

Chapter 2

Effect of Massage Therapy on Anxiety and Depression in Cancer Patients

Jiro Imanishi

Abstract Massage therapy has many kinds of effects on the physical and psychological conditions of healthy people and patients. Since it is well known that massage therapy can reduce anxiety, depression, and stress, it is given to patients with cancer. Many researchers examined the effects of massage therapy including aromatherapy massage and observed a reduced state and trait anxiety, and improved mood, depression, and quality of life (QoL) in healthy people. It was found that massage therapy including aromatherapy massage can decrease the scores of State-Trait Anxiety Inventory and psychological confusion of Profile of Mood State in healthy volunteers. Furthermore, it was recognized that patients with mild depression was ameliorated by aromatherapy massage. There are many studies on the effect of massage therapy including aromatherapy massage on anxiety, depression, stress, and QoL in patients with cancer. It appears that massage therapy can reduce anxiety and stress and improved QoL. In conclusion, massage therapy including aromatherapy massage in cancer patients would be beneficial for the reduction of anxiety, depression, and stress as well as pain, and is generally safe. However, further studies, especially randomized clinical trials, should be performed.

J. Imanishi (✉)

MUIM Center for Integrative Medicine, Meiji University of Integrative Medicine,
Kyoto Eminence 6th floor, 2-4 Higashi-Sakaidani-cho, Ooharano,
Nishikyo-ku, Kyoto 610-1143, Japan
e-mail: imanishi-micro@nifty.com

2.1 Introduction

Therapies for cancer including surgery, chemotherapy, radiation therapy, and immunotherapy have become highly sophisticated, and the curing, remission, and survival rates of patients have been greatly improved. However, psychological approaches for treating cancer patients have not yet been successfully developed and a number of cancer patients suffer from psychological issues such as anxiety, depression, and hopelessness. Therefore, psycho-oncological care is essential for cancer patients.

In addition, surgery, chemotherapy, and radiation therapy causes physical discomfort such as nausea, vomiting, constipation, diarrhea, hematological disturbances, neurological symptoms including numbness, pain, and dizziness, and psychological symptoms. Naturally, cancer itself induces various kinds of physical and mental discomfort such as pain, anxiety, depression, fatigue, and symptoms specific for the kinds and loci of cancer.

Complementary and alternative medicine (CAM) is defined by the National Center for Complementary and Alternative Medicine in the United States as a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine.

Many CAM therapies are used as adjuncts to relieve the physical and psychological discomfort caused by cancer itself and chemotherapy, surgery, and radiation. Therefore, the combination of modern medicine with CAM therapies, namely integrative medicine, is very important for cancer treatment, although different interventions are needed for different cancer stages, such as new diagnosis, period of remission, recurrence, long-term survival, and/or end of life.

In this chapter, the author reviewed studies on the effect of massage therapies including aromatherapy massage in the treatment of cancer.

2.2 Effect of Massage Therapy on Anxiety and Depression

2.2.1 *Effect of Commonly Used Massage Therapy*

Massage therapy has a long history and is one of the oldest forms of medical treatment in the world. It was first described in China in the second century B.C. and soon after in India and Egypt. Ever since then, massage therapy has been used for various medical conditions (Field 1998). However, after the development of new modern medical drugs in the 1940s, massage therapy was forgotten and ignored in mainstream medicine.

The recent boom in CAM is attracting attention to massage therapy. Generally, massage therapy is considered to improve circulation, facilitate the elimination of waste, reduce swelling, and soothe the function of peripheral and central nervous systems.

Table 2.1 Psychological changes with State-Trait Anxiety Inventory (STAI) by massage therapy in healthy people

	Pre-test		Post-test		<i>p</i> -value
	Mean	SD	Mean	SD	
State-anxiety	39.59	7.96	29.03	6.15	<0.001
Trait-anxiety	45.12	12.3	42.18	12.12	<0.001

Eleven healthy adult subjects were recruited and the scores of the STAI were measured before and after a 30-min aromatherapy massage or control massage. Results showed that state anxiety scores from the STAI decreased significantly ($p<0.001$) after both aromatherapy and control massage, which suggest that both aromatherapy massage and control massage were effective in inducing relaxation in terms of decreasing state anxiety levels

One of the most common applications of massage therapy is reducing pain. Quinn et al. (2002) showed that massage therapy reduced chronic tension headaches in four subjects, comparing with baseline measures. However, the use of massage for relaxation and reducing levels of anxiety is also becoming popular. For example, massage therapy has been reported to reduce levels of anxiety and stress hormones and improve the clinical course in children under various medical conditions (Field 1995). The psychiatric effects of massage therapy, reductions in anxiety and hostility, and diminished depression have all been documented. Diego et al. (2002) randomly assigned 17 aggressive adolescents to a massage therapy group or relaxation therapy group to receive 20-min therapy sessions, twice a week for five weeks. The massaged adolescents had lower anxiety after the first and last sessions. By the end of the study, they also reported feeling less hostile and they were perceived by their parents as being less aggressive. Significant differences were not found for the adolescents who were assigned to the relaxation group.

The effect of massage on psychological relaxation was examined in normal subjects in a non-controlled trial with 32 subjects, aged from 18 to 56 years (10 males; 22 females) (Kuriyama et al. 2005a). A 25-min whole body massage was performed and the scores of State-Trait Anxiety Inventory (STAI) were determined as psychological measures. Results showed that both state and trait anxiety scores decreased significantly ($p<0.001$) (Table 2.1).

Field et al. (1996) also reported similar results. Twenty-two depressed adolescent mothers received ten 30-min sessions of massage therapy or relaxation therapy over a 5-week period. Subjects were randomly assigned to each group. In the massage therapy group, both trait and state anxiety scores were significantly reduced, with the latter more so, which is reasonable because the “state anxiety” score represents a temporary condition that changes every moment, while the “trait anxiety” score represents a more general and long-standing quality of anxiety.

In addition, because subjects with high initial anxiety levels tended to have more decreased anxiety scores after massage therapy in our study, massage may be useful for reducing anxiety in patients with high anxiety levels such as psychosomatic and neurotic patients due to cancer. It is rather unusual that trait anxiety was also reduced in our study, which is thought to be due to large changes in state anxiety and partly due to a social desirability bias.

Furthermore, there have been reports on the effect of massage on the immune functions. Namely, Birk et al. (2000) reported that in a randomized prospective controlled trial with 42 subjects randomly assigned to one of three treatment groups or a control group receiving standard care and 45-min overall body massage therapy over a 12-week period, no significant changes were found in any enumerative immune measure ($CD4^+$ lymphocytes, $CD8^+$ lymphocytes, $CD4^+/CD8^+$ lymphocyte ratio and natural killer cells).

Diego et al. (2001) recruited HIV⁺ adolescents (mean $CD4^+$ cells = 466 mm^3) from a large urban university hospital's outpatient clinic and randomly assigned to receive massage therapy ($n = 12$) or progressive muscle relaxation ($n = 12$) two-times per week for 12 weeks. Adolescents who received massage therapy vs those who experienced relaxation therapy showed enhanced immune function by the end of the 12 weeks study. Immune changes included increased natural killer cell number ($CD56$) and $CD56^+CD3^-$. In addition, the HIV disease progression markers $CD4/CD8$ ratio and $CD4$ number showed an increase for the massage therapy group only.

Miller and Cohen (2001) reviewed evidence for the hypothesis that psychological interventions can modulate the immune response in humans, and concluded that although the reviewed data provide only modest evidence of successful immune modulation, it would be premature to conclude that the immune system is unresponsive to psychological interventions.

The mechanisms of the mode of action of massage therapy are recognized as follows: massage therapy induces pain reduction by increasing serotonin and endorphins, improving blood flow, improving lymphatic circulation, and interpersonal attention (Corbin 2009).

The hypothalamic-pituitary adrenal axis is known to play an important role in the mind-immune interaction. Positive correlations between plasma cortisol levels and neutrophil numbers have been observed in a group of hospitalized depressed patients (Kronfol and House 1989). Ironson and Field (1996) reported that 29 gay men (20 HIV-positive, 9 HIV-negative) received daily massage for one month, and massage therapy decreased cortisol in 24-h urine collections. And they suggested that decreased neutrophil counts after massage therapy were probably the result of a relaxation-induced down-regulation of the sympathetic nervous system and reduced stress hormone levels.

Thus, massage therapy is an effective relaxation/stress management technique that could reduce anxiety, downregulate the sympathetic nervous system, and reduce stress hormone levels.

2.2.2 Effect of Aromatherapy Massage on Anxiety and Depression

In general, aromatherapy is the use of essential oils, the pure volatile portion of aromatic plant products, for therapeutic or medical purposes. As is the case with other CAM therapies, use of aromatherapy has increased in recent years. Essential

oils have many kinds of pharmacological actions including anti-microbial, sedative, analgesic, spasmolytic, and estrogen or steroid hormone-like effects. Since various kinds of essential oils such as true lavender, rose, mandarin, sweet orange, sandalwood, and geranium have anxiolytic activities, aromatherapy has been used for the relief of depression and anxiety.

Like classical massages, aromatherapy massage also acts on the central nervous system, relieving depression and anxiety, reducing stress, relaxing, sedating or stimulating, and restoring both physical and emotional wellbeing (Buckle 1997).

Although there are few published clinical trials examining the effectiveness of aromatherapy, the number of trials has been increasing in recent years. Cooke and Ernst (2000) reviewed six randomized clinical trials to study the effect of aromatherapy massage, and concluded that aromatherapy appeared to have at least a transient effect in the reduction of anxiety, but there was no evidence of a lasting benefit.

The effect of aromatherapy massage on psychological measures in comparison with control massage was examined using an open controlled study (Kuriyama et al. 2005b). Data were compared in a repeated measures design immediately before and after aromatherapy massage in the same subjects. They were also compared in the measures design between aromatherapy massage and control massage in the same subjects. Eleven healthy adult subjects were recruited and the scores of the STAI and self-rating depression scale were measured before and after a 30-min aromatherapy massage or control massage (Table 2.1). Results showed that in psychological measures, state anxiety scores from the STAI decreased significantly ($p < 0.001$) after both aromatherapy and control massage. Our results suggest that both aromatherapy massage and control massage were effective in inducing relaxation in terms of decreasing state anxiety levels. State anxiety scores were significantly reduced, although trait anxiety scores did not change. Although a difference in effect between aromatherapy massage and control massage was not observed, massage and aromatherapy massage are suggested, from the results of our study, to be an effective relaxation/stress management technique to reduce anxiety.

Hongratanaworakit (2011) examined the effects of blended essential oil on autonomic parameters and on emotional responses in humans following transdermal absorption. Blended essential oil consisted of lavender and bergamot oils. Human autonomic parameters, such as blood pressure, pulse rate, breathing rate, and skin temperature, were recorded. In addition, subjects had to rate their emotional condition in terms of relaxation, vigor, calmness, attentiveness, mood, and alertness in order to assess subjective behavioral arousal. Forty healthy volunteers participated in the experiments. Blended essential oil was applied topically to the skin of the abdomen of each subject. Compared with the placebo, blended essential oil caused significant decreases in pulse rate and systolic and diastolic blood pressure, which indicated a decrease in autonomic arousal. At the emotional level, subjects in the blended essential oil group rated themselves as 'more calm' and 'more relaxed' than subjects in the control group. From the results of this and our studies, it was concluded that aromatherapy causes relaxation.

Next, we examined the effects of aromatherapy massage on cognition using a neuropsychological test designed for patients with depression (Okamoto et al. 2005).

Table 2.2 Effect of aromatherapy massage on Hamilton Depression Rating Scale (HAM) and Profile of Mood State (POMS) in patients with mild depression

	Pre-test		Post-test		<i>p</i> -value
	Mean	SD	Mean	SD	
HAM	14.8	2.39	8.8	3.63	0.039
POMS					
Tension-anxiety	57	9.25	51.4	8.88	0.144
Depression-dejection	58.6	14.36	54.2	10.33	0.144
Anger-hostility	56	13.17	50.6	11.72	0.144
Vigor	40.4	25.24	52.2	10.47	0.223
Fatigue	60.2	12.95	52.6	8.38	0.068
Confusion	62.2	13.07	51.6	8.05	0.043

Five patients aged 31–59 years, with Diagnostic and Statistical Manual of Mental Disorders-IV mild unipolar major depression, received a 30-min aromatherapy massage twice a week for four weeks, using essential oils of sweet orange, geranium, and basil. Patients were submitted to the 17-item HAM and POMS one week before the first session and one week after the last session. Results showed that HAM scores and “confusion” of POMS significantly improved, which suggests that improvements in depressive states were gained subjectively and objectively

This study was carried out with five patients aged 31–59 years, with the Diagnostic and Statistical Manual of Mental Disorders (DSM)-IV mild unipolar major depression (not including psychotic features). None of the patients had a lifetime history of electroconvulsive therapy, head injury, or substance dependence. None of the patients used anti-depressants or received psychotherapy. Each received a 30-min aromatherapy massage twice a week for four weeks, using essential oils of sweet orange, geranium, and basil. In order to examine the response to treatment, patients were submitted to the 17-item Hamilton Depression Rating Scale (HAM) and Profile of Mood State (POMS) one week before the first session and one week after the last session. Cognitive function was evaluated using the Wisconsin Card Sorting Test (WCST). Results showed that HAM scores and “confusion” of POMS were significantly improved, suggesting that improvements in depressive states were gained subjectively and objectively. “Confusion”, one of the subscales of POMS, indicated subjective disturbances of cognition and thought (Table 2.2). Errors, perseverative errors, and perseverative responses of the WCST significantly decreased (Table 2.3), meaning an improvement in prefrontal dysfunction, because WCST assessed rule conceptualization and modification of strategies for responses to verbal feedback, and is particularly sensitive to damage in the prefrontal cortex. Because of the 4-week interval, improvements in WCST scores may be due to a learning effect. However, Moreaud et al. (1996) reported a study where WCST was administered before and 21 days after treatment for major depressive patients. Results of this study suggested that improvements in WCST scores did not always depend on the intervals of the first and second administration of WCST.

Many types of depressive conditions can be involved in decreases in metabolism and low blood flow in the frontal lobe. Hirata et al. (2002) reported that olfactory stimulation increased blood flow to the prefrontal cortex. Komori et al. (1995) gave

Table 2.3 Effect of aromatherapy massage on Wisconsin Card Sorting Test (WCST) in patients with mild depression

	Pre-test		Post-test		<i>p</i> -value
	Mean	SD	Mean	SD	
WCST					
Total number of errors	24.4	3.97	17.2	3.19	0.042
Non-perseverative errors	8.8	2.28	7	3.08	0.144
Perseverative errors	15.6	5.03	10.2	2.17	0.043
Perseverative responses	16.8	5.81	10.4	2.51	0.042
Conceptual level responses	62	1.87	61.8	2.49	1
Number of categories completed	5.8	0.45	6	0	0.317
Trials to complete first category	12.4	3.05	14	2.92	0.465
Failure to maintain set	1	1.73	0.4	0.55	0.414
Learning to learn	-3.13	4.08	2.62	3.31	0.138

Five patients aged 31–59 years, with Diagnostic and Statistical Manual of Mental Disorders-IV mild unipolar major depression, received a 30-min aromatherapy massage twice a week for four weeks, using essential oils of sweet orange, geranium, and basil. Cognitive function was evaluated using the WCST. Errors, Perseverative Errors, and Perseverative Responses of the WCST significantly decreased, which means an improvement in prefrontal dysfunction because WCST assesses rule conceptualization and modification of strategies for responses to verbal feedback and is particularly sensitive to damage in the prefrontal cortex

the citrus fragrances to 12 depressive subjects and the results indicated that the doses of anti-depressants necessary for the treatment of depression could be markedly reduced. The treatment with citrus fragrance normalized neuroendocrine hormone levels and immune function and was rather more effective than anti-depressant. Thus, aromatherapy is possibly useful as a complementary therapy for depression.

2.2.3 Effects of Aromatherapy, Except for Anxiety and Depression

In addition to reductions in anxiety and improvements in the depressive state, the sedative effect of essential oils is well-known, as well as their sleep-promoting effects (Perry and Perry 2006). Therefore, aromatherapy may help to improve sleep disturbance in the elderly. Due to behavioral disturbances, patients with dementia often have marked difficulties in sleeping, and so aromatherapy may be particularly useful for them. In fact, aromatherapy has been previously used for people with dementia to reduce disturbed behavior (Henry et al. 1994; Ballard et al. 2002; Holmes et al. 2002; Snow et al. 2004), promote sleep (Wolfe 1996), stimulate motivational behavior (MacMahon and Kermode 1998), and improve cognitive function (Kennedy and Scholey 2006).

Ballard et al. (2002) conducted a placebo-controlled trial to determine the value of aromatherapy with essential oil of *Melissa officinalis* (lemon balm) for agitation in 72 people with severe dementia. They were randomly assigned to aromatherapy with melissa essential oil ($n=36$) or placebo (sunflower oil) ($n=36$). Seventy-one patients completed the trials. Sixty percent (21/35) of the active treatment group and 14% (5/36) of the placebo-treated group experienced a 30% reduction of Cohen-Mansfield Agitation Inventory (CMAI) score, with an overall improvement in agitation (mean reduction in CMAI score) of 35% in patients receiving Melissa balm essential oil and 11% in those treated with placebo. Quality of life indices also improved significantly more in people receiving essential balm oil.

Snow et al. (2004) also examined the effect of aromatherapy on agitation in seven patients with dementia in the study design of within-subjects ABCBA (A = lavender oil, B = thyme oil, C = unscented grapeseed oil). The study found no support for the use of purely olfactory form of aromatherapy to decrease agitation in severely demented patients.

On the other hand, Holmes et al. (2002) determined whether aromatherapy with lavender oil was effective in the treatment of agitated behavior in 15 patients with severe dementia in a placebo controlled trial with blinded observer rater, and concluded that lavender oil showed modest efficacy in the treatment of agitated behavior in patients with severe dementia.

MacMahon and Kermode (1998) undertook a clinical trial of the effectiveness of aromatherapy on motivational behavior in a dementia care setting using an AB design. Baseline data were recorded for two months, followed by two months of treatment data. Findings showed a statistically significant improvement in motivational behavior associated with the use of aromatherapy.

Thus, there have been many studies on the effects of aromatherapy on sleep and behavioral disturbances as mentioned above. However, there have been no studies on the effects of aromatherapy massage on circadian rhythm disturbance, which is frequently observed in the elderly.

One method of measuring the sleep state and circadian rhythms is by monitoring activity levels. This can be done through the use of an actigraph, a motion-sensing device, approximately the size of a man's wrist watch, which is worn on the wrist and is comprised of an accelerometer, a microprocessor, and 32 K of retrievable memory. Actigraphy is a simple, non-invasive method of measuring levels of day- and night-time activity and can be used for precise estimation of the amounts of both day- and night-time sleep. In addition, activity patterns over several consecutive days can be analyzed employing autocorrelational techniques to provide estimates of sleep states and circadian rhythms (Kripke et al. 1978; Taphoorn et al. 1993).

We examined the effect of aromatherapy massage on circadian rhythms in eight elderly subjects in an open semi-comparative trial, comparing parameters in the second week in which aromatherapy massage sessions were given, in 1-week periods (the first and third week) before and after sessions (Imanishi et al. 2010). The % sleep and sleep efficiency during the down period tended to increase, wake minutes after sleep onset tended to be shorter, and the "rhythm pattern" was significantly

higher in the second week than those in the first and/or third week. A higher peak in the 24-h cycle circadian rhythm was noted following aromatherapy massage in the elderly, who often exhibit circadian rhythm disturbances. Furthermore, peaks in the spectrum cycle in the second week seemed to be closer to 24 h than those in the first and third week. These results suggest that aromatherapy massage improves circadian rhythm disturbances.

2.3 Effect of Massage Therapy in Cancer Patients

2.3.1 *Usage of Massage Therapies in Cancer*

Although massage therapy can benefit patients with cancer, special considerations are needed for these patients. Risks should be minimized and benefits maximized while clinicians feel comfortable dismissing massage therapy with his or her patients (Corbin 2009).

As already mentioned, massage therapy is effective for sedation, relaxation, and the reduction of stress, anxiety, and depression. Thus, massage therapy is expected to be useful for adjunctive cancer treatment in combination with modern Western medicine treatments including surgery, chemotherapy, and radiation.

Ernst (2009) systematically reviewed the effects of massage therapy for cancer palliation and supportive care, searching six databases to identify all trials of classical massage for cancer patients. Fourteen trials met all inclusion criteria. Collectively, they suggest that massage can alleviate a wide range of symptoms: pain, nausea, anxiety, depression, anger, stress, and fatigue. However, the methodological quality of the included studies was poor, a fact that prevents definitive conclusions.

Fellowes et al. (2004) in the Cochrane Collaboration reviewed the effect of aromatherapy and massage for symptom relief in patients with cancer. They searched ten databases and sought randomized controlled trials. The search strategy retrieved 1,322 references. Ten reports met the inclusion criteria and these represented eight RCTs (357 patients). The most consistently found effect of massage or aromatherapy massage was on anxiety. Four trials (207 patients) measuring anxiety detected a reduction post intervention, with benefits of 19–32% reported. Contradictory evidence exists as to any additional benefit on anxiety conferred by the addition of aromatherapy. Evidence for the impact of massage/aromatherapy on depression was variable. Of the three trials (120 patients) that assessed depression in cancer patients, only one found any significant differences in this symptom. Three studies (117 patients) found a reduction in pain following intervention, and two (71 patients) found a reduction in nausea. Although several of the trials measured changes in other symptoms such as fatigue, anger, hostility, communication, and digestive problems, none of these assessments was replicated. They concluded that massage and aromatherapy massage confer short term benefits on psychological wellbeing, with the effect on anxiety supported by limited evidence. The effects on physical

symptoms may also occur. Evidence is mixed as to whether aromatherapy enhances the effects of massage. Replication, longer follow ups, and larger trials are needed to accrue the necessary evidence.

As for breast cancer, many studies have examined the effects of massage therapy on anxiety. Listing et al. (2009, 2010) investigated the efficacy of classical massage on stress perception and mood disturbances in 34 women diagnosed with primary breast cancer randomized into an intervention or control group. For a period of five weeks, the intervention group ($n=17$) received biweekly 30-min classical massages. The control group ($n=17$) received no additional treatment to their routine health care. The Perceived Stress Questionnaire (PSQ) and Berlin Mood Questionnaire (BSF) were used and patients' blood was collected at baseline (T1), at the end of the intervention period (T2), and six weeks after T2 (T3). Women in the intervention group reported significantly lower mood disturbances than that of the control group, especially for anger ($p=0.048$), anxious depression ($p=0.03$) at T2, and tiredness at T3 ($p=0.01$). No group differences were found in PSQ scales, and cortisol and serotonin concentrations at T2 and T3. However, perceived stress and cortisol serum levels ($p=0.03$) were significantly lower than baseline after massage therapy (T2) in the intervention group. Further research is needed to validate their findings.

Billhult et al. (2009) examined the effect of massage on immune function and stress in 30 women with breast cancer by a randomized controlled trial. Results showed that light pressure effleurage massage decreased the deterioration of natural killer cell activity occurring during radiation therapy. Furthermore, it lowered heart rate and systolic blood pressure. No effects were demonstrated on cortisol and diastolic pressure.

Massage therapy induces an improvement in the quality of life. Rueda et al. (2011) suggested in a pilot study that participation in a massage therapy program is both feasible and acceptable to newly diagnosed brain tumor patients experiencing stress. Furthermore, participants in these studies reported improvements in stress and quality of life (QoL) while receiving massage therapy.

Keir (2011) assessed the efficacy of massage therapy on primary brain tumor patients reported psychological outcomes and QoL in a prospective, single-arm intervention. Results showed that as a group, levels of stress dropped significantly between weeks two and three. A trend for the reduction in stress continued through week four. At the end of week four, the Perceived Stress Scale (PSS)-10 scores of all participants were below the threshold for being considered stressed. By the end of the intervention, participants reported significant improvements in three domains, emotional well-being, additional brain tumor concerns, and social/family well-being.

Sturgeon et al. (2009) examined the impact of therapeutic massage on the QoL of 51 patients (mean age of 53 years) undergoing treatment for breast cancer in a pre/post intervention assessment design. Treatment consisted of 30-min treatment per week for consecutive weeks. Results showed that participants experienced a reduction in several QoL symptom concerns after only three weeks of massage therapy. Respondents' cumulative pre- and post-massage mean for state anxiety, sleep quality, and QoL/functioning showed significant improvement.

It has been recognized that not only full body massage, but also topical massage such as leg or foot massage promotes psychological relaxation and reinforces first-line host defense in cancer patients (Noto et al. 2010). Fifteen healthy volunteers rested on a bed for 20 min on the first day, and three days later the subjects received a standardized massage of the legs for 20 min with non-aromatic oil. Twenty-nine cancer patients also received the same standardized massage of the legs. Anxiety/stress was assessed before and just after the rest or the massage using the STAI and visual analogue scale (VAS). Results showed that in healthy volunteers, rest significantly reduced VAS by 34%. In contrast, leg massage significantly reduced both STAI and VAS by 24 and 63%, respectively. In cancer patients, leg massage significantly decreased both STAI and VAS by 16 and 38%, respectively.

Massage therapy is useful for palliative home care. Cronfalk et al. (2009) tried to examine the effects of soft tissue massage (hand or foot) currently used in palliative care nine times over a period of two weeks for the relief of anxiety and pain in 22 patients with cancer. Soft tissue massage generated feelings of existential respite with perceptions of being released from illness for a while. Two categories constituted the basis of these experiences: (1) an experience of thoughtful attention, and (2) a sensation of complete tranquility resulting in the overarching theme “a time of existential respite”.

In addition, massage therapy may be useful for reducing the stress of caregivers. There are a few studies on the effect of massage therapy on mood improvement and anxiety reduction. Goodfellow (2003) determined influences of therapeutic back massage on psychological, physiologic, and immune function variables in caregivers (spouses) of patients with cancer. This group experimental design measured the effects of a 20-min therapeutic back massage at three time points (preintervention, immediately postintervention, 20 min postintervention) on spouses of patients with cancer ($n=42$) randomly assigned to either the experimental or control group. Two-way repeated measures analysis of variance tests determined the effects of therapeutic back massage over the two postintervention time points and resulted in significant group $\times$ time interaction on mood ($F[2,40]=14.61$, $p=0.0005$) and perceived stress ($F[2,40]=28.66$, $p=0.001$). Significant inverse relationships were found between mood and natural killer cell activity ($r=-0.41$, $p=0.009$, $n=42$) and perceived stress and natural killer cell activity ($r=-0.37$, $p=0.017$, $n=42$). These results suggest that therapeutic back massage may enhance mood and reduce stress in this population.

Rexilius et al. (2002) also examined the effect of massage therapy and healing touch on anxiety, depression, subjective caregiver burden, and fatigue experienced by caregivers of patients undergoing autologous hematopoietic stem cell transplant in quasi-experimental repeated measures. Twenty-six caregivers assigned to 13 in the massage therapy group and 13 in the control group. All caregivers completed the Beck Anxiety Inventory, the Center for Epidemiologic Studies Depression Scale, the Subjective Burden Scale, and the Multidimensional Fatigue Inventory-20 before and after treatment consisting of two 30-min massages per week for three weeks. Results showed significant declines in anxiety

scores, depression, general fatigue, reduced motivation fatigue, and emotional fatigue for individuals in the massage therapy group. Thus, massage therapy can bring benefits to caregivers of patients with cancer.

2.3.2 Use of Aromatherapy in Cancer

The popular application of aromatherapy is to reduce anxiety, promote relaxation, and increase the wellbeing of patients in palliative care (Wilkinson et al. 1999; Cooke and Ernst 2000; Hadfield 2001; Serfaty et al. 2012). Several studies have centered on anxiety in cancer patients. Corner et al. (1995) evaluated the use of massage and essential oils on the wellbeing of cancer patients by a randomized control trial. They recruited 52 patients with cancer at a UK Cancer Center, with 17 randomized to each massage group and 18 controls. The mean age of patients was 48. Forty-two percent of patients had primary disease, 40% with recurrence. Results showed that anxiety scores reduced significantly over time only for the essential oils massage group. Concerning effectiveness for pain, mobility, ability to work, and communication with family, the essential oils group performed better than the control group.

Wilkinson et al. (1999) also evaluated aromatherapy massage in palliative care in a randomized control study involving full body aromatherapy massage or carrier oil massage three times a week. Eighty-seven patients were recruited with 43 being randomly allocated to an aromatherapy massage group and 44 to a massage only group. The kinds of cancers were various, and 90% of the patients were female. The mean age of patients was 54. Patients in the aromatherapy massage group were given full body massages with carrier oil and roman chamomile essential oil three times weekly, while patients in the control group were given full body massage with carrier oil three times weekly. For the aroma group, significant improvements were found for physical, psychological, QoL, and severe physical and severe psychological subscales of the Rotterdam Symptom Checklist (RSCL), pre to post test. For the massage group, there were no differences in any RSCL subscales from the pre to post test. For the whole group and each group, significant improvements in the STAI-state were noted pre to post tests for each massage.

Kohara et al. (2004) also examined the effects of combined modality treatment consisting of aromatherapy, soaking the feet, and reflexology on fatigue in terminally ill cancer patients in an open study. Twenty patients diagnosed with advanced cancer including nine patients with lung cancer were enrolled. After a patch test was performed, patients received aromatherapy that was accompanied with a foot soak in warm water containing lavender essential oil for 3 min, followed by reflexology treatment with jojoba oil containing lavender for 10 min. Fatigue was evaluated using the Cancer Fatigue Scale (CFS) before, 1 h after, and 4 h after treatment. Total CFS scores improved significantly after this treatment. Among three CFS subscales, physical and cognitive subscale scores were significantly reduced.

We examined how aromatherapy massage influenced psychological parameters in 12 breast cancer patients in an open semi-comparative trial (Imanishi et al. 2009).

One month before aromatherapy massage, as a waiting control period, were compared with those during aromatherapy massage treatment and one month after the completion of aromatherapy sessions. Patients received a 30-min aromatherapy massage twice a week for four weeks (eight times in total).

First, the psychological responses to aromatherapy massage were examined using STAI, POMS, and Hospital Anxiety and Depression Scale (HADS). State anxiety scores of STAI are adequate to determine the short term effects of aromatherapy. In STAI especially, state anxiety scores significantly decreased after each aromatherapy massage session. This result was in accordance with those of Wilkinson et al. (1999).

On the other hand, trait anxiety using STAI and HADS, which are appropriate for the determination of long term effects, gradually reduced over the sessions. There was a significant decrease in trait anxiety scores between one month before and after massage. HADS also showed that anxiety gradually reduced over time, while there were no significant differences in depression scores. Coinciding with our results, Corner et al. (1995) also reported that aromatherapy massage significantly reduced anxiety, although other investigations did not find that aromatherapy had an anxiolytic effect in patients with cancer (Louis and Kowalski 2002; Graham et al. 2003; Soden et al. 2004).

Louis and Kowalski (2002) measured the response of 17 cancer hospice patients to humidified essential oil aromatherapy. Each subject was measured on three different days before and after a 60-min session consisting of: (1) no treatment (control), (2) water humidification (control), or (3) 3% lavender aromatherapy. Results reflected a positive, yet small, change in blood pressure and pulse pain, anxiety, depression, and sense of well-being after both the humidified water treatment and the lavender treatment.

Graham et al. (2003) determined whether the inhalation of aromatherapy during radiotherapy reduces anxiety in 313 patients, randomly assigned to receive either carrier oil with fractionated oils, carrier oil only, or pure essential oils of lavender, bergamot, and cedar wood. Patients underwent assessment by the HADS and the Somatic and Psychological Health Report (SPHERE) at baseline and at treatment completion. Results showed no significant differences in HADS depression or SPHERE scores between the randomly assigned groups. However, HADS anxiety scores were significantly lower at treatment completion in the carrier oil only group compared with either of the fragrant arms. The fragrance alone without massage did not influence psychological conditions of patients with cancer.

Soden et al. (2004) compared the effects of 4-week courses of aromatherapy massage and massage only on physical and psychological symptoms in 42 patients with advanced cancer. They were unable to demonstrate any significant long-term benefits of aromatherapy or massage in terms of improving pain control, anxiety or QoL. However, sleep scores improved significantly in both the massage and the combined massage groups. There were also statistically significant reductions in depression scores in the massage group. In this study of patients with advanced cancer, the addition of lavender essential oil did not appear to increase the beneficial effects of massage. Their results do suggest, however, that patients with high levels of psychological distress respond best to these therapies.

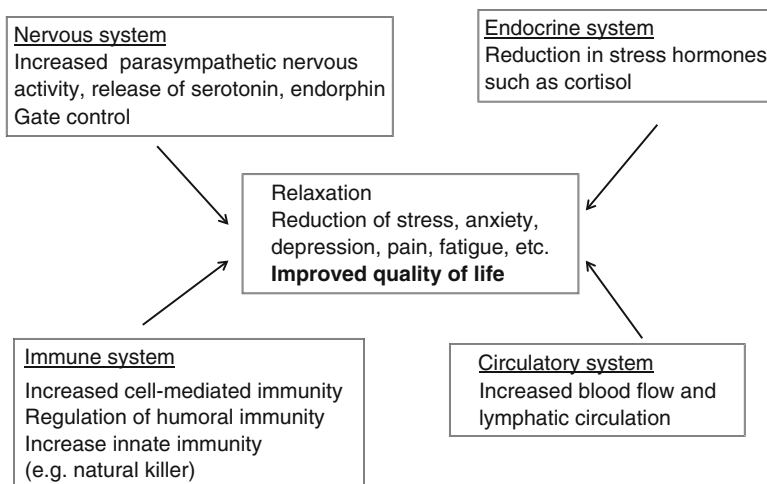


Fig. 2.1 Mode of action of massage and aromatherapy massage in cancer

On the other hand, we found that aromatherapy massage had both short and long term effects on anxiety reduction in breast cancer patients (Imanishi et al. 2009). No significant changes in the waiting control period and significant decreases of anxiety both in the short-term and long-term show that aromatherapy massage holds promise as an effective therapy for breast cancer patients. Further investigations with an increased sample size and improved study design, including a control group, are required to confirm the effect of aromatherapy massage. To do this, it will be important to find a therapy suitable for controls.

Outside psychological therapies, anxiolytic drugs, anti-depressants, and conventional medicine offer no effective interventions to reduce anxiety concerning recurrence and/or metastasis. It has been suggested that aromatherapy massage is a viable complementary therapy that significantly reduces anxiety in patients with malignant brain tumors (Hadfield 2001).

Finally, the author would like to discuss the safety of massage therapy and aromatherapy massage. In general, massage is thought to be safe for patients with cancer, although a few studies have reported adverse effects such as internal hemorrhage due to coagulation disorders, fracture with metastatic cancer in bones, and infection on open wounds or radiation dermatitis. However, we cannot find any evidence to suggest that massage therapy can spread cancer (Corbin 2009).

Massage and aromatherapy massage caused various actions favorable for patients with cancer such as relaxation, reductions in anxiety, depression and fatigue, and improvements in QoL *via* nervous, endocrine, immune, and circulatory systems (Fig. 2.1).

In conclusion, massage therapy including aromatherapy massage in cancer patients would be beneficial for the reduction of anxiety, depression, and stress as well as pain, and is generally safe. Therefore, further studies, especially randomized clinical trials, should be performed.

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