People.Health.Care.

Debrisoft®

Clinically tested. Proven in practice.

Summary of selected clinical research
and case studies.

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Contents

About L&R USA INC.

L&R USA is an affiliate of our global parent company Lohmann & Rauscher, which has a 160-year history as a well-recognized and respected global manufacturer and supplier of compression therapy solutions and innovative wound care products. L&R USA provides you with effective compression solutions, including bandaging and the Solaris Collection of garments and wraps, to help you treat your lymphedema and edema patients.

When you use L&R USA products, you know your patients are in good hands with trusted brands like TributeNight™, ReadyWrap™, Rosidal® K, and Debrisoft®.

L&R USA — passionate about delivering innovative wound care and compression solutions.

Debridement
The first step in wound treatment.

Necrosis, slough, biofilm and debris trap the wound in the inflammatory phase of wound healing. Effective debridement helps to remove these inflammatory stimulants and to reduce the associated physical and biochemical mediators, matrix metallo-proteinases (MMPs) and cytokines that degrade the wound and prevent it from progressing to the proliferative phase of wound healing.

Devitalized tissue and hyperkeratosis can interfere with the accurate assessment of the wound and surrounding skin, delaying appropriate follow-on treatment or reducing the effectiveness of topical preparations. Debridement helps expose the wound bed for accurate wound assessment and allows topical medications to reach the skin to deliver therapeutic benefits. Numerous studies have shown that debridement enhances wound healing.[1,2,3]

The main debridement challenges are:

- Pain for the patient
- Trauma to healthy and newly formed tissue
- Cost, time, number of procedures
- Training of healthcare provider

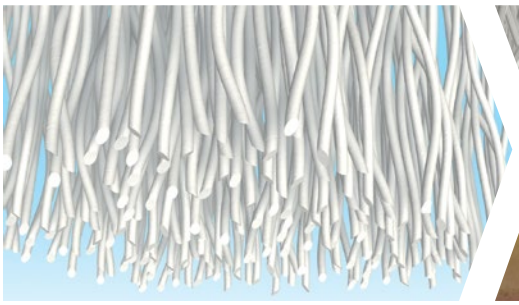
Debrisoft® solves these debridement challenges.

What is Debrisoft®?

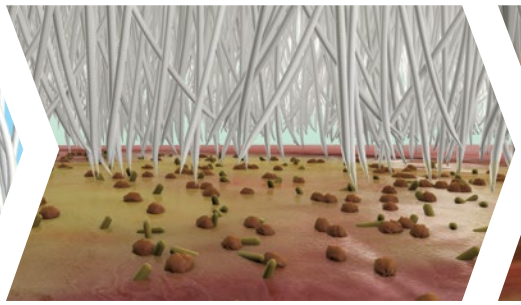
Debrisoft® is a unique, clinically proven, safe, and time saving mechanical debridement product that cleans chronic, traumatic, and superficial wounds, peri-wound, and hyperkeratotic skin.

Additionally, with the Debrisoft Lolly, deep, undermining or tunneling wounds can be debrided.

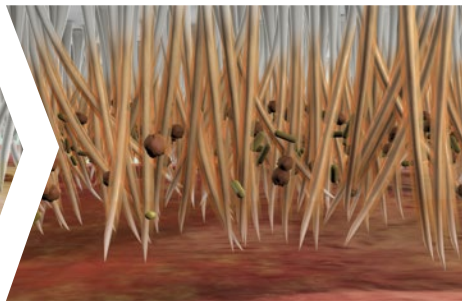
Mode of action



The fiber composite material of Debrisoft consists of 100% **knitted monofilament polyester fibers**.



Beveled fiber tips loosens debris effectively while **protecting newly formed granulation tissue** and epithelial cells.



Fiber composite **lifts, binds, and removes** slough and debris, including biofilm.

Clinical Research
Highlighting effectiveness and benefits.

Effectiveness Evaluation

National Institute for Health and Care Excellence

2014

NICE (The National Institute for Health and Care Excellence which decides what drugs and treatments are available in the UK) has released guidance recommending the use of Debrisoft to improve the treatment of acute and chronic wounds.

The NICE guidance, released at the end of March 2014, supports the case that Lohmann & Rauscher's Debrisoft provides both multiple patient health benefits as well as significant cost savings for the NHS. NICE's evaluation of Debrisoft, which is used by nurses to manage acute and chronic patient wounds, found that the monofilament debridement pad:

- Is more effective at debridement than the common practice of using hydrogel or other autolytic dressings and irrigating wounds with saline or gentle cleansing with gauze.
- Gives quicker debridement, allowing earlier visibility of the wound bed and therefore better management of the wound
- May reduce pain associated with debridement
- Enables faster treatment (on average, two to four minutes per wound)
- Results in less frequent and fewer overall care visits
- Reduces risk of trauma to healthy tissue and reduces bleeding
- Reduces overall number of wound dressings used
- Contributes to overall cost savings compared with current practices

Conclusion

The conclusion of the NICE guidance committee was that by using Debrisoft on appropriate wounds, these wounds would be 'fully debrided more quickly, with fewer nurse visits needed compared with other debridement methods. In addition, the Debrisoft pad is convenient and easy to use, and is well tolerated by patients.'

Cost savings to the NHS

The NICE guidance cost calculator estimates that using Debrisoft within the community can save the NHS up to £484 per patient for complete debridement of a wound, compared to current standard practice. NICE estimate that using Debrisoft could save the NHS as much as £15 million annually

*National Institute for Health and Care Excellence (2014), "The Debrisoft® monofilament debridement pad for use in acute or chronic wounds", NICE medical technology guidance MTG17, accessed: https://www.nice.org.uk/Guidance/MTG17

Clinical efficacy of a new monofilament fiber-containing wound debridement product

Bahr S.; **N. Mustafi**, RN; **P. Hättig**, RN; **A. Piatkowski**, Plastic Surgeon; **G. Mosti**, MD, Angiologist; **K. Reimann**, RN; **M. Abel**, PhD, Pharmacist, Head of Medical and Regulatory Affairs; **V. Dini**, MD, Dermatologist; **J. Restelli**, MD; **Z. Babadagi-Hardt**, RN; **F. Abbritti**, MD, Vascular Surgeon; **T. Eberlein**, Dermatologist; **T. Wild**, MD, Surgeon; **K. Bandl**, RN; **M. Schmitz**, Medical and Regulatory Affairs Manager

Journal of Wound Care vol 20, no 5, May 2010

Summary of findings

- 57 patient, multi-centred, observational study with 20 managed by physicians and 37 by nurses.
- Debridement was effective in 93.4% with an average time of 2.51 minutes, compared with 9 minutes for surgical debridement. No adverse incidents occurred.
- Debridement was achieved without damaging healthy, fragile skin.
- 45% of patients experienced no pain, 55% had slight discomfort for a short duration (average 2 minutes) post procedure. No analgesia was required.
- Debrisoft can be used safely even by non-specialists, and is shown to be time saving.

The wound debrider: A new monofilament fiber technology

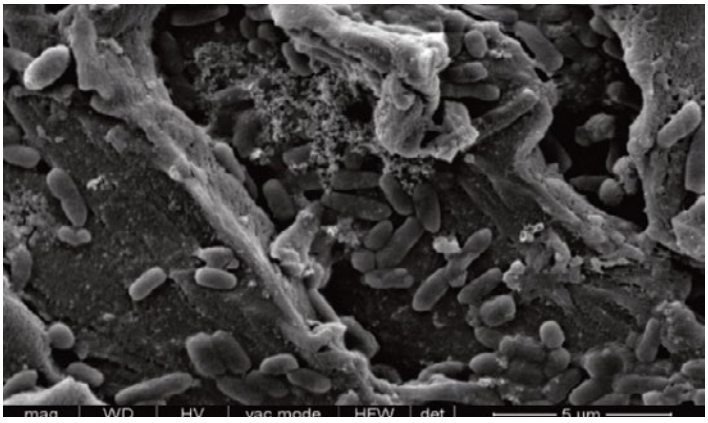
Haemmerle, G.; **Duelli, H.**; **Abel, M.**; **Strohal, R.**

British Journal of Nursing, 2011 (Tissue Viability Supplement), Vol 20, No 6

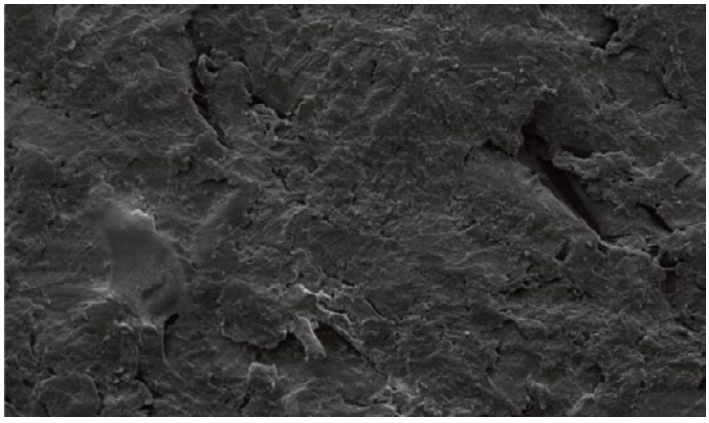
A pilot observational study to explore the safety and effectiveness on slough, necrosis and hyperkeratosis in 11 wounds.

- The moistened Debrisoft was used for 2–4 minutes on each patient removing almost all debris, leaving healthy tissue intact, even small islands of epithelium.
- Microscopic analysis showed debris tightly packed into the monofilament fibers.
- The results of before and after images were blindly analysed by a surgeon who categorised all except one wound as not requiring surgical debridement, concluding that the new technology is fast, easy, highly efficient and well tolerated.

One wound was described by the surgeon as "debridement equal to surgical debridement"..."This questions the need for other wound bed preparation".



Untreated



Treated with novel treatment method

**A novel treatment method for the removal of biofilm material: Westgate, S J and Cutting, K F. Daresbury Innovation Science Campus.

Effect of Debrisoft® Debridement of Pseudomonas Aeruginosa Mature Biofilm on Pig Skin Explants

G S Schultz, PhD, UF Research Foundation, Professor Obstetrics/Gynecology & Biochemistry, Institute for Wound Research, University of Florida

Introduction & Aim

The Debrisoft® monofilament debridement pad, marketed by Lohmann & Rauscher, is used to debride skin and wounds. The laboratory of Professor Gregory S. Schultz, PhD was contracted to perform an initial study to test the efficacy of the pad to remove biofilms formed on pig skin explants by Pseudomonas aeruginosa (PA01), a highly clinically-relevant pathogen which forms biofilms that are highly tolerant to antibiotics (Figure 1), antiseptics, and disinfectants. The efficacy was measured as a reduction of total planktonic bacteria and biofilm bacteria using the well-established ex-vivo porcine skin wound biofilm model.

Materials & Methods

Preparation of Sterile Pig Skin Explants w/ Deep Partial Thickness Wounds

Large sheets of fresh pig skin (approximately 30 cm by 30 cm) were obtained from an USDA approved commercial meat processing lab. The skin was thoroughly cleaned, and the hair closely trimmed using an electric clipper and safety razor. The subcutaneous fat layer was trimmed away so that only approximately 1-2 mm thickness remained. Next, a sheet of cleaned porcine skin was marked on the dorsal surface of the skin, and a single, partial thickness excision wound measuring 50 mm wide, 0.8 mm deep, and 100 mm in length was made in the center of each outlined explant using an electric Padgett® Dermatome. The explants were then cut from the large sheet of pig skin using heavy scissors creating rectangle explants measuring approximately 18 cm X 14 cm. The explants were sterilized by first submerging the explants in PBS containing 0.6% hypochlorous acid and 0.5% Tween 80 for 5 minutes they were transferred to a chlorine gas chamber for 45 minutes followed by submerging the explants again in phosphate buffered saline (PBS) containing 0.6% hypochlorous acid and 0.5% Tween 80 for 5 minutes. The sterile explants were rinsed twice in sterile PBS and transferred into 245 mm X 245 mm x 25 mm (500 cm^2) sterile bioassay dishes (Nunc 240835) containing sterile 0.5% soft tryptic soy agar containing antimycotic (Amphotericin B 2.5 ug/ml) and antibiotic (Gentamicin 50 ug/ml) to limit biofilm growth to the explants and inhibit fungal growth.

Growth of Mature Pseudomonas aeruginosa Biofilm on Sterile Pig Skin Explants

The wound area on each sterile pig skin explant was inoculated with 100 µl of planktonic culture containing approximately 107 – 108 colony forming units per milliliter (CFU/ml) of P. aeruginosa bacteria, strain PAO1. The suspension culture of P. aeruginosa planktonic bacteria were in early log phase growth (0.2 - 0.6 OD640nm) and were serially diluted in PBS (4.5 ml) and plated in triplicate (0.1 ml) onto tryptic soy agar (TSA) to determine starting CFU/ml of planktonic culture. The P. aeruginosa inoculated explants will be incubated for 3 days at 37°C in an atmosphere of 5 % CO2 in air saturated with water vapor. The explants were transferred daily to fresh sterile 0.5% soft TSA supplemented with antibiotic and antimycotic. After three days of growth on TSA soft agar, the explants with the mature biofilm were rinsed with sterile PBS then transferred into 245 mm X 245 mm x 18 mm sterile culture dishes (BD Falcon 351040) with a base of TSA supplemented with antibiotic and antimycotic. Excess PBS was carefully aspirated off of the explants.

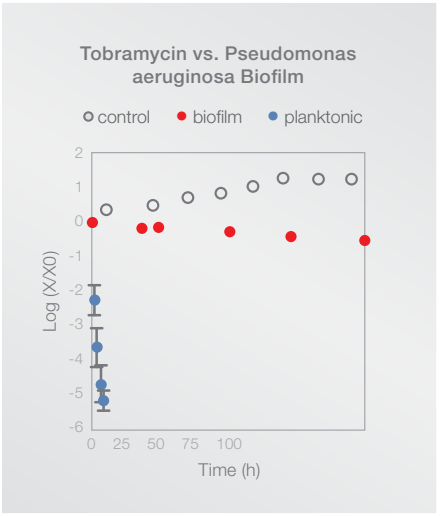


Figure 1 Tobramycin rapidly kills planktonic Pseudomonas aeruginosa (●) very effectively, but is not effective against biofilm (●). Walters et al, Antimicrob Agents Chemother 47:317, 2003

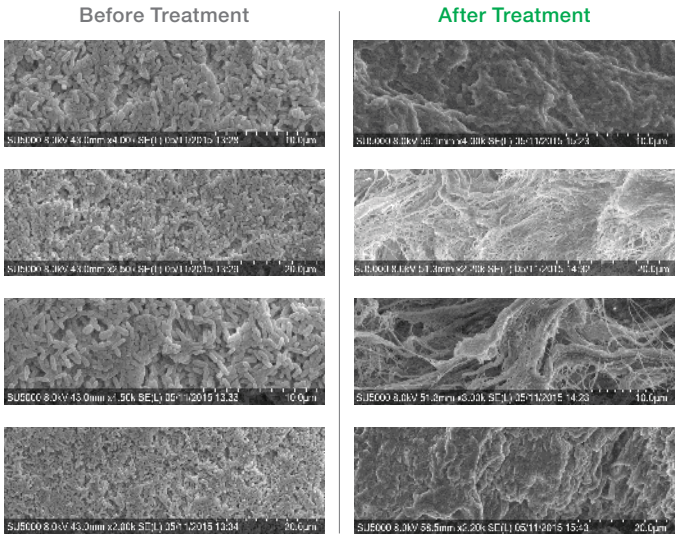


Figure 2 Electron micrographs of pig explants taken before and immediately after debridement with Debrisoft® pads.

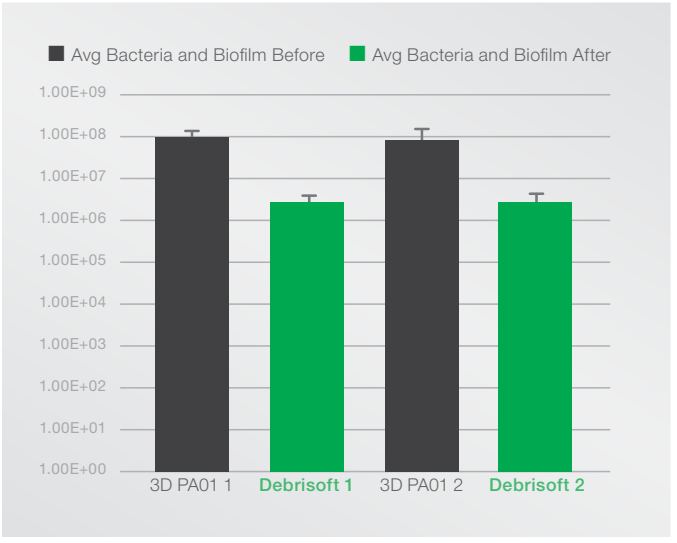


Figure 3 Average amounts of Total Bacteria and Biofilm present before and after debridement with Debrisoft® pads.

Debridement of Biofilms on Pig Skin Biofilm Explants

Pig skin explants with mature PA biofilms were placed in a laminar flow hood and a Debrisoft® pad (4x4 cm) was removed from the packaging and hydrated with 20 ml of sterile saline. The pig skin explant was secured to a large piece of sterile cardboard with large sterile paper clamps and placed on the sterile surface of the laminar flow hood. A Debrisoft® pad was held in one hand and pressed firmly to the surface of the framed pig skin explant and moved laterally across the surface of the pig skin explant approximately 4 times using the motion and pressure that would be typical for debridement of a patient's wound bed. In some experiments, a second new Debrisoft® pad was hydrated and the debridement process was repeated.

Measurement of CFUs of Total and Biofilm-Specific Bacteria Present on Pig Skin Biofilm Explants

Before treatment and immediately after treatment, six biopsies were taken aseptically from the wound area of the pig skin explant on an explant. Total bacterial levels were measured by ultrasonically dispersing the planktonic and biofilm bacteria as described for measurement of biofilm bacteria after antibiotic treatment. For biofilm-specific measurements, the biopsies were submerged in 200 µg/ml gentamicin (100 x MIC) for 24 hours to kill all planktonic bacteria, but not kill bacteria protected in a mature biofilm community ("Biofilm"). Biopsies were then transferred to separate tubes containing 5 ml of sterile PBS (or TBS if expect < 102 CFU/ml) containing a small amount of sodium thiosulfate to neutralize any remaining hypochlorous acid and sonicated 5 times in a water bath for 1.5 minutes each with a 1 minute breaks/pauses between the five sonication cycles. The bacterial suspension was serially diluted and plated in triplicate onto TSA plates to measure the number of colony forming units of total or biofilm bacteria (depending on submersion or not) after 24 hours of culture at 37°C. Additional biopsies were taken and fixed with glutaraldehyde and processed for scanning electron microscopy (SEM). Inoculated agar plates were cultured for 24 hours at 37°C in a humidified incubator and the number of colonies were counted. The CFUs per ml were calculated and average CFUs were calculated for each test condition. Statistical assessment of differences were determined using ANOVA of log-transformed data. Average CFUs per ml were calculated for each test condition.

Results

The explant model presented with approximately 107 total CFU of PA01, with approximately 106 CFU present in protective biofilm (Figure 3).

Conclusion

Overall, Debrisoft® is a very effective debridement technique to reduce total bacterial bioburden as well as the biofilm component of the total bioburden; Debrisoft significantly reduced levels of biofilm bacteria by ~3 logs from ~6 log total CFUs. There was no significant difference in the levels of reduction of total and biofilm CFUs between the debridement performed by the two investigators (Dot Weir, WOCN, and Qingping Yang, MS laboratory technician). Scanning EM examination will be performed and reported at a later date. ■

3 day PA01	Total Bacteria Before	Total Bacteria After	% Reduction
Debrisoft1	1.06E+06	5.79E+04	94.54%
Debrisoft2	1.81E+06	2.64E+04	98.54%
3 day PA01	**Biofilm Before**	**Biofilm After**	**% Reduction**
Debrisoft1	5.35E+04	3.41E+03	93.63%
Debrisoft2	1.75E+05	1.09E+03	99.38%

Figure 4 Percent reduction in Total Bacteria and percent reduction in Biofilm after debridement with Debrisoft® pads.

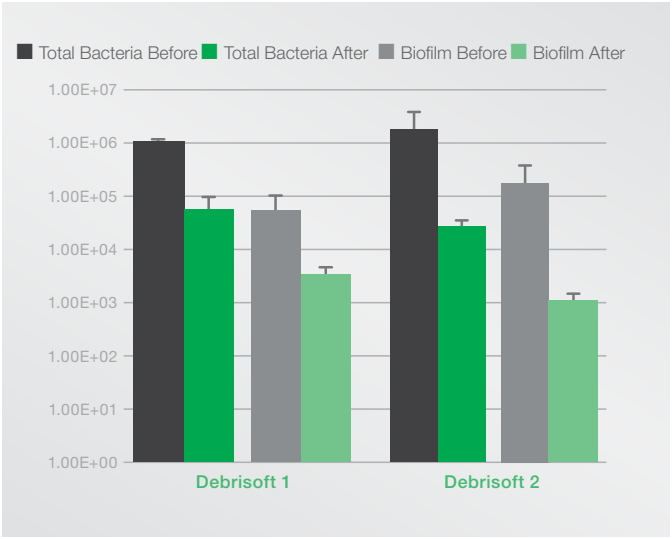


Figure 5 Amount of Total Bacteria and Biofilm before and after debridement with Debrisoft® pads.

Explants cultured over 7 days	Total Bacteria Before	Total Bacteria After	% Reduction
Debrisoft (D.Weir)	1.88E+07	2.64E+04	99.86%
Debrisoft (Q.Yang)	3.55E+04	2.41E+02	99.32%
Explants cultured over 7 days	**Biofilm Before**	**Biofilm After**	**% Reduction**
Debrisoft (D.Weir)	9.22E+02	1.44E+01	98.44%
Debrisoft (Q.Yang)	1.02E+02	1.33E+01	86.96%

Figure 6 Percent reduction in Total Bacteria and percent reduction in Biofilm after debridement with Debrisoft® pads.

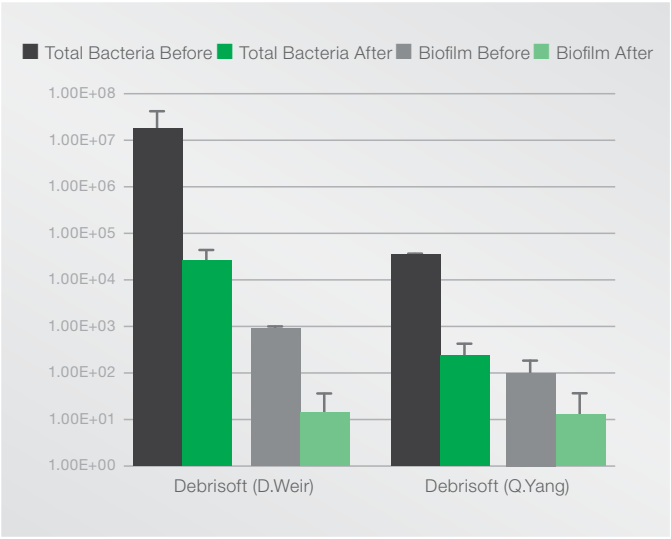


Figure 7 Amount of Total Bacteria and Biofilm before and after debridement with Debrisoft® pads.

1315

Effectiveness of monofilament pad* for debridement and wound healing

Kevin Woo, PhD, RN, FAPWCA, Queen's University, Kingston, Canada
Brandon Kober, BSc, Queen's University, Kingston, Canada

SAWC Spring, San Diego, USA, 2017

Introduction

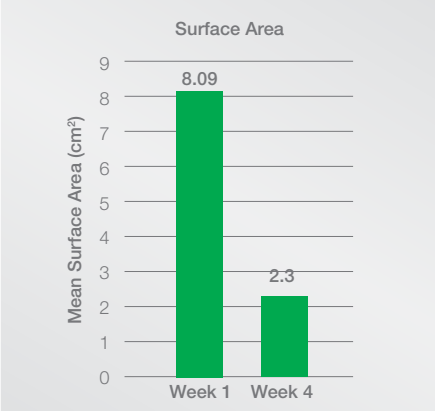
Chronic wounds such as pressure injury or diabetic foot ulcers often do not follow the predictable sequence of healing followed by acute wounds (1). Debridement is a crucial component to prepare a clean wound bed and promote healing. The term debridement was initially introduced in the 18th century by French surgeons referring to the practice of making incisions into the skin and deep fascia to release pressure from localized swelling following war injuries (2). Debridement in modern wound care involves various modalities to remove devitalized tissue, hyperkeratotic epidermis, foreign debris, cellular burden, bacteria sequestrum, and other undesirable material in the wound bed.

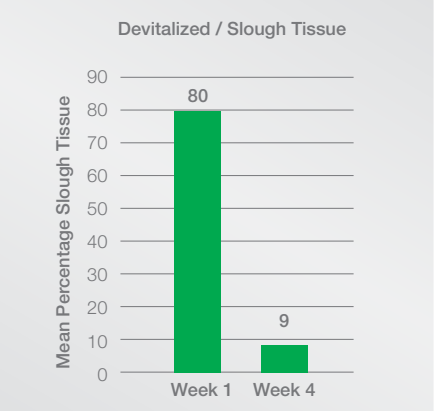
In general, necrotic tissues have been described in the form of eschar and slough. Although eschar is often depicted as dark, desiccated, hard, and leathery tissue, it could also appear wet, soft, and spongy (3, 4). Slough, on the other hand, tends to be stringy, mucinous, and slimy in consistency. Build up of these devitalized materials, that consists mainly of denatured protein, activates the immune system contributing to an inflammatory response. Dead tissue also provides an ideal and fertile medium for the bacterial to proliferate.

Overall, the potential benefits of debridement may include:

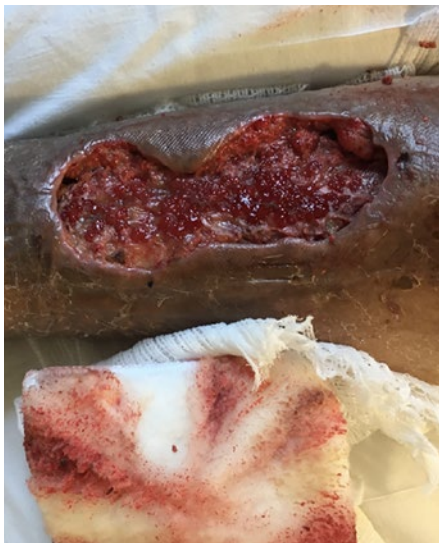
- Reduction of bacterial burden and risk of infection
- Reduction of pain from excessive inflammation
- Removal of foreign materials and denatured protein that perpetuate an excessive inflammatory response
- Removal of senescent cells that lack normal cellular functions
- Evacuation and drainage of an abscess
- Elimination of the source of odour
- Determination of wound depth and tissue types
- Restoration of a healthy wound base and edges for granulation

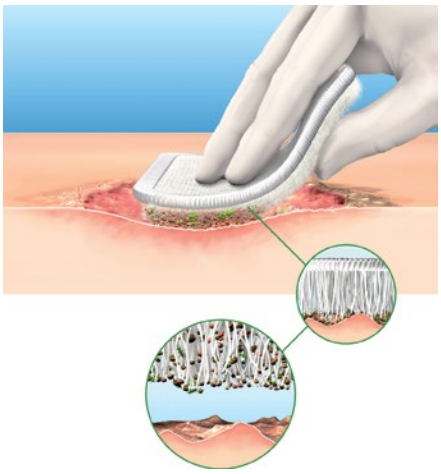
While sharp surgical debridement is considered the most expeditious way to remove unwanted tissue, cells, and bacterial burden, pain, trauma, and excessive bleeding is a major





Patient ID	Size (week 1)	Size (week 4)	Percentage of slough / devitalized tissue (baseline)	Percentage of slough / devitalized tissue (week 4)	Exudate	Pain (before and after)
1	1 x 1.1	1 x 0.5	100	20	Reduced	5-5
2	5.2 x 3	3.3 x 1.2	90	10	Reduced	4-5
3	4 x 3	1.5 x 1	100	0	Reduced	4-4
4	3.4 x 3.2	2.2 x 3	80	0	Reduced	0-0
5	1 x 0.5	0	60	0	Reduced	5-5
6	3.5 x 2.3	3 x 2	70	30	Reduced	2-3
7	5.1 x 2.3	2.8 x 0.8	60	20	Reduced	0-0
8	2.1 x 1.2	0	100	10	Reduced	4-4
9	3.2 x 1.1	0	60	0	Reduced	6-7
10	5 x 3	2 x 1	70	0	Reduced	4-4





deterrent factor. Mechanical debridement requires mechanical forces to remove or dislodge wound debris. Wet-to-dry dressing technique is probably one of the most common forms of mechanical debridement. As the wet (saline) dressing dries up, necrotic materials that are adhered to the structure of the dressing fabric are pulled and removed with force. This method of debridement is non-selective and may cause trauma and tissue damage. Considering the potential to cause pain upon dressing removal, nursing time to perform frequent dressing changes, and damage to existing granulation tissue, wet-to dry dressing should not be considered as the first line for debridement. The present study is a small case series investigating the improvements in wound healing over four weeks with effective debridement. The debridement technique under study is mechanical in nature, involving a monofilament fibre debridement pad.

Aim

Debridement addresses wound infection, the presence of devitalised tissue, and aids assessment. Whilst it is thought aid to healing there is little supporting evidence. This small case study series measured improvements in wound healing in 4 weeks with effective debridement.

Methods

Ten patients with chronic wounds of varying aetiologies were evaluated and monitored for wound size, percentage slough and exudate levels at week 1 (baseline) and week 4 (end of study). Following best practices, a monofilament fibre debridement pad was used for debridement weekly and appropriate dressings were applied to promote moist wound healing. Wound tissue characteristics, linear measurements, and pain during debridement were documented to track progress.

Results and discussion

At baseline, all wound beds were covered with slough, ranging between 60-100% (mean = 80%) of the surface area. At week 4, five wounds achieved a clean granulating surface; the mean surface area that was covered with slough reduced to 9%. All wound surface areas reduced over time from mean surface area of 8.09 cm^2 at baseline to 2.3 cm^2 at week 4. Exudate levels reduced in all 10 cases. There was no significant change in pain during debridement using monofilament pad.

Conclusion

Monofilament debridement pad was effective in removing slough from wound surface without significant increase in pain/discomfort. Effective removal of debris and slough on wound surface may promote wound healing. ■

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4. Spear M. The necessity of wound debridement. Plast Surg Nurs 2010 Jan-Mar;30(1):54-56.

1345

Effectiveness of Necrotic Tissue Removal with Dynamic Gel Dressing† and Monofilament Debridement*

Traci Brackin, DNP, APRN, FNP-BC, APCWCN, Maryville, TN

SAWC Spring 2018, Charlotte, USA.

Aim

Barriers to wound healing are explored every day by wound care providers. One of the most important barriers to wound healing is the removal of devitalized or necrotic tissue from the wound bed.

This study reviews the removal of necrotic tissue with two debridement methods; a monofilament debridement (MFD) pad* and a dynamic gel dressing†. The debridement results are compared with products often used to accomplish the same goal. The other products used in this study are collagenase‡ with daily dressing change, and medical grade honey§ with 3 times weekly dressing change.

The aim of this study is to review the effectiveness of a combined approach using MFD and a dynamic gel dressing compared to other common products by way of necrotic tissue removal and healthcare costs.

Method

Sample size of 5 patients in each arm which includes dynamic gel dressing with MFD, collagenase, and medical grade honey. The necrosis percentage was documented, along with the size of the wound. Appropriate treatment was performed based upon the corresponding arm. Afterward, the wound was evaluated by the same clinician, in order to avoid inter-rater reliability conflicts. The size of the wound and percentage of necrotic tissue were then recorded.

The cost analysis section was comprised of product cost and nursing time, taking into account the number of dressing changes per one week period of time that the study was conducted.

Results

This study has proven that there is a statistically significant reduction in necrotic tissue when compared to other treatments included in the study. The employment of a dynamic gel dressing in conjunction with monofilament debridement, when necessary, has also proven to be surprisingly cost effective when compared to common treatments. The results of this study should be shared given the significance, and wound

Table 1. Collagenase

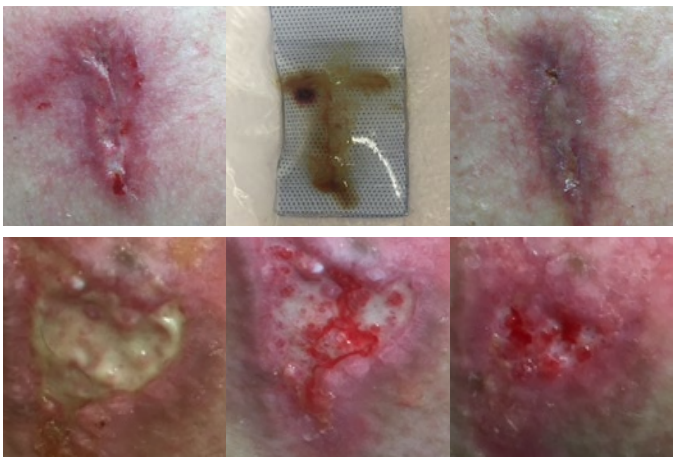
Initial Size (cm)	Size reduction	Necrotic Tissue Reduction
3.0 x 4.8	39%	15%
9.0 x 6.2	+4%	0%
3.3 x 3.0	27%	20%
3.5 x 2.5	16%	50%
6.2 x 2.0	4%	28%
Supply/Nursing cost: **$1926**	Average Size Reduction: **21%**	Dressing changes in trial period: **SEVEN**

Table 2. Medical honey

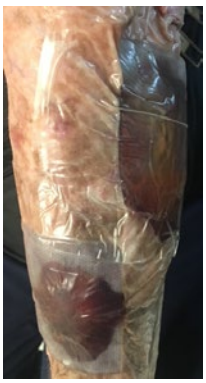
Initial Size (cm)	Size reduction	Necrotic Tissue Reduction
4.6 x 3.0	3%	28%
2.5 x 2.5	52%	52%
3.0 x 3.0	17%	48%
11.0 x 4.5	20%	100% (2.5cm^2)
5.0 x 3.0	0%	20%
Supply/Nursing cost: **$448**	Average Size Reduction: **18%**	Dressing changes in trial period: **THREE**

Table 3. Dynamic gel with MFD

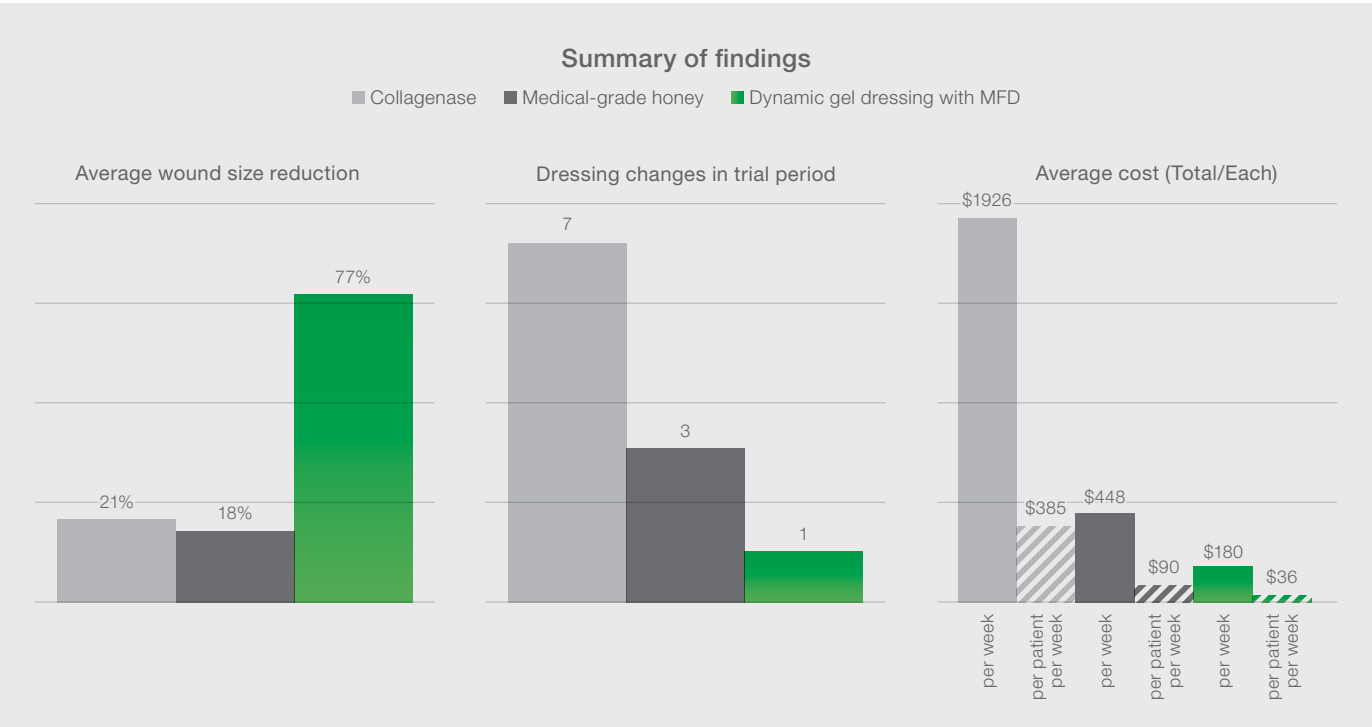
Initial Size (cm)	Size reduction	Necrotic Tissue Reduction
3.5 x 2.0	83%	66%
3.7 x 1.0	100%	100% (1.85cm^2)
3.0 x 3.0	79%	100% (4.5cm^2)
22 x 5.0	43%	N/A
2.0 x 1.5	82%	100% (1.5cm^2)
Supply/Nursing cost: **$181**	Average Size Reduction: **77%**	Dressing changes in trial period: **ONE**

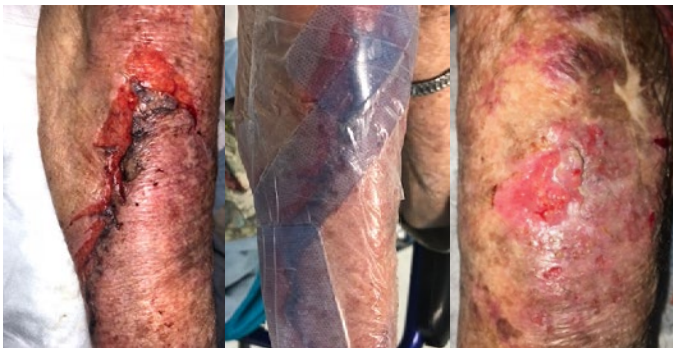


Post-operative BCC removal shoulder TOP
Back wound with full-thickness skin loss ABOVE

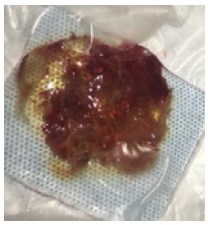


Dynamic gel dressing in place on skin tear





Complicated skin tear right arm



Dynamic gel dressing after removal

care providers should consider altering their practices for rapid, cost effective, and gentle removal of necrotic tissue.

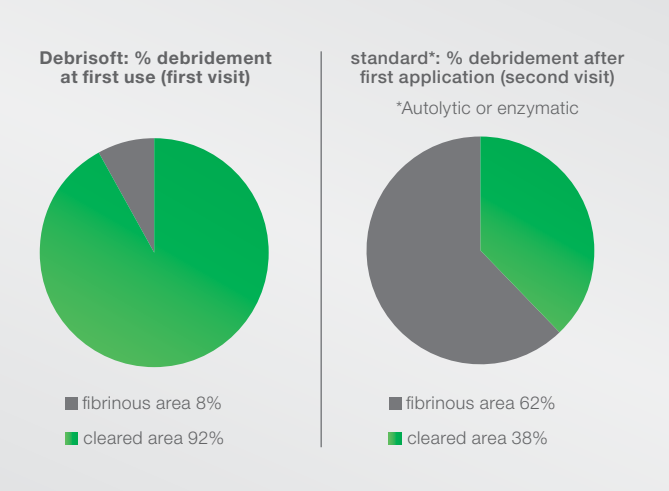
Rapid necrotic tissue removal was very likely attributed to appropriate wound bed preparation with the utilization of MFD. It is also important to note the reduction in dressing changes could directly affect the temperature and pH of the wound bed, reducing the risk of infection. ■

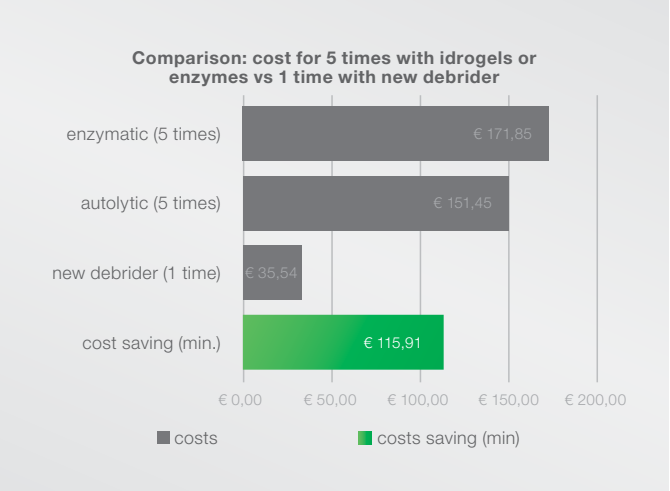
*Debrisoft®, Lohmann & Rauscher. †Suprasorb® G, Lohmann & Rauscher. ‡Santyl®, Smith & Nephew, Inc. §MEDIHONEY®, Derma Sciences, Inc.
References available upon request.

1616

Economical comparison between two different types of wound debridement (autolytic and enzymatic vs. mechanical debridement with polyester fibers)

Renato Pietroletti, Dept. of Clinical Medicine, University of l'Aquila, Italy





A variety of methods for wound debridement is now available, but controversies exist in terms of costs, effectiveness and safety, especially in home care. In this setting in particular, the specialized nurse can rely on autolytic, enzymatic and mechanical methods, requiring several skills for the procedure and performance.

In this study we retrospectively compared conventional methods of debridement (autolytic, enzymatic) with a mechanical debridement, a new available pad with polyester fibers.

35 patients, mean age 74 years, with ulcers from different aetiology (pressure ulcers, vascular, immunologic and other), were treated with the new pad*, to achieve full debridement. This group was retrospectively compared with 25 patients, meanage 78 years, with lesions of comparable aetiology. Inclusion criteria of patients in both groups were: wound bed coated with fibrin and slough, the skin around the wound with keratosis, and/ or dry exudate or old dressing; the maximum area of the wound was approx 60 cm2.

The cost of home care treatment, in both groups, includes: cost of personal time, cost of material (dressing and dressing retention/ bandage for enzymatic/ autolytic; cost of debridement pad; saline solution, gloves…).

The mean cost calculated for every visit/ treatment is similar in both groups (mean € 30,29 for autolytic; mean: € 35,54 for polyester fiber pad), but the number of visits/ treatments is very low when the pad is used.

- 1 visit/treatment with pad: 92% (mean) of the wound bed is debrided.
- 2 visits/treatments autolytically: 38,4% (average) of the wound bed is debrided.
- Until 8–10 visits/treatments with autolytic debridementhave the same results in comparison to the pad.
- Comparing three visits/treatments: the cost saving is approx € 55 for the pad.

Furthermore 10 of 35 patients showed first clinical signs of wound infection. The levels of the bacteria in the ulcer were tested (Levine-technique with swabs) according positive/ negative wound culture results. Results were positive in 7 cases. After the first day of antibiotic treatment and wound debridement with the polyester pad, the wound culture turned out negative in these patients.

Conclusions

The new pad for debridement*, made by polyester fibers, is a very fast, effective and safe method to debride, achieving the result with reduction of costs. It seems effective especially in fibrin coated wounds and in perilesional skin with keratoses and dry exudates, also in a not highly specialized care setting, suggesting a large employment in first level setting or home care.

In addition, our preliminary data suggests that polyester fibers of the pad might help to remove bacteria from the infected wound – optimizing the antibiotic treatment. ■

*Debrisoft®, Lohmann & Rauscher

1458

Case Studies
Highlighting effectiveness in a broad range of cases.

Use of a Novel Device for Selective Mechanical Debridement of Chronic Wounds

Carolyn Cuttino, RN, BSN, CWCN, CWS; Charleston, South Carolina
Dot Weir, RN, CWON, CWS; Orlando, Florida

SAWC Spring, Atlanta, USA, 2016

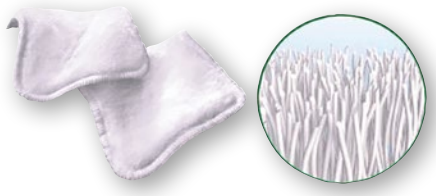
Introduction

Wound debridement is well accepted as an essential component of wound bed preparation and has been shown to be essential in achieving wound closure[1,2]. Wound debridement can be accomplished by one or more of several options: sharp/surgical, mechanical, enzymatic, autolytic, and biosurgical.

There is no singular approach that can be used for all patient and wound types. Consideration must be based on a careful assessment of the patient, goals of care, characteristics of the wound, clinical setting, skill level of the clinician, and availability of resources.

We are presenting our experience with a novel new monofilament fiber technology* which provides immediate visual results, removing superficial debris while sparing newly formed granulation tissue. We have found it to be remarkably painless in the patient use to date, providing for exceptional patient acceptance. The technology also has application in the removal / exfoliation of dry hyperkeratotic skin in the peri-wound and on the lower extremities of patients with venous insufficiency and lymphedema.

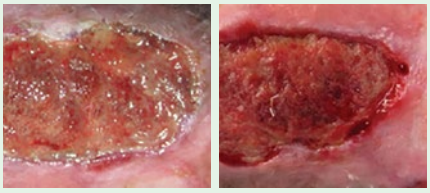
This collection of before and after photographs utilizing this new technology illustrates our early experience in different sites of service on different wound and skin types. It is evident that once trained, clinicians in virtually all care settings can use the technology as an adjunct to all types of debridement or as a stand-alone modality.



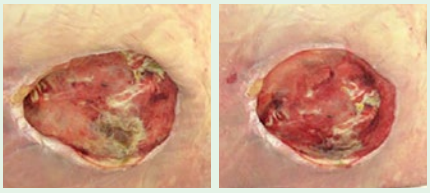
What is it and how does it work?

It is a 10 x 10 cm pad made of monofilament polyester fibers with a reverse side of polyacrylate. The monofilament fibers are cut with angled tips designed to penetrate irregularly shaped areas and remove devitalized skin and wound debris. The device is thoroughly moistened with solution of choice, and the wound or skin is cleansed using repetitive circular motions with gentle, tolerable pressure for 2-4 minutes.

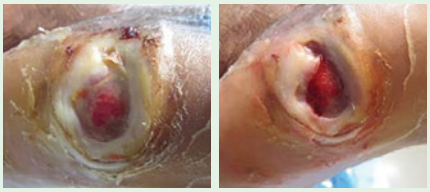
Wound Bed



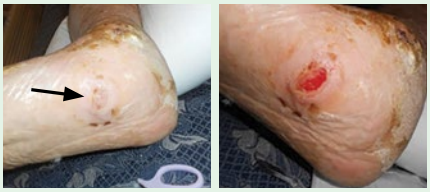
Wound Clinic: Venous ulcer from previous case. 2-3 minute scrub with device removed loose debris.



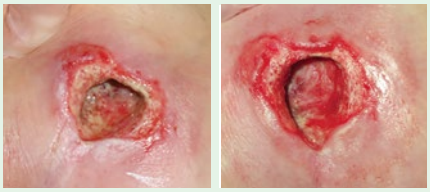
LTC Resident: Stage IV sacral pressure ulcer with bone exposed, being vtreated with collagenase. Device wet with Dakin's quarter strength (0.125%) used by nurse for 2 minutes removing significant amount of loose slough.



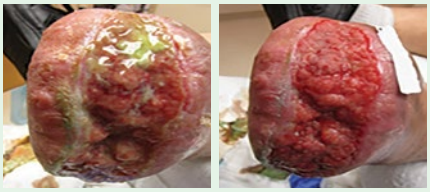
Wound Clinic: Neuropathic ulcer on lateral foot, device used for less than 1 minute. Further sharp debridement of wound edge required.



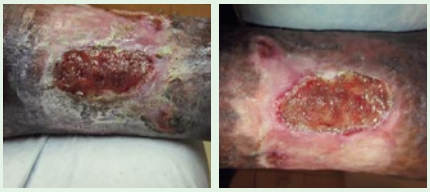
LTC Resident: Plantar foot ulcer covered with dry, adherent coagulum leading nurses to the assumption that the wound was "healed". Device used for 2 minutes to reveal wound bed facilitating accurate wound assessment.



LTC Resident: Very painful wound being treated daily with Collagenase; device used for 2 minutes with no complaints of pain. Collagenase was able to be discontinued the following week.

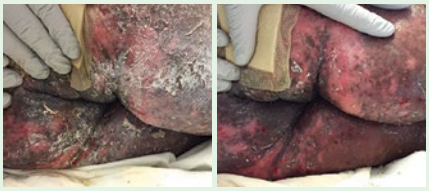


Wound Clinic: Trans-metatarsal amputation showing exudates and necrotic tissue after removal of dressing and after 3-4 minute scrub with device.

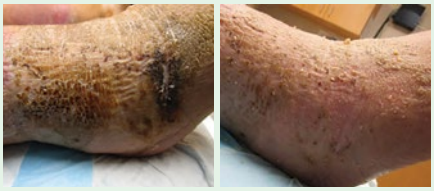


Wound Clinic: Patient with venous insufficiency ulcer and dermatitis, with residue and hyperkeratotic scales in periwound area. Device used with tap water to cleanse and de-scale periwound area before addressing the wound.

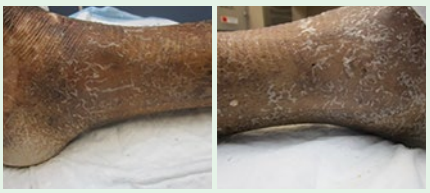
Periwound and Hyperkeratotic Skin

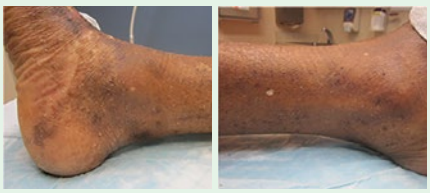


Acute Care: Bed bound incontinent patient with remnants of zinc based barrier ointment and fragile skin. Skin cleansed gently with device wet with tap water for less than 1 minute.

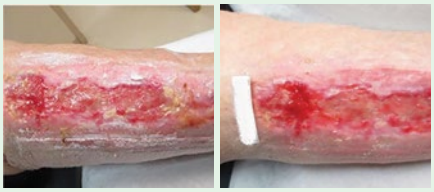


Wound Clinic: Patient with mixed venous insufficiency and lymphedema with classic appearance of brawny fibrotic skin mixed with papillomatosis. 3 pads saturated with tap water used over 15 minutes.

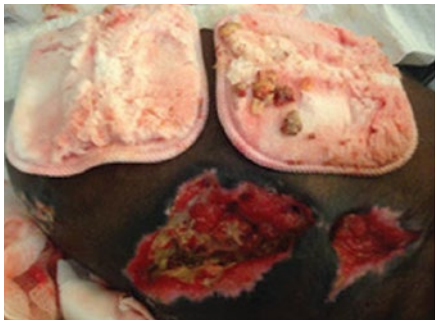




Wound Clinic: Dry flaky skin which normally moisturizers would yield only temporary results. Device used for just a few minutes with more effective exfoliation allowing better penetration of emollients or topical medications.



Wound Clinic: Post radiation injury with exquisitely painful wound and fragile periwound skin. Device used for 1-2 minutes with minimal pressure.

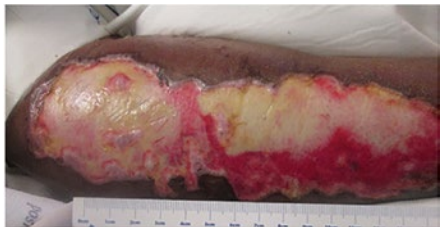


Cellular debris, loose slough, exudate and hyperkeratotic tissue become integrated into the monofilaments and are removed from the wound site. A new device is normally needed for each separate wound being treated. For large areas, more than 1 may be needed.

Implications for Practice

- Faster / effective wound bed preparation in the hands of the bedside nurse
  - Cost savings in time
- Virtually painless in our experience so far
  - May be used with topical anesthetics if needed
- Ideal adjunct with other forms of debridement
- Able to be used in all sites of service especially when instrument debridement not desired or not an option
- Effective preparation of the site just prior to cellular and tissue-based products.
- Immediate visual changes in the wound bed
- Pressure / force is in the hands of the clinician
  - Found to be less traumatic to the wound bed
  - Less bleeding in management of hypergranulation tissue
- Remarkably effective in removing hyperkeratotic skin and scales, removing previous treatment residues and other unwanted debris in the peri-wound area.
- Patient acceptance has been significant.
  - Effective cleansing of wound bed with minimal to no discomfort improves trust and patient satisfaction
  - Ability to remove scales and dry skin aids in the use of emollients, reduction of itching, improvement of dermatitis
  - Allowing patient to initially use pad on their own wound instills confidence and can reduce anticipatory pain.

As with any new technology, experience will teach us what it will and will not do. When addressing densely adherent necrotic tissue use in conjunction with other debridement modalities (i.e. enzymatic, autolytic) will enhance the effectiveness of both. ■



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2. Steed DL, Donohoe D, Webster MW, Lindsley L. Effect of extensive debridement and treatment on the healing of diabetic foot ulcers. Diabetic Ulcer Study Group. J Am Coll Surg. 1996;183(1):61–4.
3. http://www.nice.org.uk/guidance/MTG17 Accessed 8/25/15
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* Debrisoft® Lohmann & Rauscher, Milwaukee WI

1332

Gentle, Cost-Effective Debridement for All: The Microfiber Debridement Pad

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Virginia Commonwealth University Medical Center, Richmond, VA

SAWC Fall, Las Vegas, USA, 2015

Problem

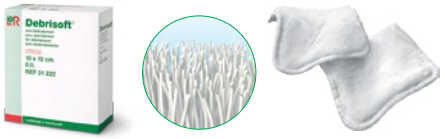
Wound debridement is critical to wound bed preparation and effective wound healing. However, debridement is often not provided by bedside clinicians, or is ineffective due to poor technique. The "Gold Standard," sharp debridement, requires a licensed clinical expert and is determined by individual state Nursing Practice Acts (NPA).

- Delayed access to wound debridement may slow the healing process, increase the risk of infection and result in poor patient outcomes.
- While other forms of debridement exist, i.e., enzymatic, mechanical, autolytic, and biodebridement, selection of the therapy depends on overall of goals, cost, urgency, setting, skill level of provider and the availability of resources.

Significance

Serial wound debridement has been demonstrated to improve wound healing outcomes and time to healing regardless of wound type or method of topical therapy selected.[1]

- A new microfiber debriding pad allows clinical staff the opportunity to provide effective debridement in acute care, outpatient clinics, long term care and in the home setting.
- The simple to use, cost-effective product is very efficient at removing non-viable tissue in addition to addressing the concerns of pain induced by some debridement modalities.[3-5]
- No specialized training required! Appropriate patients can be taught how to utilize the product at home.[6]



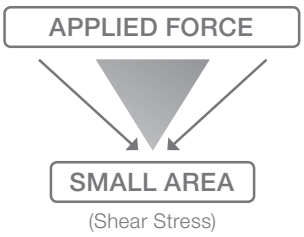
Benbow (2011):

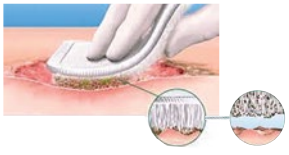
- 100% knitted monofilament polyester fibers with an outer surface of polyacrylate.
- Contains no pharmacologically or potentially irritating substances.
- Top fibers cut at an angle assist with debridement and bind cellular debris and keratosis.

Perfect for debridement of:

- Soft slough
- Fibrinous membrane
- Hyperkeratosis
- Hematoma
- Lipodermatosclerosis
- Burn patients
- Road rash
- Traumatic wounds
- Painful wounds
- Routine wound bed preparation

A scalpel cuts by concentrating the clinicians' applied load over a very small area equaling almost 10,000 lbs/in.





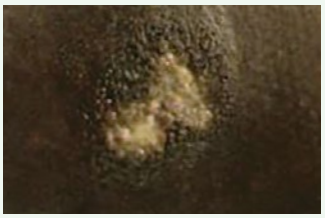
Microfiber debridement pads work in a similar fashion, transforming the gentle circular scrubbing motion of the clinician into a powerful debriding tool.

Implementation

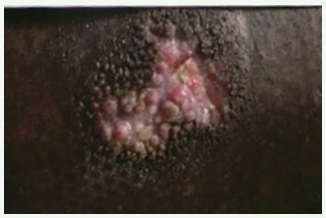
This poster will demonstrate a case series of patients from acute care and the outpatient clinic who had microfiber debridement provided by bedside nurses and WOC nurses to achieve wound bed preparation.

Case Study 1

Pt is a 46 year old African-American male with PMH of obesity, syncope, cardiomyopathy, diastolic heart failure, s/p AICD, Afib, gout, chronic bilateral lower extremity edema.



Pre Debridement

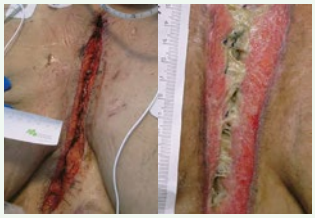


Post Debridement

- Admitted with a non-healing vascular ulcer on the left lower extremity that was very tender to palpation.
- Able to debride fibrinous exudate without need for any pain medication in less than five minutes.
- Resulted in immediate, pain free removal of necrosis.

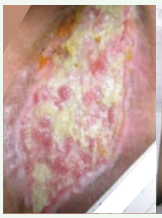
Case Study 2

Pt is a 38 year old African-American female with PMH of ESRD, DM, cardiomyopathy. Left Ventricular Assist Device placed April 2012 with explant and heart transplant in February of 2014. Sternal wound dehisced post op.

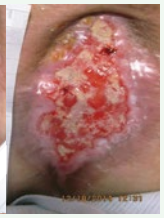


Initial Post Op

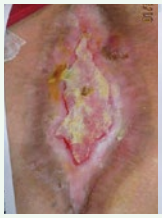
Dehiscence



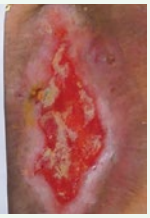
Pre Debridement



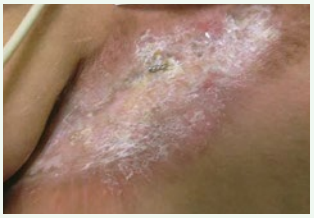
Post Debridement



Pre Debridement



Post Debridement



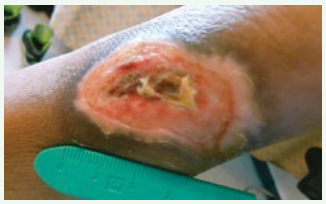
Closed

Following heart transplant, patient on multiple antirejection medications leading to stalled non-healing wound despite 3 month use of NPWT with non-contact low frequency ultrasound.

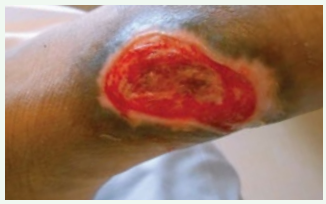
- Patient's INR supratherapeutic between 3.5–9 throughout the duration of wound healing, preventing sharp debridement.
- Patient with recurrent sepsis and malnutrition further preventing wound healing.
- Debrisoft® became available for trial and was initiated twice weekly while in hospital with daily cadexomeriodine.
- Debrisoft® continued in outpatient clinic bimonthly with on-going use of cadexomeriodine and bordered foam dressing.
- After initiation of serial debridement and cadexomer, the wound began contracting and epithelializing until complete closure 12 weeks later.

Case Study 3

This case shows the use of 2 debridement modalities for the management of a non-healing lower extremity wound with mixed venous and arterial etiology:



Pre Debridement

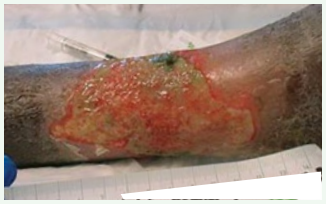


Post Debridement

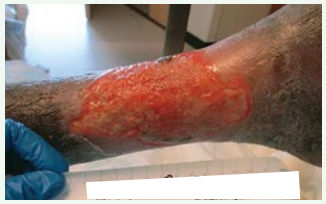
- First, Debrisoft® was used to remove dense fibrinous membrane from the outer wound bed.
- Next, a 15 blade was used to remove the eschar in the center of the wound bed.
- Finally, Debrisoft® was again utilized to remove the remaining necrotic remnants.

Case Study 4

Pt is a 40 year old African-American female admitted with sickle cell anemia, rheumatoid arthritis, new right knee pain and worsening left lower extremity pain. PMH: asthma, atrial fibrillation, cardiomegaly, CVA, diastolic heart failure, Hodgkin's lymphoma, lower extremity ulcers, s/p cholecystectomy.



Pre Debridement



Post Debridement

- Sickle cell leg ulcers are painful and disabling. These ulcers are intractable and heal slowly. Pain is severe, excruciating, penetrating, sharp and stinging.[2,6]
- Dressings had foul smelling green and yellow drainage and dense fibrinous membrane and loose slough was visible in the wound bed.
- Patient had extreme pain with palpation and was anticoagulated, which prevented ultrasound guided curette or sharp debridement.
- Debrisoft resulted in minimal pain and improved wound bed appearance.

Conclusion

In our practice, we find the use of a cost-effective, microfiber debriding pad to be an effective means of removing nonviable tissue. While it does not replace the impact of a scalpel, use of Debrisoft® can potentially minimize the need for surgical debridement and can be done at the bedside or in a clinic. In many cases it reduced patient complaints of pain, expedited wound bed preparation and can be provided by all licensed healthcare professionals.

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1331.1

Case Study

Efficacy, Safety and Pain Tolerance of a Monofilament Debridement* Pad in Neonatal and Pediatric Patients

Rene Amaya, MD**; Mayra Sustaita**, FAAP, CWSP

SAWC Spring, San Diego, USA, 2017

Introduction

Debridement of devitalized tissue is a mainstay in advanced wound care. Multiple well recognized modalities have been shown to be effective. In the fragile pediatric patient, debridement is often constrained due to concerns for trauma of adjacent healthy tissue and pain associated with the procedure. Compliance with debridement is reduced if the infant or child experiences severe pain which then results in less than an ideal procedure by the parent or health care worker.

AIM

The purpose of this five patient case series is to illustrate the efficacy, safety and pain tolerance of a monofilament debridement pad and lolly device* for mechanical removal of nonvitalized tissue in neonatal and pediatric patients. Wound types included two intravenous extravasation injuries of the ankle, a Stage III Pressure Injury of the posterior occiput, a Stage III Pressure Injury of the thoracic back and a deep necrotic open wound of the thigh.

Methods

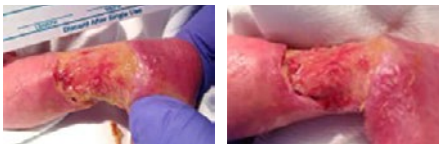
Neonatal and pediatric patients seen for wound care consultation in the hospitals and office were selected for the study. Wounds with non viable tissue that required mechanical debridement were selected and parental consent obtained. In all cases wounds were treated with dressings to promote autolytic debridement. The monofilament pad or lolly device was used at the bedside to mechanically debride all loose nonviable tissue. The monofilament pad was moistened with saline and with gentle pressure in a rotating motion the wound bed debrided of loose slough, eschar and tissue.

Pain and sensitivity were assessed by utilizing an objective pain scale (Wong Baker Faces® Pain Scale) and asking parents to assess their child's response to the mechanical debridement two minutes after the procedure was performed. In neonates, vital signs and signs of irritability were assessed. In our experience unless the patient was under conscious sedation, pain and irritation are often exacerbated by anxiety in addition to the discomfort from the procedure itself. Assessing the patient's condition two minutes after the mechanical debridement was completed served a more objective assessment of the actual pain. If the procedure resulted in severed comfort, patients would continue to show abnormalities in vital signs, irritability and emotion for longer than two minutes. If the procedure were tolerable and induced minimal discomfort, the patient's condition would return to baseline after two minutes.

Photographs were obtained prior to the procedure and after debridement to document efficacy of the monofilament debridement pad.

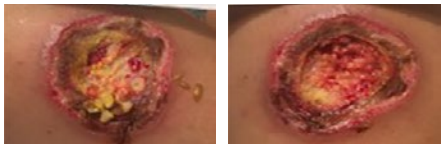
Illustration of Debridement Efficacy

Patient #1



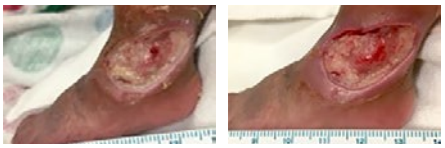
27 day old 28 week premature infant female with IV extravasation of the right ankle. The monofilament pad showed excellent mechanical debridement of nonviable tissue and showed minimal signs of pain or discomfort based on physical examination and review of vital signs two minutes after the procedure was complete. Note lack of trauma to adjacent periwound.

Patient #2



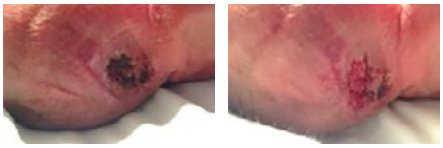
3 year old male with necrotic open wound of the posterior thigh from aberrant immunization reaction resulting in full thickness burn-like injury. The monofilament lolly device showed excellent mechanical debridement of nonviable tissue and showed minimal signs of pain or discomfort based on physical examination and review of vital signs two minutes after the procedure was complete. The unique design of the lolly device allowed for better penetration in the wound.

Patient #3



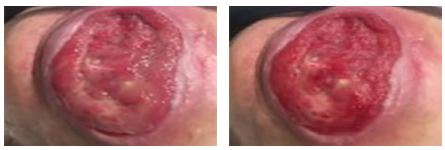
3 month old 25 week premature male with IV extravasation injury of the left ankle. The monofilament pad showed excellent mechanical debridement of nonviable tissue and showed minimal signs of pain or discomfort based on physical examination and review of vital signs two minutes after the procedure was complete. In addition, the gentle nature of the monofilament pad prevented additional trauma from arising within the wound bed.

Patient #4



13 d/o 24 week premature infant with Stage III Pressure Injury of posterior occiput. The monofilament pad showed excellent mechanical debridement of nonviable tissue and eschar with minimal signs of pain or discomfort based on physical examination.

Patient #5



11 y/o female with severe scoliosis who suffered a Stage III Pressure Injury of her mid back due to poorly fitting back brace. Open wound initially with significant slough and moderate seropurulent drainage. Monofilament pad was effective at debriding nonviable tissue while not causing additional trauma to the wound bed.

Results

In every case the monofilament pad did not result in trauma to the healthy adjacent tissue. Nonvitalized tissue was effectively debrided from the wound beds with minimal pressure or force. No complications were encountered with the product. Pain and irritability among the infant and toddler cases resolved two minutes following completion of the procedure reflecting the lack of hypersensitivity and trauma induced by the debridement pad on the woundbed. Parents were pleased with the effects and minimal pain.

Conclusions

The monofilament debridement pad and lolly device proved to be safe and effective in neonatal and pediatric patients to promote mechanical debridement of wounds. The product elicits minimal discomfort and did not result in trauma to the periwound. It should be included as a standard intervention in pediatric wound bed management. ■

*Debrisoft® Pad, Debrisoft® Lolly by L&R USA INC.

1338

Case Study Series: Utilization of Monofilament Pads* to Effectively Debride Various Types of Wounds in a Long Term Acute Care Hospital (LTACH) Setting

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SAWC Spring, San Diego, USA, 2017

Clinical Problem

A consulting general surgeon performs sharps debridement at bedside once a week in an LTACH setting. There are wounds with presence of slough or necrotic tissue that are in need of frequent debridement at each dressing change.

Past Management

Patient A Stage 4 pressure injury to coccyx. Using NPWT, enzymatic debridement, hydrofiber, and silver impregnated antimicrobial dressing.

Patient B Left shoulder full thickness wound after I&D of joint abscess.

Patient C Right hip full thickness. Balsam peru, castor oil ointment, foam border dressing.

Patient D Abscess formation due to Hidradentitis suppurativaon right gluteal, thoracic spine, and left posterior thigh. NWPT, silver impregnated hydrofiber, silver impregnated antimicrobial dressing, foam border dressing.

Patient E Right femur fracture with rod displacement and subsequent removal of bone. Myocutaneous flap from right gluteal to thigh. Using NPWT, silver impregnated antimicrobial dressing, enzymatic debridement, foam border dressing.

Clinical Approach

Monofilament debridement pad used on each wound during the course of treatment, time ranging from two to four minutes.

Patient A 3 times per week with NPWT dressing changes.

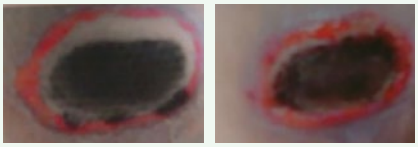
Patient B 3 times per week with NPWT dressing changes.

Patient C Daily with balsam Peru, castor oil ointment and foam border dressing.

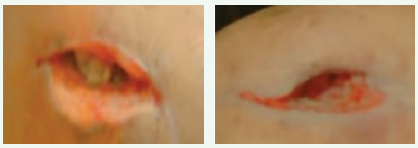
Patient D 3 times per week with NWPT dressing changes, silver impregnated hydrofiber, silver impregnated dressing with foam border dressing.

Patient E Debridement 3 times per week with NWPT, dermal template bovine collagen, silver impregnated dressing with foam border dressing.

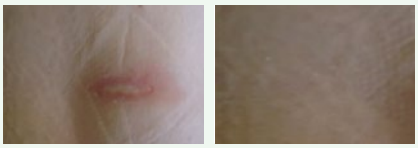
Outcomes



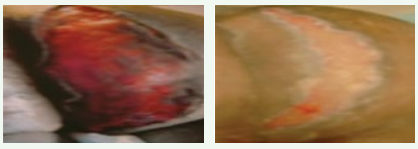
Patient A Pressure injury to coccyx with wound volume reduction of 25%, increased granulation tissue formation in wound bed



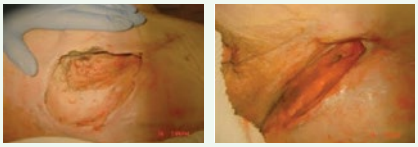
Patient B Full thickness wound to L shoulder with wound volume reduction of 57%, granulation tissues in wound bed



Patient C Right hip abrasion. 100% resolution of wound

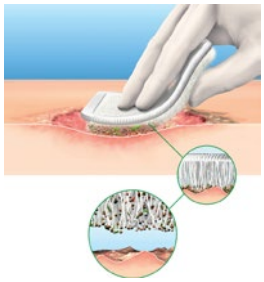


Patient D Right gluteal abscess 9.9% wound volume reduction, presence of granulation and epithelial tissue in wound bed



Patient E Presence of granulation tissues in wound bed of Right ischial tuberosity, no necrotic tissue, 93% wound volume reduction

Monofilament Debridement Pads



Conclusion

The use of monofilament debridement pad proved to be effective to actively loosen debris slough, necrotic tissues in the wound bed. It is safe and patient friendly that can be utilized by non-specialist staff in an LTACH setting. Charting reflects an increase in the presence of granulation tissue after subsequent use of debridement pad by nursing staff. ■

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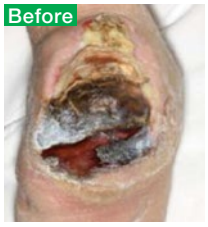
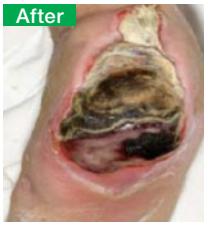
1340

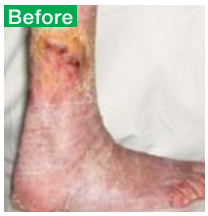
A 10 Patient evaluation of a new active debridement system

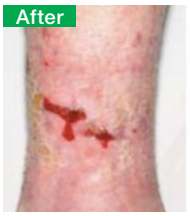
Susan Johnson, Lead Nurse Wound Care, Doncaster Royal Infirmary





Case Study 1 68 year old male. Neuroischaemic tissue damage to left heel. Previous right below knee amputation. Malodorous. Not suitable for sharp/surgical debridement. Declined amputation. Use of Debrisoft reduced malodour by reducing necrotic tissue and therefore increased quality of life.



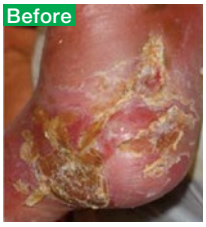


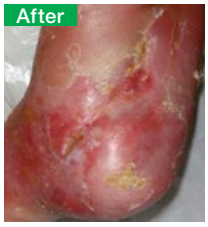
Case Study 2 72 year old female. Longstanding mixed aetiology leg ulceration. Debrisoft debrided sloughy and hyperkeratotic tissue resulting in complete epithelialisation 2 weeks post debridement.

Introduction

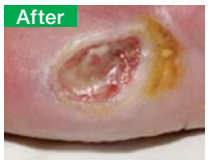
Wound debris and sloughy/necrotic tissue make an ideal breeding ground for bacteria, possibly leading to wound infection. The rapid removal of this debris and devitalised tissue improves wound healing outcomes and reduces the overall treatment time and costs. The active debridement system* I applied, enables rapid debridement of wounds and hyperkeratotic tissue from surrounding skin. Historically, wound debridement has been achieved by means of either autolysis, sharp debridement, myiasis or high pressure water. All these methods have associated problems, including cost and longevity of treatment, plus several of these treatment methods are not available in the community setting. Some of the methods stated are also only suitable with specialist nurse input or for use in specialist wound care clinics.

The aim of this study was to evaluate this new debridement system in the management of patients with hyperkeratotic skin and/or a chronic wound of the lower leg containing devitalised tissue.





Case Study 3 58 year old male Type 2 diabetic non compliant, recurrent foot sepsis requiring several surgical debridements. Autonomic neuropathy resulting in formation of hyprkeratotic skin.



Case Study 4 60 year old male with connective/immunology disease. Previously left below knee amputation. Non healing painful right 5th toe amputation site. Appearance suggestive of underlying infection. Debridement with Debrisoft was painless and removed all non viable tissue thus improving healing outcomes.

Method

10 patients in total were treated with the new debridement system and the information was compiled in the form of data collection spreadsheets.

Data collected included:

- patient history and aetiology
- photographs analysed using the WITA system
- pain scores before, during and after treatment
- debridement time

Patients were followed up within the clinic setting one week post debridement. All patients were treated with the new debridement according to the manufacturer's instructions. By using this product to debride the hyperkeratosis skin +/- the chronic wound, results were impressive.

The results were very impressive by implementing this debridement system into the management of hyperkaratotic skin and debridement of devitalised tissue.

Results

10 patients in total;

- 2 venous leg ulcers
- 3 neuro-ischaemic foot ulcers
- 2 mixed aetiology leg ulcers
- 1 neuropathic foot ulcer
- 1 digital amputation
- 1 skin prep prior to amputation

Healing rates:

- 2 venous leg ulcers healed within 2 weeks
- 1 neuro-ischaemic ulcer healed within 6 weeks
- 1 neuro-ischaemic heel pressure ulcer lost to follow up (patient dies)
- 1 neuro-ischaemic ulcer ongoing
- 2 mixed aetiology leg ulcers healed within 6 weeks.
- 1 neuropathic foot ulcer healed within 3 weeks
- 1 digital amputation ongoing
- 1 skin prep prior to below knee amputation healed with
- no wound complications

6 Female - 4 Male, Age range 60 - 75 years

In all cases the quick and easy debridement of the hyperkeratotic skin and/or the chronic wound facilitated healing or significant difference to the wound. Average time spent on debridement was 4 mins. Range 2 minutes – 10 minutes.

Pain scores remained low even during the debridement period, with most patients scoring the same pre, during and post procedure.

Conclusion

This new debridement system provides a quick, easy and painless method of debridement, often with immediate results. It will make a useful addition to the wound care tool box and will require limited resources for training staff on its application. This will be invaluable in the community setting, especially for the general nurse, as very little extra training is required to use the new debriding system, plus the short debridement time will not significantly impact on the time allocated for the patient treatment.

Further work needs to be carried out to confirm if skin preparation with this new debridement system reduces amputation wound healing complications. ■

*Debrisoft, Lohmann & Rauscher

1457

Fire works with after effects - Successful use of a polyester monofilament fibre product for the removal of embedded explosive residue

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Introduction

In cases of trauma involving fireworks, gunpowder injuries or road accidents, discolouring particles can penetrate the skin. Although these dirt particles can generally still be removed in the initial 24-48 hours without persistent aesthetic sequellae, later removal of these 'dirt tattoos' may require excision or expensive laser therapy. For prompt post-traumatic patient care, a new wound debridera, consisting of polyester monofilament fibres, represents a novel pain-free therapeutic option.

Case report

In this case report, we describe the treatment of a 17-year old male patient from our accident and emergency department. On New Year's Eve, a firework exploded near the patient's face resulting in thermal injuries equivalent to first and second degree (IIa) burns with explosive residues embedded in the skin of the face (Fig. 1).

The forehead swelling was assessed by cranial CT scan and found to be soft-tissue swelling resulting from the direct impact of the firework. Besides the findings on the facial skin, severe bilateral corneal erosion was diagnosed in the ophthalmological examination.

Material and methods

To avoid performing surgical debridement under general anaesthesia, the embedded explosive residue was removed in this patient by using a novel polyester monofilament fibre product. The debridera is a novel product consisting of 18 million polyester fibres over 10 cm^2 for superficial wound cleansing. The side that comes into contact with the skin is soft, with properties specifically designed for the mechanical removal of deposits and dirt particles when it is thoroughly moistened and passed over the surface of the skin while applying light pressure. The product is mechanically resistant and does not dissolve during use. Its fibres are chemically inert and stable and absorb fluids.

Results

Almost all of the embedded explosive residues were removed by a single application of the polyester monofilament fibre product under local anaesthesia (Fig. 2).

Conclusion

The removal of embedded explosive residues using the novel polyester monofilament fibre product represents a non-invasive, almost pain-free alternative to conventional nylon brush treatment for patients with intracutaneous particles as a result of explosive trauma, explosive injuries or road accidents.

The method for removing powder particles with the debridera led in our patient to a very good postoperative result. By using this uncomplicated procedure, cosmetically disfiguring persistent dirt tattoos can be avoided and the costs, if any, of extensive secondary treatment, such as laser therapy or dermabrasion, can be reduced. ■

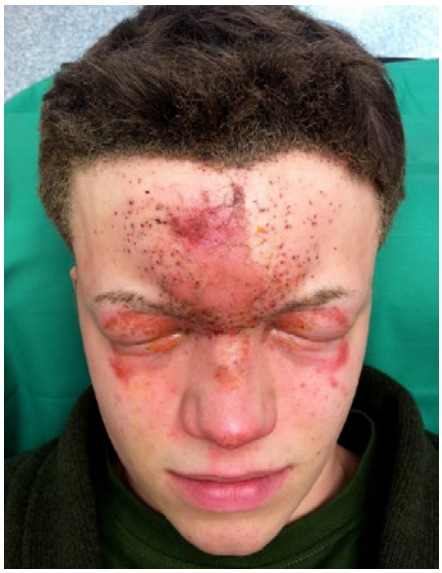

Figure 1 Baseline finding on initial presentation 10 hours after impact trauma caused by a firework rocket.

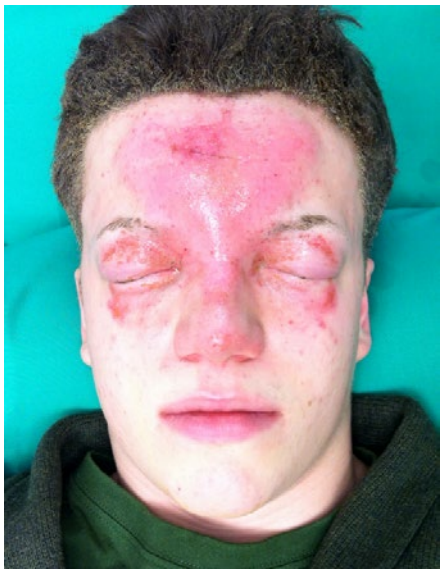

Figure 2 Patient after succesful removal of the embedded explosive residues using the debrider*.

*Debrisoft®, Lohmann & Rauscher GmbH & Co KG, Rengsdorf, Germany. Scientific grant of Lohmann & Rauscher GmbH & Co KG, Rengsdorf/Germany

1460

Clinical efficacy of a monofilament fiber wound debridement product for trauma wounds and bites

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R.J. Klicks, MD Wound Expert Center, Bovenij Hospital, Amsterdam, The Netherlands.

EWMA: 23-25 May, 2012, Vienna, Austria

Introduction

The aim of this pilot was to evaluate the wound debridement efficacy (achievement of 100% granulation tissue) and level of discomfort during the procedure using a *monofilament fiber product in patients with trauma wounds and bites. The product has been shown to successfully debride chronic wounds and the peri-wound skin.[1,2] Moreover in the patients with chronic wounds patient reported pain (VAS) during the procedure was low.[2] Patients with acute and trauma wounds generally report severe pain, especially in the first hours after injury. For debridement often local anesthesia is used and pain medication is given. For chronic wounds mostly debridement at the bedside can be performed without the need of local anesthesia.

Methods

This observational pilot assessed the debridement efficacy, safety, patient comfort and user satisfaction of the *monofilament product in ten patients. Time taken to perform the debridement procedure was also recorded. For the procedure the product was wetted with polyhexanide (PHMB) and lidocane 2% was used, as per protocol. After debridement the wounds were covered with a **bio-cellulose dressing + PHMB and an ***absorbent pad was used as a secondary dressing. Clinical outcome was scored by a trained clinician. Additionally, before and after photographs were assessed by one and the same clinician, who was blinded to the treatment given. Patients were followed until wound closure.

Results

Ten patients were included in the study. Patients had crush wounds on the shin (n=1), extensive soft tissue trauma on the lower leg (n=5), cut off fingertip (n=1), bite wounds caused by two fighting dogs (n=1 fingertip bitten off, n=2 wounds on the lower limb). Debridement was fast and effective in all of the treated wounds, already after one session the wound was completely debrided in n=3 and ready for grafting. A mean of 2,1 sessions (SD ± 0,83) (min 1 – max 3) was required to obtain a clean wound bed. In all of the sessions the product remained intact. The mean time for the debridement sessions was 2,57 minutes (SD ± 0,04) (range 2–4 minutes). Visible debris and slough were successfully removed with the *monofilament fiber product. Patients

Case 1:

The 62-year old woman injured her finger with a cleaver while cutting meat in the kitchen (Fig 1a). At day 0 she reported pain VAS: 5, which did not change during the procedure. The wound and peri-wound skin was debrided with the *monofilament product (Fig 1b and Fig 1c) after which split skin grafting was performed (Fig 1d). The wound had healed within a week without complications (Fig 1e).

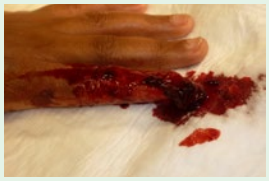

Fig 1a Bleeding was stopped

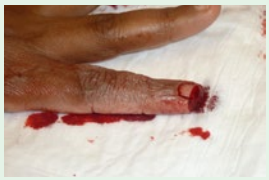

Fig 1b Situation after debridement

Fig 1c On the right the debridement is shown

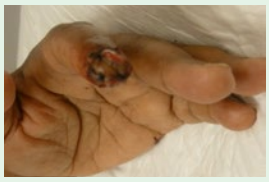

Fig 1d Skin graft is placed

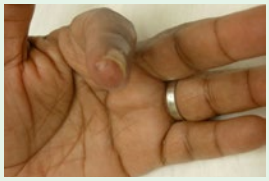

Fig 1e The wound had healed within 1 week

Case 2:

The 87-year old man injured his head in a fall against a concrete wall (Fig 2a). At day 0 he reported pain VAS: 4, which did not change during the debridement procedure. The wound and peri-wound skin was debrided with the *monofilament product (Fig 2b and Fig 2c) during 4 days. The wound had healed within 14 days without complications (Fig 2d).

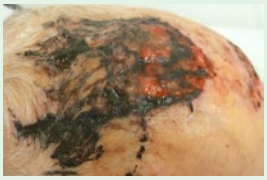

Fig 2a Day 0: Situation before debridement

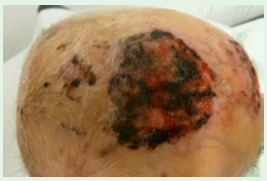

Fig 2b Day 0: after one session

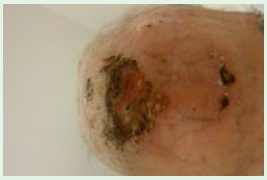

Fig 2c Day 2: after two sessions

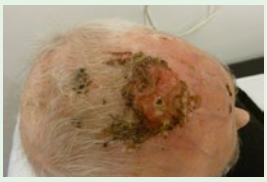

Fig 2d Day 4: after the last session

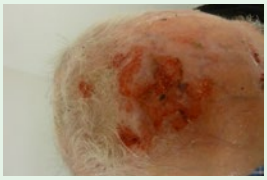

Fig 2e Day 10: the wound is almost healed

Case 3:

The 89-year old male patient injured his right shin during an accident he suffered while crossing on a ferry. The otherwise healthy male is immunocompromised. Four debridement sessions over four days resulted in an almost clean wound. After debridement the wound was covered with a bio-cellulose dressing + PHMB.

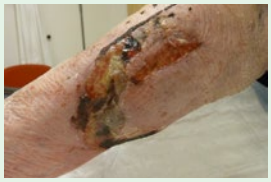

Fig 3a Day 0: Before debridement

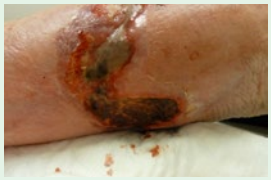

Fig 3b Day 2: after two sessions

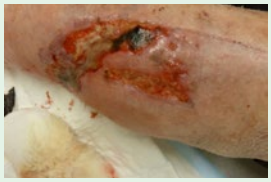

Fig 3c Day 4: almost completely debrided

Case 4:

The 61-year old woman had her middle finger bitten off at distal interphalangial while intervening in a dog fight. After one debridement session and excision of the wound edges the wound was closed and healed without complications.

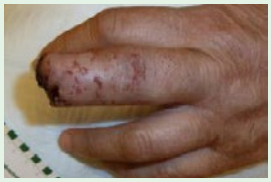

Fig 4a Distal interphalangial is amputated due to a bite from a dog

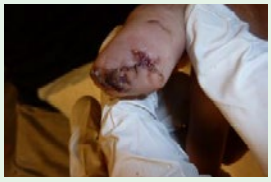

Fig 4b

reported slight discomfort for a short duration (2.0 minutes on average) in 35% of cases and in 65% of cases they reported no discomfort. No secondary infections occurred. Four typical cases are presented to illustrate the results.

Conclusion

The results indicate the potential for this *monofilament fibre product to effectively and safely debride trauma wounds and bites. ■

References

1. Haemerle G, Duelli H, Abel M, Strohal R . Br J Nurs. 2011 Mar 24-Apr 14;20(6):S35-6, S38, S40-2.
2. S. Bahr, N. Mustafi, P. Hättig, A. Piatkowski, et al. J Wound Care. 2011 May ;20 (5):250-6 21647070

*Debrisoft®, **Suprasorb® X, ***Flivasorb®, Lohmann & Rauscher. Scientific grant from Lohmann & Rauscher

1333

A total treatment approach for a complex lymphedema patient with skin lesions and extensive hyperkeratosis

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Wounds UK: November 12-14, 2012, Harrogate UK

Introduction

Prevalence of lymphedema in The Netherlands is estimated at 350.000. Its cause may be congenital (10%) or it may develop (90%) due to phlebological disorders, trauma, surgery or oncology. In combination with obesity and or lip-edema it may pose complex problems. Often lymphedema is misdiagnosed and does not get the required treatment. Therapy is delivered by a multi-disciplinary team and comprises: skin care; exercise; high stiffness compression (SSI >10) and if applicable, lymph drainage therapy. Patient guidance, education and motivation is key in the delivery of lymphedema treatment.

The aim of the case series (N=20) was to provide improvement of the patients 'quality of life, achieving complete debridement, closing the skin lesions and providing comfortable and effective lymphedema management using a short stretch compression system and tubular under padding.

Method

Case ascertainment was used in twenty patients with lymphedema. Patients gave informed consent.

Inclusion criteria:

- Male or female patients of > 18 years;
- Lymphedema of the leg(s) otherwise healthy,
- ABI >0.8
- Patients had the ability to understand and to comply with the treatment

Exclusion criteria:

- Allergy against one of the used materials;
- Arterial occlusive disease (ABPI less than 0.8);
- COPD; DM; Cardiac diseases

Typical Case

A typical case is presented to illustrate the results. The complex patient has chronic lymphedema of the legs and scattered critically colonized lesions. The 61-years-old male patient had diabetes type two, hypothyroidism, morbid obesity and was a closet alcoholic. He had poor mobility and stayed in his chair for 24 hours. He never slept in his bed. He had massive oedema in both legs that had large deformities and so far he had refused compression therapy. In order to assess his situation and to start therapy in a controlled setting he was admitted to hospital (Fig 1). After 3 weeks he was discharged and treatment was continued in the community (Fig 2).

Results

The multidisciplinary team approach comprised: Psychological counseling, education about his situation and the options for treatment, Debridement of the lesions and hyperkeratotic areas with a *monofilament fiber product + PHMB (Fig 3); Manual lymph drainage; Compression (**tubular padding and ***cohesive short stretch bandages) (Fig 4, Fig 5, Fig 6). A ****collagen dressing was used covered with an *****absorbent pad (Fig 4). Debridement sessions were repeated upon dressing and bandage system changes every second day for a week. After 6 days the skin was clean and supple and circulation had improved (Fig 7). The lesions were now covered with healthy granulation tissue and the oedema had reduced markedly (Fig 8). The approach provided effective care in the community enabling the patient to improve his condition and to face his issues. The treatment result enabled him to stay at home and improved his quality of life markedly, accepting maintenance therapy is key for his chronic condition.

Conclusion

The multidisciplinary approach provided effective care in the community for all twenty lymphedema patients that were evaluated in the case series. The treatment results demonstrated an improved quality of life. The patients received maintenance therapy and follow up visits to further control the chronic condition.■

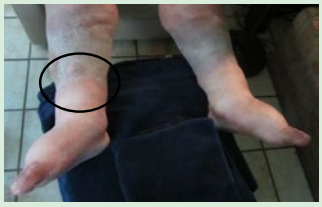


Fig 1: Situation upon discharge from the hospital. Treatment is continued in the community by a nurse specialist.

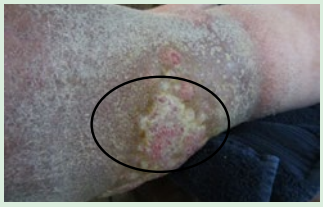


Fig 2: Detail of the right leg. Hyperkeratosis and scabs as well as lesions are scattered on his legs.

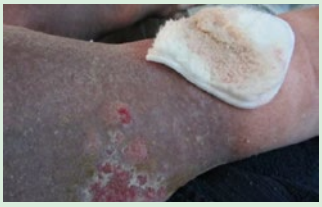


Fig 3: Debridement is performed using a *monofilament fiber product + PHMB.

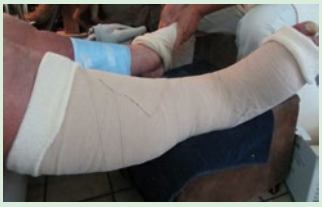


Fig 4: Compression is applied after lymphdrainage.

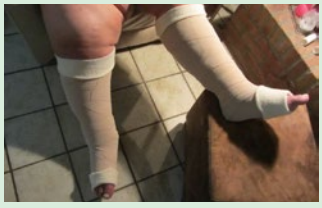


Fig 5: Compression is applied on both legs.

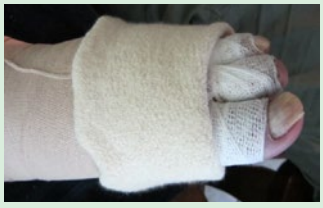


Fig 6: The toes are included in the compression bandages.

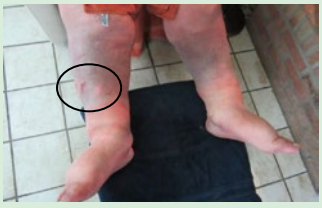


Fig 7: The oedema is reduced and the lesions are covered with granulation tissue

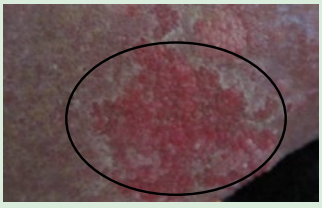


Fig 8: The lesions are covered with granulation tissue.

*Debrisoft®, **tg® Soft, ***Raucodur® Kohäsive, ****Suprasorb® C, *****Flivasorb® from Lohmann & Rauscher. Scientific grant from Lohmann & Rauscher.

1327

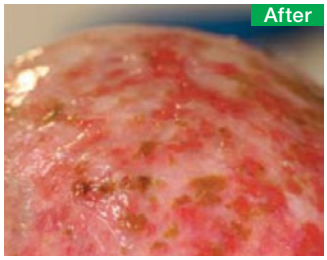
The impact of a monofilament debridement pad in the management of actinic keratosis

Anita Heron, Clinical Sister – Dermatology and Tissue Viability
Georgina Maginn, Staff Nurse, Southern Trust, Northern Ireland

Wounds UK Conference, Harrogate, UK 2014

This case study demonstrates:

- pain free, safe and effective treatment regime improving concordance and quality of life for Bob
- reduced treatment costs and specialist hospital intervention
- a promise for the use of the monofilament pad* in Dermatology



About Actinic keratosis (AK)

(also known as solar keratosis)

Symptoms

- dry, scaly patches of skin
- most commonly on the head
- can be itchy and unsightly
- the skin over the lesions can become thick and horn like

Cause

years of sun exposure

Who is most commonly affected?

- people over the age of 40
- fair-skinned people
- men more than women

Prevalence

affects 19–24% of people over 60 years of age[1]

Treatment

- minor intervention for the less severe
- photodynamic therapy/ cryotherapy/curettage (requiring an anaesthetic) for more severe cases

Outlook

treated lesions will usually go away, but are likely to re-develop

Bob (not his real name), aged 73 years presented with a history of AK on his scalp which was extremely sensitive and at risk, due to a history of a squamous cell carcinoma excised from the area and then grafted in 2010.

In December 2013 Bob's Practice Nurse identified scale developing in large amounts, causing concern, and resulting in an immediate hospital dermatology referral and appointment.

Following a holistic assessment in hospital and review by a Consultant Dermatologist, a treatment regime of saline and gauze was commenced to remove the scale build up, followed by steroid and emollient therapy. The treatment aim was removal of the significant build-up of slough, chronic pustular dermatosis and thick scale covering 80% of the scalp. This regime continued from December 2013 three times a week for 20 minute appointments over four months, which was not only ineffective, but also caused Bob significant pain and discomfort. There was also a putrid odour which caused considerable distress. Clinicians felt that topical applications were having little effect, as they were unable to penetrate the scaly skin - resulting in the area sloughing over and re-scaling, leading to further clinic visits, which were becoming troublesome for Bob.

In April 2014, as the situation had become unbearable, Bob was reviewed by his Dermatology Nurse Specialist and the decision was made to evaluate a monofilament debridement pad*. The monofilament pad was dampened with warm tap water and used in a firm, but gentle, circular motion across the whole area of the scalp. Within one application, over a period of 4 minutes, 90% of the slough and debris was removed (supported by photographic evidence). During the treatment Bob experienced no pain or discomfort and was delighted with the instant, visible results gained and commented that his scalp felt smoother. One application allowed improved penetration of steroid ointments and emollients, which went on to treat the scalp and the inflammation.

Bob attended clinic for one follow-up appointment, where the monofilament debridement pad was used again with good effect. It was evident that, unlike the previous treatment which allowed a further build-up of slough and scaling, this was no longer the case and, as a result, he was referred back to the care of his Practice Nurse.

Bob has not been back to see the hospital dermatology team since July 2014 and continues to self-care with the monofilament debridement pad. He is also reviewed by his Practice Nurse twice a month.

This case study has resulted in a change in service provision for patients suffering from the distressing, lifelong condition of AK. ■

References

1. de Berker et al (2007) Guidelines for the management of actinic keratosis. British Journal of Dermatology 2007 156, p222-230

This poster was supported by an educational grant from Activa Healthcare. Activa Healthcare is part of the Lohmann & Rauscher Group * Debrisoft®, Activa Healthcare

1459

Frequently Asked Questions

What can Debrisoft be used for?

Debrisoft and Debrisoft Lolly are recommended for debridement of both superficial acute and chronic wounds, including:

- diabetic ulcers
- venous leg ulcers
- pessure injuries
- burns
- traumatic and operative wounds
- cleansing of peri-wound and keratotic skin
- sloughy wounds and wounds containing soft necrotic tissue
- removal of exudate, cellular debris and product or dressing residue

Debrisoft Lolly additionally is suitable to debride deep, undermining, and tunneling wounds as well as cleansing hard-to-reach areas like in-between toes and skin folds.

Debrisoft may not be as effective on thick, hard eschar or thick, tenacious slough that is fixed. This may require softening first by autolytic debridement (e.g., Suprasorb® G) before the use of Debrisoft.

Does Debrisoft contain any allergenic substances / irritants / sensitizers?

No, both Debrisoft products — the Debrisoft Pad and the Debrisoft Lolly are hypoallergenic, i.e. it contains no known allergen such as colophony or its derivatives.

Is Debrisoft indicated for deep wounds?

Debrisoft Pad is indicated for superficial wounds. Debrisoft Lolly on the other hand can be used to debride and cleanse deep, undermining, and tunneling wounds as well. Multiple safety features like the break-resistant handle allow Debrisoft Lolly reach hard-to-reach areas where other debridement methods may not be suitable.

How should Debrisoft be held and used?

There is no right or wrong way to hold Debrisoft, provided the correct side is used — the soft, fluffy, fiber side. However, from clinical experience, the best results have come from using Debrisoft Pad flat, folded or corner by corner. Strokes and / or circular movements should be used over wounds and surrounding skin with as much pressure as the patient will tolerate.

Debrisoft Lolly should be held with the handle and the soft fiber head inserted into the wound to gently cleanse the area. Please be cautious not to insert the Debrisoft Lolly in a wound smaller than the width of the fiber head.

The wound and the peri-wound skin should not be treated with the same piece of Debrisoft. Open the sterile packaging. Soak Debrisoft with a standard wound rinsing solution, according to local guidelines.

Use the soft fiber side of the moistened Debrisoft over the wound surface. If necessary, use another moistened Debrisoft for the peri-wound skin. Discard Debrisoft after use in normal clinical waste, according to local guidelines.

Can individual fibers come loose from Debrisoft?

Debrisoft has been specifically designed in such a manner that no fibers can become detached from the composite material under ordinary circumstances. This is ensured by the knitted reverse side, which retains the fibers and the polyacrylate coating, which holds the fibers firmly in place, providing stability to the Debrisoft.

What liquids can be used for moistening Debrisoft?

Debrisoft can be moistened with any standard wound rinsing solution according to local guidelines.

How much liquid should be used to moisten Debrisoft?

Debrisoft should be thoroughly moistened but not dripping wet. 20-40ml of liquid for the Debrisoft Pad and 5-15ml for the Debrisoft Lolly will be sufficient for most applications. Do not wring Debrisoft.

Do emollients affect the effectiveness of Debrisoft?

If there is a large build-up of emollients on the skin, it may be helpful to rinse them away before using Debrisoft, to prevent clogging of the fibers.

Can Debrisoft be rinsed of wound debris and then re-used on other areas?

No.

How long does it take to debride a wound with Debrisoft?

In most cases, the impressive results of a debridement procedure will be apparent after 2-4 minutes, depending on wound size.

How often should Debrisoft be used?

If necessary, Debrisoft can be used each time the wound dressing is changed.

How long should treatment with Debrisoft continue?

Debrisoft should be used until the wound is thoroughly clean and has progressed from the cleansing phase to the granulation phase of healing.

Can Debrisoft be left on the wound?

No. Debrisoft is a product for debridement only and is not a wound dressing.

Can Debrisoft be re-used / re-sterilized?

No.

Can Debrisoft be cut to size as needed?

No, Debrisoft cannot be cut to size, as this would disrupt the protective coating on the reverse side and fibers may come loose from the composite material.

Do you need special training to use Debrisoft?

Debrisoft is particularly safe and easy to use, which means it can be used by specialist and non-specialist clinicians to perform a rapid, effective debridement with high patient satisfaction. Always read the instructions for use before using Debrisoft, and please refer to your local guidelines and regulations concerning who is allowed to perform mechanical debridement in your facility.

Do patients feel pain after treatment with Debrisoft?

After treatment with Debrisoft, 97.4% of all patients did not experience any pain or side effects.

What are the precautions to the use of Debrisoft?

- Do not use as a wound dressing
- Do not use after the wound becomes red or vascular
- Do not cut or trim Debrisoft
- Do not use Debrisoft on patients with a known allergy to its constituents
- Patients with severe, subjective pain or hyperaesthesia in the wound area
- Do not insert Debrisoft Lolly into a wound smaller than the width of the fiber head
- Do not reuse Debrisoft — it is a single use product only
- Do not rinse and wring Debrisoft as it can damage the fibers and it is a single use only product

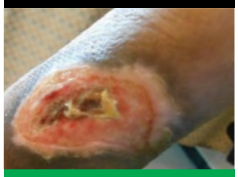
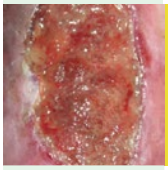
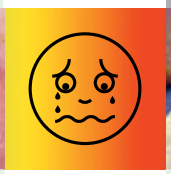
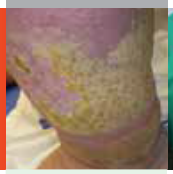
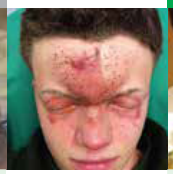
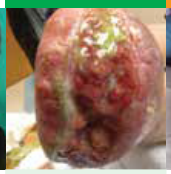
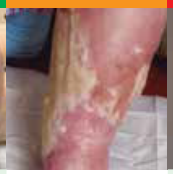
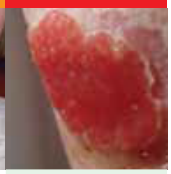
Two-Step Approach
for effective wound care.

1 Does the wound need debridement? Does the skin need cleansing?

NO

YES

What is the condition of the wound?

Necrotic/Eschar	Biofilm/ Bioburden	Pain Sensitivity	Hyperkeratosis	Burns/ Road rash	Infected	Slough	Granulating
							
Apply autolytic debridement w/ **Suprasorb® G** to first soften the necrotic tissue, then use **Debrisoft®** afterwards to speed up the debridement process.	Reduces 90%–99% of slough, biofilm, and bacterial load.	Consider for patients who are unable to tolerate pain. 97.4% report no pain or side effects.			Use in combination with adequate antimicrobial treatment.	Appropriate for moist/loose slough only.	Granulation tissue and epithelial cells are protected.

Use **Debrisoft® Pad** and/or **Lolly** for cleansing, and proceed to Step 2

2 Does the wound need treatment?

YES

What is the level of exudate?

Dry – Moderate → **Suprasorb® G**

Moderate – Heavy → **Flivasorb® or Flivasorb® Border**

Using Debrisoft and Suprasorb G, or Flivasorb or Flivasorb Border, there is the opportunity to replace:

- Collagenase ointment
- Honey dressings
- Hydrogel dressings
- Super absorbent dressings
- Foam dressings

People.Health.Care.

Debrisoft® Pad and Lolly

sterile, individually-sealed

Size	Item No.	Shipping Units (per box/case)
Pad		
10 cm x 10 cm (4" x 4")	31222	5/50
13 cm x 20 cm (5" x 8")	34323	5/50
Lolly		
5 cm x 1.9 cm* (2" x 0.76")	33224	5/50

* Core width of the fiber head of Debrisoft® Lolly only

References

1. Bahr, S., Musta , N., Hattig, P., Piatkowski, A., Mosti, G., Reimann, K., Abel, M., Dini, V., Restelli, J., Babadagi-Hardt, Z., Abbritti, F., Eberlein, T., Wild, T., Bandl, K., Schmitz, M. (2010), "Clinical efficacy of a new monofilament fibre-containing wound debridement product", Journal of Wound Care, Vol 20 (5) May
2. Attinger, C.E., et al. (2006), "Clinical approach to wounds: debridement and wound bed preparation including the use of dressings and wound-healing adjuvants.", Plastic and reconstructive surgery, 117(7): 72-109
3. Strohal, R., Apelquvist, J., Dissemond, J. et al (2013), "EWMA Document: Debridement.", J Wound Care; 22(Suppl.1):p1-p52.

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