Review Article

Aroma Therapy in Anti-Aging Medicine

Kaoru Shibamoto 1), Miho Mochizuki 1), Masatoshi Kusuhara 2)

1) Department of Nursing, Shizuoka Cancer Center Hospital
2) Region Resources Division, Shizuoka Cancer Center Research Institute

Abstract

Medical aromatherapy aimed at enhancing the prevention and symptomatic treatment of disease is widely used in nursing and the nursing field. It is important that the specific fragrance and its application are selected only after the absorption and mechanism of action of its essential oil are understood. Because it acts on the hippocampus and autonomic nervous system, fragrance stimulation has been considered a complementary and alternative medical therapy for dementia, sleeplessness and sleep disturbance, all of which are related to aging. The in vivo role of free radicals in the development of various diseases has recently been identified. A recent study reported that fragrance use enhanced the elimination of free radicals, and wide application of this modality in complementary and alternative medicine is expected.

KEY WORDS: medical aromatherapy, stress, autonomic nerve, growth hormone, free radicals

Introduction

In Japan, the concept of “medical aromatherapy as complementary and alternative medicine” has recently spread in the field of aromatherapy. Here, to better understand possibilities for and views of aromatherapy in Anti-Aging Medical treatment, we investigated various research findings on the effects of aroma (fragrance) on risk factors in aging.

Present Status of Medical Aromatherapy

Aromatherapy is a type of treatment that uses naturally refined oils (essential oils), 100% extracted from flowers, leaves, seeds, trunk, pericarp, and resin, etc. The French chemist Rene-Maurice Gattefosse first named the treatment that uses essential oils medically as “aromatherapy”. Following extensive research, a book of the same name was published in 1973, and the word aromatherapy was introduced to the world 1). To distinguish aesthetic aromatherapy, which aims at achieving beauty in aromatherapy, from that directed at medical treatment, aromatherapy aimed at facilitating the prevention and treatment of the symptoms of disease is called medical aromatherapy. The use of medical aromatherapy is not restricted to medical practice, but is also widely used in nursing and the nursing field, etc. 2).

Medical doctors in France and Belgium are now developing aromatherapy as a medical treatment, and medical insurance in these countries now covers the purchase of and consultation about essential oils, particularly in Belgium 3). Medical doctors in France and Belgium are now developing aromatherapy as a medical treatment, and medical insurance in these countries now covers the purchase of and consultation about essential oils, particularly in Belgium 3).

Aromatherapy is also used as complementary therapy in the care of cancer patients, particularly by hospices in the UK. At present, however, medical insurance coverage is not provided. About one in three cancer patients in the UK is reported to use some type of complementary therapy, among which aromatherapy treatment is particularly common 4).

With regard to the United States, a country with active home remedy and complementary and alternative therapy fields, aromatherapy has attracted much interest 5).
The Japanese Society of Aromatherapy was established by healthcare professionals in 1997. Those performing medical aromatherapy require some form of healthcare licensure. Aroma massage is thought to be within the scope of practice of nurses and physical therapists, and their provision of this treatment to patients is officially allowed. Aromatherapy treatment is not presently covered by health insurance in Japan. Because the Japanese system prohibits the mixing of public and private payments, clinics and hospitals cannot allow patients to pay for essential oils. A number of issues remain to be resolved, including expenses related to the purchase of essential oils etc. by medical institutions, clarification of responsibility for treatment effects and outcomes, and incorporation as a standard treatment method in medical institutions.

**Action, Absorption, and Excretion of Refined Essential Oils**

The mechanism of action of aroma therapy is divided into two, those involving the olfactory system and others, which include 4 routes: respiratory system, skin, oral mucosal membrane, and non-oral mucosal membrane. In each, aroma has both local effects and systemic effects via circulation in the blood after absorption (Table 1).

**Olfactory System**

A feature of the sense of smell is that, unlike the other senses, neural signals go directly to the cerebral limbic system. The cerebral limbic system influences reactions such as appetite, thirst, sexual desire, sleep, emotions, memory, creativity, and intuition. For example, fragrance stimulation influences the amygdala, which processes emotional reactions; the hippocampus, which is related to memory; and the locus ceruleus, which undergoes excitation in response to the stress reaction. Following the cerebral limbic system, the signals are transmitted to the hypothalamus, which governs the autonomic nervous, endocrinological, and immunological systems.

**Absorption**

The speed that a fragrance ingredient shifts to the blood via the pulmonary circulation depends on the balance between ventilatory volume and cardiac output. The density and amount of an essential oil must therefore be adjusted to the physical status of the subject. With regard to transdermal effects, consideration should be given to differences in the thickness of the skin by gender, age, and location.

**Excretion**

Essential oils are chiefly excreted by the kidney, while a part is also excreted from the lungs. The excretion route of essential oil elements and the ratio of excretion routes differ according to the absorption route and character of the essential oil.

**Methods of aromatherapy**

**Aromatic Bath and Inhalation**

This method works by causing the fragrance ingredient refined from the oil to diffuse into the air, and to be thereby inhaled and absorbed into the body. This approach can be easily conducted on a convenience basis, and is the most effective means of obtaining the medicinal effect of the refined oil. For diffusion into the air, tissue paper, cotton wool, and air fresheners can be used, as well as special apparatuses such as diffusers (aroma spreaders) and aroma jars. Even a mug or washbowl filled with hot water can be used.

**Compress**

In this method, a towel is wetted with hot or cold water and with floral water (aroma-flavoured distilled water which contains a slight amount of fragrance ingredients obtained by extraction of essential oils) to which essential oil has been added, and compressed onto the diseased part.

**Bathing**

In this method, essential oils and emulsifying agents such as anhydrous ethanol, salt, and sodium bicarbonate are put into hot bath water. In addition to whole-body bathing, partial bathing of the lower half of the body or of just the foot are also possible. Essential oil improves the effects of bathing, such as cleanliness, promotion of blood circulation, improvement of metabolism, relief of muscle stiffness, recovery from fatigue, and excretion of waste.
Treatment (Aroma Massage) and Dermal Application

In this method, the fragrance ingredient of refined oil is absorbed transdermally. When applied directly, the concentrated nature of the essential oil results in its stimulation of the skin. Base materials such as vegetable oils, vaseline, or shea butters, also called carrier oil (base oil), are therefore used to dilute the essential oil. In addition to the effects of aroma on relaxation, promotion of blood circulation and modulation of the nerve and endocrine system, physical touch during application itself has some synergistic effects. Moreover, individuals can apply hand creams, ointments, and lip creams themselves, indicating that an improvement in self-care ability can be expected.

Effect of Smell and Fragrance on the Autonomic Nervous System

Mammals possess a mechanism to maintain physiological conditions suitable to the maintenance of life, such as body temperature, blood pressure, or blood glucose levels irrespective of changes in the external environment. This internal homeostasis results from the cooperation of the autonomic nervous system, endocrinological system, and other humoral mediators. The high levels of stress exposure in contemporary society hamper the maintenance of body homeostasis. Lifestyle-related diseases such as high blood pressure and diabetes mellitus, diverse symptoms appear due to imbalances between the sympathetic and parasympathetic nervous systems.

Nagai et al. examined the action of essential oils on autonomic nerves using rats under urethane anesthesia. The fragrance of the grapefruit essential oil stimulated the sympathetic nerves controlling white and brown adipose tissue, the adrenal glands, and the kidney, and inhibited the parasympathetic nerves controlling the stomach. The fragrance of the lavender essential oil inhibited sympathetic nerves controlling white and brown adipose tissue, the adrenal glands, and the kidneys, and stimulated parasympathetic nerves controlling the stomach. Fragrance stimulation was shown to change physiological indices such as body temperature, blood pressures, and blood glucose through the control of autonomic nervous activity.

Fragrance stimulation also changes autonomic nervous activity in humans, and is thought to be effective in the treatment of various diseases. Hanawa et al. showed that inhaling fragrances made subjective feelings positive and reduced fatigue. Salivary amylase level has been reported to be a marker of unpleasant mental stress on the basis of its sympathetic innervation, and rapid secretion in response to stress. Salivary amylase level can be intentionally decreased during rest, or during mental work, which is state of pseudostress, by inhalation of fragrance. It is considered that the sympathetic nervous activity due to stress can be decreased by the inhalation of a fragrance.

The finding that autonomic nervous activity can be controlled by fragrance indicates that aromatherapy can be readily utilized in daily life using the convenient method of aromatic bathing, resulting in a reduction in stress. However, it is necessary to note the possibility of side effects in subjects with an abnormal physical status resulting from an excessive density or amount of fragrance relative to the absorption of essential oil, route of action and excretion. With regard to safety, it is reasonable to assume that medical aromatherapy should be conducted with lower concentrations and amounts of essential oils in patients with serious diseases than in healthy subjects. Further, attention should be given to combinations of specific essential oils with other drugs. Moreover, certain essential oils should not be used in pregnant women or nursing mothers. The effect and action of an essential oil should always be confirmed before use.

Because unfavorable odors exacerbate stress, it is important that the selection of fragrances should also give consideration to the personal preferences of the patient, and not only to the effect of the essential oil.

Trials in Cognitive Disorders

Smell stimulation is transmitted through the olfactory nerve to the cerebral limbic system, such as to the hippocampus and corpus amygdaloideum. The hippocampus and the corpus amygdaloideum are closely associated with cognitive disorders, and the hippocampus in particular shrinks remarkably in Alzheimer’s disease. A previous study has suggested that aromatherapy improves cognitive dysfunction, the major symptom of Alzheimer’s disease, and patient quality of life.

Jinbo et al. reported that disorientation in an aged patient at an elderly nursing home was improved by aromatic bathing. In addition, using a touch panel-type dementia evaluation standard, cognitive function was shown to be improved in patients with advanced Alzheimer’s disease.

Cognitive impairment in the sense of smell appears at an early stage of Alzheimer’s disease. This may represent an effective index in the earlier detection of the progression of disease from slight to severe cognitive impairment.

Smell stimulation may be a useful method for the early detection and treatment of cognitive disorders.

Sleeplessness and Sleep Disturbance

By progressive use of various essential oils in accordance with time zone, sympathetic and parasympathetic balance can be controlled, and circadian rhythm can be adjusted. Many elderly subjects in geriatric health service facilities experience sleep disturbance and difficulties stemming from problems with circadian rhythm. Watanabe et al. provided treatment to the elderly in health services facilities using a mixed aroma of genuine lavender, geranium, and Anthemis nobilis, commonly known as Roman Camomile, for 30 minutes before they went to bed. Results showed an increase in sleeping time and an improvement in arousal patterns. Further, the 24-hour circadian rhythm cycle was strengthened.

Various Japanese and overseas groups have investigated the effects of aromatherapy in sleeplessness. To adjust circadian rhythm, nighttime sleep is important. Lack of sleep causes not only feelings of worthlessness, daytime irritation, and stress, but also more serious problems. Insomnia has an influence on immunity and a long series of sleep disturbances will result in immunologic disease and eventually cancer. Sleeplessness is caused by various factors, and frequent sleeplessness is a major symptom in many psychological illnesses. The incidence of depression has recently increased, as a result of increases in
exposure to both internal (physiological) and external (environmental) stress. Medication is the first-line therapy in the treatment of insomnia, but aromatherapy is used as a complementary therapy by a number of clinicians and facilities. The production of melatonin, which is called a sleep hormone, decreases along with aging. Melatonin secretion is related to insomnia, which affects many aged individuals. It is possible to use melatonin as one means of normalizing sleep rhythm at an early stage of sleeplessness before the use of aromatherapy.

Sleep is related to the secretion of growth hormone. The sleep cycle is about 1.5 hours, and is divided into four stages: very shallow non-rapid eye movement (REM) sleep, deep non-REM sleep, shallow non-REM sleep, and REM sleep. The deep non-REM sleep in the second cycle is the most important, and plays an important role in the recovery from tiredness and the restoration of the brain. At this time, the secretion of growth hormone from the pituitary peaks. Growth hormone has many actions, including preserving skin fitness and moisture; strengthening of immune function and bone; and improvement in energy, sexual ability, cholesterol metabolism, cardiopulmonary function, and memory. A lack of growth hormone is an essential factor in the decrease in QOL due to aging. Sufficient high-quality sleep helps the production of growth hormone. The use of sleeping medicine, alcohol, and tranquillizers changes the rhythm composition of sleep, and decreases the quality of sleep. Against this background, aromatherapy is naturally effective as one means of helping the onset of sleep.

Skin

Free radicals are deeply related to aging of the skin. The skin is constantly exposed to stimulation with ultraviolet rays. After exposure to ultraviolet rays for one hour, little superficial change in the skin is seen. However, free radicals are generated in the cells of the skin, causing severe DNA damage. Sotozaki et al. reported that both lavender and rosemary increase scavenging activity against free radicals, thereby showing defensive effects against oxidative stress in the body.

In aromatherapy treatment, diluted essential oil is applied directly to and spread over the skin, thereby providing a moisturizing effect on the skin. Lavender promotes the recovery of skin. Tea Tree is effective in the treatment of atopic dermatitis, and suppresses the growth of staphylococcus aureus on the skin surface and decreases itch. It also enhances immune function, and helps the correct functioning of the defensive function of the skin. Roman Camomile suppresses the release of histamine, and relieves pruritus.

However, care is required when using the essential oil of citrus, owing to the presence of a phototoxic property of this oil which is assumed to induce skin pigmentation after use as a treatment or ointment. Direct sunlight should be avoided for 4 to 5 hours after use, and use at nighttime is recommended.

Women’s Health

Some essential oils have a hormonal effect. The clary sage shows a female hormone-like action, star anise and fennel have an estrogen-like effect, and sage shows a progestosterone-like action. Aromatherapy might not provide a dramatic and unexpected improvement in particular symptoms similar to that usually only obtained with hormone replacement therapy. Nevertheless, the use of essential oils is associated with few of the side effect seen with hormone replacement, facilitating their clinical use as medical treatment, and enhancing patient compliance and acceptance.

A decreased level of estrogen, a female hormone, induces various menopausal symptoms. With regard to perimenopausal symptoms, hormonal therapy plays a central role, but combined use of aromatherapy is also effective in the relief of symptoms during hormone treatment. Moreover, estrogen has effects on lowering serum LDL-cholesterol level, and increasing calcium absorption and bone formation. The development of osteoporosis in advance age is the single biggest problem in women. The average life span of Japanese women exceeds 80 years, meaning that women live for about 30 years after menopause. Recovery from osteoporosis-induced fracture is not easy, and many patients are subsequently bedridden. To live a fulfilling life until the end of life, it is important to prevent osteoporosis by using essential oils with hormonal effects, accompanied by nutrition therapy and therapeutic exercise.

Patients with breast cancer are often administered anti-estrogen drugs. In these cases, the use of essential oils with estrogen-like effects requires caution. How the estrogen-like effects of essential oils influence the action of other medications is not presently understood. At this moment, aromatherapy by using such oils should be avoided for patients with breast cancer.

Conclusion

Medical aromatherapy aimed at medical treatment, such as facilitating the prevention and symptomatic treatment of disease, is now widely used in nursing and nursing care. This treatment modality is one of the major pillars of complementary and alternative medicine, and is indispensable to fields in Western medicine to which it does not currently extend. Aromatherapy has the possibility of playing an important role in Anti-Aging Medical treatment. It is necessary to establish aromatherapy as an evidence-based medical therapeutic system through clinical study and scientific research of essential oils, as well as the substantial accumulation of experience.
References

4) Japanese Society of Aromatherapy (ed.): Aromatherapy for nurses. MEDICUS SHUPPAN, Publisher Co. Ltd, Osaka, 2005 (in Japanese)
20) Japanese Society of Aromatherapy (ed.): Aromatherapy for nurses-Practical use. MEDICUS SHUPPAN, Publisher Co. Ltd, Osaka, 2008 (in Japanese)