

Something Old Is New Again: Debridement and Reducing Local Wound Infection with Maggots



BY Christine Pearson

Christine Pearson, RN, IIWCC,

is a wound clinician for Vancouver Coastal Health on the North Shore. She has worked in community nursing on interdisciplinary teams for 27 years. She develops and presents wound education sessions and provides consultations on difficult-to-heal wounds for physicians, nurses, students and long-term-care facilities.

Maggot debridement therapy (MDT) is the practice of using live medical-grade fly larvae for removing dead tissue from non-healing wounds. MDT is also known as maggot therapy, larval therapy, biodebridement or biosurgery.

Debridement or removal of dead tissue is a cornerstone of good wound bed preparation. Slough, eschar and debris in the wound are a good food source for bacteria and must be removed to prevent or treat infection and to promote healing.

History of MDT

Using maggots for wound care has been documented since about the 1500s. Throughout centuries of war, physicians have noticed that soldiers with maggot-infested wounds

tended to heal better than those with non-infested wounds. The Confederate army surgeon J.F. Zacharias was one of the first American physicians to intentionally use maggots for infected wounds. In the 1930s, orthopaedic surgeon William Baer spearheaded and promoted the use of MDT in more than 300 U.S. hospitals. Then World War

II brought the advent of antibiotic therapy and better surgical techniques, so maggots were relegated to the back shelf and were rarely used for the next five decades.

We have now found that in some cases antibiotics and high-tech treatments have become ineffective in treating poorly vascularized wounds and necrotic wounds and that some bacteria have developed resistance.

In the 1990s Sherman et al. in the U.S. and Mumcuoglu et al. in Israel reintroduced maggots for treat-

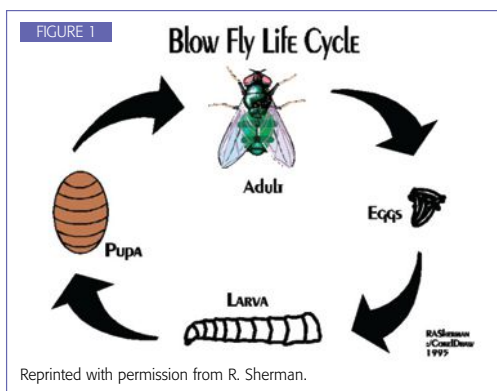
ing intractable wounds. Currently, MDT is successfully used to save lives and limbs in 20 different countries.

About Maggots

Not all flies are created equal; there are thousands of species of flies. The maggots of choice for MDT

are from the species *Lucilia sericata* (green bottle or blowfly). This species has been found to be safe and effective; they eat dead tissue and do not harm living tissue. Blowflies are often metallic green, blue or black in colour.

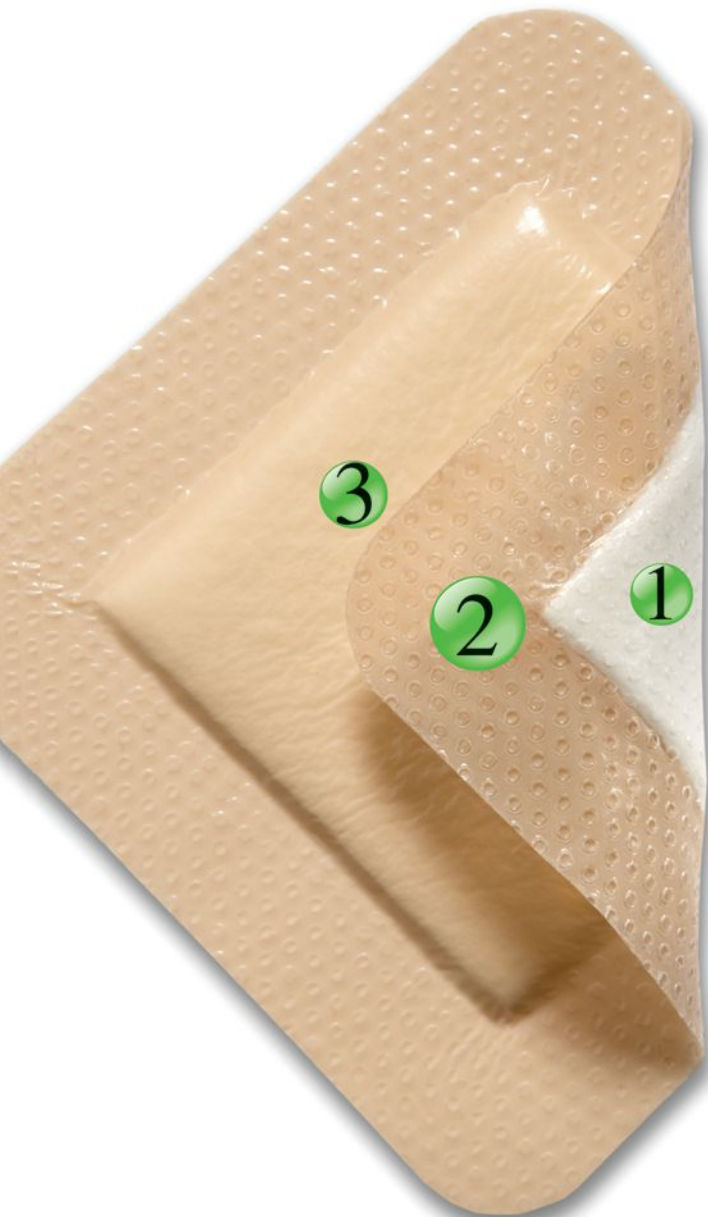
The life cycle of the fly (see Figure 1) starts with the newly hatched fly, *continued on page 24*



Prior to using MDT you need to assess and optimize the patient's condition (pain managed, nutrition assessed, pressure relieved, positioning/seating addressed, sufficient arterial perfusion present, etc.)

Evolution

Less pain. Less trauma.
Even more performance.



The evolution of wound care

Only Mepilex® Border offers:

1

Enhanced “moisture control” wound pad

- Advanced multi-layered construction
- Controls moisture content and locks exudate in
- Provides optimal fluid uptake
- Maintains integrity
- Conforms to body contours
- Promotes optimal moisture balance

2

Patented Safetac® technology

- Self-adherent soft silicone border - Soft silicone wound contact layer
- Minimizes trauma to the wound bed
- Minimizes pain on removal
- Does not adhere to moist wound bed

Safetac
TECHNOLOGY

3

New film backing with dynamic permeability

- Advanced fluid handling promotes optimal moisture balance
- Viral proof, bacterial proof & waterproof
- Thin, semi-transparent border for enhanced fixation and security
- Lower friction coefficient for secure fixation

For more information contact your
Mölnlycke Health Care representative
at 1-800-494-5134.

 **Mepilex® Border**

 **MÖLNLYCKE
HEALTH CARE**



ACCEPT NO SUBSTITUTES. MEPILEX® BORDER WITH SAFETAC® SOFT SILICONE.

which matures in one to two weeks. The adult female seeks out a food source (e.g., a dead animal) where she can lay 2,000 to 3,000 eggs. She does this so when the eggs hatch eight to 24 hours later, the new larvae have something to eat. The larvae eat for several days (three to seven) and then look for somewhere warm and dry to burrow (usually into dirt) where they form a hardened shell for the pupating phase. They stay buried in the dirt for seven to 20 days, depending on the temperature and the weather. When they emerge from the dirt they are fully developed flies, and the cycle begins again.

If unclean flies infest a wound there is a risk they could be carrying diseases (e.g., tetanus, cholera or



dysentery) or could be a more aggressive species that could cause harm to the wound. To make maggots "medical grade" they are produced in a sterile laboratory where the eggs are washed in an antiseptic solution and then placed on a clean food source of brewer's yeast and soy. This food source keeps them alive until they can be transported in a sterile jar to the patient (see Figure 2).

How Maggots Work

Five to 10 maggots per square centimetre of wound base are placed in the wound. Using fewer maggots may be ineffective, and using too many can cause pressure as they grow. When the maggots are in the wound they secrete proteolytic enzymes to liquefy the necrotic tissue in the wound, making it easier for them to ingest the slough and bacteria. The bacteria are killed both in the digestive tract of the maggots and by the antibacterial substances the maggots excrete.¹ The maggots also secrete allantoin, urea and other substances that can act as tissue growth factors.²

MDT has three functions: (1) to remove dead and infected tissue (debridement), (2) to eat and kill bacteria and (3) to speed healing. MDT can be used on any non-healing wound that contains sloughy dead tissue: pressure ulcers, venous ulcers, traumatic wounds, surgical wounds and diabetic ulcers. MDT can be used simultaneously with systemic antibiotics with no ill effects. In many cases, maggots have prevented the need to amputate limbs.³ MDT can even be used on foul-smelling, non-healable ischemic wounds to lower the amount of bacteria, thereby reducing the odour and improving the patient's and caregiver's quality of life.

continued on page 26

Applying Maggots to a Wound

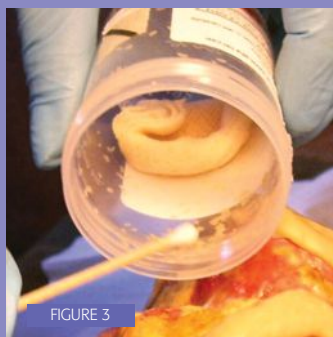


FIGURE 3

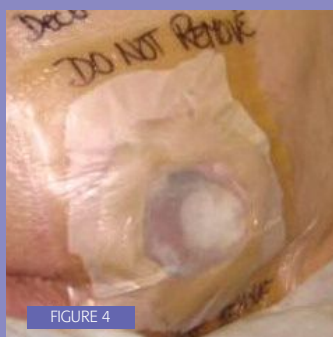


FIGURE 4



FIGURE 5

To apply MDT, use five to 10 maggots per square centimetre of wound base (see Figure 3) and cover the wound with a breathable but secure dressing. Apply gauze and an abdominal pad loosely over the primary dressing to absorb the increased drainage caused by the debridement process (see Figure 4). This outer dressing can be changed as needed. Maggots need air to breathe, so don't use any tight or occlusive dressings. Leave the maggots in the wound for two to three days, after which maggots are usually "full" (see Figure 5) and wanting to leave the wound to pupate (they will have grown four times their original size). The maggots are easily removed by flushing the wound with normal saline. Place the used maggots and dirty dressing in a plastic bag, tie it up and dispose as you would any other wound dressing. The maggots will suffocate without air. Reassess the wound to see if another batch of maggots is needed or not. Depending on the size of wound and the amount of slough present, one to five applications are usually sufficient.

Her wound healing is in your hands



control of exudate

cutability

protection



	Size cm	Code	Dressings/ box
TIELLE* MAX	11x11	MTP701	10
TIELLE* MAX	15x15	MTP705	10
TIELLE* MAX	15x20	MTP702	5

Introducing

New TIELLE* MAX
Non-adhesive hydropolymer foam dressing

MAXimized absorption
MAXimized fit
MAXimized comfort

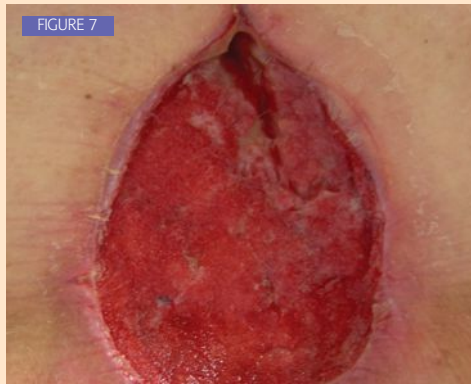
Johnson & Johnson
Wound Management
A division of ETHICON, INC.

Johnson & Johnson Medical Products • 200 Whitehall Drive • Markham, ON • L3R 0T5
Tel: (English) 1-800-668-9045 • Tél: (Français) 1-800-668-9067 • Web: www.jnjgateway.com

Johnson & Johnson Wound Management is a unit of Johnson & Johnson Medical Products,
a division of Johnson & Johnson Inc.



Before maggot debridement therapy (MDT).



After MDT.



Before MDT.



After MDT.

The biggest deterrent to MDT is the *yuk* factor. I have heard of clinicians that will refuse to work with maggots, but I have never yet had a patient refuse the treatment. Most patients with non-healing wounds are frustrated and fed up with myriad treatments that have been ineffective and are happy to accept any treatment that may get their wound healing—even if it is maggots. Patient teaching is imperative so the patient is very aware of what is involved and that some of the maggots may escape from the dressing.

Contraindications for MDT include the following:

- patient does not consent to their use
- a wound that requires frequent inspection
- necrotic bone or tendon
- exposed blood vessels
- bleeding disorders (natural or pharmacological)
- patient allergic to soy or brewer's yeast
- where debridement is contraindicated

MDT is not usually the first treatment of choice, but if other methods of debridement and decreasing the local bacterial load in the wound have failed or are progressing too slowly then MDT may be an appropriate choice. Experience shows that MDT can be an efficient, cost-effective and beneficial treatment for many people with non-healing necrotic wounds. ☺

References

1. Mumcuoglu Kosta Y, Miller J, Mumcuoglu M, Friger M, Tarshis M. *Destruction of Bacteria in the Digestive Tract of the Maggot of Lucilia sericata*. Entomological Society of America. 2001.
2. Armstrong DG, et al. Maggot therapy in "lower-extremity hospice" wound care. *JAMA*. May/June 2005;95(3):254-257.
3. Jukema GN, Menon AG, Bernards AT, Steenvoorde P. Amputation-sparing treatment by nature: "Surgical" maggots revisited. Brief report. *Clinical Infectious Diseases*. 2002;35:1566-71.

Currently in North America, only one place, in Irvine, California, produces medical-grade maggots. To order a batch of maggots for use in Canada you must have an import permit from the Canadian Food Inspection Agency and a border broker to handle issues at customs. This process can be cumbersome and slow at times and it adds to the expense of the treatment.

If you or your facility may be interested in using MDT in Canada, please contact Dr. Chris Harvey-Clark at the University of British Columbia (chclark@interchange.ubc.ca). He is considering producing maggots in Canada but needs to know the level of interest nationally to see if it is feasible.

Changing the standard of healing

Advanced Therapies

Proven Outcomes

Cost-Effective

Innovative therapeutic medical devices that promote wound healing and treat complications of immobility. Working with health care professionals everywhere to help change the standard of healing.

KCI Medical Canada Inc.

95 Topflight Drive • Mississauga • Ontario L5S 1Y1
Canada • Toll free 1 800 668 5403

Tel 1 905 565 7187

Fax 1 905 565 7270

www.kci-medical.com



2005 KCI Licensing, Inc. All rights reserved. All trademarks and service marks designated herein are the property of KCI and its affiliates and licensors. Those KCI trademarks designated with the "®" or "TM" symbol are registered in at least one country where this product/work is commercialised, but not necessarily in all such countries. The V.A.C.® (Vacuum Assisted Closure®) System is subject to patents and/or pending patents. Note: Specific indications, contraindications and precautions and safety tips exist for this product and therapy. Please consult your physician, product instructions and safety tips prior to applications.

Pulling Back the Mask: Detecting Infection in the Diabetic Foot

BY Kyle Goettl, RN, BScN, AND Stephan Landis, MD, FRCP(C)

This *Wound Care Canada* resource may be reproduced via photocopy for use by health-care professionals or downloaded from the CAWC Web site at www.cawc.net/open/wcc/5-2/goettl.pdf



In the person living with diabetes, foot ulceration and subsequent infection can be the events that lead to a lower limb amputation. Diabetic foot wound infections must be treated quickly, but identifying wound infection can be a challenge.

Classic clinical signs of a chronic wound infection include

- ☐ increased pain
- ☐ foul odour
- ☐ wound breakdown
- ☐ friable granulation tissue

Acute wound infections can also present with

- ☐ loss of function

- ☐ swelling
- ☐ heat and redness

However, in the person with diabetes, the classic signs of infection may be masked by a host of factors. For instance, diabetic sensory neuropathy may negate complaints of pain, while a blunted inflammatory response may decrease redness. Delayed healing could be related to an impaired immune response, and loss of function could be related to a motor neuropathy.

Therefore, diabetic foot wound infections may not present in the “usual way.” Much like a guest at a masquerade party, you must look past the disguise in order to make a positive identification of infection.

Steps for Identifying Infection in Diabetic Foot Wounds

- ☐ **Examine the old dressings** and peri-wound area noting any increase in wound drainage or a change in the character of the wound fluid.
- ☐ **Irrigate and debride** the wound if appropriate. (You must be sure there is sufficient blood flow to support healing prior to debridement.)
- ☐ **Measure** the length, width and depth of the wound in a standardized, reproducible way. Record and compare with earlier measurements. The increasing size of a wound can be a sign of infection.
- ☐ **Probe the wound.** Probing to the wound base and contacting bone suggests osteomyelitis and should be treated as such until proven otherwise.
- ☐ **Compare** the patient’s recent **blood sugar readings** to those from the week before and note any erratic changes. Increased impairment in glucose regulation without an obvious reason can be indicative of an infection.

Canadian Association
of Wound Care



Association canadienne
du soin des plaies

When the diabetic foot wound is not progressing as it should, even when best practice is being followed, this enabler can be utilized to help cue the clinician that there may be an underlying infection. By “unmasking” an infection, we are then able to proceed with appropriate interventions in the best interest of the people we serve.



TenderWet® Active rinses and debrides necrotic wounds for up to 24 hours.

Superior to Wet-to-Dry Dressings

If you currently use traditional wet-to-dry dressings, there's a simple way to help improve your outcomes and reduce nursing visits — use TenderWet Active.

TenderWet Active eliminates the need for wet-to-dry by actively rinsing and debriding necrotic wounds for up to 24 hours.

Absorbs and Irrigates

TenderWet Active works by attracting proteins found in dead tissue, bacteria and toxins into its superabsorbent core. At the same time, Ringer's solution is released from the dressing to help continuously irrigate the wound.

This combination of absorption and irrigation creates a unique “rinsing effect” that helps debride necrotic tissue from the wound bed.

The result is a cleaner wound that creates a more favorable environment for healing.



1-800-396-6996

905-403-7000

www.medline.com