance of slough
- Increased amount of slough.

In addition to these symptoms indicating infection, it is well known that they can also have a negative impact on the patient's quality of life and wellbeing. Pain from infection can lead to stress and anxiety, which affect the healing process, while symptoms such as exudate and malodour can lead to social isolation and embarrassment Hopkins et al, 2006; Ribu et al, 2006; Gray et al, 2011).

Ongoing assessment and documentation will help to identify the early signs of infection. The two key elements to be monitored are pain and wound size. Validated pain assessment tools should be used, such as a 10cm visual analogue scale (VAS), or a numerical rating score (NRS), where 0 means no pain and 10 is the worst pain imaginable. Other more comprehensive pain assessment scales can be used to help the healthcare professional identify if there are psychological aspects to the pain, such as the McGill Pain Questionnaire (MPQ) (Melzack, 1987).

Table 2

Signs and symptoms of wound infection in acute and chronic wounds (adapted from WUWHS, 2008)

	Signs/symptoms	Acute	Chronic
Local infection	Abscess formation	✓	—
	Unexpected, new, increased or altered pain or tenderness	✓	✓
	Delayed healing	✓	✓
	Periwound oedema and swelling	✓	✓
	Redness (erythema)	✓	✓
	Localised warmth/heat	✓	✓
	Malodour	✓	✓
	Purulent discharge	✓	✓
	Fragile and/or bleeding granulation tissue	—	✓
	Wound bed discolouration	—	✓
	Induration	—	✓
	Pocketing	—	✓
	Bridging	—	✓
Spreading infection	Spreading erythema	✓	✓
	Wound breakdown/dehiscence	✓	✓
	Crepitus in soft tissue	✓	✓
	Malaise and non-specific deterioration in patient's condition	✓	✓

Exceptions to the rule

In some chronic wounds, signs of local infection may be subtle, such as delayed healing only: there may be no symptoms of infection, but the wound will not heal despite appropriate treatment because of the bioburden. These wounds may be described as being critically colonised. Due to lack of symptoms, they will often go untreated, even though they would benefit from an antimicrobial agent. If a patient has a chronic wound that is not responding to appropriate treatment, bioburden should be suspected and antimicrobial intervention may be necessary. Failure of chronic wounds to reduce in size by 30% over four weeks is an indicator of poor healing (Plassmann, 1995; Sheehan et al, 2003).

Furthermore, symptoms such as pain that usually indicate infection may be absent in patients with nerve damage, such as those with full-thickness burns or diabetic foot ulceration. Metabolic abnormalities associated with diabetes, e.g. the impaired migration of immune and inflammatory cells, seem to put wounds at increased risk of infection (Falanga, 2000). Infection may spread rapidly causing overwhelming tissue destruction. The absence of normal

pain function in patients with diabetes means that the initial signals of infection may not be noticed. Therefore, regular assessment for infection is important.

In patients who are immuno-compromised, signs and symptoms of infection may also be absent, or less obvious, due to a dampened immune response. Thus, again, regular assessment is important.

Early diagnosis of infection reduces the risk of complications, leading to improved outcomes and reduced treatment costs (White, 2009). If signs of spreading or systemic infection are seen, rapid intervention is required.

Who is at high-risk of a wound infection?

Infection is more likely to occur if:

- The patient has a weakened immune response, e.g. the very young or old, and those who have diseases such as malignancy, diabetes, cardiac/respiratory disease
- The patient is receiving medication which compromises the immune system, e.g. immunosupressants, chemotherapy, steroids
- High numbers of bacteria are present in the wound, as this increases the likelihood of overwhelming the immune system of the host
- The bacteria have great disease-producing ability or virulence so can cause disease in low numbers
- The wound contains moist, sloughy and necrotic tissue, which provides nutrients for bacterial growth
- Usually harmless bacteria in one part of the body gets transferred to another part resulting in disease, e.g. during surgery (EWMA, 2006; WUWHS, 2008).

Thus, wound infection occurs when conditions in the wound are ideal for bacteria to multiply and also when the host's immune response is lowered. Host susceptibility is considered to be the most important pre-determinant of the risk of infection (Lawrence, 1993; Dissemond et al, 2011).

Table 3 outlines when to intervene and apply an antimicrobial dressing.

Management

Once assessment has been carried out and the wound is considered to be critically colonised, or to have local or spreading infection, topical antimicrobial agents and/or antibiotics can be started. Depending on local protocol, a swab may be taken, but waiting for the results should not delay the start of treatment, during which time the patient's condition could deteriorate further (BPS, 2011).

When wounds are infected, the tissues have been invaded by organisms and so treatment is aimed at the removal of the organisms from the tissue. Treatment should address:

- Underlying cause of the wound
- The microorganism causing the infection
- Removal of the microorganisms that have invaded the wound tissue
- Removal of dead tissue
- Providing support for the immune system of the patient.

In clinical practice, the main focus of treatment is to reduce the high numbers of organisms that are resulting in problems with healing or signs of infection (Gray et al, 2006). Reducing bioburden using an antimicrobial agent can allow the host's immune system to regain control. The ultimate aim is to provide rapid relief from unpleasant symptoms, stop enlargement of the wound, and to improve the healing tissue within the wounds (BPS, 2011). It is also important to achieve this without causing pain and discomfort to the patient, toxicity to healthy healing cells, bacterial resistance or elevating costs (Gray et al, 2006).

Selecting an antimicrobial agent

Antimicrobials should be used when:

- A wound is progressing to overt infection
- Interruption to healing is seen
- A patient is at high-risk of developing a wound infection.

It is important to remember that the topical application of antimicrobial agents to a chronic wound will not address any systemic reasons why the wound is not healing, so these must be dealt with appropriately before topical therapy is started.

An antimicrobial dressing should be selected according to the wound conditions as per usual practice. If there is a great deal of exudate present, an absorbent dressing should be used; if the wound bed is dry, pick a product

Table 3

When to apply an antimicrobial dressing

Bioburden	Action
Contamination	No action needed
Colonisation	No action needed
Critical colonisation	Reduce the bioburden; topical antimicrobial agents should be used
Local infection	Reduce the bioburden; topical antimicrobial agents should be used. Patients with reduced immunity may require systemic antibiotics
Spreading infection	Reduce the bioburden; topical antimicrobial agents should be used locally in conjunction with systemic antibiotics
Systemic infection	Reduce the bioburden; topical antimicrobial agents should be used locally in conjunction with systemic antibiotics

that donates moisture. Dressings such as films impregnated with silver are carriers only and do nothing to manage the wound. The shape, size and location of the wound should also influence dressing choice.

Consideration should also be given to the condition of the wound. Placing an antimicrobial product on a wound covered in dry eschar will have little therapeutic effect. Therefore, the wound bed must be adequately prepared before the antimicrobial is applied, otherwise its effectiveness will be compromised. Debridement of necrotic tissue and slough can significantly reduce bioburden and therefore the presence of odour (EWMA, 2006; BPS, 2011).

Severity of pain experienced by the patient may also influence the choice of antimicrobial. Some products such as honey and silver have been reported to increase pain on use, which may make treatment uncomfortable or even unbearable for the patient (BPS, 2011).

To summarise, antimicrobial selection should be based upon wound characteristics, size, volume of exudate, efficacy, evidence and cost benefit, plus patient acceptability (Gethin, 2009).

When topical antimicrobial agents are used to treat critically colonised and locally infected wounds, and consistent signs of progression towards healing are observed, treatment should be stopped and a dressing selected that is suitable for the condition of the wound at that time. If the wound remains unchanged after 14 days of treatment, an alternative antimicrobial product should be used. If the wound worsens or shows increasing signs of infection, a systemic antibiotic may be required (BPS, 2011). In patients at high risk of infection, such as those who are immunocompromised or who have conditions such as diabetes, the use of systemic antibiotics may be considered.

Different antimicrobial agents

Antimicrobial agents all have different physical properties with regards to the level of antimicrobial they release, their ability to handle exudate or manage odour or pain. The most commonly used in wound care are iodine, silver, honey, and polyhexamethylene biguanide (PHMB).

Iodine

Iodine was first used in 1839 by Davies as an aqueous potassium iodine solution for the treatment of wounds, and later in the American Civil War (Hugo, 1991). Early products had limited value as they caused pain, irritation and staining. The development of iodophores (povidone iodine and cadexomer iodine) since 1949 has provided safer, less painful alternatives. Povidone iodine is available in a range of concentrations and formulations, i.e. medicated dressings, solutions, ointments, and spray. It can be used for cleaning surfaces and storage containers and to purify water. Cadexomer iodine is available as an ointment and dressing.

Severity of pain experienced by the patient may also influence the choice of antimicrobial. Some products such as honey and silver have been reported to increase pain on use, which may make treatment uncomfortable or even unbearable for the patient (BPS, 2011).

Silver

Silver and silver compounds have a long history of use as bactericidals (Klasen, 2000). The bonding of silver with a sulphonamide antimicrobial, sulphadiazine (silver sufadiazine, SSD) has resulted in a safe, topical treatment with broad-spectrum antibacterial, antifungal and antiviral activity. Silver sulfadiazine is a mainstay of treatment for burns and is used for acute and chronic wounds to treat infection. However, in recent years there have been concerns about the development of resistance to silver and its misuse in clinical practice.

Honey

While honey was an ancient remedy, it has been used in the UK since 2000 as a modern wound management product (Dunford et al, 2000). It has become a mainstream therapy, presented in a range of products such as tubes, or impregnated into dressings, i.e. tulles and alginates. Its properties remain under investigation with new advances being found (Cooper et al, 2011).

Polyhexamethylene biguanide (PHMB)

PHMB has been available as a wound irrigation fluid in Europe for some time. Recently, it has been successfully introduced into wound management within a range of dressings including non-adherent products, gauze, drains and intravenous sponges (Motta and Trigilia, 2005; Moore and Gray, 2007), and hydrogels. In some cases, the PHMB molecule has been chemically bound to the base of the material, providing it with antiseptic/antimicrobial properties when in contact with wound moisture. Therefore, the product protects against the development of wound infection by decreasing the bacterial load in the dressing and bacterial penetration through the dressing. In other products, the active component is free to be delivered into the wound and periwound tissues: the dressing in this case being a carrier for a wider antimicrobial activity by donating PHMB to the wound surface. PHMB has been seen to block *Pseudomonas aeruginosa*-induced infection (Cazzaniga et al, 2000) and prevent its degradation of wound fluid and skin proteins *in vitro* (Werthen et al, 2004). It can also kill a diverse range of bacteria and fungi (Lee et al, 2004).

Conclusion

Early diagnosis and management of infection is vital if complications are to be avoided. Clinicians must remain mindful of the signs and symptoms of infection, and those patients in whom the signs are more subtle and absent. Understanding when to start and stop antimicrobial therapy is also important, as is knowledge of the dressings available so that antimicrobial therapy can be delivered in a clinically and cost-effective way.

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Key points

- The presence of pain can result in delayed healing, due in part to raised stress levels, leading to a vicious circle of emotional debilitation, poor concordance and poor healing.
- The use of products which are both atraumatic and antimicrobial can address issues of infection and pain simultaneously.
- Suprasorb X + PHMB has been shown to be effective at reducing bioburden and pain in a variety of wound types.

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MANAGING WOUND INFECTION AND PAIN USING SUPRASORB® X+PHMB

Pam Cooper

Pain is the most common indicator of infection across all wound types. Patients with infected wounds experience greater pain and are also more sensitive to it. It is therefore important to identify these wounds promptly, managing pain as a priority alongside wound bioburden in patients with critically colonised and infected wounds. Dressings that are atraumatic to use while delivering antimicrobial therapy should be used as part of a holistic care plan. Suprasorb® X+PHMB is an antimicrobial dressing that will be described in more detail in this article and clinical evidence supporting its efficacy at reducing both pain and bioburden in a variety of wound types will be presented.

KEY WORDS

Infection
Pain
Suprasorb® X+PHMB
Antimicrobial dressing
HydroBalance technology

It is now well recognised that living with a chronic wound has a huge impact on patient quality of life (Franks et al, 1994; Price and Harding, 1996). Of all the symptoms experienced, including exudate, odour and restricted mobility, pain is the one that patients with chronic wounds find most distressing (Charles, 1995; Ebbeskog and Ekman, 2001; Rich and McLachan, 2003; Hofman, 2006; Price et al, 2008). Factors that cause wound pain have been defined (Hollinworth and Collier, 2000; *Table 1*).

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Virtually all chronic wounds have high numbers of bacteria present, which can quickly result in infection if circumstances permit (White, 2009). If the chronic wound becomes infected, this can result in further pain (Gardner et al, 2001).

Of all the symptoms experienced, including exudate, odour and restricted mobility, pain is the one that patients with chronic wounds find most distressing.

The presence of infection in the wound triggers an inflammatory response that results in a constant influx of neutrophils that compete for nutrients and oxygen, while at the same time releasing enzymes, free oxygen radicals and inflammatory mediators (Coderre and Katz, 1997). This can result in irritation of the nerve endings, thereby increasing pain (Sibbald et al, 2008). These inflammatory agents also damage tissue and lead to a cycle of bacterial proliferation and continued tissue destruction.

The most consistent indicator of wound infection across all wound types is pain, particularly if it is sudden in onset, there is a change in the type of pain experienced, or if it increases in its severity (Gardner et al, 2001). Price et al (2008) reported that pain associated with wound infection was found to be especially painful. It is important to remember that a high bacterial load can result in an increase in pain, even before the signs of infection are observed. It has also been recognised that pain is implicated in delayed healing, due in part to raised stress levels (Bjarnsholt et al, 2008; Soon and Acton, 2006; Kiecolt-Glaser et al, 1995).

Thus, pain may lead to a vicious circle of pain, emotional debilitation, poor concordance with treatment and

Table 1

Factors that may result in wound pain (Hollinworth, 2000)

- Trauma during dressing change
- Products used
- Skin excoriation
- Infection
- Lack of empathy
- Poor bandaging technique

slow healing (Hofman, 2006; *Figure 1*). As a result, both pain and infection need to be managed simultaneously to improve the condition of the wound (White, 2009), as well as patient wellbeing (Gray et al, 2011).

The pain experienced by chronicity and infection may also be exacerbated at wound-dressing related procedures. A study by Price et al (2008) revealed that patients found the touching and handling component of wound dressings very painful, followed by cleansing and dressing removal. Thus, it is important to ensure that this is minimised through careful assessment and management, which includes selection of a dressing to manage the local wound symptoms and bioburden (World Union of Wound Healing Societies [WUWHS], 2004).

The use of products which are less likely to result in pain on use while delivering antimicrobial therapy may have benefits in terms of reducing stress- and infection-induced pain, as well as combating infection. Price et al (2008) reported that in terms of pain, 620 out of 1785 patients indicated that the use of products could make a difference to their experience of pain.

Suprasorb® X+PHMB (Activa Healthcare) is an antimicrobial wound dressing with proven action against a variety of bacteria and pain-relieving properties (Glover and Wicks, 2009), which will now be discussed in more detail.

Suprasorb® X+PHMB

Suprasorb X+PHMB is an antimicrobial dressing that uses HydroBalance technology and PHMB (polyhexanide), a broad-spectrum antimicrobial agent.

Suprasorb X

Suprasorb X is a cellulose dressing that utilises HydroBalance technology. This enables the absorption and donation of moisture at the wound dressing interface, creating a moist wound healing environment that also promotes autolytic debridement. Suprasorb X has been shown to reduce pain and has been reported to have a cooling and soothing effect on the wound and surrounding tissues (Alvarez et al, 2004; Eberlein et al, 2007; Knottenbelt, 2007; Wild and Eberlein, 2007; Dini et al, 2008; Fumarola, 2009).

Tests of the biocompatibility of PHMB (which measures its antimicrobial activity in relation to its cytotoxicity) have shown that it results in less damage to healthy wound cells compared to other antimicrobial agents such as chlorhexidine, povidone-iodine, triclosan, silver and sulfadiazine (Muller and Kramer, 2008).

PHMB

The PHMB component of the dressing has a proven broad-spectrum action with efficacy against bacteria, fungi and yeasts (Cazzaniga et al, 2002; Muller and Kramer, 2008; Mueller and Krebsbach, 2008; Wild et al, 2009), but it does not have an adverse effect on healthy host cells. Although PHMB is a synthetic compound, it is similar in structure to antimicrobial peptides (AMPs) that are produced by many cells in the wound, such as keratinocytes and inflammatory neutrophils, which play a role in protecting the wound from infection (Sorensen et al, 2003). This similarity means that PHMB can insert into bacterial cell membranes and kill bacteria in a similar way to AMPs (Moore and Gray, 2007). It works by interfering with the cell metabolism of microorganisms, preventing them from absorbing nutrients and disposing of waste products, which ultimately results in microorganism death while the host cells remain unaffected.

PHMB has been used as an antimicrobial agent for approximately 60 years in a number of different applications including contact lens solution and pool cleaning. In all cases it has demonstrated a good antimicrobial efficacy and safety profile, with no reported cases of the development of resistance (Larkin et al, 1992; Moore and Gray, 2007; Gilliver, 2009).

Tests of the biocompatibility of PHMB (which measures its antimicrobial activity in relation to its cytotoxicity) have shown that it results in less damage to healthy wound cells compared to other antimicrobial agents such as chlorhexidine, povidone-iodine,

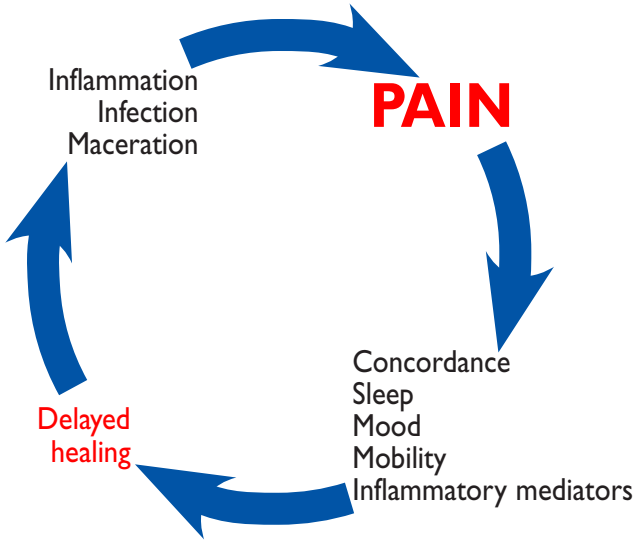

Figure 1. Vicious circle of pain (Hofman, 2006).

triclosan, silver and sulfadiazine (Muller and Kramer, 2008).

Indeed, an array of literature now identifies PHMB as a credible first-line alternative to silver and other antimicrobial agents. PHMB is now available in a range of dressings for use in wound management. In some products, the PHMB has been chemically bound to the base material, enabling it to work only when it comes into contact with wound fluid, which may affect antimicrobial effectiveness especially if used on a dry wound. In other products, such as Suprasorb X+PHMB, the PHMB is free to be delivered to the wound and peri-wound tissues giving wider antimicrobial action (Best Practice Statement, 2010).

The indications and contra-indications of Suprasorb X+PHMB are listed in *Table 2*.

Suprasorb X+PHMB has shown efficacy in managing bioburden (Carvosi et al, 2006; Mosti et al, 2008; Wild et al, 2009), and also in the management of pain across a variety of wound types.

Galitz et al (2009) carried out a prospective comparative clinical study that compared the effects of Suprasorb X+PHMB with that of a standard silver wound dressing on pain (both persistent and at dressing change), and microbial reduction in critically colonised or locally infected wounds. Thirty-seven patients with chronic wounds and a visual analogue scale (VAS) score of greater than, or equal to 4 were included for 28 days. Group one had their wounds managed with Suprasorb X+PHMB and group two a silver dressing. A secondary dressing was used if necessary. Results demonstrated that both dressings reduced overall wound pain, although greater reductions were reported for those patients treated with Suprasorb X+PHMB. After the first dressing change, a reduction in VAS scores was only recorded in group one, along with a significant reduction ($p<0.05$) in overall pain scores. After four weeks of treatment, the mean overall pain score in group one reduced to the lowest VAS category (none/minimal).

... reduction in pain was attributed to diminishing infection and the soothing effects of moisture donation from the dressing, both of which helped to put the wound on a healing trajectory.

A study by Price et al (2008), one of the biggest international surveys of the patient's perspective of chronic wound pain, found that venous and arterial ulcers are more frequently associated with frequent pain.

Swan (2010, see *pp. 17–18* in this document) used Suprasorb X+PHMB to treat a patient with a 14-year history of venous leg ulceration, recurrent cellulitis, severe pain and multiple sensitivities to dressings. The patient, who had been treated using a silver-impregnated foam, was highly anxious at dressing change with a recorded pain score of the worst pain imaginable. The use of Suprasorb X+PHMB, in combination with allowing the patient to remove her own dressings, greatly reduced her anxiety and pain. Following 42 days of treatment, the reduction in pain enabled the patient to undergo Doppler and have compression therapy applied.

Suprasorb X+PHMB was also successfully used to manage a patient with Raynaud's disease and a meticillin-resistant *Staphylococcus aureus* (MRSA)-infected leg ulcer (Thomson, 2009), resulting in a reduction in pain score from 4–6 moderate pain on the VAS, to 0–3 mild pain within three weeks. The reduction in pain was attributed to diminishing infection and the soothing effects of moisture donation from the dressing, both of which helped to put the wound on a healing trajectory.

Table 2

Indications and contraindications for the use of Suprasorb X+PHMB

Indications	▸▸ Critically colonised or infected wounds ▸▸ Wounds producing light to moderate exudate ▸▸ Dry wounds ▸▸ Superficial or deep wounds ▸▸ During any stage of the healing process
Contraindications	▸▸ For peritoneal lavage ▸▸ For antiseptic joint lavage (cartilage toxicity) ▸▸ In applications involving any part of the central nervous system (CNS), including the meninges and intralumbal applications ▸▸ For applications involving the middle or inner ear, or for intraocular applications ▸▸ During the first four months of pregnancy (at any time thereafter, a strict benefit/risk assessment has to be performed ▸▸ In patients allergic to PHMB (Dissemond et al, 2010)

Hetherington (2009) reported the use of Suprasorb X+PHMB to treat a patient with an infected mixed aetiology leg ulcer. The patient had a history of being reluctant to receive treatment and had previously refused outpatient appointments, a skin graft and antibiotics. After three days of treatment with Suprasorb X+PHMB, the patient reported no pain and the wound was almost healed after three months.

Similarly, Fumarola (2009) used the dressing as part of a treatment plan for a 97-year-old patient with an infected skin tear, multiple comorbidities and poor nutrition. At presentation, the wound was malodorous, the patient's pain score was 8 (10=extreme pain), and she was unable to stand as a result. After six days of treatment, the odour had gone, the patient's pain score had reduced to 3 and she was able to stand with assistance. Due to her vulnerable condition, the patient was treated with systemic antibiotics. Thus, infection management cannot be attributed solely to Suprasorb X+PHMB, but this case demonstrates the successful use of the dressing as part of an overall holistic package of care.

A study by Mosti et al (2008) reported upon 11 patients with vascular leg ulcers that were critically colonised or locally infected, and which were treated using Suprasorb X+PHMB as a primary dressing, plus a foam or absorbent dressing to hold the product in place. Results showed that seven of the patients healed in 13.4 weeks, while three of the 11 patients underwent successful skin grafting as a result of good wound bed preparation (one patient died suddenly from stroke). The patients reported a mean reduction in pain, using a visual analogue scale (VAS) from 7.3 (+-1.9) to 2.8 (+-0.8) within 3.4 weeks (+-0.8). The pain decreased as infection/inflammation was diminished.

Cossu et al (2009) treated eight patients with infected Scleroderma ulcers with standard scleroderma therapy and Suprasorb X+PHMB. Over 20 weeks, 27 ulcers were treated. Pain was assessed using a VAS every four weeks, and ulcer severity graded by the clinician on a scale of 1 to 10. Results showed that there was a reduction in pain and ulcer severity from the first application of the product.

The development of dressings that minimise trauma and include antimicrobial agents provide a way of controlling both pain and bioburden, thereby impacting positively on the wound's progress and the patient's wellbeing. One such dressing is Suprasorb X+PHMB.

Denyer (2009) reported on the use of Suprasorb X+PHMB for the management of children with epidermolysis bullosa, a condition resulting in varying degrees of skin fragility, chronic wounds, pain and itching. She reported that its use facilitated patient comfort and showed a significant reduction in pain and pruritis. These benefits resulted in improved quality of life, demonstrated by an improvement in mood in those severely affected, and greater mobility in patients with milder forms. Denyer had previously reported that in infant patients treated with silver products, there was some absorption through the skin which was detected as high silver plasma levels (Denyer, 2009). Thus, the use of silver products is no longer recommended in this patient group, with PHMB providing a suitable antimicrobial alternative, although, as with all antimicrobial agents, it should always be used with caution in paediatric cases (Best Practice Statement, 2011).

Conclusions

Patients with infected wounds experience greater pain, and are also more sensitive to it than those with uninfected wounds (White, 2009). Thus, it is important to diagnose and treat these wounds rapidly, using effective antimicrobial products as part of a holistic care protocol. The development of dressings that minimise trauma and include antimicrobial agents provide a way of controlling both pain and bioburden, thereby impacting positively on the wound's progress and the patient's wellbeing. One such dressing is Suprasorb X+PHMB.

Table 3

Properties of Suprasorb X+PHMB

- Reduces wound bioburden
- Reduces pain
- Hydrates the wound
- Absorbs exudate
- Promotes healing

(Carvosi et al, 2006; Bruckner et al, 2008; Mosti et al, 2008; Glover and Wicks, 2009; Wild et al, 2009)

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Use of topical antimicrobial therapy in burns patients: A case series

Louise Baines, Steven Jeffery

Burns disrupt the protective integrity of the skin. The ensuing generalised immune suppression allows microorganisms to multiply. The burn wound surface is sterile immediately following injury; however, microorganisms survive within the hair follicles and bacteria repopulate the wound bed within the first 48 hours. More virulent gram-negative organisms subsequently populate the wound after day 5 (Peral, Martinez and Valdez, 2009). If left untreated, bacterial colonisation and infection can lead to impaired healing (Ousey and McIntosh, 2009).

Bacteria may be more successfully targeted through the use of topical antimicrobial dressings (Tadej et al, 2009). Their use in isolation is recommended where the patient is able to mount a sufficient host response and has sustained a minor traumatic wound (Ousey and McIntosh, 2009).

The ideal properties of antimicrobial dressings were described by Maillard and Denyer (2006). PHMB is a topical antimicrobial agent that fulfils this criteria. It is bactericidal and kills bacteria by destroying the bacterial cell membranes (Ousey and McIntosh, 2009).

Suprasorb® X+PHMB has already demonstrated positive results in patients with multiple comorbidities

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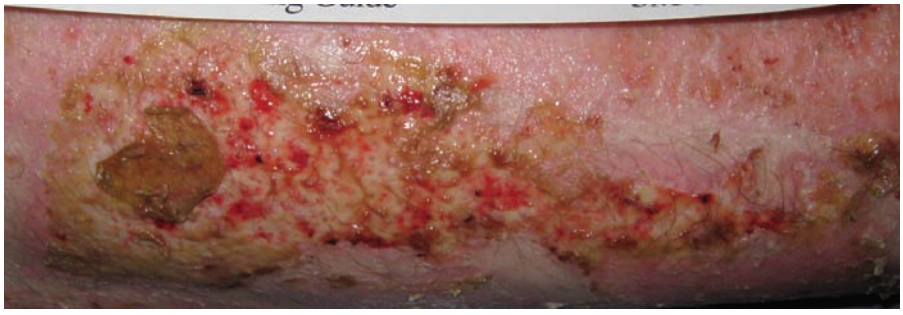
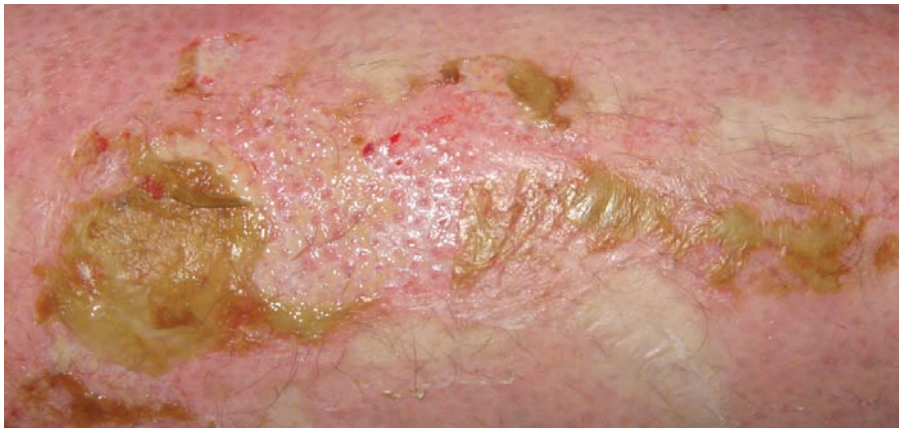
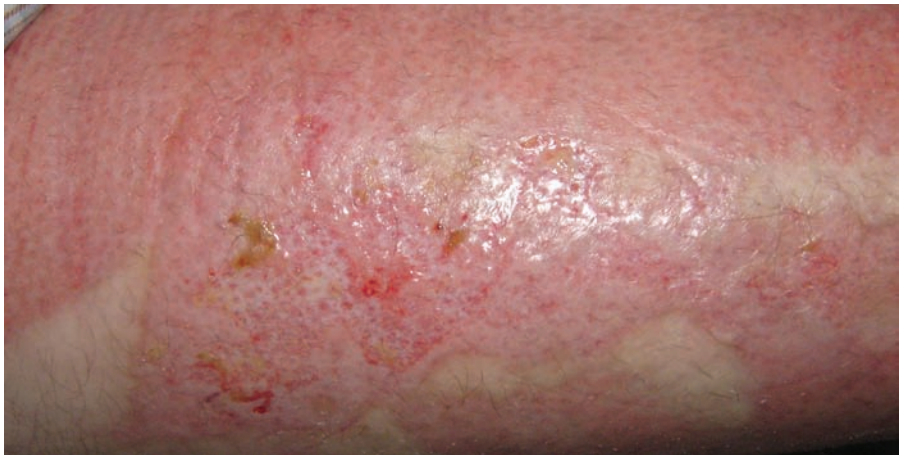


Sloughy donor site.



Removal of slough with Suprasorb X+PHMB Hydrobalance dressing with polyhexamethylene biguanide antimicrobial agent.



Prevention of infection and pain relief.

and chronic non-healing wounds (Tadej et al, 2009). Therefore, in light of questions regarding the value of silver in preventing wound infection in burn wounds, Suprasorb X+PHMB was chosen as a topical antimicrobial to treat patients with burn/scald and donor site wounds. (Storm-Versloot et al, 2010).

Method

Seven patients with a variety of wounds were followed for differing time periods between January to April 2010. These patients' wounds consisted of scald to thigh, leg donor site x 2, hand burn combined burn to hand and forearm, arm burn and finger burns. All wounds were treated with Suprasorb X+PHMB sheet dressings, with dressing changes taking place between one and six days. The primary dressings were secured with gauze and bandages.

Results

The outcome for the seven patients were two completely healed, two almost healed, one hand burn went from sloughy to being suitable to receive a split skin graft, and two patients were discontinued due to pain in one case and a reduction in wound exudate which resulted in the primary dressing adhering to the wound bed in the second patient. Regular wound swabs were taken, with only one patient having a significant result which reported *Staphylococcus aureus* and mixed anaerobes. However, this wound went on to complete healing within five days of the swab result.

Discussion

This case series demonstrates the challenges of burn, scald and donor site wounds, due to their clinical presentation, wound site and propensity for developing wound infection. Previous alternative antimicrobial dressings had been used in these seven patients with limited success.

Conclusion

It is hoped that this case series will give clinicians working with this population the confidence to try Suprasorb X+PHMB as a primary wound dressing. Although not a randomised clinical trial, the experiences of the authors demonstrate success and limitations when using this product. It is paramount that these wounds do not develop wound infections in what is an already compromised patient group. Therefore, the antimicrobial wound dressing is a key part of the wound management plan.

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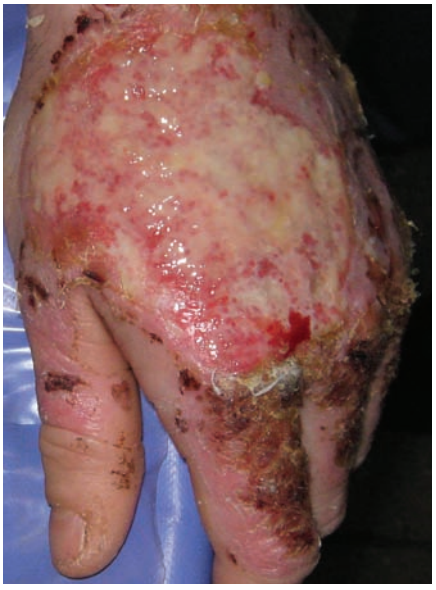
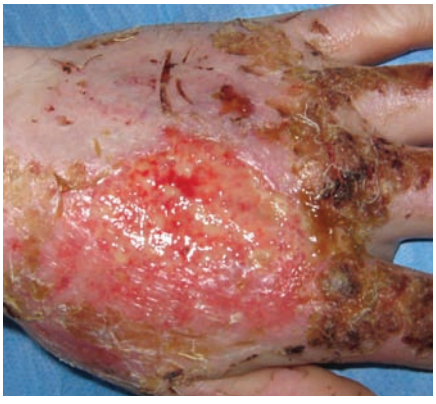
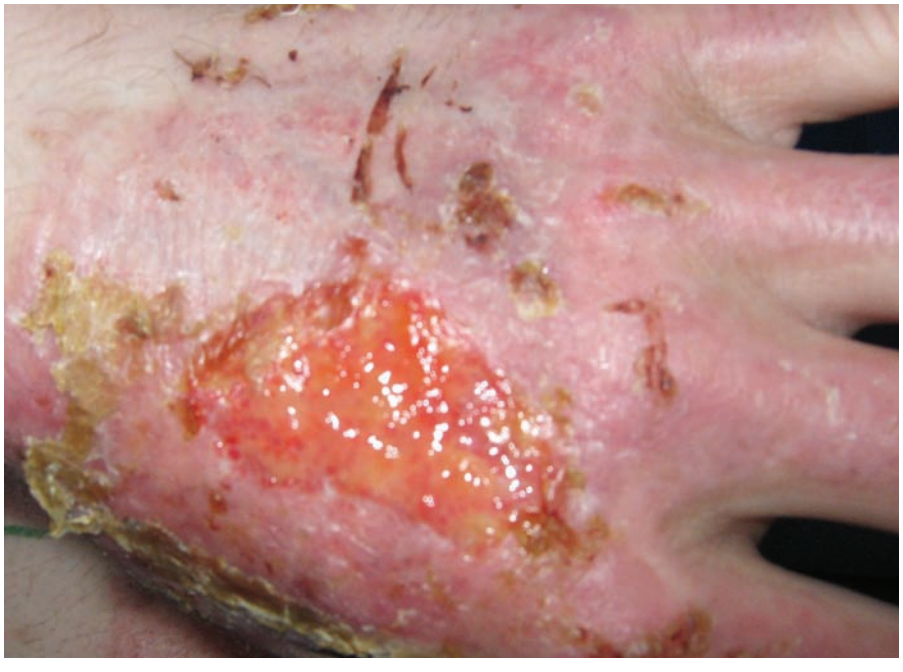


Sloughy burn wound.



Removal of slough.



Hand now ready for grafting.

Case report of a venous leg ulcer using Suprasorb® X+PHMB

Joanna Swan

Suprasorb® X+PHMB (polyhexamethylene biguanide) is a safe and effective new antimicrobial. It is a HydroBalanced, biocellulose wound dressing containing 0.3% PHMB. This means that the dressing has a high surface area of cellulose fibrils which are woven into a mesh that regulates the absorption and donation of moisture at the wound dressing interface (Alvarez et al, 2004). PHMB is a broad spectrum antimicrobial agent that is highly effective (Mulder et al, 2007), with low toxicity to human cells (Wiegand et al, 2008). Given the properties of this dressing and the growing body of evidence supporting its efficacy, it was decided to start a small scale trial within the author's trust.

Method

A case report approach was taken. Mrs G was a 49-year-old, morbidly obese lady with a 14-year history of venous leg ulceration to her left leg. She had suffered recurrent cellulitis requiring regular antibiotic treatment. Severe pain, multiple sensitivities to dressings and the condition of the surrounding skin due to eczema and psoriasis had also been problematic. In January 2010 Mrs G presented as highly anxious at dressing changes, with a pain score of 3 (trust adopted scale of 0–3, 3 being the worse pain imaginable). Swabs identified mixed organisms and coliforms; no antibiotics were being given. Following a full wound assessment, a review of her pain management and a discussion with Mrs G, it was decided to apply and evaluate Suprasorb X+PHMB.

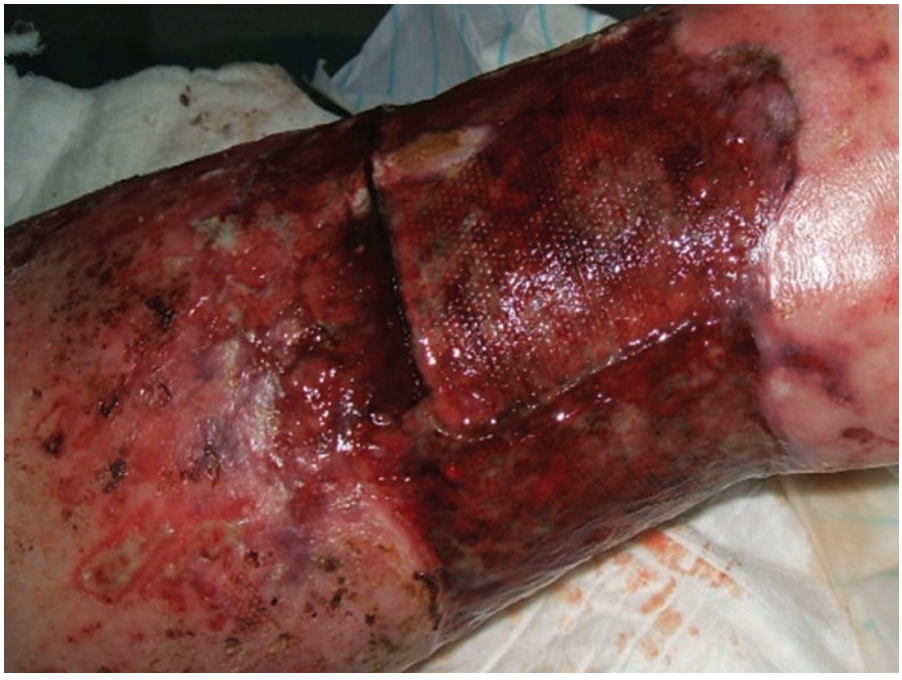


Figure 1. Medial/posterior aspect day 1.

Due to the irregular shape and size of the ulcer, it was decided to use photos alone to assess any improvement/deterioration (*Figures 1* and *2*). Photographs were taken at each dressing change on the Friday of each week to be consistent. In addition, the wound product evaluation form developed by the West Midlands Association of Tissue Viability Nurses (WMATVN) was used to aid in the evaluation of the product. Using the previous dressing regimen, the frequency of dressing change had been daily. It was decided to check bandages for strikethrough daily, but initially to aim for a full change every third day. Numbers of dressings used were calculated in order to do a cost comparison.

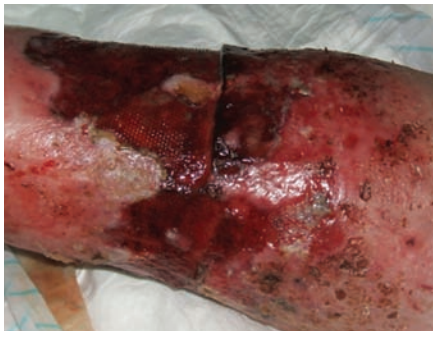


Figure 2. Anterior aspect day 1.

Results

Pain score on application and removal for the first dressing change, despite the commencement of a fentanyl patch, was high, but this improved by the second dressing change. The patient reflected at a later stage that

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the pain was bearable, as she knew the comfort of the dressing once in place was so good. To try and help with the pain and anxiety levels, Mrs G would remove the dressings herself. At day 11 there was significant progress in the appearance of the wound (*Figures 3* and *4*). By the fifth dressing change the pain score had fallen and her anxiety levels had noticeably reduced. This continued to improve and, on day 42, Mrs G expressed she would be able to tolerate having a Doppler performed with a view to having compression bandaging. This resulted in Suprasorb X+PHMB being applied with reduced compression twice-weekly.

Cost

A cost comparison was made for changes of wound contact layer only over one week. Secondary dressings and bandages in use were similar to those in use before admission.

Previously, Mrs G's ulcer had been dressed with a silver impregnated foam as the wound contact layer. Two foam dressings 20x20cm were required to cover the ulcer. Two Suprasorb X+PHMB 14x20cm were required to cover the ulcer. This involved the following costs:

- Silver impregnated foam 20x20cm = £17.96 per piece
- Suprasorb X+PHMB 14x20cm = £16.12 per piece.

Therefore, dressing cost per week 1 (daily dressings required with the foam dressing) = £251.44.

Dressing cost with Suprasorb X+PHMB (three dressing changes per week) = £96.72.

Discussion

At a number of the dressing changes there was concern that the surrounding skin was becoming macerated. However, over time it became clear that this was not the case and it actually transpired to be new epithelial tissue.

Residue can also appear as slough on the wound bed. Some of the residue is easily removed, but some remains well-adhered to the wound bed. However, it became clear to the tissue viability nurses conducting the evaluation that the residue neither appears to be detrimental, nor does it impede wound healing. Reduction in wound dimensions was steady and sustained (*Figures 5* and *6*).

Conclusion

Suprasorb X+PHMB has a number of benefits in terms of patient satisfaction, patient outcomes, pain reduction, ease of application and removal for the practitioner and appears to be cost-effective.

There may be educational issues regarding the dressing residue which would need to be addressed, as the dressing might be discontinued inappropriately if maceration was thought to be occurring, as proven in a study from the Netherlands (Van Leen, 2006).

Mrs G changed considerably over the course of the evaluation. She was able to see quick progress within the wound and is now pain-free with little, if any, anxiety about her wound. She often says that she just cannot believe how good the ulcers look and is pleased with how much better she feels.

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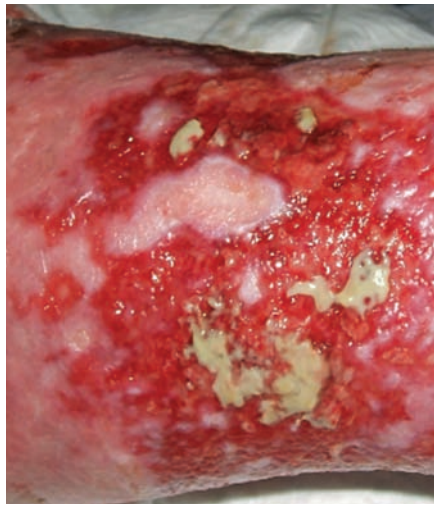

Figure 3. Anterior aspect day 11.

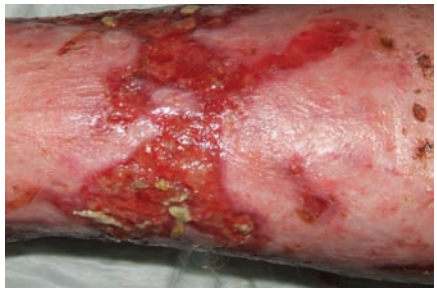

Figure 4. Anterior aspect day 11.

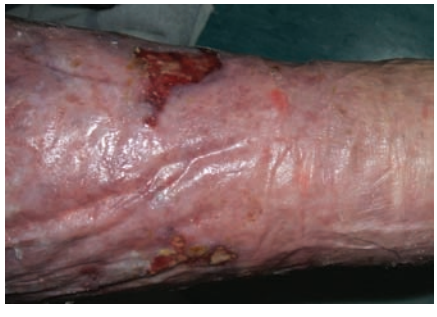

Figure 5. Anterior aspect day 66.

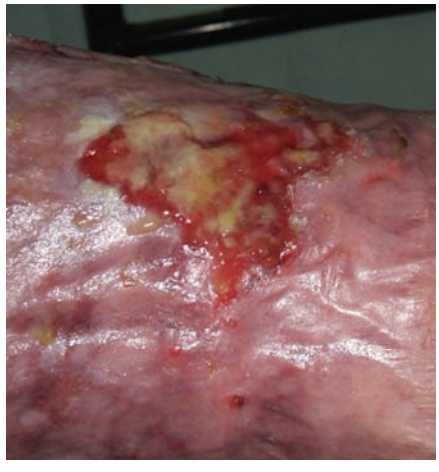

Figure 6. Medial/posterior aspect day 66.

Case report of a patient with a chronic hand wound

Rommel Orig

Suprasorb® X+PHMB (polyhexamethylene biguanide) is a new dressing combining Suprasorb® X, a unique HydroBalance dressing that is able to absorb and donate moisture, with PHMB, an antiseptic compound with no known cytotoxicity or resistance). PHMB has been introduced into wound management demonstrating positive effects on wound healing (Davies and Field, 1969; Kramer et al, 2004; Daeschlein et al, 2007; Wiegand et al, 2008). Having had positive results using Suprasorb X+PHMB on chronic leg ulcers as part of a small scale trial it was decided to expand its use in this trust.

Method

This case report discusses Mr V who sustained a traumatic injury to his right index finger leading to proximal interphalangean joint amputation and a non-healing wound. Past history included type 1 diabetes, renal failure requiring haemodialysis, micro-angiopathy with suboptimal blood supply to right arm due to fistula steal syndrome, neuropathy, infection and *pyoderma gangrenosum* to right hand wound necessitating steroid therapy. A multidisciplinary approach was taken, involving the plastic specialist hand surgery, dermatology and vascular teams. Advanced wound management products, including topical negative pressure, silver and honey were used in conjunction with surgical debridement, with no dramatic improvement in seven months.

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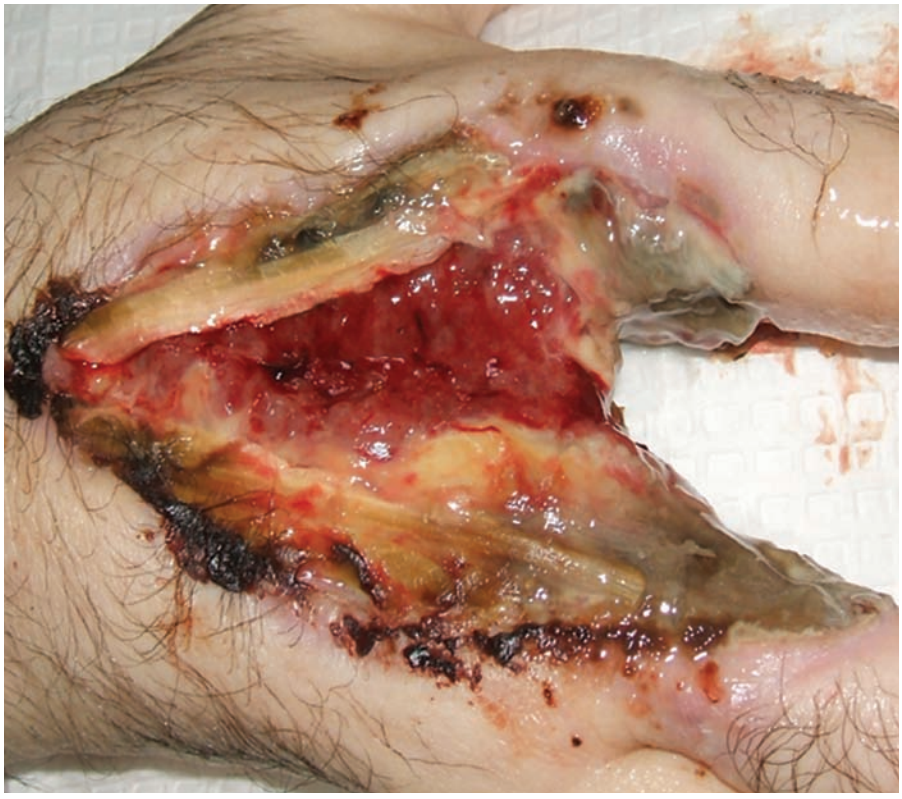
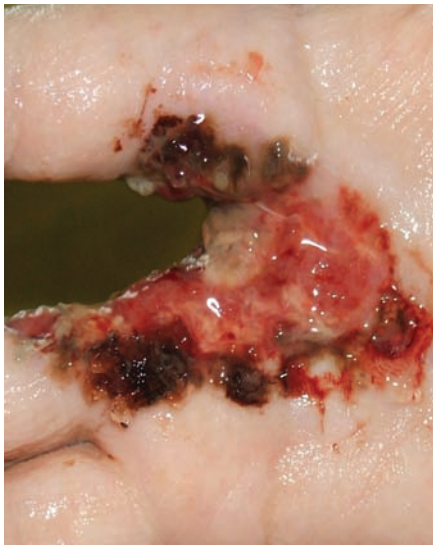


Pre Suprasorb X+PHMB trial 8/03/2010 — dorsum right hand.

Mr V had been referred to tissue viability before and ActiFormCool®, (Activa Healthcare), a sheet hydrogel dressing, had been used to debride the devitalised tissue. The wound measured 9.5x4.5 cm to dorsal aspect and 6.5x2.5cm to plantar aspect, with 50% devitalised tissue, 30% poor quality granulation tissue and 20% tendon that was felt to be non-viable.

Mr V was apprehensive about the sudden change of team monitoring and managing his wound. Being wheelchair-dependent he was particularly anxious about the possibility of losing his hand, as this would be life-changing in terms of his independence. It was felt that a new and innovative approach to



8/03/2010 — plantar right hand.

his wound management was needed. Mr V agreed to and commenced on Suprasorb X+PHMB following discussion.

Due to Mr V's apprehension and anxiety, it was decided that one member of the tissue viability team would perform every wound assessment and dressing change at first. A series of photographs were taken at each dressing change to keep track of any progress made.

Results

At the first dressing change the wound was found to be very dry with no improvement. A dressing pad and bandage had been used to hold the dressing in place for three days. It was decided to use a film dressing to secure the primary layer in place, in order to improve moisture levels at the wound bed. This was left in place for 3–4 days. After seven days all devitalised tissues appeared moist and loose to dorsal aspect, with a 0.5x0.5cm reduction in wound size to the plantar aspect. The small improvement in wound size and the positive change in wound appearance increased Mr V's confidence in the new team, and subsequently with the new product.

He began to take an active role in his treatment, ensuring that the dressing was kept in place and was dry and clean. Suprasorb X+PHMB was easy to use and mould into the interweb spaces of the wound, allowing a more secure fit. Mr V felt it was conformable and comfortable. He could also still manage to use his wheelchair effectively.

Mr V was happy to be discharged with the support of the district nurses. Continued and significant wound improvement was reported by the district nurses three weeks post discharge.

Discussion

Suprasorb X+PHMB has had a significant impact on the reversible physiological causes of Mr V's chronic wounds and also effectively managed wound infection without systemic antibiotics. It encouraged and allowed a reduction in wound size and actively debrided devitalised tissues. However, its impact on *pyoderma gangrenosum* is unclear, as concomitant treatment with steroids was used three months before the application of the dressing.

Using this new innovative product gave an anxious patient, who was fearful of losing his hand, renewed confidence both to take part in his treatment and in the clinical practitioner managing his care.

Conclusion

Suprasorb X+PHMB is an advanced wound management product that responds well to wound infection and actively debrided the devitalised tissue base in this case report.

Suprasorb X+PHMB had a number of positive outcomes to both the patient's wound and also his outlook. Using this new innovative product gave an anxious patient, who was fearful of losing his hand, renewed confidence both to take part in his treatment and in the clinical practitioner managing his care.

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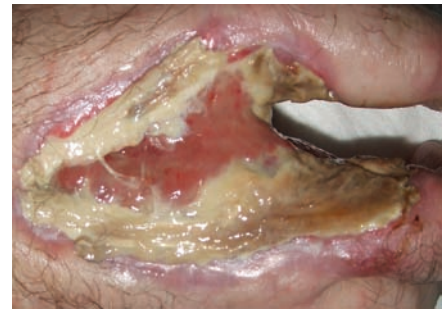
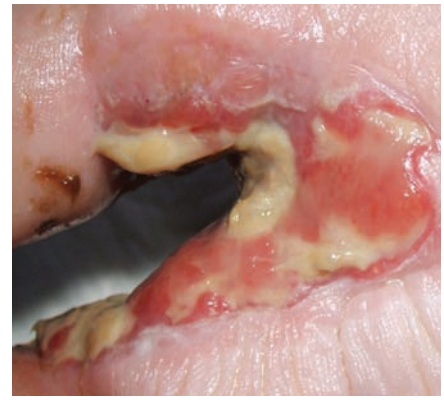
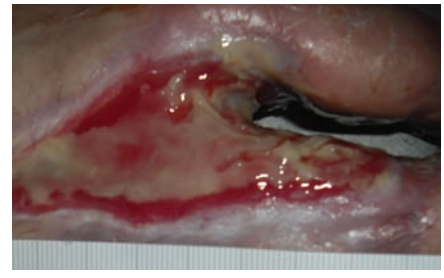


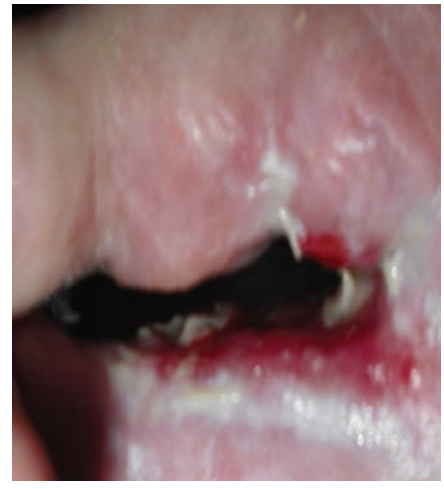
Seven days post Suprasorb X+PHMB application. 15/03/2010 — dorsum aspect of right hand.



15/03/2010 — plantar aspect of right hand.



Dorsum aspect of right hand.



Plantar aspect of right hand.

Antimicrobial dressing use in a community hospital

Debbie Keelor

This case involved an 83-year-old lady who presented with bilateral leg wounds, following bilateral angioplasty and surgical debridement. She also had a category 4 (European Pressure Ulcer Advisory Panel/National Pressure Ulcer Advisory Panel [EPUAP/NPUAP] 2009) pressure ulcer to her left heel, identified following assessment by the county tissue viability link nurse and tissue viability nurse.

It was decided to apply Suprasorb® X+PHMB (polyhexamethylene biguanide) HydroBalance antimicrobial dressing to manage infection, Suprasorb® X HydroBalance dressing for pain relief, and Flivasorb® superabsorbent dressing to manage exudate at different stages of her healing (Kingsley et al, 2009; Tadej, 2009). These dressings were being evaluated as part of an audit within the primary care trust (PCT).

Case report

The lady was admitted for rehabilitation and wound management. She had a past history of tablet controlled diabetes, bilateral angioplasties under general anesthesia, and surgical debridement of leg ulcers. She presented with ischaemic leg ulceration, which had 90% necrotic tissue and a category 4 pressure ulcer to the left heel.

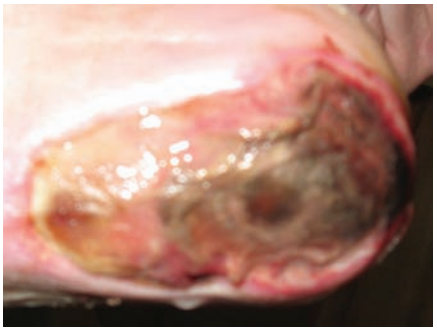
On admission to the community hospital, a holistic assessment and specific wound and pain assessment were undertaken. The wounds presented with the clinical signs of infection (European Wound Management Association [EWMA], 2005, 2006) with high levels of exudate, redness, raised temperature and an increase in pain, especially from the left heel. Her pain was controlled by MST 10mg twice daily, Amitryptline 20mg at night and Oramorph 5mgs before dressing changes. A decision was made to start the use of Suprasorb X+PHMB and Flivasorb to manage her symptoms.

Method

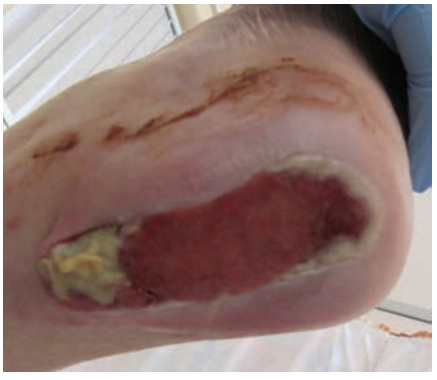
A holistic wound assessment was undertaken. Wounds swabs were taken from all wounds. The wound to the back of the right leg measured 14x30cm, the wound to the top of the right leg measured 6x4cm, and both wounds had high levels of exudate and slough, with thick slough to the Achilles area of the right heel. The wound on the top of the left leg measured 10x10cm with slough and high levels of exudate, the pressure ulcer category 4 to the left heel measured 10x6cm with black eschar and pain.

The wounds were irrigated with normal saline and Cavilon™ No Sting Barrier Film Spray (3M) was applied to the surrounding skin to prevent maceration. Suprasorb X+PHMB was applied to all wounds as the primary dressing, with Filvasorb as a secondary dressing. This was documented on the wound assessment chart, with a dressing change regimen of every two days. The response to the Suprasorb X+PHMB led to a positive clinical outcome with the reduction of exudate. Following assessment, it was decided to stop the Filvasorb after the second dressing change and use a foam dressing.

At three weeks the wounds were showing signs of healing, exudate levels began to reduce and pain was beginning to improve. Suprasorb X+PHMB had hydrated the eschar on the left heel and the thick slough to the right heel had reduced. At this point a decision was made to use larval therapy to debride the remaining slough, one application of larvae to the right heel and 2 applications to the left heel. As there were no further signs of infection, treatment was changed to Suprasorb X.



Left heel, 8 July, 2010.



Left heel, 4 September, 2010.

Results

After eight weeks of wound management there was significant improvement to both wounds. The wound beds had healthy granulating tissue, there was a reduction in size, and the wound to the top of the right leg had almost healed. Her pain had reduced, the MST was initially reduced to 5mgs twice daily

Debbie Keelor, Ward Manager, Tissue Viability Link Nurse, Malvern Community Hospital, Worcestershire PCT

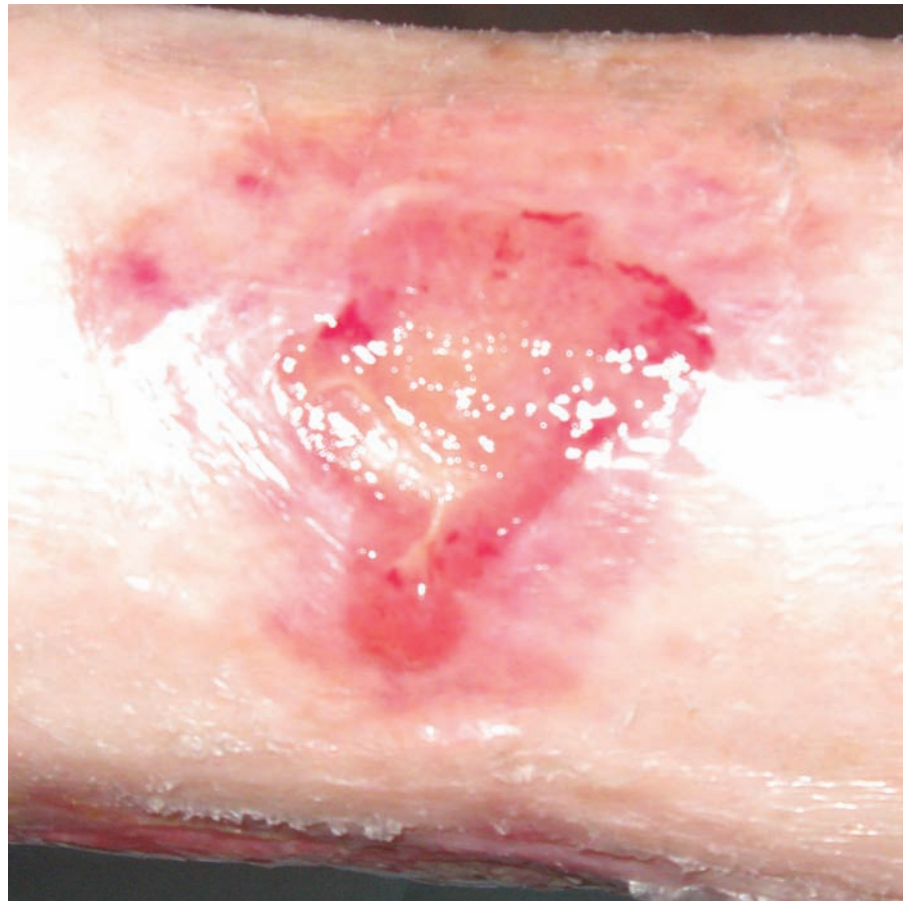
and eventually stopped. Additionally, the Amitryptylline was reduced to 10mgs at night, with an occasional anti-inflammatory being given.

Discussion

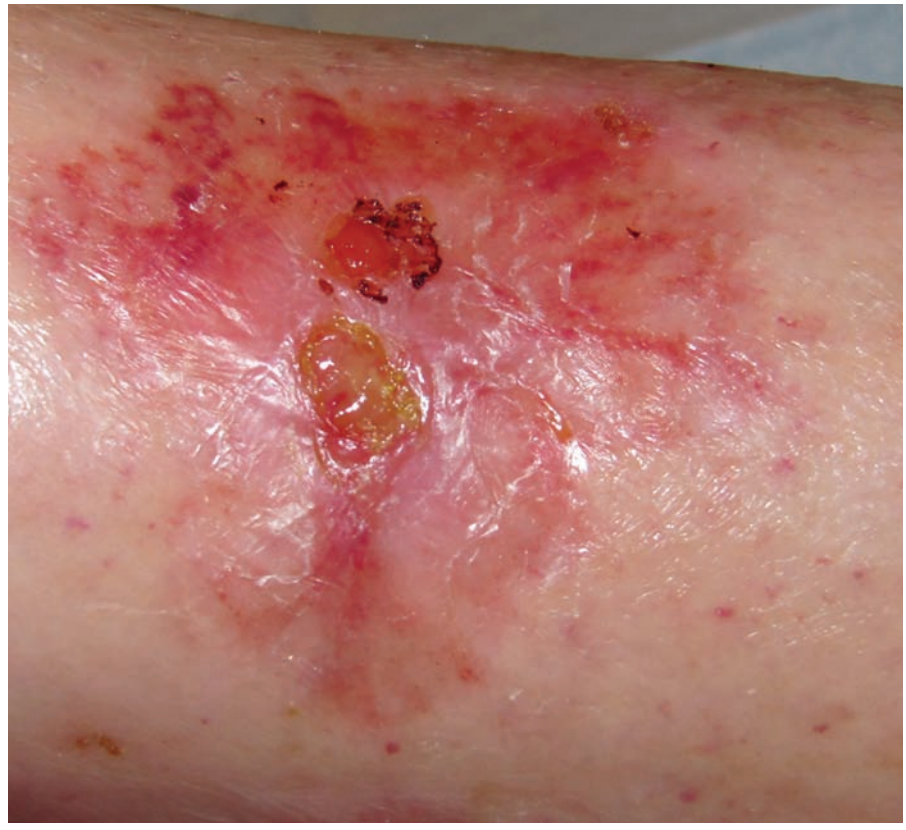
This product was easy to use and comfortable for the patient. Initially, it was found that the Suprasorb X+PHMB was drying out. It was felt that this was due to the Filvasorb. Therefore, the secondary dressing was changed to a foam dressing. A semi-permeable dressing was tried but this was found to be neither as easy, nor as cost-effective to manage the wound. Suprasorb X+PHMB was used for a period of 4–5 weeks on two of the wounds, compared with silver which had been used before she was referred to the tissue viability team — this was continued for seven more days but found to be ineffective. After the infection had subsided, Suprasorb X was continued as the primary dressing.

Conclusion

This case was an interesting journey for the team and the patient. It was encouraging to see significant wound bed healing and a reduction in pain for the patient. The wounds continue to progress, with one wound almost healed. The patient, too, has made progress and is concentrating on her rehabilitation with a goal of returning home.



Top of right leg, 14 July, 2010.



Top of right leg, 4 September, 2010.

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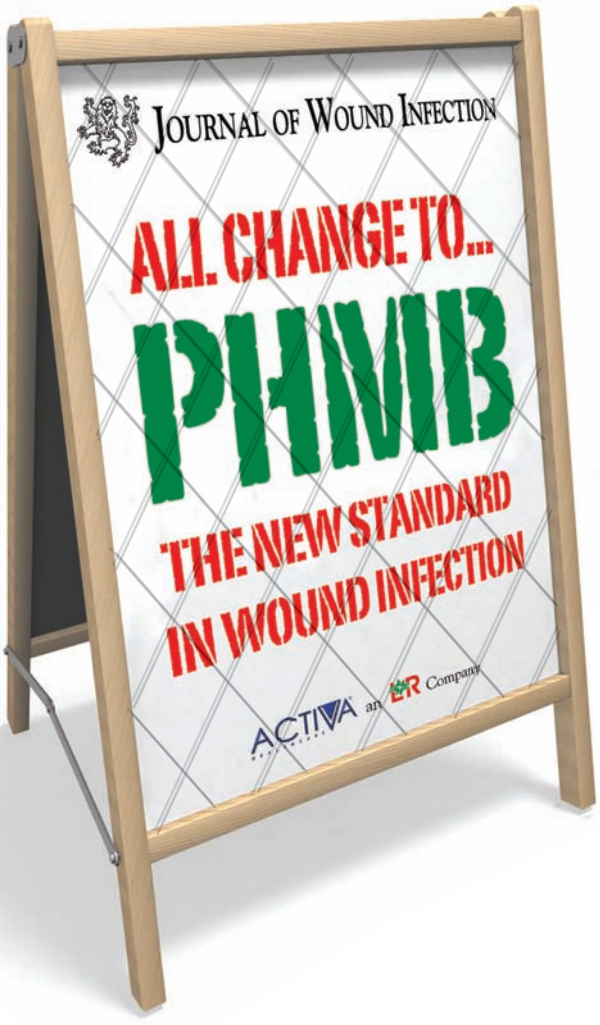

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