MIRACULOUS MEDICAL MAGGOTS

(1) What if your doctor told you that after months of using different medical treatments on your infected foot that nothing was working and that your foot would have to be cut off? If there was one last hope to save your foot but it would involve something unusual and gross, would you try this last resort? If so, then you should get prepared for maggot debridement therapy or MDT. In this procedure, living maggots are applied to a wound that is not healing. The maggots will seek out and eat the necrotic tissue which is made up of the dead and damaged cells in a wound. Debridement is the medical term for cleaning out the dead and unhealthy tissue from wound.

(2) Maggots are the larvae of flies. In the larval stage, they are wriggling, pale and wingless with big appetites. Medical maggots need to be carefully treated and chosen. These maggots are disinfected before they are introduced into a wound so that they don't transmit other infectious organisms. As well, not all maggots are medically useful and can be quite harmful. Some species of maggots are parasitic and cause diseases. In many parts of the world, various botflies, blowflies and screwflies create parasitic myiasis. Myiasis occurs when fly larvae start consuming healthy tissue and cause wounds which can become infected. Some larval species can even tunnel into the body and reach the internal organs including the brain. Currently, the common green bottle fly, also scientifically known as *Phaenicia sericata*, is the approved maggot of choice for maggot debridement therapy.

(3) The common green bottle is a species of botfly that is useful for many reasons. Though it is a botfly, it poses very little risk of causing myiasis when used to debride wounds in a medical setting. The larvae also have antibacterial secretions that can lower the risk of infection, especially from the bacteria that tend to colonize chronic wounds. Currently, certain compounds in larval secretions from the green bottle fly larvae are being tested for their effectiveness in treating MRSA, which is a bacteria that is responsible for infections that are very difficult to treat using antibiotics. As well, there are indications that larval secretions also encourage fibroblasts to migrate through the body and towards the wound. Fibroblasts are cells that produce extracellular matrix and collagen, which are two materials needed to promote wound healing and closure.

(4) Not all wounds are suitable for maggot debridement therapy. Wounds must be open, moist and have a good supply of oxygen for them to benefit from MDT. Dry wounds are not suitable though some can be made suitable if the wound is soaked and softened in saline solution for 48 hours before applying the maggots. Wounds deep within body cavities are also not suitable. Though the wound might be moist, there isn't enough oxygen within a body cavity to keep the maggots alive.

(5) A typical MDT treatment involves putting hundreds of small 1-2mm maggots on a wound. The maggots debride the wound in a manner that is much more precise than any surgeon could perform as maggots selectively leave the living tissue intact while eating the necrotic tissue. The maggots feed through a process called extracorporeal digestion. This means that they secrete a liquid containing enzymes that break down and liquefy the necrotic tissue. The maggots then absorb the liquid tissue nutrients over the next two or three days and grow in size to 8-10mm. The wound can become quite gooey and sloppy and produce a bad smell during this time. After no longer than 72 hours, the maggots are removed and the wound is cleaned.

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(6) Some patients report that maggot debriding causes a tickling sensation. This can become very uncomfortable for some people and even painful for others as the maggots roam over delicate nerves and insert themselves into tight crevices in search of necrotic tissue. For some patients, pain medication needs to be supplied.

(7) A dressing must be applied to the wound after the maggots are in place. A dressing is a sterile pad or compress that covers the wound. It is needed to protect the wound from further injury and infection but it is also required to prevent the maggots from escaping. In many cases, it is also needed to shield the patient from seeing the maggots while they debride the wound. Though MDT therapy might be very useful, many patients find the idea distasteful and disturbing even if it is deemed the most effective course of treatment.

(8) Maggot debridement therapy was actually quite popular in the early 20th century. It was often used by military surgeons in WWI to treat wounds. The advent and widespread use of antibiotics caused MDT to fall out of favor. Currently, with the list of antibiotic resistant bacteria on the rise, MDT has reemerged as an effective therapy to treat ulcers, gangrene, burns and even skin cancer in some cases.

Article Questions

1) What does debridement mean?

2) What is necrotic tissue?

3) Give three reasons why the green bottle fly is a good species of maggot for wound debridement?

4) What three conditions does a wound need for it to be suitable for maggot debridement therapy?

5) How do maggots feed?

6) What is one potential negative side effect of maggot debridement therapy?

7) Why did MDT fall out of favor as a therapy after the early 20th Century?