

# Complementary and alternative therapies for management of odor in malignant fungating wounds: a critical review

Georgina Gethin<sup>1</sup>  
Caroline McIntosh<sup>2</sup>  
Sebastian Probst<sup>3</sup>

<sup>1</sup>School of Nursing and Midwifery, National University of Ireland, Galway,

<sup>2</sup>Discipline of Podiatric Medicine, National University of Ireland, Galway, Ireland; <sup>3</sup>School of Health, University of Applied Sciences Western Switzerland, Geneva, Switzerland

**Abstract:** Malignant fungating wounds (MFWs) affect an estimated 5%–10% of all people with cancer. They have a profound effect on the individual, and their associated symptoms such as bleeding, odor, exudate, and pain cause much distress, anxiety, and social isolation. Odor is cited by patients and clinicians as the worst aspect of such wounds. Strategies to manage odor at the wound site include the use of complementary and alternative therapies. This review aimed to synthesize the current evidence for the use of complementary and alternative therapies in the management of odor in MFWs. No restrictions on date, language, or care setting were applied. Nine databases were searched yielding four papers meeting our criteria. Of the four papers, one was a randomized controlled trial (RCT), and three were case studies. Two papers investigated the use of green tea teabags as a secondary dressing, while others used essential oils either combined with a cream applied directly to the wound or as a secondary dressing. In an RCT, green tea was used as a solution to cleanse the wound followed by the application of green tea teabag as a secondary dressing versus metronidazole powder for the management of odor over 7 days. All patients reported a reduction in odor and physical discomfort, and an improvement in social interaction and appetite, but the difference between groups was not statistically significant. The case studies all reported an improvement in odor management. The use of complementary and alternative therapies in the management of MFW-associated malodor is not supported by evidence from RCTs. Green tea may have potential as a secondary dressing to manage odor. Further research in this area is warranted.

**Keywords:** malignant fungating wound, odor, complementary medicine, alternative medicine

## Introduction

Malignant fungating wounds (MFWs) affect ~5%–10% of all people with cancer. They may present as either primary lesions or metastatic lesions. Major symptoms associated with MFWs include odor, pain, bleeding, itching, and exudate. Of these symptoms, patients, carers, and clinicians cite odor as the most distressing and debilitating symptom. Interventions to manage odor are not well established, and a recent international survey among clinicians identified that many used alternative and complementary therapies either directly on the wound bed or in the patient's environment. This survey also identified the lack of any consensus or standardized approach on how best to manage odor with approximately half of all respondents claiming that their current strategies were only somewhat effective. Given the growing interest in the use of complementary and alternative medicine (CAM), there is a need to synthesize the current evidence for its use in the management of odor in MFWs.

Correspondence: Georgina Gethin  
School of Nursing and Midwifery,  
National University of Ireland, Newcastle  
Road, Galway, Ireland  
Tel +353 9149 2018  
Email georgina.gethin@nuigalway.ie

## Background

MFWs are defined as an infiltration of the tumor or the metastasis into the skin and can involve the afferent blood and lymph vessels.<sup>1,2</sup> They may be a primary skin tumor, a metastatic tumor, or malignant transformation of an existing tumor.<sup>3</sup> They are sometimes referred to as ulcerating tumors, malignant wounds, or neoplastic lesions.<sup>4</sup> It is difficult to get an accurate account of the true prevalence of MFWs, but it is estimated that 5%–10% of people with cancer develop such wounds. The most frequently affected body sites are the breast (49%), followed by the neck (21%), the chest (18%), the extremities and genitals (17%), the head (13%), and other areas (2%).<sup>2,5,6</sup>

Sadly, people with an MFW usually die within 6–12 months of visible growth, and such wounds are a significant cause of psychological distress to the persons and their informal carers.<sup>6,7</sup> Individuals have reported feelings of isolation and depression and having a body that can no longer be trusted, sometimes described as having an “unbounded body”.<sup>1,8,9</sup> Patients have to cope with the symptoms associated with the wound including odor, exudate, pain, bleeding, and itching. Of all these symptoms, odor is cited by patients, carers, and health professionals as the worst aspect of the wound.<sup>7,10</sup>

Odor is an intriguing and dual-pronged phenomenon. Pleasant odors are widely used for relaxation and relief from stress and have been investigated for their analgesic effect during dressing change for painful leg ulceration.<sup>11</sup> However, malodor has a negative impact on physical and psychological domains. Research on environmental odors has reported that they cause nausea, headaches, and insomnia, negatively affect well-being, and increase fears and feelings of isolation and reduced social contact.<sup>12</sup> Odors emitted from wounds cause similar problems, as they can evoke feelings of repulsion, and can be so severe as to cause a gagging reflex among professionals caring for patients with such wounds.<sup>13,14</sup>

Odor may be caused by a range of factors, including the presence of necrotic tissue, infection, a high bacterial burden, high levels of exudate, and in some cases poor management.<sup>15</sup> Malodor represents a cocktail of volatile agents, which contain molecules that evaporate easily and reach the receptors in the nose.<sup>16</sup> These volatile agents include bacterial microorganisms, acids (*n*-butyric, *n*-valeric, and *n*-caproic), and cadaverine and putrescine, which are released by nonsporing anaerobic bacteria.<sup>17</sup> Dimethyl trisulfide has been identified as a source of odor in malignant wounds.<sup>18</sup> This compound has been identified in volatiles emitted from fermented milk and certain vegetables, and is also produced by aerobes such

as *Pseudomonas aeruginosa*.<sup>18</sup> Growth of a malignant wound can damage the surrounding tissue through a combination of the loss of vascularity, proliferative growth, and ulceration.<sup>19,20</sup> The loss of vascularity in MFWs can lead to necrosis and provision of an ideal environment for proliferation of aerobic and anaerobic bacteria with consequent malodor and profuse exudate.<sup>21</sup>

A recent international survey among 1,444 professionals from 36 countries reported current practice in the management of wound odor.<sup>10</sup> Its results showed a lack of confidence in current odor management strategies and a “trial-and-error” approach to odor management. It further demonstrated the lack of a current standardized approach to odor management. While advanced wound care dressings predominated in management options, there was a lack of confidence in their efficacy. This survey reported that 8% (*n*=115) of respondents currently use aromatherapy oils to the wound bed, the most frequently cited being lavender followed by lemongrass.

CAM is a term for medical products or practices that are not part of standard medical care (<http://www.cancer.gov/about-cancer/treatment/cam>). CAM is often used in Western society when people feel dissatisfied with the care they currently receive or want more involvement in helping their recovery. The research literature shows an increased use of CAM among cancer patients and in the area of wound management.<sup>22–26</sup> Indeed, four in every ten adults in the US report using CAM, with the most common therapies being non-mineral, non-vitamin, natural products.<sup>26</sup> Given the debilitating effects that odor has on individuals, it is understandable that people may self-prescribe CAM in an effort to better manage this problem. However, the lack of Level 1 evidence plus different regulatory frameworks across health systems remains a limiting factor to the use of CAM in wound management. In addition, an absence of evidence from research studies may mean that any adverse effects of CAM on MFWs are not fully understood. Serious adverse effects from self-prescribed alternative medicines and practices have been reported in two case studies of women with breast carcinoma.<sup>27</sup> In the first case report, the patient applied a mixture of boiled apricots, molasses, and raisins; in the second case report, an unknown herbal mixture was self-administered. Both patients developed serious wound complications that were attributed to the topical applications of these products.

MFWs are a distressing complication of cancer, and given the extent of their symptoms and the lack of effective

strategies, there is a need to synthesize, through a critical review of the research literature, the evidence base for the use of topical CAM for managing odor in these complicated wounds in order to guide therapeutic decisions and future research in this area.

## Methods

A critical review of the literature was undertaken to synthesize the evidence for non-pharmaceutical, alternative or complimentary topical therapies for the management of malodor in MFWs. For the purpose of this review, non-pharmaceutical topical agents comprised all alternative and complimentary topical therapies and products that are not presently considered to be part of conventional medicine, and are not considered to be advanced wound care dressings. A critical review of the literature was undertaken based on PRISMA guidelines and the Cochrane Handbook for Systematic Reviews of Interventions. This involved the retrieval and selection of the published studies, analysis, and interpretation of the results. The methods employed within this review were guided by previous systematic reviews of topical treatments, and dressings used to control the odor of MFWs.<sup>4,28</sup> These reviews included advanced wound care dressings and other pharmaceutical agents and were not limited to CAM.

## Objective

The objective of this study was to review, and synthesize, the current evidence for non-pharmaceutical, alternative or complimentary topical therapies for the management of malodor in MFWs.

The research question was constructed based upon patient, intervention, comparison, and outcome strategy and was as follows: “what non-pharmaceutical, alternative, or complimentary topical therapies are used for the management of malodor arising from MFW?”

## Types of patients

Individuals with malodorous MFWs or ulcerating tumors, malignant wounds, or neoplastic lesions without reference to stage or severity of the MFWs were included.

## Types of interventions

Studies evaluating different non-pharmaceutical, alternative, or complimentary topical therapies for MFWs or ulcerating tumors, malignant wounds, or neoplastic lesions were included.

## Comparison

For the purpose of this review, comparators were not specified due to the lack of defined or standardized treatments for MFWs.

## Search methods for identification of studies

Nine databases were last searched on March 30, 2015: Scopus, EBSCO CINAHL, Ovid MEDLINE, Ovid EMBASE, the Cochrane Central Register of Controlled Trials (CENTRAL), CANCERLIT, Web of Science, Trial Registry, and Clinical Trials. There was no restriction applied on care setting, date, or language.

## Eligibility criteria for studies

Keywords and terminology of Health Sciences Descriptors and Medical Subject Headings terms were employed. Free text and where available subject heading searches were conducted using the following search terms: “malignant fungating wound,” “odo(u)r”, “complementary medicine,” and “alternative medicine”. All of the word variations and Medical Subject Headings terms were used.

## Types of studies

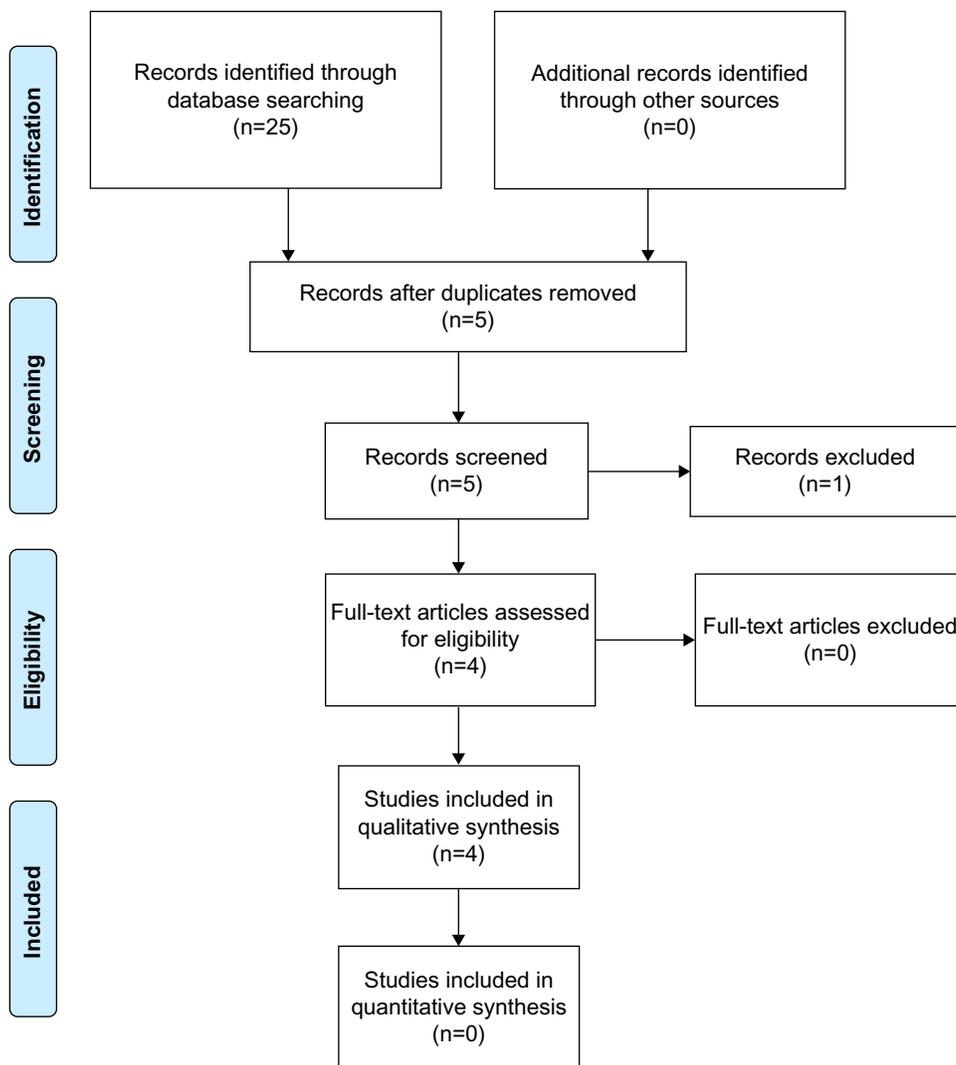
Eligibility criteria included randomized controlled trials (RCTs), and in their absence, controlled clinical trials with a concurrent control group that assessed the effectiveness of non-pharmaceutical topical agents in the management of malodor in MFWs.

## Types of outcome measures

The primary outcome measure, for the purpose of this review, was malodor. The researchers chose not to restrict the search to only studies reporting malodor as measured by a recognized generic or disease-specific tool, given the lack of consensus or standardization of the measurement and reporting of wound odor.

## Data collection and analysis

All authors undertook an advanced search of the literature. Two authors assessed all titles and abstracts of the studies identified in the search, in accordance with our selection criteria (CMcI and GG). Studies were assessed independently, and consensus was sought between the independent reviewers before the articles were excluded. Full-text articles were obtained for all papers meeting the inclusion criteria. Two independent authors assessed full papers against the selection criteria, and agreement was sought from both assessors



**Figure 1** An adapted PRISMA flow diagram of the search process.

with regard to inclusion in the review. Figure 1, an adapted PRISMA flow diagram, provides a graphical representation of the research articles obtained and reviewed through our search strategy.

## Data synthesis

Only one study met the original eligibility criteria for inclusion in this review (ie, RCTs, and in their absence, controlled clinical trials with a concurrent control group). It was, therefore, deemed necessary to widen the original selection criteria to include noncontrolled clinical studies and case-study designs, given the paucity of research articles on CAM products for MFWs in cancer patients. Given the small numbers of studies that met inclusion criteria, data pooling was not feasible, and therefore,

a narrative overview of selected studies is provided within the “Results” section.

## Data extraction and management

After widening the eligibility criteria, four articles in total were found to meet our revised inclusion criteria. Details of the studies including author(s), year of publication, intervention(s), design and sample, outcome, and methods for evaluating odor were extracted and reported on a data extraction sheet. Table 1 provides a summary of the data extraction process and the studies that met our criteria.

## Results

Twenty-five articles were identified. Of these, only five related to the topical application of CAMs for MFWs. Of the five

**Table 1** Summary of the data extraction process and studies meeting inclusion criteria

Author (year)	Intervention(s)	Design and sample	Outcome	Method to evaluate odor
Lian et al (2014) <sup>30</sup>	Green tea versus topical metronidazole	Randomized experimental study (n=30)	Treatment group as effective as control	Method not stated
Yian (2005) <sup>31</sup>	Green tea teabags	Case study (n=4)	Improved odor control	VNS 1–10
Warnke et al (2006) <sup>33</sup>	Antibacterial essential oils	Case study (n=30) – only reported three cases	Improved odor control	Method not stated
Mercier and Kneivitt (2005) <sup>32</sup>	Topical aromatherapy	Case study (n=4)	Improved odor control	Method not stated

**Abbreviation:** VNS, verbal numeric scale.

articles, one was excluded as it did not meet the revised selection criteria for this review; Stringer et al investigated the use of a neutralizing odor cream (a product based on blended essential oils) as a treatment to manage odor in MFWs. This paper presents preliminary, mainly anecdotal, findings of the topical application of neutralizing odor cream in cancer patients.<sup>29</sup>

## Description of studies

In total, four research articles met the revised inclusion criteria and were selected for this review. An RCT compared the efficacy of cleansing with green tea fluid plus application of green tea teabag as a secondary dressing versus a standard agent, topical metronidazole powder, for odor control in MFWs.<sup>30</sup> The rate of malodorous score reduction was measured using the verbal numeric scale. This small RCT study, of 30 participants (n=15 each group), compared the two interventions over 7 consecutive days. Results of this study demonstrated that both groups had a reduction in odor, but the difference between groups was not statistically significant ( $P>0.05$ ). Patients in both groups reported an improvement in appetite and social activities and a reduction in physical discomfort at day 7.

Yian<sup>31</sup> investigated the effectiveness of green tea teabags as a secondary dressing in odor management in fungating breast wounds. This small study employed a case-study method that included four participants. The author reported a reduction in odor and an associated increase in patient appetite due to the reduction in odor. This study provides some, albeit limited, evidence that support the use of green tea teabags as an effective secondary dressing to control odor and thus potentially improve patient's quality of life.

The use of essential oils in malodorous wounds was described by Mercier and Kneivitt<sup>32</sup> and by Warnke et al.<sup>33</sup> Mercier and Kneivitt reported on the use of topical aromatherapy, to complement traditional medicine, in a palliative care setting.<sup>32</sup> The authors described the adoption of a protocol for using topical aromatherapy claiming that 13 patients

in the final stages of their lives were helped by the use of aromatherapy in managing their wounds. However, the authors presented anecdotal information on only four cases. The main oils employed within this study were lavender and tea tree oil. The second study reported on the use of “antibacterial” essential oils in patients with incurable head and neck cancer and associated malodorous necrotic ulcers.<sup>33</sup> The authors claimed to have successfully used essential oils, a mixture of eucalyptus oil, melaleuca oil, lemongrass oil, lemon oil, clove leaf oil, and thyme oil on an ethanol base, on 30 patients. However, the authors presented anecdotal evidence from only three of the 30 cases.

## Discussion

MFWs are a devastating complication of cancer. They are rarely curable and occur at a time of advanced and uncontrolled cancer, further exacerbating the emotional distress of the patients, their families, and carers. The extent of the symptoms of MFWs can significantly impact on the quality of life leading to distress, shame, depression, and embarrassment.<sup>28</sup> In order to improve the patient's quality of life, management of MFWs should focus on the palliation of symptoms.<sup>29</sup>

There is a dearth of clinical research that specifically focuses on the topical application of CAM for the management of odor in MFWs. The small number of studies (n=4) identified for the purpose of this review demonstrates that there is an absence of good-quality RCTs that investigate the safety and clinical effectiveness of CAM for MFWs. Current reports on green tea are only supported by clinical evidence from one small RCT and one case study. However, it should be noted that a reduction in wound odor had positive patient outcomes, including reduction in social isolation, increase in appetite, and improved body image.<sup>9,34–36</sup>

The results of this review demonstrate that CAM products may have the potential to be used as an alternative or complimentary topical therapy to manage odor from MFWs. For instance, if manufactured odor-adsorbing or

odor-controlling advanced wound dressings or pharmaceutical agents are not available, the use of CAM like unused green tea teabags in the dressing of an MFW provides a culturally acceptable, cost-effective option for containment of wound odor.<sup>37</sup> However, there is a need for robust study designs, to provide an evidence base in this area that would help to inform therapeutic decision making and future research into the use of CAMs as an alternative or adjunctive therapy for MFWs.

Methods used to assess odor were reported in one study in which a ten-point verbal numeric scale was used.<sup>30</sup> Of the three case studies, none reported on the methods used to assess odor. This is consistent with other research in which only 12% of clinicians actually assessed odor, and when assessed, a myriad of scales were used.<sup>10</sup>

## Limitations

This review has a number of limitations. First, while nine databases were searched with no limits placed on date or language, it is possible that additional studies do exist and were not identified in this search, and this limitation should be considered when interpreting the findings of this review. A future review should include thesis and conference proceedings as a source of research reports in this area. Second, we did not assess the risk of bias of the studies identified. This approach was beyond the scope of this review and would take into account potential sources of bias, including randomization, sequence generation, allocation concealment, and blinding, among others. Third, by limiting to non-pharmacological agents, we did not assess some more widely used interventions such as charcoal or metronidazole.

## Conclusion

There is not enough evidence at the level of RCTs to evaluate the clinical use of non-pharmaceutical, alternative, or complementary topical therapies for the management of malodor in MFWs. Given the distressing nature and the extent of symptoms associated with MFWs, there is a need for high-quality RCTs to investigate safety and clinical effectiveness of CAMs to confirm the effectiveness of these interventions for MFWs. For nurses, the use of CAMs is rarely seen as a part of their skills and is discouraged in many conventional medicine approaches. This means that alternative medicine may need greater recognition in the care of patients with an MFW. Furthermore, clinicians need to develop strategies to ask patients about their use of CAMs and be more open to their experience of using such products.

## Disclosure

The authors report no conflicts of interest in this work.

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