

# THE EFFECT OF APPLYING CINNAMON AROMATHERAPY FOR CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER

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Children with attention deficit hyperactivity disorder (ADHD) are distracted easily, unable to sit still, overactive, lack of patience and concentration, and have short attention span. They can't get along well with others and usually have learning disability and poor self-confidence. The traditional treatments of ADHD include medications, rehabilitation and behavior modification. The present study explored the combination effect of rehabilitation and cinnamon aromatherapy in twenty children with ADHD. After six months treatment, the SNAP-IV Questionnaire and child activity scales were  $58 \pm 2.6$  and  $102 \pm 5.8$  in experimental group, and  $64 \pm 5.8$  and  $110 \pm 7.2$  in control group. The SNAP-IV Questionnaire and child activity scale were significantly better in the experimental group than in the control group ( $p < 0.05$ ). Cinnamon aromatherapy is a safe and convenient method for children with ADHD. Aromatherapy also is more acceptable in children than traditional medical therapy.

**Key words:** Attention deficit hyperactivity disorder, aromatherapy, child activity scale.

## INTRODUCTION

As indicated from the statistic information of Taiwan area, about 3% to 9% of schooling children are suffering from ADHD. The incidence rate between boy and girl is about 3-4:1. If patients don't receive proper treatment during childhood period, 30% to 70% of them will suffer from the illness to youth and adult period.<sup>1</sup> As viewed from past literatures, the causal factors of ADHD are rather numerous, including neurotic, genetic and environmental factors.<sup>2</sup> The medication treatment, reha-

bilitation treatment, and behavior treatment have been documented to be effective for ADHD.<sup>3,4</sup> The traditional medication for ADHD is Methylphenidate, but some patients are found poor appetite and weight loss.<sup>5</sup> Nonetheless, the general public is hoped that medication can be effectively in treatment but with less side effects. Therefore, the present study wants to explore a new therapy that is effective and less in side effect. As such, aromatherapy is reckoned to be one of alternative treatment we can opt to. According to previous studies, aromatherapy is used in pain control and reducing anxiety.<sup>6,7</sup> However, the application

of aromatherapy in ADHD children remains to be unclear. The present study tries to do the combination effect of rehabilitation and cinnamon aromatherapy in children with ADHD.

## MATERIALS AND METHODS

*Patient profile.* Twenty patients with ADHD were enrolled into the present study from outpatient department. The excluding criteria is poor compliance or using medication treatment. The age was between 2 to 7, with an average of 4. There were 16 boys and 4 girls. All patients were randomized into two groups. Ten patients in control group received rehabilitation treatment, while the others in experimental group received rehabilitation treatment as well as cinnamon aromatherapy. The rehabilitation programs are motor-sensory integration and activity therapy, such as puzzles, blocks and play-dough. We used 1% cinnamon as the aromatherapy substance, which was 1gm cinnamon in 100ml water and put in a special bottle with electric light control. The therapeutic room is around 50m<sup>2</sup>. The period of treatment was twice every week, and each last for 30 minutes. The control group had the same treatment course and environment with the experimental group except only 100ml water in a special bottle with electric light control without cinnamon. The treatment tracked down for half year, and the characteristics of patients were showed in table 1. The age, sex distribution, body height, body weight and compliance are no significant difference in the two groups.

*Ways of evaluation.* During the study period, two occupational therapists, who don't know about the group separation of patients, measured the scores

**Table 1 The clinical characteristics of the study subject**

item	control group	experiment group	p value
sex			
male	7	9	NS
female	2	2	NS
age	3.8	4.2	NS
body weight(kg)	14.8	15.0	NS
body height (cm)	124	120	NS
compliance(%)	96	98	NS

NS: non significant

of child activity scale before and after treatment. During the process of treatment, the parents also didn't know about group separation, since parents are not there to accompany and were requested to fill in SNAP-IV questionnaire before and after treatment. The child activity scale has 27 items with scores from 1 to 5, and the highest score is 135. The SNAP-IV questionnaire includes 26 items with scores from 0 to 3, and the highest score is 78. The higher scores of both two scales represent the more serious symptoms of ADHD. The child activity scale and SNPA-IV questionnaire were showed in appendix 1 and 2. They are both simple and popular scores for evaluating ADHD children.

*Statistical analysis.* The scores before and after the treatment of the two groups were analyzed with paired t-test. All parameter values were expressed as mean  $\pm$  standard deviation. There was significant difference while  $p < 0.05$ .

## RESULTS

Table 2 showed the responsiveness analyses of SNAP-IV questionnaire and child activity scale. After

**Table 2 The results of treatment of ADHD patients**

item	control group	experiment group	p value
child activity scale			
before treatment	128±4.6	126±6.4	NS
after 6 months	110±7.2	102±5.8	<0.05
improvement	17±7.4	24±0.6	<0.05
SNAP-IV Questionnaire			
before treatment	75±3.4	76±6.6	NS
after 6 months	64±5.8	58±2.6	<0.05
improvement	10±7.6	18±4.0	<0.05

PS: p<0.05 significant difference, NS: non significant

six months treatment, the SNAP-IV Questionnaire and child activity scales are 58±2.6 and 102±5.8 in experimental group, and 64±5.8 and 110±7.2 in control group, respectively. Both scores in two groups were improved after 6 months treatment. According to the data analysis, the SNAP-IV questionnaire and the child activity scale were significantly better in the experimental group than in the control group (p<0.05).

## DISCUSSION

With regarding to ADHD, it has affected thousands of children and adults throughout the world. There are some factors to be related with the occurrence of ADHD, which include neural and chemical factor, genetic factor, environmental factor, and anatomy factor. Under the development of biological and psychiatric medicine, certain evidences have shown that the occurrence of ADHD is found with some minor malfunction of the brain, as a result, deficit is found with the quantity and operation of neurotransmitters, especially with the forehead of the brain. Neural cells within human body make use of neurotransmitters to transmit information, such as Se-

### Appendix 1. Child activity scale

- a. at eating:
1. can not set properly at eating
  2. interrupt others at eating
  3. move body at eating
  4. play spoon at eating
  5. talkative at eating
- b. at watching television:
6. can not set properly at watching television
  7. move body at watching television
  8. play toys at watching television
  9. talkative at watching television
  10. play the button at watching television
- c. at doing homework:
11. can not set properly at doing homework
  12. move body at doing homework
  13. play pencil at doing homework
  14. talkative at doing homework
  15. need supervision
- d. when playing:
16. can not play quietly
  17. can not keep play one game
  18. make noise at playing
  19. talkative at playing
  20. interrupt other at playing
- e. about sleep:
21. difficult to fall asleep
  22. short sleep time
  23. can not sleep well
- f. outside school and home:
24. make trouble in the trip
  25. make trouble when shopping
  26. can not quiet when seeing movies
  27. can not quiet when visit friends
- score: never:1 seldom:2 sometime:3 often:4 always:5

rotonin, Dopamine, Norepinephrine, Acetylcholine, Gamma- amino- butyric acid and others. Most of the ADHD children are found with imbalanced sign of these neurotransmitters in their brain, for instance their secretion of Dopamine and Norepinephrine is comparatively low than most people.<sup>8</sup> Lately, a study focused on adults with ADHD had indicated that its occurrence is related to dopa-decarboxylase that

## Appendix 2. The SNAP-VI questionnaire

1. make mistake at homework
  2. can not keep attention to work
  3. poor attention to others command
  4. can not follow up order
  5. difficult in organization
  6. avoid brain exercise
  7. easy lost things
  8. easy attract by others
  9. poor memory
  10. can not sit properly
  11. leave seat any time
  12. jump up and down anywhere
  13. can not play quietly
  14. move body anytime
  15. very talkative
  16. urgent to answering
  17. can not take turns
  18. interrupt others when playing
  19. poor temper
  20. do not obey seniors
  21. refuse seniors command
  22. interrupt others when working
  23. do not kwon his mistake
  24. poor emotion control
  25. easy angry
  26. illness to others
- score: never:0 sometime:1 ofen:2 always:3

compounds Dopamine as when dopa-decarboxylase cannot operation normally, it will lead to occurrence of ADHD.<sup>9</sup> It is found from many studies of ADHD genes that as many as 30% of siblings or parents to ADHD children are found with attention deficit problem. However, there are not yet any substantial conclusions about relevant gene and chromosome position of ADHD.<sup>10</sup> The status during pregnancy is also related to attention deficit. Furthermore, premature baby, baby born less than 1,500 gm, or baby suffering from difficult labor, there could be some brain injury, which could also be factor that brings forth ADHD. Take normal children for example, their brain will keep growing during the period of embryo

and 1 year after birth, while suitable formation and integration with neural cells are conducted during the process of development. As an average, the frontal lobe of children suffering from ADHD will be about 10% smaller than that of the normal children, while the capacity of anterior-superior and anterior-inferior of their brain will also be 10% smaller than that of normal children. As researchers use brain image for scanning, they found that the brain of children suffering from ADHD are noted with abnormally increased activity in two areas, being the frontal lobe and striatal areas underneath. These two areas are related to the control of physical and voluntary action.

Generally speaking, most of ADHD patients will be diagnosed and receive treatment before pre-school or during primary school, while the clinic diagnosis criteria of ADHD are base on DSM-IV of American Psychiatric Association. It has been proved that medication treatment, rehabilitation treatment, and behavior treatment are effective for ADHD. The first-line medication for ADHD treatment is CNS stimulant, and its function mechanism is to vitalize neurotransmitters as dopamine and serotonin.<sup>11</sup> It is effective to enhance attentiveness, improve cognition impulse, and increase short-term memory. Besides, it also helps with positive impact with in learning and interpersonal interaction among children. Having gone through tracking research for more than 15 years, Hechman and Weiss pointed out that those youth and adults who have received medication treatment are found with lower index in terms of imprisonment, hospitalization, discharged from school, unemployment, and divorce.<sup>12</sup> Methylphenidate(MPH) has been widely use on the treatment of ADHD patients for more than 30 years, and its safety of medication has been substantiated for a long period of time.<sup>13</sup> Though

some patients are found with abdomen pain or nauseating in the initial stages of 2 to 3 months, and some even with poor appetite and weight loss, longer-effect mode as MPH(Concerta) can be considered for use as the dosage will slowly release, and help avoid fluctuating blood concentration from short-effect mode. The research finds that it impacts less to the appetite of patient children.<sup>14</sup> For behavior treatment, it is through, positive reinforcement, environmental stimulation, and stimulus to control that help to guide patients to complete the tasks that haven't initiated. Rehabilitation treatment is to conduct treatment with activity and cognition training. We are hoped that the medication is effective, but with less side effect. Aromatherapy is one of the choices of alternative therapy that one opts to, and one can trace aromatherapy back with rather long history. Until early 20th century, Gattefoss, French chemist, has first started to work on it, and he extracted ingredients from natural plants to alleviate certain syndromes.<sup>15,16</sup> The ways of employment is to inhale from our respiratory, skin massage, and oral in-take.<sup>17</sup> There were Czech scholars who had conducted research of effect that aroma and spice can exert to emotion, and it is found that allylbenzenes and propenylbenzenes both are pioneering materials for amphetamine are found in the most-often used spices as cinnamon as one prepares Christmas meal. Allylbenzenes and propenylbenzenes will be turned into amphetamine after metabolism, and will make one mentally stimulated and pleasant.<sup>18,19</sup> However, as we review past literature study of the kind remains rather few, while our study is conducted with design upon such theoretical foundation.<sup>20</sup> It is hoped that we can gain a further knowledge and application with regard to aromatherapy and ADHD, and conduct our research under such scientific structure so that

more precise and safe criteria can be established with dosage and prescription, providing the mass with relevant and reasonable information. For the time being, aromatherapy remains classified as alternative therapy, and the research results of this study have indicated that children suffering from ADHD taking both rehabilitation treatment and cinnamon aromatherapy have shown with better treatment results, as indicated from child activity scale and SNAP IV Questionnaire, than those with mere rehabilitation treatment 6 months later. Many factors such as family support, family education and environment will affect the prognosis of the ADHD child. Some children maybe also receive alternative therapy like acupuncture, music and art therapy. The amount of cinnamon take by each child may be different since we use nasal inhalation method. These are all potential biases of our study. Nonetheless, since the numbers of case limited and time of tracking is not long enough, it should take further tracking.

## CONCLUSION

Medication treatment, behavior treatment, and rehabilitation treatment can reduce such hyperactive behavior and dispersed attention of ADHD patient and help adjust emotion impulse, improve interpersonal relationship, and largely enhance their academic and work achievement. Many parents like, on one hand, to resort to medication to improve the concentration and learning capability of patient children, but they would, on the other hand, hope to stop using medication as soon as possible. Nonetheless, once the patient children stop taking medication, ADHD syndrome would again resume. The present study used cinnamon aromatherapy in 20 ADHD children and

found both the SNAP-IV Questionnaire and the child activity scale were better in the experimental group than in the control group. Since some ADHD children are too young to take MPH or poor compliance to MPH, cinnamon aromatherapy is a good alternative therapy.

## REFERENCES

1. Millichap JG. Etiologic classification of attention deficit hyperactivity disorder. *Pediatrics*. 121(2): 358-365, 2008.
2. Biederman J, Faraone SV. Attention deficit hyperactivity disorder. *Lancet*. 366: 237-248, 2005.
3. Weber W, Newmark S. Complementary and alternative medical therapies for attention-deficit/hyperactivity disorder and autism. *Pediatric Clinics of North Am*. 54(6): 983-1006, 2007.
4. Brown RT, Amier RW, Freeman WS. Treatment of attention-deficit/hyperactivity disorder: overview of the evidence. *Pediatrics*. 10(6): 749-757, 2005.
5. Newcorn JH, Michelson D, Kratochvil CJ. Low-dose atomoxetine for maintenance treatment of attention-deficit/hyperactivity disorder. *Pediatric*. 118(6): 701-706, 2006.
6. Buckle J. The role of aromatherapy in nursing care. *Nursing Clin of North Am*. 36(1): 57-72, 2001.
7. Burns E, Zobbi V, Panzeri D. Aromatherapy in childbirth: a pilot randomized controlled trial. *Int J of Obs & Gyn*. 114(7): 838-844, 2007.
8. Bush G, Spencer TJ, Holmes J, et al. Functional magnetic resonance imaging of methylphenidate and placebo in attention-deficit/hyperactivity disorder during the multi-source interference task. *Arch of General Psychi*. 65(1): 102-114, 2008 .
9. Higgins ES. A comparative analysis of antidepressants and stimulants for the treatment of adults with attention-deficit hyperactivity disorder. *J of Family Practice*. 48(1):15-20, 1999.
10. Wolraich ML, Wibbelsman CJ, Bromn TE. Attention-deficit hyperactivity disorder among adolescent: a review of the diagnosis, treatment, and clinical implication. *Pediatrics*. 115(6): 1734-1746, 2005,
11. Higgins ES. A comparative analysis of antidepressants and stimulants for the treatment of adults with attention-deficit hyperactivity disorder. *J of Family practice*. 4(1): 15-20, 1999.
12. Foreman DM. Attention-deficit hyperactivity disorder: legal and ethical aspects. *Arch of disease in child*. 91(2): 1992-1994, 2006.
13. Wilens TE, Newcorn JH, Kratochvil CT. Long-term atomoxetine treatment in adolescents with attention-deficit/hyperactivity disorder. *J of Pediatrics*. 149(1): 112-119, 2006.
14. Bangs ME, Hazell P, Danckaerts M, et al. Atomoxetine for the treatment of attention-deficit/hyperactivity disorder and oppositional defiant disorder. *Pediatrics*. 121(2): 314-320, 2008.
15. Lin DW, Chan WC, Ng BF, et al. Efficacy of aromatherapy (*Lavandula angustifolia*) as an intervention for agitated behavior in Chinese older persons with dementia: a cross-over randomized trial. *Int J of Geriatric Psychi*. 22(5): 405-10, 2007.
16. Kuriyama H, watanabe S, Nakaya T. Immunological and Psychological Benefits of Aromatherapy Massage. *Evidence-Based Complementary and Alternative Medicine*. (2): 179-184, 2005.
17. Graham PH, Browne L, Cox H. Inhalation aroma-

- therapy during radiotherapy: result of a placebo-controlled double-blind randomized trial. *J of Clin Oncology*. 21(12): 2372-2376, 2003.
18. Ballard CG, O'Brien JT, Reichelt K, et al. Aromatherapy as a safe and effective treatment for the management of agitation in severe dementia: the results of a double-blind placebo-controlled trial with Melissa. *J of Clin Psychi*. 63(7): 533-538, 2002.
  19. Cooke B, Erust E. Aromatherapy: a systemic review. *Br J of General Practice*. 50(455): 493-496, 2000.
  20. Moss M, Cook J, Wesnes K. Aromas of rosemary and lavender essential oils diferentiay affect cognition and mood in healthy adults. *Int J of Neuroscience*. 113: 15-18, 2003.

# 應用肉桂芳香療法於注意力缺失過動症孩童之療效

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注意力缺失過動症在學齡兒童約3-9%，由於注意力無法適當集中，導致學習障礙，無法進一步發揮本身的長處，造成兒童自信心不足，進而影響人際關係，若無適當之治療介入，其影響將延續至青少年及成人，至目前為止，注意力缺失過動症的成因仍未有定論，故治療上也面臨了許多衝擊，一般來說，藥物治療、復健治療及行為治療是醫院可提供的方法，本研究是以復健治療輔以肉桂芳香療法，針對門診20名學齡前注意力缺失過動症患者進行6個月之追蹤治療，發現復健治療輔以肉桂芳香療法之患童，其兒童活動量表由 $126\pm 6.4$ 進步到 $102\pm 5.8$ 分，家長問卷表評估結果由 $76\pm 6.6$ 進步到 $58\pm 2.6$ 分，而單以復健治療者，其兒童活動量表只由 $128\pm 4.6$ 進步到 $110\pm 7.2$ 分，家長問卷表評估結果由 $75\pm 3.4$ 進步到 $64\pm 5.8$ 分，故不論在兒童活動量表或家長問卷表評估結果，復健治療輔以肉桂芳香療法之患童進步程度皆較單以復健治療者高，且有統計意義之差別。芳香療法是安全又方便的治療方式，家長的接受度普遍高於一般之傳統藥物，且一般藥物治療建議用於學齡兒童，而芳香療法則不受年齡限制，值得進一步研究與推廣。

**關鍵詞：**注意力缺失過動症、芳香療法、兒童活動量表。-