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Advancing Healthcare through Education & Research in BioTherapy



# **DISCLAIMERS AND LEGAL NOTICES**

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**Disclosure**: Ronald Sherman, one of the co-authors of this template and Board Member of the BTER Foundation is also the Co-Founder and Laboratory Director of Monarch Labs, which produces and distributes Medical Maggots<sup>™</sup> and other biotherapy products.

### POLICY NAME

Maggot Debridement Therapy Policy and Procedure

#### POLICY NUMBER

XXXXX

### **PURPOSE**

The purpose of this policy is to provide guidelines for the use of Maggot Debridement Therapy (MDT) in wound management.

### PERSONNEL

ET and/or Wound Care Specialist MD, DO, DPM, PA, NP RN, LPN, LVN, CCA, CNA, NA Physical therapists Pharmacy &/or Supply & Receiving staff Social Worker / Case Manager Infection Control

### **INDICATIONS**

Non-healing wounds that contain slough or necrotic tissue (neuropathic and/or ischemic foot ulcers, pressure ulcers, venous stasis ulcers, traumatic wounds, and problematic post-surgical wounds). Some therapists also use MDT for maintenance debridement, or to determine the level of viability by debriding the necrotic tissue until reaching the viable tissue underneath. Some therapists use MDT for palliation of odor, drainage or pain. Be sure to document the indication(s) for treatment.

# WARNINGS, CONTRAINDICATIONS and RELATIVE CONTRAINDICATIONS

- 1. Persons allergic to fly larvae or materials used in their manufacture (brewer's yeast; soy) may manifest allergic reactions to maggots prepared in such media. *Check manufacturer's labeling.*
- **2.** Rapidly advancing infection that needs frequent inspection and possibly surgical intervention. MDT dressings could impair direct visualization of the wound.
- **3.** As an alternative to surgical resection for osteomyelitis, when surgery itself is not contraindicated. Surgical resection, when feasible, is the preferred method of debriding dead bone.
- 4. Necrosis extending to, and involving, blood vessel walls may be dissolved by the maggots' digestive secretions, along with the other necrotic tissue, leading to serious bleeding. If such wounds are to be treated with maggot therapy, then treatment should be rendered under close or intensive observation.
- 5. Unable to obtain informed consent from patient or power of attorney for healthcare.
- 6. Patients with natural or pharmacologically induced coagulopathy are at increased risk of bleeding; if they are treated with MDT they must be observed closely and frequently.
- 7. Disinfected maggots should never be transferred from one patient to another.
- **8.** Vials of medicinal maggots should never be used more than once. They are not intended nor approved for multi-dosing.
- **9.** *Pseudomonas* infections may not always respond to maggot therapy; they may need specific antimicrobial therapy before and/or during MDT.
- **10.** Medicinal maggots should not be used if the sterile seal is broken, if the container is damaged, if the maggots have a strong offensive odor, or if they are known or suspected of being contaminated.

### PERSONAL PROTECTION

Personal protective equipment (PPE) will be used at all times, as appropriate. Clean gloves will be used when handling maggots or wound dressings. Mask, eye protection, and gown, when performing treatment where exposure to blood/body fluids is likely.

### **COMPETENCIES**

Only licensed personnel who have been trained in the procedure will apply MDT dressings. Any licensed personnel may remove MDT dressings. Outer dressings may be changed by any personnel allowed to change simple dry dressings by current hospital policy. Patients, family members and caregivers may remove MDT and/or change outer dressings as a part of teaching prior to discharge.

### **PROCEDURES - Dressing Application**

The specific procedures and supplies for applying maggot therapy dressings depend on the location and dimensions of the wound. Several methods will be described here, but the successful therapist will often have to improvise. All of these dressings have in common the fact that they are designed to create a 'cage' over the wound floor, providing the maggots with free access to the wound bed (and undermined areas), but preventing them from leaving the proximity of the wound. An absorbant dressing (i.e., gauze) on the outside of the cage-dressing collects the liquified necrotic tissue drainage, and gets replaced as frequently as necessary (as frequently as it gets soiled). It is crucial that adequate air reaches the maggots through the dressing, and that the maggots do not drown in the liquid exudate that they create.

*Wound documentation supplies -* Camera, wound tracing device, marker, Skin Ulcer Flow Sheet, Nursing records

Miscellaneous supplies - Consent form, PPE (see below), rubbish collection supplies

1) Planar Wounds (Examples: ischial or sacral pressure wounds, plantar foot wounds, anterior tibial wounds, etc)

#### A) Pre-assembled MDT dressings (i.e., LeFlap [Monarch Labs])

- 1. Assess wound for appropriateness (see Clinical Indications, above).
- 2. Obtain MD order.
- 3. Obtain patient and/or family informed consent, and consent for photography, if applicable.
- 4. Gather and inspect all supplies. Read and understand product literature (preferably before reaching the bedside).
- 5. Photograph the wound before the first treatment (recommended), and periodically thereafter to measure and document progress.
- 6. Gently cleanse the wound and peripheral skin (never use povidone iodine or other skin irritants), cut hair, if extensive, and protect the skin with a skin protectant, if possible.
- 7. When using a dressing like LeFlap, it will be necessary to cut out from the hydrocolloid layer a hole that matches the dimensions of the wounds. If the dressing itself needs to be trimmed to fit the anatomy, then LeFlap DuJour is the better choice, because it can be trimmed without loosing adhesiveness. If the dressing already has a hole cut out in the foundation (hydrocolloid) layer, then it will not be necessary to cut the hole. Using the wound tracing device and marker, outline the wound, and cut out the pattern. Trace the pattern onto the hydrocolloid pad, and cut out the shape of the wound from these dressings.
- 8. Place the dressing on the skin, open the netted (flapped) layer, and place the maggots on the wound (easily accessible because of the hole in the hydrocolloid layer).

- 9. The dose of maggots is 5-10 per square cm. If the maggots come as "maggotimpregnated gauze" then simply calculate the amount of gauze necessary to contain the desired number of maggots, and place that amount of gauze over the wound. If this amount of gauze is not adequate to cover the entire wound, then an additional pad of gauze can be moistened with sterile water or saline and placed over the wound bed. For example, if the wound were 5 cm by 7 cm, then it's surface area would be 5 x 7 = 35 cm. The dose wound be 175 - 350 maggots. If the vial of maggot-impregnated gauze contained 600 maggots, then the therapist would need about half that to equal 300 maggots. The therapist would take or cut half the gauze and place it over the wound. There is no need to count each maggot, or attempt repeatedly to get every single maggot out from the vial. The maggots can simply be transferred from the vial to the wound within the maggot-impregnated gauze pad.
- 10. Now peel back the adhesive liner and flap down the netted fabric layer. Press firmly in place, to create a good bond.
- 11. If the patient or wound area is likely to move a lot or become soiled, it may be desirable to reinforce the dressing with silk, cloth or pink plastic tape, or with transparent membrane dressings, in a "picture frame" pattern. The film should cover the hydrocolloid frame and peripheral skin, but must NOT cover the central porous wound covering, or else it will prevent air from reaching the maggots and prevent the necessary drainage of necrotic wound exudate.
- 12. Cover this "maggot cage dressing" with dry absorbent gauze and secure loosely with a short gauze wrap or two pieces of tape. Air should be able to enter the dressing and the liquefied necrotic tissue should be able to drain out. Check this outer dressing every 4-6 hours for soiling, and replace with clean dry gauze as needed.
- 13. Leave the maggot cage dressing in place for approximately 48hours.

#### B) Do-It-Yourself (DIY) dressings, custom-made at the bedside

Sometimes the size or shape of a wound does not lend itself easily to being covered with a standard maggot dressing. In such cases, it is valuable to be able to create a MDT dressing from locally available products. The procedure is similar to that described above, except that the netted fabric layer must be adhered to the hydrocolloid layer with glue, tape, and other bonding materials.

- 1. Assess wound for appropriateness (see Clinical Indications, above).
- 2. Obtain MD order.
- 3. Obtain patient and/or family informed consent, and consent for photography, if applicable.
- 4. Gather and inspect all supplies. Read and understand product literature (preferably before reaching the bedside).
- 5. Photograph the wound before the first treatment (recommended), and periodically thereafter to measure and document progress.
- 6. Gently cleanse the wound and peripheral skin (never use povidone iodine or other skin irritants), cut hair, if extensive, and protect the skin with a skin protectant, if possible.
- 7. Using the wound tracing device and marker, outline the wound, and cut out the pattern. Trace the pattern onto a hydrocolloid pad, and cut out the shape of the wound from the pad.
- 8. Place the cut-out hydrocolloid pad over the wound, to expose the wound but cover the peri-wound skin. Apply securely to the skin, such that it frames the wound.
- Coat the hydrocolloid ring with a layer of liquid adhesive, such as NuHope Adhesive or Skin Bond (Smith & Nephew). The adhesive will become tacky while the maggots are placed within the wound bed.
- 10. The dose of maggots is 5-10 per square cm. If the maggots come as "maggotimpregnated gauze" then simply calculate the amount of gauze necessary to contain the desired number of maggots, and place that amount of gauze over the wound. If this amount of gauze is not adequate to cover the entire wound, then an additional

pad of gauze can be moistened with sterile water or saline and placed over the wound bed. For example, if the wound were 5 cm by 7 cm, then it's surface area would be 5 x 7 = 35 cm. The dose wound be 175 - 350 maggots. If the vial of maggot-impregnated gauze contained 600 maggots, then the therapist would need about half that to equal 300 maggots. The therapist would take or cut half the gauze and place it over the wound. There is no need to count each maggot, or attempt repeatedly to get every single maggot out from the vial. The maggots can simply be transferred from the vial to the wound within the maggot-impregnated gauze pad.

- 11. Place a porous cover (i.e.: polyester net, such as Creature Comforts<sup>™</sup> by Monarch Labs or Tegapore by 3M) over the maggots in the wound, making sure to extend it well past the wound edges, and affix it securely to the hydrocolloid pad with another layer of glue. The layers of glue above and below the porous net will bond will with each other, through the pores. Then add a layer of cloth or silk tape to sandwich the bond (hydrocolloid glue net glue -tape).
- 12. If the patient or wound area is likely to move a lot or become soiled, it may be desirable to reinforce the dressing with silk, cloth or pink plastic tape, or with transparent membrane dressings, in a "picture frame" pattern. The film should cover the hydrocolloid frame and peripheral skin, but must NOT cover the central porous wound covering, or else it will prevent air from reaching the maggots and prevent the necessary drainage of necrotic wound exudate.
- 13. Cover this "maggot cage dressing" with dry absorbent gauze and secure loosely with a short gauze wrap or two pieces of tape. Air should be able to enter the dressing and the liquefied necrotic tissue should be able to drain out. Check this outer dressing every 4-6 hours for soiling, and replace with clean dry gauze as needed.
- 14. Leave the maggot cage dressing in place for approximately 48hours. If maggots escape the dressing they should be disposed of in a red garbage bag. The dressing may be resealed, if possible, or may need to be removed completely and replaced with a normal saline moist to moist dressing (see below), changed every shift until new dressing orders can be written.

2) Three-dimensionally complicated wounds (Examples: stump wounds, large heel wound, anterior foot wound, which can not easily be covered with a simple sheet of fabric without wrinkling). These wounds are usually best covered by bag-like or stocking-like dressings, which can cover the stump, foot or circumferential let wounds.

For years, nylon stockings have been used for this purpose. They are simple to work with, readily available, and of low cost. The stretchable weave allows them to fit a variety of sized wounds. The major drawback, however, has been the fact that the smallest maggots, when first applied, can escape through the expandable holes. This can be quite disconcerting (seeing up to 5% of the applied larvae crawling out of the dressing), although it is of little concern, since the larvae, before finding their way to the wound bed, are germ-free and will desiccate within 30 minutes, so they will not spread to anyone else. Up until now, our only suggestion has been to use white- or ivory-colored nylon stockings, so the larvae will exit mostly unnoticed.

There is now a maggot-specific, fixed-weave (non stretchable) polyester net dressing in the shape of a stocking, which will avoid the problem of escaping larvae (LeSoc<sup>™</sup> by Monarch Labs). Since it is not stretchable, it comes in a variety of sizes to match the needs of the patient. Both can be applied in a similar fashion, which will be described below.

Warning - since fixed-weave fabrics do not stretch, be sure not to use them in a manner, or on patients who are susceptible to, constriction by the fabric, leading to ischemia.

- 1. As described previously, assess the wound for appropriateness (see Clinical Indications, above).
- 2. Obtain MD order.
- 3. Obtain patient and/or family informed consent, and consent for photography, if applicable.
- 4. Gather and inspect all supplies. Read and understand product literature (preferably before reaching the bedside).
- 5. Photograph the wound before the first treatment (recommended), and periodically thereafter, to measure and document progress.
- 6. Gently cleanse the wound and peripheral skin (never use povidone iodine or other skin irritants), cut hair, if extensive, and protect the skin with a skin protectant, if possible.
- 7. Cut a hydrocolloid pad into 1 cm wide strips, and place these strips as a fence around the wound. For example, they should be placed around the mid foot, proximal to a fore-foot wound involving the toes or toe stumps; for a circumferential leg wounds, one strip should be placed around the leg just proximal to the wound, and another just distal to the wound. For a breast wound involving the axilla, a fence could be made by laying strips down the mid-chest, laterally along the scapula and antero-lateral chest wall, and then across the proximal arm and down the flank or back.
- 8. Coat the hydrocolloid ring with a layer of liquid adhesive, such as NuHope Adhesive or Skin Bond (Smith & Nephew). The adhesive will become tacky while the maggots are placed within the wound bed.
- 9. The dose of maggots is 5-10 per square cm. If the maggots come as "maggot-impregnated gauze" then simply calculate the amount of gauze necessary to contain the desired number of maggots, and place that amount of gauze over the wound. If this amount of gauze is not adequate to cover the entire wound, then an additional pad of gauze can be moistened with sterile water or saline and placed over the wound bed. For example, if the wound were 5 cm by 7 cm, then it's surface area would be 5 x 7 = 35 cm. The dose wound be 175 350 maggots. If the vial of maggot-impregnated gauze contained 600 maggots, then the therapist would need about half that to equal 300 maggots. The therapist would take or cut half the gauze and place it over the wound. There is no need to count each maggot, or attempt repeatedly to get every single maggot out from the vial. The maggots can simply be transferred from the vial to the wound within the maggot-impregnated gauze pad.
- 10. Now place the porous, sock-like dressing (nylon stocking, LeSoc<sup>™</sup> dressing, etc) over the maggots in the wound, making sure to extend it at least far enough to cover the hydrocolloid strips. Affix it securely to the hydrocolloid strips with another layer of glue. The layers of glue above and below the porous net will bond will with each other, through the pores. Then add a layer of cloth or silk tape to sandwich the bond (hydrocolloid glue net glue -tape). The excess netted fabric can be trimmed, carefully, with scissors.
- 11. If the patient or wound area is likely to move a lot or become soiled, it may be desirable to reinforce the dressing with silk, cloth or pink plastic tape, or with transparent membrane dressings, in a "picture frame" pattern. The film should cover the hydrocolloid frame and peripheral skin, but must NOT cover the central porous wound covering, or else it will prevent air from reaching the maggots and prevent the necessary drainage of necrotic wound exudate.
- 12. Cover this "maggot cage dressing" with dry absorbent gauze (perhaps roll gauze). Air should be able to enter the dressing and the liquefied necrotic tissue should be able to drain out. Check this outer dressing every 4-6 hours for soiling, and replace with clean dry gauze as needed.
- 13. Leave the maggot cage dressing in place for approximately 48hours. If maggots escape the dressing they should be disposed of in a red garbage bag. The dressing may be resealed, if possible, or may need to be removed completely and replaced with a normal saline moist to moist dressing (see below), changed every shift until new dressing orders can be written.

# PROCEDURES - Dressing Removal

Dressing removal is essentially the same for all types of maggot therapy dressings. Remove all or nearly all maggots quickly and completely, disposing of them as wet dressing waste.

- 1. Maggot debridement dressings should be removed after approximately 48 hours (maximum 72 hours).
- 2. To remove the dressings, place an infectious waste (i.e.: "red") bag next to or under the dressing.
- 3. Inspect the dressing and surrounding skin carefully, noting any problems or abnormalities.
- 4. Remove the outer gauze dressing and gently loosen (but do not remove) the hydrocolloid pad from the skin.
- 5. Quickly peel back the hydrocolloid pad and the entire cage dressing from the wound with one hand, while wiping the larvae in the same direction with a moist 4x4" gauze held in the other hand, "sandwiching" the maggots between the hydrocolloid pad and the fresh moist gauze pad. The "wiping" gauze pad can be moistened with normal saline, irrigation water, or gentle antimicrobial (i.e., hydrogen peroxide). If using the latter, be sure to rinse out the antimicrobial thoroughly after removing the maggots (see #21, below).
- 6. Toss the MDT dressing and sandwiched larvae into the infectious waste bag. If the bag is mounted underneath the wounded limb, then the loose maggots will drop into the bag below as they attempt to escape.
- 7. Irrigate the wound with normal saline.
- 8. It may be necessary to use gloved fingers, forceps, or cotton swabs to remove a few immature larvae. Never kill the larvae within the wound if you are unable to extract them. It is better to leave live larvae in the wound, which will crawl out on their own and bury themselves in a dry gauze dressing, rather than risk leaving dead larvae within the wound.
- 9. Check the bedding for loose larvae, which may wander off in search of the infectious waste bag. Grasp them firmly and drop them off at that destination.
- 10. Secure the waste bag in the following manner: Tie a knot in the plastic bag (or drop the paper bag into a plastic bag, and tie a knot in that plastic bag). Then place this plastic bag into a second infectious waste bag and seal it securely with a knot. This technique is called "double-bagging." Be sure that the knots are tied completely, securely, and "AIR-TIGHT." A bow tie made from two opposing edges of the bag ("rabbit-ear bow-tie") is not adequate to prevent maggots from escaping from the bag. Drop the double-bagged maggots and dressings into the infectious waste bin.
- 11. Assess the wound for another application of maggots, or another appropriate dressing.
- 12. Apply that dressing
- 13. Document.

# ADDITIONAL CONSIDERATIONS

- 1. Maggot therapy must be performed within the context of good skin and wound care (pressure relief, cleanliness, repositioning of those with immobility, limb positions and dressings that optimize lymph and venous drainage and arterial perfusion, as per standard policies and procedures).
- 2. Patients with fever or changes in mental status should be evaluated for spread of infection (i.e., bacteremia, cellulitis) or elevated serum ammonia levels. Maggot dressings may need to be removed immediately to facilitate wound inspection.
- 3. See also package labeling and manufacturer guidelines.
- 4. Someone must be on-call and available at all times to answer questions and address problems with MDT patients. The name and contact number must be clearly identifiable in the patient's chart, and should be made known to the nursing staff and to the patient and/or family.

- 5. Staff must notify the wound care specialist on call for MDT patients if: the maggots are escaping, if the dressing comes loose, if the patient is not tolerating the therapy; or if there are any other non-routine problems.
- 6. If the patient does not tolerate the presence of the maggots (5-30% of patients experience some pain or discomfort after 30 hours, as the larvae grow larger, especially if the wounds were painful *before* MDT), then pain meds and anxiolytics should be readily available. If analgesics do not adequately control the pain, the dressing should be removed immediately. The pain should cease completely as soon as the dressings are removed. Replace the MDT dressing with a moist dressing, changed every shift, until new dressing orders can be written.
- 7. If maggots are seen to escape from the dressing, inspect the area and notify the wound care specialist on-call for MDT patients. Loose maggots should be "double-bagged" and discarded with infectious waste. If the dressing has a small defect or opening, and if the cage is not very full, then the dressing may be resealed. However, if the escape is due to the maggots being mature and leaving the wound, or due to too many larvae within the cage which is now bursting open, then the dressing should be removed and the wound inspected. The dressing can be replaced with a normal saline moist to moist dressing, changed every shift until new dressing orders can be written.
- 8. <u>Contact the person on-call for MDT dressings if the patient expires.</u> The dressings must be removed immediately if the patient expires.

# DOCUMENTATION

- 1. Consents
- 2. Skin Ulcer Flow Sheet
- 3. Dressing Change Flow Sheet
- 4. Wound Measurement Flow Sheet
- 5. Multidisciplinary Care Plan
- 6. Nursing Flow Sheet;
- 7. Patient and Family Teaching Form
- 8. Discharge Teaching Form.

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# APPROVALS:

Original Date: Supercedes #:		Originating Department:	
		ective Date:	Expiration Date:
Name	Title	Signature	Date
Name	Title	Signature	Date
Name	Title	Signature	Date