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Bringing Down the Barriers of Maggot Debridement Therapy

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BRINGING DOWN THE BARRIERS OF MAGGOT DEBRIDEMENT THERAPY

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Requirements for the degree of

Master of Arts in Nursing

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**Augsburg College
Department of Nursing
Master of Arts in Nursing Program
Thesis or Graduate Project Approval Form**

This is to certify that **Kristine Gillard** has successfully defended her Graduate Project entitled "**Bringing Down The Barriers**" and fulfilled the requirements for the Master of Arts in Nursing degree.

Date of Oral defense June 13, 2008.

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Abstract

The purpose of this paper is to describe the rationale for Maggot Debridement Therapy (MDT) and the development of a practice model. Chronic wounds are a growing problem in health care. Debridement of a wound is an essential component of wound healing as the presence of devitalized tissue can impede the healing process. Even with today's high-tech medicine there are still times we need to resort back to the basic and simple principles from nature that may help combat medical problems. The use of maggot larvae for wound debridement has made resurgence into wound management in the last 15 years. This paper outlines and follows the development of a maggot debridement and implementation program at large medical center in Middle America.

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BRINGING DOWN THE BARRIERS OF MAGGOT DEBRIDEMENT THERAPY

Chapter 1 - Background

Chronic wounds are a growing problem within health care (Wollina, 2002).

Debridement of a wound is an essential component of wound healing as the presence of devitalized tissue can impede the healing process (Parnes & Lagan, 2007). Overuse of antibiotics has led to a greater increase of Methicillin-resistant Staphylococcus Aureus (MRSA) colonization and increased instances of antibiotic resistant strains such as vancomycin resistance enterococcus (Bowling, 2007). Even with today's high-tech medicine there are still times we need to resort back to the basic and simple principles from nature that may help combat medical problems (Jukema, 2002). The use of maggot larvae for wound debridement has made a resurgence into wound management in the last 15 years. Parnes and Lagan (2007) comment, "As a treatment it meets the demands of clinical governance, being not only beneficial to the patient, but also, being proven to be more cost effective" (p. 488).

Currently, Maggot Debridement Therapy (MDT) is being offered by the Department of Dermatology at Mayo Clinic Rochester. A registered nurse (RN) who works in an outpatient care setting offering therapy and education for psoriasis, dermatitis, wound care and other dermatologic diseases is currently the only nurse who does this treatment and was trained at a maggot debridement conference at the University of California in Riverside on April 21, 2006. This nurse has applied the larvae and dressings and educated ten patients that have been treated with MDT at Mayo Clinic thus far. To continue treating patients with MDT more of the nursing staff must be trained in

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this therapy. This nurse will be an integral part of the project helping to educate her other colleagues on dressing application as well as helping to spread the information about MDT.

The MDT is offered within the overarching philosophical framework guiding nursing care at Mayo Clinic. Jean Watson's Theory of Human Caring provides the underlying framework for the Mayo Nursing Care Model. This new model was designed to describe what nurses at Mayo Clinic do each day, their values and traditions. The Mayo Nursing Care Model states that relationship based care is humanized care. The model embodies Jean Watson's idea that the caregiver benefits from the care given to the other, the caring moment and the creative use of self by the caregiver. This model will guide the development of the maggot therapy program.

Watson's theory resonates well with the practice of maggot therapy and how one must relate with the patient receiving therapy. Patients who have chronic wounds are often suffering from pain that may be debilitating to the point that they are unable to work and may not be able to carry out normal day-to-day functions. The ensuing financial hardship, potential loss of employment and adequate healthcare coverage and the rift in personal relationships compound the person's burden. The relationship with these patients happens in the first few moments of contact and is dependent on touch, facial expressions, honesty and trust. These elements are among those spelled out in Watson's ten clinical *caritas* processes. Watson's theory is also congruent with Mayo Clinic's primary value of "the needs of the patient come first" (Mayoclinic.org, 2008). Watson's theory fits with the changing face of the relationship of the patient and their healthcare; it recognizes that the patient is a partner in their own health care. When

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talking with a patient who has tried many times and many different ways to heal an ulcer and they are devastated by pain, perhaps debilitated and unable to work, the nurse has to come to them with a caring attitude, ready and willing to build that relationship. He or she must be sensitive to what they are going through, their fear and hesitation and the nurse needs to be honest and provide them with all the information they need to understand the pros and cons of maggot therapy.

Additionally, the Theory of Human Caring is part of the culture and mission of nursing at Mayo Clinic. It is symbolized by the “three shields” in the Mayo Clinic logo that represent practice, education and research. Practice is lifted up as an integrated multidisciplinary team effort focusing on the needs of the patients in the community, region, nation and world. Education of the nursing staff is encouraged and promoted to ensure that the information provided to patients is accurate and reliable. This is supported by the nursing culture of research to improve patient care and to do their part to help society. Thus, the atmosphere at the Mayo Clinic is one of mutual respect, teamwork and continuous improvement.

Additionally, there is an atmosphere of teamwork on the nursing unit in which MDT will be taught and put into practice. The type of leadership that is seen on this unit is servant leadership. Robert Greenleaf first coined this term in 1970 when he wrote an essay entitled *The Servant as Leader*, with the goal of getting people thinking about how they could develop a caring society (Spears, 1998). Isis Lioba Howatson-Jones (2004), in her article entitled *The Servant Leader*, writes “leaders cannot lead without followers, perhaps understanding the followers’ perspective is a better way to promote effectiveness” (p. 4). She continues on in the article to suggest that by considering the

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needs and desires of employees, the leader can then collaborate with them to achieve the organizational goals. In a group of professional nurses such as the one involved in MDT, it is expected that the leader will practice collaboration.

MDT is a new practice to this work unit; much of the literature suggests that nurses have barriers when it comes to accepting this therapy. Not surprisingly this work unit is not entirely ready to embark on the practice of MDT. An education model will be developed to show the group the usefulness and the impact that maggot therapy can have on a wound and ultimately the patient. This hands-on model will also help the nurses overcome the “yuk factor” as described by Steenvoorde et. al. (2005) as the nurses learn how to apply maggots and the complicated dressing as well as educate the patient and family.

The literature review in Chapter 2 will present current research related to MDT and the role that leadership and education have in the development and implementation of a successful MDT program.

Chapter 2 – Review of Relevant Literature

Nursing Theory

Nursing is in a unique place at this time. As a profession nursing is trying to go back to its roots as a vocation or calling, to care for others as an independent profession. Historically, nursing has been called a “caring” profession. For many years nursing has been trying to define what “caring” is. “There is a growing body of literature focusing on the concept of caring and its relevance to nursing practice” (McCance, 2003, p. 102). There has been research identifying the outcomes of caring and a theoretical link between caring and the quality of care (McCance, 2003; Chantal, 2003).

Jean Watson’s Theory of Human Caring brings nursing back to its vocation of caring. This theory helps one understand the larger context of caring and takes nursing from a job to a profession. In Watson’s theory, the “caring consciousness of the nurse becomes essential for the connection and understanding of the other persons perspectives” (Chantal, 2003, p. 53). This understanding brings about quality of care.

The Human Caring Theory was developed by Jean Watson in the late 70’s. This theory centers on the premise that caring is essential to developing transpersonal relationships and finding the caring moment or occasion to promote healing. Watson has developed 10 carative factors that have served as a framework for her theory. As her theory has matured, her carative factors have developed into Clinical Caritas Processes (Watson, 2006). These processes serve to define the caring-healing processes that have helped to move the profession of nursing ahead. Today, many institutions of higher

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learning and nursing institutions are using these Clinical Caritas Processes to define and develop a model of care to guide education and practice within their own organizations.

The Theory of Human Caring describes the relationships developed in the caring fields. Jean Watson describes how to connect with our patients. She discusses the caring moment and the caring consciousness. She puts a voice to what nurses have known by intuition. One must convey trust and caring to connect with a person, and then take advantage of that specific window of time when the patient and the nurse are connected at the spirit–to–spirit level (Watson, 2006) to be able to teach, care for, and heal. The relationship described in Jean Watson’s theory is that of the caregiver and the person needing care. It requires the formation of a true relationship of understanding, “knowing” the person in a spiritual way that assists in reading the persons mannerisms, gestures, and even expressions. This enables one to know the other so that a relationship of trust and caring are formed to allow one to work with the other to intentionally care.

Maggot Therapy

Maggot therapy has a place in today’s wound care management. With the rise in diabetes, increase in antibiotic resistance and an aging population that is being required to pay more of their own health care costs, there is a need to find a wound care alternative that is less expensive, requires fewer antibiotics and is easily managed and accepted by the patient and their nurse. Despite advances in wound care, antibiotics and surgical technology, chronic wounds remain a significant health and financial problem. Maggot therapy is an old treatment but new studies show efficacy and safety that is also cost effective (Parnes & Lagan, 2007, p. 488).

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In January 2004, the FDA gave clearance to produce and market medical maggots “for debriding non-healing necrotic skin and soft tissue wounds, including pressure ulcer, venous stasis ulcer, neuropathic foot ulcers and non-healing traumatic or post surgical wounds” (Thomas Hess, 2005, p. 12). Since this time many practitioners have turned to the maggot once again for assistance. Dr. Ronald Sherman in 2002 stated “more than 1000 physicians and surgeons now use maggots in wound care” (p. 136) and “worldwide, 5,000 to 10,000 maggot treatments are administered annually (Sherman, 2002, p. 136).

The use of maggots for chronic or infected wound debridement goes back hundreds of years. There are reports dating back to the Napoleonic times discussing the successful use of larvae in removing the slough tissue from wounds (Parne & Lagan, 2007, p. 488). Reports from the 1500’s note the cleanliness of wounds on soldiers that were infested with worms. Military surgeons would praise the healthy state of battlefield wounds that had become infested with fly larvae (Rojo & Geraghty, 2004; Sherman, 2002; Waxman, Walker, & Walker, 2000). William Baer, an orthopedic surgeon in World War I, witnessed first hand the benefits of maggot-infested wounds. Baer used maggot therapy to successfully treat many patients at John Hopkins and Children’s Hospital in Baltimore. He presented his results in 1929 to his colleagues. After his death, his colleagues published the results in 1931. Over the next five years maggot therapy was used widely through out the United States, Canada and Europe (Sherman, 2002).

In the 1940’s the popularity of using maggot larvae to debride and heal wounds dropped out of favor. The reason for this was three fold. First, antibiotics were discovered. Second, surgical techniques were greatly improved. The use of these newly

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created antibiotics and improved surgical techniques resulted in maggot therapy being considered as treatment only when the newer conventional therapy had failed. Third, the incidence of chronic bone and soft tissue infections, for which maggots had been used as therapy, had declined. Between the years of 1950 and 1990 maggot therapy was rarely used and seldom talked about publicly (Sherman, 2002).

With today's rising cost of healthcare and rise in antibiotic resistant strains of bacteria, larval therapy needs to be considered in wound management. The cost of a pot of maggots, about 300 larvae, is about \$88.00

(<http://www.bterfoundation.org/indexfiles/MDT.htm>). This cost is significantly less than the cost of traditional wound management. It is estimated that in the United States it costs over \$150 million a year to treat just foot ulceration related to diabetes (Harding, 2002). Maggot therapy at this point is being used as the last resort before amputation or at the most as the third or fourth line of defense. Insurance is increasingly agreeing to pay for the treatment because of the low cost. This therapy may be done in an outpatient setting, decreasing the cost even further. The benefit to the patient is that the treatment stays on for 48-72 hours so there is less disruption of the wound. The larvae eat only dead, necrotic tissue. As they eat they rid the wound of bacteria and secrete proteolytics that encourages the formation of granulation tissue. If maggot debridement therapy was used earlier in the management of wounds it would decrease the use of antibiotics in these chronic wounds, reducing hospital admissions and the need for surgical intervention in the treatment of certain types of necrotic wounds.

Leadership

“Leadership is defined as the art of influencing and engaging colleagues to serve collaboratively toward a shared vision” (Gilster, 2002, p. 233). In the healthcare field, service to others is the main motivating factor. It takes a leader to take that idea of service and guide the area toward a means of shared vision. The leader must have a passion and commitment to serve. A strong leader has a sense of ownership of that vision. This passion, commitment and vision on the part of the leader then drives the followers to want to make a difference in someone else’s life.

“Nursing practice no longer relies on tradition or ritual; instead, it is based on research and empirical evidence” (Flynn, 2005, p. 142). Nursing has been working very hard to define the care for specific patient diagnosis to assure that the proper care is given to improve patient outcomes and decrease complications. Procedural guidelines and protocols have improved patient care by assuring that the proper care is given to the patient, and has increased efficiency and effectiveness (Bell, 1997).

The research and reviews indicate that when nurses follow their vocation and uphold the caring values, their practice is transcended from a state of “just a job” to that of a gratifying profession (Chantal, 2003), which then leads to quality care. This transcendence reflects one’s attitude about leadership and one’s role as a caregiver. Larry Spears (1998), in his foreword to *Insights on Leadership*, states that servant-leadership emphasizes increased service to others, a holistic ecological approach to work promoting a sense of community, of togetherness, of connection (p. xv). This form of leadership takes the traditional hierarchal pyramid and turns it upside down. The leader is serving the employee and helping the work unit succeed by helping each individual succeed.

Blanchard (1998) states, “servant leadership is all about making goals clear and then rolling your sleeves up and doing whatever it takes to help your people win” (p. 28).

Transformational leadership has similar qualities to servant leadership.

According to Daft (2005) a transformational leader leads by “rallying people around an inspiring vision, expressing optimism about the future, helping followers’ develop their potential and empowering people to make change happen” (p. 154). The hierarchy is not flattened as it is in servant leadership but there is a similar emphasis on the followers.

Followers are encouraged to express themselves by becoming involved in the organization through its vision and goals. The leader concentrates on the needs of the follower, trust is formed and the follower begins to look beyond himself or herself so that they are looking forward toward the good of the work unit. Change is not a threat in this environment but something that is necessary to work through to obtain the shared vision. The vision is the most important element of this form of leadership, “Without vision, there can be no transformation” (Daft, 2005, p.155).

The healthcare climate is changing and along with it, the leadership role is changing. Today there is competition not only for good employees but also for customers. Everything is about service. The customers expect excellent service or they go to the competitor next door and if employees don’t feel they are treated right, they shortly follow the customers. Today’s workers want to know that their contributions are valued. They want their ideas listened to. In short, they want to feel cared for. Employees are no longer happy being submissive to the leader and being told what to do. “Today’s leaders need to bind people together for a shared purpose through more positive forces such as caring and compassion, listening, and connecting to others on a personal

level” (Draft, 2005, p. 199). Batten (1998) states, “To care, share, and forgive is to live at life’s cutting edge. As we care, we reach out beyond ourselves....If we do not care much about others, we will ultimately not care much about ourselves in the real sense of the word” (p. 35).

Servant leadership is a form of influencing others rather than the traditional style of leadership that works on control of others. Influencing others cannot be done unless there is a trusting relationship between workers and their leader. Today’s worker wants to be respected, and truly cared for. Loving and caring relationships with workers builds on trust and community. A servant leader has an idea of where the work unit needs to go and that direction is energetically shared through a vision with the workers. Once all of these elements are working together, the leader serves the worker by encouraging their growth and development. A creative and energetic work unit working as a community toward a common vision that will become realization rewards the leader.

Rationale for project

This project will outline and follow the development of a maggot debridement therapy program at Mayo Clinic in Rochester, Minnesota. On April 21, 2006 the Department of Dermatology sent two nurses to a Maggot Debridement Therapy course at the University of California, Riverside. The mission was to learn how to conduct maggot therapy, bring that information back to Mayo Clinic and develop a program to be implemented within the Mayo setting. The goal was to have another tool in the toolbox to help heal wounds such as pressure ulcers, venous stasis ulcers and diabetic wounds.

To make a maggot debridement program acceptable as an inpatient treatment and an outpatient treatment it needs to be accepted and understood by the various departments

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in the hospital that may come in contact with the patient during the treatment. An educational power point was developed to share with the supervisors of environmental services, linen services, housekeeping, pharmacy and infection control. Individual meetings were held to explain the need for the therapy, the benefit to the patient and the treatment described. The outcome of the meetings was acceptance of the program as a safe treatment that would not cause harm to other patients in the hospital or outpatient settings.

Patient education needs to be developed to help the patient understand the use of maggots for wound therapy versus accepted medical and surgical wound treatment therapy. Ronald Sherman, MD is a researcher at the University of California and Director of Biotherapeutics, Education Research Foundation (BTER) in Irvine California. Dr. Sherman is a driving force behind maggot therapy. His foundation, BTER is the primary supplier of medicinal maggots in the United States. The method for maggot application that has been adopted for use at Mayo Clinic in Rochester is identical to that of Ronald Sherman, MD and the technique he instructs in his MDT conference. Sherman and his staff did numerous tests to find the best dressing design to effectively keep the maggots in the “cage”. The dressing they designed will allow the maggots to receive oxygen and allow secretions to drain out of the wound. Their dressing design is simple to apply but durable enough to last the 48-72 hours of treatment. The dressing is nonirritating to the patient’s skin and is also translucent to be able to inspect the wound. A key benefit to this kind of therapy is the low cost. The products used in the dressing are all inexpensive (Sherman, 1997).

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The thought of having maggots on a wound is not a particularly nice thought for many people. It was shown that patients who have wounds that are not healing do not have an aversion to having maggots put on their wounds (Steenvoorde et al., 2005). This phenomenological study suggests having patients who have experienced MDT therapy speak out in the media would decrease any anxiety. Sherman (2002) comments, “younger, alert patients, still active in directing their own medical care, tend to request maggot therapy more commonly and forcefully” (p. 213). Literature shows that patients who need treatment for a non-healing wound are not adverse to MDT (Sherman, 2002; Steenvorde et.al. 2005). Patient education that describes the treatment to the patient and their family and friends makes a difference in acceptance and resistance. “When patients are well informed and instructed, no one is deterred by the idea of maggots” (Steenvoorde, et al., 2005, p. 351).

The word maggots make many people uncomfortable. In their phenomenological study, Steenvoorde et al. (2005) explain their research into the acceptance of maggots by patients. What they found is that with education, the patients needing maggot therapy are not deterred by it. It is interesting to note that they found health care workers have a bigger “yuk factor” than patients when it comes to maggot therapy. This may be because it is the health care worker who is actually applying and working with the maggots. To deter this in the unit’s design of a maggot therapy program an education session to assist the nurses in overcoming the “yuk factor” in order to provide the best therapy possible for the patient.

The ten nurses in this outpatient Dermatology practice area will be trained to do MDT. The desire is that all of these ten nurses will display a professional commitment to

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ethical practice in doing MDT. In order to accomplish this, all members of the unit will be given a series of four articles to read. The articles will describe the development of the cage, application and removal as well as informative articles on maggot debridement therapy. The desire is that each nurse will be able to apply and demonstrate their knowledge of MDT to other nurses, physicians and ultimately their MDT patients. The group then will meet and discuss the articles and have their questions answered. During the discussion the nurses will be able to ask questions and express their fears. The desired outcome will be that each of the ten nurses will be able to summarize and apply the information on maggot therapy. Through the discussions an expert RN in MDT will influence the other nurses feelings related to the “yuk” factor. The group of nurses will then be taught how to assemble the cage dressing according to a procedural guideline (it is in draft form) in order that they may be able to demonstrate safe dressing application and removal (Clark, 2008).

Chapter Three - Development of the Practice Model

For one year the manager and the nurse expert of the outpatient area managed the MDT patients from education of the patient and family through application and removal of the therapy. As the procedural guidelines were developed it was determined that it was time to begin educating the whole group of nurses to successfully conduct MDT. The process used was a discussion of the literature and two hands-on sessions in which the nurses utilized the procedural guideline in draft form to assist them in learning the application and removal of the maggot cage.

Literature Discussion

A group of four articles were chosen from the literature to share with the group of nurses participating in MDT. The first article summarizes a research project done by a nurse and doctor team. The article explains how 12 patients with necrotic leg ulcers were divided into two groups, one being treated with conventional therapy and the other treated with maggots. The procedure and varied uses are discussed (Fitzpatrick, 2000). A second article discusses the use of maggot versus conservative debridement therapy for the treatment of pressure ulcers. This article by Dr. Ronald Sherman (2002) summarizes the results from a study conducted on 103 patients who had 145 pressure ulcers. The results of this study are stunning. Using traditional therapy, only 48% of the wounds were debrided, while 80% of those receiving maggot therapy were debrided. This study emphasizes the effectiveness of maggot therapy. The article goes on to clearly document the stages of changes and the efficacy of this treatment modality. The success of the treatment resulted in patients willing acceptance of this treatment option.

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A third article by Parnes and Lagan (2007) describes larval therapy in wound management. This article establishes the relationship between devitalized tissue and wound healing. It reviews the historical use of larval therapy or maggot therapy for wound debridement. The three-stage process of wound debridement is explained and the discussion of advantages and disadvantages of MDT is presented.

Finally, Dr. Sherman's 1996 article introducing the new dressing design or cage mechanism is read and discussed by the nurses. This article describes the dressing design Dr. Sherman developed for use with maggot therapy. The application process, materials used and their purpose in keeping the maggots contained within the wound by means of readily available materials is clearly presented.

These articles spoke of the design of the maggot cage or dressing, the "yuk" factor and potential outcomes of MDT on varying diagnoses. The packet of articles was delivered to the nurses with a list of five discussion points to guide their reading. The discussion points were: name the species of larvae that is used for MDT; review the lifecycle of the maggot; identify the three primary actions of medical maggots on a wound; review the seven steps of dressing/cage building and review the disposal of maggots. Two weeks later, the group was pulled together over a long noon hour. Over lunch, the manager of the area guided the group discussion through all of the articles. Time was allowed for discussion and questions as well as concerns and fears. The nurses voiced their worries of touching the maggots and had envisioned them as larger than what they are in actuality. There was also some concern of being involved with a therapy that may not be accepted by patients and their families.

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Demonstration of application of MDT

In doing MDT, the successful development of the maggot cage is of utmost importance. It is the cage or dressing that keeps the maggots around the wound while allowing oxygen in and permitting the exudates to drain out (Sherman, 1997, p. 451). All of the nurses were given two hours away from the work unit on a particular day to practice this skill. The group met around a large table with all of the MDT dressing materials available to them. They were also given the *Maggot Debridement Therapy Procedural Guideline*, (Appendix A) which was in draft form. The session began with the expert nurse walking the group through the procedural guideline while demonstrating construction of the maggot cage. Members were allowed to ask questions and comment on the dressing steps. The group was looking forward to doing MDT as a group and having MDT become something that they as a group would conduct within the institution and be known for. This group of nurses truly wants to help patients. As professional nurses they are willing to overcome their own fears to bring a new treatment to patients who would benefit. This doesn't mean they weren't a bit nervous. The second half of this session had the nurses working dyads, constructing the maggot cage according to the procedural guideline. The expert nurse and the manager supervised the groups practicing the skill of cage development. At the end of this session, the group requested a second practice session (Appendix B).

The second practice session occurred one week later. Again, the group was given a two-hour period, all around a table with all of the dressing materials and procedural guideline available. The nurses, having read the literature and practiced the dressing before, were more confident in their cage building skill. The manager and expert nurse

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only monitored the cage building during the first half of the session. As the group became more confident of their knowledge and skills, the manager and expert nurse only needed to assist as necessary. During this session, live maggot larvae were available to put into the cage. The group of nurses knew that live maggots would be a part of this practice session. Some of the nurses were nervous about working with the maggots. The nurses as a group shared afterwards that they spent a lot of time prior to this second session reviewing the literature and convincing themselves of the good that maggot therapy could do for many patients that they have previously been unable to help heal. Helpful hints in working with the maggots were shared by the expert nurse to help the group feel confident and secure in application. All of the nurses worked with and handled the maggots during the session. At the end of this second session the group expressed that they would be able to do MDT. Roger's innovation adoption curve states that the expert nurse was the innovator for MDT. The nurse became knowledgeable about the therapy and pulled the rest of her colleagues along by persuading them of the therapy's worth until they consciously or unconsciously made the decision to move with the innovation of MDT and be part of the implementation. The nurse's colleagues were early adapters and some of them the early majority. It took some longer to make the decision to be part of the innovation but the communication that they received from the expert all through the process helped them to move along with the innovation (Rogers, 2008).

Chapter Four – Outcomes of MDT Education Sessions

Staff response to the educational sessions was positive. After the sessions, the staff commented that they felt assured that they would be able to conduct MDT. Six months after the education sessions a patient was admitted to have MDT. The nurses successfully administered the therapy.

The nurses of the outpatient unit do not have the “yuk” factor. During the education sessions, the “yuk” factor was talked about only during the literature review in reference to the article by Steenvoorde and Buddingh (2005). The nurse who became the expert in MDT was empowered by the manager to focus on the future of MDT in this particular institution and what it could mean to patient care. This power motivated the nurse to work hard at perfecting her cage building technique, work with the manager and the Clinical Nurse Specialist to develop the procedural guideline and gave her the initiative to work with the physicians on the first year of MDT patients. When looking at the Clinical Caritas Processes that Jean Watson shares, we see that our expert nurse has developed a helping, trusting relationship with the manager. This allowed the expert nurse to be creative, become engaged in the teaching-learning experience (Watson, 2006). The nurse shared her experiences with her colleagues. She openly shared her knowledge of MDT with her colleagues and shared the patient cases with them so that they could know the remarkable work that MDT was doing for these patients. This nurse became the MDT expert in the eyes of her colleagues. She became the MDT authority, and, as the expert nurse, continued to work and share her experience with MDT with her colleagues and others through poster and speaking presentations within and outside the institution.

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This expert nurse transformed her colleagues' fear of the maggot larvae, the "yuk" factor, by motivating her colleagues with a positive attitude regarding MDT and assisting them in seeing the value of MDT to their patient population (Grossman & Valiga, 2005). The intrinsic needs of these nurses - growth, advancement, achievement, responsibility - motivated them to overcome their fear of working with the maggot larvae (Patronis Jones, 2007). The followers, the expert nurse's colleagues, have become engaged and knowledgeable in MDT and strive to help it gain its place in wound management within their institution (Grossman & Valiga, 2005). All of the trained MDT nurses now collectively call themselves the MDT team.

Shortcomings

A shortcoming of this project was that it was centered on educating only the nurses in MDT. There is a collective group of eight staff physicians and their residents who work with the MDT nurse team. This physician group initially sees the patient and writes the orders for MDT and follows them daily determining continuation of treatment. The physician group was invited to participate in the education that was designed for the nursing group but declined. The result is a physician group who may or may not have the knowledge of MDT that the nurses do. This is a problem because not all of the physicians support this practice in the same manner as the nurses. A small subset of the physician population would like to use MDT only as an adjunct therapy for a diagnosis in which there has been little written to support the MDT use. Both nurse and physician colleagues are often suspicious of its benefit with patients needing wound debridement. The result is that we have MDT, a very good tool to put in our wound treating "kit". We are not using this tool for care of wounds that literature supports would respond with

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successful healing using this treatment method. There is also a patient safety issue in the fact that the physician group may be called to respond to situations on the off shift and they will not be able to respond appropriately to assist the patient.

A second shortcoming of this project is that it is currently only being used as an inpatient treatment at Mayo Clinic in Rochester, Minnesota. Mayo Clinic has a Wound Care Center, which treats many types of wounds on an outpatient basis. MDT would be an excellent tool for them to have available to treat the wide variety of wounds they see. The wound care nurses were invited to watch the application of MDT and be involved with several cases as well as take advantage of the education sessions but too, declined. This leaves a whole population of patients who could potentially benefit from this treatment option unaware of its availability. Even if patients were interested, the staff in the wound care clinic are lacking the knowledge and skill to conduct the therapy. As the MDT team continues to treat patients, they will need to continue to educate other healthcare workers and patients on the value of MDT as a wound care option.

Chapter 5 – The Future of MDT

At the onset of this project there were only two nurses, the manager and a staff nurse, who were willing to learn MDT and develop a program for treating patients. Through hard work, dedication and the desire to offer a cost effective alternative for wound treatment a new practice was developed. Two years into this project there are a group of ten nurses who are trained and willing to conduct MDT. This project benefited the nursing unit by the staff closely pulling together to overcome their fear and inhibitions and obtain the goal of offering patients a cost-effective wound care alternative.

Now that MDT is a treatment option, this group of nurses will need to move forward on patient education. Currently, the MDT team has put together a one sheet, two-sided patient education tool that answers many of the questions that are normally asked by patients and family members who are considering MDT for treatment. While this sheet has been an adequate education tool thus far, it is not of the quality that Mayo requires. The MDT team will need to develop a patient education brochure.

A nursing competency will need to be done yearly on MDT. With MDT being one of many treatment options to heal a wound, the MDT team may go for months without treating a patient. MDT is a low volume, high-risk procedure that will require a yearly competency to be sure that the MDT team remains knowledgeable and able to treat a patient successfully. Ideally, if a high volume wound area – such as the Wound Care Center – adapted this therapy the nursing staff would have a much better opportunity to maintain competence. This cost-effective therapy could then be offered to a larger number of people on an outpatient basis.

Maggot Debridement Therapy

Creating a maggot debridement therapy program has been a two-year effort. With the help of an innovative staff nurse this work unit has been able to show that MDT has a place in today's wound care management. By treating several patients and sharing their stories the nurses have gained interest and acceptance by other groups within the hospital environment. All ten of the nurses in the Dermatology Outpatient Care Center are now trained to conduct MDT. They still have some steps to take to making this an accepted form of treatment.

MDT needs a physician proponent to keep this practice alive and moving forward. This program began with a directive, from the physician group, for the manager to train the staff in MDT because the physicians wanted to utilize this form of therapy. The physician group did not participate in the training nor have they been interested in the observations of the therapy or concerns by the nursing group. The physician group has not used this therapy to its full intent. It was a failure of this project to not find a physician proponent at the beginning of this venture.

To keep this therapy alive, the nursing group needs to find a MDT proponent. The expert nurse was an innovator for her nursing colleagues. The nursing group needs to find a physician whom they can work together with, who can be the supporter and innovator for MDT with the physician group. They need to find someone who is willing to learn how to conduct MDT and is willing to work with the group to make it a bona fide treatment option for wound healing within the institution. The next step is for the nursing group to work together to write an article about MDT to submit to a nursing journal. They have collectively done many hours of research and training in MDT and need to share their knowledge with other nursing colleagues. They are in the beginning process

of making this happen. When the nurses have been successful in having their article published, the physician group will need to step up and take a bit more interest.

At this point the nursing group needs to put forth the offer for education to the physicians again. They will be wise to look toward the physician residents to find a member who will work with them and help to make this therapy a component of the wound care treatment options. Perhaps sharing the patient outcomes broadly with the Wound Care Center nurses and physicians would be most helpful. Rogers (2008), on his web site about innovation states that “the mainstream adopters are the ones who can make the difference to whether an innovative practice is embedded in an organization” (para 6). Nursing needs to keep this therapy option at the forefront of patient care.

For me as the manager, this has been a learning adventure. It is not often that a manager has the opportunity to learn a new skill and therapy and be the proponent to bring it into the institution. There have been many lessons learned. There is value in finding a proponent for your project early on. Rogers (2008) on his web site states, “Trying to convince the mass of a new idea is useless. Convince innovators and early adopters first” (para 1). It is very important to empower and support that proponent along the way while guiding their leadership development also. Daft (2005) states that, “a critical aspect of leading change is understanding why people resist change and how to overcome resistance. Leaders use communication and training, participation and involvement to overcome resistance” (p. 659). Bringing a new therapy option into an institution requires a salesperson attitude. One needs to find the stakeholders of the therapy and sell and share with them what is needed and keep them updated on the progress along the way. To gain support and interest one needs to advertise the therapy

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by sharing the knowledge and outcomes of the therapy with the many groups of nurses and physicians. The manager also needs to remain part of the process to insure someone who does not have the full breadth of knowledge does not harm the integrity of the program. The patient and the value of the treatment to the patient should always be at the forefront of the project.

Conclusion

Maggot Debridement Therapy is now being offered to patients as a treatment option for the treatment of non-healing wounds at the Mayo Clinic in Rochester, Minnesota. There is still some work to do to improve aspects of the therapy but with the ten educated and motivated professional nurses that comprise the MDT team, the challenges will be met.

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Maggot Debridement Therapy (MDT) Procedure Guideline and Number

Inpatient
Outpatient Dermatology

Purpose : to provide guidelines for the use of Maggot debridement Therapy (MDT) in wound management

Definitions:

Maggot therapy: Biological debridement of necrotic tissue through placement of maggot larvae in wound

Necrotic tissues: dead, avascular tissue

Policy Statements

Maggot Therapy is indicated for non-healing wounds that contain slough or necrotic tissue such as chronic soft tissue wounds, neurovascular ulcers, venous stasis ulcers, pressure ulcers, chronic bed sores, traumatic and surgical wounds, osteomyelitis and last resort for healing before amputation

- Provide pre-procedure education.
- An order is required.
- Procedure can be completed by an MDT trained nurse.
- Prior to the procedure each person directly involved verifies patient using two patient identifiers.
Institutional Policy: Placement of Patient Identification Bands. PC.62
- 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.

Procedure Statement(s)

- Obtain equipment
 - Larvae
 - Photocard
 - Coloplast
 - Hydrocolloid dressing (ie Douderm) sized to fit around wound
 - Silk or cloth tape
 - Skin protectant
 - Glue (ie contact cement)
 - Scissors
 - Transparent semi-permeable membrane dressing (ie Tegaderm) to fit wound
 - Mesh (ie surgical silk)
 - Normal saline
 - Cotton applicator
 - 4x4 gauze to keep wound moist
 - Wound tracing device
 - Skin marker
 - Ziploc bag

- Ensure the maggot container is intact and larvae are active.
- complete two patient identifier
- clean wound with normal saline
- Fill out photo card and have patient sign; photograph wound
- Using the wound tracing device and marker, outline the wound on the tracing device, and cut out the pattern
- Trace the pattern onto the hydrocolloid pad and the transparent film dressing, and cut out the shape of the wound from these dressings.
- Wipe the peri wound area with skin protectant
- 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.
- Wet loose gauze or cotton tip applicator with normal saline Apply 5-10 maggots per cm² of wound surface using either the wet gauze or the cotton tip applicator, Maggots may be transferred from the vial either by wiping them from the vial wall with a normal saline dampened 2x2 gauze pad or by transferring the maggot-laden gauze pad supplied within the container. If using the maggot-filled gauze pad within the container, approximate the desired number of larvae by cutting the gauze pad proportionately (applying only half the pad to the wound should transfer only about 50% of the larvae).
- place the mesh 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 glue and tape.
- Place the transparent film dressing over the mesh, matching the pattern of the hydrocolloid and seal down the edges. The film should cover the hydrocolloid frame and peripheral skin, but must NOT cover the mesh covering. Air is needed for the maggots. The mesh covering also facilitates drainage of necrotic wound exudate.
- Apply a label to the dressing frame stating “ do not change “ to avoid removal of the maggot cage.
- Cover this “maggot cage dressing” with dry absorbent gauze and secure loosely with 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 drainage, and replace with clean dry gauze as needed.
- After completing dressing, supply the patient and family and/or the nursing station with information on how to contact the maggot debridement therapy nurse and instructions on how to contact the on-call dermatology resident between 2130 and 0600.
- Leave the maggot cage dressing in place for approximately 48 hours. If maggots escape the dressing they should be disposed of in a biohazard 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 until new dressing orders can be obtained.

Removing the Dressing

- maggot debridement dressings should be removed after approximately 48 hours (maximum of 72 hours).

- To remove the dressings, place an infectious waste bag next to or under the dressing.
- Inspect the dressing and surrounding skin carefully, noting any problems or abnormalities.
- Remove the outer gauze dressing and gently loosen (but do not remove) the hydrocolloid pad from the skin.
- 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, containing the maggots between the hydrocolloid pad and a moist gauze pad. The “wiping” gauze pad can be moistened with normal saline.
- Place the MDT dressing and larvae into the Ziploc bag.
- Irrigate the wound with normal saline.
- It may be necessary to use gloved fingers, forceps or cotton tip applicators 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 gauze, rather than risk leaving dead larvae within the wound.
- Check the bedding for loose larvae.
- Secure the waste bag in the following manner:
 - Zip shut the Ziploc bag and place the Ziploc bag into the red infectious waste bag
 - double knot the bag shut.
- Assess the wound and apply the next maggot dressing or other prescribed dressing.
- Document
- For any issues involving the maggot debridement therapy such as increased pain, escaped maggots or the dressing coming loose, contact Maggot Debridement therapy nurse from 0600 to 2130 at 127-03040/5-8860. After 2130 to 0600 contact dermatology on-call at 127-04709.

Documentation

Record	Location – Electronic
Size of wound before therapy and after therapy removed, description of wound, placement and removal of therapy	Skin integrity

Resources

Dermatology Outpatient Care Center nursing staff

Literature Resources

Literature resources may be obtained from a clinical nurse specialist upon request.

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Alphabetical Index Titles

Contact Person:

Content Reviewer(s):

Approved By: Nursing Guideline Subcommittee Co-chairs

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Appendix B

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Minneapolis, MN 55454