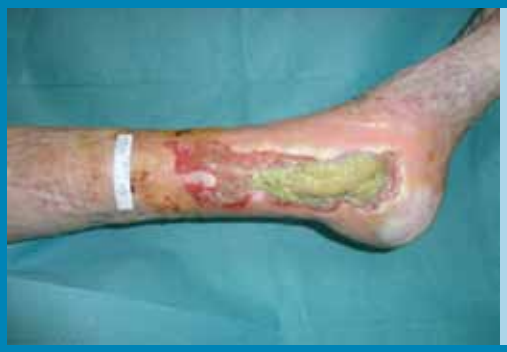
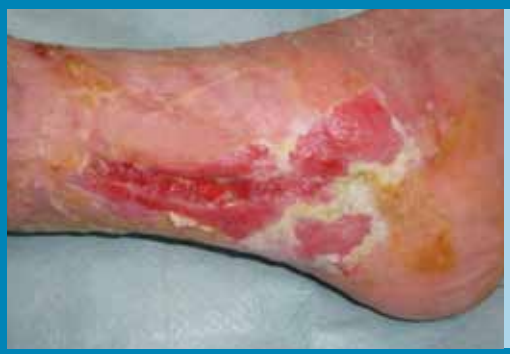
A TARGETED APPROACH TO COMPLEX WOUNDS: A CASE STUDY EVALUATION

USING SILVERCEL® NON-ADHERENT



USING ACTISORB® SILVER 220



USING PROMOGRAN®/PROMOGRAN PRISMA®

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A TARGETED APPROACH TO COMPLEX WOUNDS

For the majority of people with a wound, the process of healing is straightforward. However, for some patients, healing is prolonged and accompanied by major symptoms, such as pain, exudate and odour, which adversely affect their quality of life (EWMA, 2008).

The normal healing process can be divided into four overlapping and well-orchestrated phases: haemostasis, inflammation, proliferation and maturation. This process can be interrupted at any stage due to a variety of intrinsic and extrinsic inhibitory factors (Vowden, 2011). An understanding of the physiology of normal wound healing and its relevant phases allows clinicians to be better placed to intervene and provide management and treatment solutions when problems occur.

Box 1: Factors for delayed healing (from Vowden, 2011)

- Patient-related factors (eg underlying pathology/ comorbidities, severe pain, psychological factors, gender and reduced mobility)
- Wound-related factors (eg ulcer size >10cm^2
- Ulcer duration >6 months, anatomical location and wound bed condition)
- Clinical competency factors (eg skills and knowledge of healthcare professional)
- Resources and treatment-related factors (eg availability and suitability

WHAT FACTORS DELAY WOUND HEALING?

Wound aetiology, patient age and the presence of significant co-mordibities can all impact on the healing process, as do factors such as wound size and depth, location, wound duration and the presence of a heavy bioburden (Vowden, 2011). However the reason for delayed healing may not be related solely to an abnormality within the wound itself. Available healthcare resources, product availability and the skill and knowledge of the attending clinician may also influence outcomes (Box 1) (Vowden, 2011).

Although delayed healing appears to be common, it is frequently not recognised at an early stage and can pose a major problem. This can have a negative impact on clinical workloads and use of healthcare resources (Vowden, 2011). The earlier the wound healing problems are detected, the better the outcome will be for the patient (Harding et al, 2005).

When treating a patient with a wound, it is essential that a thorough patient history is taken and underlying conditions that could influence healing are diagnosed. Recognising non-healing requires careful reassessment over several weeks while delivering a treatment plan to move the wound towards healing (Troxler et al, 2006).

If the wound fails to progress (eg reduce in size or there is no improvement within the expected time frame) it is essential to reassess the patient and alter the treatment plan (Int Consensus, 2011).

INFECTION AND WOUND HEALING

Infection is the single most important contributory factor in delayed wound healing (WUWHS, 2008). Most wounds contain micro-organisms (particularly bacteria), yet the majority are not infected. The potential for bacteria to produce harmful effects is influenced by the ability of the patient's immune system to combat the bacteria as well as the number and type of bacteria present. A wound infection continuum — ranging from contamination, colonisation, critical colonisation through to infection — is a useful aid to understanding the level of bacteria in the wound and when intervention is required to prevent deterioration and to facilitate wound healing (WUWHS, 2008) (Figure 1).

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 with antimicrobial dressings and/or systemic antibiotics (Vowden et al, 2011).

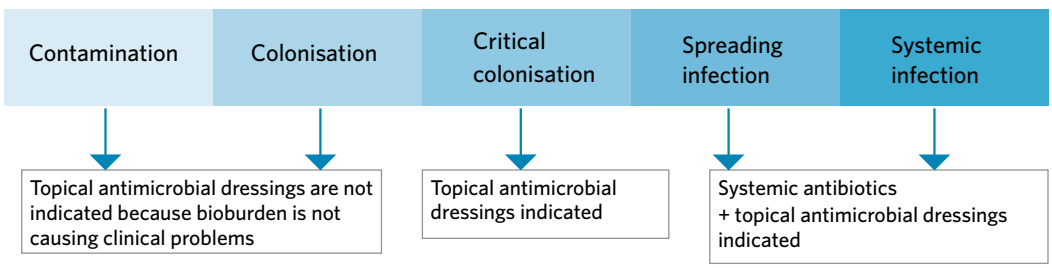


Figure 1: The wound infection continuum and measures taken towards healing (adapted from Int Consensus, 2012)

Selecting a topical antimicrobial dressing

When choosing an appropriate antimicrobial dressing, the priority should be to regain control of bacterial growth. In addition to reducing bacterial load, clinicians need to consider how different antimicrobial products support moist wound healing, manage exudate levels and assist wound bed preparation (Vowden et al, 2011).

Role of silver

The topical antimicrobial agent silver has been used for hundreds of years in wound care. In recent years, a wide range of wound dressings that contain elemental silver or a silver-releasing compound have been developed. All silver-containing wound products only exert antimicrobial effects when they release the ionic form of silver (Ag^+). This usually occurs when the dressing comes into contact with wound fluid (Int Consensus, 2012).

Silver ions are active against a broad range of bacteria, fungi and viruses (Int Consensus, 2012), including antibiotic resistant bacteria, such as methicilin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococci* (VRE). In addition, *in vitro* studies using experimental models of biofilms suggest that silver may kill bacteria within the biofilm matrix and reduce bacterial adhesion, destabilising the matrix (Chaw et al, 2005; Percival et al, 2008).

Appropriate use of silver dressings

A recent consensus on the appropriate use of silver dressings described the main roles of silver dressings in the management of wounds to be the reduction of bioburden and to act as an antimicrobial barrier (Int Consensus, 2012).

Whenever a silver-containing dressing is used to improve healing or to prevent infection, the rationale should be fully documented in the patient's health records and a schedule for review should be specified.

The 2012 consensus recommends that silver dressings be used initially for a two week 'challenge' period. At the end of the two weeks, the wound, the patient and the management approach should be re-evaluated. If after two weeks, the wound has:

- improved, but there are continuing signs of infection, it may be clinically justifiable to continue to use silver dressings with regular review
- improved and there are no longer signs or symptoms of infection, the silver dressing should be discontinued
- not improved, the silver dressing should be discontinued and the patient reviewed and a dressing containing a different antimicrobial agent initiated, with or without systemic antibiotics.

ELEVATED PROTEASE ACTIVITY (EPA) AND WOUND HEALING

Wounds that are not healing despite correction of underlying causes, exclusion of infection and optimal wound care, may be stuck in a persistent inflammatory state (Vowden, 2011).

In normal wound healing, there is an initial rapid rise in protease activity, which starts to reduce by about day five (Figure 2). In non-healing wounds, protease activity reaches higher levels and persists for longer (Int Consensus, 2011). If left unchecked, sustained excessive protease activity can start to destroy the healthy extracellular matrix and newly formed tissue, preventing the wound from progressing to the proliferative stage (Int Consensus, 2011).

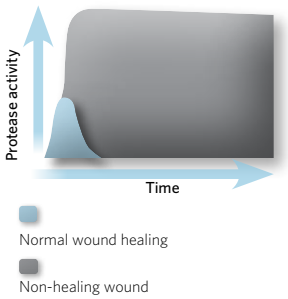


Figure 2: Protease activity over time in healing and non-healing wounds (Int Consensus, 2011)

Studies have found elevated levels of protease activity in a range of non-healing wounds, including venous leg ulcers, diabetic foot ulcers, pressure ulcers and non-healing trauma wounds (Ladwig et al, 2002; Beidler et al, 2008; Liu et al, 2009; Serena et al, 2012a). This suggests that elevated protease activity is related to a problem with the healing process itself rather than to the underlying cause.

Chronic wounds with EPA have a 90% probability they will not heal (without appropriate intervention) (Serena et al, 2012a). However, approximately 28% of non-healing wounds may have EPA (Serena et al, 2012b). Elevated protease activity has therefore been identified as a suitable biochemical marker for predicting poor wound healing in chronic wounds (Int Consensus, 2011).

There are a number of interventions that may reduce protease activity in a wound. The three key principles involved are:

- treat the underlying cause and any factors that may delay healing, eg compression, offloading and revascularisation
- optimise the wound bed and patient condition, eg regular debridement and cleansing, and effective exudate management
- modulate protease activity, eg protease modulating dressings.

The use of protease modulating therapy to reduce excessive protease activity allows a targeted treatment approach for wounds that have not progressed within an expected time frame. It has been suggested that the ability for a wound to heal may be determined by a reduction in wound area over 2–4 weeks (Dissemond et al, 2013).

Selecting a protease modulating therapy

There are many dressings classified as protease modulating, but not all dressings within this category will work the same way (Young, 2012). Some will reduce protease activity by absorbing exudate, removing proteases and/or inflammatory mediators from the wound bed; others act directly by binding or inactivating proteases (Young, 2012). The action of these protease modulating dressings is supported by varying levels of evidence, including the results of randomised controlled trials (Lazaro-Martinez et al 2007; Gottrup et al 2011).

When choosing which dressing to use to modulate protease activity, it is important to also consider the needs of the wound and the patient. For example, does the dressing have the right absorbency to manage exudate effectively?

Role of collagen/ORC dressings

Collagen/ORC dressings have been shown to reduce the activity of proteases, as well as levels of inflammatory cytokines in a range of chronic wounds (Cullen et al, 2002; Cullen et al, 2004; Smeets et al, 2008).

When a dressing comprising a collagen/ORC matrix (eg PROMOGRAN®/PROMOGRAN PRISMA®) comes into contact with fluid/exudate in the wound, it absorbs the liquid to form a soft gel. This allows the dressing to conform to the shape of the wound and come into contact with all areas of the wound bed. The gel physically binds to and inactivates damaging proteases, both matrix metalloproteases (MMPs — in particular MMP-2 and 9) and elastase that are present within the wound. In addition, it binds with naturally occurring growth factors and prevents them from being broken down by damaging proteases. As the matrix slowly breaks down, the growth factors are released back into the wound in an active form, while the damaging proteases remain inactive (Cullen and Ivins, 2010).

Targeted use of protease modulating therapy

There are no visual signs to detect EPA and clinicians are not able to distinguish between normal inflammation (seen at the initial stage of wounding) and sustained, chronic inflammation associated with abnormally high protease levels (Young, 2012). In the past, measurement of protease activity has been used mainly for research purposes. More recently, a new technology has become available that allows clinicians to identify EPA in the wound bed. WOUNDCHEK™ Protease Status (Systagenix) is a rapid, point of care test method that is:

- Easy to use
- Able to detect EPA in 15 minutes
- Able to identify which wounds to treat with protease modulating therapy.

Once detected, and in the absence of clinical signs of infection, reduction in protease activity within the wound should become a clinical priority.

An international consensus recommended that protease modulating dressings should be used for short courses of 2-4 weeks, followed by review (Int Consensus, 2011). For wounds that are critically colonised or infected, the clinical priority should be to reduce the wound bioburden using topical antimicrobials and/or systemic antibiotics. If the wound continues to be slow to heal, EPA should be detected (if the test is available) and appropriate protease modulating treatment initiated (Figure 3).

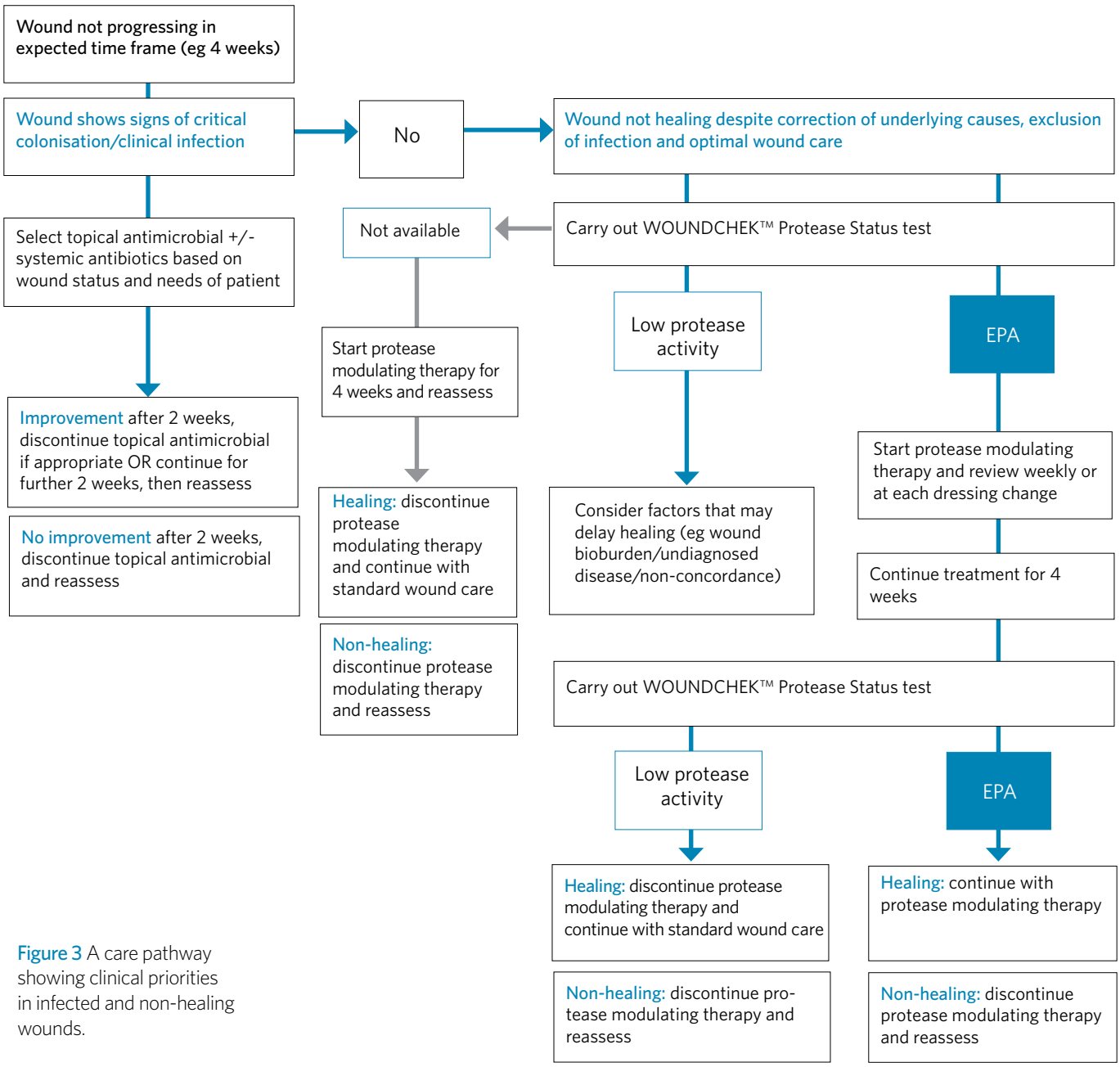


Figure 3 A care pathway showing clinical priorities in infected and non-healing wounds.

CASE STUDIES IN PATIENTS WITH COMPLEX WOUNDS

This document contains a number of case studies in patients with a range of complex wounds where healing may have been delayed due to infection and/or EPA.

These studies show that early and accurate detection of infection and EPA as part of a structured approach to wound assessment and management using targeted interventions (eg topical antimicrobials or protease modulating dressings) can potentially result in a reduction in overall treatment duration, resource use and costs. The case studies in this document evaluate the use of the following dressings:

- SILVERCEL® NON-ADHERENT
- ACTISORB® SILVER 220
- PROMOGRAN® AND PROMOGRAN PRIMSA®

FOR MORE ON SILVERCEL® NON-ADHERENT

SILVERCEL® MADE EASY http://www.woundsinternational.com/pdf/content_9675.pdf

CASE STUDIES 2012 http://www.woundsinternational.com/pdf/content_10580.pdf

PRODUCT INFOMATION: http://www.systagenix.co.uk/our-products/lets-protect/silvercel-antimicrobial-dressing-16

FOR MORE ON ACTISORB® SILVER 220

CASE STUDIES 2012 http://www.woundsinternational.com/pdf/content_10586.pdf

PRODUCT INFORMATION: http://www.systagenix.co.uk/our-products/lets-protect/actisorb-dressings-215

FOR MORE ON PROMOGRAM®/ PROMOGRAN PRIMSA®

PROMOGRAN® & PROMOGRAN PRISMA® MADE EASY http://woundsinternational.com/pdf/content_8836.pdf

CASE STUDIES 2012 http://www.woundsinternational.com

PRODUCT INFORMATION: http://www.systagenix.co.uk/our-products/lets-promote/promogran-prisma-3

SILVERCEL® NON-ADHERENT

SILVERCEL® NON-ADHERENT is a sterile absorbent antimicrobial dressing that is suitable for use in moderately to heavily exuding wounds, which are infected or at increased risk of infection. The dressing has an outer perforated film layer designed to prevent adherence to the wound and the shedding of fibres (Clark et al, 2009a; 2009b). The central absorbent core of the dressing is made up of a combination of highly absorbent high G calcium alginate and carboxymethylcellulose (CMC) and silver-coated fibres. The dressing delivers antimicrobial action through the release of silver ions (Ag^+) on contact with fluid (eg exudate).

Laboratory and clinical studies have indicated that the dressing is suitable for a wide range of wounds and offers:

- Good antimicrobial activity against many common wound pathogens, including multi-resistant organisms
- High absorbent capacity
- Good tolerability and low adherence (*see* Clarke and Bradbury, 2010).

SILVERCEL® NON-ADHERENT has been evaluated in patients with locally infected wounds, complex medical problems and a history of recurrent wound infections (Ivins et al, 2010). The dressing was easy to apply and remove, did not cause trauma and no fibres were seen in the wound bed. Signs of infection reduced during the evaluation and several patients experienced reduction in wound pain during dressing wear (Ivins et al, 2010).

ACTISORB® SILVER 220

ACTISORB® SILVER 220 is a sterile primary dressing comprising an activated charcoal cloth, impregnated with silver within a spun bonded nylon sleeve. It may be used in the treatment of most types of chronic wounds, but is particularly recommended for the management of malodorous, infected wounds.

When applied to a wound, the active charcoal layer absorbs bacteria and locally released toxins as well as volatile amines and fatty acids responsible for wound odour (Kerihuel, 2010). The silver in ACTISORB® SILVER 220 has been shown not to cause any detrimental effect to cell growth, while providing an antimicrobial effect (Nisbet et al, 2011a). An *in vitro* study found that the bacteria and endotoxins absorbed by the activated charcoal are destroyed by the silver within the dressing, preventing them from returning to the wound (Verdu et al, 2004). The perforated outer nylon sleeve of the dressing allows exudate to flow freely through to a secondary dressing, while facilitating dressing removal by minimising adherence to the wound.

Laboratory and clinical studies have indicated that the dressing offers:

- good antimicrobial activity (Furr et al, 1994; Jackson, 2001)
- good bacterial endotoxin binding for odour control (Nisbet et al, 2011b)
- good dressing tolerability (Stadler et al, 2002).

ACTISORB® SILVER 220 was evaluated in two separate randomised controlled trials in patients with chronic venous leg ulcers and pressure ulcers (Kerihuel, 2010). Evidence from non-controlled studies, large population surveys and case studies also support using ACTISORB® SILVER 220 in various clinical situations (Kerihuel et al, 2003; White, 2001). These studies have shown clinical benefits in reducing bioburden responsible for wound odour in patients with chronic wounds healing by secondary intention.

PROMOGRAN®/PROMOGRAN PRISMA®

PROMOGRAN® is a sterile, freeze-dried composite of 55% collagen and 45% oxidised regenerated cellulose (ORC). PROMOGRAN PRISMA® matrix is a freeze-dried composite of 55% collagen, 44% oxidised regenerated cellulose (ORC) and a 1% ORC/silver compound. PROMOGRAN®/PROMOGRAN PRISMA® matrix is designed to promote an optimal healing environment and 'kick start' the healing process (Cullen and Ivins, 2010). PROMOGRAN PRISMA® also provides protection against infection (Cullen et al, 2006).

In clinical trials, both dressings have been shown to improve healing rates in stalled wounds and to be cost-effective (Ghatenekar et al, 2002; Cullen et al, 2006; Lazaro-Martinez et al, 2007; Tacconi and Vagnoni, 2009). The clinical efficacy of PROMOGRAN®/PROMOGRAN PRISMA® compared with standard care has been demonstrated in a number of randomised controlled trials (*see* Cullen and Ivins, 2010). In addition, a recent study confirmed that the clinical efficacy of PROMOGRAN®/PROMOGRAN PRISMA® increased when targeted to wounds with EPA. Seventy-seven percent of venous leg ulcers with EPA responded to PROMOGRAN®/PROMOGRAN PRISMA® treatment by week four (Cullen et al, 2011).

CASE STUDIES: SILVERCEL® NON-ADHERENT

INFECTED — SILVER DRESSING TO TREAT INFECTION — REDUCTION IN SIGNS OF INFECTION AT WEEK 4

CASE 1: DIABETIC FOOT ULCER

Samantha Haycocks, Advanced Podiatrist, Salford Royal (NHS) Foundation, Salford, UK

BACKGROUND

Mr G, a 59-year-old man with type 2 diabetes, presented at the podiatry clinic with ulceration to the right foot. The wound had been sustained when Mr G was walking without his orthotic device at a social event. Initially the area had blistered and subsequently the skin broke down. The wound had been present for 3 weeks and had been treated over that period with an absorbent foam dressing containing silver sulfadiazine (Allevyn™, Smith & Nephew). Mr G was also on oral antidiabetes medications.

Treatment

The wound was located on the fifth metatarsal head, measured 20mm x 15mm and extended to bone. The patient had had intravenous antibiotics for eight days which was then changed to oral antibiotics. On examination the wound appeared to be infected. Swab results indicated a Group B *Streptococcus* was the causative agent. SILVERCEL® NON-ADHERENT was applied to the wound and left in place for three days. Dressing change was carried out by the district nurse between clinic visits.

Week 1: Mr G returned to the clinic one week later. The dressing did not require soaking prior to removal and no debris was left on the wound bed. The patient did not complain of pain. Clinical examination indicated that the erythema was subsiding and the volume of exudate was reducing. There was evidence of 0-25% granulation tissue. There was slight malodour, but overall the wound was showing signs of improvement. The patient continued on antibiotic therapy and SILVERCEL® NON-ADHERENT as the primary dressing.

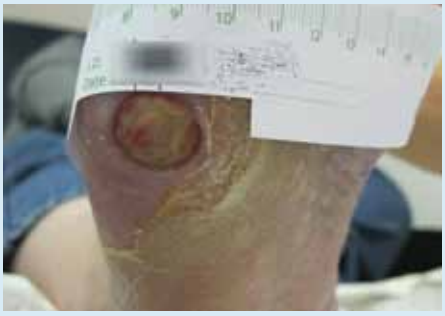
Week 2: The patient had some pain prior to dressing change and on dressing removal (3 on a VAS of 1-10), but did not wish to have any analgesia. The dressing was removed easily without soaking and did not leave debris on the wound bed. The wound had reduced in size (15mm x 14mm). Exudate levels were reduced and there was no malodour. The wound bed had 25-50% granulation tissue. SILVERCEL® NON-ADHERENT was reapplied.

Week 3: The patient continued to improve and there was no pain prior to or on dressing removal. There was a marked improvement in the wound bed with 25-50% granulation tissue present. SILVERCEL® NON-ADHERENT was reapplied.

Week 4: There was a marked improvement in the wound, with no malodour, a reduction in exudate volume and the wound had reduced in size (10mm x 10mm). The wound bed showed 100% granulation tissue coverage.

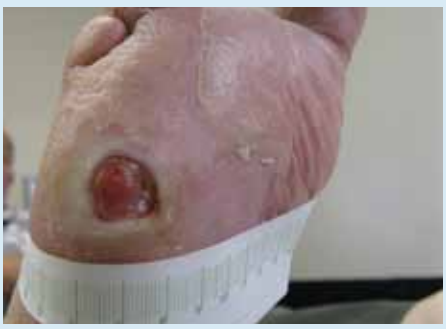
Outcome

An inter-professional approach involving podiatry and nursing staff, good local wound care and antibiotic therapy were key in progressing the wound to healing in a timely fashion. Odour was quickly eliminated, exudate levels reduced and the wound bed improved. Throughout the treatment period the staff graded SILVERCEL® NON-ADHERENT as highly satisfactory in terms of ease of use. Mr G was happy with the outcome and assured staff he would wear his orthotic appliance at all times when weight bearing.



Week 1

Week 3



Week 4

Figures 1-3: The ulcer reduced in size over the four-week case study period with marked improvement in the wound bed with increased granulation tissue and reduction in exudate levels and malodour.

CASE STUDIES: SILVERCEL® NON-ADHERENT

INFECTED — SILVER DRESSING TO TREAT INFECTION — REDUCTION IN SIGNS OF INFECTION AT WEEK 4

CASE 2: DIABETIC FOOT ULCER

By: Paul Chadwick, Principal Podiatrist, Salford Royal (NHS) Foundation, Salford, UK

Background

In May 2012, Mr S presented with a foot ulcer. He had a pressure relieving device but it had become worn resulting in trauma to the right toe. The wound had been present for 10 months. Mr S, a 40-year-old man with type 2 diabetes, had peripheral neuropathy, hypertension and venous insufficiency. He was on antidiabetes medication and had been fitted with bespoke shoes with a rocker sole to relieve pressure from the toe.

Treatment

The ulcer was located on the plantar aspect of the first right toe and measured 16mm x 16mm. On examination there were signs of infection, localised cellulitis, malodour and moderate amounts of exudate. He also presented with cellulitis on the left foot extending to the lower leg. Mr S commenced oral antibiotic therapy for 10 days. The wound was dressed with SILVERCEL® NON-ADHERENT ribbon. The patient undertook dressing changes himself on alternate days.

Week 1: The patient reported a pain score of 3 (measured on a VAS of 1-10) prior to dressing change. A pain score of 4 was also recorded on dressing removal, but the patient indicated that he did not require analgesia to control the pain. The dressing was easy to remove and did not require soaking. On removal no debris remained in the wound bed.

Although there was no decrease in wound size and some malodour was still present, signs of infection decreased and the wound bed contained 50-75% granulation tissue. There was an increased level of haemoserous exudate and it was decided to change the dressing daily.

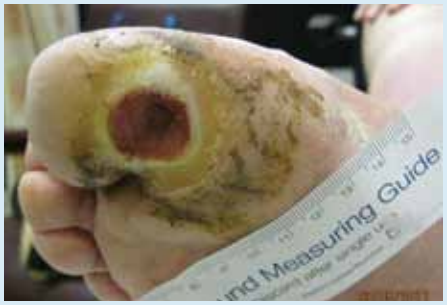
Week 2: There was no pain prior to or during dressing change. Wound debridement was carried out. There were reduced signs of infection and there was evidence of 50-75% granulation tissue, with slight maceration to the periwound skin. Slight malodour was still present, the wound had reduced in size (15mm x 15mm).

Week 3: Exudate levels had reduced and there was no malodour; there was slight localised erythema. Due to the general improvement, wound dressings were reduced to alternate days. Treatment with SILVERCEL® NON-ADHERENT was continued.

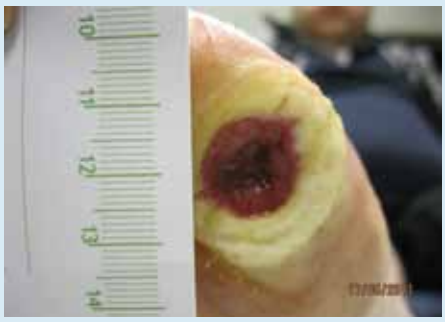
Week 4: Wound debridement was carried out resulting in an increase in wound size (20mm x 17mm). No erythema, heat or swelling were noted and the wound bed had 50-75% granulation tissue. The general improvement in the wound meant Mr S was able to be more mobile. This was important for general wellbeing but it did lead to an increase in exudate levels. The wound dressing was changed at this time to a superabsorbent dressing to manage the higher exudate levels.

Outcome

During the course of treatment, the clinical staff rated the dressing as satisfactory or highly satisfactory in terms of ease of use. Debridement of non-viable tissue and topical antimicrobial therapy avoided a further course of antibiotics in this instance. The patient was fitted with new pressure relieving footwear and he was able to resume his normal activities.



Baseline



Week 2

Week 4

Figures 1-3: The general improvement in the wound over the four-week case study period meant that the patient was able to be more mobile.

CASE STUDIES: SILVERCEL® NON-ADHERENT

INFECTED — SILVER DRESSING TO TREAT INFECTION — REDUCTION IN SIGNS OF INFECTION AT WEEK 4

CASE 3: AMPUTATED TOE WOUND

By: Helen Strapp, Tissue Viability Clinical Nurse Specialist, AMNCH Tallaght Hospital, Dublin, Ireland

BACKGROUND

In May 2012, Mr M presented with a wound on his left foot following amputation of the second toe. Surgery had been required two weeks previously to remove bone fragments. The wound had been present since July 2011, when Mr M had been unaware of a screw in his shoe that had caused skin breakdown.

Mr M, a 54-year-old man, had insulin-dependent diabetes, hypertension and Barrett's oesophagus. The original wound had been treated with cadexomer iodine paste (Iodoflex®, Smith & Nephew), a Hydrofiber® dressing (Aquacel®, ConvaTec) and a silver Hydrofiber® dressing (Aquacel® Ag, ConvaTec). Mr M was not receiving systemic antibiotics.

Treatment

The wound on the left foot measured 30mm x 20mm and was 20mm deep. It appeared to be infected, was malodorous and exuding heavily. The edges of the wound were macerated. Because of the depth of the wound, SILVERCEL® NON-ADHERENT ribbon was chosen to treat the infection and manage the exudate.

Week 1: The wound was reassessed after three days. There was no pain on dressing removal, although the patient reported a pain score of 4 (on a VAS of 1-10) before the dressing change. The wound had reduced in size to 25mm x 15mm x 30mm with evidence of 50-75% granulation tissue. Malodour was still present but less noticeable and the wound continued to exude heavily.

SILVERCEL® NON-ADHERENT ribbon was reapplied and reviewed three times per week.

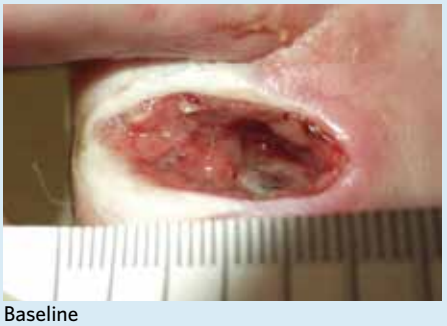
Week 2: On reassessment after a further week, the wound was no longer odorous and other signs of infection were reduced. The wound was exuding less and there was no erythema. The wound had decreased in size and was now 23mm by 12mm, and 12mm deep. It was decided to continue with thrice weekly dressing changes and to reapply SILVERCEL® NON-ADHERENT ribbon.

Week 3: The patient reported less pain prior to dressing change and no pain on dressing removal. The wound had continued to improve with further reductions in the amount of exudate, no erythema and a clean wound bed. The wound measured 20mm x 10mm and was only 2mm deep. A flat SILVERCEL® NON-ADHERENT dressing was applied and the patient was reviewed in three days.

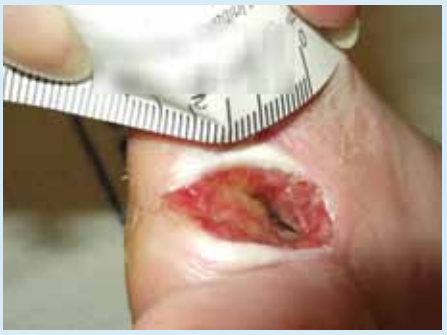
Week 4: The patient was now pain free before and during dressing removal, and the wound was considerably reduced in size to 12mm x 8mm and had no depth. There was some evidence of overgranulation and treatment was changed to a povidone iodine dressing (INADINE®, Systagenix)

Outcome

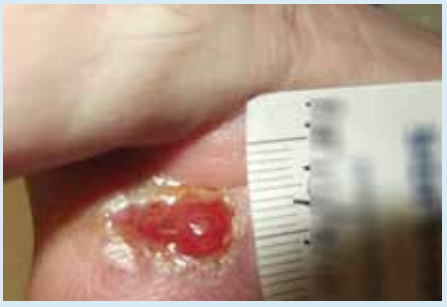
Clinicians commented that the SILVERCEL® NON-ADHERENT ribbon and dressing were easy to use. Over the case study period, the size and depth of the wound decreased considerably in size and the reduction in malodour and exudate volume indicated that bioburden was much reduced.



Baseline



Week 1



Week 4

Figures 1-3: The size and depth of the ulcer reduced over the case study period with a reduction in odour and exudate.

CASE STUDIES: SILVERCEL® NON-ADHERENT

HEAVILY COLONISED — SILVER DRESSING TO REDUCE BIOBURDEN — NO SIGNS OF CRITICAL COLONISATION AT WEEK 4

CASE 4: VENOUS LEG ULCER

By: Jane Megson, Wound Care Research Nurse, Bradford Royal Infirmary, Bradford, UK

BACKGROUND

Mr A, a 73-year-old man, presented to the outpatient clinic in May 2012 with a venous leg ulcer of 4 years' duration. The ulcer was located over the pre-tibial aspect of the right lower leg and measured approximately 14.5cm^2. The patient's history suggested that the ulcer had originally developed following an episode of cellulitis and skin breakdown. Various treatments had been tried with limited success.

Four-layer compression bandaging had been in use throughout. The patient was also receiving pregabalin (Lyrica®, Pfizer) for neuropathic pain.

Treatment

On examination the ulcer was assessed to be heavily colonised although not clinically infected. SILVERCEL® NON-ADHERENT was selected to reduce the wound bioburden and four-layer compression bandaging was applied to promote venous return.

Week 1: Initially, the patient reported a low level of pain (2 on a VAS of 1-10). However, this increased at dressing change to 8 and oral analgesia was required despite soaking the dressing prior to removal (this was done to help alleviate the pain, the dressing did not adhere to the wound bed). It was noted that a second wound on the leg may have also contributed to the patient's pain.

On assessment of the ulcer and surrounding area later that week, it was noted that signs of critical colonisation, including exudate levels, had diminished and the wound size had decreased from 14.5cm^2 to 12cm^2. Granulation tissue was evident in 0-25% of the wound bed. SILVERCEL® NON-ADHERENT was continued for a further week.

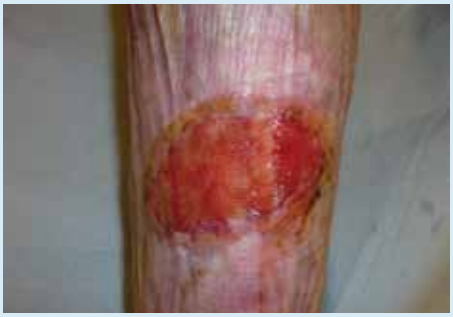
Week 2: The patient reported a pain score of 3 increasing to 9 on dressing removal, despite oral analgesia and soaking the dressing pre-removal. On inspection the ulcer was free of debris and signs of critical colonisation remained diminished with a reduction in exudate levels. The wound bed appeared healthy with approximately 50-75% granulation tissue coverage and the wound size had decreased again (10.5cm^2). Compression bandaging layers were reduced from four to three to reduce pain.

Week 3: Mr A's pain score reduced from 8 to 3 at dressing change, a considerable improvement on previous weeks. No analgesia was required and the dressing was removed easily without pre-soaking. The ulcer size was slightly reduced (10cm^2) and the coverage of granulation tissue in the ulcer bed remained constant at 50-75%. No signs of infection were observed.

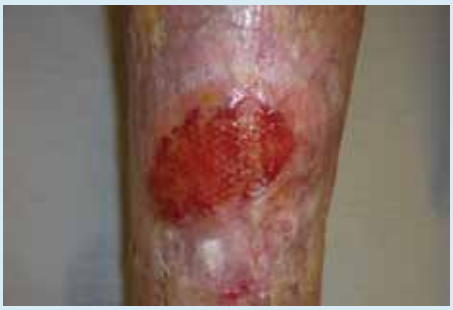
Week 4: Dressing change pain remained comparatively low (VAS of 2) and the wound dimensions had decreased to 9cm^2. Granulation tissue coverage was between 50-75%. No signs of infection or critical colonisation were noted.

Outcome

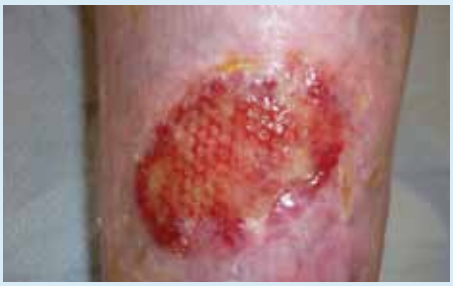
Quality of life can be significantly affected by chronic wounds. There was a good reduction in Mr A's pain levels at dressing change and the wound showed no signs of critical colonisation or infection by week 4.



Baseline



Week 2



Week 4

Figures 1-3: The ulcer reduced in size over the four-week case study period with a reduction in pain during dressing changes and an increase in granulation tissue.

CASE STUDIES: SILVERCEL® NON-ADHERENT

HEAVILY COLONISED — SILVER DRESSING TO REDUCE BIOBURDEN/PAIN — BIOBURDEN/PAIN REDUCED AT WEEK 4

CASE 5: VENOUS LEG ULCER

Jane Megson, Wound Care Research Nurse, Bradford Royal Infirmary, Bradford, UK

BACKGROUND

In April 2012, Mrs S presented to the outpatient clinic with a venous ulcer of 7 months' duration on her right lower leg, resulting from a traumatic skin injury sustained when moving a chair.

Mrs S, an active and independent 90-year-old woman, underwent a left hip replacement and varicose vein surgery (7 and 40 years prior, respectively). In recent years she had reported problems with swelling in her right leg, but was not receiving medication for this. Prior to presentation, Mrs S's ulcer had been treated by community nurses with three-layer graduated compression bandaging and various antimicrobial treatments — most recently, silver sulfadiazine (Flamazine™, Smith & Nephew).

Treatment

The venous ulcer was located on the lateral gaiter aspect of the right leg with a surface area of approximately 8.5cm^2. On assessment, the wound appeared heavily colonised but uninfected, with localised erythema, exudate and pain. Clinical priorities for wound management were to reduce the wound bioburden and minimise pain at dressing change. SILVERCEL® NON-ADHERENT was chosen for use in conjunction with compression bandaging.

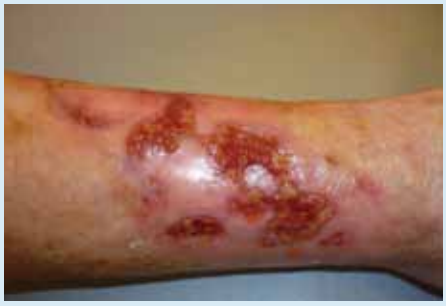
Week 1: Signs of local infection were reduced including no malodour and comparatively less exudate and erythema than seen on initial presentation. The wound bed showed evidence of 25-50% granulation tissue and a 5cm^2 reduction in wound size (from 8.5cm^2 to 3.5cm^2). The dressing was removed easily from the wound bed although the patient reported moderate pain during the dressing change, recorded as 5 on a visual analogue scale (VAS) of 1-10. On dressing removal the wound bed was clean.

Week 2: SILVERCEL® NON-ADHERENT was reapplied for a further week. On reassessment, Mrs S reported that her pain at dressing change was slightly reduced (from 5 to 4 using the VAS). There was less exudate and erythema and no malodour was noted. Granulation tissue had increased to 50-75% of the wound bed.

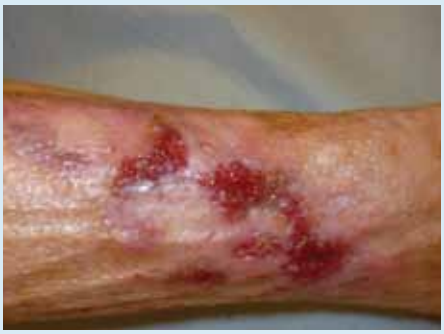
Weeks 3–4: Improvements in the wound continued over the next 2 weeks of treatment with once weekly assessments showing further reductions in pain, exudate levels, erythema distribution and ulcer size. At week 4, the final case study assessment, Mrs S reported no pain on dressing change. The wound size was 1.5cm^2 (a decrease of 7.5cm^2 in total).

Outcome

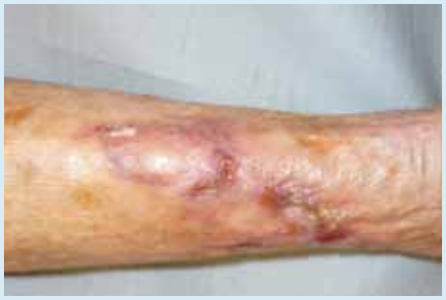
SILVERCEL® NON-ADHERENT was found to be easy to use, with clinicians reporting a high level of satisfaction overall. A reduction in exudate, erythema and pain indicated that the wound bed bioburden had diminished. Granulation tissue had increased and there was a reduction in wound size. Most importantly from the patient's perspective, pain at dressing change was eliminated.



Baseline



Week 2



Week 4

Figures 1-3: The ulcer reduced in size over the four-week case study period with evidence of new granulation tissue and an overall improved colour.

CASE STUDIES: ACTISORB® SILVER 220

CRITICALLY COLONISED — SILVER DRESSING TO MANAGE BIOBURDEN/ODOUR — BIOBURDEN/ODOUR REDUCED AT WEEK 4

CASE 6: VENOUS LEG ULCER

By: Professor Marco Romanelli, Consultant Dermatologist, University of Pisa, Italy

Background

Mr N was a 52-year-old man who had multiple non-healing chronic wounds due to venous insufficiency. The patient was a smoker.

The patient presented to the clinic with a venous leg ulcer, which had recurred at a previously healed site on the right leg. The wound had been present for 5 years. Advanced wound dressings and inelastic 2-layer compression bandaging had been used to treat the wound.

Treatment

The ulcer measured 8.6cm x 3.5cm on presentation and was critically colonised with odour, which had been a problem for the past month. The patient reported a pain score of 6 on a VAS of 1-10. It was decided to treat the wound with ACTISORB® dressing to control the odour and bacterial burden.

Week 1: After a week of treatment, there was no change in the appearance or size of the wound, although the odour had reduced. Granulation levels were between 0–25% and the exudate level was high. There was no erythema but there was fibrin present in the wound bed.

The clinician assessing the wound was satisfied with the dressing and reported that it was very easy to use. It was decided to continue using ACTISORB® together with two-layer inelastic compression.

Week 2: The wound showed signs of improvement with 50–75% granulation tissue and exudate levels had reduced. The periwound skin also seemed improved. The wound size remained static at 8.6cm x 3.4cm. It was decided to continue with the treatment regimen.

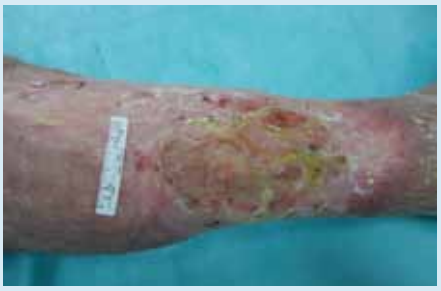
Week 3: Signs of infection were further reduced. Granulation was good at 50–75% coverage. Odour was reduced and the wound had decreased in size to 7.4cm x 3.5cm. It was decided to continue with ACTISORB® and two-layer compression. The wound was also cleansed with a saline solution.

Week 4: There was good granulation at 25-50% and there were no signs of infection. Odour was reduced. There was no change in size from week 3 and the wound remained static at 7.4cm x 3.5cm.

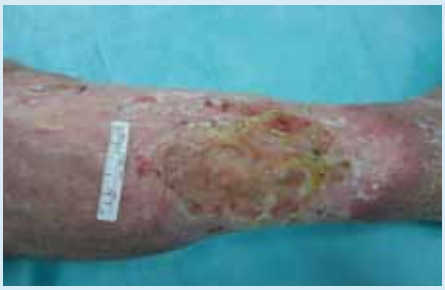
It was decided to continue with the treatment regimen.

Outcome

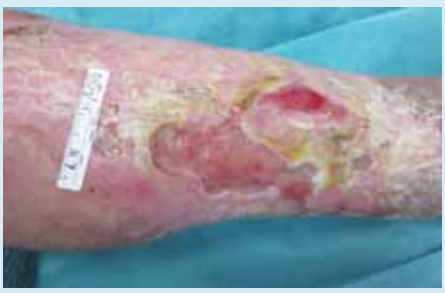
ACTISORB® was found to be easy to use, with clinicians reporting a high level of satisfaction overall. A reduction in exudate indicated that the wound bed bioburden had diminished. Granulation tissue had increased and there was a reduction in wound size. Most importantly, from the patient's perspective, the wound odour was reduced.



Baseline



Week 1



Week 4

Figures 1-3: The size of the ulcer reduced over the four-week case study period. A decrease in odour and exudate was observed.

CASE STUDIES: ACTISORB® SILVER 220

INFECTED — SILVER DRESSING TO REDUCE BIOBURDEN/MANAGE ODOUR — NO SIGNS OF INFECTION AT WEEK 2

CASE 7: INFECTED DIABETIC

Paul Chadwick, Principal Podiatrist, Salford Royal (NHS) Foundation, Salford, UK

BACKGROUND

Mr G was a 42-year-old man who had insulin-dependent type 2 diabetes and neuropathy. He presented with two infected diabetic foot ulcers with heel fissures on the left foot.

Treatment

On clinical examination one wound measured 15mm x 20mm and the other was 15mm x 20mm x 4mm. The ulcers had been present for five weeks and had been treated with Allevyn™ (Smith & Nephew) and a softcast heel. The patient had been taking antibiotics (co-amoxiclav) for four weeks to treat infection of the left heel. It was thought that the ulcers had been infected and malodorous for the past week. The patient was in some pain, rating it as 4 on a VAS of 1-10. It was decided to treat the wound with ACTISORB® to manage the odour and bacterial burden.

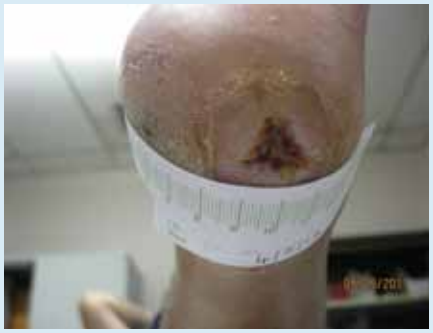
Week 1: After one week of treatment the signs of infection had reduced. There was less erythema, less exudate and much less odour. There was 25–50% granulation tissue. The wounds had not reduced in size, but the clinician was highly satisfied with the progress and it was decided to continue with the dressing regimen as well as the softcast heel.

Week 2: After two weeks the signs of infection had again reduced. There was some maceration, but this may have been because the patient had left the dressing off. The malodour had been completely eliminated and there were signs of healing. Granulation tissue was 25–50% and the wounds had reduced in size. One wound was now 5mm x 4mm (wound 1) and the second was 15mm x 14mm x 4mm (wound 2). The patient had completed the course of antibiotics and the signs of infection had been eliminated.

A WOUNDCHEK™ Protease Status test showed elevated protease activity (EPA). It was therefore decided to switch to PROMOGRAN PRISMA® for wound 2. The smaller wound had healed by the following week.

TREATMENT REVIEW

ACTISORB® was found to be easy to use with a high level of satisfaction reported overall. A reduction in erythema, exudate and odour at week 1 indicated that the wound bioburden had diminished. There was complete elimination of the odour at week 2 and both wounds had reduced in size. Due to elevated protease activity (EPA), treatment was switched to PROMOGRAN PRISMA®.



Week 1

Week 2

Figures 1-3: Signs of infection and malodour decreased over the two-week period in which Actisorb® was used. Infection was eliminated by week 2.

CASE STUDIES: PROMOGRAN PRISMA®

CASE 7: CONTINUED

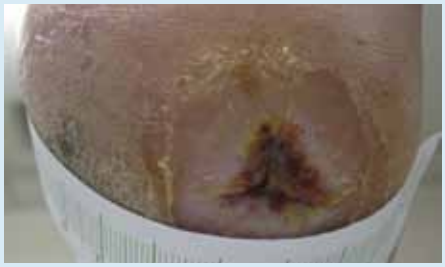
Elevated protease levels were detected by a WOUNDCHEK™ Protease Status test. PROMOGRAN PRISMA® was chosen because there had been recent infection and the dressing offered protection against the wound becoming infected again. TIELLE® was used as a secondary dressing.

Week 1: After a week of treatment the wound was debrided. The patient had been taking antibiotics (co-amoxiclav) for three weeks. The course was nearly finished and there were signs of healing. The wound bed was not visible but appeared to be less deep. The wound width and length (15mm x 14mm) remained unchanged. The wound was not infected or critically colonised. A WOUNDCHEK™ Protease Status test showed elevated protease activity (EPA). Both the nurse and patient were highly satisfied with the dressing so it was decided to continue using it along with TIELLE®.

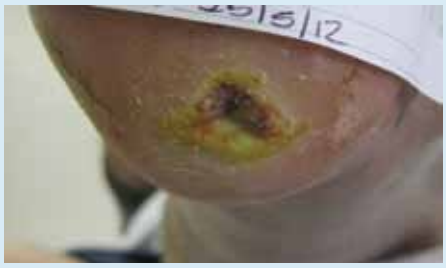
Week 2: The wound was assessed after debridement. There were signs of healing and the wound bed was improving. Granulation tissue coverage was estimated to be 50–75%. The wound now measured 10mm x 7mm x 3mm. There was no infection or critical colonisation. Protease activity was still elevated and this was confirmed using a WOUNDCHEK™ Protease Status test. The patient and nurse were both satisfied with the PROMOGRAN PRISMA® dressing and so it was continued.

Week 3: The wound was debrided. There were signs of healing and the wound had continued to improve, now measuring 10mm x 6mm x 3mm. The wound was not infected or critically colonised, with evidence of 50–75% granulation tissue. A WOUNDCHEK™ Protease Status test showed that protease activity was low so PROMOGRAN PRISMA® was discontinued.

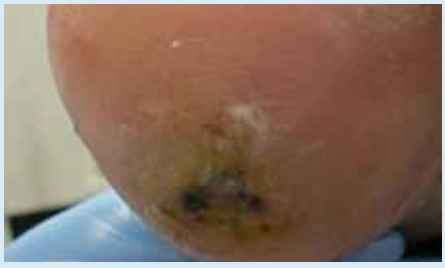
Outcome
PROMOGRAN PRISMA® was discontinued after three weeks because the wound had decreased in size and was healing well. A WOUNDCHEK™ Protease Status test indicated low protease activity. The dressing regimen was changed to ALLEVYN™ Heel (Smith & Nephew). After treatment with PROMOGRAN PRISMA®, the wound had reduced in size considerably. The clinical staff did not note any problems with the dressing.



Week 1



Week 2



Week 3

Figures 4-6: The wound decreased in size and the wound bed improved.

CASE STUDIES: PROMOGRAN PRISMA®

EPA DETECTED — PROTEASE-MODULATING THERAPY — SIGNS OF HEALING WEEK 2 — LOW PROTEASE ACTIVITY WEEK 2

CASE 8: VENOUS LEG ULCER

By: Professor Marco Romanelli, Consultant Dermatologist, University of Pisa, Italy

BACKGROUND

The patient, a 70-year-old man, presented with a venous leg ulcer on the left leg of 12 years' duration, which had recurred after eight months of him being ulcer-free. The wound measured 5cm x 1cm x 0.8cm. He had a history of multiple wounds, which had healed and recurred during the previous nine years. Several treatments had been attempted, including autologous skin grafting.

He had had a history of venous insufficiency since the age of 45, and had found it difficult to be concordant with compression stockings.

Treatment

This particular wound had recurred over a period of seven years. It had been treated with four-layer compression bandaging and a foam dressing. The wound had not been improving but there was evidence of granulation tissue.

It was not infected and a WOUNDCHEK™ Protease Status test showed that protease activity was elevated. PROMOGRAN PRISMA® was applied with the aim of promoting healing.

Week 1: Granulation tissue was estimated to cover 50–75% of the wound and exudate levels were reduced. The edges of the wound were a healthy colour and beginning to advance, although the wound still measured 5cm x 1cm (the depth was not recorded). The wound was not infected and a WOUNDCHEK™ Protease Status test showed low protease activity.

PROMOGRAN PRISMA® was continued without a secondary dressing due to the reduced exudate levels and to maintain low MMP activity. Two-layer compression bandaging was applied.

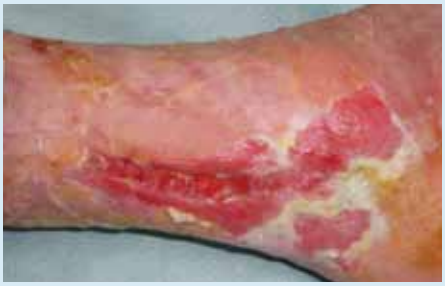
Week 2: The wound had reduced in size and granulation tissue coverage was greater than 75%. The wound measured 3.5cm x 1cm and remained free from infection and critical colonisation. A WOUNDCHEK™ Protease Status test showed protease activity to be low. It was decided to continue with PROMOGRAN PRISMA® to maintain low protease activity. Two-layer compression bandaging was also continued.

Week 3: The wound had reduced in size to 3.2cm x 1cm. Granulation coverage continued to be greater than 75% and the wound was not infected or critically colonised. A further WOUNDCHEK™ Protease Status test showed that protease activity was low.

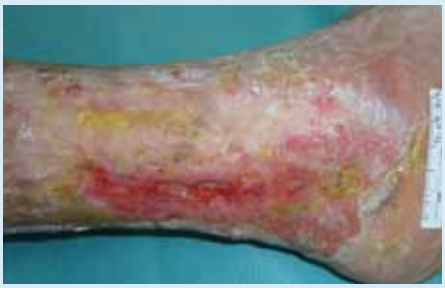
Week 4: After four weeks of treatment there was 50–75% granulation tissue and the surrounding skin was described as regular. The wound measured 3cm x 0.8cm. The wound was not infected and a WOUNDCHEK™ Protease Status test showed that protease activity was low.

OUTCOME

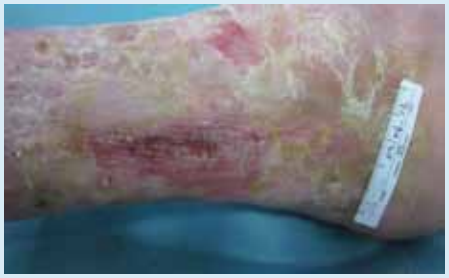
Both the nurse and patient reported being satisfied or highly satisfied during the evaluation period based on the dressing's ease of use and performance. PROMOGRAN PRISMA® proved to be an appropriate treatment for this previously non-healing wound. The elevated protease activity was reduced to low after one week and the wound continued to heal over the four-week period. Treatment with PROMOGRAN PRISMA® was continued to avoid recurrence.



Baseline



Week 2



Week 4

Figures 1-3: Granulation tissue increased over the study period and EPA reduced.

KEY FACTS

Infection is the single most contributory factor in delayed wound healing

Protease activity may be elevated in non-healing wounds which, if left unchecked, may prevent the wound from progressing

Wounds treated with silver dressings showed a marked improvement in signs of infection with a reduction in exudate levels, elimination of odour and pain, and improvement in the condition of the wound bed by week 4

Wounds with detected EPA and treated with protease modulating therapy showed evidence of healing at 2 weeks and low protease levels by week 4

All wounds progressed over 4 weeks using a targeted approach to treatment

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