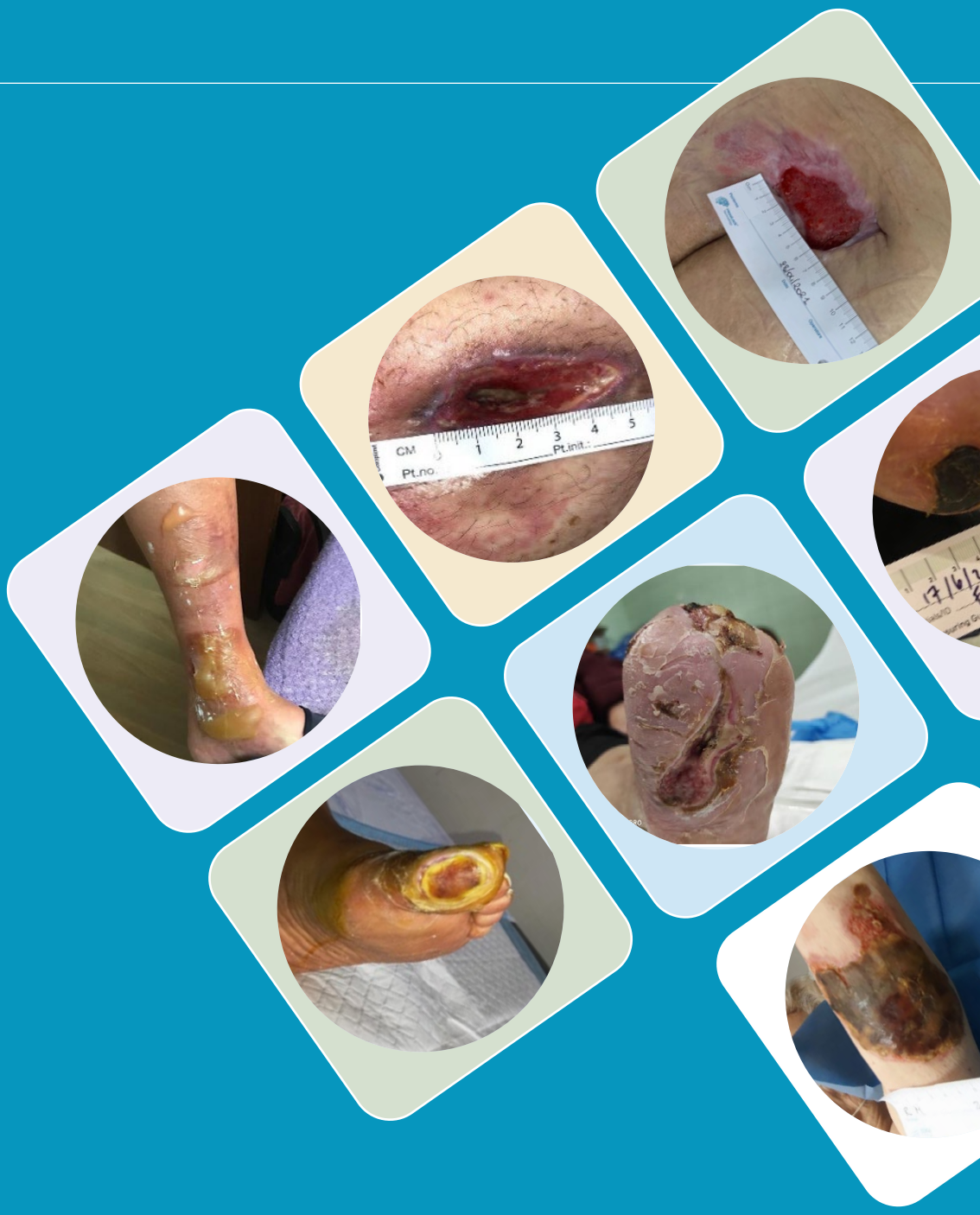
INTERNATIONAL
CASE STUDIES

Retrospective case studies evaluation: Biatain® Fiber with HexaLock Technology



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INTRODUCTION

Wound exudate is a fundamental part of wound healing, but if it is present in the wrong amount, location, composition, or consistency, it can cause complications, such as infection and damage the periwound skin. This may lead to maceration increasing the wound surface area and prolonging healing time (Haryanto et al, 2016; World Union of Wound Healing Societies [WUWHS], 2019).

Wound exudate contains a variety of components, including a high level of proteases that degrade proteins (e.g. matrix metalloproteinases [MMPs]), micro-organisms, substances that can inhibit healing, as well as proteins that promote the growth of bacteria. This leads to an increased risk of infection and subsequent development of biofilm (Young, 2012).

If exudate is not effectively managed, exudate can pool at the base of the wound bed. The risk of exudate pooling increases when dead space or a 'gap' forms as a result of the dressing not maintaining direct contact with the wound bed. The gap presents a clinical challenge as the increased risk of exudate pooling leads to an increased risk of leakage, maceration, and infection, which may delay wound healing (Cutting et al, 2009; Young, 2012; Haryanto et al, 2016). Highly exuding, sloughy and cavity wounds, wounds with undermining and wounds with a steep angle between the wound edge and wound bed, and fistulas are at a higher risk of dead space and exudate pooling (Dowsett et al, 2019; von Hallern et al, 2020).

GELLING FIBRE DRESSINGS

Gelling fibre dressings are a solution for moderate-to-highly exuding wounds (WUWHS, 2019) and are a well-accepted treatment option in the management of exudate. Upon exudate absorption, the fibres form a gel that supports autolytic debridement and tissue granulation, and helps maintain a moist wound environment (Dabiri et al, 2016).

However, challenges remain when using gelling fibre dressings (Karlsmark et al, 2020):

- Not all gelling fibres are effective at absorbing and retaining large amounts of exudate, which can lead to complications
- Some gelling fibre dressings have a surface shrinkage of more than 36% upon wetting (NHS, 2018), which can lead to gap formation, exudate pooling and maceration
- Clinicians can often experience issues in removing gelling fibre dressings, such as the dressing breaking on removal or leaving residue or debris in the wound, which leads to increased time being required to remove the dressing or deal with resultant issues.

BIATAIN® FIBER WITH HEXALOCK TECHNOLOGY

Biatain Fiber (Colopast) with HexaLock Technology is a soft gelling fibre dressing with integrated strength, which effectively absorbs and retains large amounts of exudate. The dressing keeps its shape with minimal shrinkage, thereby minimising the risk of gap creation and reducing exudate pooling. Biatain Fiber can be easily removed in one-piece with minimal risk of leaving residue in the wound. (Karlsmark et al, 2020; Garcia Dominguez et al, 2021; Le et al, 2021).

The benefits of Biatain Fiber are enabled by HexaLock Technology, which is a combination of three components: an optimised combination of absorbing carboxymethylcellulose (CMC) gelling fibres and strengthening fibres; thermobonding that locks the fibres together; and a hexagon net applied by ultrasonic embossment.

Biatain Fiber is intended for use as a primary wound dressing for use in highly exuding, sloughy and cavity wounds, including undermining **(Box 1)**. It is available in a square or ribbon variant and can be cut to fit the size of the wound.

Box 1. Indications for Biatain Fiber

Acute and chronic wounds such as diabetic ulcers, leg ulcers (arterial ulcers, venous ulcers and leg ulcers of mixed aetiology), pressure ulcers (stage 2-4), exudate absorption in oncology wounds, traumatic wounds, partial-thickness burns, donor sites, and post-operative surgical wounds.

The choice of secondary dressing will depend on the characteristics of the wound. Covering Biatain Fiber with a conforming foam dressing, such as Biatain® Silicone with 3DFit Technology (Coloplast) can provide additional vertical absorption in highly exuding wounds.

CLINICAL EXPERIENCES USING BIATAIN FIBER

The experiences of clinical groups in Italy and Spain using Biatain Fiber on various types of wounds were presented at the European Wound Management Association Conference 2021 (De Angelis et al, 2021; Blasco et al, 2021). In both posters that included five patients, the dressing supported wound healing very well. The dressing had high absorption and retention capacity, managed high viscosity exudate and protected the wound edges and periwound skin from maceration.

A recent survey exploring the opinion of clinicians in Spain on performance of the new reinforced gelling fiber confirmed that satisfaction with Biatain Fiber was high. From 399 responses, clinicians particularly valued the following properties of Biatain Fiber (Garcia Dominguez et al, 2021):

- **The exudate management capacity** = Absorption was evaluated as 'very good' or 'good' in 99% of the evaluations and retention was evaluated as 'very good' or 'good' in 97% of the evaluations. In an open-ended question on the greatest benefits of the dressing, 74% of the evaluations specifically mentioned benefits relating to exudate management.
- **The ability to debride the wound** = Debridement capacity was evaluated as 'very good' or 'good' in 83% of the evaluations.
- **The ability to keep its shape with minimal shrinkage** = Level of shrinkage was evaluated as 'very good' or 'good' in 97% of the evaluations, and 93% stated that it is 'very positive' or 'positive' to have minimal shrinkage in a fiber dressing.
- **The ability to remove the dressing with ease and without leaving a residue** = No residues were left in the wound was reported in 85.2% of the evaluations.
- **The ability to remove the dressing in one piece** = In 99% of the evaluations, the dressing could be removed in one piece.

CASE STUDY EVALUATIONS

Here, we present nine cases evaluating the clinical performance of Biatain Fiber dressing on various types of wounds. The Triangle of Wound Assessment (Dowsett et al, 2019) was used by the clinicians to assess and manage all areas of the wound – the wound bed, wound edge and the periwound skin. The Triangle of Wound Assessment guides clinicians to undertake a holistic assessment, set management goals and select the optimal treatment for the patient and wound.

The patient and wound were regularly monitored for clinical signs of improvement, such as reduction in wound size; improvement in wound bed tissue composition and periwound skin condition; reduction in exudate levels and malodour; signs of infection; and impact of the wound on patient quality of life. Any relevant additional treatment and advice were also reported, such as pressure offloading, debridement, secondary dressings and periwound skin care.

Cases 1 and 2 are ulcers related to diabetes, cases 3 and 4 are burns, case 5 and 6 are abdominal surgical dehisced wounds, case 7 is a sacral pressure ulcer, case 8 is a heel pressure ulcer, and case 9 is a venous leg ulcer. These cases are representative of a clinician's everyday use of Biatain Fiber dressings.

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CASE 1: Management of a complex atypical transmetatarsal amputation

Consuelo Fernández Marcuello, Nurse Responsible for Wound Care Unit, University Hospital Complex, Ourense, Spain

The patient was a 65-year-old woman with a history of arterial hypertension, ischaemic heart disease and type 2 diabetes, which developed during pregnancy 30 years ago. For 7 years, she has had chronic kidney disease and haemodialysis as she was not eligible for a kidney transplantation. As a result of diabetic retinopathy, she is blind in one eye. In 2014, the left first, fourth and fifth toes had been amputated.

The patient visited the emergency room for pain in the left foot after sustaining a trauma 2-3 weeks previously. There was an abscess of the third left toe, and the clinical signs of local infection were present (bleeding and purulent material). The patient was urgently admitted to the hospital for monitoring. After 2 days, the wounded area began to bleed and there was an outflow of purulent material. She had distal pulses and no fever. As three of the toes were amputated in 2014, it was agreed that the remaining second and third toe would also be amputated. On Day 3 of hospital admission, an atypical transmetatarsal amputation was conducted: tendons were sectioned, and devitalised and infected tissue removed. The plantar area was left open for washing and cleaning.

The patient was discharged from hospital 10 days after surgery, and ongoing treatment was conducted between primary care and the hospital. After 1 month, the wound had not progressed and because of the complex patient and wound needs, the patient was referred to the wound care specialist.

Initial wound assessment by the wound care specialist

The plantar ulcer of the left foot measured 85 mm (length) x 35 mm (width) x 0.5-0.9 mm (depth). The slough and necrotic tissues were removed **(Figure 1)** and the wound was cleaned with polyhexanide solution for 15 minutes. The Triangle of Wound Assessment (Dowsett et al, 2019) was used to assess the wound and the management goals were determined:

- Wound bed assessment: The tissue type was 50% sloughy, 30% granulating and 20% necrotic
  Exudate levels were medium to high
- Wound edge assessment: Macerated, undermining and thickened/rolled edges
- Periwound skin assessment: Dry skin and hyperkeratosis were present.

The management goals were as follows:

- Wound bed: Remove non-viable tissue, manage exudate and protect granulation/epithelial tissue
- Wound edge: Manage exudate, remove non-viable tissue and protect granulation/epithelial tissue
- Periwound skin: Manage exudate, protect skin, rehydrate the skin, remove non-viable tissue.

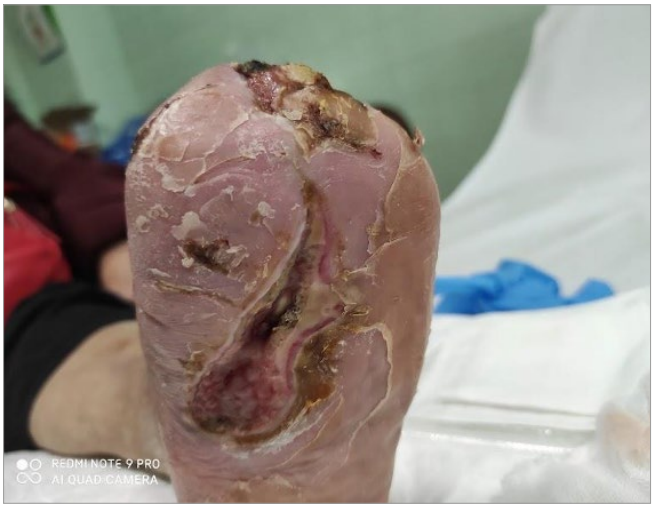

Figure 1. Initial assessment by wound care specialist before debridement (Day 1)

Treatment

The wound was dressed with Biatain Fiber and Biatain Silicone Multishape, and dressing change was planned for three times per week. As exudate management and the condition of the wound improved, the plan was to reduce dressing changes to twice a week. The dressings were held in place by an elastic tubular bandage, cotton and crepe. Although the patient was unable to walk, 5 mm felt pads were used to ensure offloading of the wound.

In the first 4 weeks of treatment, the wounded area had reduced in size and the condition of the periwound skin improved considerably **(Figure 2)**. After approximately 6 weeks, the wound reduced in size by approximately 50% **(Figure 3)**. After 3 months, there was a small wound in the plantar surface of the foot with very low exudate **(Figure 4)**; therefore, treatment with Biatain Fiber was stopped and Biatain Silicone Lite was used until complete epithelialisation.

Conclusion

At presentation to the wound care specialist, this wound had a high level of devitalised tissue and exudate levels were high, increasing the risk of maceration of the periwound skin. The wound care plan that included Biatain Fiber supported favourable conditions for autolytic debridement by removing slough and necrotic tissue without the need for debriding products. Biatain Fiber also absorbed and managed the high levels of exudate, helping to reduce further maceration of the periwound skin and supported epithelialisation.

Biatain Fiber worked well in combination with Biatain Silicone Multishape as a secondary dressing, as Biatain Silicone conformed to the contours of the foot, was easy to apply and provided comfort to the patient. Once gelled, Biatain Fiber was not observed to shrink in the wound and was easily and atraumatically removed without leaving any residue.

The patient had complex care requirements, and, as the wound began to heal, she became more confident and felt less anxious about her wound.

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Dowsett C, Swanson T, Karlsmark T (2019) A focus on the Triangle of Wound Assessment. *Wounds International* 10(3): 34-9

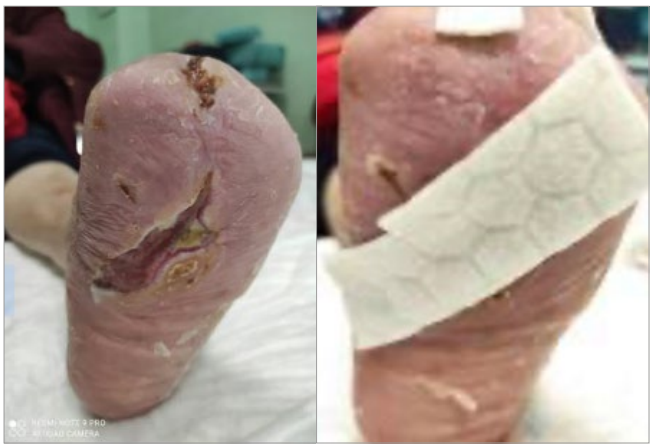

Figure 2. Day 26 of treatment

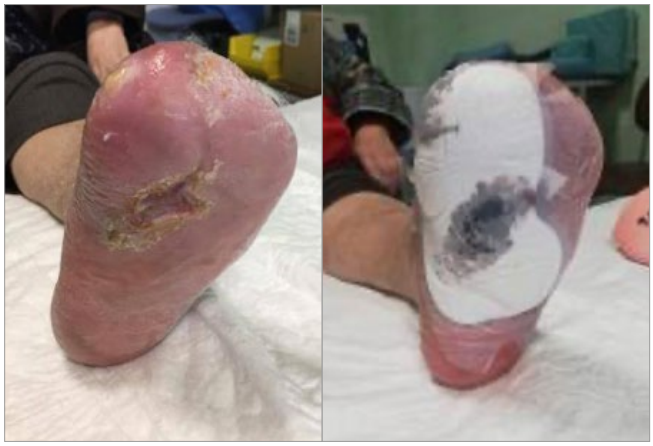

Figure 3. Day 42 (6 weeks) of treatment

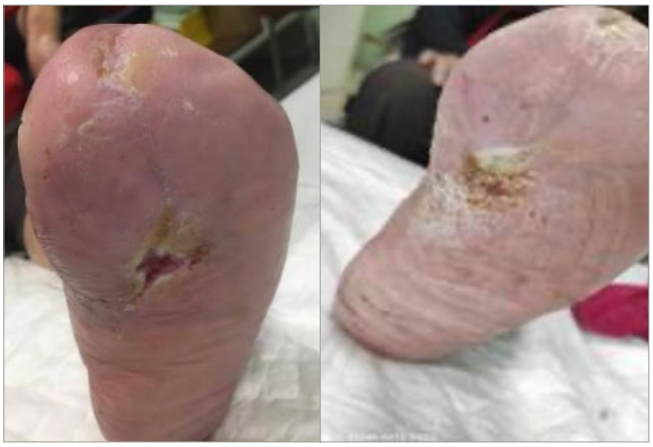

Figure 4. 3 months of treatment

CASE 2: Diabetic foot ulcer management

Mazizi Njokweni, Senior Podiatrist and Diabetic Foot Ulcer Specialist, Leratong Hospital, Krugersdorp, South Africa

The patient was a 63-year-old woman with type 2 diabetes and hypertension, which was managed with oral medication. Her HbA_{1c} was 7.5% (58.5mmol/mol). She presented to the wound care specialist with a diabetic foot ulcer (DFU) that had been present for 3 weeks and was believed to be caused by wearing tight-fitting footwear. At first a blister developed on the left first toe, which subsequently burst. The patient self-treated the wound with home remedies before seeking medical treatment. Before referral to the diabetic foot care team, the wound was treated in the local clinic with paraffin gauze, simple low-adherent, adhesive dressing and iodine. The wound was very painful (9 out of 10; 0=no pain, 10=unbearable pain).

Initial assessment by the diabetic foot ulcer specialist

The foot had good palpable foot pulses (ankle–brachial pressure index=1.2) and the skin temperature was normal on the proximal aspect of the foot; however, on the distal aspects of the hallux around the wound, the temperature was abnormally warm and the wound was malodourous, which was indicative of local wound infection. The wound itself measured 50 mm (length) x 30 mm (width) x 5 mm (depth) **(Figure 1)**. The Triangle of Wound Assessment (Dowsett et al, 2019) was used to assess the wound bed, wound edge and periwound skin and determine the management goals:

- Wound bed: The wound bed comprised 99% sloughy tissue. There was a moderate level of thick exudate, and increased pain, erythema, oedema and malodour, which was indicative of infection
- Wound edge: Undermined surrounding skin
- Periwound skin: Hyperkeratosis.

The management goals were as follows:

- Wound bed: Remove non-viable tissue, manage exudate, manage bacterial burden
- Wound edge: Manage exudate, remove non-viable tissue
- Periwound skin: Manage exudate, protect skin, remove non-viable tissue.

Treatment

The wound was debrided with an enzymatic debriding gel, but wound moisture increased. Therefore, it was important to choose a dressing that would minimise the risk of maceration to the periwound skin. Biatain Fiber 10 cm x 10 cm was used as the primary wound dressing to manage the wound moisture and was held in place by Biatain Foam Non-Adhesive 10 cm x 10 cm (Coloplast). A 'football' dressing technique was used to offload the ulcer (**Box 1**; Rader and Barry, 2008). Consultations and dressing changes were planned for twice weekly. The patient was prescribed a broad-spectrum short course of co-amoxiclav 1g twice daily for 7 days.

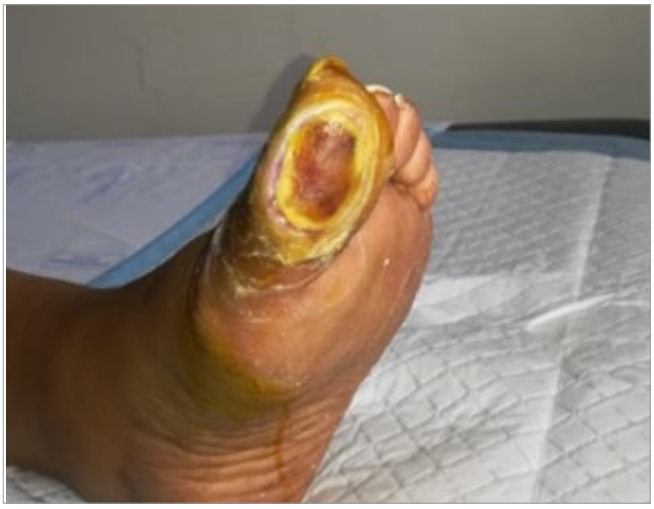

Figure 1. First day of treatment with Biatain Fiber dressing

Box 1. The "football" dressing technique

The "football" dressing technique is a low-cost offloading method used as an alternative to the known mainstream offloading devices. It is composed of multiple layers of gauze around the wound region, enough to provide cushioning over the wound dressing(s) applied, and crepe bandage wrapped around the midfoot, ankle and lower third of the leg firmly so that the patient can comfortably flex their ankle joint.

A semi-compressed felt material that complements the patients' foot type and/or wound location can be added to the offloading sandal or beneath the foot.

Example of the 'football' dressing technique used on a forefoot ulcer

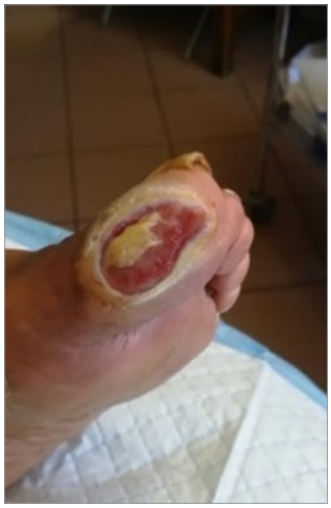

Figure 2. 30 days of treatment

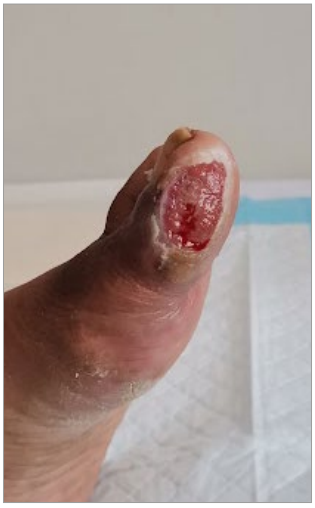

Figure 3. 54 days of treatment

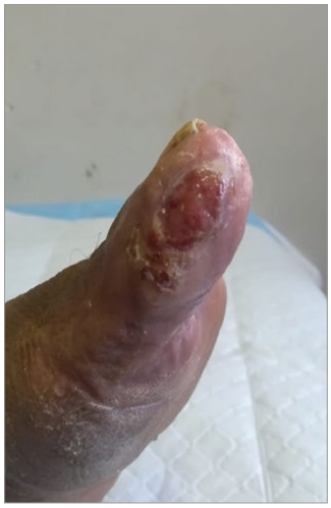

Figure 4. 82 days of treatment

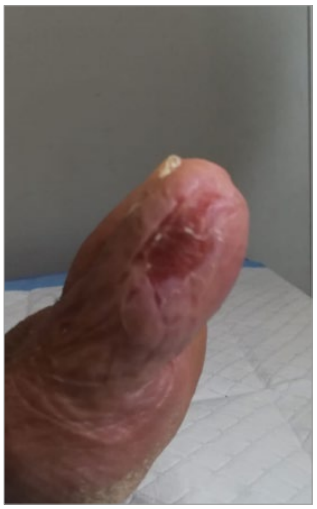

Figure 5. 124 days (approx. 4 months) of treatment

After 1 month of treatment, the wound had reduced in size (48 mm x 26 mm x 5 mm) and the wound bed composition was improving **(Figure 2)**. The wound became slightly less painful (8 out of 10). After 3 weeks, the levels of exudate had reduced and the patient only required dressing change once per week. The wound continued to reduce in size (35 mm x 20 mm x 2 mm), and the periwound skin was healthy **(Figure 3)**.

Approximately 2 months later, the wound area had decreased further, and pain had considerably reduced (3 out of 10). The wound measured 1.6 mm x 1 mm x 0 mm **(Figure 4)** and the wound bed composed of 90% epithelialisation tissue. There were no signs of infection and exudate level was low. The management goals were to protect the newly formed granulation and epithelialisation tissue of the wound bed and wound edges, and to protect the periwound skin.

Six weeks later, the wound was fully epithelialised with fragile, new skin **(Figure 5)**. Therefore, the management goal was to protect the skin. The dressing regimen was changed to Biatain® Contact 5 cm x 5 cm (Coloplast) and a 10 cm x 10 cm low-adherent, adhesive dressing.

Conclusion

For this sloughy, highly exuding DFU with undermining at the edge, Biatain Fiber dressing absorbed and retained exudate away from the wound bed. Biatain Fiber was easy to apply as the dressing conformed to the shape of the toe. When the dressing was removed, it had not shrunk and it was visible that a gel had formed in the dressing which had conformed to the shape of the wound, reducing the risk of gap creation and exudate pooling.

The ulcer had initially presented with signs of local infection, which resolved with the use of Biatain Fiber without the need for a topical antimicrobial. The patient was pleased that dressing change was pain free, that no fluid leakage occurred from the dressing, and that the wound fully healed.

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CASE 3: Management of a thermal burn on the lower limb

Raúl García Vallejo, Family nurse, Wound care specialist, Primary Care Center Campamento, Madrid, Spain

The patient was an 83-year-old man with diabetes, anaemia and a medical history of cardiovascular risk, including hyperlipidemia and chronic obstructive pulmonary disease (COPD). He had good mobility and a good nutritional status.

He presented to the hospital emergency department with a mixed (superficial and deep) second-degree thermal burn caused by a flame **(Figure 1)**. In the emergency department, the wounded area was treated with argentic sulfadiazine plus a petrolatum mesh covered with a sterile dressing. Although most burns that are seen in the primary care setting are mild or not very serious, it is very important to know how to treat these wounds correctly to avoid complications that may harm the patient's wellbeing.

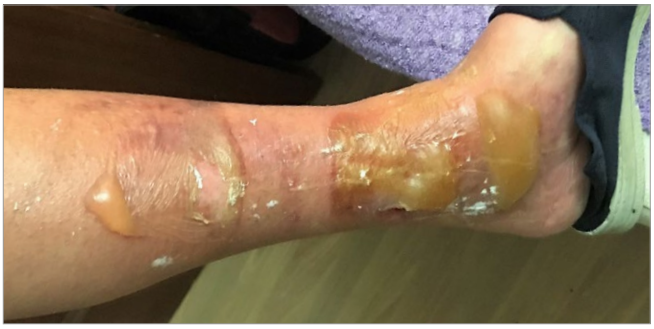

Figure 1. Day of injury

Initial wound assessment and start of treatment by the wound care specialist in the Primary Care Centre

After 2 days, the patient arrived to the Primary Care Centre with three blisters covering two-thirds of the medial part of the left leg. The wound was very painful (7 out of 10; 0=no pain, 10=unbearable pain). The Triangle of Wound Assessment (Dowsett et al, 2019) was used to assess the wound bed, wound edge and periwound skin and determine the management goals:

- Wound bed assessment: The tissue type was 50% sloughy and 50% granulation tissue. There were high levels of serous exudate from the wound area
- Wound edge assessment: Healthy
- Periwound skin assessment: Dry skin present.

The management goals were as follows:

- Wound bed: Remove non-viable tissue, manage exudate, manage bacterial burden and protect granulation/epithelial tissue
- Wound edge: Manage exudate, remove non-viable tissue and protect granulation/epithelial tissue
- Periwound skin: Manage exudate, protect skin, rehydrate the skin, remove non-viable tissue.

Treatment

First, the area was cleaned with saline and the devitalised tissue and skin was debrided from the wound bed. The periwound skin and wound edges of the burn were not affected. As there were high levels of serous exudate, Biatain Fiber was applied as a primary dressing and Biatain Silicone Sacral 25 cm x 25 cm as a secondary dressing. Two of each dressing were required to adequately cover the injured area **(Figure 2)**.

A skin moisturiser was applied to perilesional skin. A crepe bandage was applied to hold the dressings in place. It was recommended to change the dressings every 48 hours.

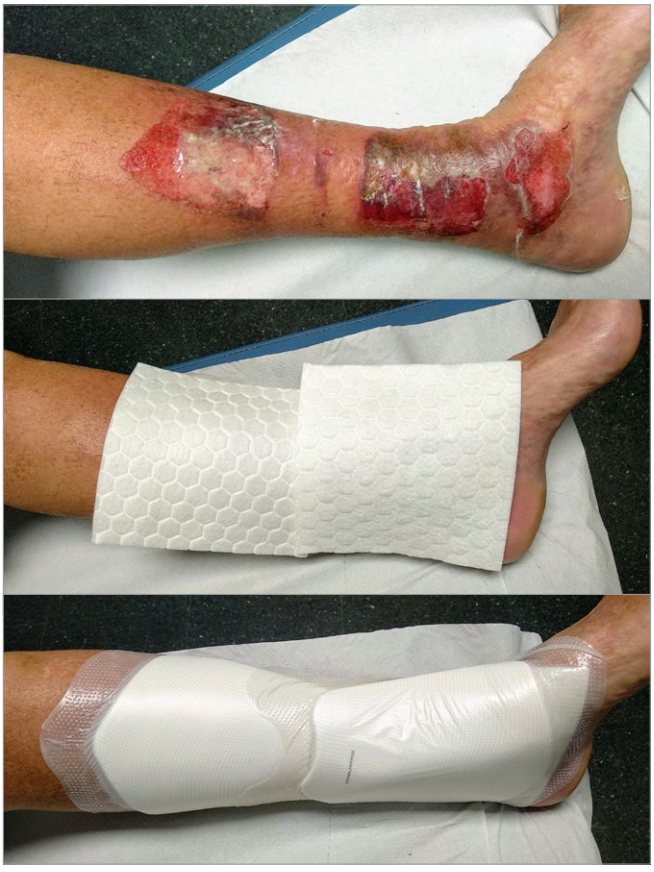

Figure 2. Day 1 of treatment with Biatain Fiber dressing - after cleansing and debridement

In the emergency department, the patient was prescribed paracetamol 650 mg every 6-8 hours. As the pain remained elevated and constant, he was also prescribed tramadol 50 mg at night.

Three days after the initial assessment by the wound care expert **(Figure 3)**, the dressings were changed. The combination of the

two dressings managed the exudate well, and the would edges and the periwound skin were both healthy.

After 10 days of treatment **(Figure 4)**, the exudate level had decreased to medium, so only Biatain Silicone was applied. Dressing change was planned for every third day. After 17 days of treatment, the three wounded areas had all decreased in size. Hyperoxygenated fatty acid (HFA) oil was applied to the newly epithelialised areas.

After 4 weeks of treatment, all the wounds were decreasing in size and there was epithelialised tissue on the wound beds **(Figure 5)**. The pain had decreased, so tramadol was no longer necessary.

The wounds continued to progress, but after 43 days, two skin tears (measuring 4 cm x 2 cm and 1 cm x 2.5 cm) had occurred **(Figure 6)**. The patient did not know how the skin tears occurred, but it is likely to have occurred because of friction or scratching.

As a results, Biatain Fiber was applied again to protect the skin. After 10 days (Day 53), the skin tears had resolved and it was no longer necessary to use Biatain Fiber. Biatain Silicone was used until healing.

Two of the wounded areas reached full closure in just under 2 months (Day 57), only the larger, central injury remained to be closed. The wounded area was 95% epithelialised and the exudate level was very low. After 2.5 months of treatment (Day 71), the treatment had been successful and all the wounds had closed **(Figure 7)**.

Conclusion

One of the key aims of the treatment of highly exuding burns is to minimise the risk of infection by managing the high amount of exudate. The exudate was efficiently absorbed and retained by the Biatain Fiber dressing away from the wound bed and periwound skin, which minimised the risk of further maceration to the periwound skin. The combination of Biatain Fiber and Biatain Silicone, with their vertical absorption of exudate, was effective at supporting this large, wounded area to healing.

The removal of the dressings was simple, easy, atraumatic and painless for the patient. Biatain Fiber did not leave any residue in the wound bed nor did it shrink within the wound bed.

References

Dowsett C, Swanson T, Karlsmark T (2019) A focus on the Triangle of Wound Assessment. *Wounds International* 10(3): 34-9

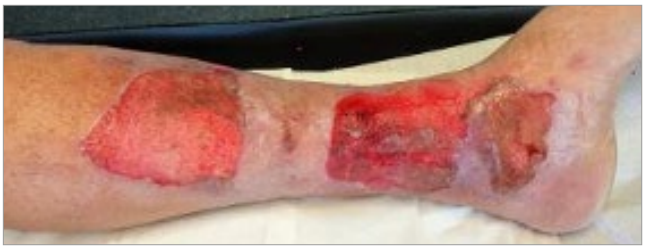

Figure 3. Day 3 of treatment

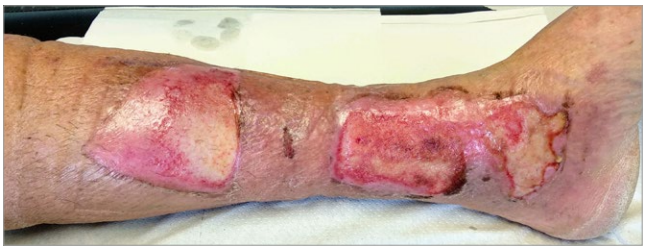

Figure 4. Day 10 of treatment

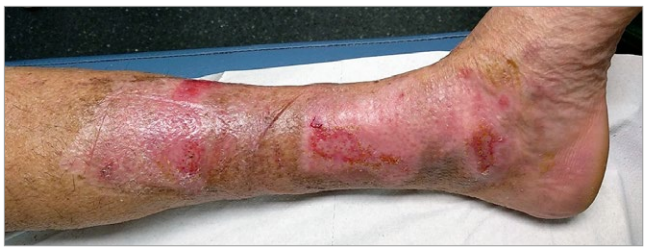

Figure 5. Day 28 of treatment

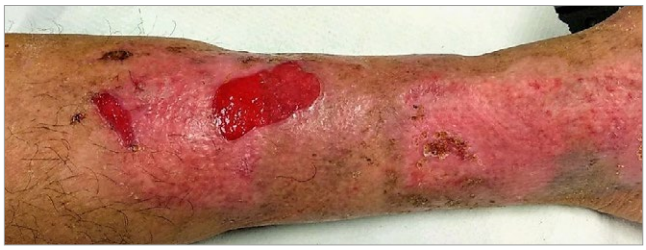

Figure 6. Day 43 of treatment

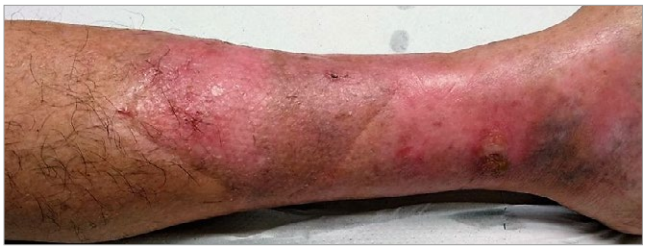

Figure 7. Day 71 of treatment

CASE 4: Management of a deep thermal burn on the left upper limb

Katia Feliziani, Wound Care Specialist, Ambulatorio Ferite Difficili Distretto Macerata, Italy
Alessandro Tedeschi, Wound Care Specialist, Ambulatorio Ferite Difficili Distretto Macerata, Italy

A woman in her 90s sustained a thermal burn on her left forearm. For 6 weeks (45 days), the wound was treated with a cream containing the antibiotic gentamicin and the steroid betamethasone by the primary care team, but the wound was not progressing so she was referred to the outpatient wound care clinic. The patient was in good health with no comorbidities.

Initial wound assessment by the outpatient wound care clinic

There were no signs of ongoing inflammation, but there was necrotic tissue/eschar on the wound bed and minimal exudate **(Figure 1)**.

Surgical debridement under topical anaesthesia was conducted on the wound bed, and hydrocolloid and hydrogel dressings were used to facilitate autolytic debridement for 10 days. After 10 days, there was a reduction in necrotic tissue but the level of exudate increased from scarce to abundant. The wound measured 100 mm (length) x 80 mm (width) x 10 mm (depth), and there were no clinical signs of infection **(Figure 2)**. The Triangle of Wound Assessment was used to assess the wound bed, wound edge and periwound skin (Dowsett et al, 2019) and determine the management goals:

- Wound bed assessment: The tissue type was mostly granulation tissue, and there was a high level of exudate
- Wound edge assessment: Macerated
- Periwound skin assessment: Macerated.

The management goals were as follows:

- Wound bed: Manage exudate
- Wound edge: Manage exudate
- Periwound skin: Manage exudate.

Treatment

The key management goal for the wound bed, wound edge and periwound skin was to manage exudate to reduce the risk of maceration. Biatain Fiber was selected as a primary dressing and Biatain Silicone was used as a secondary dressing to protect the periwound skin. Biweekly dressing changes were necessary for the next 2 weeks due to the high levels of exudate. After the 2-week assessment **(Figure 3)**, dressing change was reduced to once weekly. **Figure 4** illustrates the wound after 3 weeks of treatment as the amount of exudate reduced.

After 4 weeks of treatment (Day 29), there was a reduction in the size of the wound, removal of residual fibrin and exudate was being effectively managed by the dressing combination, minimising the negative impact on the periwound skin, wound edge and wound bed **(Figure 5)**.

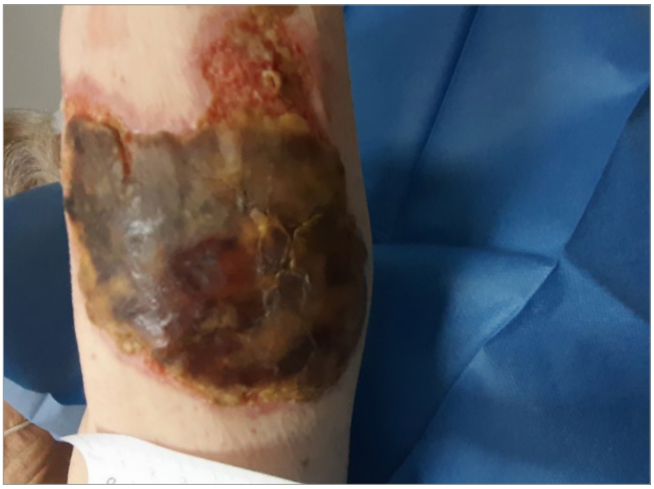

Figure 1. Initial assessment by the wound care specialist before debridement

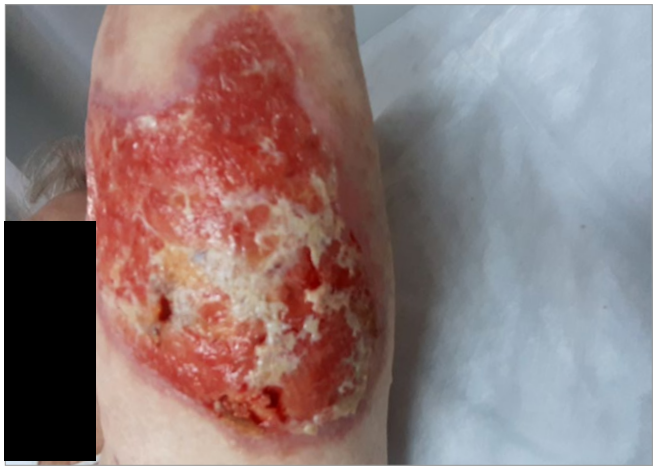

Figure 2. Start of treatment with Biatain Fiber after debridement (Day 1)

Biatain Fiber was stopped as exudate levels had decreased. One week later (Day 36), the periwound skin had become macerated and there was some hyper-granulated tissue on the wound bed, so treatment with Biatain Fiber as the primary dressing and Biatain Silicone as a second dressing resumed. After 1 week (Day 43; **Figure 6**), the composition of the wound bed had vastly improved and the periwound skin was less inflammed.

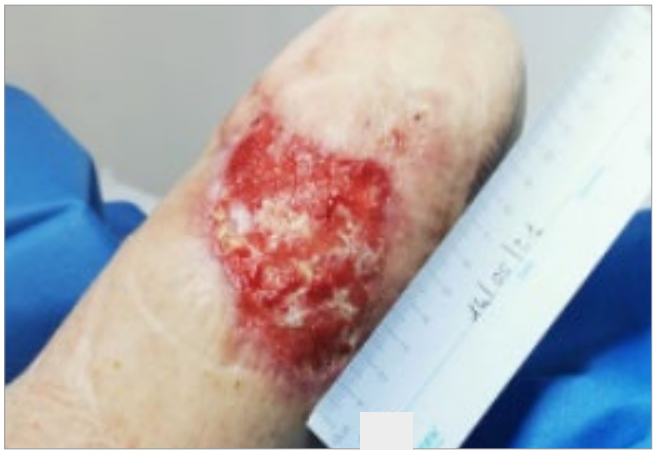

Figure 3. Day 15 of treatment

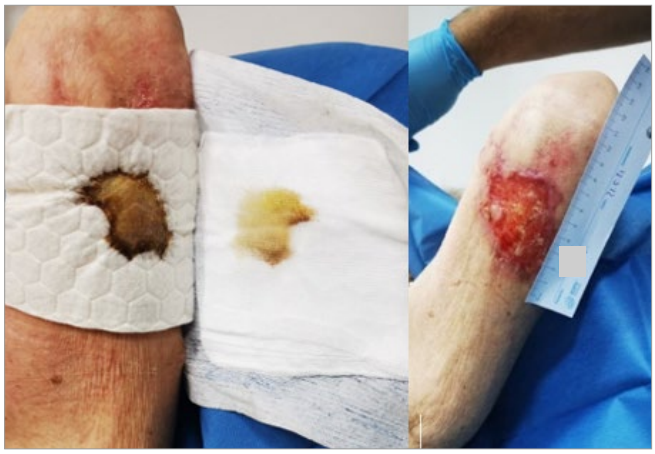

Figure 4. Day 22 of treatment

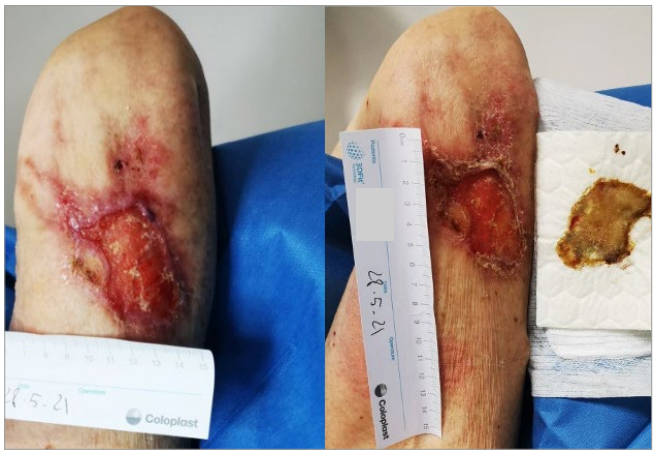

Figure 5. Day 29 of treatment

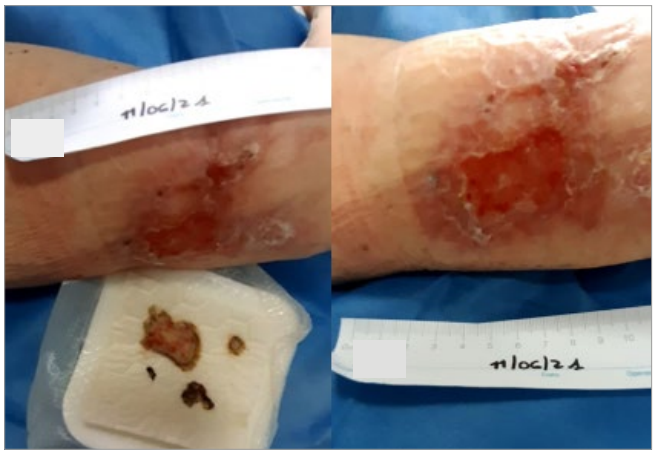

Figure 6. Day 43 of treatment

Conclusion

During the evaluation period using Biatain Fiber and Biatain Silicone for the treatment of the forearm burn, there was a reduction in wound size and islands of re-epithelialisation had begun to develop. Periwound maceration had resolved and there were no signs of inflammation or infection. Biatain Fiber efficiently managed and retained a high volume of exudate to form a cohesive gel both in the first phase of healing when the exudate was of a thick consistency, and in the second phase, when the exudate was of a thinner consistency. The dressing regimen of Biatain Fiber and Biatain Silicone was well tolerated by the patient; it did not cause pain and did not limit her movements, so the patient was able to continue her lifestyle and social relationships as before.

References

Dowsett C, Swanson T, Karlsmark T (2019) A focus on the Triangle of Wound Assessment. *Wounds International* 10(3): 34-9

CASE 5: Management of an abdominal dehisced surgical wound

Stefano Colognese, Wound Care Specialist, Ambulatorio Medicazioni Complesse, AUSL Reggio Emilia, Italy

A 30-year-old woman was hospitalised 5 months after her sleeve gastrectomy. The sleeve gastrectomy had been conducted at a different hospital in Northern Italy and required multiple revision surgeries, ultimately resulting in a dehisced abdominal wound. She had a BMI of 35 kg/m^2 and no other comorbidities.

Initial wound assessment by the wound care specialist

The Triangle of Wound Assessment (Dowsett et al, 2019) was used to assess the wound and select the management goals. The wound measured 91 mm (length) x 55 mm (width) x 35 mm (depth) **(Figure 1)**:

- Wound bed: The wound bed was sloughy with abundant purulent, dense, turbid, strongly malodorous exudate. After assessment with *Moleculight i:X*, there was evidence of slough and biofilm matrix on the wound bed, with strong suspicion of critical colonisation/infection **(Figure 1)**
- Wound edge: The wound edge was 360° undermined, rounded and rolled
- Periwound skin: Healthy.

Following the initial assessment, the management goals were to:

- Wound bed: remove non-viable tissue, manage exudate, manage bacterial load, promote new tissue growth
- Wound edge: remove non-viable tissue, reduce undermining
- Periwound skin: Manage exudate, protect periwound skin from maceration and remove non-viable tissue.

Treatment

The wound was highly infected and culture tests were positive for *Proteus mirabilis, Morganella morganii, Enterococcus faecalis, Escherichia coli, Klebsiella aerogenes, Staphylococcus aureus* and *Candida albicans*. The following antibiotics were used for the management of wound infection, according to the antibiogram: piperacillin sodium/tazobactam sodium, fluconazole, meropenem trihydrate, linezolid, ciprofloxacin lactate, daptomycin.

The patient was treated with negative pressure wound therapy (NPWT) for 3 weeks with an antimicrobial filler; dressing change was planned for every 2-3 days. At the end of the 3-week treatment with NPWT, the wound had reduced in depth. There were still signs of local wound infection, so a variety of antimicrobial dressings were used in succession (e.g. cadexomer iodine, calcium alginate with silver, silver sulfadiazine dressings). Superabsorbent polymer dressings were also used to manage exudate.

After 6 weeks, the overt clinical signs of local infection had resolved, but biofilm was still suspected. As a result of the high exudate levels, treatment with Biatain Fiber and Biatain Silicone was initiatied **(Figure 2)**; dressing changes were planned for 3 times a week due to the high

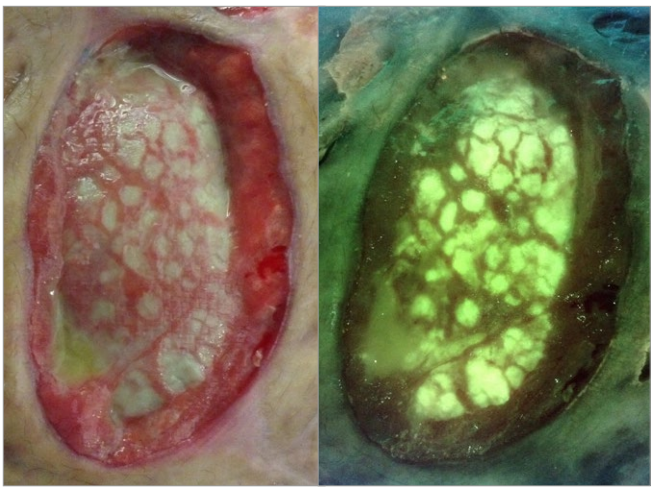

Figure 1. Initial assessment (image captured with *MolecuLight i:X*)

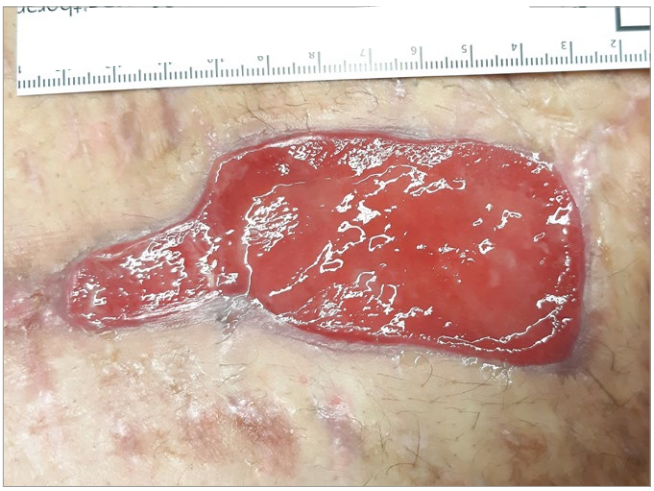

Figure 2. Start of treatment with Biatain Fiber and Biatain Silicone (Day 1)

levels of exudate and malodour. After 20 days, dressing change frequency was reduced to twice a week and then once a week.

After 34 days of wound management with Biatain Fiber and Biatain Silicone **(Figure 3)**, the wound was re-assessed by the wound care specialist to review the treatment plan. There was a progressive reduction in the amount of wound exudate and approximately a 63% reduction in wound area.

The wound was brought to complete closure after 65 days from the start of treatment with Biatain Fiber in combination with Biatain Silicone **(Figure 4)**.

Conclusion

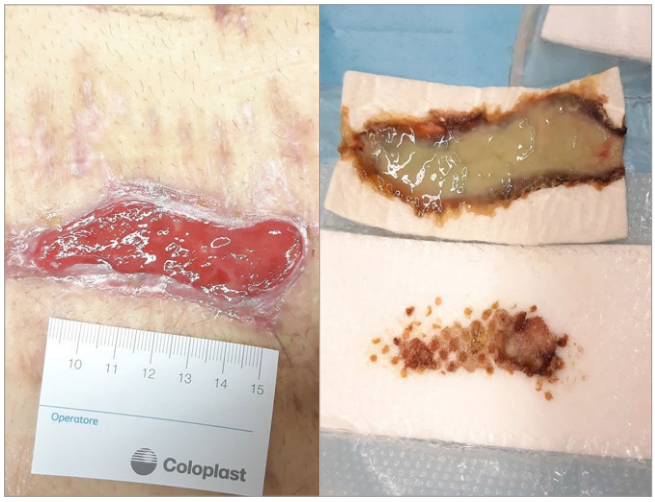

Figure 3. 34 days of treatment with Biatain Fiber and Biatain Silicone

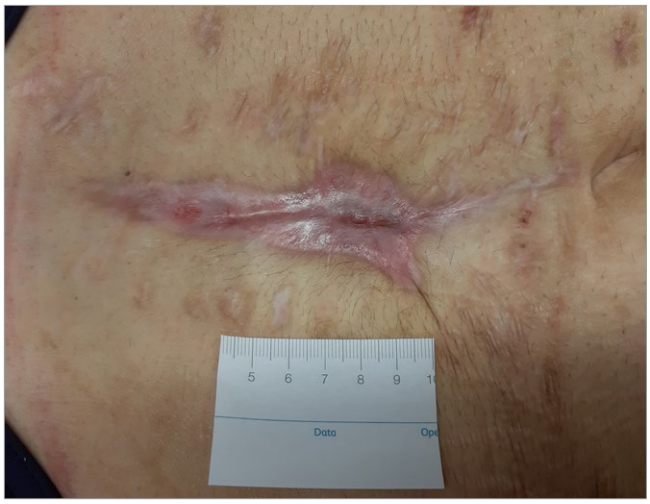

Figure 4. Complete wound closure with scar being remodeled (Day 65)

The wound in this case evaluation was a deep cavity wound, which was infected with multiple bacterial strains. Once the clinical signs of infection were resolved, the wound was at high risk of re-infection. Biatain Fiber dressing was selected to absorb and retain the exudate, thereby removing the residual bacterial load from the wound bed. The combination of Biatain Fiber and Biatain Silicone effectively reduced the amount of exudate pooling in the wound bed, protected against maceration of the periwound skin, and managed the residual microbial load present on the wound bed. Biatain Fiber formed a soft gel when in contact with fluid, was not observed to shrink in the wound and remained intact on removal. The removal of the dressing was always simple and atraumatic, preventing the patient from experiencing pain.

The wound treatment plan also helped to manage the malodourous nature of the wound; therefore, the dressings could be changed less frequently, which had a positive impact on the patient's quality of life. The conformability of Biatain Fiber and Biatain Silicone to the patient's abdominal wound and body contours assured that the patient's movements were not limited, allowing her to carry out the normal activities of daily life.

References

Dowsett C, Swanson T, Karlsmark T (2019) A focus on the Triangle of Wound Assessment. *Wounds International* 10(3): 34-9

CASE 6: Colostomy closure

Carmen Ruth Lavandera Arrocha, Wound Care Specialist Nurse, Department of General and Digestive Surgery, Hospital del Sur. Tenerife, Spain

Reversing a temporary stoma involves two surgical procedures: the reconstruction of intestinal transit and the closure of the abdominal wall at the site of the stoma. Surgical site infection is described as the most frequent complication after the closure of a temporary stoma with an incidence ranging from 2–40% (Liang et al, 2013), so it is important to close the wound as quickly as soon as possible and avoid infection.

A 68-year-old man presented to the wound care specialist with a history of hypertension and dyslipidemia. He had received a renal transplantation and was taking immunosuppression treatment. The patient was treated for acute perforated diverticulitis with peritonitis and an uncomplicated Hartmann-type urgent colostomy was performed and a stoma was made to pass the intestinal evacuations into a bag.

The colostomy was temporary, and the intestinal transit was rebuilt approximately 3 months later. There was an open wound in the left iliac fossa due for closure by second intention.

Initially, the wound was managed by the patient at home. The wound was cleaned with soap and water, saline and gauze, but the wound did not progress. Therefore after 2 weeks, the patient sought medical advice (Day 1; **Figure 1**).

Initial wound assessment by the wound care specialist

The wound measured 50 mm (length) x 20 mm (width) x 20 mm (depth) at the left iliac fossa **(Figure 1)**. The Triangle of Wound Assessment (Dowsett et al, 2019) was used to assess the wound and select the management goals:

- Wound bed: The wound bed comprised 50% slough and 50% granulation tissue. There were high levels of exudate
- Wound edge: Healthy
- Periwound skin: Eczema.

The key treatment goal was to remove non-viable tissue and protect healthy granulation and epithelialised tissue:

- Wound bed: remove non-viable tissue, manage exudate, protect granulation/epithelial tissue
- Wound edge: Manage exudate, remove non-viable tissue, protect granulation/epithelial tissue
- Periwound skin: Rehydrate skin, remove non-viable tissue.

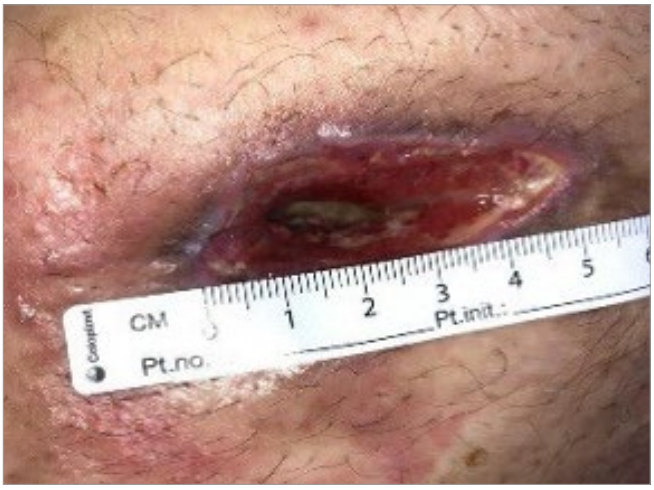

Figure 1. Initial assessment by the wound care specialist (Day 1)

Treatment

The wound bed was cleansed with saline and an antiseptic solution. The periwound skin was protected with a zinc-based barrier cream to protect the skin from maceration. Biatain Fiber was applied with Biatain Silicone 15 cm x 15 cm as secondary dressing. Dressing change was planned for every 48 hours **(Figure 2)**.

In 15 days, the wound size and level of exudate had both reduced. The wound bed presented with 100% granulation tissue **(Figure 3)**. After 30 days, the wound bed was 100% epithelialised **(Figure 4)**.

Conclusion

The colostomy site healed in 30 days and the patient was very happy and satisfied with the results. The Triangle of Wound Assessment was a useful tool to assess the wound, identify the management goals and develop an holistic treatment approach for this patient and his wound.

The treatment plan that included Biatain Fiber and Biatain Silicone was easy to use. Biatain Fiber absorbed the high levels of exudate away from the wound bed; no wound gap was observed between the dressing and the wound bed because the dressing conformed very well to the contours of the wound bed. Also, Biatain Fiber was very easy to remove from the wound bed without leaving any residue, and dressing changes did not cause pain to the patient.

References

Dowsett C, Swanson T, Karlsmark T (2019) A focus on the Triangle of Wound Assessment. *Wounds International* 10(3): 34-9

Liang MK, Li LT, Avellaneda A et al (2013) Outcomes and predictors of incisional surgical site infection in stoma reversal. *JAMA Surg* 148: 183-9

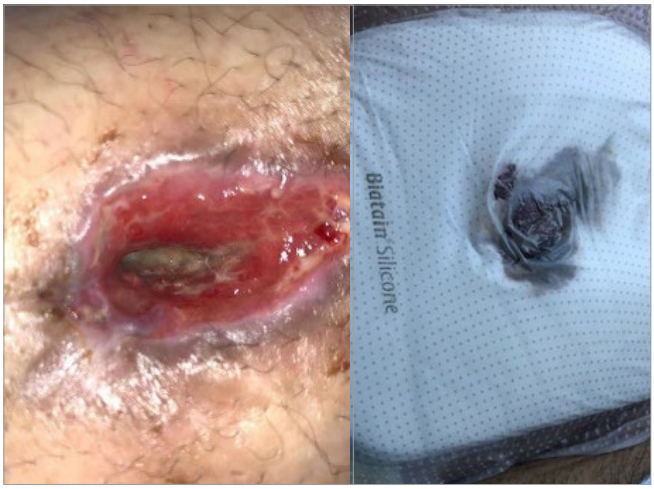

Figure 2. Day 3 of treatment

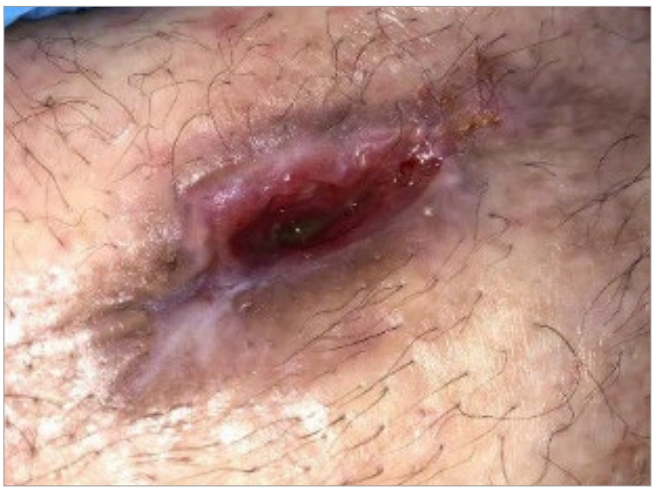

Figure 3. Day 15 of treatment

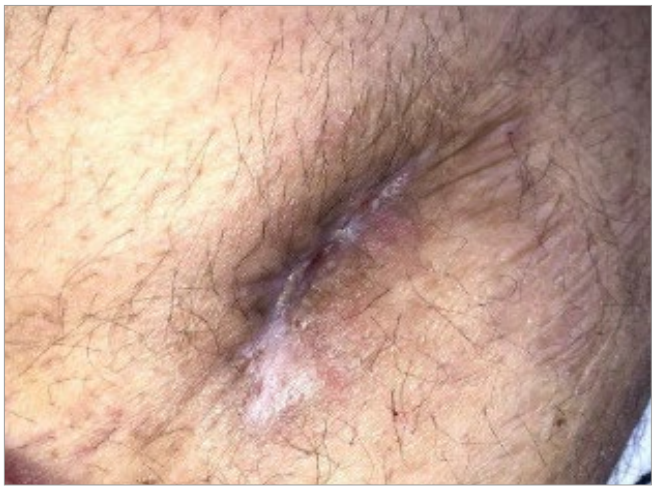

Figure 4. Day 30 of treatment

CASE 7: Management of a sacral pressure ulcer

Pierluigi Gallo, Vulnologist, Mavi Center, San Sebastiano Al Vesuvio, Naples, Italy
Federica Maiello, Wound Care Specialist Nurse, Loreto Hospital of Naples, Italy

A man in his mid-70s was admitted into a residential care home with an unstable non-stageable sacral pressure ulcer. He had been in the care home for 6 months and the ulcer remained unhealed and non-progressing. The ulcer measured approximately 120 cm^2 and was malodourous, which was indicative of local infection. He also had systemic infection (continuous fever) and cardiac decompensation.

Over the past 6 months, a range of treatments had been used but the wound remained unhealed, e.g. aggressive surgical debridement was conducted multiple times, wet-to-dry therapy was used, and negative pressure wound therapy had been used twice for 3 weeks. Biatain Fiber and Biatain Silicone, as a secondary dressing, were selected to absorb and retain the high amount of viscous exudate.

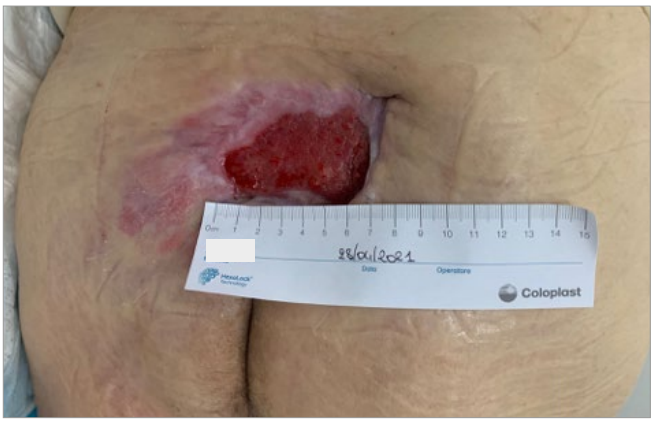

Figure 1. Assessment Day 1 (Biatain Fiber had been used for 1 month)

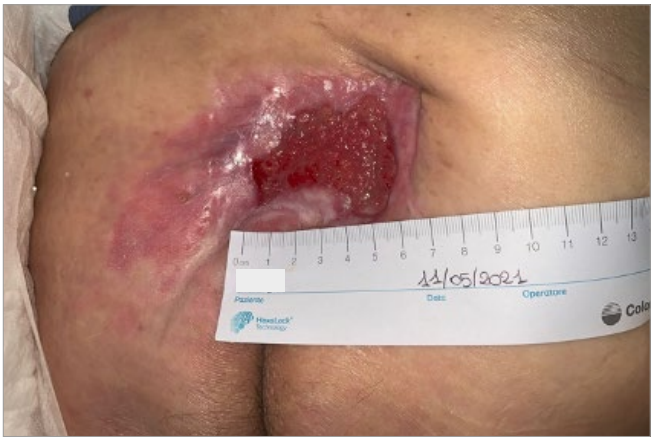

Figure 2. Day 13 of treatment

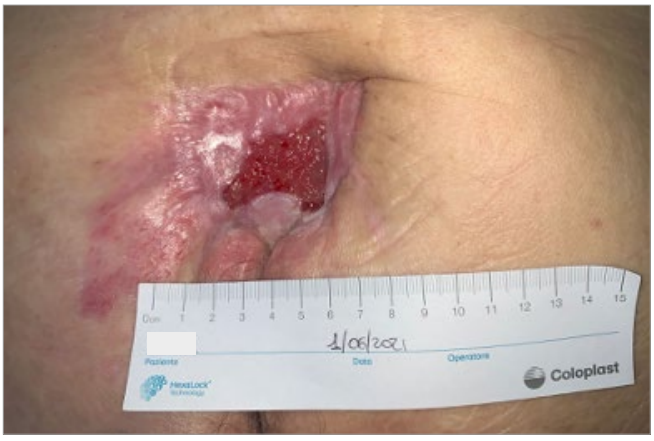

Figure 3. Day 33 of treatment

Wound assessment by the wound care specialist

The wound measured 70 mm (length) x 40 mm (width) x 20 mm (depth) **(Figure 1)**. The Triangle of Wound Assessment (Dowsett et al, 2019) was used to assess the wound and determine a wound management plan:

- Wound bed assessment: The wound bed comprised granulation tissue; exudate was viscous and malodourous
- Wound edge assessment: Undermined wound edges
- Periwound skin assessment: Eczema.

The management goals were as follows:

- Wound bed: Remove non-viable tissue, manage bacterial burden an rehydrate the wound bed
- Wound edge: Manage exudate, rehydrate the wound edges and protect granulation/epithelial tissue
- Periwound skin: Manage exudate.

Treatment

The wound was cleansed using an isotonic solution. A 10% zinc oxide paste was applied to the perilesional area, and Biatain Fiber was applied as the primary dressing to fill the cavity, and Biatain Silicone was applied as secondary dressing. Dressing change frequency was determined by visual cues from the dressing (i.e. approximately 24-30 hours). The patient was repositioned every 2 hours.

The dressing regimen remained the same for 8 weeks as the wound reduced in size **(Figures 2–3, 4b)**. After 8 weeks, the wound measured 25 cm^2. The periwound skin and wound edges were healthy and the wound edges were advancing to full wound closure. Biatain Fiber dressing continued to be used until the wound had fully epithelialised **(Figure 5)** approximately 6 weeks later.

Conclusion

For this large cavity wound with undermining, the combined approach of Biatain Fiber and Biatain Silicone was effective at managing the viscous exudate in this large cavity wound. The exudate was well absorbed and retained in the primary Biatain Fiber dressing into a cohesive gel which conformed to the wound bed **(Figure 4a)**. The secondary dressing, Biatain Silicone, conformed well to the patient's sacral area.

As healing progressed, the patient was happier with treatment as he was able to move by himself without assistance, there was a reduction in pain and a vesical catheter was no longer required. As a result of the treatment regimen over the 8-week evaluation period, there was a substantial reduction in wound size and improvements to the periwound skin. The wound was on a healing trajectory to full closure.

References

Dowsett C, Swanson T, Karlsmark T (2019) A focus on the Triangle of Wound Assessment. *Wounds International* 10(3): 34-9

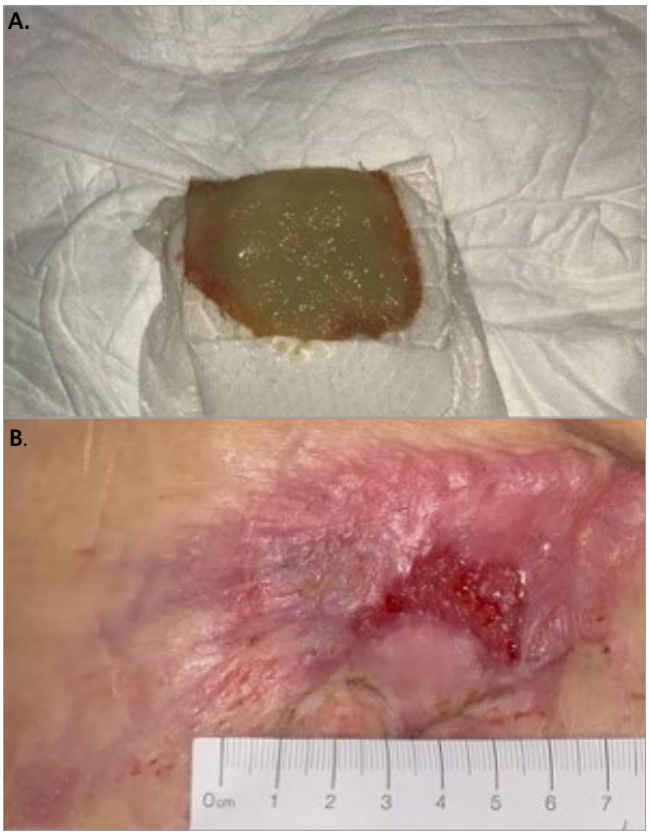

Figure 4. Day 48 of treatment

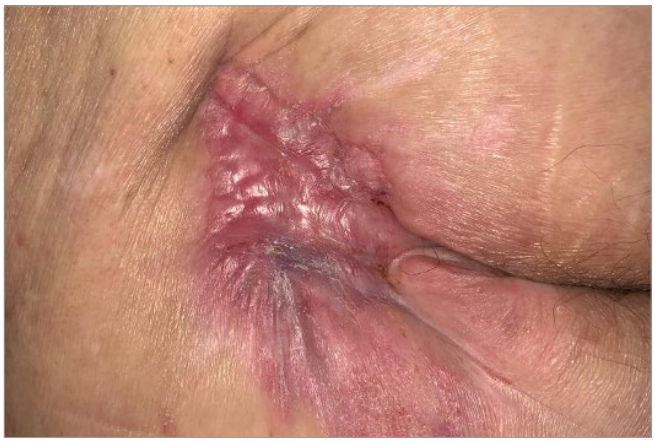

Figure 5. Day 92 of treatment

CASE 8: Management of an unstageable pressure ulcer on the heel

Stephanie Rakis, Nurse Practitioner, Skin and Wound Care Consultancy, Australia

A 70-year-old man presented with an unstageable pressure ulcer on his left heel. The patient had multiple sclerosis and was wheelchair- and bed-bound. He experienced chronic pain, had a history of Bell's Palsy and chronic urinary tract infections. He was dependent on his wife for all activities of daily living. It was unclear how long the ulcer had been present due to the location of the wound.

Wound assessment by the wound care specialist

The wound measured 4 cm (length) x 2.5 cm (width), the depth was unknown due to the necrotic tissue 'cap' on the wound bed **(Figure 1)**. The Triangle of Wound Assessment (Dowsett et al, 2019) was used to assess the wound and determine a wound management plan:

- Wound bed assessment: 100% necrotic/devitalised tissue 'cap'. No exudate or overt signs and symptoms of infection
- Wound edge assessment: Border of necrotic tissue 'cap' lifting from the wound bed
- Periwound skin assessment: Intact and normal inflammatory erythema.

The management goals were as follows:

- Wound bed: Remove non-viable tissue
- Wound edge: Remove non-viable tissue
- Periwound skin: Protect skin, rehydrate the skin, remove non-viable tissue.

Treatment

Betadine antiseptic was applied to the necrotic tissue daily by the patient's wife and dressed with a simple, low-adherent dressing and tape for 2 weeks to prepare the area for sharp debridement **(Figure 2)**. After 2 weeks, the wound bed was 98% slough/necrotic and 2% granulation tissue, and there was a low level of haemopurulent exudate. The wound edge was intact and there was normal inflammatory erythema around the periwound skin. There was an area of contact dermatitis on the lateral ankle. The size of the wound was unchanged from the initial assessment.

The aim of treatment was to avoid hospital admission and prevent wound infection; treatment would include debridement, creating a moist wound environment, and offloading pressure to the heel. The necrotic 'cap' was debrided with a sterile blade. The depth of the wound was still unknown due to extensive amount of devitalised tissue present. The wound was mechanically debrided with the Alprep® Pad cleansing and debridement pad (Coloplast). An antimicrobial soak was used and a barrier film was applied to the periwound area, a moisture-donating gel dressing to the wound area and a heel-shaped foam dressing with a silicone border. Corticosteroid ointment was applied to the area of contact dermatitis.

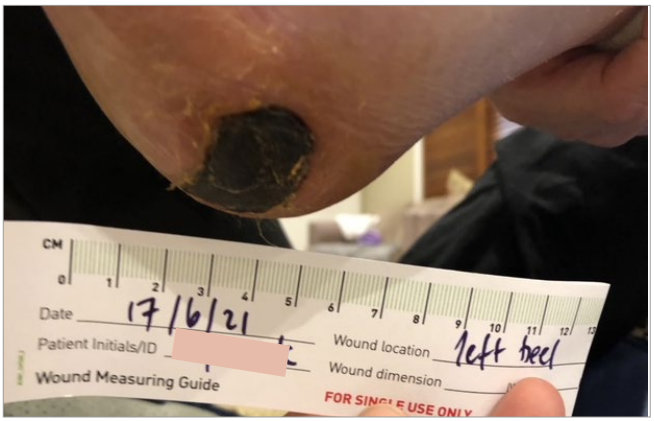

Figure 1. Initial assessment

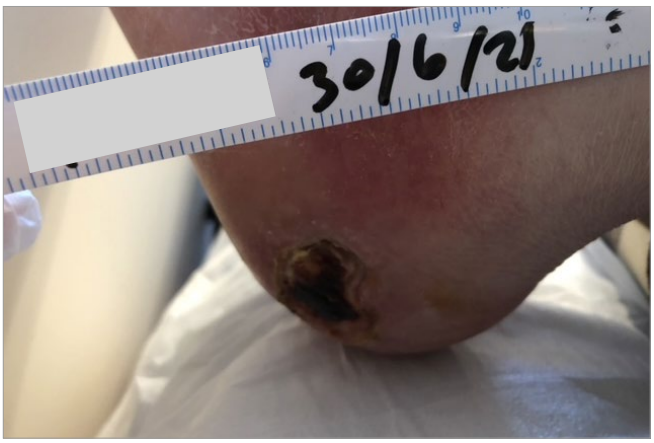

Figure 2. 2 weeks of treatment (Wound size: 4.53cm^3)

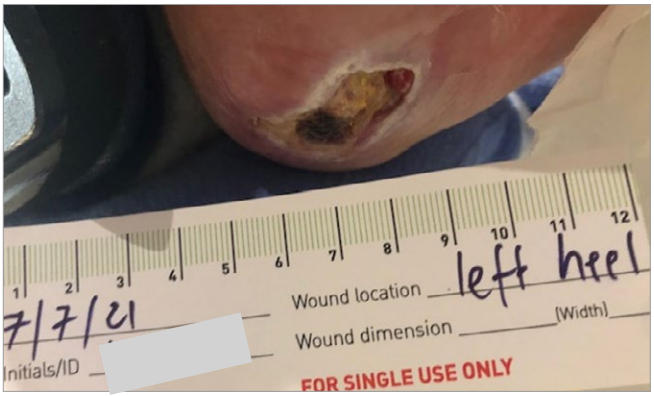

Figure 3. 3 weeks of treatment – Day 1 of Biatain Fiber (Wound size: 2.98cm^2)

At 3 weeks of treatment, the wound had reduced in size by 43% (2.98 cm^2). The wound bed comprised 85% slough/necrotic tissue and 15% granulation tissue. There was a moderate level of haemopurulent exudate and no signs of infection. The wound edge was intact, but slightly macerated. The area of contact dermatitis was beginning to resolve. The aim of treatment at this stage was to absorb the exudate and avoid further macerated tissue. Therefore, the moisture-donating dressing with gel was ceased. The wound was debrided with a sterile blade and mechanically debrided with the Alprep Pad. The wound was cleansed with an antimicrobial soak, and a barrier film was applied to the periwound area. Biatain Fiber was selected as the primary dressing to absorb the exudate and a secondary silicone foam dressing was applied **(Figure 3)**.

After 43 days of using Biatain Fiber as part of the treatment plan, the wound bed was 40% sloughy and 60% hyper-granulation tissue. The wound measured 0.99 cm^2 **(Figure 4)**. The wound edge was intact, and the area of contact dermatitis had resolved. Following over 2 months of treatment, the wound bed was 100% granulation tissue and there was a moderate level of haemoserous exudate **(Figure 5)**. After 5 months of treatment, the wound had fully epithelialised **(Figure 6)**. The dressing regimen was changed to Biatain Silicone in the final 2 weeks of treatment because the wound bed was shallow and had low levels of serous exudate. Biatain Silicone was preferred over other adhesive foam dressings because of the gentle removal and its long wear time of up to 7 days.

Conclusion

For this patient with an unstageable heel pressure ulcer, the wound healed completely after 5 months of treatment. The key aims of the treatment plan were thorough debridement of the devitalised, necrotic tissue and management of excess exudate to create a moist wound environment. The Alprep Pad was used for mechanical debridement and helped support optimal wound bed preparation. The dressing regimen that included Biatain Fiber as a primary dressing created a moist wound environment that supported wound healing. Biatain Fiber absorbed and managed exudate helping to reduce further maceration of the periwound skin and support epithelialisation of the wound bed. The Biatain Fiber conformed to the wound bed and was easy and atraumatic to remove at dressing change.

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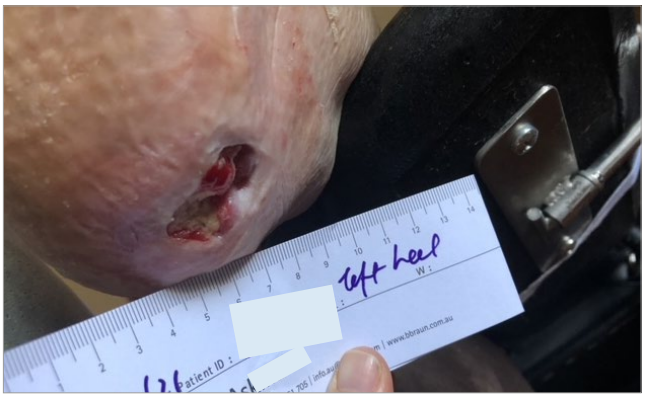

Figure 4. 43 days of treatment with Biatain Fiber (Wound size: 0.99cm^2)

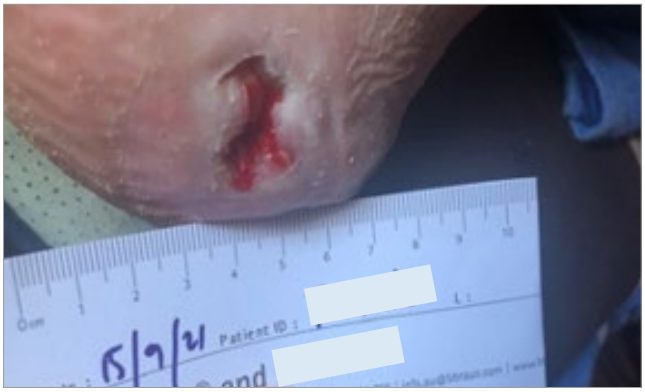

Figure 5. 70 days of treatment with Biatain Fiber (Wound size: 0.56cm^2)

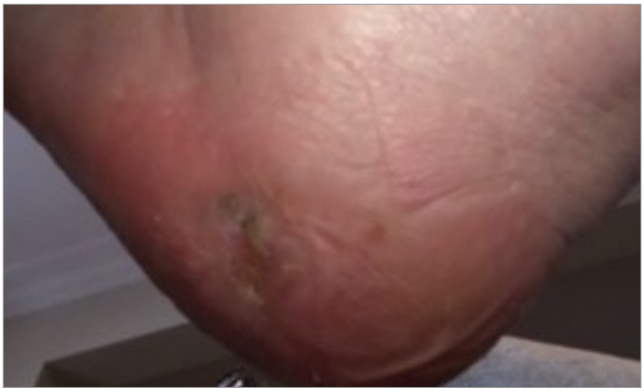

Figure 6. After approximately 5 months of treatment

CASE 9: Recurrent venous leg ulcer

Justo Rueda López, Nurse in Primary Health Center, CAP Terrassa Nord. Consorci Sanitari de Terrassa, Barcelona, Spain

A 92-year-old woman had long-term hypertension, anaemia, venous insufficiency and chronic renal failure and chronic heart failure. Because of her pathologies, she received treatment with diuretics, antihypertensive and anticoagulants. The patient had mild cognitive impairment and lived with her daughter and was moderately dependent for activities of daily living (Barthel Index=60; **Box 1**). The patient had a history of venous ulceration for the last 3 years.

The patient visited the Primary Health Center with a new ulcer on her left leg that had been present for 3 month and remained unhealed. The wound was treated with a range of different dressings, for example: collagenase with hydrogel, foams, silver foam dressings, alginates, alginates with silver, and hydrofiber dressings with silver, but the ulcer did not improve. In addition, several rounds of oral antibiotics were administered. The patient was not able to tolerate compression therapy.

Initial wound assessment by the wound care specialist

The wound measured 70 mm (length) x 50 mm (width) x 10 mm (depth) on the right lower extremity **(Figure 1)** and was very painful (8 out of 10; 0=no pain, 10=unbearable pain). The limb was oedematous, and the Ankle-Brachial Pressure Index was 1.03, which indicated there was no arterial disease component to the wound and it was safe to apply compression therapy. The Triangle of Wound Assessment was used to assess the wound (Dowsett et al, 2019) and select the management goals:

- Wound bed: The wound bed comprised 10% necrotic, 30% slough and 60% granulation tissue. There were high levels of thin consistency exudate
- Wound edge: Macerated, thickened, rolled edges
- Periwound skin: Macerated.

The key treatment goal was to manage the exudate and protect the skin from further maceration:

- Wound bed: remove non-viable tissue, manage exudate, protect granulation/epithelial tissue
- Wound edge: Manage exudate, remove non-viable tissue, protect granulation/epithelial tissue
- Periwound skin: Manage exudate and protect the skin.

At the patient level, the treatment goals were to control the wound pain, reduce caregiver overload and improve the management of resources for treatment (cost-effectiveness).

Treatment

Biatain Fiber was applied to the wound and the patient's pain was managed so she was able to tolerate compression with 2-layer compression bandaging. From the second dressing change, the level of exudate in the wound bed had considerably decreased.

Box 1. The Barthel Index

The Barthel Index is a rating scale for the measurement of activity limitations in patients with neuromuscular and musculoskeletal conditions in an inpatient rehabilitation setting. The Barthel is a 10-item ordinal scale that measures functional independence for personal care and mobility. Specifically, it measures self-care, sphincter management, transfers and locomotion (Mahoney et al, 1965).

Scores range from 0 to 100, and several authors have proposed guidelines for interpreting Barthel scores. Shah et al (1989) suggest that scores of 0-20 indicate "total" dependency, 21-60 indicate "severe" dependency, 61-90 indicate "moderate" dependency, and 91-99 indicates "slight" dependency.

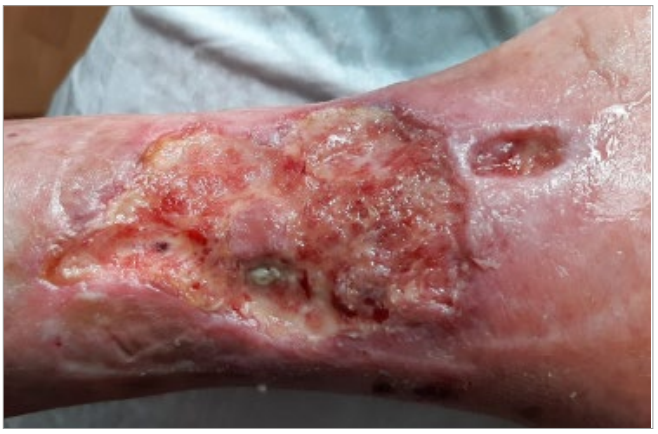

Figure 1. Initial assessment by the wound care specialist

At first, daily dressing changes were required, but after 2 weeks this was reduced to twice per week. At the 2-week assessment, there was more granulation tissue and the necrotic tissue had disappeared **(Figure 2)**. The vascularisation of the wound had improved and the level of oedema had reduced. The wound pain now measured 6 out of 10.

After 1 month of treatment with Biatain Fiber and 2-layer compression bandaging, dressing changes were reduced to once a week. The wound continued to improve, comprising 50% epithelialisation tissue after 2 months of treatment **(Figure 3)**.

In just under 4 months, the wound bed comprised 65% epithelialised tissue, exudate levels were low and the wound was progressing towards healing **(Figure 4)**. The wound edge was less macerated and the wound had become less painful (5 out of 10). Unfortunately, the patient died soon after from pneumonia unrelated to the wound.

Conclusion

Venous leg ulcers can be challenging to manage and slow to heal, and they require expertise, correct dressing selection and compression therapy.

The treatment plan that included Biatain Fiber and 2-layer compression bandage achieved the management goals: providing effective exudate management, decreasing the number of dressing changes required and improving the quality of life for the patient and caregiver.

The quality of the tissue in the wound bed improved over the treatment period, becoming more granulated and epithelialised. The wound edge and periwound skin became healthier to support the healing of the wound.

Although the wound did not heal completely before the patient died, the wound progressed very well in a short timeframe. The clinician was very satisfied with the result and the patient was more comfortable because fewer dressing changes were required and they experienced less wound pain.

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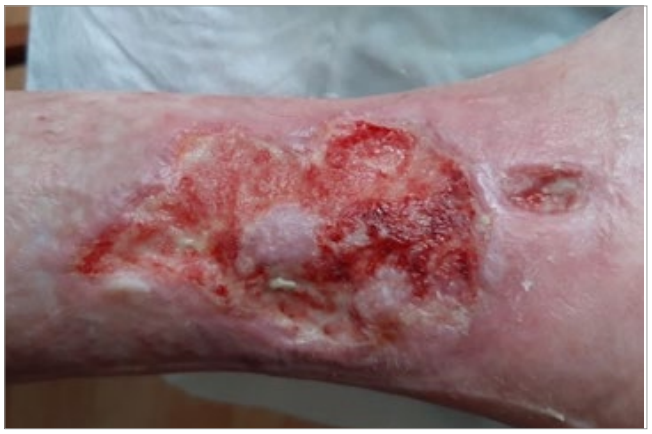

Figure 2. 2 weeks of treatment

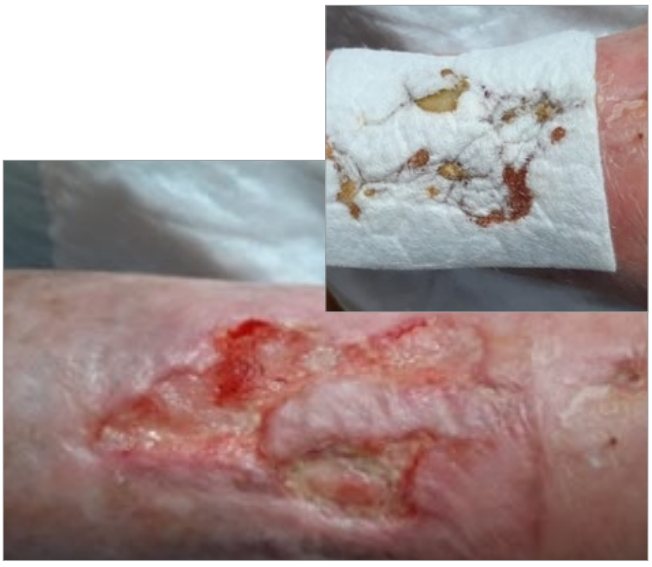

Figure 3. 2 month of treatment

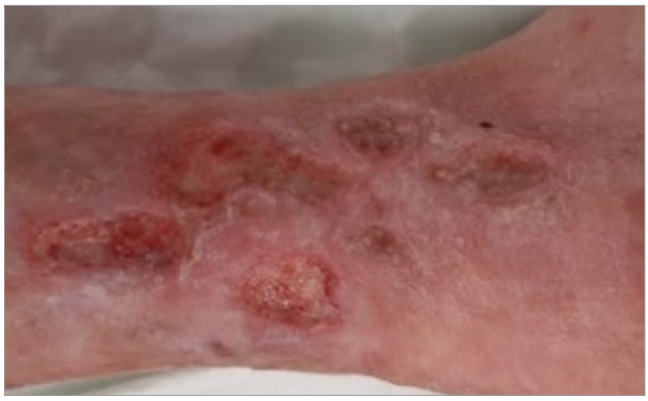

Figure 4. Under 4 months of treatment

CONCLUSION

In this case series, a range of challenging highly exuding, sloughy cavity wounds with undermining of different aetiologies were successfully managed with a treatment regimen that included Biatain Fiber. In all the cases, Biatain Fiber supported healing very well and most wounds healed completely over the treatment periods.

Biatain Fiber efficiently absorbed and retained high volumes of exudate away from the wound bed and periwound skin. Thereby, the risk of maceration of the periwound skin was minimised. It was noted in several cases that Biatain Fiber was also able to absorb and retain thick and viscous exudate and slough.

On contact with wound fluid, Biatain Fiber created a strong cohesive gel that conformed to the wound bed and there was no dressing shrinkage observed in any of the cases. In several cases, it was noted that Biatain Fiber maintained close contact with the wound bed, which prevented dead spaces or gaps forming between the dressing and the wound bed. In one case, it was observed that close contact was also maintained between the gelling fiber and the secondary conforming silicone foam dressing.

In eight of the cases, Biatain Fiber was either used with the secondary dressing Biatain Silicone with 3DFit Technology (seven cases) or Biatain Non-Adhesive with 3DFit Technology (one case). Biatain Fiber worked well in combination with these conforming secondary dressings. The gelling fibre, as well as the secondary dressings, have high absorption capacity and absorbed the exudate vertically, protecting wound edges from fluid leakage and maceration.

In all the cases, a positive wound healing trajectory was noted with Biatain Fiber and in several cases, the wound was dressed with only Biatain Silicone in the final stages of wound healing. No leakage of wound fluid was observed with Biatain Fiber and the dressing changes did not cause pain to the patients, which increased the confidence of treatment and wellbeing of the patients. In all cases, Biatain Fiber was easy to remove without causing trauma nor leaving any residue in the wound bed. In one case, management of malodour from the wound was noted, and, in two cases, it was noted that fewer dressing changes were needed, which also had a positive impact on the patient quality of life.

The conclusions from this case evaluation mirror observations from clinicians in Italy and Spain (Blasco et al, 2021; De Angelis et al, 2021) and results from a survey conducted among Spanish clinicians (Garcia Dominguez et al, 2021).

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De Angelis G et al (2021) *Clinical experience with a new gelling fiber dressing among clinicians in Italy.* EP104. Poster presented at: EWMA 2021

Garcia Dominguez J et al (2021) *High performance of a new gelling fiber dressing evaluated by users in Spain – results of an online survey.* EP035. Poster presented at: EWMA 2021

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