

# **THE ROLE OF ESSENTIAL OILS IN THE TREATMENT AND MANAGEMENT OF ATTENTION DEFICIT HYPERACTIVE DISORDER (ADHD)**

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## **Abstract**

**This paper reflects the results of a semi-qualitative study undertaken by the author, in which the nature of ADHD and the validity of employing essential oils to support the management of this condition were explored. Six semi-structured interviews were conducted with the parents of students aged between 11-14 years attending Wennington Hall EBD School who had been Statemented (section 168 of the Education Act 1993 and the Education (Special Education Needs) Regulation 1994) as presenting emotional and behavioural difficulties (EBD), in particular, ADHD. A literature review was carried out and experts in the field of aromatherapy were questioned.**

**Based on the outcome of this study, a synthesis of resulting research, opinion and experience is presented here; first exploring the aetiology and consequences of ADHD, then discussing the use of essential oils within this context. The author concludes that essential oils have a valid role in the management of ADHD, when used complementarily with other supporting strategies, such as relaxation and mindfulness techniques, cognitive behavioural therapy and counselling; particularly where co-morbidities are present e.g. anxiety, depression, low self esteem and restlessness.**

**The following information is intended to offer insight and support for fellow aromatherapists, parents, teachers, carers, and other health care professionals and researchers.**

## **Introduction**

**This paper will present the results of a research project carried out by this author, which explored the potential use of essential oils as a viable method of complementary support in managing the symptoms and co-morbidities of Attention Deficit Hyperactive Disorder (ADHD). Six semi-structured interviews were carried out with parents of adolescent sons, aged between 11-14 years, who had been Statemented (section 168 of the Education Act 1993 and the Education (Special Education Needs) Regulation 1994) as presenting emotional and behavioural**

difficulties, in particular ADHD. A review of relevant literature, research findings and the experiences of professional aromatherapists and essential experts were also sought. Synthesizing the resulting information gleaned, this author aims to provide the unfamiliar reader with an insightful background in relation to the aetiology and consequence of ADHD followed by discussion relating the use of essential oils in this context.

The remaining information will be presented under the following sub-headings:

- What is ADHD?
- The Experience of ADHD
- ADHD and Essential Oils
- Conclusion

## What is ADHD?

The term ADHD was coined by the American Psychiatric Association (1994) (DSMV-1V), and is the label most commonly referred to. Hyperkinetic Disorder is the term, with similar implications, applied by British Psychiatrists (ICD-10) (Munden & Arcelus 1999). ADHD is usually present with other similar learning disorders, especially those that fall under the dyslexic 'umbrella' and other behavioural disorders such as Opposition Defiant Disorder, Conduct Disorder and Autism (Cooper & Bilton 1999). Some traits may overlap with others, which can complicate diagnosis.

ADHD is reported to affect between 4 and 20% of school age children, with boys outnumbering girls 3:1, or according to some studies, 10:1 (Munden & Arcelus 1999). Official figures vary, which may serve to accentuate the complexities underpinning the disorder, variations in parameters of measurement and diversity of professional opinion.

A variety of labels have been applied to this 'disorder' or 'condition' since George Still wrote on the subject in the Lancet during 1902. For example, labels have included terms like 'minimal brain dysfunction', 'brain-injured child syndrome', 'hyperkinetic reaction of childhood', and 'hyperactive child syndrome' (Barkley 1998). Several postulations relating to its cause have been forwarded and biomedical researchers, assuming that ADHD is an abnormality or dysfunction, continue their exploration for possible causes in a bid to find a 'cure'. Meanwhile, there remains much speculation and debate in the absence of conclusive evidence.

A link between damage, or injury, to the frontal lobe of the brain, as well as damage caused by toxin exposure, and *ADHD-like* behaviour or symptoms, has been postulated, for example. Other factors, such as maternal tobacco and alcohol use and premature birth have been implicated. Research suggests that collectively, these factors may be implicated in approximately 20% of reported incidences of ADHD (see for instance Barkley 1998). In spite of this, neural-imaging studies provide evidence that brain *damage*, which would produce *ADHD-like* symptoms, is not present in the actual *disorder* of ADHD. These studies, though, apparently indicate that some individuals with ADHD may exhibit 'abnormalities' in the development of specific brain regions, particularly the striatal region, the area of the brain which controls behaviour and movement (Paule et al 2000). Other researchers claim to have found subtle structural 'abnormalities', suggesting that the brains of ADHD subjects were more symmetrical compared to those of a matched control group (Castellano 1996). So far, however, this research has not proved conclusively that there is a general direct correlation between such brain abnormalities and ADHD.

The strongest evidence produced so far appears in genetic research, which provides evidence of a potential link between ADHD and 'unusual' brain development, evidenced in twin studies (Faraone & Biederman 1998). This research has identified certain gene differences and a strong inheritable tendency in ADHD subjects, particularly affecting the dopamine D<sub>4</sub> receptor, dopamine D<sub>2</sub> and the dopamine transporter gene (Mugalia et al 2000). Noradrenalin (norepinephrine) and dopamine control attention and hyperactivity; low levels may be experienced as restless boredom. Serotonin is implicated in depression, aggression, disturbed sleep patterns, impulsivity and anxiety. Low levels may induce suicidal or violent thoughts (Gallahar 2001). Supporting this, Fisher and Beckley (1999) suggest:

The neurotransmitters that operate in the frontal area of the brain are predominantly dopamine and norepinephrine. It is the biochemical system that is affected; this [ADHD] is not a disorder involving any damage to the brain. Rather the brain is intact, just not able to work to its potential.

Research also suggests that this deficiency state or biochemical imbalance within the dopaminergic system, especially a deficit of dopamine transporter, may also result in high levels of novelty seeking:

Novelty seeking is a personality dimension defined as a compulsive need for varied, novel and complex sensations with the willingness to take physical and social risks for the sake of such experience. (Gerra et al 2000)

Observing behavioural traits, cognitive researcher assume that there are four executive functions 'down' or impaired in ADHD (Cooper & Bilton 1999). These are:

1. Impairment of working memory – this makes it difficult for individuals to retain and manipulate information for purposes of appraisal and planning.
2. the function of internalized speech – here the consequences and implications of impulses are weighed up and discussed internally in most people, which allows for self-control and discipline. However, this process appears to be inhibited or lacking in ADHD individuals.
3. Motivational appraisal – this facet of internal deliberation enables decisions to be made by providing information about emotional associations generated by an impulse and the extent to which the impulse is likely to produce desirable outcomes.
4. Reconstitution or behavioural synthesis – this function enables the planning of new and appropriate behaviours.

Others hypothesise that, while neural-imaging shows activity in unexpected areas of the brain and less in expected areas, such as the prefrontal cortex and striatum, this may not necessarily be entirely due to deficit or abnormal function (Gallahar 2001). They suggest that individuals with ADHD naturally 'think' differently, using parts of the brain useful to eliciting spontaneous responses in the way that helped our ancestors remain alert to their environment and survive the threat of physical danger and intrinsically assist in their search for food. The frontal region of the brain is the most recent part to develop (relatively speaking) and accommodates the type of abstract thought processes engaged by modern industrial/intellectual human beings. According to Gallahar (2001), the areas of the brain that individuals with ADHD engage correspond with sensual, intuitive feelings and responses. This is not to suggest that individuals with ADHD are less intelligent, however. In fact, many individuals with ADHD have been found to score within the average to above average IQ scales when tested (Gallahar 2001).

Parallel with this line of thinking, a correlation between ADHD and creativity and sensitivity is also postulated (Crammond 1995). This hypothesis purports that those who exhibit mixed brain dominance, or anomalies, may also display remarkable creative talents, suggesting that those with ADHD may have a greater abundance of spontaneous, creative thought and, consequently, more internal distraction from fleeting sensory input. Equally,

they may have less command over their thought processes or distractions from 'outside' noises or images, which may impinge upon their attention.

Diet has also been implicated as a cause for hyperactivity and *ADHD-like* symptoms (Feingold 2001; Murray & Pizzorno 1999). Feingold (2001) for example, found that hyperactivity was reduced in some 55% of cases when certain foods containing artificial colours, flavouring, preservative and natural salicylates were excluded from the diet (see fig 1 for example). This exclusion was supported with inclusion/intake of specific vitamins and minerals. For example, vitamins B (all), C, D, E, and magnesium, iron, essential fatty acids, potassium and zinc; either balanced or increased (Feingold 2001; Sharon 1998). Such measures have been shown to significantly reduce hyperactivity where *ADHD-like* symptoms were present, and improve concentration. However, this type of exclusion regime has not shown to 'cure' the underlying symptoms of those with 'true' ADHD (Bagg et al 2001; Feingold 2001).

**Examples of synthetic colourants which cause or exacerbate hyperactivity, attention disorder, allergies, eczema and asthma in children**

**Colours (generally reds and yellows) mainly derived from coal tar, also known as the 'dirty six', found in sweets, jellies, ice lollies, fizzy drinks and icing on cakes:**

- **Sunset yellow (E 110)**
- **Carmoisine (E 122) (also found in Calpol)**
- **Tartrazine (E 102)**
- **Ponceau 4R (E 124)**
- **Quinoline yellow (E 104)**
- **Allura Red (E 129)**

**Commonly used benzoate preservatives:**

- **E 210 to E 219**

**(Renton 2009)**

Fig 1

The parents interviewed by this author confirmed that an exclusion diet quelled their son's hyperactivity to a certain degree only. These results, though, indicate that sensitivities and allergies to foods and non-food substances and an unbalanced diet might present contributory factors and/or a co-related feature of ADHD, which may aggravate or exasperate the underlying symptoms.

But what does all this mean for the individual with ADHD?

## The Experience of ADHD

ADHD is a vivid, obvious and challenging condition for the affected individual and for those in their orbit. This 'disorder' appears to present enormous social difficulty in a society apparently driven (almost obsessively) by a need for control and order; so much so that medication such as methylphenidate (Ritalin) or dexamphetamine (Dexedrine) is increasingly the treatment of choice (Perry & Kuperman 2000). There is concern that medication is becoming oversubscribed and inappropriately used by some physicians (Miller 1999). Others suggest that pharmacological interventions, with or without psychosocial interventions, is a superior course of treatment to psychosocial interventions or standard community care alone (Paule et al 2000). Medication is apparently aimed at reducing hyperactivity and increasing concentration; however, the side effects experienced by some of the recipients, such as bedwetting, loss of weight, slowed growth and sleep disturbances, can be unpleasant (Zimmerman 1998). This author found that among those parents surveyed whose sons took methylphenidate (Ritalin) 75% expressed concern about the long-term consequences and side effect of taking medication. One parent said that she recognized that her son's medication was not a 'cure', and questioned the ethics of her own dependency on being able to administer his medication when she could no longer cope with his hyperactivity. Another parent said that her son seemed to benefit from taking medication because it improved his concentration. There appears, however, some concern that medication could become a convenient 'chemical cosh' (Wilson 1999).

The individual with ADHD appears to be spontaneous and reactive to their environment and to sensory stimuli. They appear to be constantly physically active and restless, unable to remain seated or in one position for any length of time, often fidgeting or 'playing' with objects when forced to sit still – tapping feet or fingers, playing with pens, doodling when listening. Some individuals with ADHD argue that this behaviour actually helps them to concentrate because it channels their restless energy while they focus attention (Hallowell 1992). Unfortunately, this fidgety behaviour may be irritating to others and may be a source of disturbance, or may even be interpreted simply as inattention. Individuals with ADHD act as they think, often interrupting others, butting into conversations or blurting out answers or statements. This behaviour is also explained as a response to short-term memory inadequacy, where information or questions are quickly forgotten if they are not responded to immediately (Cooper & Bilton 1999). Unfortunately, these behavioural traits may be regarded as rude and/or anti-social.

The individual with ADHD often shifts from one task or object to the next before one is completed. This gives the outward impression that they are chaotic, disorganized and messy, but often, left to their own devices, some manage to multi-task well and will complete tasks or assignments in their own time and order (Hallowell 1992). Others find that staying 'on task' or completing projects is overruled by their inner lack of sustainable attention or in some cases, boredom. Some individuals with ADHD engage in daring or risky activities because they have not deliberated about the consequences, they 'just do it'. Individuals with ADHD do not seem to have a sense of time, which further impinges on their apparent inability to be organized, often forgetting deadlines and important dates and arriving late for appointments. This inability to fit in with an ordered, 'clockwork' environment causes obvious problems. Unfortunately, to the observer these behavioural traits appear undisciplined and chaotic, and are not always conducive to discipline in circumstances where control and uniformity are necessary; one instance being in school, for example.

For those who do not relate to the traits of ADHD, or understand that such traits are often not deliberate, these behaviours can become annoying and frustrating. These traits may also be interpreted as defiance or as oppositional, particularly as ADHD individuals have difficulty sticking to the usual 'rules', driven by their spontaneity and apparent inability to think things through before acting. Consequently, individuals with ADHD may feel misunderstood and alienated, having difficulty maintaining friendships, and upsetting people with outspoken, thoughtless comments (Cooper & Bilton 1999). A sense of isolation, of not fitting in, of being different, leads to

obvious psychological challenges. Depending on the maturity or character or familial stability of the individual with ADHD, this will have an impact on their self-esteem and confidence, and may lead to feelings of depression and anxiety (Cooper & Bilton 1999). Individuals with ADHD appear easily frustrated and are often argumentative and/or volatile, especially when they are denied immediate access to something they want, which, unfortunately, tends to alienate them even further from those around them.

To summarise so far, the individual with ADHD may have a poor sense of time, with short-term memory deficiency that renders them forgetful, and an inability to 'stop and think' which makes them appear reckless. They may be sensitive, even over-sensitive, to their environment. They may be potentially unable to control or switch off from the stimulation of sensory input; images, colours, sounds and movement. They may be easily distracted (or over-focused) by their internal thought process, yet conversely they may act and speak spontaneously without the internal deliberation that enables a person to stop or withdraw. A 'multi-coloured bouquet' with blooms of creativity, ideas, fast thinking, fast talking, energetic enthusiasm – interspersed with sprays of depression, anxiety, frustration, even anger – held together with the delicate thread of their individual uniqueness.

How might essential oils influence the multifaceted consequences of ADHD?

## ADHD and Essential Oils

This author found very little existing information or research evidence in relation to the use of essential oils and ADHD, in spite of the link between apparent symptoms (discussed previously) of the condition and the influence of essential oils on cerebral activity, especially with in the limbic region (for example, the pituitary gland, the hypothalamus, amygdale and hippocampus, which influence mood, emotion, behaviour, memory and hormonal activity – see box 2) (Sorensen 2001, 2000; Robin 2000; Damian & Damian 1995; Herz 1999; Degel 1999). Sorensen (2001) investigated the hormonal activity of *Vitex agnus castus* (Chaste tree), finding that identified (and unidentified) diterpenes with pharmacological dopaminergic activity act as dopaminergic agonists, especially affecting the D<sub>2</sub> receptors. Genetic research (mentioned previously) has established a link between ADHD and inheritable dopaminergic deficiencies, particularly dopamine D<sub>2</sub> and D<sub>4</sub>, and dopamine receptors. Sorensen (2001) found that 'hormonal, thereby emotional disorders, are treated very successfully with *Vitex agnus castus* (both extract and oil)' especially depression and anxiety, although, she acknowledges this depends on the nature of the underlying disorder. Synthesizing these findings, though, suggests that *Vitex agnus castus* essential oil may potentially benefit the symptoms of ADHD, justifying further investigation and research.

<b>Essential oils which potentially influence the Limbic System</b>	
<b><u>Pituitary gland:</u></b>	<b>clary sage, jasmine, patchouli, ylang ylang</b>
<b><u>Hypothalamus:</u></b>	<b>bergamot, frankincense, geranium, rosewood</b>
<b><u>Thalamus:</u></b>	<b>clary sage, jasmine, grapefruit, rose</b>
<b><u>Amygdale / Hippocampus:</u></b>	<b>black pepper, peppermint, rosemary, lemon</b>
<b>(Donaldson 2004; Sorensen 2001; Tisserand 2001; Damian &amp; Damian 1995)</b>	

Fig 2

Tisserand (personal correspondence 2001) recommends that essential oils of nutmeg, rosemary, peppermint and eucalyptus may also benefit due to their cephalic stimulating activity. However, Tisserand also points out, because of potential sensitivity traits amongst individuals with ADHD (see box 4), that rosemary and peppermint oils be regarded with caution and administered in low dosages. Significantly, however, the parent of an autistic child (personal correspondence 2001) reported that massaging essential oils of eucalyptus, geranium, lavender and peppermint into the soles of his son's feet procured great benefit, stating that treatments 'helped reduce the hyperactivity and increase his attention span'. There were a combination of separate factors present, though, which may also have contributed to this outcome that cannot be overlooked; for example, massage (touch), reflex zone/point stimulation (reflexology) and the parent/child relationship, as well as the synergistic potential of the essential oils.

There is an intrinsic neural connection between olfaction, cognition and reflexive behaviour and conditioning (Alexander 2001). Herz et al (2000) used odour in connection with pleasant/unpleasant circumstances to examine the effect of odour on memory, finding that memories elicited by odours are:

More emotionally potent than memories evoked by other sensory stimuli and when salient emotion is experienced during odour exposure, the effectiveness of an odour memory cue is enhanced.

The odour cue works equally for positive and negative experiences and memories. Similarly and significantly, Pitman (2000), in a study involving a group of 11-12 year-old children with ADHD and other behavioural problems, invited them to select three essential oils each. These oils were blended in vegetable oil for self administration during class. The oils were initially used in conjunction with relaxation techniques. One drop was rubbed into the wrist when the student felt the need or the blend was sometimes used at home in a bath. This method appeared to use the odour as a positive memory cue, while at the same time exploiting the cephalic psycho-emotional qualities of the particular essential oils selected (Alexander 2001; Tisserand 2001, 1997; Damian & Damian 1995; Shepperd-Hanger 1995). Pitman found that:

It was very noticeable that both the oils and the relaxation improved concentration. Students definitely stayed calmer, longer, and recovered quickly from upsets. There were fewer disruptions to lessons.

The parents interviewed by this author said that they used essential oils at home with some success to help calm their son's behaviour and improve their ability to relax, but they also agreed that the essential oils did not diminish the underlying symptoms (Fig. 3). One parent stated that her son actually became more hyperactive when she vaporized '...the fruity ones, no matter which one it is can set him off high if I had it on for too long'. Significantly at least half the group surveyed reported incidences of underlying allergies, skin conditions, sleep disturbances or sensitivities to food (see fig 4 & 5).

<b>Modes of application and effectiveness of essential oils used by the parents surveyed</b>		
➤	<b>Those who used essential oils</b>	<b>67%</b>
➤	<b>Methods of use:</b>	
	<b>Environmental oil burner/diffuser</b>	<b>75%</b>
	<b>Bath</b>	<b>50%</b>
	<b>Massage</b>	<b>50%</b>
➤	<b>Those who found the essential oils effective</b>	<b>75%</b>
➤	<b>Those who found the essential oils calming</b>	<b>50%</b>

Fig. 3

Feingold (2001) found a relationship between allergies, hyperactivity and chemicals in food (55%), mentioned previously. Johnson (2000) found in an unofficial survey involving 65 ADHD adults that between 30% and 70% were hypersensitive, displaying symptoms such as skin conditions like eczema, rashes, or allergies to foods or environmental allergies such as hay fever; claustrophobia in crowds and sensitivity to noise etc. Of further significance, Aron (1999) suggests that hypersensitive people (HSPs) are easily aroused and highly sensitive to their environments:

High levels of stimulation (e.g. a noisy classroom) will distress and exhaust HSPs sooner than others. While some will withdraw, a significant number of boys especially will become hyperactive.

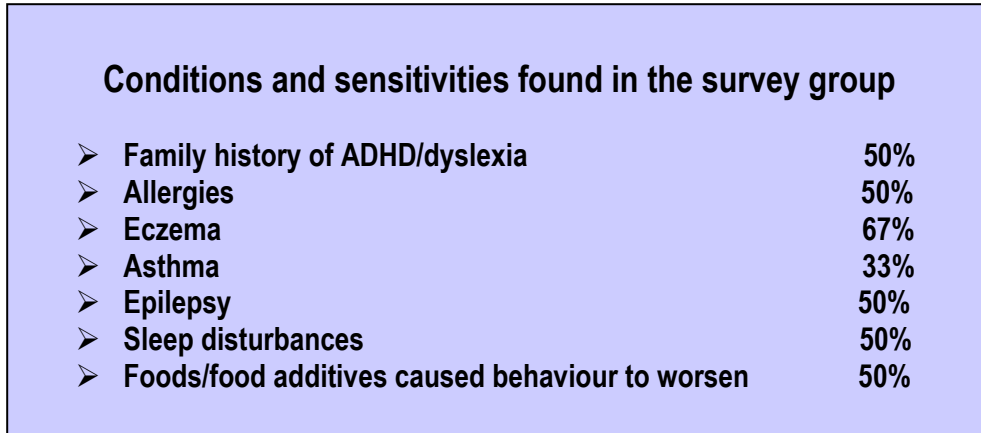


Fig. 4



Fig. 5



Relating this potential of sensitivity in individuals with ADHD to the use of essential oils indicates there is need for caution when applying treatment. For example, there is a risk that the recipient may develop an allergic reaction to certain essential oils or may become sensitized to others very quickly. Paradoxically, however, essential oils can also be of value for some of the sensitivity conditions, such as eczema, sleep disturbance and emotional vulnerability. This author found in her experience, for example, that a blend of *boswellia carteri* (frankincense), *anthemis nobilis* (chamomile Roman) or *lavendula angustifolia* (lavender) and *citrus bergamia* (bergamot) or *citrus reticulata* (mandarin), using one drop of the blend on a tissue and inhaling, helped quell panic attacks and feelings of anxiety in an ADHD client. The key appears to be moderation and responding to observation when working with potential sensitivity; for example, the above mentioned parent used other essential oils, avoiding the ‘fruity ones’, having regarded her sons response to them. This author has found that, when using essential oils for psycho-emotional conditions, small amounts are still very effective. Direct inhalation of essential oils requires limited amounts (½ to one drop) to procure a significant response. The essential oils both recommended and used by those surveyed and this author are listed below (Fig. 6):

<b>Essential oils hypothetically recommended by therapists</b>	
➤ <i>Citrus bergamia</i> (bergamot)	➤ <i>Lavendula angustifolia</i> (lavender)

<b>Essential oils recommended by Robert Tisserand</b>	
<ul style="list-style-type: none"> <li>➤ <i>Eucalyptus globulus / radiata</i> (eucalyptus)</li> <li>➤ <i>Lavendula angustifolia</i> (lavender)</li> <li>➤ <i>Myristica fragrans</i> (nutmeg)</li> </ul>	<ul style="list-style-type: none"> <li>➤ <i>Vitex agnus castus</i> (Chaste tree)</li> <li>➤ <i>Mentha piperita</i> (peppermint)</li> <li>➤ <i>Rosemarinus officinalis</i> (rosemary)</li> </ul>

<b>Essential oils used by parents and therapists</b>	
<ul style="list-style-type: none"> <li>➤ <i>Anthemis nobilis</i> (chamomile Roman)</li> <li>➤ <i>Boswellia carteri</i> (frankincense)</li> <li>➤ <i>Cananga odorata</i> (ylang ylang)</li> <li>➤ <i>Cedrus atlantica</i> (cedarwood)</li> <li>➤ <i>Citrus bergamia</i> (bergamot)</li> <li>➤ <i>Citrus reticulata</i> (mandarine)</li> <li>➤ <i>Citrus sinensis</i> (orange, sweet)</li> </ul>	<ul style="list-style-type: none"> <li>➤ <i>Citrus aurantium v amara</i> (neroli)</li> <li>➤ <i>Eucalyptus globulus / radiata</i> (eucalyptus)</li> <li>➤ <i>Lavendula angustifolia</i> (lavender)</li> <li>➤ <i>Mentha piperita</i> (peppermint)</li> <li>➤ <i>Pelargonium graveolens</i> (geranium)</li> <li>➤ <i>Rosa demascena</i> (rose)</li> <li>➤ <i>Salvia sclaria</i> (clary sage)</li> </ul>

<b>Essential oils used by the author</b>	
<ul style="list-style-type: none"> <li>➤ <i>Anthemis nobilis</i> (chamomile Roman)</li> <li>➤ <i>Boswellia carteri</i> (frankincense)</li> <li>➤ <i>Cedrus atlantica</i> (Cedarwood)</li> <li>➤ <i>Citrus aurantium var. amara</i> (orange bitter)</li> <li>➤ <i>Citrus bergamia</i> (bergamot)</li> </ul>	<ul style="list-style-type: none"> <li>➤ <i>Ferula galbaniflua</i> (galbanum)</li> <li>➤ <i>Lavendula angustifolia</i> English (lavender)</li> <li>➤ <i>Nardostachys grandiflora</i> (spikenard)</li> <li>➤ <i>Pogostemon cablin</i> (patchouli)</li> <li>➤ <i>Santalum album</i> (sandalwood)</li> </ul>

- Citrus reticulate (mandarine)
- Cupressus sempervirens (cypress)

- Valeriana fauriei (valerian)
- Vltex agnus castus (Chaste tree)

In the absence of deeper researched evidence in relation to essential oils and ADHD, these references remain anecdotal, the therapeutic properties merely suggestive according to the chemical composition of the essential oil, i.e. Franchomme/Pénoël 'functional group theory' and application of essential oils in other psycho-emotional contexts, such as depression and anxiety (Buckle 2003; Sorensen 2001; Grace 1999; Tisserand 1997; Damian & Damian 1995; Schnaubelt 1995; Franchomme & Pénoël 1990). Synthesising available literature and research evidence with the survey results reported here, however, suggests that essential oils could be employed to support the *symptoms* (rather than the cause) of ADHD, especially the co-morbidities of anxiety, depression, low self esteem and to a certain extent, hyperactivity. Essential oils have a direct chemical influence on cephalic function, especially with in the frontal lobe and limbic area of the brain (Fig. 2), stimulating or balancing hormonal/dopaminergic activity, positively influencing memory, mental alertness, clarity and attention, co-ordination, response time, mood, emotion and behaviour (Sorensen 2001; Degel et al 1999; Herz & Cupchick 1995; Imberger et al 1993; Knasko 1992; Buchbauer et al 1992; Jager et al 1991). For example, Miyazaki et al (2001) found 'the inhalation of orange oil increased activity of the parasympathetic nervous system' and Miyake et al (dnf) found 'the odour of bitter orange affected the cortex and inhibited the excitement of the central nervous system' inducing sedative affects. Imberger et al (1993) found in a vigilance task that jasmine produced excitatory effects and lavender sedative effects on subjects. This author finds, in her own experience, that essential oils derived from woods and roots appear to have a significant 'grounding' or 'earthing' effect on anxious or hyperactive clients. Boswellia carteri (frankincense), for example, appears to almost immediately slow and deepen the breathing of clients. When treating clients experiencing grief, for instance, this author finds they often sigh very deeply, as if 'expelling' their emotions, when frankincense has been applied. Adding citrus aurantium var. amara (orange bitter) or citrus reticulate (mandarine) or citrus bergamia (bergamot) to a 'grounding' blend as a complement, appears to uplift and 'lighten' the clients mood. Managing anxiety in individuals with ADHD, which is often a consequence of their hyperactivity, 'flighty thinking' and agitation, this author finds, aids their ability to 'slow down', 'stop and think' and find their locus of control.

Essential oils may be applied in conjunction with relaxation and mindfulness techniques (Duerden 2009) or behavioural therapy. They may be employed for their chemical influence on the above processes, or used to reinforce positive memory cues (Pitman 2000; Herz 1999). They may be applied in conjunction with massage techniques, where self esteem may be improved and hyperactivity temporarily quelled. This author has found that encouraging self massage, or peer massage (particularly when working with children and adolescents), of the hands and shoulders, encourages 'ownership', self support, personal control and when shared with peers, supports relationships. Equally, this author finds that self administration to the wrists of an appropriate prescribed blend of essential oils and vegetable oil, using a small 'roller bottle', supportive in cases of anxiety, depression or grief; clients are able to use this method when ever they feel the need, therefore, taking personal control. Other methods of self application include:

- Adding up to 6 – 8 drops of an essential oil blend to full fat milk (to avoid slippery baths – especially poignant when used for children, the elderly, disabled or frail) or vegetable oil, to a bath before bedtime.
- Vapourising up to 6 – 8 drops of compatible essential oils in a candle lit 'oil burner' or electrical diffuser (the later being the safest, especially when used for children) in a room (when doing this in a shared environment, permission or approval needs to be sought from other occupants).
- Adding up to 6 – 8 drops of an essential oil blend to vegetable oil or lotion to apply during self massage; shoulders, arms, legs, face, abdomen.

- Applying up to 3 – 4 drops of an essential oil blend to a tissue, or material wrist band, and inhaling when required (applying essential oils to a wrist band allows the odour to linger until evaporated during daily life/activities)
- \* When applying essential oils for use with children, the elderly, frail or those with sensitivities or allergies, half or less of the above amounts will be administered.

This author observes that personal selection (and rejection) of essential oils forms an important aspect of creating a potent blend for therapeutic (and aesthetic) use; what one person finds pleasant another may dislike. The client's participation in the selection of appropriate oils is, therefore, vital. Our sense of smell, taste and touch has been vital to our survival since prehistoric time; we seem to intrinsically, instinctively know what is good for us, and what is not (Alexander 2001) Using this innate sense, clients are very good at choosing specific oils from a range presented by the therapist. This aspect, inevitably, complicates quantitative scientific research which might explore a single or a specific blend of essential oils against one condition. Exploration of essential oils in a therapeutic context appears best suited, therefore, to qualitative or semi qualitative research (Bell 1999; Jenkins et al 1998).

Essential oils are available to purchase over the counter or through mail order. However, clearly, caution should be applied when using essential oils for personal use. Before they are applied, for example, due to their chemical nature, the user needs to be sure of their quality in terms of authenticity and purity (cheap essential oils are often adulterated or bulked out with inferior, less expensive chemicals or oils) and be aware of the chemical constituents present with in individual essential oils, which may influence their therapeutic value or may interfere with prescribed medication (it is advisable to check with the GP or Consultant, where medication is being taken). This is especially poignant where children, the elderly or frail are concerned or where there is potential sensitivity; in such circumstances, essential oils need to be applied in moderation (see above). For consistent use with long term or chronic conditions or for constant use for relaxation, minimal amounts might be applied, and the oils used varied, with periods of regular abstinence (2 – 3 weeks of use followed by a week break, for example). In acute conditions, where specific oils are applied for brief periods only, the dose might be temporarily higher, once tested for sensitivity or allergy.

## CONCLUSION

The chemical qualities and therapeutic versatility of essential oils appear ideal when managing the complexity of symptoms presented by ADHD. The evidence presented here suggests that essential oils may inspire significant benefit in terms of exerting a positive psycho-emotional and physiological influence with in the recipient, especially in terms of supporting the co-morbidities of depression, anxiety, low self-esteem and sensitivity. Essential oils can be used complementarily alongside other supporting strategies such as relaxation and mindfulness techniques, cognitive behavioural therapy and counselling.

By increasing awareness of ADHD, especially amongst other therapists, discussing its consequence and the results of other pertinent research, this paper aims to assist those wishing to use essential oils as a complementary method of treatment and/or management. The evidence presented here in relation to the use of essential oils in the treatment of ADHD is anecdotal and suggestive, due to the limited research evidence so far available. Therefore, generalization of the findings cannot be assumed. In sharing this information and her own experience and observations, however, this author hopes to inspire others; anecdotal evidence provided by therapists, parents, carers, support staff and teachers could begin to build a significant picture, which may assist others wishing to use essential oils in this capacity and may encourage and serve to justify funding for further investigation and research.

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