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Wound bed preparation in community settings

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Clinical focus

Initiating compression therapy for those with heart failure

In this article, the authors review the evidence on initiating compression therapy for those with venous disease or lymphoedema and heart failure

Clinical review

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This article discusses the correlation between the pathophysiology of diabetes and chronic wounds, especially lower leg wounds, aiming to equip practitioners with a strong understanding of this association

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The British Journal of Community Nursing is published by MA Healthcare Ltd, St Jude's Church, Dulwich Road, London SE24 0PB

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ISSN 1462-4753

Printed by Pensord Press Ltd, Blackwood, NP12 2YA

Cover image: Unsplash/Rainer Krienke

Wound care is not just about the wound

In August and September 2021, the 2020 Olympic and Paralympic games were held in Tokyo, Japan; some believed these games would never happen. With everything the pandemic had thrown at us, it was remarkable that the competitors had found innovative ways to train, while organisers addressed the endless complications to allow these games to happen.

As I sat listening to Sir Chris Hoy commentate following a cycling event, I was reminded of the importance of wound care addressing the needs of the patient, rather than our needs as nurses to make people feel better. All too often, nurses try to find a regime to help heal a wound; I have been guilty of this in the past myself. But healing a wound is not always a priority for the patient. Sir Hoy reflected on the physical and mental aspects a competitor faces. While he talked in detail about the gruelling training, the details of the race plan and the sheer exhaustion racers face, I found myself focusing on his discussion around the painful falls on the wooden track, the pain from superficial grazes and splinters. Traditional wound care dressings cannot be used for these, as they are not aerodynamic. What struck me most about these injuries was how the pain affected the cyclist. Sir Hoy talked about the disturbed sleep following a fall, as the pain from these extensive grazes is severe enough to wake the cyclist should they roll onto the damaged area in their sleep. This is not the best preparation for a race the following day. While healing the wound is an ideal and obvious solution, the priority (other than preventing infection) should perhaps be on managing the pain effectively, allowing the body time to rest and recover.

Listening to this commentary, I was reminded of some of my patients. I commenced my first role as a tissue viability nurse in 1999. On reflection, I have realised that some of my most memorable patients were not always the ones I managed to heal (sometimes against all odds), but, in fact, were patients whose lives I helped improve. It may have been addressing their pain or reducing any offensive odour that made the biggest difference to the patient. I can still recall the joy of one patient after I had helped address the offensive odour from her gangrenous legs; she finally felt she could see her grandchildren again. She had hidden herself away from her grandchildren as she did not want them thinking of her as 'smelly nanny'.

Effective wound management can be complex, with various approaches required, often involving a multidisciplinary approach. Delivering effective wound care should include the use of recognised frameworks, helping support consistent practice. Ensuring that wound bed preparation is successfully completed will aid any wound care management, as wounds are required to heal from the bottom up, and wound bed preparation supports this approach. Diabetes often throws a curve ball for practitioners undertaking wound care, with the possibility of numerous complications. Hard-to-heal wounds are often observed in patients who are additionally diagnosed with diabetes; this can be due to various factors related to both the physiological and psychological effects of coping with diabetes. New approaches and products continue to evolve as we continue to learn through practice and research.

Wound care is likely to be part of every nurse's role, as it is something that is relevant to all ages. While the nurse must continue to work within best-practice guidance, the needs of the patient—even those not directly related to the healing of the wound—should always guide choices. **CWC**

Melanie Lumbers, Independent Tissue Viability Nurse

Wound bed preparation: an overview

Abstract

Wound bed preparation is the management of a wound in order to optimise healing and/or facilitate other therapeutic measures. It is the most pivotal step in healing wounds. Early referral to a specialist wound clinic can markedly improve the wound healing process. This overview will discuss the techniques involved in the preparation of the wound bed that will effectively accelerate the healing process. The process begins with a correct diagnosis of the wound and optimising the patient's medical condition. The TIMERS framework is discussed. Wound dressings, including the use of negative-pressure wound therapy, are discussed, along with debridement techniques and agents. The timing of wound intervention and evaluating progress will also be discussed, and wound bed preparation strategies will be included. There has been an added challenge of wound care in the community as a result of the COVID-19 pandemic. The present article provides an overview of how to prepare a wound bed in the community.

■ Wounds ■ Wound bed preparation ■ Biofilm ■ Debridement ■ Irrigation ■ Dressings ■ Wound infection

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Accepted for publication: September 2021

Wounds can be caused by surgery, trauma, systemic diseases and burn injuries. Most acute wounds heal normally and require only minimal intervention in the form of simple dressings. Complex wounds frequently require referral and more complex care, including the use of skin grafts, skin substitutes and/or flap reconstruction. Complex wounds will take longer to heal and can be a sign of underlying diseases. Complex or non-healing wounds are defined as those that do not progress through the normal and timely phases of wound healing as expected. A variety of factors may affect the healing of a wound. For example, diabetes, vascular disease, autoimmune diseases, infection and malnutrition may impair the healing process (Guo and DiPietro, 2010). Wound care in the community is not a 'one size fits all' concept. Each wound needs to be assessed with a unique understanding of each patient's general health. Early referral of a wound that is stalling, to a specialist wound clinic is an integral part of wound care in the community.

Stages of wound healing

The stages of acute wound healing are well established, and the healing process in acute wounds has been extensively studied throughout the years.

Starting with the clotting phase, coagulation takes place quickly (within minutes) when platelets adhere to the site of injury, and then it is completed with the formation of a fibrin plug. The inflammatory phase (0–4 days) begins right after the injury, when the injured blood vessels leak transudate fluid. This inflammation controls bleeding and invites healing and repair cells to the wound. During the inflammatory phase, white blood cells and growth factors can contribute to the removal of any pathogens and damaged cells. The next stage is the proliferative phase (3–14 days). The wound is rebuilt with new tissues composed of collagen and extracellular matrix. A new network of blood vessels is constructed, so that the granulation tissue can receive nutrients and oxygen. Myofibroblasts cause the wound to contract by pulling the wound edges together. At this stage, the granulation tissue is usually pink or red and uneven in texture. Dark granulation may indicate infection or a disrupted blood supply. The next stage of healing is epithelialisation, which occurs at a faster rate when the wound is moist and hydrated. The final stage is the maturation phase. The collagen that has been laid down is remodelling from type III to type I. The collagen laid down during the proliferative phase is chaotic and thick. During the maturation phase, collagen is well aligned and cross linking occurs, which gives the wound further strength. Any cells that are not needed are

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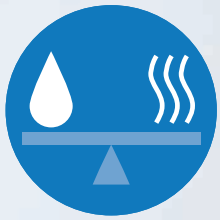

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destroyed during programmed cell death. These finely tuned processes are regulated by microscopic growth factors and cells. Remodelling usually starts at around 21 days after injury and can continue for up to 18 months (Rodrigues et al, 2019). Healed wounds only have 80% of the tensile strength of non-wounded skin.

These finely tuned stages are very fragile, and a failure in any of these steps can lead to a hard-to-heal or chronic wound. Often times, a hard-to-heal wound is considered to be an acute wound, in which the normal healing processes and time have gone awry. However, this way of thinking is flawed. The chronic wound healing process differs in many important aspects from that seen in acute wounds. In hard-to-heal or chronic wounds, the orderly sequence of events seen in acute wounds becomes 'stuck' at one or more of the different stages of wound healing. For the normal repair process to resume, the barrier to healing must be identified and removed through application of the correct techniques. Therefore, it is important to understand the molecular events that are involved in the wound healing process in order to select the most appropriate intervention (Schultz et al, 2003). Prolonged or excessive inflammation may result in hard-to-heal wounds, such as vascular ulcers, diabetic ulcers and pressure ulcers.

What is wound bed preparation?

Wound bed preparation is a well-established concept. For many years, the TIME framework was used. This consisted of:

- Tissue management
- Inflammation and infection
- Moisture balance
- Edge or epithelial advancement.

Recently, two new categories were added, and the term was re-designated TIMERS (Atkin et al, 2019):

- Regeneration and repair
- Social factors.

Wound bed preparation is the management of a wound in order to accelerate endogenous healing or to facilitate the effectiveness of other therapeutic measures.

Preparation of the wound bed

The first step in wound bed preparation is ensuring that the patient has had simple analgesia prior to the consultation. The ideal time to take this is 15–30 minutes before their appointment.

A complete history should be taken from the patient, including any comorbidities and medication. It should be ensured that their tetanus status is up to date. These should be documented in the clinical notes at the first visit, in addition to the size and dimensions of the wound. This is essential for good practice. A reduction in wound area would suggest that the wound management strategy being used is working, but, if there is no progress, the plan will need to be reevaluated, and other healing interventions will need to be considered. Some units advocate clinical photography of wounds and have a departmental camera for this purpose. Local guidelines should be adhered to for practice. It should be ensured that microbiological swabs and tissue specimens are taken before an assessment for the presence of any bacteria is undertaken. These need to be sent to the microbiology lab for analysis.

The recommendations from the TIMERS pathway detail that hard-to-heal wounds are unlikely to respond to healing until risk factors are addressed. Risk factors may include non-viable tissue. Wound practitioners should be able to identify the different tissue types present in a wound bed.

- Necrotic tissue: this is a result of cell death, which often occurs when bacteria, viruses, fungi, or parasites are present. It can also be the result of oxygen deprivation, pressure or other extreme environmental conditions. Antibiotics and surgical management, including drainage of abscesses, wound debridement and amputation, are standard treatments when necrotic tissue is present
- Viable tissue: viable tissue often appears light pink to red and may be moist. The line between viable tissue and non-viable tissue in a wound is often marked by visible signs of infection or maceration
- Granulation tissue: granulation tissue provides a moist wound environment with active healing. It often appears red, uneven and dotted. Friable granulation tissue, or tissue that bleeds easily, may indicate the presence of infection. It is important to be able to identify over-granulation, as this should be treated early
- Eschar or slough: tissue may be yellow, gray, purple, black or brown and have a soft, slimy consistency, or it can form a hard, leathery eschar. Debridement and moisture management may address this type of tissue, although dry, stable eschar should generally be left in place
- Epithelial tissue: this tissue is pale pink with white dots within the wound bed or at the wound edges. Epithelial tissue signifies a healing wound
- Tendon, ligament,and bone: Tendon or ligament tissue appears yellow or off-white and is shiny unless dehydrated. Bone is white and hard unless it is necrotic. Exposed tendon and ligament can resemble yellow slough and may require negative-pressure wound therapy or a surgical reconstruction.

Components of a wound preparation toolkit

Antiseptic and saline solution

Wound cleaning is an essential step in reducing infection and promoting healing. The clinicians should use sterile gloves, sterile drapes, a mask and barrier protection. As mentioned, it should be ensured that a microbiological specimen has been taken prior to any cleaning.

The skin around the wound should be disinfected with antiseptic after checking the patient's allergies. Antiseptics in wound care are generally efficient at killing microorganisms but can be toxic to healthy fibroblasts. Antiseptic solutions are skin disinfectants with broad-spectrum antibacterial, antiviral and antifungal activity. They are used for cleaning or irrigating infected wounds (International Wound Infection Institute (IWII), 2016). Some antiseptics are also known to be painful for the patient, such as iodine-based products. The most frequently

used antiseptic is clinical practice is chlorhexidine or Tisept. The next step is decontamination of the wound, by removing any superficial foreign bodies. Thorough irrigation of the wound follows. If the wound is heavily contaminated, high pressure irrigation will be needed. A high index of suspicion of wound infection must be maintained (Corum, 2019).

Basic dressings

For simple wounds, the most common practice is to use Jelonet or Mepitel dressings. These are suitable for post-surgical wounds or small wounds that are expected to heal in the normal time limits.

Hydrocolloid dressings

These can be used on burns, high-exudate wounds, necrotic wounds, pressure ulcers and venous ulcers. These include DuoDERM (ConvaTec), Granuflex (ConvaTec) and AQUACEL Extra™ (ConvaTec). These are non-breathable dressings that are self-adhesive. The flexible material that they are made from makes them comfortable to wear and suitable for fragile skin.

These dressings create a moist environment, which can help heal certain wounds. The surface is coated with a substance containing polysaccharides and other polymers, which absorb water and form a gel, keeping the wound clean, protecting it from infection and helping it to heal more quickly.

Hydrogel dressings

Hydrogel dressings contain large amounts of water and have been the dressing of choice for dry wounds. They can be used for a range of wounds that produce low levels of exudate. They are also suitable for painful, necrotic wounds or pressure ulcers and donor sites. Hydrogel dressings can also be used for second-degree burns and infected wounds. These are designed for patient comfort and pain reduction. Examples include IntraSite gel (Smith and Nephew) and Hydrosorb (Hartmann).

Alginate dressings

Alginates are suitable for high-exudate wounds, burns, venous ulcers, packing wounds and pressure ulcers. These dressings absorb excess liquid and create a gel that helps to heal the wound. Containing sodium and seaweed fibres, these dressings are able to absorb high amounts of fluid and are biodegradable after use. These need regular changing usually, on alternate days, and should only be used for high-exudate wounds or they can cause wounds to dry out too quickly.

Foam dressings

These can be used in wounds of varying degrees of severity. These include Allevyn (Smith and Nephew) and Mepilex (Molnlycke). Foam dressings absorb exudates from the wound's surface, creating a moist environment for healing. These come in adhesive and non-adhesive varieties.

Silver dressings

Silver products have antimicrobial properties. Silver is thought to provide extensive coverage against bacteria, viruses and fungi. It has both bactericidal and bacteriostatic properties. Silver dressings often combine silver with other products, such as hydrocolloid, foam and alginates. Examples include AQUACEL Ag+ Extra™ (ConvaTec), Acticoat (Smith and Nephew) and Flamazine (Smith and Nephew).

Negative-pressure wound therapy

Negative-pressure wound therapy has primarily been designed to prevent exudate collection while simultaneously stimulating healing in the wound. It has also been claimed that these dressings increase oxygen tension in the wound, decrease bacterial count, increase granulation formation and prevent shear force on the wound surface. The VAC Veraflo Therapy system shows promise for treating acute infected or chronic wounds that are not healing. However, there is not enough good-quality evidence to support the case for routine adoption (National Institute for Health and Care Excellence (NICE), 2021a). PICO negative-pressure wound dressings come in single-use formulation and have been found to be associated with fewer surgical site infections (SSIs) and seromas than standard dressings. Prevena Incision is thought to be suitable for closed surgical incision wounds for patients at increased risk of SSI (Powell et al, 2021). In patients at risk of SSI from closed surgical incisions with up to moderate exudate levels, Leukomed Sorbact dressings have been recommended (NICE, 2021b).

Cleansing solutions

Wound cleansing has come to be recognised as a vital step of wound bed preparation. They were developed originally to address exudate and topical contaminants.

Nexodyn solution

Nexodyn (Regen Medical) is a sprayable hypochlorous acid compound. It is thought to reduce the clinical signs of localised infection in the wound bed, as well as wound-associated pain.

Chlorasolv

Amino acid-buffered hypochlorite (ChloraSolv (RLS Global AB, Sweden)) is a wound bed preparation gel developed for cleansing and debridement/desloughing of wounds. In a recent study, treatment with amino acid-buffered hypochlorite suggested a more rapid transformation from black or yellow necrosis/devitalised tissue in the ulcers to purulence and red granulation tissue than standard of care (Eliasson et al, 2021).

Debridement

Debridement is the process of removing any devitalised tissue and bioburden from wounds. These include necrotic material, eschar, infected tissue, slough, pus, haematomas and debris. Caution should be exercised with debriding the wound in the community. Many patients are taking anticoagulants, and even the minimal amount of debriding can cause significant bleeding and blood loss. Debridement should only be carried out by a trained professional, as it carries a considerable risk with it. Debridement carried out safely minimises tissue loss to avoid deep tissue exposure such as bone, joint and tendons.

Debridement is dependant on the clinical status of the wound, general health of the patient and the skill and qualification of the healthcare personnel.

Recent evidence suggests that wound healing is stalled by chronic infection, which consists of the presence of bacteria in a biofilm state (Morris, 2018). Guidelines recommend adequate wound bed preparation to physically remove the biofilm, with topical products assisting in this process (Morris, 2018; Stevenson and Schultz, 2019).

Several debridement methods are in use, including sharps, larvae, autolytic debridement, enzymatic debridement, jet lavage, ultrasound and surgical debridement. Mechanical debridement is the process of physically removing devitalised tissue from the wound bed. Innovative, evidence-based products have been developed to assist with mechanical debridement. Sharp debridement is the most common form of wound debridement. It is considered a quick and easy method for removing non-viable tissue. Low-frequency contact ultrasonic debridement therapy (LFCUD) can remove non-viable tissue safely, painlessly, effectively and, most importantly, selectively (Vallejo et al, 2021).

Debriding pads

Mechanical debridement is now typically carried out using specialised, single-use monofilament fibre debridement pads and debridement cloths. The Debrisoft (L and R) monofilament fibre debridement pad is recommended by NICE for use in the community based on evidence of its effectiveness and estimated cost savings (NICE, 2016). These offer a quick and effective method of debridement that requires no specialist training and can be used in acute and chronic wounds in adults and children (Morris, 2018).

Choosing the right dressing

Assessment of the wound effectively and choosing the appropriate dressing will enable the clinician to monitor and record wound progress at each dressing change. Antimicrobial stewardship aims to change prescribing practice to help slow the emergence of antimicrobial resistance and ensure that antimicrobials remain an effective treatment for infection. When prescribing any antimicrobial, a clinical assessment must be undertaken, and the clinical diagnosis must be documented (including symptoms) in the patient's record and clinical management plan.

If there are signs of acute systemic infection, antibiotics should be used under the guidance of antibiotic and antiseptic stewardship guidelines (NICE, 2015).

Oxygen therapy

This involves provision of oxygen directly to the wound bed. An example of this type of therapy is Natrox (Inotec AMD) (NICE, 2020). It consists of a rechargeable battery-operated oxygen generator and an oxygen delivery system. This delivers 98% oxygen directly to the wound bed. This is a portable device that is the same size as a mobile phone. The generator is reusable for different patients. The delivery system is a single-use system, which is placed directly on the wound bed.

Conclusion

Wound care depends on the type of wound. Standard care involves regular dressing changes with thorough cleaning and dressings. Choosing the correct dressing depends on wound location, size and depth and amount of exudate. More complicated wounds, for example, surgical site infections, diabetic foot problems, venous leg ulcers and pressure ulcers, can result in chronic non-healing wounds and need more advanced care (World Union of Wound Healing Societies, 2007). Care of these types of wounds aims to promote healing and minimise the risk of further complications. If a non-healing wound is thought to be infected, healthcare professionals should take a microbiological sample and prescribe an antibiotic to treat the infection. The wound should be cleaned and debrided regularly, and dressed. Clinical staff choose a dressing that will promote healing and manage exudate based on the individual wound. Chronic non-healing wounds typically need more advanced dressings. People may be referred to a specialist for multidisciplinary care, depending on wound aetiology (Sin, 2019). Tertiary wound care should be used to assess wounds if they are infected, if there is a differential diagnosis or if the person has complex comorbidities.

NICE recommendations are evidence-based recommendations encompassing healthcare in England and Wales (Powell et al, 2021). They are routinely used by health professionals for the most up-to-date guidance on the management of patients. Working within the NICE pathways and guidelines will ensure that wound care is evidence based. Frameworks such as TIMES are useful in clinical practice to structure wound assessment (Atkin et al, 2019). **CWC**

Declaration of interest: The author is editor of the Journal of Wound Care.

KEY POINTS

- Choosing the correct dressing depends on wound location, size and depth, and amount of exudate
- Early identification of wound bed infection is vital to the wound healing process
- Failure of a wound to progress at the normal healing rate is an early sign of wound infection
- Tertiary wound care should be used to assess and treat complicated wounds if there are considerable comorbidities.

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CPD REFLECTIVE QUESTIONS

- What are the systemic conditions that may delay wound healing?
- Can skin cancer masquerade as a non-healing wound and how should you exclude this as a cause of a non-healing wound?
- Why is antimicrobial stewardship so important?
- How do we ensure we are selecting the most appropriate management plans for a wound infection?

Initiating compression therapy for those living with heart failure

Abstract

Compression therapy is used to treat leg symptoms arising from chronic venous disease and lymphoedema. Heart failure, which is traditionally regarded as a contraindication for compression therapy, is prevalent among patients with such leg symptoms. This article aims to assess the evidence on the safety and effectiveness of compression therapy, as well as recommending the assessment and measures required when initiating compression therapy in patients with heart failure. Recent evidence suggests that initiating compression therapy in patients with stable and compensated heart failure is safe if appropriate precautionary measures are undertaken. However, there is still insufficient evidence to support the safety of compression therapy in patients with severe and decompensated heart failure. A standardised, evidence-based guideline on compression therapy in patients with heart failure will help medical and nursing professionals and improve informed consent for the patients.

■ Venous leg ulcers ■ Heart failure ■ Compression therapy ■ Chronic venous disease ■ Oedema

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Accepted for publication: August 2021

Compression therapy is frequently used as a physical therapy in conditions involving venous and lymphatic insufficiency in the lower limbs (Lim et al, 2014). Different subsets of patients who may also benefit from compression therapy are those with features of blood stasis, including lower limb swelling of non-venous or lymphatic origin, where alleviating the oedema improves symptoms and quality of life (Yancy et al, 2013). The mechanisms leading to peripheral oedema are dependent on the underlying causes and are often related to one or several of the following factors:

- Reduced venous and lymphatic return
- Impaired cardiac function
- Increased oncotic pressure leading to impaired microcirculation
- Increased capillary hydrostatic pressure and permeability (Messerli et al, 2002).

While aiming to treat the underlying condition, medical and nursing professionals may make use of compression therapy, either as a first-line or adjunctive treatment or for prevention of lower limb oedema.

Overall, compression therapy is relatively safe with few regularly quoted contraindications (*Box 1*). Traditionally, one of these contraindications is heart failure, although the evidence supporting this is unclear and has been evolving recently. Heart failure is a common condition, and frequently causes bilateral lower limb oedema. It is not uncommon that patients who are indicated for compression therapy may have heart failure as a comorbidity or even as the main cause of lower limb oedema. While the recent evidence has been building up towards an increasingly liberal approach towards compression therapy for patients with suspected or confirmed heart failure (Attaran et al, 2020), it is important that the medical and nursing professionals are able to identify patients with heart failure and provide a safe, effective and evidence-based assessment when initiating such treatment. Therefore, the aim of this narrative review article is to assess the evidence on its safety and effectiveness and recommend assessment and measures required when initiating compression therapy in patients with heart failure.

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Box 1. Common contraindications for compression therapy

Peripheral arterial disease
Peripheral neuropathy or other cause of sensory impairment
Allergy to stocking material
Heart failure
Local skin or soft-tissue condition, including fragile 'tissue paper' skin, gangrene, oozing dermatitis and severe cellulitis
Deformity of the leg preventing correct fit

Source: Lim and Davies, 2014

Methods

A literature search was performed in Pubmed, with a combination of the following terms: 'compression stocking' OR 'compression therapy' OR ' compression hosiery' AND 'heart failure' OR 'cardiac failure'. The titles and the abstracts were assessed. Original and review articles that were assessed and discussed compression therapy in heart failure were included. Only literature written in English was considered. Since there were a relatively small number of articles that met the inclusion criteria, the references of the articles were also scrutinised, and further search on Google was also performed to expand the literature reviewed.

Heart failure

Heart failure is a progressive chronic condition where the heart is unable to pump the circulation adequately, leading to features of impaired perfusion and venous return, such as breathlessness, generalised fatigue, peripheral oedema including in the lower limbs and, ultimately, end-organ failure (McMurray, 2005; Yancy et al, 2013; Ponikowski et al, 2016). The prevalence of heart failure is around 1–2% in the adult population, increasing to more than 10% among those aged over 70 years (Yancy et al, 2013; Ponikowski et al, 2016). The aetiology of heart failure is multifactorial, with uncontrolled hypertension and ischaemic heart disease being the most common risk factors. Other common causes of heart failure include cardiac valvular abnormalities, pulmonary hypertension, arrhythmias, toxic damage from alcohol, cocaine or other drugs, fluid overload and metabolic derangements (Ponikowski et al, 2016).

There are several classifications of heart failure, but the most commonly used grading of the severity, and of relevance to this review, is done on clinical grounds using the New York Heart Association (NYHA) classification (*Table 1*). Although not used for grading the severity of heart failure, lower limb oedema is well known to be a manifesting symptom. The pathophysiology contributing to lower limb oedema in patients with heart failure is complex. Briefly, the oedema can be caused by blood stasis from reduced venous return due to right-sided heart failure and inadequate cardiac output from left-sided heart failure causing poor tissue perfusion. This activates compensatory and autoregulation mechanisms, in particular, the renin-angiotensin-aldosterone system that leads to fluid retention, and/or medication (Urbanek et al, 2020). In addition, other associated mechanisms, including side effects of medications, malnutrition, reduced mobility and other concurrent non-cardiac related causes of lower limb oedema, may also contribute.

Compression therapy in patients with heart failure

Although there is a great amount of experience in treating chronic venous disease and lymphoedema with compression therapy, concerns over its safety for patients with heart failure have raised controversy (Andriessen et al, 2017; Hirsch, 2018). The postulated mechanisms behind these concerns include the notion that compression therapy shifts fluid from the lower leg to the intravascular compartment, which could lead to overloading and straining of an already diseased heart. This would eventually cause pulmonary oedema and worsening heart failure.

The main indications for compression therapy including chronic venous disease and lymphoedema are common (*Figure 1*). Several studies indirectly screened for the presence of heart failure through the evaluation of risk factors, symptoms and signs, including shortness of breath and pulmonary crackles, imaging and blood markers such as B-type natriuretic peptide (BNP), as well as assessing the criteria from the chronic heart failure guideline (National Institute for Health and Care Excellence (NICE), 2018) in patients with lower limb oedema. These studies reported that cardiac dysfunction was relatively prevalent in patients presenting with lower limb swelling (Urbanek et al, 2020). Furthermore, chronic venous disease and heart failure are common conditions and, hence, may coexist and contribute to the blood stasis, which causes lower limb swelling, skin changes and ulceration (Augey et al, 2010; Kelly et al, 2019). Patients with these conditions also often share similar risk factors, including reduced mobility, increasing age and obesity, which may worsen the blood stasis. This leads to two important questions when

Table 1. The New York Heart Association (NYHA) classification

Class I	No limitation of physical activity
Class II	Slight limitation to physical efforts, in which ordinary activity leads to fatigue, palpitation or dyspnea, but patient is confortable at rest.
Class III	Marked limitation of physical activity, in which less-than-ordinary efforts results in the same symptoms as above, but patient is also confortable at rest.
Class IV	Inability to carry on any physical activity without discomfort, but also symptoms of heart failure at rest, with increased discomfort if any efforts are undertaken.

Source: Yancy et al, 2013

Figure 1. Common indications for compression therapy which include (a) lower limb oedema, (b) venous skin changes and (c) ulceration

initiating compression therapy in a patient: (1) does the patient have heart failure, and (2) if the patient has heart failure, is it safe to initiate compression therapy?

To address the first question, it is vital that the medical and nursing team who initiate the compression therapy have a high degree of suspicion while identifying patients who may have heart failure, if they have not been previously diagnosed. This is especially important in patients with bilateral lower limb oedema, a common presentation of heart failure, and many other conditions (*Box 2*). As there is often an overlap between heart failure and other causes of leg swelling, care must be taken while looking for tell-tale signs of heart failure before initiating compression therapy (*Box 3*), since there are no reliable bedside tests and agreed criteria to address this. In a situation where previously undiagnosed heart failure is suspected while initiating compression therapy, referral should be made to the GP or cardiologist for further assessment and appropriate management. The authors suggest withholding the compression therapy while this is being carried out.

Box 2. Common conditions that cause bilateral lower limb oedema

Heart failure
Liver cirrhosis
Chronic renal impairment
Bilateral chronic venous disease
Bilateral lymphoedema
Obesity
Drugs
Source: Ponikowsli et al, 2016

Box 3. Indications of heart failure

Advanced age
Past medical history of hypertension and cardiac conditions, such as ischaemic heart disease, valvular heart disease, pulmonary hypertension, cardiac arrhythmias including atrial fibrillation, and cardiomyopathy
Shortness of breath; including orthopnoea and paroxysmal dyspnoea, and abnormal plain chest film showing pulmonary oedema (*Figure 2*)
Generalised lethargy
Bilateral pitting oedema of the lower limb (especially when no other obvious cause is found) (*Figure 3*)

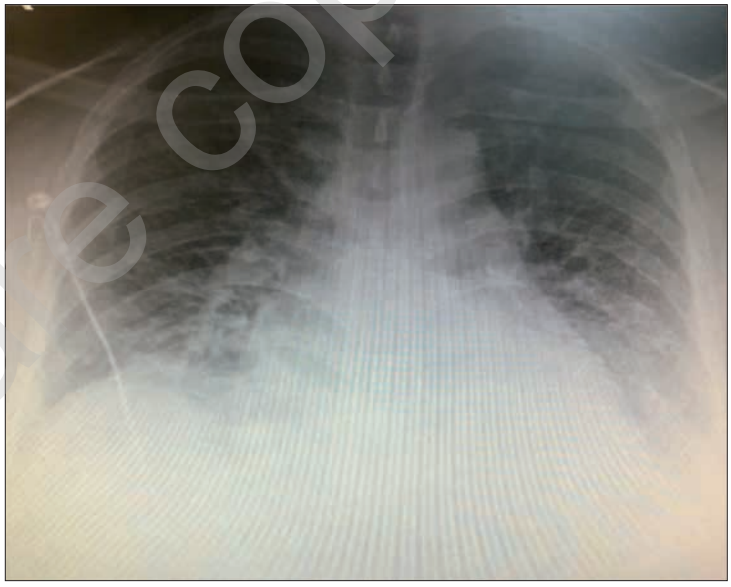

Figure 2. Plain chest film of a patient with heart failure shows pulmonary oedema (note the haziness and shadowing of the lung fields.

In relation to the second question, that is, when the diagnosis of heart failure is established, the fear of worsening cardiac symptoms and precipitation of pulmonary oedema secondary to redistribution of the blood to the central circulation traditionally deems heart failure as a contraindication to compression therapy (Mostbeck et al, 1977; Wittens et al, 2015; Andriessen et al, 2017). Although rare, death from the initiation of compression therapy in patients with decompensated heart failure has been reported (Moffatt, 2008). Contrary to the traditional advice, more recent evidence suggests that many patients with heart failure may, in fact, still be considered for compression therapy with appropriate precautionary measures (Andriessen et al, 2017).

Early small studies showed transient but clinically non-significant changes in cardiac function parameters, including invasive right atrial, pulmonary arterial and wedge pressure, and human atrial natriuretic peptide following initiation of

Figure 3. Lower limb pitting oedema is an important sign of heart failure

compression in patients with heart failure, including in those with NYHA II (Bain et al, 1989; Dereppe et al, 1990; Galm et al, 1996). More recently, one study showed that simultaneous multilayer compression bandages and muscle contraction induced a significant increase in the right arterial pressure and led to transient deterioration of the right and left ventricular functions with an increase in preload and afterload in patients with severe heart failure, that is, NYHA III and IV. Despite the return of the investigated parameters to the baseline without long-term clinical impairment, the authors cautioned against the continuous use of multilayered bandages in patients with severe heart failure (Wilputte et al, 2005). However, in another study, application of thromboprophylatic foot and calf-length intermittent pneumatic compression sleeves on patients with NYHA III and IV did not lead to worsening of cardiovascular condition (Nose et al, 2010). Meanwhile, Moady and colleagues reported that thigh-length sequential compression on patients with NYHA II and III causes no significant worsening of clinical symptoms despite increase in pulmonary venous return leading to a decrease in systemic vascular resistance and increase in cardiac output (Moady et al, 2019). In another study, manual lymphatic drainage in NYHA III and IV patients had also shown no deterioration clinically or in related parameters for heart function (Leduc et al, 2011). Independent reviews of the literature including those discussed above by Hirsch et al (2018) and Urbanek et al (2020) concluded that compression therapy for NYHA I and II was generally safe. Most recently, Attaran and colleagues retrospectively assessed a cohort of 95 patients with the confirmed diagnosis of stable heart failure who underwent compression therapy (mean duration of 310 days) for venous ulcers, and compared their outcomes with the global heart failure population (Attaran et al, 2020). The study found no significant difference in mean body weight, diuretic dose increase, haematocrit or glomerular excretion rate between the groups. The authors concluded that, in spite of the limited sample size, their study provided evidence that compression therapy was probably safe in patients with compensated heart failure.

However, it is important to point out that all the abovementioned studies were limited by their non-randomised design, with relatively small sample sizes and heterogenous groups; hence, they had potential biases.

Recommendations for clinical practice

Thus far, there is no level I evidence-based recommendation with regard to the use of compression therapy in patients with heart failure. Therefore, all patients should be assessed individually, weighing the risks and benefits of compression therapy, preferably in a multidisciplinary setting. All patients with heart failure should be medically assessed and treated by their GPs and/or cardiologists, if they have not already done so. Compression therapy should be initiated slowly with several issues to be considered, as suggested by Moffatt (2008) (*Table 5*). Alternative or adjunctive therapy to compression should always be considered, such as endovenous ablation treatment for superficial venous incompetence.

The limited body of evidence seems to support that initiating compression in compensated and stable heart failure patients who are not at risk of deterioration or pulmonary oedema (NYHA I and II) is relatively safe. The authors would recommend gradual increments of compression pressure with close monitoring and early follow-up. All patients should also be adequately counselled on the early symptoms of decompensated heart failure, such as increasing shortness of breath, and the actions to be taken. When facing clearly decompensated patients in the community, the primary care team should refer them for urgent assessment straight away. There is insufficient evidence to support the safe use of compression therapy in patients with severe or decompensated heart failure (i.e. NYHA III and IV), and it should be avoided. However, in rare cases when the benefits of compression therapy outweigh the risks, the initiation of compression very gradually, preferably as inpatient, is recommended, with close monitoring of the cardiorespiratory system.

There are still many unanswered questions with no clear evidence-based guidelines in relation to compression therapy in patients with heart failure. Future studies should focus on identifying the subsets of patients with heart failure who could be treated safely and effectively with compression therapy for their lower limb symptoms, as well as the objective precautionary measures needed. A standardised, evidence-based guideline on compression therapy in patients with heart failure is clearly needed to help medical and nursing professionals, as well as to improve informed consent for the patients.

Strengths and limitations

The strengths of this review are that the recommendations of clinical practice provided are supported by assessment of the up-to-date evidence in the literature. Furthermore, the authors are from both clinical and nursing background, and can, therefore, provide a holistic view on the subject. The main limitation of

the article is that it is not a systematic review or meta-analysis. However, in the authors' opinion, the relatively few studies with small sample sizes in the literature and the heterogeneity of the aims and designs of these trials would restrict a meta-analysis and systematic review.

Conclusions

Heart failure and indications for compression therapy, including chronic venous disease and lymphoedema, often coexist. Despite the traditional belief that compression therapy is contraindicated in patients with heart failure, more recent evidence suggest otherwise in patients with stable and compensated heart failure (NYHA I and II), if appropriate precautionary measures are undertaken. However, there is still insufficient evidence to support the safety of compression therapy in patients with severe and decompensated heart failure (NYHA III and IV). A standardised, evidence-based guideline on compression therapy in patients with heart failure is clearly needed to help the medical and nursing professionals and to improve informed consent for the patients. **CWC**

Declaration of interest: none

Ethics statement: Informed consent was provided by all patients whose images have been presented in this article.

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KEY POINTS

- Heart failure and common indications of compression therapy, including chronic venous disease and lymphoedema, often co-exist
- A high degree of suspicion and understanding of their disease pathophysiology and clinical presentations are important to ensure that compression therapy is initiated safely and effectively
- All patients with suspected or confirmed heart failure should be fully assessed and medically treated before initiating compression therapy
- Based on the available limited evidence, gradual increments of compression pressure and close monitoring of patients with stable and compensated heart failure are recommended

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CPD REFLECTIVE QUESTIONS

- What are the potential tell-tale signs of heart failure that the medical and nursing professionals should be aware of when initiating compression therapy?
- What is the potential complication of initiating compression therapy on a patient with severe heart failure?
- What are the precautions that the medical and nursing professionals need to take when initiating compression therapy on a patient with stable heart failure?

Releasing time for personalised wound care through embedding a multi-professional approach

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Prior to the pandemic, the number of people with a wound in England continued to increase year on year, and, at the same time, the wound care activity delivered by specialist teams and services has escalated. Guest et al (2020) found that, within a 5-year period, the number of visits being made by community and district nursing teams relating to wound care had risen by 399%, accounting for 29% of the total cost of wound care.

This ongoing growth in wound care activity has added to the pressures faced by community and district nursing services, which are already stretched by high numbers of referrals and support provided to care homes, as well as the ever-increasing care needs of people with long-term conditions and those with complex multiple morbidities who live at home.

Not surprisingly, COVID-19 has only compounded this problem. At the peak of the pandemic, some of the specialist workforce were redeployed to other clinical areas, causing wound care clinics to close. At the same time, the numbers of patients with wounds attending clinics that were operational declined, due to fears of contracting the virus (Schofield, 2021). In some areas, this situation has been worsened by an over-reliance on the skills of specialist teams, resulting in a loss of wound care knowledge and skills in the non-tissue viability specialist clinical workforce.

Imagine the impact on specialist teams and services if the whole patient-facing health and care workforce had the skills to promote skin integrity, to assess and manage the risk of pressure area breakdown and to clean and dress a wound appropriately.

Enabling a collaborative wound care culture

The National Wound Care Strategy Programme (NWCSP), commissioned by NHS England and NHS Improvement, was established in recognition of the increasing burden of wounds in England, the variability in wound care practice and the delays seen in wound healing. The programme aims to '… implement a consistently high standard of wound care across England by reducing unnecessary variation, improving safety, and optimising patient experience and outcomes.'

When I started as the education delivery lead for the NWCSP, it was clear there was a definitive role for education in enabling all patient-facing health and care practitioners to develop their wound care knowledge and skills. It was also clear that there was a need for a shift in culture as to where the responsibility for wound care lies in the health and care workforce.

It is no simple task to define the knowledge and skills required by the whole patient-facing health and care workforce in England, at all levels, in any healthcare setting where a person with a wound might be. A capability framework provides a means of assessing the capabilities of an individual, team or organisation, enabling a better understanding of where there are skills and where there are gaps. For wound care, where there is notable variation in pre-registration proficiencies across professions, as well as variations in practice, a capability framework provides the necessary first step to defining wound care-related knowledge and skills.

The NWCSP Capabilities Framework for Wound Care was developed by an expert steering group, with Skills for Health providing skilled, impartial project management. Representatives from the Queen's Nursing Institute, Royal College of Nursing, Royal College of Podiatry, Health Education England and Skills for Care developed the framework alongside a paramedic, surgeon, GP, physiotherapist, nurses, academics and an expert by experience. Nursing associates, while a relatively new role, are playing an important role in delivering wound care and, so, they were also represented on the group.

Developing a flexible, comprehensive foundation for all

Twelve capabilities are defined within five domains (underpinning principles; assessment, diagnosis and investigation; wound care; personalised care and health promotion; education, research and leadership). Each capability is defined in three tiers, with progressive knowledge and skills requirements in each. We have steered away from aligning these tiers to specific roles, instead designing them to allow flexibility, so that individual practitioners, in partnership

with their employers, can determine the tier of knowledge and skill they require for their specific role. A health or care practitioner may require different tiers of knowledge and skill in different capabilities.

A far-reaching consultation garnered 585 responses from health and care professionals and organisations, 97% of whom agreed in full or part with each capability and felt that it offered clear standards to be met in service provision, which would improve safety in wound care delivery.

The National Wound Care Core Capabilities Framework for England was launched on 9 June 2021 and is available free to download on the Skills for Health Info Hub (https://tinyurl.com/48pt77f6). Between publication and the end of June 2021, the framework was accessed over 13 000 times, which gives an indication of the interest in this framework.

How might the framework benefit community and district nursing teams?

The Queen's Nursing Institute, which is the leading charity for improving the nursing care of people in their own homes and communities, welcomed the framework '… for its clear and comprehensive synthesis of the key elements involved in evidence-based, high quality wound care. Embedded into community health services, it has the potential to drive improvements in the way that wounds are managed and treated, promoting healing and transforming quality of life.'

Our aim is to enable the whole, patient-facing workforce to develop to a minimum of tier 1 level knowledge and skill. Used to assess the wound care capabilities of individuals and teams across settings and services, the framework can help to identify areas where development is required. To support the framework and knowledge and skills attainment, a suite of free-to-access, interactive, online 'essentials of' wound care modules have been developed by wound care experts, using evidence-based practice.

Meanwhile, the digital, immersive technology and simulation landscapes are rapidly evolving, with increasing applications seen in education and practice using virtual, augmented and mixed-reality robotics and artificial intelligence. Accelerated by the COVID-19 pandemic, the use of technology in wound care practice has already seen an increase in remote consultations and the use of digital wound assessment and monitoring systems. Education will be developed using these evolving technologies, recognising that people have different learning styles and that online learning modules may not suite everyone. Over the coming months and years, the 'essentials of' modules will be added to with games, simulation scenarios and videos to become a comprehensive catalogue of learning resources, through which tier 1–3 level knowledge and skills can be built.

Our vision is that, with the increasing levels of wound care knowledge and skill of the general patient-facing health and care workforce, there will be greater expertise in promoting skin integrity and wound prevention and more judicious referrals to specialist teams. This will lead to reduced burden on specialist teams and services, reduced prevalence of wounds, improved healing rates and a more personalised care experience for those people living with a wound. **CWC**

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Lower limb wounds in diabetes: the challenges of wound healing

Abstract

Managing ulceration in the lower limb for a patient with diabetes can be complex and challenging, requiring a multiprofessional, patient-centred, holistic approach with early referral for specialist review as key. Any delay in referral and intervention can be catastrophic, as time is tissue. Peripheral arterial disease and neuropathy both contribute significantly to the delays in wound healing, and it is important to rapidly recognise the problems with an informed assessment and understand the possible reasons for delayed wound healing, so that management is appropriate, rapid referrals are made and patient outcomes are optimised. This article discusses some of the reasons why wound healing is complicated in those with diabetes as a comorbidity.

■ Diabetes ■ Leg ulcers ■ Peripheral arterial disease ■ Sensory neuropathy ■ Foot ulcers ■ Wound healing

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Accepted for publication: July 2021

Diabetes is a multifaceted metabolic disorder characterised by hyperglycaemia (defined as high glucose levels in the bloodstream). It affects almost all body systems through its wide array of irreversible macro- and microvascular complications, including neuropathy, nephropathy, retinopathy, ischaemic heart disease, cerebrovascular disease, peripheral arterial disease, atherosclerosis and immunological dysfunction (Portou et al, 2020).

Around 20% of individuals with diabetes will develop a leg or foot ulcer, which severely affects their quality of life for individuals with diabetes (World Health Organization (WHO), 2021) The burden of care, both in terms of socio-economic and direct healthcare costs on patients and healthcare systems, is significant due to the challenges of managing these ulcers, as they are diverse in presentation with multifactorial aetiology (Raghav et al, 2018).

There are many reasons for delayed wound healing in the population with diabetes, as discussed below.

Peripheral arterial disease

Peripheral arterial disease (PAD) is considered an important predictor of both lower limb and mortality outcomes and is defined as atherosclerotic narrowing of the arteries (Christman et al, 2011). Hyperglycaemia results in atherosclerosis, which occurs at a much greater frequency in individuals with diabetes. Endothelial damage is followed by platelet aggregation, lipid accumulation, smooth muscle proliferation and plaque formation, which results in narrowing of the arteries, decreased blood flow and perfusion to the limbs, which delays wound healing (Inoue et al, 2011).

The presence of PAD is associated with higher cardiovascular morbidity and mortality regardless of gender or its clinical presentation (that is, whether it is symptomatic or asymptomatic). Therefore, early detection and timely treatment is significant and important (Amirkhiz et al, 2021). Arterial sclerosis can cause chronic limb-threatening ischaemia and is associated with a two-fold higher risk for ulceration and a three-fold higher risk for amputation (Volmer-Thole and Lobmann, 2016). It is important to refer affected individuals immediately following skin breakdown in the lower limb to relevant services in accordance with local pathways.

Atherosclerosis in diabetes is further complicated by early calcification of the tunica media resulting in hardened arterial

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To find out more about Accel-Heal, please contact: customerservices@accelheal.com

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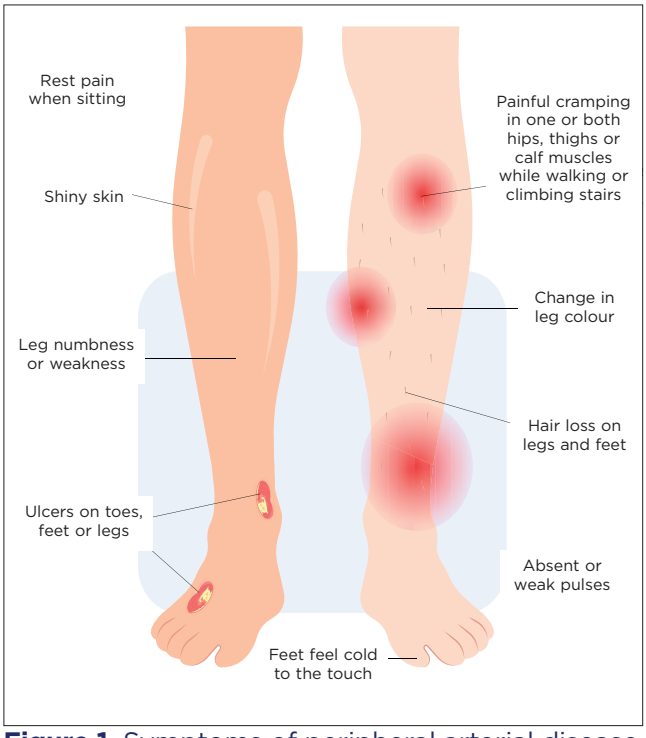

Figure 1. Symptoms of peripheral arterial disease

walls that are not adequately compressed during an ankle brachial pressure index (ABPI) measurement. This may result in a falsely elevated or inaccurate readings. To mitigate this challenge, toe brachial index (TBI) pressure measurements may be used to improve the evaluation of arteriosclerotic disease and local tissue perfusion. TBI is a measure of small arterial function, which is less like to be affected by medial calcification, so will not yield false elevated results like ABPI can (Linton et al, 2020).

It is important to note that these diagnostic tools should be used as one element of a vascular assessment but should never replace a full assessment of the general signs and symptoms of arterial disease. These may include hair loss and/or a change in the temperature or colour (such as pale or blue) of the lower limb, or pain experienced in the leg muscles on activity, which is relieved by rest (National Institute for Health and Care Excellence (NICE), 2018).

Evidence-based audit tools, such as the Wound, Ischaemia and foot infection (WIFI) classification system, is useful in predicting potential healing outcomes for individuals. Wound depth and the presence of infection are other key factors that impact healing and the likelihood of amputation. Therefore, it is important that assessment, diagnosis and treatment planning be conducted on presentation (Mills et al, 2014), and a rapid referral be made to the vascular team if there are signs of ischaemia.

Peripheral neuropathy

It is estimated that, in the UK, almost 10% of individuals with diabetes aged over 55 years of age are affected by peripheral neuropathy (Hicks et al, 2019). This wound healing complication is caused by cellular changes due to hyperglycaemia that lead to ischaemia resulting in nerve dysfunction and sensory motor and autonomic neuropathy (Dietrich et al, 2017).

Sensory neuropathy

The initial symptoms of sensory neuropathy may go unnoticed, due to a gradual and insidious onset. Typical symptoms include burning sensation, sharp stabbing pain, shooting pain and numbness, which may be exacerbated nocturnally. Protective pain sensation is reduced, and, consequently, the risk of trauma and injuries may be missed, which contributes to delayed wound healing (Volmer-Thole et al, 2016). It is important to ensure that individuals check their feet daily to identify any ulceration, blisters or trauma, with or without infection; be advised to apply a dry dressing; and seek help. NICE clinical guidance for the diabetic foot (NICE, 2016) recommends that, if any active ulceration to the foot is noted, then the referral should be made within 1 working day to the multidisciplinary foot care service or foot protection service according to local pathways.

Motor neuropathy

Motor neuropathy can be seen in an atrophy of the intrinsic muscles of the foot, which results in foot deformity, clawing of the lessor toes and an increase in the height of the arch in the foot. Additionally, glycosylation of the tendons affects foot functioning, resulting in stiffness of the joints in the foot in about 40% of patients. This contributes to unequal and elevated plantar pressure and unsteady gait, increasing the risk of developing ulceration (Andersen et al, 2012).

Autonomic neuropathy

The autonomic nerves control involuntary processes, such as heart rate, contraction, blood vessel constriction and dilation and sweating. Two noticeable changes noted due to autonomic neuropathy is a decrease or absence of sweating (anhidrosis) and increased rate of blood flow (Vinik et al, 2003). The decrease in sweating causes dry skin and reduces tissue elasticity and resilience, which can result in callus formation and fissuring, reducing the skin's protective function and increasing the risk of infection and injury. Autonomic neuropathy leads to vasomotor paresis, resulting in arteriovenous shunts of the subcutaneous vascular supply. Arteriovenous shunt is the passage of blood directly from the arteries to veins, bypassing the capillary network. Clinically, this may be seen as distended veins over the foot and leg and warm feet, with strong bounding pulses. This may be interpreted as good blood supply to the foot, but the fast rate of flow fails to fill the smaller vessels of the the foot, thereby reducing distal blood supply, which will affect wound healing (Boissaud-Cooke et al, 2015). Autonomic neuropathy can also lead to other complications that affect wound healing, such as medial arterial sclerosis, Charcot's foot (diabetic osteoarthropathy) and neuropathic oedemas, as well as alterations in the skin thickness (Bruhn-Olszewska et al, 2012).

This challenging combination of increased mechanical stress and loss of protective sensation with poor tissue viability due to

autonomic neuropathy is one of the most common causes of tissue damage in the diabetic foot and is a major contributing risk factor in diabetic foot amputation (Schaper et al, 2015). A 10g monofilament or even a simple test such as the 'touch the toes test' (otherwise known as the Ipswich touch test) can be used to identify any neuropathic sensory issues and prompt immediate preventative action (Hu et al, 2020).

Tools such as ACT NOW assessment can be used to educate both patients and healthcare professionals and promote timely referrals to appropriate services. The acronym stands for:

- A: Is there a recent or history of an accident or trauma?
- C: Is there any new swelling, redness, change of shape of the foot?
- T: Is there is a change in temperature? Could this be due to infection or possible charcot?
- N: Is there new pain present? Is it localised or generalised throughout the foot?
- O: What colour is any oozing (exudate)? Is there any odour?
- W: Document the size, shape and position of the wound on the affected foot.

Diminished physiological healing response

Diabetes also reduces the normal physiological responses required at each phase of wound healing: haemostasis, inflammation, proliferative and maturation.

Normal wound healing starts with haemostasis followed by the inflammatory phase, where inflammatory cells, neutrophils and macrophages clean up debris and pathogens and provide the wound with growth factors and other cytokines and cells. In the proliferation stage, new tissue, blood vessels (angiogenesis) and matrix construction begin to fill the wound, leading to the final stage of remodelling, where the tensile strength of the extracellular matrix develops during maturation. Delays in any of these stages will result in impaired healing. Wounds in diabetes usually stall in the inflammatory phase, where the neutrophil and macrophage infiltration stage is significantly extended (Wetzler et al, 2000). There is also a marked increase in pro-inflammatory cytokines and matrix metalloprotease production, which results in exaggerated destruction of the extracellular matrix and impaired granulation formation (Shakya et al, 2015).

A structured approach to wound assessment, such as the generic wound care assessment minimum data set (NWCSP, 2020), can facilitate a consistent approach to wound assessment in practice and support improvements in wound care with the potential to improve patient outcomes (Colemans et al, 2017).

Delayed immune response

Hyperglycaemia in individuals with diabetes causes dysfunction of the immune response (Berbudi et al, 2020). The body's host response is disrupted, and it fails to control the spread of invading pathogens, making them more susceptible to infection and delays in wound healing. It is important that any infection is treated as a red flag and treated in line with NICE antimicrobial guidelines (NICE, 2020).

KEY POINTS

- Wound healing in the lower limb for those with diabetes is complex
- Early detection of perpherial arterial disease for people with lower limb ulceration is necessary to enable optimal managment and rapid referral
- Using tools like WIFI on presentation is useful in predicting potential healing outcomers for people with diabetes who have wounds
- Recognising the symptoms of neuroapthy will enable community nurses to educate and support their patients to manage and prevent lower limb wounds
- Urgent early referral is key as 'time is tissue' and timely referrals save limbs and lives

Conclusion

In conclusion, there are many causative factors that contribute to delayed wound healing in individuals with diabetes. Awareness of the possible reasons for these delays can inform treatment and management planning of these complex wounds, to ensure that the highest standard of wound care is provided, improving safety and optimising patient outcomes. However, crucial to all of these is immediate referral to a multidisciplinary team within 1–2 working days, in accordance with NICE clinical guidelines for the diabetic foot (NICE, 2016). **CWC**

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CPD REFLECTIVE QUESTIONS

- How does diabetes affect wound healing?
- How and why is it important identify peripheral arterial disease and neuropathy?
- What changes are you going to make to your practice on the basis of the information in this article?

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A renewed look at silver dressings for wound infections: Ag Oxysalts technology

Abstract

Wound infection is an important complicating factor in the wound healing process, and infections can be even more complex and difficult to manage in the case of wounds with biofilms. Silver has been used to treat infected wounds for a long time now, and the strength of the product depends on the number of Ag ions, where the greater the number of ions, the higher and faster the reactivity is. Ag Oxysalts technology—used in 3M Kerracontact Ag dressing—has three times more ions than standard silver dressings. The technology also does not show the typical disadvantages of silver, such as cytotoxicity and systemic toxicity. This article discusses the use of Ag Oxysalts technology for infected wounds and presents case studies to support the efficacy of this product in promoting wound healing.

■ Wound infection ■ Silver dressings ■ Ag Oxysalts technology ■ Antimicrobial resistance ■ Silver toxicity

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Accepted for publication: 2021

The prevalence of acute and chronic wounds in the UK has been predicted to increase by 9% and 12% per year, respectively (Guest et al, 2017). As suggested previously, wound care should be viewed as a specialised segment of healthcare that requires clinicians with specialist training, because there is potential for better patient management and wound care product selection that would improve outcomes and reduce costs (Guest et al, 2015). Managing infection is one of the main complicating factors for health professionals in wound care. From the time of wounding, all open wounds are contaminated with microbes, but these become harmful to healing if the wound moves from bacterial balance (organisms present but not invasive) to imbalance (local, spreading and systemic infection), where damage to tissue occurs (Sibbald et al, 2003). As wound bacteria multiply, the normal inflammatory response phase is prolonged because harmful enzymes, oxygen free radicals and inflammatory cells are released; these eventually break down tissue in the wound and cause it to deteriorate (Edwards-Jones and Flanagan, 2013). Therefore, it is imperative for health professionals to understand the risk factors, signs and symptoms of wound infection.

A comprehensive wound assessment, where diagnosis of wound infection is primarily based on the clinician's assessment of the individual, the wound and peri-wound tissue and host responses—such as systemic inflammatory response—aids early detection and timely treatment. This article will discuss the use of Ag Oxysalts technology as an antimicrobial to manage and prevent wound infection.

The International Wound Infection Institute (IWII) (2016) defined infection as 'the invasion of a wound by proliferating microorganisms to a level that invokes a local and/or systemic response in the host'. It is well acknowledged that it is more

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than just the presence of bacteria that leads to adverse events in wounds. There are several stages described in the IWII document, which guides clinicians on how to respond when conducting a holistic assessment (IWII, 2016).

Signs and symptoms of wound infection

Textbook criteria for any infection are: heat, swelling, pain and redness. However, although some individuals present with classic (overt) signs and symptoms of wound infection, for immunocompromised individuals and those with chronic wounds, early detection of infection relies on identification of more subtle or covert signs of infection. *Table 1* describes the different signs and symptoms of infection.

Effective management of wound infection

In order to manage wound infection effectively, it is important to make an appropriate diagnosis of the infection. There are gold-standard methods to be used when assessing and diagnosing wound infection, including clinical professional judgement and clinical presentation of the wound and/or patient; however, diagnosis depends on both clinical expertise and available methods (Wounds UK, 2020).

Clinicians also need to consider behavioural changes by using the back-to-basics approach to ensure appropriate hand hygiene, aseptic non-touch technique and wound hygiene to minimise any further contamination.

Health professionals also need to be aware of increasing antibiotic resistance and the lack of development of new classes of antibiotics (World Health Organization, 2017). Hence, Percival et al (2005) stated that, unlike antibiotics, which have one specific target in a bacterial cell, antimicrobial dressings that have a broader spectrum of activity are less likely to induce resistance. The IWII reinforced the principle that prompt diagnosis and treatment of infection promotes wound healing and minimises the impact on the individual, their carers and health systems (IWII, 2016). This was also supported by Guest et al (2015), who mentioned that effective diagnosis and wound care management would help to minimise costs and improve patient outcomes. While, generally, thorough wound hygiene technique and wound debridement will facilitate eradication of microbes, topical antimicrobials are also recommended in order to prevent (or at least delay) attachment of planktonic microbes and to kill any organisms in disrupted or dispersed biofilm. It is imperative to optimise and conserve all antimicrobial interventions in wound management. *Table 2* describes all available antimicrobials in practice for wound infection management (IWII, 2016).

Until fairly recently, a limited range of antimicrobial products have been available to treat wound infections and reduce bacterial burden (Vermeulen et al, 2010). One of them was iodine—notably Inadine—which was introduced in the 1980s and contains 10% povidone iodine with an equivalent of 1% available iodine (Sibbald et al, 2017). Today, there are several alternative antimicrobial wound products on the market, including silver, honey, enzyme alginogel and polyhexamethylene biguanide (PHMB).

Table 1. Signs and symptoms associated with stages of the wound infection continuum

Contamination	Colonisation	Local infection		Spreading infection	Systemic infection
All wounds may acquire microorganisms. If suitable nutritive and physical conditions are not available for each microbial species, or they are not able to successfully evade host defenses, they will not multiply or persist; their presence is therefore only transient, and wound healing is not delayed	Microbial species successfully grow and divide, but do not cause damage to the host or initiate wound infection	Covert (or subtle) signs of local infection: ■ Hypergranulation (excess 'vascular' tissue) ■ Bleeding, friable granulation tissue ■ Epithelial bridging and pocketing in granulation tissue ■ Wound breakdown and enlargement ■ Delayed wound healing beyond expectations ■ New or increasing pain ■ Increasing malodour	Overt (classic signs of local infection): ■ Erythema ■ Local warmth ■ Swelling ■ Purulent discharge ■ Delayed wound healing beyond expectations ■ New or increasing pain ■ Increasing malodour	■ Extending in duration with or without erythema ■ Lymphangitis ■ Crepitus ■ Wound breakdown/ dehiscence with or without satellite lesions ■ Malaise/ lethargy or nonspecific general deterioration ■ Loss of appetite ■ Inflammation, swelling of lymph glands	■ Severe sepsis ■ Septic shock ■ Organ failure ■ Death

Source: International Wound Infection Institute, 2016

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Table 2. Antimicrobial agents used to treat wound infections

Antimicrobial agents	Type	Biofilm efficacy	Guidance for us
Enzyme alginogel	Alginate gel with two enzymes: ■ Lactoperoxidase ■ Glucose oxidase	■ Prevents formation of biofilms at concentrations M0.5% (w/v) ■ Inhibits growth of established biofilms at higher concentrations ■ Does not disrupt biofilm biomass	■ Concentrations of alginate of 3% and 5% depending on level of exudate
Iodine (povidone or cadexomer)	■ Solution ■ Impregnated wound dressings ■ Powder and paste	■ Inhibits development of new biofilm ■ Eradicates young biofilm colonies ■ Significantly reduces mature biofilm colonies	■ Contraindicated in individuals sensitive to iodine or with thyroid or renal disorders ■ Contraindicated in those with extensive burns
Honey	■ Medical grade ■ Honey impregnated dressings	■ Inhibits biofilm growth ■ Reduces biofilm colony formation ■ Inhibits quorum sensing of biofilm, therefore ability to proliferate	■ Select products that have been gamma irradiated ■ Leptospermum species is more effective than other types
Silver	■ Salts (e.g. silver sulphadiazine, silver nitrate, silver sulphate, silver CMC) ■ Metallic (e.g. nanocrystalline silver-coated nylon fibres) ■ Impregnated wound dressings	■ Denatures existing bacterial biofilm in concentrations over 5 μg/ml	■ Change more frequently in wounds with heavy exudate ■ Avoid in individuals with silver sensitivities
Ionic silver combined EDTA and BEC (anti-biofilm agents)	■ CMC gelling dressing impregnated with ionic silver enhanced with EDTA and BEC	■ Combines antibiofilm and antimicrobial components that work in synergy to disrupt biofilm and expose associated microorganisms to the broad-spectrum antimicrobial action of ionic silver ■ Eradicates mature biofilm within 5 days ■ Prevents biofilm formation ■ Associated improvement in healing rates	■ Change more frequently in wounds with heavy exudate ■ Avoid in individuals with sensitivities to silver, EDTA or BEC
Surfactant	■ Concentrated surfactant gels with antimicrobial preservatives	■ Prevents biofilm formation ■ Increases antibiotic efficacy ■ Eradicates mature biofilm	■ Can be used between and post-debridement to prevent re-establishment of biofilm ■ May require daily application for the first few days

Source: IWII, 2016. CMC=carboxymethyl cellulose; EDTA=ethylenediaminetetraacetic acid; BEC=benzyloxyethyl cellulose

All antimicrobial wound products should be used based on regular individual assessment. Considerable research recommends the use of a 2-week challenge with a topical antiseptic, as this allows sufficient time for the topical agent to exert a beneficial activity (Percival et al, 2005; IWII, 2016). A wound that does not progress despite the use of an antimicrobial agent and remains chronic could be indicative of the presence of biofilm (IWII, 2016). It is now widely accepted that biofilm is present in 70–100% of chronic wounds (Malone et al, 2017). Biofilms are not visible to the naked eye and can be difficult to confirm unless a biopsy is taken (Wounds UK, 2020). This will involve regular physical debridement and cleansing to remove debris as part of standard care. However, it will also require the use of an antimicrobial with proven effect against mature biofilms in clinical practice. Hence, the use of a highly effective

antimicrobial is required for shorter-duration treatments to kill bacteria, thereby minimising the risk of inducing microbial resistance (Ayello et al, 2012).

Role of silver in managing wound infection

Silver is unreactive and does not kill bacteria in its metallic form. It is only effective at killing bacteria when it is missing electrons and in its ionic state. The more electrons that are missing, the more reactive it becomes and the greater is its ability to disrupt the normal function of bacteria. Several silver dressings are available on the market to reduce bioburden and combat wound infection. The proven advantages of silver dressings are numerous, with one being localised antimicrobial wound therapy, as opposed to whole-body systemic exposure, and immediate access to the wound bed in bactericidal concentration, which would reduce the overall use of antibiotics (Lipsky and Hoey, 2009).

Unfortunately, a lack of understanding about the mode of action of silver dressings may have led to their inappropriate use, for example, continued use after the infection has cleared or as prophylaxis against infection, thereby increasing local wound dressing costs (Young et al, 2016). Silver resistance and toxicity are also among the reported disadvantages, where raised systemic levels of silver are noted, although they reduce once silver is discontinued, for example, with use of silver over prolonged periods for large burn wounds. Other mild adverse effects of silver include allergy or skin staining.

Choosing the right silver dressing

The main criteria a silver dressing will need to meet are to:

- Provide sustained broad-spectrum antibacterial action
- Be efficacious against biofilm
- Be efficacious in the presence of exudate
- Have adequate absorptive capacity and conformability; need for a secondary dressing and recommended dressing change frequency also must be considered
- Be safe.

Ag Oxysalts Technology

3M™ Kerracontact™ Ag, a ground-breaking, patented silver wound dressing using Ag oxysalts technology is the first dressing to use silver in its most active state (Lemire et al, 2015). It is a unique silver wound dressing that acts quickly (within 1 week) against bacteria and destroys biofilms (Warde, 2018). This swiftness of response means that, instead of targeting for a '2-week challenge', clinicians can reassess wounds for reduction in the signs and symptoms of infection after just 1 week.

The AG Oxysalts technology used in 3M Kerracontact Ag is a unique silver technology that facilitates fast and effective bactericidal activity and an ability to disrupt biofilms and prevent reformation within 24 hours of application (Thomason and Beasley, 2015), while also being cost effective and patient friendly (Crawford Healthcare, 2015).

Ag Oxysalts is designed with three missing electrons (Ag3+), while other silver dressings are only missing one electron (Ag1+). Thus, it offers enhanced reactivity, which underlies its fast and powerful antimicrobial activity (Thomason et al, 2018). Oxygen is vital for wound healing, and adequate wound tissue oxygenation can trigger healing responses. AG Oxysalts technology produces oxygen for wound healing in two ways: from the natural breakdown of Ag Oxysalts technology and the breakdown of hydrogen peroxide (Thomason et al, 2018).

Effectiveness of AG Oxysalts

When in contact with an aqueous solution, for example, wound exudate, Ag Oxysalts release three types of silver ions, which provides a sustained silver ion release for the duration of dressing wear while maintaining the antimicrobial activity (Wounds UK, 2018). This is a recommended point of clinical practice to ensure continuous antimicrobial effect during the treatment and minimise wound disturbance. In addition, Ag Oxysalts has also been found to be non-toxic, showing no cytotoxicity, systemic toxicity, irritation and sensitisation in laboratory tests (Kalan et al, 2017), indicating that it is safe for application in clinical practice.

An in vitro study conducted by Lemire et al (2015) found that Ag2+ and Ag3+ ions effectively eradicate organisms growing planktonically or in a mature biofilm state and prevent biofilm reformation at low concentrations, which reduces the risk of toxicity, as well as the overall exposure to silver. Evidence from several in vitro and in vivo studies has demonstrated that Ag Oxysalts technology is proven to quickly kill 99.999% of a broad spectrum of bacteria (Crawford Healthcare, 2015), as described in *Box 1*.

In a 50-centre study by Motta et al (2012), a dramatic response in terms of bacterial elimination and biofilm disruption was seen within 7 days, which indicates that the wear time of the dressing was up to 7 days. This was further supported by an in vitro study by Miller et al (2013), who found that mature biofilms of *Pseudomonas aeruginosa* and *Staphylococcus aureus* showed a log 4 reduction in 4 hours or less (in a simulated wound fluid), with a sustained bactericidal effect over 7 days. No viable bacteria were retrieved after 24 hours, and the biofilms were disrupted, allowing the bacteria to be killed quickly and effectively.

Indications for use

3M Kerracontact Ag can be used for acute and chronic wounds that are locally infected or at high risk of infection, including burns, leg ulcers, pressure ulcers, diabetic foot ulcers and surgical wounds (Crawford Healthcare, 2015). From a clinician point of view, following the IWII (2016) document, 3M Kerracontact Ag can be used in the stage between colonisation and local infection to reduce the overt and covert signs of infection. It can also be used immediately following debridement if a biofilm is suspected due to its effectiveness in rapid disruption of biofilm and prevention of reformation (Miller et al, 2013).

Following holistic assessment and where standard care has failed, 3M Kerracontact Ag can be applied directly to the wound bed, wet or dry. Since the silver does not need to be activated

Box 1. Organisms against which Ag Oxysalts technology is effective

Gram negative
- *Acinetobacter baumannii*
- *Escherichia coli*
- *Pseudomonas aeruginosa*

Gram positive
- *Corynebacterium striatum*
- *Enterococcus faecalis*
- *Enterococcus faecalis VRE*
- *Staphylococcus epidermidis*
- *Staphylococcus aureus*
- Methicillin-resistant *Staphylococcus aureus*

Fungus
- *Candida albicans*
- *Aspergillus niger*

in any way, the dressing does not need to be moistened. It can be cut to wound size and shape, and a secondary dressing will be required in most cases. Depending on clinical assessment, the secondary dressing may require changing more often, but the Kerracontact Ag dressing can be left in situ for up to 7 days. There is no evidence of skin staining or toxicity reported from use of Kerracontact Ag to date and no patient discomfort mentioned in any studies or case reports (Motta et al, 2012).

Case studies

Case 1

A 56-year-old woman with sickle cell disease presented with multiple ulcerations to the medial and lateral malleolus. The size of the wound over the lateral left malleolus at presentation was 6.6 x 2 cm, and the patient-reported pain score was 6/10 (*Figure 1a*). The appearance of the wound bed was poor, with 60% granulation tissue and 40% slough.

The patient was started on Kerracontact Ag and short-stretch compression bandaging, and she attended for twice weekly dressing changes. After 4 weeks of treatment with Kerracontact Ag, the size of the wound reduced to 4.4 x 2 cm (*Figure 1b*), and the pain score was 7/10. This increase in the pain score was not uncommon for this patient, as she experienced pain all over her body during this visit and subsequently attended the haematology unit for management of sickle cell crisis. The wound bed appeared much healthier, with 90% granulation tissue and only 10% slough.

Although this patient was not followed up until her wounds had healed completely, the clinicians noted that the wound had shown considerable progress towards healing.

Case 2

A 51-year-old man presented with long-standing ulceration that had been non-healing for 4 years; the wounds would improve but then recur. The patient had a past medical history

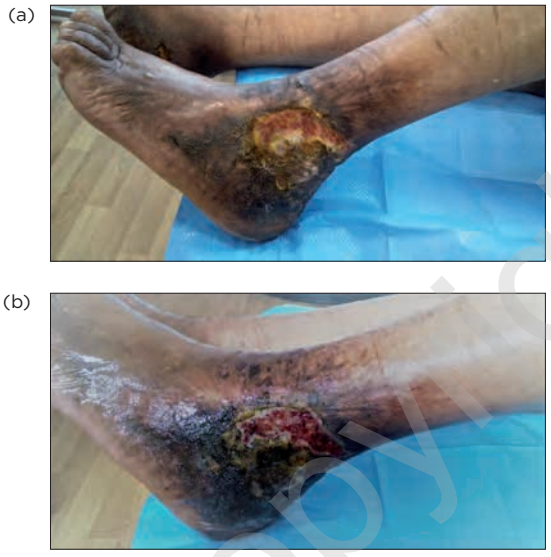

Figure 1. Case 1. (a) Wound over the left malleolus at presentation. (b) Wound at 4 weeks after treatment with Kerracontact Ag

of sickle cell disease. At presentation, the pain score was 9/10, and the main wound measured 11.5 x 5.5 cm, with a depth of 0.2 mm (*Figure 2a*). The wound bed appeared poor with 100% slough. The patient was treated with Kerracontact Ag dressing, for which he was seen three times a week. After 4 weeks, the wound bed showed significant improvement in appearance; the slough was lifting, and small areas of granulation were now visible (*Figure 2b*). Further, the bridge between the main wound and the smaller one adjacent to it had widened. The size of the wound in week 4 was 10 x 4 cm, but it had insignificant depth. After 15 weeks of treatment with Kerracontact Ag, the main wound had improved significantly, and the smaller one adjacent to it had closed.

Case 3

A 56-year-old man presented to the complex wound clinic with a 6-year history of bilateral venous leg ulcers (VLUs). Both legs were ulcerated to the gaiter area, but the left wound was worse than the right leg, with a high level of thick, green exudate, pain reported to be worse during dressing change and malodour (*Figure 3a*). The wounds were found to be locally infected (methycillin-resistant *S. aureus* detected on a swab test and presence of *P. aeruginosa* indicated by the green exudate), and the patient had a past medical history of hypertension, hypercholesterolaemia and type 2 diabetes mellitus.

The patient was treated with several courses of oral antibiotics before being referred to the complex wound clinic. On assessment in the clinic, he was started on an antimicrobial dressing (which was changed three times a week), with the aim of decolonising the wound, reducing bioburden and reducing malodour. After 2 weeks, the wound bed had remained stagnant, and the pain level not reduced despite all standard care and compression bandages. Kerracontact Ag was

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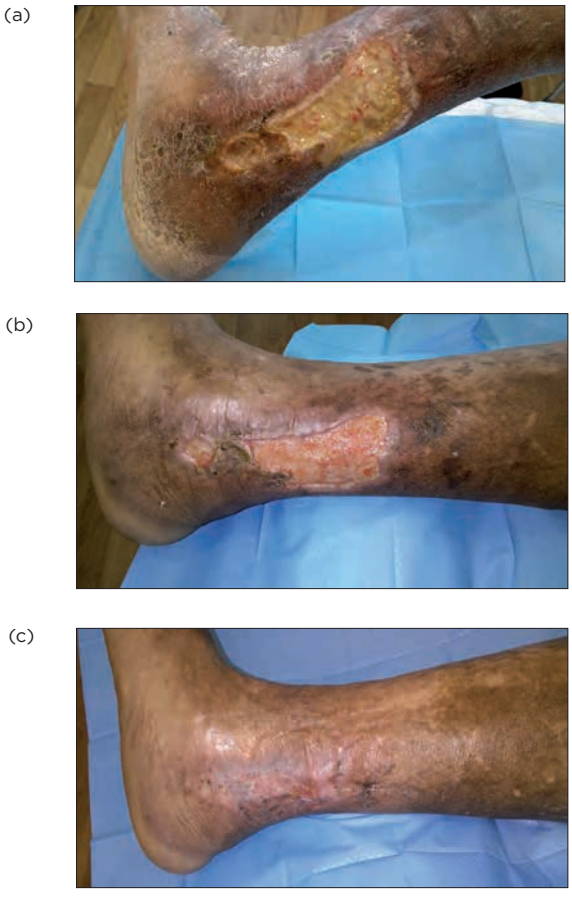

Figure 2. Case 2. (a) Wound on the left leg at presentation. (b) Wound at 4 weeks after treatment. (c) Wound at 15 weeks after treatment; the main wound is almost completely healed, and the lower wound has closed

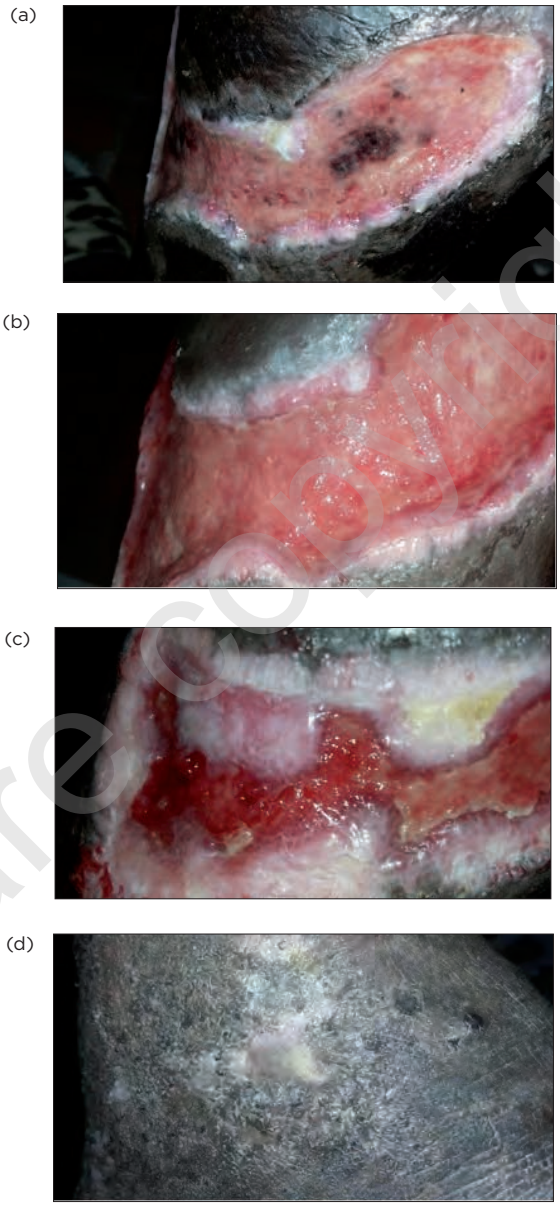

Figure 3. Case 3. (a) Wound at presentation. (b) Wound at 1 week after treatment with Kerracontact Ag. (c) Week 2 of Kerracontact Ag treatment. (d) Wound in week 8 of treatment

then started for 7 days, with the aim of treating the infection, and Kerramax Care was used as a secondary dressing for absorption under the compression.

At week 1 after starting Kerracontact Ag, pain was reported to be 6/10, and no analgesia was required when the dressing was changed (*Figure 3b*). The patient's mobility had improved, and he was eating and drinking better as the malodour was less. The Kerracontact Ag dressing was changed twice in the first week of use. Thereafter, it was left in situ, and only the secondary dressing was changed.

In week 2 of Kerracontact Ag use, the wound edges were contracting, and new epithelial tissue was present in the wound bed (*Figure 3c*). At that point, the patient did not experience any pain during dressing change and reported better sleep at night, as there was no pain or malodour. The patient arrived at the clinic wearing normal trousers instead of jogging trousers, as he felt more comfortable to dress up with no exudate or malodour. His quality of life had improved with the new dressing, and the impact was noticeable in just 1 week. After 2 weeks of Kerracontact Ag use, the dressing was discontinued, as no signs of infection was present, and treatment was stepped down to another formulary product suitable for the wound bed (*Figure 3d*).

Case 4

A 61-year-old women was admitted to care after abdominal surgery following trauma. She had a past medical history of hypertension, high cholesterol, rheumatoid arthritis and recent washout following an infected abdominal wound in the hospital.

On discharge to the community, she had negative pressure (VAC) in situ for exudate management and to speed up wound healing. The VAC therapy was discontinued, as the

Figure 4. Case 4. (a) Wound at presentation. (b) Wound at 1 week after treatment with Kerracontact Ag. (c) Week 2 of Kerracontact Ag treatment. (d) Wound at 1 week after stopping Kerracontact Ag treatment

exudate level was low and the wound bed appeared stagnant (*Figure 4a*). On assessment by a tissue viability nurse, the wound bed was found to be dry and shiny, with no malodour or pain reported on dressing change. In order to disrupt the biofilm suspected in the wound bed, the wound was curetted using a Derma Curette, and Kerracontact Ag was started.

After 1 week of using Kerracontact Ag, healthy granulation tissue was present on the wound bed on assessment, and the edges were advancing (*Figure 4b*). No curetting was done, and Kerracontact Ag was re-applied for week 2 of treatment (*Figure 4c*). In week 3, despite stopping the Kerracontact Ag dressing, the wound bed progressed to healing, with all edges contracted and new epithelial tissue present (*Figure 4d*). This supports the findings of studies which demonstrated that Kerracontact Ag disrupts biofilm rapidly and prevents its reformation, thus improving the healing rate (Lemire et al, 2015). The patient was discharged from care with skin care advised.

KEY POINTS

- Silver dressings have been in use for infected wounds for a long time, but are associated with silver toxicity
- Considering global concerns around antimicrobial resistance, silver shows potential as it does not produce resistance in microorganisms
- Ag Oxysalt technology, which produces three silver ions instead of two, is more reactive and effective than regular silver dressings and shows no silver toxicity
- Since Ag Oxysalts technology allows for faster healing, it can contribute considerably to improving patients' quality of life and reducing the cost of infected wound treatment

Conclusion

The IWII document (IWII, 2016) is an excellent tool for clinicians to effectively diagnose and manage infection appropriately, although following national and local guidance is the priority. Clinical evidence of the effectiveness of Kerracontact Ag dressing continues to grow in practice, and many clinicians have opted to use Kerracontact Ag because of its fast and effective action in killing bacteria within just 7 days and its sustained bactericidal effect within these 7 days, hence reducing the 2-week challenge to 1 week only in some cases. The effectiveness of Kerracontact Ag on biofilm has also demonstrated its importance in the wound care world, as delayed healing and infection are often attributed to biofilm formation. The Kerracontact Ag should help overcome some of the problems encountered in clinical practice and achieve better health outcomes, thereby reducing the unnecessary use of antibiotics and corresponding costs, and improving patient's outcomes. **CWC**

Declaration of interest: This article was supported by 3M.

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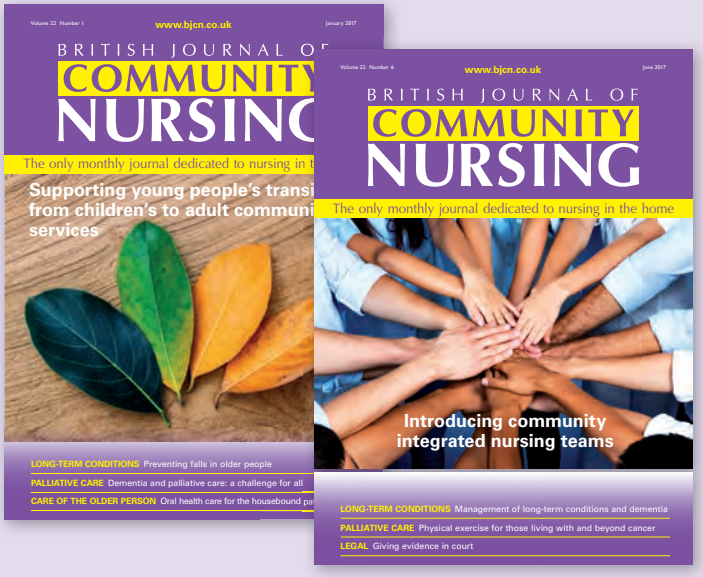
CPD REFLECTIVE QUESTIONS

- What are the overt and covert signs of local wound infection?
- What are the advantages and disadvantages of the use of silver for treating infected wounds?
- What important criteria must silver dressings meet before they can be used for an infected wound?



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Leg Club 2021: what's been happening?

As the world was taken over by the pandemic at the beginning of 2020, the Best Foot Forward Leg Club was forced to close suddenly. Who would have thought that access to nursing treatment would be limited? But looking back this was just the beginning of things to come and the challenges to accessing services.

'The emphasis of the Leg Club Model is to provide a therapeutic, non-medical, clinical environment in which social interaction, participation and peer support can ease loneliness, engender friendship and develop a sense of community — this in turn leads to concordance with leg ulcer management techniques.' (Lindsay, 2008)

Our thriving Leg Club with 40 plus members attending each week for active ulcer care, Well Leg support and social activities closed. As a nursing team, it left us feeling empty.

'The ethos of care, social support, friendship and medical treatment is what makes this form of nursing care so unique and successful.' (Lindsay, 2020)

The motivation to support more vulnerable members was a great team focus. Administrative staff and nurses worked hard to make alternative arrangements for our members.

All active ulcers were allocated to practice nurses based in a new COVID-safe nursing hub at a GP surgery site. Joint working between our district nurses and our enhanced care team supported those who required home visits. Members who had availed themselves of the Well Leg service were phoned by the practice nurse and offered weekly, bimonthly or monthly telephone support, which was then bolstered with support for the members from the volunteers. The National Wound Care Strategy Programme (NWCSP) recognises the importance of promoting self-care and shared decision making (NWCSP, 2020). Not knowing how long the pandemic restrictions would be in place, it rapidly became apparent that we were building a list of overdue hosiery and Doppler assessments; to manage this, we created a waiting list, so that we had some accuracy to work with when able.

Jenna Martin, Melanie Abel

Jenna Martin, GP Nurse; Melanie Abel, Advanced Nurse Practitioner, both at the Adam Practice, Dorset

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Best Foot Forward Club back in action!

As ease of lockdown began after the first wave, the team started to explore how we could safely reopen in October 2020 shortly after our 5th anniversary. In order to re-open, we needed to prioritise active ulcers while continuing to support our Well Leg service remotely, in keeping with the Leg Club Model. As suggested by Health Education England in 2016, working to bring healthcare closer to home kept us focused to be proactive and creative to get things moving. A formal risk assessment was conducted for the venue, as well as for staff and volunteers. Volunteers were approached to see if, risk assessment permitting, they would be willing to support reopening. Naturally, there were some nerves, but there was also considerable enthusiasm to reopen. For all of us, it felt like we were making some progress back to 'normality.'

Our venue, Upton Social Club, agreed to allowing us back, supported by their manager and cleaning team. The risk assessment established a new working layout; on paper, it felt rigid and too 'formal' compared with the Leg Club environment we had once known, with one-way systems and restricted numbers accessing the building at one time. However, we had to give it a go, erring on the side of caution with all plans.

We based this on the rule of six, creating bubbles for our members. Some volunteers were unable to return following risk assessment but understood the importance of working within the Government's COVID guidance. The apprehension of staff, members and volunteers was palpable, and initially, there was a subdued atmosphere compared to the usual hustle, bustle and fun of our Leg Club! Our strict adherence to infection control and prevention and risk assessment quickly reassured our members,

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and, although no social element, teas or raffles were possible, our bubbles began to interact with each other from their chairs, and we began to hear familiar laughter. Some members only left the house for Leg Club each week and commented on the impact that returning to Leg Club had on their overall wellbeing. Whether a volunteer or member of the nursing team, we all recognised the privileged position we were in and the trust our members placed in us.

The lack of background noise was a change for all of us, so we introduced some background music, which helped us all relax. We then asked members for their music requests and created a Leg Club 'playlist'. This generated laughter and conversation about who selected which tune and what memories were associated with these tunes. Brenda, a volunteer, loved Beethoven, while one of our members, Keith, loved Queen. We all enjoyed listening to our members' stories.

Creating a video for the international vWIN Foundation vein week was a highlight for members and reminded us of the value of the chair exercise sessions we used to have. Members also participated in new dressing trials for service industry supporters and completed the related paperwork, which again stimulated conversation and gave them a sense of supporting Leg Clubs and the wider community.

As lockdown has eased further, we have started to offer refreshments again. To help with infection control and reduction of weekly plastic waste, we have our own reusable Leg Club mugs available for a donation; these were a hit in the first week! The volunteer team has reintroduced the weekly 'golden ticket' and continue to plan the reintroduction of the monthly raffle, and there are even thoughts of a monthly hairdresser. As pointed out by Mechen (2019):

> *'It is this enhanced social component that makes a positive difference to patients, breaking the cycle of poor compliance to treatment and low healing.'*

The nursing team is planning a slow reintroduction of armchair exercises and podiatry. Striving to drive services

Social activities restarting at Best Foot Forward following the easing of restrictions

Staff and members of Best Foot Forward Leg Club at the reopening during the pandemic

forward and helping our future medical and nursing team grow is vital (NHS England, 2019), and we are supporting medical, pre-registration nursing students and nursing associates with educational placement time.

We are also looking forward to welcoming back our housebound patients and being able to use the community bus transport; the social support for these members will be invaluable. Reintroducing our joint working with our district nursing team in a timely manner is important, as their services have remained open but over-stretched.

The Leg Club at the Adam Practice is not only sought as important by those who physically work there but is valued by the whole wider team. This was reflected in our 2021 Jurassic challenge walk, where 30 members of staff completed a circular walk from Weymouth and around Portland. All funds raised will be going to the Lindsay Leg Club foundation and Best Foot Forward charity. The fresh air also provided time to think about those members and volunteers who we have sadly lost during the last year. Having raised over £3000, we are looking to utilise some of these funds to enhance our Well Leg service; we also asked members to feedback their ideas for improvements. Here are some of their comments:

> *'The new layout of Leg Club has meant that I have enjoyed chatting to people that I have not spoken with before.'*

> *'I look forward to Leg Club each week. I have felt very safe, wearing my mask, and the nurses have theirs on too, and are very thorough with cleaning.'*

> *'I have bought a new Best Foot Forward mug and have enjoyed chatting with friends since refreshments have started.'*

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Are we actively in dialogue with those in our care?

Sylvie Hampton
Sylvie Hampton, Tissue Viability Consultant Nurse; Director of Wound Care Consultancy Ltd

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Clinical teams' delivery of wound care in a Leg Club environment benefits from collaborative working with the local tissue viability nurse specialist and relevant multidisciplinary teams to ensure a high standard of professional service within the Clubs. This means providing people with the knowledge, skills and confidence, which, to those seeking their advice and expertise, are necessary components of effective care.

Leg ulcers (and other chronic leg problems such as oedema and lymphoedema) can affect people at any age, but are particularly common in people over 60 years. At present, individuals with problems of the lower limb and leg ulcers are treated in the individuals' own homes by district nurses or by practice nurses in GP surgeries. These conditions present several challenges to the individual and families caring for their loved ones. In addition to the high costs of wound care in terms of nursing resource and dressings, protracted healing time and high recurrence rates, there is disparity in care delivery. Further, chronic wounds have a long-term impact on people's lives, as well as creating considerable expense for healthcare systems, and, for some individuals and/or their families, there is often little help available in the form of support and advice on prevention of leg ulcers.

Wound care is interdisciplinary, with different professionals and services involved in an individual's treatment journey. Yet, sadly, many visitors seeking help and advice via the Leg Club (www.legclub.org) and Legs Matter websites (www.legsmatter.org) have identified that those receiving care find communication, or the lack of it, extremely stressful and frustrating, especially when the lack of continuity means several interactions with various hospital clinics and clinical teams.

Effective communication and treatment need to involve a two-way relationship and, as professionals, we should ensure that those in our care and their families have sufficient information to enable them to understand what and why specific treatments have been recommended. Often, this is not happening, and people seek information via the internet. Here is an extract from a member of the public seeking advice for a loved one via the website.

'I wonder if you can help us. My [loved one] has had an issue with her legs for a number of years now and, although there have been various GP and hospital visits, during all that time that time, no one has been able to diagnose what the problem is, or provide a solution. We are really at our wit's end with this and looked online for information as a last resort. This is how we came across your website.

I have attached a photo of her legs; as you can see they are extremely swollen and extremely heavy. The weight is considerably restricting her movement and she is sadly suffering, with no real quality of life anymore. If you could assist with, potentially, a cause for this, or even provide details for anyone that you know of in our that specialises in legs please could you let me know. (Desperate)'

This is not an uncommon scenario; at the Leg Club Foundation, we have become very familiar with such letters. The desperate relatives wrote again:

'At the moment, xxx is in hospital after feeling unwell as a result of her leg situation. She can't walk because of the swelling, so she is then prescribed diuretic treatment but can't make it to the toilet—so it's all a bit of a nightmare.

She is still at the point of getting no real assistance or a referral. The latest GP appointment was provided telephonically, and a nurse then visited to wrap the legs. This is a repeated process which has occurred for around 2–3 years. Issues worsen, doctor calls, nurse

Figure 1. Patient with a swollen knee

visits to bandage, repeat with hospital visits/ambulance callouts in between. Most recent photos attached. Tomorrow, family members will be insisting on a referral; otherwise, I think the situation will continue to deteriorate.'

Via the websites, we learn about people's stories and their personal experience of pain, depression and social isolation. Why is this happening and how and why are these situations occurring? Being mindful that the communication is via the internet, its difficult to undertake an assessment when there may be a simple answer to the deplorable situation. This, sadly, is a reflection on practice by the those caring for them. Thus, the international psychosocial Leg Club model advocates and promotes a multidisciplinary and multi-agency approach to education and encourages input from the specialists into visiting and supporting their local Leg Club. This ensures that members are provided with clinical expertise in a social situation that ensures not only companionship and friendship but also helps members realise that they are not alone, in the way that the family above feels alone.

Figure 1 shows a very swollen knee. This person is very obviously suffering and requires a fully assessment to see if they are suitable for compression from the specialist team. If suitable, the specialist may recommend a full-length toe-to-thigh bandage, or flat knit compression hosiery for lymphoedema could be applied to continue to reduce and control the oedema. The development of the wrap system is an example of modern-day innovative technology to treat individuals more effectively, while providing increased quality of life and wellbeing and offering considerable overall cost savings. It also offers an alternative shared supportive care solution for people who are unable to tolerate or adhere to other forms of compression therapy. These may include older adults or morbidly obese individuals.

Figures 2 shows wet limbs that could be due to dermatitis. Again, on viewing the photo, it is clear that the situation may possibly have worsened due to inappropriate bandaging, and the clinician may recommend application of a very potent steroid cream applied from the toe to the knee. Two or three applications would correct the dermatitis, and then either Ichthopaste bandage under compression bandages or Dermasilk hosiery (meant for eczema and dermatitis) could correct this situation very quickly. No one is better placed to know this

Figure 2. Wet limbs, possibly due to dermatitis

or to apply it than a very experienced Leg Club nurse and/or specialist tissue viability or lymphoedema nurse consultant.

Conclusion

Many patients, their families and carers may not know what standards, options and treatments they can expect. It is particularly difficult for older patients and their families, who tend not to question what is being offered and what the alternatives could be. Leg Clubs provide solutions for patients with leg problems, like the person described in this article, offering so much more than just dressing care. **CWC**

Note: The family who sent in the query consented to a transcript of their enquiry and the pictures being published in this article.

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