Developed by the BC Provincial Nursing Skin and Wound Committee in collaboration with Wound Clinicians from:

TITLE	**Procedure: Maggot Debridement Therapy (MDT) in Adults & Children**
Practice level	• Maggot debridement therapy (MDT) is a *restricted activity* according to the Nurse's (Registered) and Nurse Practitioner Regulation [1]. CRNBC states that registered nurses must successfully complete additional education before *directing* [2] MDT. • Registered nurses must demonstrate competence and follow an established decision support tool when carrying out maggot debridement therapy. Agency / health authority policy and standards must be in place to support this practice. • Clients undergoing maggot debridement therapy require an inter-professional approach to provide comprehensive, evidence-based assessment and treatment. This clinical practice guideline focuses solely on the role of the nurse, as one member of the inter-professional team providing care to these clients.
Background	• Maggot debridement therapy[3] (MDT) is the therapeutic use of sterile, live, medical grade maggots (fly larvae) for cleaning / debriding non viable tissue from healing and non healing wounds. • Medicinal maggots act by (1) debriding wounds and biofilms by dissolving and ingesting necrotic and infected tissue; (2) disinfecting the wound by killing bacteria; and (3) speeding healing by stimulating granulation tissue. • Maggots require moisture to effectively debride; therefore dry exudate and eschar must be softened prior to using MDT. • Medical grade maggots must be ordered by the physician through Health Canada Special Access Program and are transported in a sterile container containing gauze impregnated with soy and / or yeast. . • Maggots are single-use only and should be used within 24 hours of receipt to ensure sterility and optimal viability. Complete debridement may require from 1 to 6 cycles of MDT depending on the size of the wound and amount of necrotic debris in the wound. • MDT can be used in conjunction with systemic antibiotic therapy, chemotherapy and radiotherapy. • Used maggots must be handled as contaminated medical waste and destroyed following use. • The client or family must give verbal consent prior to initiating maggot therapy and must be able to comprehend, participate in and adhere to the MDT treatment plan. • In the event of death, the maggot dressing must be removed from the client immediately. The maggot dressing is also removed if the death is a coroner's case, however the dressing removal must be communicated to the coroner's office when the death is reported.
Indications / Precautions / Contraindications	**Indications** • Pressure ulcers, malignant wounds, diabetic ulcers, traumatic wounds, arterial and venous wounds, burns and wounds needing surgical closure which are needing debridement of moist necrotic tissue/slough or soft, boggy eschar. • Wounds that are colonized or infected, e.g. MRSA; may be used in conjunction with antibiotic therapy if needed. • Wounds where Conservative Sharp Wound Debridement is not possible due to the difficulty in differentiating viable from non-viable tissue. • For clients who are unable to go for surgical debridement due to their medical condition. • May be used for a wound that has limited blood supply and a goal of healing of "To 'Maintain' in order to achieve a clean wound bed. **Precautions** • Must be able to totally offload the wound, especially over the sacrococcygeal area as any pressure over the dressing will destroy the maggots. • Wounds infected with *Pseudomonas aeruginosa* may not be controlled with maggot use alone; consult a physician prior to treatment.

[1] College of Registered Nurses of British Columbia. (2010). Scope of practice for registered nurses: Standards, limits and conditions. Vancouver: Author.

[2] According to the Nurse's (Registered) and Nurse Practitioner Regulation, registered nurses cannot give orders to other registered nurses but can provide direction to initiate an activity such as maggot debridement therapy.

	• Clients with natural or medication-induced coagulopathy are at increased risk of bleeding with MDT and require close supervision if it is used. • Wounds which are very painful. • Not indicated as the primary treatment with infected bones (osteomyelitis) or tendons. • Deep tracking and deep joint wounds; consult a physician prior to treatment. **Contraindications** • Clients who are allergic to brewer's yeast and / or soy bean products. • Necrotic wounds that are dry or covered with eschar. • Life or limb threatening infection or rapidly advancing infection that requires frequent inspection. • Wounds with inadequate blood supply unless wound healing is not the goal. • Fistulae or wounds that connect with the abdominal cavity; should not be placed into any sterile body cavity. • Wounds close to major blood vessels or nerves. • Wounds not directly exposed to the outside. • The client refuses MDT or is not able to comprehend, participate in or adhere to the MDT treatment plan..
Definitions	**Aseptic Technique –** Technique used to limit the transfer of microorganisms from one person to another by minimizing the microbe count and preventing cross contamination; includes sterile technique, no-touch technique and clean technique. The technique chosen is based on the clinical condition of the client, the etiology and healability of the wound, the invasiveness of the dressing procedure, the goal of care and agency policy: ○ Sterile Technique – the use of sterile gloves, a sterile field, sterile dressing tray, sterile instruments, sterile solution and sterile dressings; only sterile gloved hands or instruments are used for direct contact with the wound. ○ No-Touch Technique – the use of clean gloves and a sterile field, sterile tray, sterile instruments, sterile solution and sterile dressings or dressings appropriately saved using no-touch technique; only sterile instruments are used for direct contact with the wound. ○ Clean Technique – the use of clean gloves (single client use, non-sterile), a clean field, a clean or sterile dressing tray, clean instruments (single client use), clean solution (single client use), clean dressings or dressings appropriately saved using clean technique; clean gloved hands or instruments are used for direct contact with the wound. **Debridement** –The removal of non-viable tissue from the wound to support healing. This includes autolytic, enzymatic, mechanical, sharp and surgical debridement, in addition to MDT. **Eschar, dry stable** – Firm, dry necrotic tissue with an absence of drainage, edema, erythema, fluctuance or separation from the wound edge. It may be black or brown in color and is attached to the wound edges and wound base. **Eschar, soft boggy** – Soft necrotic tissue which may be black, brown, grey, or tan in color. It may be firmly or loosely attached to the wound edges and wound base. Fluctuance and drainage may be present. **Larva** – Distinct juvenile form of many insects prior to metamorphosis (becoming an adult). **Maggot** – Larva of the fly *Lucilia (Phaenicia) Sericata*. **Slough** – Soft, moist necrotic tissue; brown, tan, yellow or green in colour; may be thin or thick and the consistency may be fibrous, stringy or mucinous; may be firmly or loosely attached to the wound edges and base.
Related Documents	Guideline: Wound Bed Preparation Guideline: Maggot Debridement Therapy in Adults & Children

Equipment and Supplies

1. Ordering and Receiving Maggots

- Must be ordered by the physician through Health Canada Special Access Program. Allow 24-48 hours for delivery of maggots.
- In acute care, the Wound Clinician receives the delivery and transports the maggots to the unit when MDT is initiated. In community care and long term care, maggots are managed on arrival according to agency / health authority policy.
- When the shipment of maggots arrives, remove the styrofoam cooler lid to allow fresh air into the container and inspected them to ensure they are alive and safe to use. Maggots must not be used if (1) the sterile seal on the container is broken or missing, (2) the container has a suspicious odour or (3) there is suspicion of contamination.
- Refrigeration is recommended to increase the longevity of the maggots if they cannot be used the day of arrival. Maggots can be refrigerated at 5 – 8 ºCelsius for up to 48 hours or longer.

2. Dressing Supplies

For applying the dressing:

- Clean gloves x 4
- Sterile dressing tray
- Sterile 2"x2" or 4"x4" gauze
- Sterile normal saline
- Disposable measuring guide
- Camera
- Transparent film dressing x 2; size for dressing should be twice the size of the wound
- Hydrocolloid dressing **or** the Le Flap dressing (a pre-packaged self-adhering hydrocolloid and Dacron Mesh dressing from Monarch Labs).
- Sterile scissors
- Skin sealant
- Sterile cotton tipped applicator
- Sterile gloves; if preferred for applying the maggots
- Fine mesh cover (e.g. Dacron mesh from Monarch Labs)
- Paper tape
- Ostomy paste or Ostomy strip paste
- Indelible marker
- Non-occlusive cover dressing (e.g. ABD pad)

For changing the outer dressing only:

- Clean gloves x2
- Non-occlusive cover dressing (e.g. ABD pad)
- Paper tape

For removing the entire dressing:

- Clean gloves x2
- Sterile dressing tray
- Sterile normal saline
- Sterile 2x2 or 4x4 gauze
- 2 plastic garbage bags(needed when removing maggot cage dressing)
- Appropriate dressing supplies to reapply another maggot cage dressing or apply another type of dressing.

Procedure

Applying the Cage Dressing	
Steps	**Key Points**
1. Explain procedure to client and obtain verbal consent for procedure. Assess for the presence of pain and pre-medicate if necessary.	
2. Check the dressing supplies available at the bedside or in the home. Gather all other additional supplies that are required.	Take only necessary dressing change supplies to the bedside or into the home - all supplies taken to the bedside or home cannot be returned to the dressing supply and must be discarded if not used.
3. Ensure cleansing solution is at least room temperature (20^0 C).	Using a cool or cold cleansing solution to cleanse the wound can lower the wound temperature delaying healing and can cause discomfort for the client.
4. Prepare / clean work surface.	
5. Perform hand hygiene with either soap and water or waterless antiseptic hand rub.	Follow agency policy and guidelines for hand washing.
6. Position client for procedure. If needed, position disposable pad / kidney basin to catch the cleansing solution. Wear gloves if needed.	

Steps	Key Points
7. Perform hand hygiene with either soap and water or waterless antiseptic hand rub.	Follow agency policy and guidelines for hand washing.
8. Set up dressing tray using appropriate aseptic technique.	
9. If required, put on personal protective equipment as per agency policy.	Using fluid under pressure can cause splash-back.
10. Put on clean gloves.	
11. Thoroughly cleanse the wound and peri wound skin with, at least room temperature, sterile normal saline.	If irrigating the wound, use personal protective equipment to protect from back-splash.
12. Assess and measure the wound; remove gloves and photograph the wound if camera available.	To establish a baseline and to monitor progress in order to make decisions about continuing treatment.
13. Apply clean gloves; place one of the transparent film dressing over the wound and trace the edges of the wound with an indelible marker; then cut out the area inside the tracing.	Provides a pattern for the dressing.
14. Trace the pattern onto both the hydrocolloid dressing and the other transparent film dressing and cut out the areas inside both tracings.	
15. If using the Le Flap dressing, also trace the pattern onto the back of the hydrocolloid dressing and cut out the area inside the tracing.	
16. Apply skin protectant to the peri wound skin.	
17. Place the hydrocolloid over the wound so the cut-out part is around the wound opening and place a bead of ostomy paste (optional) on the cut edge of the hydrocolloid dressing.	Acts as a barrier to maggot migration and protects the wound edges from enzymes secreted by the maggots.
18. Transfer the maggots from the bottle onto the wound with moistened sterile gauze, a sterile Q-tip or use sterile gloved finger. Apply 5 – 10 maggots per cm^2.	The number of maggots required to achieve rapid debridement is determined by the size of the wound and the amount of necrotic slough that is present. Apply no more than 10 maggots per cm^2; apply less maggots per cm^2 for wounds with less necrotic tissue or slough as maggots grow 10 – 15 times their original size in 48 – 72 hours. Using too many maggots per cm^2 may cause undue pain or pressure or cause overcrowding of the maggots as they grow.
19. Lay Dacron over the wound and extend it well beyond the wound edges. Secure the Dacron to the hydrocolloid with either ostomy paste or tape. If using the Le Flap dressing, peel the backing off the Dacron mesh and apply.	This forms the "maggot cage" securing the maggots in the wound but allows air to enter and exudate to escape.
20. Apply the transparent film around the edges (window pane) but **not** over the top of the cage dressing	If the transparent film dressing is applied over top of the maggot cage dressing, it will cut off the air supply suffocating the maggots and will cause pooling of exudate thereby drowning the maggots.
21. Write "Do Not Remove This Dressing" with indelible marker on the transparent film dressing.	This will alert staff not to remove the maggot cage dressing when changing the outer dressing.

22. Cover the maggot cage **loosely** with a non-occlusive cover dressing and tape. Ensure that the wound area is off-loaded.	The cover dressing must be able to absorb wound exudate while not suffocating the maggots. Applying the cover dressing too tightly or not ensuring that the wound area is off-loaded will cause pressure on the maggots which will damage them.
23. The "maggot cage dressing" is to be left in place for 48 hours. Every 2-4 hours check that: • the wound area is off-loaded • the outer cover dressing is dry; change when the exudate has wicked through to the outer layer • there are no openings in the maggot cage • the 'window paned' edges of the dressing are intact If the maggot cage is loose: • re-enforce only the dressing edges with transparent film • check surrounding area for escaped maggots, crush them with gloved fingers or drown them in a cup of water; then double bag them and discard in the garbage • notify the Wound Clinician If a small opening occurs in the cage: • attempt to reseal the open area with transparent film or tape • check surrounding area for escaped maggots, crush them with gloved fingers or drown them in a cup of water; then double bag them and discard in the garbage • if the open area cannot be resealed, remove the maggot cage, apply a cover dressing and notify the Wound Clinician immediately	The debriding process will create increased exudate. A saturated outer cover dressing will not be able to continue to wick the exudate from the wound and the maggots can drown. Increased exudate may have caused the edges to lift causing the maggot cage to become loose. If it is suspected that one or more maggots have escaped, remove all the bedding and call housekeeping (Acute Care and Residential Care) to do a terminal clean of the area. In Community, have the surrounding area searched for any escapees.

Changing the Outer Dressing Only	
Steps	**Key Points**
1. Wash hands and apply clean gloves. Remove the outer dressing and discard. Remove gloves.	
2. Apply clean gloves. Cover the maggot cage with a non-occlusive cover dressing and tape **loosely** in place.	The cover dressing must be able to absorb wound exudate while allowing air to reach the maggots to avoid suffocation. Applying the cover dressing too tightly will cause pressure on the maggots which will damage them.
3. With increased exudate the cage dressing may loosen. If this occurs: • re-enforce the dressing edges with transparent film • check surrounding area for escaped maggots, crush them with gloved fingers or drown them in a cup of water; then double bag them and discard in the garbage • notify the Wound Clinician	If it is suspected that one or more maggots have escaped, remove all the bedding and call housekeeping (Acute Care and Residential Care) to do a terminal clean of the area. In Community, have the surrounding area searched for any escapees.

Removing the Entire Cage Dressing	
Steps	**Key Points**
1. Explain the procedure to the client and obtain consent to apply the maggot dressing.	
2. Assess for the presence of pain and pre-medicate as necessary.	
3. Wash hands and apply clean gloves. Prepare moist gauze.	
4. Place one of the plastic bags next to or under the dressing.	Use the bag to catch any loose maggots.
5. Remove and discard the outer cover dressing.	
6. With one hand, peel back the hydrocolloid and the entire "maggot cage" from the wound. With the other hand, wipe the maggots from the wound into the "maggot cage" with the moisten gauze. Holding the gauze against the maggot cage to keep the maggots contained, discard the dressing and maggots into the plastic garbage bag.	
7. Cleanse the wound thoroughly with sterile normal saline to remove the maggots and cleanse the wound. If maggots adhere to the wound, cleanse with more sterile normal saline and apply a moderate level of pressure to wipe maggots from the wound bed or remove them with tweezers/ forceps.	
8. Check the area for escaped maggots and put them in a plastic garbage bag.	If it is suspected that one or more maggots have escaped, remove all the bedding and call housekeeping (Acute Care and Residential Care) to do a terminal clean of the area. In Community, have the surrounding area searched for any escapees.
9. Secure the opening of the plastic garbage bag with a knot and double bag in the second plastic bag, also secured with a knot. Dispose of the plastic garbage bags according to agency policy.	The double bagging and knotting of both bags ensures the maggots do not escape and eventually they are suffocated. Maggots must be handled as contaminated medical waste and destroyed following use.
10. Apply another maggot cage according to the previous procedure or apply another appropriate dressing as pre agency policy.	

In the Event of Death	
Steps	**Key Points**
1. In the event of death remove the maggot debridement dressing immediately.	Following death the maggots will begin removing tissue outside the confines of the wound.
2. If the death is a coroner's case remove the maggot debridement dressing and communicate the dressing removal to the coroner's office when the death is reported.	

Documentation

1. Client / family consent for MDT must be documented on the client record.
2. Document initial and ongoing assessments as per agency guidelines.
3. Document dressing changes, care plans and revisions, and clinical outcomes as per agency guidelines.
4. In the event of death document that the maggot debridement dressing has been removed.

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