

Smart scents

Nick Singer puts the case for the intranasal delivery of essential oils. This method, he argues, can produce both physiological and psychological effects and has potential for widespread use



In aromatherapy practice a range of different interventions can be used to improve a client's overall wellbeing. For each of these interventions, the delivery method is of great importance and this is especially true with aroma-alone interventions.

With methods such as aromatherapy massage the effects of the overall treatment result from both aromatic compounds and physical manipulation. However, with aroma-alone interventions, and most notably aroma-inhalation, the *functional aspect* is the most crucial element. Therefore any effect produced must be the result of, not just the aroma itself, but also of its method of application.

Countless studies have been conducted on the use of odours to elicit a response but most have failed to show any benefit bar a psychological one, suggesting that essential oils contain no pharmacologically active compounds capable of influencing physiology. The failure of these studies to find physiological effects can be attributed to the fact that the wrong application method was used.

Different methods of aroma application can produce wildly differing results, and this is due to two important characteristics of olfaction. The first is that olfactory responses are highly dependent on the concentration of odour molecules reaching the nose. The higher the concentration of odour molecules, the greater the number, as well as type, of receptors that are triggered, resulting in a greater response (Laing *et al* 2003; Purves *et al* 2001).

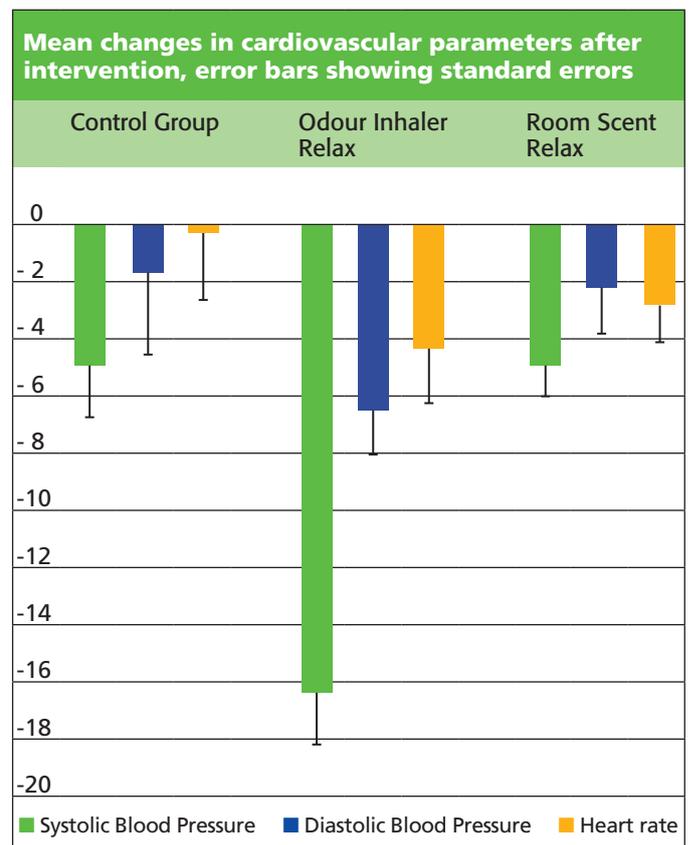
The second important factor to take into consideration is habituation and olfactory adaptation. Even relatively short periods of exposure to an aroma can result in drastic reductions in both conscious and unconscious responsiveness to odour stimuli (Dalton & Wysocki 1996). Therefore, in addition to interacting with as many receptors as possible, exposure time to the aroma must be limited in order to reduce the effects of habituation.

If we accept these two features it is clear that, in an aroma-alone intervention, the aromas delivered need to be highly concentrated and must be administered in brief bursts to be most effective. This is where the use of an inhaler comes in.

Studies on intranasal delivery

An investigation, part of a series of five studies (Schneider, 2016), was undertaken to explore the (physiological) effects of intranasal aroma delivery via a patent-pending inhaler and room scents, the most common form of aroma-alone intervention. In a randomised, placebo-controlled, three-armed study involving 45 individuals, the effects of a blend of lavender, vetiver and mandarin essential oils, delivered by an inhaler, was compared with the same scent delivered in ambient air and also with a control group that received neither.

The results showed that the effects from an inhaler on various physiological biomarkers (systolic and diastolic blood pressure and heart rate) were up to three times more powerful than experienced with ambient scents (Schneider, 2016). This has been supported by other studies using rosemary, which showed a direct link between performance on cognitive tasks and the concentration of absorbed molecules (Moss & Oliver 2012).



That aromas from an inhaler can produce such dramatic results over ambient scent should not be so surprising. With regular breathing, only 10 per cent of inhaled air reaches the olfactory area of the nose (Delank, 2008), and this is relatively independent of the flow rate (Keyhani *et al*, 1995).

This means that any method involving aroma delivery must maximise the concentration of scent molecules within the inhaled air. By releasing scents into ambient air, they become highly diluted, meaning that very few scent molecules reach the olfactory region, greatly diminishing the potency or effectiveness of the intervention. By delivering scents intranasally with an inhaler, the air that reaches the olfactory system is completely saturated, resulting in an intake of scent molecules at a level high enough to elicit a physiological and psychological effect.

Furthermore, an inhaler is designed to deliver a brief but intense stimulus to the olfactory system. This greatly reduces the impact and risk of habituation and olfactory adaptation for several reasons. First and foremost, the individual is exposed to the scent for only a very short period, which ensures that sensitivity and perception, and thus response to that scent, is not reduced. This is because more frequent stimulation (ie with each intake of breath over a period of time) results in greater reductions in responses to stimuli, until it reaches asymptomatic levels.

“An inhaler is designed to deliver a brief but intense stimulus to the olfactory system”

Secondly, the less intense the stimulus, the more rapid, and more pronounced the response decrement is to that stimulus. This is especially significant when it comes to ambient odours. By delivering an intense odour by inhaler, each inhalation is perceived as important, and is accompanied by the resultant reactions. It is even possible for very intense odours to produce no habituation effects at all (Rankin *et al*, 2008). While repeated use of an inhaler in a short time-frame may lead to habituation or sensory adaptation, response levels recover very quickly to the baseline level after stopping (Cain, 1974; Steinmetz *et al*, 1970).

Wide-ranging effects

The five studies in the investigation outlined above show that three inhalations over a period of 10 minutes is enough to produce a pronounced effect, and it is not just cardiovascular parameters such as blood pressure and heart rate that can be affected in this manner.

The studies showed that homeostatic regulation is being influenced as well, with one study showing cortisol release reduced by 17 per cent after the use of an inhaler. Other indications such as cognitive function (Schneider, 2016), weight loss and pain relief can benefit from the use of an inhaler too ((see www.aromastick.net/products). This is due to a major advantage of the aromatic inhaler over

other forms of aromatherapy in that intranasally-delivered scents bypass the blood-brain-barrier, which limits the need for systemic administration.

By utilising the olfactory nerve tract and potentially the trigeminal pathway, which has been implicated in the delivery of therapeutic drugs, the scents are able to influence the central nervous system (including the limbic system and its modulation of emotional, motivational and homeostatic responses) directly (Hanson & Frey, 2008; Merrick *et al*, 2014). By bypassing the thalamus, results can occur near instantaneously. Indeed, olfactory messages reach the brain within 150 to 200 milliseconds of each sniff (Olofsson, 2014).

Compared with oral administration which takes approximately 30 minutes for an active substance to reach its target, and transdermal application, which ranges from minutes to hours, the olfactory route is the fastest route when it comes to application of essential oils. The risk of contact allergies is also greatly reduced by this form of intervention since no handling of essential oils is needed beyond filling the inhaler.

Future potential

Other studies indicate the potential of aroma inhalers being used to improve the efficacy of medication, with preliminary studies showing the effects of pain medication being enhanced by up to 30 per cent. The inhaler's small size and ease of use means that patients can use this method on their own, without burdening their caregiver, and can be used wherever the patient might be.

It should be noted, however, that these inhalers are not drugs, nor should they be used as such. They are a fast, effective, non-invasive intervention designed to improve wellbeing and mood, and an intervention that can be used in all aspects of life, from home to clinical settings.

The advantages of the inhaler as an aroma therapeutic intervention include:

- ease of administration
- non-invasiveness
- rapid delivery to the central nervous system
- ability to repeat dosing easily, whenever and wherever it is needed
- no further handling after inhaler has been filled
- minimal systemic exposure

Its potential, while known to some for many years, is only now starting to be more widely appreciated.

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Edinburgh-based Nick Singer currently works for AromaStick, a company that seeks to reinvent aspects of aromatherapy, founded by his father eight years ago. He quickly became interested in the science of essential oils and their use in therapy and is heavily involved with the company's research activities.

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