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# *The Science and Art of Aromatherapy*

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*Essential oils have been used for thousands of years. Hippocrates claimed that the way to health was through aromatic baths and massages. Much anecdotal evidence exists regarding aromatherapy's positive effects on recipients. However, well-designed research trials are sparse. Certainly much controversy exists regarding the appropriate way to conduct research on holistic therapies. Can their effects be broken down and studied without contradicting the central premise on which holism is based? The purpose of this article is to review the current state of the science of aromatherapy and to propose future research. The author also offers guidelines for safe aromatherapy practice while awaiting future research on its clinical efficacy.*

**Aromatherapy involves** the therapeutic use of essential oils—concentrated oils extracted from various parts of aromatic plants (e.g., flower, stem, leaf, root, bark)—with the intent to calm, balance, and rejuvenate mind, body, and spirit (Corio, 1993). In general, essential oils are derived from plants through steam distillation.

Aromatic oils have been used for almost 5,000 years. Egyptians used essential oils for embalming, cosmetics, perfumes, and love potions (Lawless, 1997). There are more than 180 references in the Bible to the use of oils for mental, spiritual, and physical healing (Welsh, 1997).

Modern aromatherapy was originally developed in Germany in the 16<sup>th</sup> century, but most of its development has occurred in the current century (Urba, 1996). Gattefosse, a French chemist, investigated the antibacterial and healing properties of essential oils during World War I while treating wounded soldiers (Walsh, 1996). According to Welsh (1997), Dr. Jean Valnet, a French army surgeon, further fueled the revival of aromatherapy during World War II. Currently, an

international market exists for aromatherapy oils. They are manufactured and used worldwide. In France, medical students are required to study aromatherapy; it is frequently prescribed by physicians and typically covered by insurance (Lavabre, 1990). In Japan, manufacturers filter essential oils such as rosemary and lavender through factory ventilation systems to improve productivity and prevent the spread of communicable illnesses such as influenza (Keville & Green, 1995). According to Lawless (1997), bacteria generally do not develop resistance to essential oils as they do to antibiotics. In the last 5 years, the popularity of aromatherapy among clinicians and lay people in the United States has grown dramatically.

There are two issues to consider when incorporating a therapy into clinical practice: safety and efficacy. Few adverse reactions to aromatherapy are reported in the literature. Two articles have been written documenting cases of contact dermatitis resulting from exposure to essential oils. According to Schaller and Korting (1995), a 53-year-old man in Germany was admitted and treated for severe contact dermatitis resulting from exposure to several essential oils. He was found to be highly allergic to linalool, a compound found in lavender, rosewood, and jasmine oils. He was using these oils, among others, routinely. He was treated, and his skin lesions resolved; however, they returned when he went home, although he was no longer practicing aromatherapy. The second reaction was believed to have resulted from airborne molecules. There was no elaboration as to whether these essential oils were being used correctly. This report also mentions the phototoxic nature of bergamot oil. In addition, laurel oil was implicated in causing cheilitis and stomatitis. Laurel oil is frequently used in men's cologne and medicated facial cleansers. The authors concluded that in the German literature, jasmine and lavender oils are considered rare contact allergens, but they expressed concern about an increasing incidence as the use of essential oils increases.

Bilsland (1990) described an episode of contact dermatitis related to marigold essential oil. Burns and Blamey (1994) noted that 3% ( $n = 16$ ) of the 585 participants in their study complained of transient adverse effects related to peppermint and clary sage essential oils. Participants complained of burning when peppermint oil was applied to the forehead for nausea and vomiting. A few participants thought clary sage had an unpleasant odor.

In summary, it seems prudent to use caution when considering the use of essential oils in individuals with atopic or sensitive skin. According to the current literature, aromatherapy is a safe therapy.

However, its effectiveness has not been clearly documented. Much of the research concerning its clinical efficacy is anecdotal. Very few well-designed research trials have been conducted. If aromatherapy is to be successfully and responsibly integrated into mainstream nursing practice, its efficacy needs to be established. The debate on the appropriateness of studying holistic therapies in a reductionistic paradigm is appropriate here and will be addressed when suggesting directions for future research. First, a review of aromatherapy research will be presented.

### THE SCIENCE OF AROMATHERAPY

Research reports and articles on aromatherapy were found by electronically searching Medline and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). The reference lists of articles found were also reviewed for research reports.

#### “Soft” Evidence

In an article titled “Flower Power,” Wise (1989) described many uses of aromatherapy ranging from the use of geranium, lavender, and marjoram for calming and comforting to the use of lavender for migraine headaches. This article beautifully describes the use of aromatherapy by nurses in a hospital in England; however, no research was cited to support these uses. In an article about the use of complementary therapies in the elderly, Passant (1990) explained that essential oils were effective in promoting relaxation and comfort. She stated that the oils were chosen intuitively; again, no research was included. Tobin (1995) reported success when using aromatherapy in patients with dementia. In an anecdotal report, she described the tendency of aromatic massage to delay, reduce, and even prevent agitation. She used lavender, orange, geranium, and clary sage. In a beautiful narrative, Lennox (1997) describes the incorporation of aromatherapy in the nursing home where she is a part-time nurse. The typical, often unpleasant nursing home scent had been replaced by the scents of jasmine and lavender. She reported the resolution of both a chronic leg ulcer and an episode of cellulitis. One resident’s chronic depression improved.

In a descriptive research report, Walsh (1996) explored the use of aromatherapy for the treatment of psoriasis in 15 clients. The clients

were asked to apply aromatherapy preparations (essential oils in a carrier oil) to their bodies daily. They were also asked to add six to eight drops of essential oil to their bath and soak for at least 10 minutes. Aromatherapy prescriptions were individualized. Essential oils included bergamot, lavender, lemon balm, jasmine, geranium, and sandalwood. Various carrier oils were used including avocado, wheat germ, sweet almond, evening primrose, and coconut. Of the 15 clients, 14 reported marked improvement in the skin condition, including a reduction in the number and severity of outbreaks and lengthened remissions between outbreaks. Walsh also cited psychological and personal benefits related to the improvement of the psoriasis. Six clients experienced increased confidence and self-esteem and a reduction in embarrassment. These clients were able to engage in sports and other activities they had been too self-conscious to undertake in the past. Five clients experienced significant improvement in their personal relationships. They felt this was due in part to the ability of their partners to engage in the treatments, as they were much more pleasant to apply than the traditional topical treatments. Although this was not a controlled study, it does provide insight into both the science and art of aromatherapy.

In another descriptive study, Burns and Blamey (1994) examined the use of aromatherapy in childbirth. A total of 585 women were enrolled in this study. Trained midwives administered aromatherapy to women in labor and delivery. Ten essential oils were chosen based on their healing properties, including lavender, clary sage, peppermint, eucalyptus, chamomile, frankincense, jasmine, rose, lemon, and mandarin. The oils were administered in various ways including inhalation and topical application. Given to calm uterine contractions and reduce anxiety, lavender was used most frequently. Peppermint oil was given as a drop on the forehead for nausea and vomiting. A total of 80% of women started childbirth with essential oil as the only form of analgesia. Two thirds of participants were later given other forms of analgesia. Of the participants who used aromatherapy, 62% described the essential oils as effective. The authors concluded there was a high degree of overall satisfaction when using aromatherapy in labor and delivery. They also mentioned they had decided to temporarily stop using the oils while they interpreted the data. However, mothers and midwives insisted the option should remain and the practice continued. Again, this was not a rigorous trial, but again, the effects of aromatherapy were believed to be beneficial by the participants.

In a pilot study with 15 elderly patients, Hudson (1996) investigated the sedative effects of lavender essential oil. She theorized that if the quality of sleep could be improved in the elderly, their days would be spent in more alert therapeutic activities. The essential oil was placed on the patients' pillows at night. She found that lavender *angustifolia* improved sleep quality in 84% of the patients and increased daytime activity levels and alertness in 70% of the patients. Based on the encouraging results of this pilot study, a larger trial is certainly indicated.

### **“Hard” Evidence**

A few more rigorous, experimental studies were found in the literature. Buckle (1993) investigated the effects of two different types of topically applied lavender essential oil on cardiac surgery patients in an attempt to disprove two assumptions about the effectiveness of essential oils. Often, aromatherapy is practiced with massage, making it difficult to know if there are effects independent of those associated with touch. Also, aromatherapy's effects are often attributed to the placebo effect. Buckle's (1993) hypothesis was stated as follows:

If it could be shown that there is a difference between the therapeutic effects of two essential oils of the same genus, but different species, which had close chemical affinity, then it would seem to disprove the hypothesis that aromatherapy using topical application of oils is effective purely because of the touch, massage, or placebo factor. (p. 32)

She chose two species of lavender: *Lavandula angustifolia* and *Lavandula burnatii*. A total of 28 patients were given 20-minute massages to the feet, legs, hands, arms, and forehead by the researcher, using a randomly assigned lavender oil during the afternoon/evening on two consecutive days. Four patients were dropped from the trial for medical reasons, leaving 24 patients for analysis. Of the 24 participants, 20 exhibited slower, deeper respirations, with four participants experiencing a drop from 32 to 22 breaths per minute. Blood pressure and pulse rates were essentially unchanged. Emotional and behavioral stress levels were measured before and after each treatment. Included in the report were bar charts showing mood, coping, anxiety, and positive effects of lavender A and lavender B. However, the tools used to measure these responses were not specified. The author concluded that because lavender A was more effective than lavender B in

reducing anxiety, the therapeutic effects of aromatherapy are not simply due to the effects of massage, touch, or placebo. This is an unfounded conclusion given the absence of a control group and the lack of control over other potential confounding variables. There were also no statistical analyses reported. In addition, the author stated that this was a double-blind trial, but this is a fallacy. Although each of the oils was sent for gas chromatography to document their different compositions and the results were kept secret, the oils reportedly smell so distinctly different that blinding cannot be claimed. Nevertheless, this trial does demonstrate the potential antianxiety effects of lavender essential oil, which is one of the benefits ascribed to lavender in aromatherapy texts. It is known that aromatherapy can produce either stimulating or sedative effects upon inhalation of fragrance compounds (Buchbauer, Jirovetz, Jager, Plank, & Dietrich, 1993).

Another experimental study evaluated the effects of aromatherapy, massage, and periods of rest in an intensive care unit (Dunn, Sleep, & Collett, 1995). A total of 122 patients admitted to a general intensive care unit were randomly assigned to one of three groups: massage, aromatherapy using essential oil of lavender, or a period of rest. Pre- and posttreatment measures of blood pressure, pulse, and respiratory rate, as well as behavioral assessment of anxiety, mood, and ability to cope were assessed using a modified assessment tool developed for intensive care patients who are unable to verbally respond. The tool included both positive and negative responses based on observable behaviors such as motor activity, somatic changes, and facial expressions. The validity and interrater reliability of the tool was assessed and thought to be adequate. The majority of participants received two treatment sessions with more than half receiving all three treatments. Rest was as effective as massage in reducing anxiety and improving mood, and it was also as effective as aromatherapy in improving coping ability. One concern of the authors was that a 1% concentration of lavender oil was used, which was at the lower end of the range of recommended dilution. They hypothesized that a 2% dilution might have shown more beneficial effects. Other than the absence of a control group, there were no major methodological flaws in this study. Certainly, periods of rest should be incorporated into the intensive care unit experience, and massage and aromatherapy may be useful adjuncts to enhance well-being in this population.

A randomized clinical trial was conducted investigating the effects of lavender oil in relieving perineal discomfort following childbirth

(Dale & Cornwell, 1994). In this trial, 635 women were blinded to the specific treatment condition and randomly assigned to one of three groups: one using pure lavender oil, one using a synthetic lavender oil, and one using an inert substance in a daily bath for 10 days following normal childbirth. A common belief among aromatherapy practitioners is that essential oils are necessary to achieve the desired benefit because of the presence of their life force, which is inherent only in living matter. It is believed that synthetic oils do not deliver the same therapeutic results, although Martin (1996) has begun to dispel this idea based on chemical analyses of essential and synthetic oils that have yielded no differences in chemical structure. Dale and Cornwell (1994), following primary and secondary data analyses, found no statistically significant differences in mean daily perineal discomfort scores among the three groups in the 10-day period. Using an analysis of effect size to standardize the magnitude of differences between these mean scores, there were no statistically significant differences. In the only reported rigorous experimental trial employing a control group, two null hypotheses were retained: (a) There are no differences in effect between lavender essential oil and synthetic lavender oil, and (b) there is no effect on postpartum perineal discomfort when lavender oil is used as a bath additive.

Despite some interesting and valuable insights, this review of the research demonstrates that there is a paucity of well-designed studies investigating the effects of aromatherapy. In addition, of the well-designed clinical trials conducted, the results are not consistent regarding the efficacy of essential oils. In general, participants enjoyed the aromatherapy interventions. This fact alone makes aromatherapy a viable modality for self-care and possibly holistic nursing care. However, further investigation into the efficacy of aromatherapy is needed.

### **Directions for Future Research**

In an interesting report, Martin (1996) reviewed the current evidence and clinical significance of the "role of olfactory stimulation in the alteration of cognition, mood, and social behavior," concluding there is "a common, if uneasy, relationship with the holistic practice of so-called aromatherapy" (p. 63). The review includes both quantitative and qualitative research. Martin cited several authors who noted cognitive improvement in a number of tasks when participants



were exposed to odors, including photo and slide recognition, and word recall. This branch of research is known as *olfactory psychology*. This area of research is distinguished from olfactory remediation or aromatherapy primarily by its consistently quantitative research paradigm. Martin concluded that carefully designed trials are needed to assess the potential effects of aromatherapy on human health; he calls for research projects containing adequate sample sizes, objective measurements of the outcome variables of interest, partitioned effects of confounding variables, and follow-up studies.

Following the current review of the scientific status of aromatherapy, I concur with Martin (1996). Admittedly, this strategy involves subjecting a holistic practice to a reductionistic scientific approach. However, rigorous designs are necessary to investigate the specific effects of aromatherapy. Furthermore, holism and reductionism are not mutually exclusive terms. Owens and Holmes (1993), in their review of holism, encapsulated the holism-reductionism dichotomy. They described the historical evolution of this conflict from the time of the ancient Greeks, who believed that human beings could not be understood unless nature was understood and that nature was comprised of organisms as complete wholes rather than parts. Descartes then contradicted this notion by breaking the whole into parts and the mind and body into separate entities. Owens and Holmes offered a solution to the dilemma by identifying the underlying theme of parts and wholes and their interrelationships or connectedness. They stated that a part is simultaneously part and whole, regardless of whether it is being viewed strictly as a part or as part of a greater whole. The purpose of both holism and reductionism is to discover what can be known, but from somewhat different perspectives.

King (1994), in a review of the scientific status of aromatherapy, stated that effective therapies are composed of the following three key components: (a) The therapist should possess a positive attitude, (b) the therapy should be based on beliefs also shared by others, and (c) these beliefs should be scientifically valid. He concluded that aromatherapy measures up in the first two respects, but it lacks the third key component. In a review of the scientific evidence of mind-body medicine and holistic approaches, Sommer (1996) concluded that "outcome studies appear to be the best way to evaluate these methods as they can be implemented safely without a requirement to fully understand their mechanisms of action" (p. 1241). This statement is particularly important when considering aromatherapy trials.

Patient satisfaction and well-being are outcomes that need to be considered because they may justify our ethical use of aromatherapy even if well-controlled trials investigating other outcomes do not provide positive results. Also, essential oils are absorbed through the skin and inhaled through the nose. It is believed that they exert their effects via the limbic system, but there is evidence that the cerebral cortex (in addition to the amygdala of the limbic system) is responsive to olfactory stimulation (Martin, 1996). In addition, as Buckle (1993) demonstrated, different species of oils may produce different effects. Currently, much is unknown about the mechanisms of action of essential oils.

A scientifically derived knowledge base is needed to guide the appropriate use of essential oils in clinical practice. Aromatherapy is currently enjoying a surge in popularity among lay people as well as nurses. However, if aromatherapy is to be widely incorporated into nursing education and practice, more well-designed research is needed. Aromatherapy is a potentially valuable therapy, and its place in clinical practice needs to be further evaluated. The positive anecdotal evidence needs to be verified using a scientific paradigm. King (1994) illustrated this point quite eloquently, stating that

aromatherapy is a shadowy world of romantic illusion, its magic easily dispelled by the harsh light of science. Its quaint notions may have a value for patients equivalent to a child's belief in Father Christmas. It would be uncharitable to break the spell too soon. (p. 413)

King concluded that future research should view the therapeutic elements of an aromatherapy session separately. He cited the relationship with the practitioner, the use of background music, the effects of massage, the pharmacological effects of essential oils absorbed through the skin, and the psychological effects of the particular fragrance. Many of the studies reviewed are methodologically, procedurally, and statistically flawed. Well-designed trials are needed to appropriately assess the specific effects of aromatherapy on health.

According to the current review, more scientific evidence is needed concerning basic mechanisms of action and efficacy of particular oils in particular populations to foster the effective justifiable use of essential oils in nursing practice. Guidelines have been presented to facilitate these efforts. In the meantime, however, it is reasonable—based on the currently available literature and research—to

consider incorporating aromatherapy into practice. The following are general guidelines for the beginning of the incorporation of aromatherapy into practice.

### THE ART OF AROMATHERAPY

In general, to maximize patient safety and efficacy, one should have some formal training before using or recommending aromatherapy in nursing practice. There are multiple books and articles on the subject as well as formal training courses (see appendix).

Aromatherapy oils are widely available. A good oil to begin with is lavender. In general, lavender *angustifolia* is available in the United States and has demonstrated promising results in the research literature. This may be the most popular of aromatherapy oils. It is certainly the most frequently investigated. It is also relatively inexpensive. Essential oils are priced based on the amount (usually in pounds) of a plant it takes to extract one ounce of oil. It takes 50 pounds of eucalyptus, 150 pounds of lavender, 500 pounds of rosemary, and 2,000 to 3,000 pounds of rose to produce one ounce of essential oil (Pounds, 1992).

According to aromatherapists, lavender is a cell rejuvenator, anti-septic, and immunostimulant. It is known for its calming effects, and it is said to enhance well-being (Worwood, 1991). Essential oils can be used in massage/bath oil, inhalation, compresses, lotions, and hydrating mists. Wafer (1994) has successfully incorporated aromatherapy into practice in a hospital nursing unit that administers aromatherapeutic baths, foot baths, inhalation, compresses, and massages. In general, essential oils should not be ingested. Some essential oils such as peppermint are safe for ingestion (Holt, Muntyan, & Likver, 1996). However, ingestion of essential oils should be done only in the care of a skilled aromatherapist or clinician. In general, essential oils should not be applied directly to the skin. They should be mixed in a carrier oil such as vegetable oil, sesame, almond, or jojoba. Cold pressed oils should be used because they are free from chemical solvents, heat, and other contaminants. Caution is appropriate when working with clients who have very sensitive skin or respiratory disorders such as asthma. Often, these conditions can be improved with aromatherapy, but one must acquire an appropriate level of training prior to working with these individuals.

## CONCLUSION

Aromatherapy can be a useful adjunct in nursing practice if used appropriately. Research has only barely begun to demonstrate its potential for increasing well-being and improving health. Because of its safety and anecdotal efficacy, it is reasonable to incorporate aromatherapy into practice while acknowledging the need for further scientific investigation into its potential benefits and possible side effects. According to Sommer (1996), holistic therapies provide clients with "self care skills and hope for a greater quality of life in a true partnership with us" (p. 1241). Mailhot (1996), in an eloquent description of the "operating room of the future," stated " [We] may be performing procedures on patients 'anesthetized' by acupuncture, therapeutic touch, and aromatherapy in a totally bloodless environment" (p. 28E). These closing quotes provide a sense of holism and well-being in nursing practice in a time of great change and transition. Our holistic practices and scientific endeavors may provide further evidence that aromatherapy and other complementary therapies may enhance care and healing in the 21<sup>st</sup> century.

## APPENDIX

### Aromatherapy Information and Sources

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- Jane Buckle teaches aromatherapy courses around the country. She can be reached at P.O. Box 868, Hunter, NY 12442; fax: (518) 263-4031.
- The American Alliance of Aromatherapy is a professional organization working to share knowledge, encourage education, and foster ethical and equitable business practices. They can be reached at (503) 392-4006, fax: (800) 809-9808 or AaoA, P.O. Box 309, Depoe Bay, OR 97341.

For additional information, please see the following sources:

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