DEBRICHEM®

A Guide to Debriding Infected and Hard-to-Heal Wounds

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DEBRICHEM®
DEBX MEDICAL

Each year, the NHS manages an estimated 3.8 milion wounds. Of the £8.3 bilion total cost of wound management, £5.6 billion is spent on wounds that become hard to heal.[1] Delayed healing is often the result of bacterial colonisation, which can lead to biofilm formation (*Box 1*) and cause recurrent infections.[2] Bacteria and especially biofilms are harboured by non-viable (sloughy or necrotic) tissue in the wound bed.[2,3]

BOX 1. **BIOFILM**

Biofilms are complex communities of bacteria and fungi that clump together and adhere to the wound bed and edges. They form rapidly, becoming resistant to antiseptics and antibiotics. If disrupted, a biofilm will soon reform.[2,4] Biofilms are invisible to the naked eye but are thought to be present in all wounds, to some extent, as well as implicated in wounds becoming hard to heal and infected.[5]

FIGURE 1. **DEBRIDEMENT TYPES**

Surgical debridement
Excision in theatre with surgical tools

- ✓ Highly effective
- ✓ Very fast
- ✗ Requires expensive surgical training and hospital facilities
- ✗ Highly invasive, with need for anaesthesia and risk of complications

Sharp debridement
Excision with a blade, (scalpel, curette or scissors)

- ✓ Highly effective
- ✓ Very fast
- ✓ Available to non-surgeons outside hospital
- ✗ Requires specialist training
- ✗ Invasive, with risk of damage to healthy tissue

Ultrasonic debridement
Application of low-frequency wavelengths

- ✓ Reduces microbial bioburden
- ✓ Relatively painless
- ✓ Selective
- ✗ Requires specialist training and equipment
- ✗ High cost

Hydrosurgical debridement
Washout (lavage) with a high-pressure liquid

- ✓ Targetable
- ✓ Effective against biofilm
- ✗ Requires specialist training and equipment
- ✗ Potentially painful
- ✗ Invasive, with risk of damage to healthy tissue and increased risk of infection

Biological debridement
Ingestion by live, sterile fly larvae

- ✓ Rapid
- ✓ Requires minimal training
- ✗ High cost
- ✗ Potentially psychologically offputting for patients
- ✗ Unsuitable for hard dry necrotic tissue

Enzymatic debridement
Dissolution via biochemical enzymes

- ✓ Dissolves necrotic tissue
- ✓ Effective in a moist environment
- ✗ Relatively expensive
- ✗ Unsuitable for large or infected wounds
- ✗ Slow

Mechanical debridement
Abrasion with a cloth or pad

- ✓ Selective effect
- ✓ Low cost and requires minimal training
- ✗ Less effective than gold-standard options
- ✗ Potential for discomfort
- ✗ Unsuitable for eschar and thick fibrous slough

Autolytic debridement
Natural breakdown, encouraged by therapeutic dressings

- ✓ Minimally invasive and rarely painful
- ✓ Widely available and requires minimal training
- ✗ Time-consuming
- ✗ Limited evidence of impact on biofilm

WOUND BED PREPARATION

The key to restarting the healing process in stalled wounds is regular removal of debris, biofilm and non-viable tissue through cleansing and debridement, known as wound bed preparation. Wound bed preparation should form one part of a holistic programme of care, alongside treating the wound aetiology, managing comorbidities and addressing psychosocial factors.[6] Debridement aims to expose healthy wound tissue by actively removing biofilm, foreign matter and non-viable tissue. Clinicians can select from a wide range of methods for achieving this, with varying clinical effectiveness, cost and accessibility.[2,7] The gold-standard methods, surgical and sharp debridement, require specialist training and can be daunting for patients and professionals. Until recently, all the established options have had to be performed regularly, and none have managed to combine a rapid and effective debridement action with broad accessibility to clinicians in non-hospital settings (*Figure 1*).

TOPICAL DESICCATING AGENT

The topical desiccating agent DEBRICHEM® (DEBx Medical BV, Amsterdam, Netherlands) is a pioneering debridement option indicated for debriding infected non-surgical wounds, including diabetic foot ulcers, venous leg ulcers and pressure ulcers.[8]

In case studies, DEBRICHEM® has shown to reduce pain, malodour and exudate levels, with fewer infections requiring antibiotics and improved quality of life. This suggests that bacteria and biofilm were removed from the wounds and prevented from reforming.[8-12] The product is also easy to use and accessible to a wide variety of clinicians in many settings, without need for specialist training or facilities. Moreover, it is quick to apply and usually only requires a single application, helping make it a cost-effective option (*Box 2*).[11-13]

BOX 2. ADVANTAGES OF DEBRICHEM®

- Accessibility to a variety of clinicians
- No need for specialist training
- Suitability for use in many settings, without need for specialist facilities
- Ease of use
- Short application time (60 seconds)
- Rapid results
- Single application (in most cases)
- Cost-efficacy

BOX 3. DEBRICHEM® CONTRAINDICATIONS

- Ischaemic wounds
- Neoplastic wounds
- Burns
- Exposed tendon or bone
- Underlying abscess or fasciitis that requires incision/excision and drainage
- Unexplored tunnelling or undermining (due to risk to underlying organs)
- Underlying osteomyelitis
- Allergy or intolerance to ingredients
- Implants and vascular grafts

BOX 4. CAUTIONS FOR DEBRICHEM®

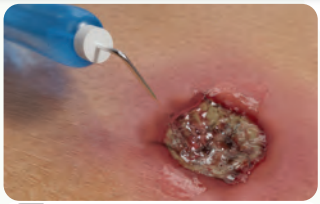
- Exposed bones
- Eschar (unless removed)
- Near the face
- Near the anus, vagina, penis or testicles
- Ongoing cancer treatment

HOW IT WORKS

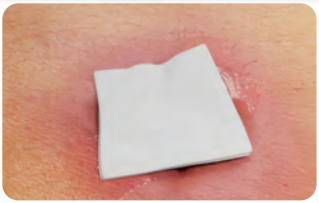
DEBRICHEM® is a compound of methanesulfonic acid, dimethylsulfoxide and amorphous silica with a selective desiccating action. On contact with the wound bed and periwound, the gel rapidly draws moisture out of biological materials with a high water content. This means that a 60-second application will effectively desiccate infected and non-viable tissue, which tend to be relatively wet, while leaving drier healthy tissues unaffected.[13,14] Immediately after application, the wound is

FIGURE 2. HOW TO APPLY DEBRICHEM®

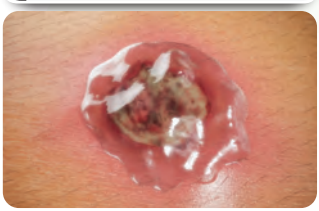
1. Put on gloves and goggles



2. Uncover and cleanse the wound and periwound area



3. Dry the wound with dry gauze

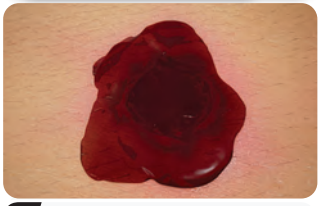


4. Apply topical analgesia to wound and periwound (when applicable) and remove after it has taken effect

5. Shake the vial vigorously for 30 seconds before opening

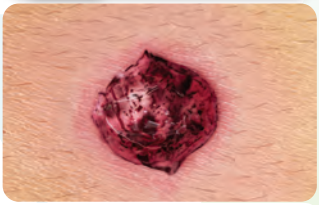
6. Pour DEBRICHEM® onto wound, covering 1 cm of periwound skin

7. Spread DEBRICHEM® evenly on wound and periwound, applying light pressure with a glove

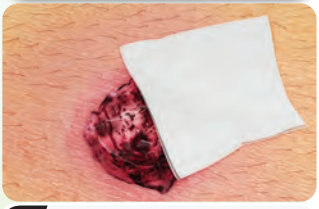


8. Leave DEBRICHEM® in situ for 60 seconds from first application

9. Rinse the wound with plenty of free-flowing saline or sterile water



10. After application, expect a darker, drier wound



11. Remove any remaining loose debris with dry gauze

12. Apply primary and secondary dressings following protocol

rinsed with plenty of sterile water or saline, and the wound bed will appear much drier and darker in colour, due to the carbonisation effect caused by the reaction. The remaining desiccated material will gradually separate from the underlying wound bed and eventually lift off to reveal healthy tissue below.[8,10,12]

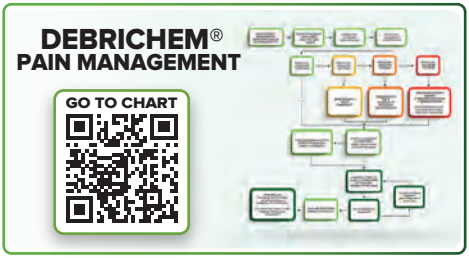
During this time, patients should receive holistic standard of care according to best-practice guidelines.

USE

Preparation: Suitable patients (*Boxes 3 and 4*) should be informed of the potential risks and benefits of DEBRICHEM.® Any dry, crusty and thick necrotic tissue (eschar) should be removed beforehand. First, the clinician should put on personal protective equipment, including glasses. Next, the wound bed and surrounding skin should be cleansed. The clinician should then dry the wound with gauze. Topical analgesia can be applied, if required; it should be removed after it has taken effect and prior to DEBRICHEM® application (*Box 5*).

Application: DEBRICHEM® must be applied according to the instructions for use. This is essential to effectively trigger its mode of action, minimise discomfort and ensure patient and clinician safety (*Figure 2*).

Follow-up: The patient should continue to receive standard of care, including wound bed preparation and promotion of a moist healing environment, according to local protocol.[10] This should achieve optimal benefits from DEBRICHEM® and ensure that biofilm and bioburden remain well controlled. To measure the impact of the gel, the wound tissue types, clinical signs of overt or covert infection and other markers of healing should be monitored over the coming weeks. If sloughy tissue and signs of infection return, a further DEBRICHEM® application can be considered.



BOX 5 PAIN MANAGEMENT WHEN USING DEBRICHEM®

DEBRICHEM® is safe for patients and clinicians to use, but its acidic action can cause pain during and after application.[8,10] This pain is brief and should markedly decline after the gel has been washed off, gradually dissipating over the next 5-60 minutes. However, patients should be informed of and prepared for potential pain, and their concerns heard and addressed.

Unless the wound is insensate, DEBRICHEM® application should be preceded by use of an appropriate anaesthetic, such as topical lidocaine and prilocaine.[15,16] Pain management should follow relevant policy, local formulary and the product's instructions for use. Topical analgesic should be removed prior to DEBRICHEM® application.

Just before full DEBRICHEM® application, it is optional to test the anaesthetic effect by applying two drops of the gel and leaving for 10 seconds before rinsing off with saline. If the test is tolerable for the patient, application can continue. If the test is intolerable, there may be a need to escalate pain management with subcutaneous lidocaine injection, peripheral nerve block or systemic narcotics, according to local policy, practitioner level and qualifications.

EVALUATION

A recent *Journal of Wound Care* supplement included an observational evaluation of the effectiveness of DEBRICHEM® in debriding non-viable tissue and reducing signs of covert and overt infection in hard-to-heal wounds.[17] It also assessed the safety profile of DEBRICHEM,® including pain during application, and established patient and clinician satisfaction with the gel. Following treatment, patients were treated with a variety of primary dressings, according to the local formulary and clinical need.

The 21 patients had a mean age of 72, while 76% had a venous leg ulcer and 24% a non-surgical post-traumatic wound (mean duration 22 months).

- At week 4, there was increased mean percentage of granulation tissue and reductions in devitalised tissue, exudate, wound size and general wound-related pain
- No patients needed antibiotics in the 4 weeks following application
- 81% of patients had pre-application topical anaesthesia
- Mean pain during application was 4/10, which is comparable to levels of pain caused by sharp debridement[15]
- 71% of patients felt that DEBRICHEM® was significantly or slightly better then previous treatment.

Three of the patients treated as part of this evaluation are presented in more detail in *Cases 1–3*.

CONCLUSION

This guide has introduced DEBRICHEM® as a unique solution to wound care. It is designed to lock onto water molecules within damaged tissue and/or infected tissue, effectively drying them out. This dehydration process can result in the removal of devitalised tissue and biofilm in a single step, making this a swift and efficient debridement option. By rapidly facilitating a cleaner wound environment for faster recovery, it offers a breakthrough for those with hard-to-heal wounds.

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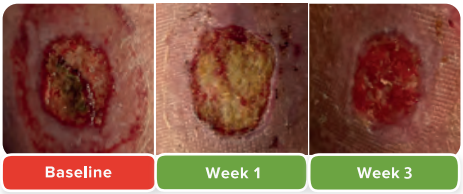
CASE STUDIES

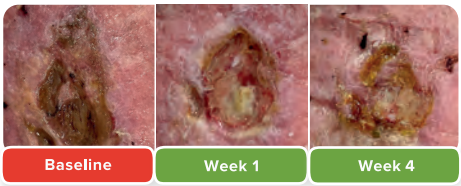
Case 1. 84-year-old man with a hard-to-heal venous leg ulcer

Rationale: No progress for 4 months and sloughy tissue suggesting a high bioburden. Patient also had diabetes.
Pain at application: No analgesia given due to absence of sensation in neuropathic wound.
Current treatment: Reduced compression (carefully monitored with access to vascular services). Silver Hydrofiber absorbent dressing changed to Hydrofiber absorbent dressing at week 4.
Results: From a baseline of 100% slough to 40% slough and 60% granulation tissue at week 1 and 5% slough and 95% granulation at week 3; wound size decreased from 18.8 cm² to 13.5cm² at weeks 1 and 3; exudate level went from medium to low over the first week.
Conclusion: There was a notable reduction in slough, wound size and exudate.



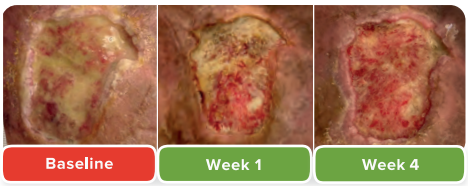
Case 2. 90-year-old man with a hard-to-heal post-traumatic leg wound

Rationale: No progress for at least 3 weeks and likely bacterial colonisation.
Pain at application: Topical anaesthesia; 5/10 pain on a visual analogue scale (VAS) at DEBRICHEM® application, compared with 4/10 during prior wound cleansing. Patient had no general wound pain.
Current treatment: Standard of care Iodine dressing changed to Hydrofiber absorbent dressing at week 4.
Results: From 100% slough at baseline and week 1 to 100% granulation by week 4. Wound area decreased from 5.5 cm² to 5.0 cm² at week 1 and 3.0 cm² at week 4. From baseline to week 1, exudate level went from medium to low and wound edges changed colour from red to pink. Patient and clinician felt DEBRICHEM® was significantly better than previous treatments.
Conclusion: There was a total replacement of slough with granulation tissue, as well as reductions in wound size and exudate, with very high user satisfaction.



Case 3. 60-year-old man with a hard-to-heal venous leg ulcer

Rationale: No progress for 18 months and obesity (BMI of 43).
Pain at application: Topical analgesia; 7/10 pain on a VAS compared with 3/10 on prior cleansing.
Current treatment: Compression therapy. Silver Hydrofiber absorbent dressing used from baseline to week 2 and a wound contact layer thereafter.
Results: Ratio of slough to granulation tissue on wound bed changed from a baseline 80:20% to 20:80% at week 1. There was an increase in slough in week 3 (90:10%), but this reduced by week 4 (60:40%). Wound size decreased from 7.8 cm² to 7.0 cm² at week 1 and 5.0 cm² at week 4. General wound pain decreased from 3/10 to 1/10 at week 1 and 0/10 at week 4. Exudate was medium at week 1 and low at week 4.
Conclusion: There was a reduction in slough, wound size, exudate and pain.



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DEBRICHEM®

1

REMOVES BIOFILM & INFECTION

DEBRICHEM® removes biofilm and infection in a 60-second application triggering **fast granulation and promoting natural healing**.

2

SINGLE APPLICATION

DEBRICHEM is certified as a **single use medical device** (IIb). Clinical **results show** that after a single DEBRICHEM application **>90% of wounds start healing**.

3

EASY AND FAST TO USE

Due to its fast action and applicability **outside the surgery room**, DEBRICHEM® can easily be integrated within standard wound care procedures.

4

SAFE ON INTACT SKIN

DEBRICHEM® works by withdrawing water from the wound bed. Due to the low water content of the outer layer of the epidermis, the surrounding **healthy skin is not affected**.

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