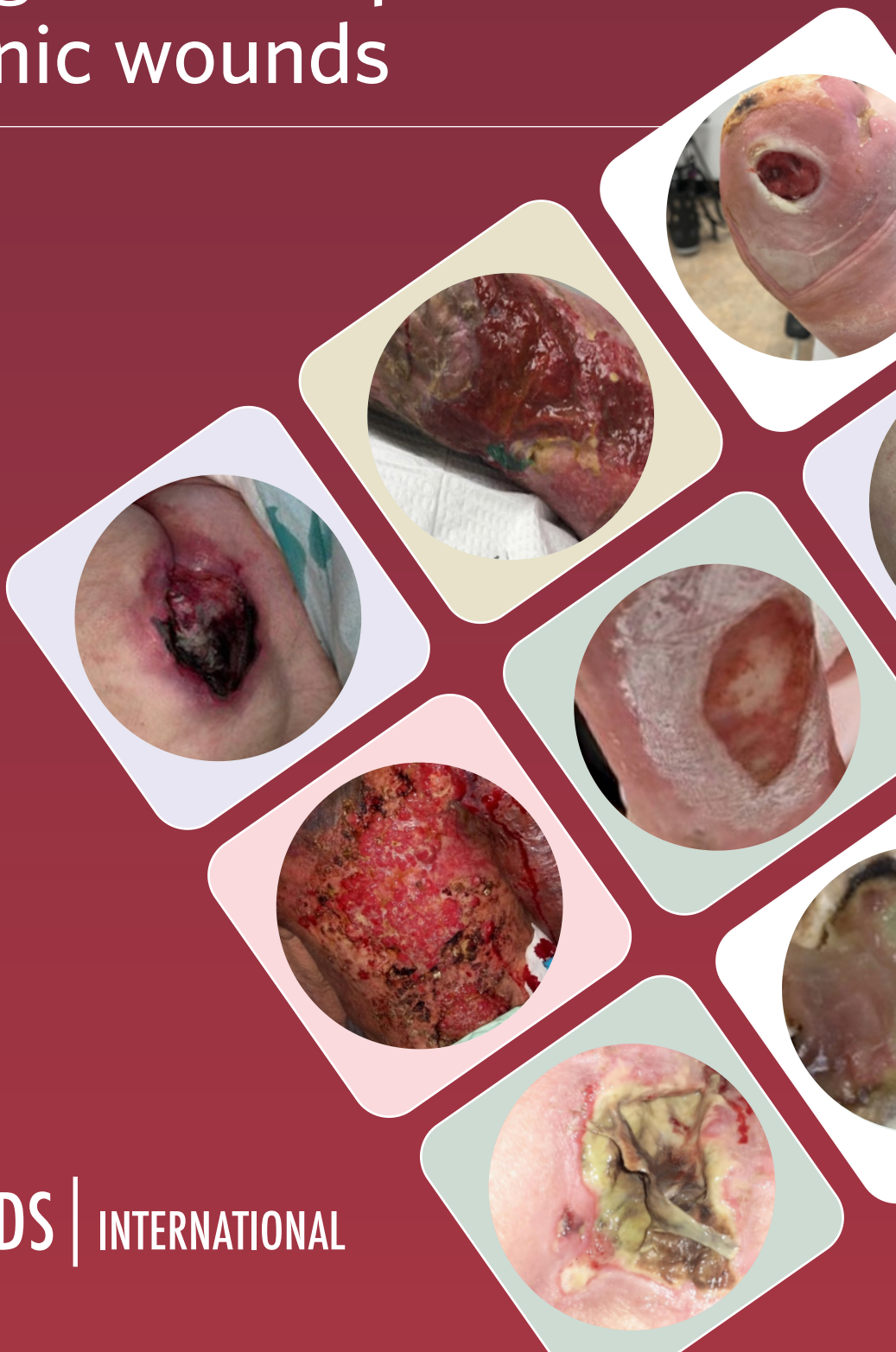
INTERNATIONAL **CASE STUDIES**

Case series:
3M™ Kerramax Care™ Super-Absorbent Dressing for the management of patients with chronic wounds



CASE STUDIES SERIES 2024

WOUNDS | INTERNATIONAL

Published by
Wounds International
A division of Omniamed Communications Ltd
108 Cannon Street
London EC4N 6EU, United Kingdom
Tel: +44 (0)20 3735 8244
Email: info@omniamed.com
www.woundsinternational.com

WOUNDS | INTERNATIONAL

Suggested citation
Wounds International (2024) *Case series: 3M™ Kerramax Care™ Super-Absorbent Dressing for the management of patients with chronic wounds* Wounds International

Free download available from:
www.woundsinternational.com

3M Science. Applied to Life.™

Supported by an educational grant from 3M.

The views expressed in this publication are those of the authors and do not necessarily reflect those of 3M.

CONTRIBUTORS

Catherine Milne, Advanced Practice Wound, Ostomy, Continence Nurse, Connecticut Clinical Nursing Associates, LLC Bristol, United States

Luxmi Dhoonmoon, Nurse Consultant Tissue Viability, London North West University Healthcare NHS Trust, United Kingdom

Robert Snyder, Dean, Barry University School of Podiatric Medicine at Barry University, Fort Lauderdale; Florida and Chief Medical Officer, MediWound, Harvard Medical School, United States

Rosalyn Thomas, Acute Foot Podiatrists, Diabetes Centre, Morriston Hospital, Swansea, United Kingdom

Philippe Leger, Angiologist, Wound Ulcer Centre, Clinique Pasteur, Toulouse, France

3M™ Kerramax Care™ Super-Absorbent Dressing for the management of patients with chronic wounds

Box 1. Common complications of chronic wounds (Järbrink et al, 2016).

- Infection
- Osteomyelitis
- Cellulitis
- Necrosis
- Dehiscence
- Gangrene
- Maceration
- Haematomas
- Oedema
- Periwound dermatitis.

INTRODUCTION

Chronic wounds, such as pressure ulcers, diabetic foot ulcers, venous ulcers and other lower limb ulcers, affect an estimated 12% of people during their lifetime (Järbrink et al, 2016). The number of non-healing wounds is increasing as the population is ageing and healing capacity diminishes with older age (Guest et al, 2020; Alam et al, 2021). Complications associated with wound chronicity, as shown in Box 1, increase the personal and financial cost of wounds in terms of impact on quality of life and burden on the healthcare system.

EXUDATE MANAGEMENT AND THE ROLE OF 3M™ KERRAMAX CARE™ SUPER-ABSORBENT DRESSING

Management of exudate is one of the biggest challenges in wound care. Highly exuding wounds can have a significant negative impact on quality of life as a result of (Browning, 2016; Hughes and Jones, 2017; World Union of Wound Healing Societies, 2019):

- Saturation or loss of adhesion/integrity necessitating unscheduled dressing changes
- Strikethrough increasing the risk of infection, as exudate contains bacteria
- Periwound skin becoming macerated and painful
- Patients experiencing limited mobility or being unable to perform normal activities of daily living (such as work, shopping and cooking)
- Social interaction being curtailed or avoided due to leakage or malodour
- Patients feeling a burden on carers and family members who must change dressings at short notices.

It is important to select the most appropriate dressing based on safety, comfort and efficacy. Strikethrough occurs when the dressing used is not suitable for the volume of exudate or planned wear time (Browning, 2016).

Box 2. Properties of Kerramax Care Super-Absorbent Dressings

- Designed to absorb and retain high levels of fluid
- Prevents leaks from the dressing
- Prevents strikethrough – where exudate comes through a dressing (Hughes et al, 2022)
- Protects from maceration of surrounding skin (Hughes and Jones, 2017)
- Able to be used under compression
- Can be left in place for up to seven days
- Comfortable and conformable, helping support patient engagement (Hughes and Jones, 2017).

Kerramax Care Dressing is a super-absorbent polymer dressing range [Box 2] indicated for the control and removal of excess exudate in moderately to highly exudating wounds. These dressings have a greater absorption capacity than traditional foam dressings. The super-absorbent core with Exu-Safe™ Technology absorbs and retains high levels of exudate, which may contain potentially harmful bacteria and matrix metalloproteinases*, helping to keep it within the dressing core to reduce the risk of skin maceration and to protect patients and caregivers from its harmful contents (Hughes and Jones, 2017; Singh et al, 2022). The super-absorbent polyacrylate polymers form a gel on contact with exudate, locking away fluid, bacteria, proteases and inflammatory mediators, all while providing a moist healing environment (Hughes and Jones, 2017; Singh et al, 2022). The gelling action decreases the risk of leakage and maceration and increases dressing wear time, improving patient quality of life as dressing changes are often painful and traumatic (Hughes and Jones, 2017). Kerramax Care Dressing has demonstrated good fluid absorbency and retention over periods of up to 3 to 7 days (Singh et al, 2022).

These dressings can also be used in conjunction with compression if oedema is present. Kerramax Care Dressing has a thin profile and evenly distributes exudate under compression through lateral wicking, resulting in fewer leaks (Jones and Barraud, 2014). When paired with the 3M™ Coban™ 2 Two-Layer Compression System, Kerramax Care Dressing effectively manages exudate, remains in its position over time, whilst the Coban 2 Layer Compression System is a two-layer compression bandage system that is designed to deliver therapeutic compression to address oedema (Hughes et al, 2022).

BENEFITS IN CLINICAL PRACTICE

An evaluation of the safety, effectiveness and patient experience of Kerramax Care Dressing involving 101 patients with moderate to heavily exuding wounds of various aetiologies found the dressings had the ability to control exudate and strikethrough and prevent damage to the periwound skin (Hughes and Jones, 2017).

*Sequestration in the dressing core demonstrated *in vitro*

In another study, a nursing evaluation involving 54 patients highlighted the main clinical benefits of Kerramax Care Dressing as being exudate management, reduced maceration and reduced dressing changes (Jones and Barraud, 2014).

Published case studies have also reported that Kerramax Care Dressing is effective for fluid handling and can be used in conjunction with compression. Furthermore, a series of eight venous leg ulcer cases evaluating Kerramax Care Dressing plus Coban 2 Compression System found the combination to be acceptable to patients as well as effective and comfortable to wear (Hughes et al, 2022).

KERRAMAX CARE DRESSING CASE SERIES

Many of the chronic wounds in this case series have occurred in older patients with underlying conditions that can cause wounds to develop (e.g. diabetes or venous insufficiency) or impair healing (e.g. infection or malnutrition). The wounds have produced moderate to very high volumes of exudate that previous dressings had not been able to handle. Additionally, the patients in this case series had conditions that indirectly complicated their wound management.

Ulceration is a serious complication of lymphoedema that makes it difficult to use compression and results in high volumes of drainage. The need for regular dressing changes limits patients' independence, imposing a burden on nursing staff and caregivers. Two case studies (Milne, pages 6—7 and Snyder, pages 10—11) highlight this challenge, with foam dressings and abdominal pads being unable to effectively manage the quantities of fluid exuding from the wounds. Kerramax Care Dressings, by contrast, rapidly reduced the number of dressing changes by absorbing fluid and locking it away from the wound bed. This not only supported a moist healing environment but also enabled sustained use of compression to address oedema.

In cases where patients had limited mobility, the selected dressings needed to withstand lifting and handling pressures. In patients with leg ulcers, the dressing had to remain in place and intact during activities of daily living, such as walking or resting the leg on a supporting surface. Kerramax Care Dressing demonstrated an excellent ability to withstand shear forces while adhering to difficult-to-dress areas such as the sacrum and calf.

When compared to previous treatments, patients able to communicate clearly reported reduced pain during Kerramax Care Dressing changes. They said the dressings were comfortable to wear. Patients and nursing staff were pleased with the improved exudate management and decreased number of dressing changes.

CONCLUSION

A wide range of factors need to be considered when selecting the most appropriate wound dressing for individuals with highly exuding wounds. This case series demonstrates that Kerramax Care Dressings are effective at handling large volumes of exudate, remaining in place and intact during patient movement and when saturated with exudate or lymph fluid. The improved dressing wear time enhanced patients' quality of life while reducing bioburden and addressing complications, such as maceration.

REFERENCES

Alam W, Hasson J, Reed M (2021) Clinical approach to chronic wound management in older adults. *J Am Geriatr Soc* 69(8): 2327-2334

Browning P (2016) Comparative evaluation of the functional properties of super-absorbent dressings and their effect on exudate management. *J Wound Care* 25(8): 452-62

Guest JF, Fuller GW, Vowden P et al (2020) Cohort study evaluating the burden of wounds to the UK's National Health Service in 2017/2018: update from 2012/2013. *BMJ Open* 10(12): e045253

Hughes MA, Jones J (2017) A large-scale evaluation of managing moderate and highly exudating wounds in the community. *Wounds* 13(3): 78-85

Hughes M, Strapp H, Jaspar A et al (2022) 3M Kerramax Care Super-Absorbent Dressing and 3M Coban 2 Two-Layer Compression System case series supplement. *Wounds International*

Järbrink K, Mi G, Sönnergren H et al (2016) Prevalence and incidence of chronic wounds and related complications: a protocol for a systematic review. *Syst Rev* 5(1): 152

Jones J, Barraud J (2014) An evaluation of Kerramax Care in the management of moderate to heavily exuding wounds. *Br J Community Nurs* 48: S50-3

Singh G, Byrne C, Thomason H et al (2022) Investigating the microbial and metalloprotease sequestration properties of super-absorbent wound dressings. *Sci Rep* 12: 474

World Union of Wound Healing Societies (2019) Consensus Document. Wound exudate: effective assessment and management *Wounds International*

CASE 1: Improving the quality of life for a patient with a fungating wound

Author: **Luxmi Dhoonmoon**, Nurse Consultant Tissue Viability, London North West University Healthcare NHS Trust, United Kingdom

A 58-year-old female with advanced breast cancer presented with a fungating wound, which had erupted rapidly within a few days and originated from the torso, armpit and back. Previous interventions, such as using low-absorbent pads held in place with self-adhesive dressing tape, proved unsuccessful. At each review, new lesions continued to form, and bleeding occurred frequently. The wound significantly impacted the patient's quality of life as touch and friction with any clothing or external garment would cause pain.

WOUND PRESENTATION

On presentation, the fungating wound was cancerous in nature and had been present for three months. It covered almost the entire front and side of the upper body and was composed of 100% unhealthy granulation tissue, which would result in frequent bleeding and dry scabs scattered throughout the wound [Figure 1]. The level of exudate was moderate with a thin, and watery consistency that would often soak through the dressing, causing leakage onto clothes and bed linen. The surrounding skin was extremely fragile and exhibited signs of inflammation, erythema and excoriation. The wound caused significant pain to the patient, who rated her pain as a 10 out of 10 (with 10 being the worst pain experienced). Consequently, the patient was prescribed morphine sulphate and other analgesics for pain management.

The intended treatment outcomes were to reduce the frequency of dressing changes; minimise trauma, bleeding and pain associated with dressing changes; and protect the periwound area. In view of the aggressive nature of the malignancy, it was recognised that the goal of treatment was symptom management only and not wound healing progression.

KERRAMAX CARE DRESSING APPLICATION

To prepare for dressing application, the wound was gently washed with an antimicrobial wash mitt to remove any dry blood, reduce bioburden, and provide a clean surface area, thus minimising odour resulting from dry blood. Emollients were then used to moisturise and protect the periwound area to prevent maceration or other complications with the surrounding skin.

To effectively manage exudate, as well as conform to the body's contour without causing patient discomfort and trauma to healthy skin on removal, a [20cm x 30cm] Kerramax Care Dressing was applied across the torso and back. Additionally, a [10cm x 22cm] Kerramax Care Dressing was applied to the underarm and secured in place with a light compression bandage to avoid any adhesive contact with the fragile skin.

REVIEW 1 (DAY 7)

Initially, the planned frequency for dressing changes was three times weekly, but at the first dressing review, it was reduced to twice weekly as it proved to be sufficient. The dressing conformed well to the wound bed and effectively managed wet lesions without causing excoriation. The dressing also maintained its integrity and did not stick to the skin or any dry lesions. The patient experienced a significant improvement in her quality of life; there were no more distress calls to the nursing teams concerning the dressing coming off. The compactness of Kerramax Care Dressing allowed her to sleep longer compared to the bulkiness of her prior dressings.

Additionally, she could freely move around her home without worrying about inadvertent dressing removal or leakage. The patient commented that the dressing's performance, absorption capacity and wear time were "excellent." During the dressing removal process, Kerramax Care Dressing was removed easily without any bleeding, and the patient rated her pain as 0/10. Overall, the dressing was soft and comfortable, and the patient expressed being "extremely satisfied" with the treatment when using Kerramax Care Dressing.

REVIEW 3 (DAY 22)

By the third week of treatment, at the patient's request, the frequency of dressing changes was further reduced to once weekly. The wound demonstrated a reduction of wet lesions within the wound bed, reduced erythema and improved periwound integrity.

CONCLUSION

The patient's fungating wound was significantly impacting the patient's quality of life, characterised by substantial pain and frequent bleeding.

Kerramax Care Dressing proved to be highly effective in managing exudate while minimising trauma and pain during dressing changes. Within just one week of treatment, the patient's dressing change frequency decreased from three times weekly to once weekly. This improvement allowed her to sleep comfortably and move freely around her home without concerns related to dressing-related issues.

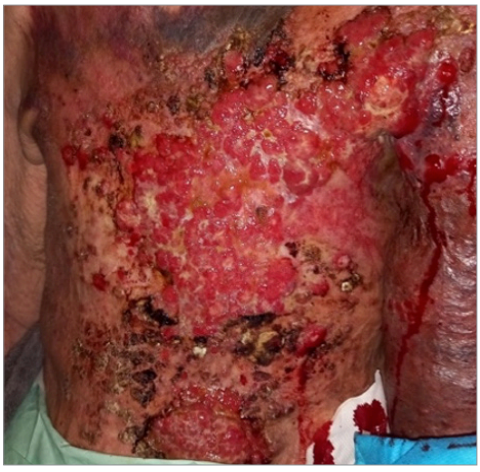


Figure 1. Extent of fungating wound at start of treatment with Kerramax Care Dressing

CASE 2: Managing a chronic venous leg ulcer

Author: **Catherine Milne**, Advanced Practice Wound, Ostomy, Continence Nurse, Connecticut Clinical Nursing Associates, LLC Bristol, United States

A 86-year-old woman presented seeking treatment for her chronic venous leg ulcer. She had been hospitalised with cellulitis of her left lower extremity a year before and said that the problem had started with her leg swelling and then "one day a wound appeared." She had received intravenous vancomycin for the cellulitis; her leg ulcer was treated with silver gelling fibre to manage local infection, a sterile abdominal pad held in place with a gauze roll and compression therapy with an offloading boot. Ankle-brachial index and venous duplex ultrasound with reflux confirmed that the patient had venous insufficiency. She had been offered ablation, which she refused.

The patient was concerned about needing frequent dressing changes, as healthcare providers would only come to her house three times a week and she regularly had strikethrough drainage. The leg ulcer had decreased her mobility and placed a burden on her son, who had to leave work to change her dressings when strikethrough occurred if no home healthcare visit was scheduled. In addition to a history of cellulitis, the patient had lymphoedema, which affected her leg. She was taking 100 mg gabapentin three times a day to manage the pain associated with her leg ulcer.

WOUND PRESENTATION

On presentation, the patient's left lower leg ulcer was classified as Grade 6, according to the CEAP (Clinical, Etiological, Anatomical and Pathophysiological) classification of venous disorders. It measured 7.8cm (length) by 5.2cm (width) and was covered by 25% slough and 75% granulating tissue [Figure 2]. The centre of the wound bed was poorly granulating and contained fibrin, while the periwound area was pink and there was no epithelialisation from the margins. The surrounding skin consisted of epithelialised hypopigmented tissue with scant maceration at the wound edges. A high volume of thin, watery exudate was being produced, which was striking through the current dressings and leaking onto the patient's clothes and bedding. The patient's pain level was 5 out of 10 despite the gabapentin she was taking to manage it.

The patient needed a highly absorbent dressing to reduce the frequency of dressing changes so she would feel less of a burden to her son. She was moderately active, walking around the house and running small errands in town, therefore the dressing selected needed to stay in position and remain intact during light exercise.

The intended outcome of the new treatment regimen was to manage exudate and improve the wound over the following four weeks.

KERRAMAX CARE DRESSING APPLICATION

Before applying any dressings, the wound was cleaned and debrided using pulse lavage. The patient requested that zinc oxide be used to protect the surrounding skin from maceration. A [13.5cm x 15.5cm] Kerramax Care Dressing [Figure 3] was applied to the ulcer, followed by a Coban 2 Lite Two-Layer Compression System to treat the underlying venous insufficiency (Ankle-brachial index 0.67). The intention was that the dressings would remain in place for two days before being changed. The patient was provided with education to help her better manage her lymphoedema, and was advised to elevate her leg and to reduce her salt intake.

REVIEW 1 (DAY 7)

When the patient was reviewed a week later, there had been no instances of strikethrough. Kerramax Care Dressing was absorbing the exudate well and handling the pressure on the posterior calf wound when the patient was lying down and when placing her leg on a recliner chair. The lymphoedema therapist had changed the patient's dressings three times during the week, with no additional changes required. The dressings remained intact and did not leak exudate on removal. The patient was very happy that her son had not had to change her dressings. She found the dressings comfortable, saying that she felt "no pain in the leg except when it is exposed to the air and the wound is washed." Her pain level had reduced to 1 out of 10.

The condition of the wound had improved — it was draining less and had reduced in size to 7.2cm (length) x 5cm (width). Granulation in the centre of the wound was improving, and maceration of the surrounding tissue had resolved. The amount of slough had decreased to 15% and there were some signs of epithelialisation. The patient had been following advice on lymphoedema management and the oedema in her left leg was decreasing. Local wound treatment continued as the wound was showing signs of healing — the periwound skin was healthy and oedema had decreased. The next dressing change was planned for two days later.

REVIEW 2 (DAY 14)

The dressings were changed twice between the patient's first and second review. Kerramax Care Dressing continued to manage the high volume of exudate without strikethrough and remained in place between dressing changes. The patient was pleased with her treatment, saying, "It's not leaking all over the place." She was also happy that she had not had to rely on her son for assistance, as the dressing changes had been performed by the lymphoedema therapist and home healthcare provider. The wound bed measured 6.8cm (length) x 4.8cm (width), was a healthier colour and drainage had decreased to a moderate volume.

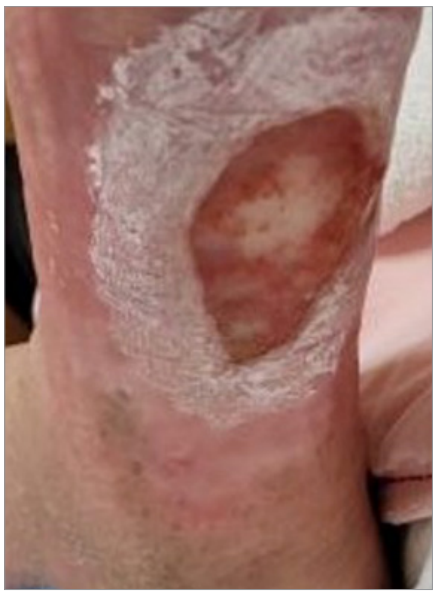


Figure 2. On presentation (Day 0), the ulcer was producing a high volume of fluid, and the wound bed was pale and contained fibrin

Figure 3. Application of Kerramax Care Dressing

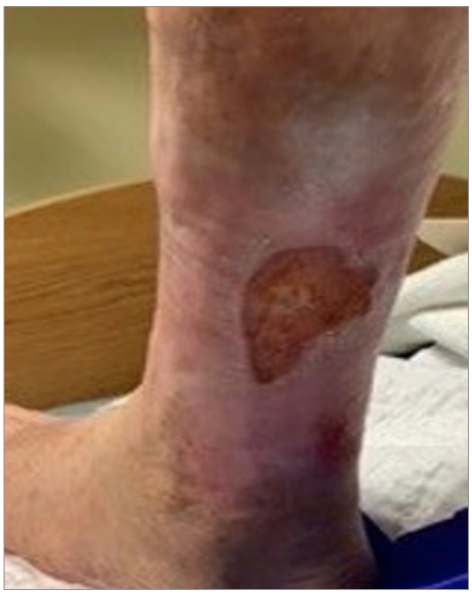


Figure 4. Following the use of Kerramax Care Dressing (Day 28) to manage exudate and Coban 2 Lite Compression System to manage oedema, the ulcer had significantly reduced in size and started to epithelialise

REVIEW 3 (DAY 21)

At her third review, the patient's wound care was easy to manage: her dressings were changed three times a week at scheduled times and they remained intact and stayed in place. The wound had further decreased in size, measuring 6.2cm (length) x 4cm (width). There was further improvement in epithelialisation and a decrease in the amount of slough (3%) in the wound bed. The surrounding tissue remained healthy, and the leg was less oedematous.

REVIEW 4 (DAY 28)

At her final review, the wound measured 5.4cm (length) x 4cm (width), the volume of exudate was low to moderate, and granulation was progressing well [Figure 4]. The patient's quality of life had improved: she reported no wound-associated pain and was very happy with the treatment, as the longer dressing wear time meant dressing changes could be planned.

CONCLUSION

Ulceration is a serious complication of lymphoedema, and the associated fluid retention impairs healing. This patient had previously struggled with strikethrough and leakage, as her dressings had not handled the forces exerted on her leg ulcer and the large volume of fluid being produced. The patient was advised on lymphoedema management, and her treatment was changed to better address both oedema (using Coban 2 Lite Compression System) and exudate (using Kerramax Care Dressing). Kerramax Care Dressing prevented leakage and strikethrough, improving the patient's quality of life as she had felt a burden to her son, who had to change her previous bandages when they failed. As dressing changes became predictable and she no longer needed to rely on her son, the burden was taken off her "worry list."

CASE 3: Sacral pressure ulcer

Author: **Luxmi Dhoonmoon**, Nurse Consultant Tissue Viability, London North West University Healthcare NHS Trust, United Kingdom

A 72-year-old female with end-stage Parkinson's disease, systemic lupus erythematosus and hypothyroidism presented with a sacral pressure ulcer. The ulcer had developed more than 2 months prior to presentation. Previous interventions included foam dressings with adhesive borders, but excessive purulent discharge led to reduced dressing adhesiveness, causing them to come off after a few hours. Given the patient's intolerance to these dressings, the patient further developed red, sensitive skin.

Additionally, the patient experienced several falls which led to the patient to become frightened of leaving the bed. This lack of mobility subsequently contributed to the rapid deterioration of the patient's skin. The high level of wound exudate impacted her ability to achieve adequate sleep and impacted her quality of life, as well as that of her son, her primary caregiver, who assisted with dressing changes.

WOUND PRESENTATION

On initial assessment by the tissue viability team, the wound was deemed unstageable due to the presence of 50% thick slough and 50% necrotic tissue obstructing the wound bed from evaluation. The pressure ulcer measured 10cm (length) x 8cm (width) and exhibited high levels of thick exudate and strikethrough drainage. The periwound area exhibited signs of fragile skin, maceration, and non-blanching erythema. Following full debridement, the wound was classified as a Category 4 pressure ulcer [Figure 5], according to the European Pressure Ulcer Advisory Panel pressure ulcer scale.

Malodour, high exudate, pain when touching the wound, and swelling in the periwound area indicated that the wound was infected. To address the infection, the patient was prescribed antibiotics, and an antimicrobial gel was applied to aid in autolytic debridement and slough removal from the wound bed.

As the patient was non-verbal, her facial expressions were used to estimate her wound pain, which was rated as 10 out of 10. Morphine sulphate was prescribed orally, as needed, to manage her pain.

The intended treatment outcomes were to effectively manage exudate, improve the periwound area, and apply a dressing that is easy for her son to change without causing skin irritation and pain.

KERRAMAX CARE DRESSING APPLICATION

A [20cm x 22cm] Kerramax Care Dressing was applied alongside a hydrofibre dressing to effectively manage wound exudate, help reduce pain and skin irritation associated with dressing removal, and improve the periwound area. The dressing was secured using self-adhesive dressing tape.

REVIEW 1 (DAY 7)

At the first dressing review, Kerramax Care Dressing had effectively managed the thick and viscous exudate, showing no signs of strikethrough, leakage or disintegration. Kerramax Care Dressing was changed three times weekly and remained securely in place without dislodging or causing any skin maceration, which provided the patient's son with a break from daily dressing changes and allowed more quality time with his mother.

The wound measured 10cm (length) x 8cm (width), showing a reduction in slough to 30% with no new tissue maceration along the wound margins. The volume and consistency of exudate was high and moderately thick.

The wound remained infected with non-blanching erythema on the surrounding skin, high exudate level, and malodour. Consequently, the patient continued to receive oral antibiotics and antimicrobial gel to facilitate autolytic debridement and reduce bioburden.

Despite the persistent infection, there was an improvement in the patient's discomfort and pain during dressing changes, as indicated by her facial expression. The patient's son expressed being "extremely satisfied" with the integrity, wear time and treatment provided by Kerramax Care Dressing, noting a lack of leakage at night and reduced odour compared to the initial presentation.

REVIEW 2 (DAY 15)

By the second dressing review, dressings were changed twice weekly. Sharp debridement was used to remove all slough and non-viable tissue from the wound bed, which measured 9cm (length) x 8cm (width) x 2cm (depth). The wound bed consisted of 80% granulation tissue and 20% necrotic tissue, and the surrounding skin appeared healthy.

Healing progression remained slow due to poor tissue perfusion [Figure 6], but as noted by her son, Kerramax Care Dressing continued to perform "exceptionally" well in terms of staying in place, exudate management, and improvement of skin integrity.

Oral antibiotic use was discontinued as the wound was no longer infected and exudate levels were moderate, characterised by a thin/watery consistency.

CONCLUSION

Over the two-week treatment period, Kerramax Care Dressing was found to be easy to apply and demonstrated 'excellent' exudate management, as noted by the patient's son, who was her primary caregiver. He also expressed being "extremely satisfied" with the dressing's ability to keep his mother dry for longer, allowing for more time to be dedicated towards spending quality time with her rather than wound care or washing bedding and clothes due to exudate leakage.

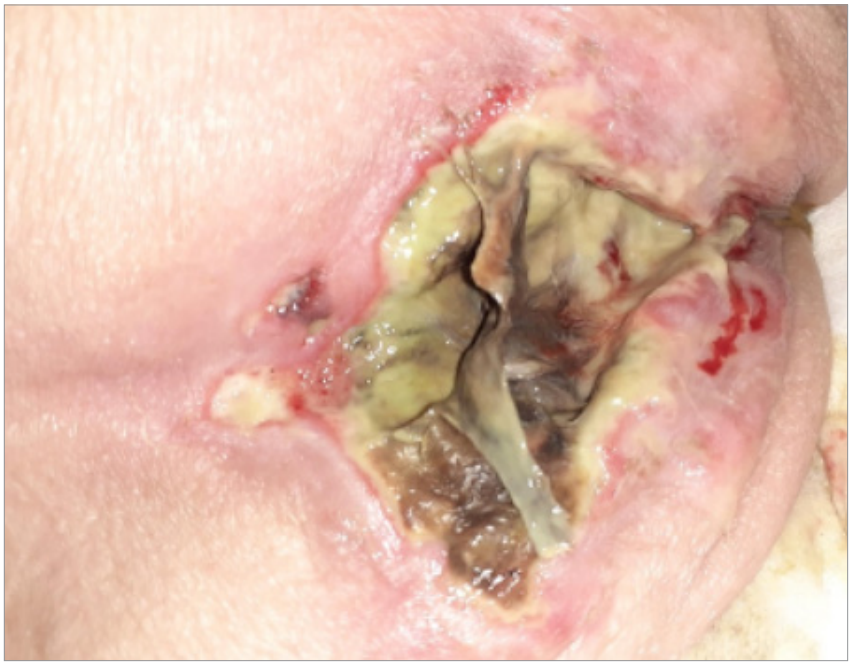


Figure 5. Sacral pressure ulcer on presentation and prior to start of treatment (Day 0)

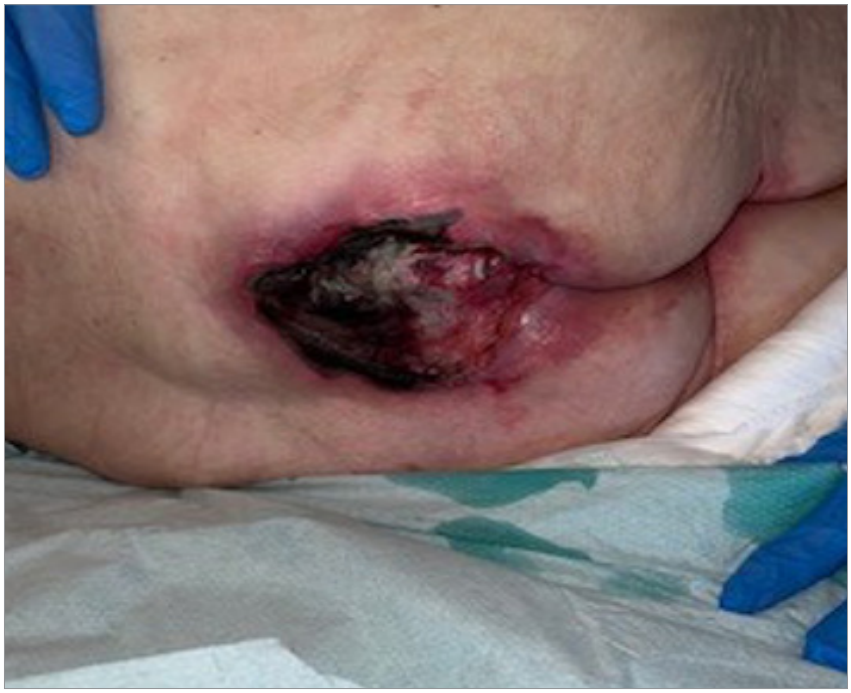


Figure 6. Sacral pressure ulcer following 14 days of treatment (including debridement and Kerramax Care Dressings)

CASE 4: Multiple lower limb ulcers with lymphoedema

Author: **Robert Snyder**, Dean, Barry University School of Podiatric Medicine at Barry University, Fort Lauderdale, Florida and Chief Medical Officer, MediWound, Harvard Medical School, United States

A 68-year-old male presented with multiple lower right leg ulcers producing a very high volume of exudate and evidence of lymphoedema of the lower extremity. Lymphoedema had been present for many years but had not been successfully managed.

The patient's lymphoedema had been treated with compression and the ulcers with foam dressings and abdominal pads. The volume of fluid being produced by the ulcers had become so great that strikethrough was a daily occurrence. If the patient's dressings were not changed several times a day, the drainage would start to 'puddle' on the floor. The volume of fluid prevented the sustained use of compression to manage the lymphoedema.

The patient had a history of hypertension, for which he was taking antihypertensive medication. There were no signs of infection or other underlying comorbidities present.

WOUND PRESENTATION

At the time of presentation, the patient's leg and foot were visibly swollen and the skin on the dorsum of the foot could not be pinched. A positive Stemmer sign was therefore noted. In addition to swelling, there were signs of mild venous insufficiency: including brown skin around the ankle, greater pain when walking than when resting and leg cramps.

On palpation of the foot, pulses were discerned for both the dorsal [pedal] and posterior tibial arteries. There were no other orthopaedic or neurological findings of note.

On assessment, the venous ulcers covered a large proportion of the calf. They had produced copious amounts of serous/serosanguinous fluid which had saturated the foam bandages that had been applied six hours previously [Figure 7]. The wound bed of the largest ulcer was pale and contained slough and necrotic tissue. The skin of the lower leg and ankle was discoloured, dry, cracked and friable.

The intended treatment outcomes for this patient were to:

- Manage drainage
- Reduce the number of dressing changes required
- Enable sustained use of compression to reduce oedema
- Use a highly absorbent dressing able to retain fluid when under compression.

KERRAMAX CARE DRESSING APPLICATION

The ulcers were debrided and cleansed, yet continued to be very wet [Figure 8]. Alongside a multilayered compression wrap to address lymphoedema, a Kerramax Care Dressing was applied with the aim that it would:

- Remain intact and retain lymphatic fluid, even when saturated
- Be effective when used in conjunction with compression
- Provide the option of dressing folding or stacking to handle the large amount of drainage being produced.

REVIEW 1 (DAY 7)

Kerramax Care Dressing was changed three days after the patient's initial assessment and at his first review, on Day 7. There had been a remarkable improvement in this short space of time. The patient reported that there had been no 'puddling' of fluid. When the compression garment was removed, it was clear that the volume of drainage had decreased considerably and had been retained within the dressing [Figure 9a].

The wound bed was a healthier colour and no longer wet, while the periwound skin was less erythematous and cracked [Figure 9b]. Oedema of the lower limb had decreased as a result of consistent compression. Treatment was continued with weekly planned dressing changes.

REVIEW 2 (DAY 28)

After almost one month of treatment with Kerramax Care Dressing and a compression garment, the ulceration had healed, and there was only mild oedema present [Figure 10]. The skin of the lower extremity was still discoloured but was less erythematous.

The patient was prescribed a support garment and pneumatic compression, for daily use, to help manage his lymphoedema and venous insufficiency.

CONCLUSION

The severe drainage resulting from lymphoedema was complicating the management of this patient's leg ulcers. The use of Kerramax Care Dressing and a multilayered compression wrap for a month led to a rapid reduction in the volume of fluid being produced, as well as protected the wound bed and periwound skin and reduced oedema, resulting in successful wound healing.

Following this, the patient was advised to see a lymphoedema therapist. Since this time, he has managed well, with only mild exacerbation of his lymphoedema.

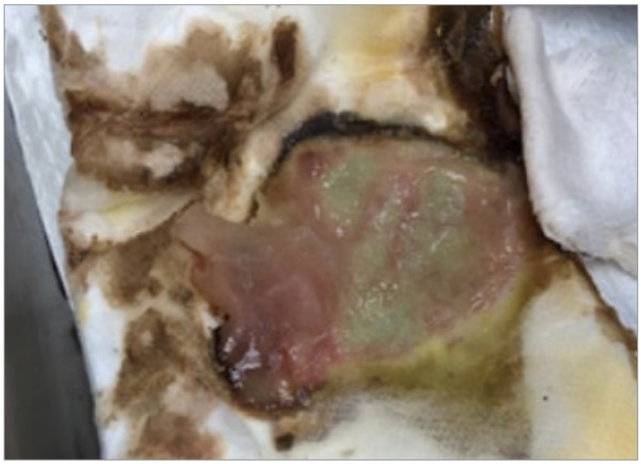


Figure 7. The ulcers were pale, sloughy and producing copious quantities of discharge

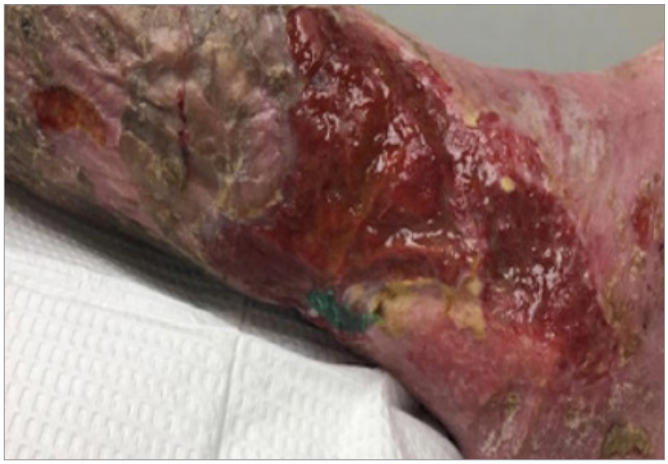


Figure 8. On day 0, the ulcers were extensive, covering the calf and ankle, while the surrounding skin was discoloured and friable

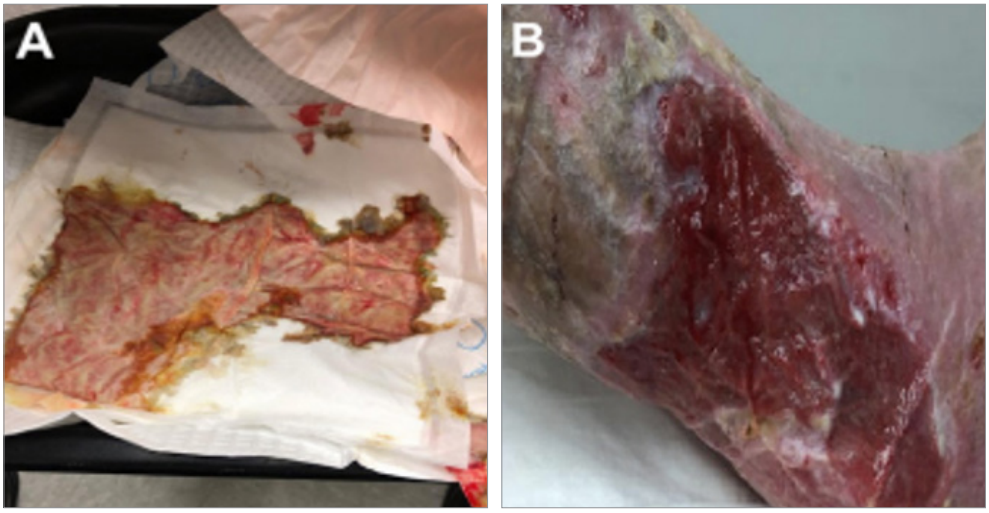


Figure 9. (a) On Day 7, Kerramax Care Dressing had absorbed and retained the lymphatic fluid, (b) protecting the wound bed and surrounding skin, which had improved

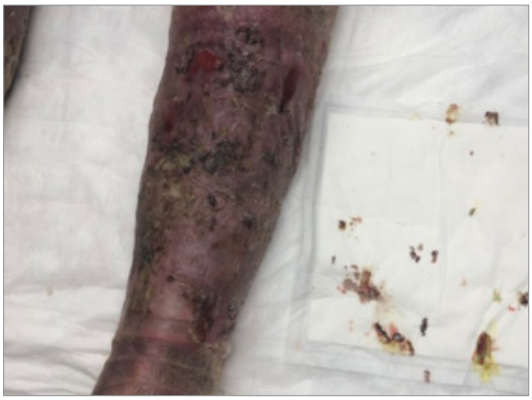


Figure 10. On Day 28, the ulcers had healed and oedema had significantly decreased

CASE 5: Grade 1 Stage B diabetic foot ulcer

Author: **Rosalyn Thomas**, Acute Foot Podiatrists, Diabetes Centre, Morriston Hospital, Swansea, United Kingdom

A 43-year-old male with a history of depression, attempted suicide, acute kidney failure, obesity, hypertension, type 2 diabetes, neuropathy, coronary artery disease and non-alcoholic fatty liver disease, presented with an ulcer. The ulcer initially began as a blister due to incorrectly fitting offloading boots.

Over the past few years, the patient has sustained a number of foot wounds, including a first ray amputation of the left foot and an amputation of his right forefoot. His right forefoot healed by secondary intention using negative pressure wound therapy (NPWT), and he relied on crutches, a total contact cast and an offloading boot to help him offload his diabetic foot ulcer. As a result of his limited mobility, he lost his job and experienced depression and suicidal thoughts.

WOUND PRESENTATION

On presentation, the patient's wound was classified as a Grade 1 Stage B diabetic foot ulcer according to the University of Texas Wound Classification System (Armstrong et al, 1998). At the time of treatment, the wound had been present for two months [Figure 11].

During the course of the four weeks of treatment, the patient experienced painful diabetic neuropathy, rating his wound pain as 8 out of 10, for which he took paracetamol and amitriptyline according to local pain management guidelines.

The wound bed comprised of 100% red granulation tissue with high levels of thin exudate leaking through the dressing. The wound measured 3.3cm (length) x 5cm (width) x 0.1cm (depth), and there were signs of maceration around the periwound area.

The intended treatment outcomes were to overall manage and control wound exudate, reduce periwound maceration and decrease the frequency of visits.

KERRAMAX CARE DRESSING APPLICATION

The wound was cleaned with polyhexanide irrigation solution, and a [10cm x 10cm] Kerramax Care Dressing was applied to the wound, secured by an adhesive fabric dressing. At each review, sterile saline was used to cleanse the wound before each application of Kerramax Care Dressing. After applying Kerramax Care Dressing, the wound was offloaded with a total contact cast.

REVIEW 1 (DAY 5)

At the first dressing review, there was no strikethrough, and exudate was well-managed. The wound measured 3.2cm (length) x 5.2cm (width) x 0.2cm (depth), with a reduction in maceration tissue along the wound margins. The composition of the wound bed remained the same with 100% red granulation tissue and high levels of thin exudate.

REVIEW 2 (DAY 8)

At the second dressing review, three days later, although there was no improvement in wound size, exudate and composition of tissue and surrounding skin, the patient found Kerramax Care Dressing to be very comfortable and was "satisfied" with the treatment.

REVIEW 3 (DAY 14)

A slight improvement in wound progression was observed six days later, during the third dressing review. The wound measured 3cm (length) x 5cm (width) x 0.2cm (depth) with 100% dull red granulation tissue and less maceration tissue at wound margins. Kerramax Care Dressing remained in place and maintained its integrity throughout the patient's wear time. The patient was "satisfied" with both the wear time and treatment of Kerramax Care Dressing because dressings were changed only once a week.

REVIEW 4 (DAY 21)

At the fourth dressing review, seven days later, the wound appeared visibly smaller in size and measured 2.5cm (length) x 3.7cm (width) x 0.2cm (depth) [Figure 12]. There was less maceration around the wound margins, and the surrounding skin was in good condition.

Following the fourth dressing review, it is noted that the wound had become slightly larger in size due to deteriorating underlying cardiac problems and poorly controlled diabetes which impacted on healing progression [Figure 13 and 14 for wound on Day 29 and 44 of treatment, respectively].

Kerramax Care Dressing, however continued to perform "exceptionally well" in terms of staying in place, maintaining integrity and overall wear time. Due to the use of the total contact cast, the wound was still affecting the patient's mobility and ability to carry out daily activities.

CONCLUSION

Overall, the patient was extremely satisfied with the treatment and found Kerramax Care Dressing to be very comfortable. The patient continued to experience neuropathic pain associated with the diabetic foot ulcer, but during the four visits, he rated pain on the removal of Kerramax Care Dressing as 0 out of 10.

The patient was referred to a trauma orthopaedic consultant because he is still depressed about the neuropathic pain in his foot and leg.

For highly exuding wounds that are not suitable for NPWT, Kerramax Care Dressing provides an excellent choice in ulcer management for people living with diabetes.

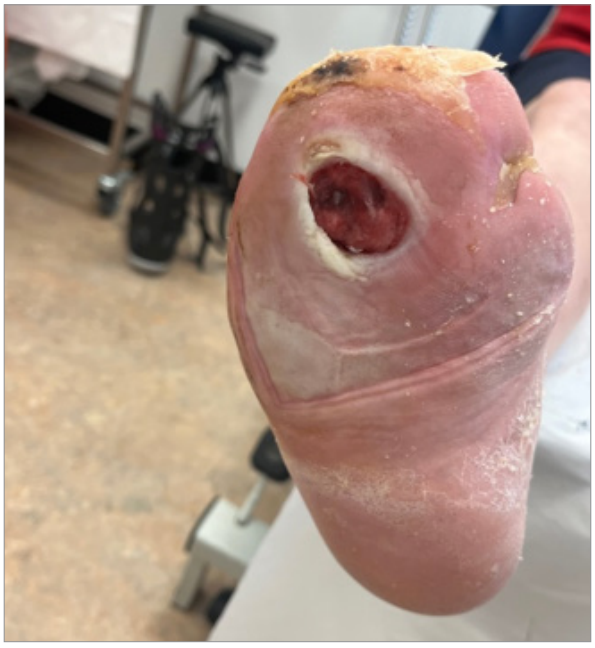


Figure 11. Diabetic foot ulcer on plantar surface of the right foot at presentation (Day 1)

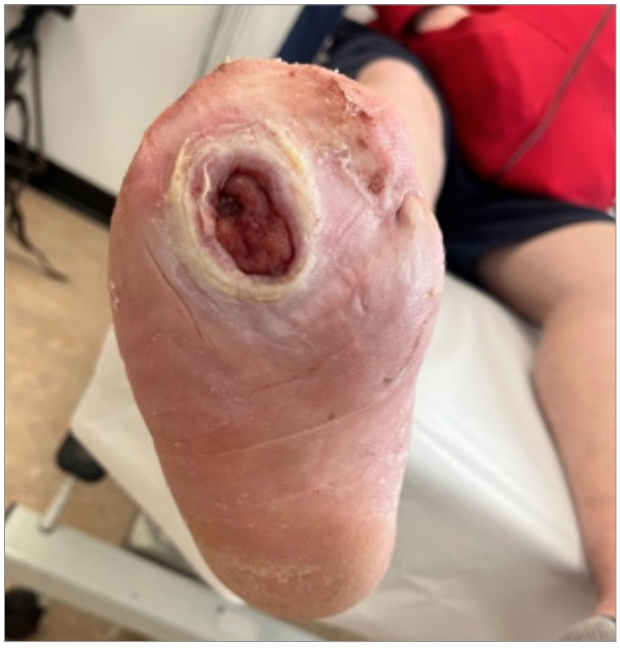


Figure 12. Diabetic foot ulcer on plantar surface of the right foot after 21 days of treatment

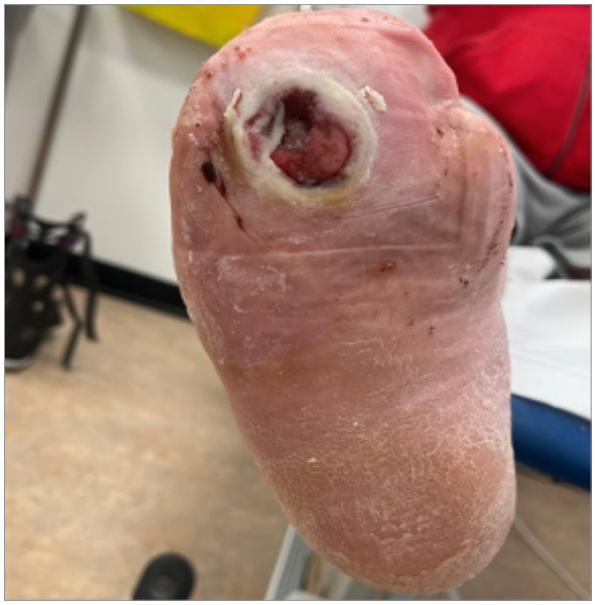


Figure 13. Diabetic foot ulcer on plantar surface of the right foot after 29 days of treatment

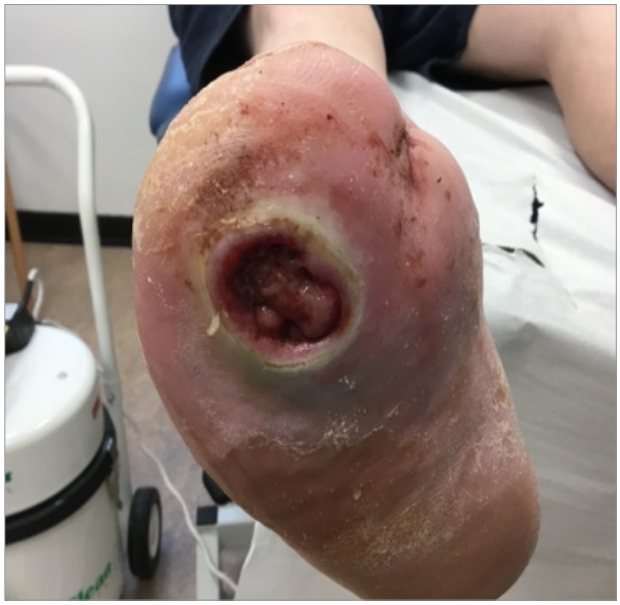


Figure 14. After 44 days of treatment. Note, ulcer is slightly larger in size due to deteriorating systemic health of the patient

REFERENCE

Armstrong DG, Lavery LA, Harkless LB (1998) Validation of a diabetic wound classification system: The contribution of depth, infection, and ischemia to risk of amputation. *Diabetes Care* 21(5): 855–9

CASE 6: Grade 3 Stage B diabetic foot ulcer

Author: **Philippe Leger**, Angiologist, Wound Ulcer Centre, Clinique Pasteur, Toulouse, France

A 64-year-old female with diabetes, neuropathy, retinopathy, distal peripheral arterial disease, coronaropathy and bilateral lower leg oedema presented with a diabetic foot ulcer. Initially, the patient sought treatment and was treated with a foam dressing by community nurses. With limited success, the patient then presented at the wound centre unit with a fever and swollen red feet.

WOUND PRESENTATION

On initial presentation, the wound was located on the left first metatarsal bone with a fistula to the second toe and was classified as a Grade 3, Stage B diabetic foot ulcer according to the University of Texas Wound Classification System (Armstrong et al, 1998). It measured 1.5cm (length) x 0.8cm (width) x 4cm (depth) and had been present for 22 days [Figure 15].

The wound bed consisted of 100% slough with high levels of thick, purulent exudate, with strikethrough onto the dressings and leakage onto clothes and bedding. There were signs of maceration, inflammation, erythema, and oedema around the periwound area.

Monofilament tests confirmed the presence of diabetic neuropathy. Following clinical examination and a bone sample obtained through biopsy, the wound was confirmed infected, displaying clinical signs such as oedema, local purulent exudate and erythema.

The intended outcome of the new treatment regimen was to address the infection, manage exudate, and promote wound healing, ultimately enabling the patient to offload her foot and facilitate recovery.

KERRAMAX CARE DRESSING APPLICATION

To effectively manage exudate and conform to the body's contour without causing patient discomfort, a [10cm x 22cm] Kerramax Care Dressing was applied to the ulcer after extensive debridement of infected bone and tissue. Additionally, a [10cm x 10cm] 3M™ Tegaderm™ High Integrity Alginate Dressing was used as the primary wound dressing due to the depth of the wound. The dressings were secured using bandages, with planned changes daily for the first week, followed by every two days thereafter.

The patient was advised to continue offloading her foot during the treatment with Kerramax Care Dressing and commence oral antibiotics for six weeks to address the infection.

HOLISTIC REVIEW 1 (DAY 9)

At the first dressing review, the Kerramax Care Dressing had been changed daily since initial presentation due to the high volume of exudate [Figure 16a]. Following thorough debridement [Figure 16b], the wound measured 1.5cm (length) x 0.5cm (width) x 3cm (depth). Due to the depth of the wound, a [10 cm x 10 cm] Tegaderm High Integrity Alginate Dressing was still used alongside Kerramax Care Dressing. The condition of the wound improved significantly, with 90% of the wound covered in granulation tissue and 10% with slough. The condition of the surrounding skin had also improved with hyperkeratosis present. The volume of exudate remained high and moderately thick.

The patient rated Kerramax Care Dressing as "very well" in terms of dressing performance, absorption capacity and wear time. It was noted that the dressing remained in place throughout the day, despite the high volume of thick exudate. However, there was still evidence of strikethrough.

During the dressing removal process, Kerramax Care Dressing was removed easily, and the patient reported a pain rating of 0/10. Overall, the dressing was noted to be soft and comfortable, and the patient expressed being "extremely satisfied" with the treatment while using Kerramax Care Dressing.

Starting from Day 10, the plan was to extend the duration between dressing changes, with the intention to keep the dressings on for two days at a time, rather than daily.

HOLISTIC REVIEW 2 (DAY 23)

By the second dressing review, dressings remained in place and only required changing every two days. As per local protocol, dressing changes are done more frequently despite exudate levels, in the author's country compared to other countries, where dressing changes may be done less frequently. The sizing of the dressing decreased to a 10cm x 10cm Kerramax Care Dressing.

The wound measured 1cm (length) x 0.2cm (width) x 0.4cm (depth) and consisted of 100% granulation tissue. At this stage, Tegaderm High Integrity Alginate Dressing was discontinued. Drainage had decreased to a moderate volume, and the surrounding skin appeared healthy, with slight signs of hyperkeratosis [Figure 17].

The patient expressed being "extremely satisfied" with the treatment while using Kerramax Care Dressing, noting that she "did not feel the dressing," yet acknowledged the dressing's excellent ability to retain exudate.

During this review, the treatment regimen involving Kerramax Care Dressings was discontinued due to the low exudate level. The patient was advised to continue offloading and to use shoes and soles designed for their foot. Additionally, therapeutic education sessions were provided to the patient after the conclusion of the treatment regimen.

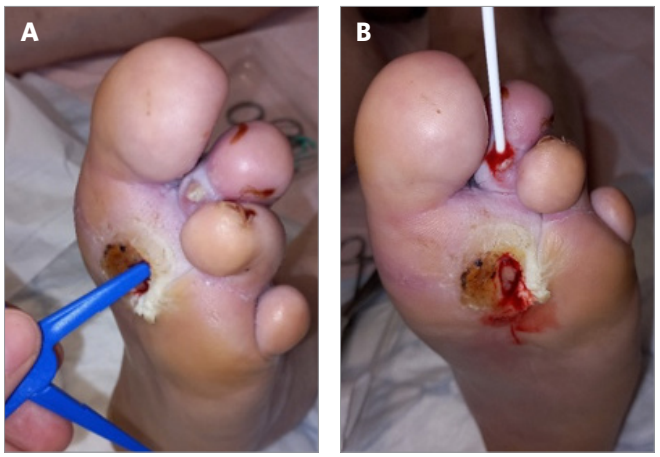


Figure 15. (a) Diabetic foot ulcer on the plantar surface, located over the first metatarsus and (b) fistula situated on the second toe at presentation prior to the start of treatment (Day 0)

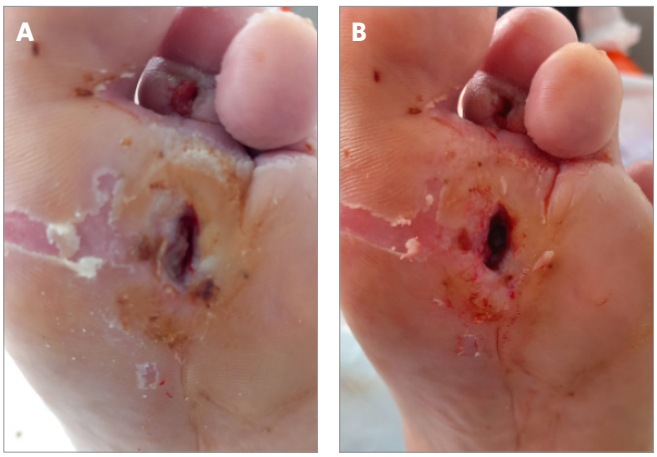


Figure 16. Diabetic foot ulcer and fistula to the second toe following 10 days of treatment with Kerramax Care Dressings (a) before debridement and (b) after debridement

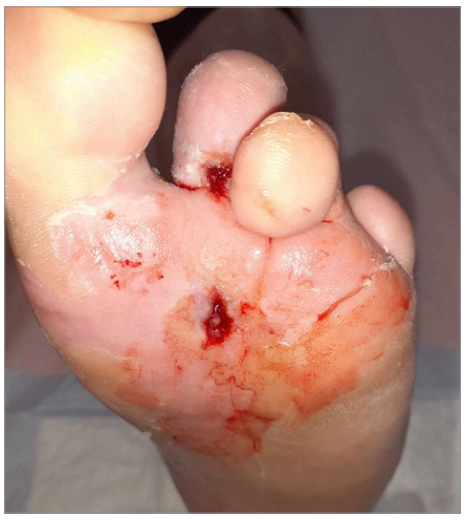


Figure 17. Diabetic foot ulcer and fistula to the second toe following 23 days of treatment with Kerramax Care Dressings

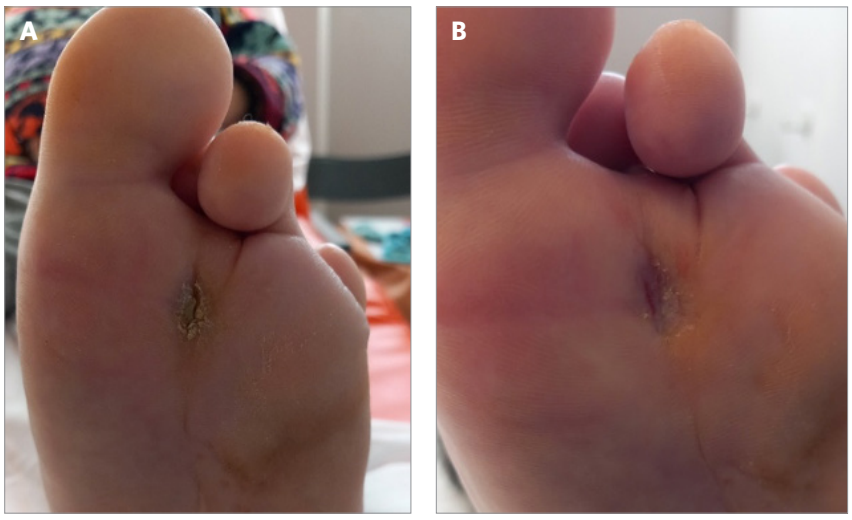


Figure 18. Diabetic foot ulcer at follow-up appointment on day 46, (a) before debridement and (b) after debridement

FOLLOW-UP REVIEW (DAY 46)

At the follow-up appointment, the wound's depth had completely resolved and now measured 0.1cm (length) x 0.1cm (width), consisting entirely of granulation tissue. Initially, slight hyperkeratosis was observed [Figure 18a], but after minimal debridement, it was no longer present, resulting in healthy-looking surrounding skin [Figure 18b].

CONCLUSION

Overall, the patient was extremely satisfied with the treatment and found Kerramax Care Dressing to be very comfortable as she "didn't feel the dressing," but saw the positive effects of it regarding exudate retention. Since initial presentation, the patient rated pain on removal of Kerramax Care Dressing as 0 out of 10. At the final follow-up appointment, the patient was advised to continue offloading and attend therapeutic education sessions.

REFERENCE

Armstrong DG, Lavery LA, Harkless LB (1998) Validation of a diabetic wound classification system: The contribution of depth, infection, and ischemia to risk of amputation. *Diabetes Care* 21(5): 855–9

WOUNDS | INTERNATIONAL

A Wounds International publication