

The Treatment of ADHD with Acupuncture and/or Traditional
Herbal Medicine and Amino Acid Therapy
A Research Synthesis Review

By

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Abstract

This study engaged a research synthesis approach to non-drug treatment of ADHD looking at acupuncture, and/or traditional herbal medicine and amino acid therapy as a safe and effective treatment strategy instead of prescription medication. The data that emerged, lead to a modular holistic treatment approach to this condition given the wide range of symptom variations in the ADHD population. There is also a significant opportunity to further reduce ADHD symptoms with lifestyle choices, such as an elimination diet and mindfulness meditation. Combining acupuncture, traditional herbal medicine, amino acid therapy and healthy lifestyle choices appears to be a safe and effective method of reducing ADHD symptoms and improving the quality of life for these individuals and their loved ones. Recommendations for further research to verify these findings are warranted.

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Chapter 1

Current Status and Diagnosis of ADHD in the U.S.

In the last decade Attention Deficit Hyperactivity Disorder (ADHD) has been on the rise in children, teens and adults. The Center for Disease Control reports that 11% of children in the United States have been diagnosed with ADHD by a health care provider (Center for Disease Control 2010). This amounts to 1 in 10 children or 6.4 million children in the U.S., according to a 2014 National Survey (Center for Disease Control 2014). The 2014 national survey was a follow-up to the 2011-2012 National Survey of Children's Health (Visser, S. N., Zablotsky, B., Danielson, M. L., & Bitsko, R. H. 2015).

According to this report, in 2014 the most common age at which children with ADHD were diagnosed was 7 years old, and one-third were diagnosed before age 6. Primary health care physicians diagnosed over 53% of the children with ADHD, regardless of their age.

The initial concern about a child's behavior, in children later diagnosed with ADHD, came from a family member (64.7%), and someone from school or daycare initially pointed out the possibility of ADHD in about one-third of children later diagnosed with ADHD (30.1%) (Center for Disease Control 2014).

The global consensus on ADHD/Hyperkinetic disorder (HKD) has helped to establish the validity and impact of this condition as well as its impact on development in children. This condition has a wide reaching influence at home and school socially, emotionally and cognitively. In late adolescents and adults, this condition, if untreated, will continue to impact relationships at home and may lead to poor academic

achievement as well as less than optimal occupational status. In adolescents and adults with ADHD there is an increased risk of substance abuse and potential trouble with the law. The International Classification of Diseases (ICD-10), World Health Organization in 1992 defines this disorder now commonly known as ADHD as Hyperkinetic Disorder (Remschmidt, H. 2005).

The World Health Organization states that ADHD is characterized by abnormal levels of inattentiveness and restlessness that are pervasive across situations and persistent over time. These characteristics are easily observable and are not the result of autism or affective disorders (UKAAN 2013 Handbook for Attention Deficit Hyperactivity Disorder in Adults).

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) of the American Psychiatric Association, ADHD is among the most prevalent of neurobehavioral disorders in children. DSM-IV classifies ADHD according to three subcategories. These include: (1) predominantly inattentive type (ADHD-I), (2) predominantly hyperactive-impulsive type (ADHD-HI) and (3) combined type (ADHD-C). The inattentive subtype is consistent of people who primarily exhibit inattentive behaviors, yet do not show hyperactive or impulsive behaviors. The predominantly hyperactive-impulsive type is directly opposite to the inattentive type. The combined type (3) has characteristics of both type (1) and type (2).

Potential Causes of ADHD and Its Characteristics

Research points to genetics being the most dominant causal factor of ADHD although environmental factors such as pesticide exposure, heavy metal toxicity, allergies and diet appear to be significant contributing factors.

The most prevalent characteristics of ADHD that occur are:

1. Inattentiveness
2. Hyperactivity/Restlessness
3. Impulsiveness
4. Distractibility
5. Disorganization
6. Emotional Dysregulation
7. Sleep Disturbance
8. Social Impairment

ADHD expert Daniel Amen, M.D. who has treated ADHD for more than 30 years, has found 7 different ADHD types. These are: Classic, Inattentive, Overfocused, Temporal Lobe, Limbic, Ring of Fire and Anxious. The expanded types of ADHD are from the book by Amen, D.G., (2015) *Change Your Brain Change Your Life, Revised and Expanded*. New York, N.Y.: Harmony Books.

Coexisting conditions also known as comorbidity in ADHD are learning disabilities, oppositional defiant disorder, anxiety disorders, depression, emotional dysregulation, language disorders, deficit in facial affect recognition and insomnia (Sinzig, J., Morsch, D., & Lehmkuhl, G. 2008; Shaw, P., Stringaris, A., Nigg, J., & Leibenluft, E. 2014).

Early concepts of ADHD referred to it as “minimal brain damage”. Emotional dysregulation was the primary symptom and inattention was a secondary symptom (Clements, S. D. 1966).

Emotional Dysregulation as a Primary Symptom

Research indicates that the combination of ADHD with emotional dysregulation has a much more significant effect on children, adolescents and adults than the impact of hyperactivity and inattention in ADHD alone. The primary areas of impact are wellbeing, self-esteem, interpersonal and social conflict, peer relationships, family relationships, academic performance and career or job attainment (Wehmeier, P. M., Schacht, A., & Barkley, R. A. 2010; Bunford, N., Evans, S. W., & Wymbs, F. 2015; Shaw, P., et al. 2014).

Emotional dysregulation was defined in a study as having a moderate elevation on the combined Child Behavior Checklist subscales of Attention Problems, Aggressive Behavior and Anxious/Depressed subscales. The Child Behavior Checklist is a widely accepted method of identifying problematic behavior in children and it covers emotional, behavioral and social aspects of life (Klein, R. G., et al. 2012). This checklist is becoming widely utilized by doctors diagnosing ADHD in the US as an additional assessment tool to the DSM-IV diagnostic criteria. A study that followed children with ADHD and emotion dysregulation into their adult years, found that four years later these individuals had persistent ADHD along with increased social impairment and psychiatric issues compared to children who had ADHD without emotional dysregulation.

Another study showed children that match the ‘dysregulated profile’ on the Child Behavior Checklist but did not have ADHD, had persistent and elevated levels of anxiety

and disruptive behavior in adulthood compared children who did not have issues with emotional regulation (Althoff, R. R., Verhulst, F. C., Rettew, D. C., Hudziak, J. J., & Van der Ende, J. 2010).

An aspect of social impairment can be attributed to a reduced ability to recognize various emotional states of others by noticing their facial expressions. A person with ADHD may have a deficit in the ability to recognize fear, anger, sadness or joy in the person they are in the presence of and then respond appropriately. This lack of awareness can lead to difficulty in social situations and a lack of being connected with those persons they are with. Recent Research indicates the both Autism and ADHD can share the characteristic of a deficit in facial affect recognition in children (Sinzig J. et al. 2008; Dyck, M.J. et al. 2001; Singh, S.D. et al.1998).

Standard of Care Medical Intervention

In the United States the first choice for the medical intervention and treatment of ADHD is to prescribe stimulants such as methylphenidate (Ritalin). Often times this type of medication is effective as far as improving symptoms of ADHD such as inattentiveness, impulsivity and hyperactivity, but at what cost to the individual taking the medication?

Over 1.5 million children in the U.S. take Ritalin (methylphenidate) as of 2004. However, most of the research studies that followed the use of psychostimulant treatment for ADHD extended for only several months (Jadad, A. R., Booker, L., Gauld, M., 1999; Scharchar, R. J., Tannock, R., 1993). There is research that evaluated one or two years use on these types of medication and while they did continue to reduce some symptoms of ADHD these children continued to have issues in terms of academic performance,

social impairment and psychiatric problems during their teens all the while being on stimulant medications (Gillberg, C., Melander, H., Von Knorring A., et al.1997; Hinshaw, S.P., Klein, R.G., Abikoff, H., 1998; Barkley, R. A., McMurray, M. B., Edelbrock, C.S., Robbins, K., 1990).

Stimulant Medication and its Physical Side Effects

Potential side effects with ADHD stimulant drugs are significant, serious, and potentially life threatening. The following is a partial list of events associated with the ADHD group of medications as a whole, but is not limited to the following:

1. These drugs have a black box warning of increased risk of suicidal ideation and a possibility of severe liver injury.
2. Stimulant drugs can cause possible sudden death in cases with pre-existing structural cardiac abnormalities or other serious heart problems.
3. There also exists a risk for stroke and myocardial infarction as well as a risk of drug dependence (Vitiello, B. 2008; Munk, K., Gormsen, L., Kim, W. Y., Andersen, N. H., 2015).
4. Amphetamines may impair the ability of the patient to engage in potentially hazardous activities such as operating machinery or vehicles.
5. ADHD stimulant drugs can cause lowering of the seizure threshold.
6. There is an increased possibility of developing leucopenia and/or anemia.

Other side effects are: higher incidence of infection, photosensitivity reaction, constipation, tooth disorders, emotional liability, decreased libido, somnolence, speech disorder, palpitation, twitching, dyspnea, sweating, dysmenorrhea, and impotence.

Integument disorders include, but are not limited to, urticaria, rash, and hypersensitivity reactions including angioedema and anaphylaxis. Other side effects manifesting on the skin are serious skin rashes, including Stevens Johnson Syndrome and toxic epidermal necrolysis.

Stimulant Medication and its Mental and Emotional Side Effects

Treatment by stimulants at usual doses can cause emergent psychotic or manic symptoms, e.g., hallucinations, delusional thinking, or mania in children and adolescents without prior history of psychotic illness or mania. These stimulant medications may exacerbate symptoms of behavior disturbance and thought disorder in patients with a pre-existing psychotic disorder. This class of stimulant medications can increase aggression and hostility as well as induce mixed/manic episodes. Contraindications include patients with marked anxiety, tension, and agitation, since the drugs may aggravate these symptoms. This class of drugs can increase the risk of drug dependence (Hinz, M., Stein, A., Neff, R., Weinberg, R., & Uncini, T. 2011).

A study that followed 79 children who took methylphenidate for ADHD over a five-year period found the most prevalent side effect experienced was a reduction in appetite. For children who are of a slender body type this may be a problem (Charach, A., Ickowicz, A., & Schachar, R. 2004; Powell, S. G., Frydenberg, M., & Thomsen, P. H. 2015; Zachor, D. A., Roberts, A. W., Hodgens, J. B., Isaacs, J. S., & Merrick, J. 2006).

Taking into consideration there are 3 generally recognized different types of ADHD: 1) Inattentive Type, 2) Hyperactive Type, and 3) Mixed Type, and some experts who state that there are 7 different types; ADHD is a complicated condition. Add to this the potential coexisting conditions such as anxiety, depression, emotional dysregulation

and insomnia and it becomes clear that prescribing medication for this condition is not as simple as one or two drugs fits all.

Some individuals are more sensitive to this class of medication than others and there is a need for them to have a safe, effective and well-tolerated method of managing their symptoms of ADHD and any comorbidity.

Treatment of ADHD with Chinese Medicine

ADHD is a condition that varies widely from individual to individual. A basic tenant in Chinese medicine is “same disease different treatment” and “different disease same treatment” (based on each individual's presenting symptoms and patterns). The fact that Chinese medicine considers the underlying causes of a disease or imbalance lends itself to the possibility of being an effective and safe treatment of this condition. Chinese medicine also takes into account the direct relationship between the primary organs and their associated emotions, thus lending additional insight and treatment strategies for ADHD and the emotional dysregulation, or insomnia that so frequently accompanies it.

There are various modalities within Chinese medicine that ought to improve the symptoms of ADHD. Certain modalities may be more effective than others for specific symptoms. The notion of employing a non-drug, modular approach and using the most effective modalities of Acupuncture, Traditional Herbal Medicine or Amino Acid Therapy for certain aspects of ADHD, while choosing a different modality or combination of these for other aspects of ADHD, has not been addressed in the current research I have found to date. The author submits that the time has come to approach and treat the individual with ADHD and not simply treat ADHD. There are viable options to accomplish this in an individualized and holistic way.

Acupuncture and ADHD with Hyperactivity Predominant

Research articles on acupuncture and ADHD indicate that certain aspects of this condition, such as hyperactivity, respond well to this modality while inattentiveness and impulsivity may respond more slowly than hyperactivity.

According to Chinese medicine and Acupuncture theory, when hyperactivity and restlessness are present, it is an imbalance that may involve the liver, kidneys and heart or some combination of these organs.

This condition of hyperactivity is common in young children, especially boys. However, when liver depression qi stagnation (emotional tension, moodiness) occurs along with kidney and heart yin vacuity (weakness) the symptoms are more profound and persistent throughout childhood, and potentially continue into adolescents and adulthood. Additionally, Spleen qi (digestive function) is typically weak and still developing in younger children, which may further imbalance the kidneys or become a source for phlegm and congestion. According to Chinese medicine, this can “mist the heart”, which further agitates the child’s shen (emotion stability) and can negatively affect sleep and ability to maintain focused attention.

Traditional Herbal Medicine and Amino Acid Therapy

Research Articles on Traditional Herbal Medicine and Amino Acid Therapy show promise in the area of supporting attentiveness and impulsivity, so it appears that a combination of modalities may yield the best results given the variability of presenting symptoms of these individuals.

Part of the problem in reviewing research on the topic of ADHD is that one modality is used and evaluated. This condition with all its inherent variables lends itself to a multi-prong approach. Meta-Analysis on the topic of ADHD and acupuncture or Chinese medicine is looking for effective homogeneous treatments, yet the very nature of this condition does not lend itself to this approach. Typical exclusions of research articles on Acupuncture and ADHD are different types of acupuncture being used together or other modalities added to acupuncture; specifically more than one type (body acupuncture and ear acupuncture), acupuncture and tuina (Chinese massage), acupuncture and Chinese herbs, acupuncture and behavior therapy, etc.

Glossary of Terms

ADD: Attention deficit disorder. In years past ADD was distinct from ADHD as it did not include symptoms of hyperactivity.

ADHD: Attention deficit hyperactivity disorder. This acronym has replaced ADD in more recent years and includes the three most recognized types of ADHD. 1. Inattentive Type, 2. Hyperactive-Type, 3. Mixed Inattentive-Hyperactive Type.

Amino Acid Therapy: A method of administering amino acids and precursors in an effort to balance the levels of dopamine and serotonin in the brain. Typically the dose is guided by urine testing of dopamine and serotonin. Once dopamine and serotonin are at an optimal dose, symptoms of ADHD diminish significantly.

Comorbidity: Two or more coexisting medical conditions or disease processes that are additional to an initial diagnosis.

Emotional Regulation: Researchers are not absolutely clear on a definition of this term, yet two key points need to be mentioned. One key aspect is that emotion regulation seems to involve a network of systems that work together (e.g., attentional, cognitive, behavioral, social, biological). Second, these processes ideally act to balance, manage, stabilize or organize emotions to help individuals adapt appropriately to their environment. Emotions may be positive (e.g., joy, love) or negative (e.g., depressed, anxious) in their intrinsic nature. Some people respond with great emotional intensity to a stimulus, while others show little or no emotion to the same stimulus. Emotional Regulation involves the regulation of multiple systems such as cognitive, attentional, behavioral, and neurological. Ideally, all these processes are modulated in such a way that helps a person meet the demands of the situations that present in a relatively healthy, appropriate fashion (Hilt, L.M., Hanson J.L., & Pollack, S.D., 2011).

Emotional Dysregulation: A deficiency in the ability to effectively modulate and control emotions in light of social, environmental and situational circumstances. Emotional Dysregulation is basically a maladjusted attempt to regulate emotions in such a way as to realize one's goals, get along socially and feel good about one's self (Hilt, L.M. et al. 2011).

Facial Affect Recognition: The ability to recognize facial expressions and eye expressions in order to understand, predict and respond appropriately to the person or persons in your presence (Sinzig, J. et al. 2008).

Hyperactivity: means having increased movement, impulsive actions, and a shorter attention span, and being easily distracted. Hyperactive behavior usually

refers to constant activity, being easily distracted, impulsiveness, inability to concentrate, aggressiveness, and similar behaviors (Hyperactivity (2015)

MedlinePlus Medical Encyclopedia. (n.d.). Retrieved December 15, 2015, from <https://www.nlm.nih.gov/medlineplus/ency/article/003256.htm>.

Traditional Herbal Medicine: The practice and art of prescribing herbs traditionally used in China, India and other areas of the world that have an ancient system of classifying herbs according to function and an effective way of combining and prescribing herbs based on a traditional diagnosis.

Oppositional Defiant Disorder A behavior disorder in children and adolescents characterized by a persistent pattern of defiant, disobedient, and hostile behavior towards authority figures; a frequent loss of temper, arguing, becoming easily angered, chronically uncooperative and oppositional, or other negative behaviors. There is a link between increased activity in the Anterior Cingulate Gyrus, a part of the Prefrontal Cortex of the brain, and oppositional or argumentative behavior (Amen, D.G., 2015. Looking Into Worry and Obsessiveness. *Change Your Brain Change Your Life, Revised and Expanded* (223) New York, NY: Harmony Books).

Prefrontal Cortex: An area of the brain located in the frontal lobe that is the seat of executive function, planning, reasoning, problem solving, working memory, strategic memory, regulates stress response and inhibits sexual behavior.

Problems related to the prefrontal cortex, according to ADHD expert Daniel Amen, M.D. are: short attention span, distractibility, lack of perseverance, impulse control problems, hyperactivity, chronic lateness, poor time management,

poor organization and planning, procrastination, unavailability of emotions, misperceptions, poor judgment, trouble learning from experience, short term memory problems, social and test anxiety, lying and misperceptions (Amen, D.G., 2001. *Healing ADD The Breakthrough Program That Allows You to See and Heal the 6 Types of ADD* pgs 87-92, New York: The Berkley Publishing Group).

Theories of Mind (ToM): the notion that our cognitive functions allow us to process the behaviors and experiences of those we are with in such a way that we can recognize, understand, predict and follow what is being communicated (Baron-Cohen, S. 2008, *Empathy Mindblindness and Theory of Mind*, *Psychology Today* online, posted 2008, retrieved from <https://www.psychologytoday.com/blog/aspergers-diary/200805/empathy-mindblindness-and-theory-mind>).

Purpose and Potential Value of the Study

Can Acupuncture, Traditional Herbal Medicine and or Amino Acid Therapy be an effective treatment for Attention Deficit Hyperactivity Disorder? It is hypothesized that regular and consistent treatment with acupuncture, traditional herbal medicine and/or amino acids can balance blood flow and master neurotransmitters in the prefrontal cortex of the brain and thereby reduce or resolve the symptoms of ADHD.

The purpose of this study is to compare and contrast the effects of acupuncture, herbs and/or amino acids on the 3 types of ADHD: 1.) Inattentive Type, 2.) Hyperactive Type and 3.) Mixed Inattentive-Hyperactive Type, and investigate which one or combination of these has the most significant results.

This research synthesis would be of value to the child, adolescent and adult population as a possible alternative to prescription medication, which is the current standard treatment for this condition. Acupuncture, herbs and/or amino acids each have a low incidence of side effects and have the additional benefits of improved function and regulation of the body, mind and emotions.

This study can also be of value to the acupuncture, psychology and biomedical communities to help their patients with ADHD as a viable option that shows scientific evidence of its effectiveness. Parents, children, adolescents and adults will also benefit directly by accessing this information and using these non-drug methods of reducing or resolving the symptoms of ADHD.

Chapter 2

In this chapter we will review some of the research highlights of Acupuncture, Traditional Herbal Medicine and Amino Acid Therapy as it applies to treating key symptoms and co-morbidities of ADHD.

The key symptoms and co-morbidities of ADHD are:

1. Hyperactivity/Restlessness
2. Inattentiveness/Short attention span
3. Impulsivity
4. Distractibility
5. Disorganization
6. Emotional Dysregulation
7. Anxiety
8. Depression
9. Insomnia

Acupuncture and Hyperactivity

Hyperactivity or Restlessness can respond favorably to Acupuncture, Traditional Herbal Medicine and Amino Acid therapy.

Acupuncture was found to be helpful for hyperactivity and restlessness in children according to a pilot study at the Xiaoxiao Children's Centre in Milan, Italy. At this centre the practitioners also emphasized home treatment using Chinese massage (tuina), which the parent or caregiver was instructed on how to perform. This helped to reinforce the weekly acupuncture treatments (Rossi E. 2010).

In a study that compared 155 children receiving acupuncture treatment vs. 58 children receiving Ritalin treatment, it was found that both methods were significantly effective and had about the same success rate. The study found that acupuncture was more effective in the younger children (12 years old); especially those with hyperactive or mixed subtype ADHD. However, a key point of the study was that the acupuncture group retained 82.6% effectiveness in symptom reduction one month after treatment stopped, while the Ritalin group retained 32.8 % effectiveness over the same duration (Becker, S. A. 2001).

Acupuncture encourages homeostasis of the nervous system and endocrine system, which effectively calms restlessness. Acupuncture also promotes balance of digestive, immune and circulatory systems (Ma, Y., Ma, M. & Cho Z. (2005) *Biomedical Acupuncture for Pain Management: An Integrative Approach*. St. Louis, MO: Elsevier).

In a study by Li S. et al. completed in 2011, *Acupuncture for Attention Deficit Hyperactivity Disorder (ADHD) in children and adolescents (Review)*, from The Cochrane Collaboration of 14 studies, no evidence was available from randomized control trials or quasi-control trials that passed the exclusion criteria and showed efficacy for Acupuncture in the treatment of ADHD according to the authors. While many of these 14 studies reported effective results the bias remained high and the quality of the studies low (Li S. et al. 2011).

Reducing Inattentiveness & Short Attention Span with THM & Amino Acid Therapy

Studies show that traditional herbal medicine and amino acid therapy are helpful in reducing symptoms of inattentiveness /short attention span.

Traditional herbal medicine using Chinese and Ayurvedic herbs show promise in providing the specific nutrients needed to improve attention in order to stay on task. The herbal compound combining both Chinese and Ayurvedic herbs along with spirulina showed positive changes in mood while improving focus (Katz, M., et. al. 2010).

Some of the herbs used in traditional Ayurvedic medicine that show beneficial effects for cognitive function, improving memory and in some cases mood regulation are *Celastrus paniculatus* Willd. seed oil, *Centella Asiatic* L., *Acorus calamus*, *Whithania somnifera*, *Bacopa monnieri* and *Nigella sativa* L. seeds. (Arora, N., & Shashi Pandey-Rai, S. 2012; Shukla, S. D., Bhatnagar, M., & Khurana, S. 2012; Kongkeaw, C., Dilokthornsakul, P., Thanarangsarit, P., Limpeanchob, N., & Norman Scholfield, C. 2014; Bin Sayeed, M. S. et al. 2014; Kumar, M.H.V.& Gupta Y.K., 2002).

In Traditional Chinese medicine *Ginkgo biloba* leaf has been used for centuries to enhance cognitive function, memory, cerebral circulation and neuronal cell metabolism. This herb also demonstrates antioxidant action and is neuroprotective and reduces apoptosis. *Magnolia officinalis* bark and *Ziziphus spinosa* seed are Chinese herbs that treat mild anxiety, nervousness and sleep-related problems. *Magnolia officinalis* is an antioxidant, is neuroprotective, anti-inflammatory and shows antioxidant action. *Polygala tenuifolia* Willd. is an herb used in TCM as a cardiogenic, cerebrotonic, strengthens the will, and eases insomnia while enhancing memory and improving understanding (Lin, C.-C. K., Cheng, W.-L., Hsu, S.-H., & Chang, C.-M. J. 2003; Koetter, U., Barrett, M., Lacher, S., Abdelrahman, A., Donick, D. 2009).

Specific amino acids and their co-factors cross the blood brain barrier and can optimize levels of dopamine and serotonin while balancing dopamine and serotonin in the

brain. This method shows efficacy in improving attention, staying on task, reducing impulsivity and promoting emotional stability. Amino Acid Therapy dosing is very individualized and must be at the therapeutic level for each person in order to attain these results. Urine lab tests for Dopamine and Serotonin are necessary in approximately 40% of pediatric cases for resolution of ADHD symptoms. In approximately 60% of these cases, symptoms resolved in 3-5 days following initial dosing protocol. A series of urine lab test results reflect the changing levels and ultimately the optimal balance of dopamine and serotonin (Hinz M., Stein A., Trachte G., Uncini T. 2010).

This novel approach helps the individual's yin and yang balance. This is reflected in the improvements of focus, attention, impulsivity and mood regulation (Hinz M. et al, 2011).

Hyperactivity or Restlessness can respond favorably to Acupuncture, Traditional Herbal Medicine and Amino Acid Therapy. Depending on the child and family some modalities may be better suited for that individual in terms of compliance.

Effects of THM and Amino Acid Therapy on Impulsivity and Distractibility

Impulsivity, which is a hallmark symptom of all forms of ADHD, appears to be least responsive to acupuncture. Research indicates that both Traditional Herbal Medicine and Amino Acid Therapy, in some cases, guided by urine lab testing of serotonin and dopamine are effective in reducing impulsivity.

According to Katz, the combination of Chinese and Ayurvedic herbs used in their research study in Israel showed both safety and effectiveness in reducing impulsivity, a symptom of ADHD that is often difficult to treat holistically (Katz, M., et al. 2010).

In the peer reviewed study of 84 school age children, ages 4-18 years, given amino acid therapy by Hinz et al., symptoms of impulsivity resolved once the therapeutic dose was reached for these individuals. This method raises serotonin and dopamine levels as needed and strikes a balance between these master neurotransmitters in the brain (Hinz, M. et al. 2011).

The amino acid therapy as recommended by Hinz in the 2011 study is based on a protocol that had 3 different dosage levels. These individuals all start at level 1 dosing and if symptoms of ADHD were not resolved in one week on that dose the next week they increased to level 2. If symptoms were not resolved after the end of the week on dose level 2, then level 3 dose was started. At the end of week three if symptoms were not resolved, a urine sample was collected and urinary serotonin and dopamine assay results were assessed to find the needed dose of amino acids.

The amino acids used in the study and dosage levels are listed below:

Level 1: 75mg 5-HTP/750 mg L-Tyrosine am & 4pm

Level 2: 112.5mg 5-HTP/1125mg L-Tyrosine am & 4pm

Level 3: 112.5mg 5-HTP/1125mg L-Tyrosine am & 4pm, 112.5mg 5-HTP/1125mg L-Tyrosine 7pm

Distractibility or short attention span and disorganization are other key symptoms of ADHD and reflect the under functioning or dysregulation of the prefrontal cortex of the brain. This area of the brain is the seat of executive functions.

The majority of these problems can present in individuals with ADHD. It takes proper firing at the pre-synaptic gap of the neurons with enough electricity to have good

functioning of the prefrontal cortex of the brain. When dopamine and or serotonin levels in the brain are low there is not enough electricity to bridge the gap and fire the neurons appropriately to light up the prefrontal cortex. The application of Amino Acid Therapy can improve the electrical firing at the pre-synaptic gap.

One possible contributing factor causing symptoms of ADHD are neurotoxins from heavy metals (mercury, lead) and environment toxicants such as PCBs and pesticides. Emerging research links mercury, lead and pesticide exposure to increase risk of ADHD (Bouchard, M. F., Bellinger, D. C, Wright, R. O. & Weisskopf, M. G. 2010; Cone, M. 2012).

“Each 10-fold increase in urinary concentration of organophosphate metabolites was associated with a 55 percent to 72 percent increase in the odds of ADHD,” study author Maryse F. Bouchard, PhD, of the Department of Environmental and Occupational Health, University of Montreal, told Medscape Psychiatry. (Bouchard, M. F., et al. 2010)

Amino Acid for Sleep and Other ADHD Symptoms

Several studies have shown that the amino acid L-Theanine that is derived from green tea (*camellia sinensis*) is useful for stress reduction, balancing mood, improving subjective alertness, cognitive/ mental function and improving sleep (Giesbrecht,T., Rycroft, J.A., Rowson, M.J., De Bruin, E. A., 2010; Lyon, M. R., Kapoor, M. P., & Juneja, L. R. 2011; Juneja, L. R., Chu, D.-C., Okubo, T., Nagato, Y., & Yokogoshi, H. 1999).

Upwards of 50 percent of children and adolescents diagnosed with ADHD experience some type of sleep trouble. The amount of time it takes to fall asleep, known

as sleep latency, is an issue in approximately 56 percent of children with ADHD. Another 39 percent of these children struggle with restless sleep and waking at night.

One study using L-Theanine measured objective and subjective sleep quality in 47 boys with ADHD and showed significant improvements in the percent of night time spent sleeping restfully, a lowering of episodes of waking up and the time it took to fall back to sleep when awakened in the night. The study did not show significant improvement in sleep latency, the amount of time it took to fall asleep (Lyon, et al. 2011).

One interesting point gleaned from this study was that parents of ADHD children who filled out the Pediatric Sleep Questionnaire, which was a subjective measure of their child's sleep quality, were not fully aware that their child had sleep disturbances or to the extent shown by the subjective measurement using Actigraphy. Actigraphy monitors sleep by a wristband-like recording device worn during sleep to measure a wide range of sleep parameters such as quality, quantity, activity/awakenings and sleep latency (Corkum, P., Tannock, R., Moldofsky, H. 1998; Wiggs, L., Montgomery, P., Stores, G 2005; Ball, J.D., Tiernan, M., Janusz, J., Furr, A. 1997).

This method of measuring sleep disorders in children with ADHD has been established as a reliable means of accessing sleep disorders in this population (Lyon, et al. 2011).

Acupuncture Eases Anxiety and Improves Sleep

Acupuncture is effective in reducing anxiety and improving sleep. Often these two symptoms occur together in people with ADHD as well as chronically higher states of arousal. Chronic anxiety during the day may be a contributing factor to insomnia. This type of insomnia leads to waking multiple times throughout the night. The dual manifestation of anxiety and insomnia represents the most common type of insomnia treated today. Acupuncture has been found to increase Melatonin secretion and consequently improving both anxiety and sleep issues (Spence, D.W. et al. 2004).

Electro-Acupuncture Has Therapeutic Effect with Depression

In a study from 1998 electro-acupuncture was shown to be as effective as amitriptyline for people with depression. Those experiencing the physical effects of anxiety and the cognitive disturbance of depression considered this form of treatment more effective than amitriptyline. (Luo, H., Meng, F., Jia, Y. & Zhao, X. 1998).

Omega-3 Fatty Acids May Support ADHD Symptoms and Comorbidity

There may be a role for omega-3 fatty acids and especially DHA in supporting those with ADHD accompanied by symptoms of emotional dysregulation, unipolar depression, cognitive performance issues, insomnia and impulsivity. The potential benefit of balancing the omega-3 fatty acids to improve symptoms of ADHD holds true for adults as well. The typical Western diet is particularly high in omega-6 fatty acids and relatively low in omega-3 fatty acids. Research shows that omega-3 fatty acids are critical for brain development. A deficiency in omega-3 fatty acids plays a part in the reduced functionality of the brain in psychiatric and neurological imbalances. Omega-3 is also a

factor in initiating and maintaining the sleep cycle (Richardson, A. J., 2006; Richardson, A.J., Puri, B.K., 2002; Sinn, N., Bryan, J., Wilson, C., 2008; Kidd, P.M., 2007; Montgomery, P., Burton, J. R., Sewell, R. P., Spreckelsen, T. F., & Richardson, A. J. 2014).

Animal studies show that chronically low levels of omega-3 fatty acids affect dopamine levels and their receptors in the prefrontal cortex of the brain. ADHD has been linked to low levels of dopamine in the prefrontal cortex of the brain. (Takeuchi, Fukumoto & Harada, 2002).

Chapter 3

This study was conducted on PI laptop computer, Public Library, Yo San University library links, University Southern California Medical Dental Library links, home, clinic office, internet at these locations.

Research was conducted June 14, 2014 and ended March 30, 2016. This is a research synthesis, so no subjects were used. Only public journals were used. Case Studies used were research of women, men and children.

Data Collection, Analysis and Reporting:

According to The Handbook of Research Synthesis and Meta-Analysis, “research synthesis can be defined as the conjunction of a particular set of literature review characteristics. Most definitional about research synthesis are their primary focus and goal: research synthesis attempt to integrate empirical research for the purpose of creating generalizations. Implicit in this definition is the notion that seeking generalizations also involves the limits of generalizations. Also research synthesis almost always pays attention to relevant theories, critically analyze the research they cover, try to resolve conflicts in the literature, and attempt to identify central issues for future research” (Cooper, H., Hedges, L.V., & Valentine, J.C. 2009).

Research Synthesis data was compiled through online search of medical journals through Pubmed, EPSCOHOST, Cochrane Data Base and Google scholar. Published books, class notes and seminar notes were used.

Search words used: Attention Deficit, Attention Deficit Hyperactivity Disorder, ADD, ADHD, Acupuncture, Herbs, Chinese herbs, ADHD treatment, ADHD

nutrition, Amino Acids, Essential Fatty Acids, Minerals & Vitamin Supplements, Anxiety, Depression, Insomnia and Emotional Dysregulation. Inclusion criteria for Research synthesis Studies and articles from 1990 to the present will be used. Human studies will be used. Articles from all countries will be accepted. Exclusion criteria for Research synthesis: no articles older than 1990.

Chapter 4

This chapter collates the results of the studies reported in the literature review of chapter 2. First we will focus on acupuncture and ADHD with hyperactivity and mixed type showing more favorable results. One theme that the researcher noticed is that the acupuncture studies showed a high degree of bias and the qualities of the studies in general were lacking. One example is that DSM-IV was not reported as diagnostic criteria for two out of six studies. Several meta-analysis that were done on acupuncture and ADHD were not able to recommend acupuncture as an effective and safe treatment due to the poor quality of studies, mainly from Asia. While it appears that acupuncture may indeed be effective, the quality of the studies resulted in limited evidence that acupuncture is an effective treatment for the symptoms of ADHD. Another theme that needs to be considered is the number of acupuncture treatments and length of time the course of treatment should span. Some studies may not have been conducted over an adequate time period to yield positive results.

Acupuncture and ADHD (Hyperactive and Mixed Type)

The following table shows 5 different acupuncture studies on ADHD; some with limited evidence of benefit, while other findings show acupuncture is helpful for hyperactive and mixed type.

| Name LI | Date | No. & Age of Participants | Treatment Period | Method of Treatment | Points or Dose | Findings | Diagnosis and Criteria for Improvement |
|---------|------|---------------------------|------------------------------|--|--|---|--|
| | 2009 | 180 (4-6) | 72 6-day week 12 weeks | Electro-acupuncture and behavioral treatment | GV24, GB13, EX-HN3, GV20, BL18, BL23, KI3, BL20, LR3 | Limited evidence exists that acupuncture is an effective treatment for symptoms of ADHD | DSM-IV |

| | | | | | | | |
|-----|------|------------|--|---|---|---|--------|
| XU | 2007 | 68 (6-16) | 2-3x week 30 days | Acupuncture | GV14, CV8 | Limited evidence exists that acupuncture is an effective treatment for symptoms of ADHD | n.r. |
| Liu | 2007 | 60 (4-18) | 90 3x day (30 days) | Auricular acupuncture | Auricular points: kidney, heart, brain system, shen men, excitation | Limited evidence exists that acupuncture is an effective treatment for symptoms of ADHD | n.r. |
| Lai | 1999 | 155 (4-14) | 60 5x week for 2 weeks as a course of treatment 6 courses | Acupuncture on scalp and body vs. Ritalin | Si Shen Cong, Nao San Zhen, GV17, GB19, and Nie San Zhen were main points. Additional points were added on body depending on sub-type | Hyperactive, and mixed sub-types more effective than inattentive subtype. 82.58% treatment effect. Results were sustained at 82% one month after stopping therapy. | DSM-IV |
| Lai | 1999 | 58 | 5 days week 3 mo. total | Acupuncture vs. Ritalin | Ritalin 7.5mg up to 30mg | 87% treatment effect. One month after Ritalin treatment effect decreased to 32.8% | DSM-IV |

n.r. = not reported

Of the five acupuncture studies which total 521 participants, it appears that acupuncture is more effective in hyperactive and mixed type ADHD and less effective in inattentive type ADHD. Younger participants in the study near age 6 also appeared to experience more benefit from acupuncture than children 12 years or older. One possible reason the younger participants may have received greater benefit is that their brains are still in a relatively early state of development compared with children 12 years and older. Boys often appeared to benefit more from acupuncture than girls. Perhaps this is due to

the notion that boys tend to have the hyperactive or mixed type more often than girls, who often are inattentive type.

In a standout from the Lai acupuncture study in 1999 that compared acupuncture to Ritalin, both methods significantly reduced symptoms in the hyperactive and mixed subtypes, although the benefits of acupuncture were sustained even one month after therapy was discontinued. The acupuncture benefits were sustained at 82% while the Ritalin group sustained at only 32.8%. Acupuncture appears to support balance of the primary symptoms of ADHD by improving the overall balance of the individual. This is distinct from drug treatment and the effects apparently are longer lasting with acupuncture.

Traditional herbal medicine, THM and amino acids have shown promise in helping to reduce symptoms of inattentiveness and short attention span as indicated by improvements on the TOVA (Test of Variables of Attention) and ADHD-RS rating scales frequently used in the U.S. to measure symptoms of ADHD. Both of the studies in the following table used DSM-IV as a diagnosis for all participants and the two studies included a combined total of 205 participants.

In the THM study participants used a liquid herbal compound given three times a day by a parent or teacher/aid and dose compliance records were filled in and checked at 3 to 4 week intervals during the 4-month study. Improvements in attention, cognition and impulse control were noted.

Reducing Inattentiveness, Short Attention Span, Impulsivity and Distractibility with THM & Amino Acids

The following two studies indicate significant improvement in key ADHD symptoms using THM in one study and Amino Acid precursors in another study. TOVA and ADHD-RS respectively were used to measure improvement before and after treatment.

| Name | Date | No. & Age of Participants | Treatment Period | Method of Treatment | Dose | Findings | Diagnosis & Criteria for Improvement |
|------------|------|---------------------------|------------------|---|---|--|---|
| Katz et al | 2010 | 120 (6-12) | 4 months | Traditional herbal medicine vs. placebo | 3 x per day. Compliance records checked at 3-4 week intervals | Improved attention, cognition and impulse control | DSM-IV TOVA |
| Hinz et al | 2011 | 85 (4-18) | 8-10 weeks | Amino acid therapy | 2-3x per day | Significantly reduced symptoms of ADHD per ADHD rating scale. More males experienced a decrease in symptoms in ADHD-RS, from 8.9 to 2.3; vs. females, decreasing in symptoms from 7.1 to 2.2 | DSM-IV ADHD-RS 77% showed significant improvement |

Inattentiveness and Impulsivity are symptoms of ADHD that may persist in adolescents and adults. Acupuncture may yield slow or marginal results in these symptoms, which are more difficult to treat. In the above studies, using Traditional Herbal Medicine combining Chinese and Ayurvedic herbs in the study by Katz and Amino Acid Therapy in the study by Hinz (2011), promising results were indicated for these more challenging symptoms. Often time's girls will have the Inattentive Type

ADHD with much lower incidence of hyperactivity. In the past, girls were often not diagnosed with ADHD even though they had this condition, owing to the fact that they have the less obvious, non-hyperactive form “Inattentive Type ADHD”. These two methods offer natural supplements with virtually no side effects that yield very good results for the symptoms of ADHD, including inattentiveness and impulsivity.

One important difference in these two methods of treatment is that the traditional herbal medicine is administered in liquid form and does not require taking pills. There are as many as 3 or more divided doses throughout the day. In terms of compliance, for some individuals and families this may be a more desirable option. Traditional herbal medicine can also reduce symptoms of anxiety, mild to moderate depression and insomnia.

The amino acid method, which balances levels of serotonin and dopamine, also helps with emotional balance; thus reducing co-morbidity of anxiety, mild to moderate depression and insomnia.

For individuals who prefer not to seek acupuncture treatment for ADHD these two methods potentially offer a stand-alone, non-drug path to managing symptoms of ADHD when combined with supportive diet and lifestyle choices.

Positive Results Using Acupuncture Increased Nocturnal Melatonin Secretion and Reduction in Insomnia and Anxiety

This study looks at the effect of acupuncture on modulating melatonin and its effect on sleep, the subjective improvements in sleep quality and mood improvement.

| Name | Date | No. & Age of Participants | Treatment Period | Method of Treatment | Points or Dose | Findings | Diagnosis and Criteria for Improvement |
|--------|------|---------------------------------|-------------------------------------|---------------------|----------------|---|--|
| Spence | 2004 | 18 Adults ages (18-55) mean age | 5 weeks, 2 sessions per week, total | Acupuncture | n. r. | Normalization of endogenous melatonin metabolite 6-sulpha | Diagnosis based on international classification of |

| | | | | | | |
|--|--|----------|-------------|--|---|---|
| | | 39.0 +/- | 10 sessions | | <p>toxy melatonin in urine.</p> <p>Polysomnography tests showed a number of objectively measured improvements in sleep architecture.</p> <p>psycho-metric tests indicated these subjective improvements:</p> <p>Self-accessed feelings of depression & anxiety decreased following acupuncture.</p> | <p>sleep disorders.</p> <p>Subjects had at least 2 symptoms of insomnia, preceding polysomnography and acupuncture.</p> |
|--|--|----------|-------------|--|---|---|

In this study acupuncture shows positive results in normalizing sleep and easing symptoms of anxiety and mild to moderate depression. Acupuncture has a general regulatory effect on melatonin. This study showed that while melatonin levels were increased at night following acupuncture treatment, melatonin levels decreased during the morning and daytime following the normal cycle of endogenous melatonin production.

Concerning insomnia, there is a very high correlation between daytime anxiety and insomnia. In fact this dual diagnosis is the main pattern of insomnia seen in sleep disorder clinics currently. Acupuncture basically taps into endogenous stores of neurally active substances and has a modulating effect on these substances while having a far superior side effect history compared to prescription drugs. This particular study was unique in that it measured both subjective sleep improvement while objectively measuring & monitoring nocturnal and diurnal neuro-chemical changes in melatonin over a 24-hour period. Melatonin has also been shown to be a CNS depressant with anti-anxiety and mood influencing effects. One key improvement noted by participants in the study was the subjective improvement in quality of sleep following acupuncture.

Amino Acid L-Theanine for Improving Sleep and Other ADHD Symptoms

These three studies indicate the usefulness of the amino acid L-Theanine in sleep, focus, cognitive function, alertness and relaxation.

| Name | Date | No. & Age of Participants | Treatment Period | Method of Treatment | Dose | Findings | Diagnosis and Criteria for Improvement |
|------|------|---------------------------|----------------------|---------------------|---|--|--|
| Lyon | 2011 | 98 Male Children (8-12) | 5 consecutive nights | L-Theanine Tablets | 2 tablets am & pm, totaling 400mg day of L- | PSQ subjective findings were not significant | DSM-IV (PSQ) Pediatric Sleep |

| | | | | | | |
|--|--|--|--|--|---|---------------------------------------|
| | | | | | <p>Thanine</p> <p>nor did they correlate with objective findings</p> <p>Actigraph subjective findings show significantly higher sleep percentage & sleep efficiency scores. Sleep latency and duration were not significantly improved.</p> <p>These findings applied to boys on stimulant medication and those who were not.</p> <p>Other studies indicate that L-Theanine improves mood and alertness although this was not verified on this ADHD study</p> | <p>Questionnaire</p> <p>Actigraph</p> |
|--|--|--|--|--|---|---------------------------------------|

| Name | Date | No. & Age of Participants | Treatment Period | Method of Treatment | Dose | Findings | Diagnosis and Criteria for Improvement |
|------------|------|---------------------------|--|--|-----------------------------------|---|--|
| Giesbrecht | 2010 | 44 young adults (18-34) | 96 to 320 cognitive task trials were performed | Powder dissolved in Tea based soft drink | 97mg L-Theanine and 40mg Caffeine | Improvement in accuracy, focus, self-reported alertness and reduced self-reported tiredness especially during | Cognitive Tasks included Choice-reaction time task, Visual-search task, Egocentric mental-rotation task, |

| | | | | | | | |
|--|--|--|--|--|--|------------------------------|--|
| | | | | | | cognitively demanding tasks. | attention-switching task Self-report measure including Task demand rating scale, Bond-Lader visual analogue mood scale. Physiological measures included Systolic and Diastolic blood pressure and heart rate measurement. |
|--|--|--|--|--|--|------------------------------|--|

| Name | Date | No. & Age of Participants | Treatment Period | Method of Treatment | Dose | Findings | Diagnosis and Criteria for Improvement |
|--------|------|---------------------------|-----------------------|---------------------|---------------------|---|--|
| Juneja | 1999 | 50 female adults (18-22) | Two month test period | | 50-200mg L-Theanine | Relaxation effect without drowsiness. L-Theanine promotes Alpha brain waves, which are known to induce an awake, alert and relaxed physical and mental state. | Manifest Anxiety Scale (MAS) Brain wave patterns measured on Brain surface. |

In the study by Lyons (2011), it was found that L-Theanine is a non-drug method in helping sleep quality in children and early adolescents. Among children and adolescents with ADHD there is an upwards of 50 percent incidence of various forms of sleep disturbance. There is a very high incidence of problems with sleep latency (time it takes to fall asleep), frequent night arousals and parents reporting difficulty waking their ADHD child or adolescent in the morning, often followed by daytime tiredness. Clearly

there is a need for a safe and effective way to improve sleep in this group of individuals and these studies show L-Theanine to be an effective choice, at least for some aspects of sleep. Sleep latency appears not to be affected by L-Theanine and yet quality of sleep was improved (sleep efficiency) and nocturnal restlessness reduced. Since disturbed sleep can contribute to, or exacerbate other symptoms of ADHD such as mood, cognition and behavior, it is very important to improve sleep in a safe way for these individuals. This study also showed that parents are typically not fully aware of the poor quality of sleep that these children and adolescents experience. The use of the actigraph and the parent's answers on the Pediatric Sleep Questionnaire usually did not correlate in this study.

The study by Giesbrecht shown in the above tables indicates that L-Theanine along with green tea improve relaxation, focus and reduced tiredness that can accompany mentally taxing tasks. This is important because many people with ADHD have trouble switching attention from one task to another and may become anxious when feeling the pressure of cognitively demanding tasks such as quizzes and exams in school. L-Theanine and green tea appear to help those with ADHD to remain relatively calm and focused while maintaining good energy under cognitively demanding situations.

In the study by Juneja, 50 females reported good results using L-Theanine to help reach an alpha brain wave state, which equates to relaxed, focused attentive state. This state of relaxation was marked by both physical and mental relaxation in young women 18-22 years of age. For those with ADHD and anxiety this could be a very useful adjunct to their mood support program.

In summary, the L-Theanine studies support ADHD and many of its comorbidities. Some key areas of support are improved sleep quality even for those taking stimulant

medications, reduced feeling of tiredness following mentally challenging activities or tests, improved focus, alertness and relaxation without drowsiness.

Traditional herbal medicine and Amino Acid Therapy both improve a range of key ADHD symptoms including inattentiveness and impulsivity while also helping to stabilize moods of anxiety and mild to moderated depression.

Acupuncture is effective in improving sleep by modulating melatonin, which also helps with reducing anxiety and mild to moderate depression. Since almost 50% of individuals with ADHD have problems with sleep there are many other secondary benefits to improved sleep for this population. Acupuncture may also be useful for reducing hyperactivity as it has a general regulatory effect on the nervous system. However, more rigorous studies need to be designed and completed to verify this.

Chapter 5

Discussion

In this chapter we will summarize the findings and discuss the implications of this information.

ADHD is on the rise in the last decade and not only affects children; in the majority of cases it persists into adolescence and adulthood. The impact of ADHD on a person's life runs the gamut from academic achievement, social/relationship functioning and success, mental emotional health, substance abuse, incarceration to career achievement.

The standard treatment of ADHD is pharmacological and while improvement in some of the key symptoms of ADHD often occurs, research has primarily been done on the short-term effects and side effects of stimulant medications. Clearly there are side

effects to these medications and some of them are serious. Insomnia that frequently accompanies ADHD is usually not helped by medication and in some cases is made worse.

There is a need to find non-drug methods to reduce or resolve the symptoms of ADHD while avoiding the side effects of prescription medications. Chinese medicine, including acupuncture and traditional herbal medicine, shows promise in helping those with ADHD. Amino Acid Therapy, essential fatty acids and some minerals that have antioxidant characteristics also show promise. As part of a non-drug approach it is also necessary that a healthy diet, exercise and behavior therapy become an active part of the program.

Acupuncture may be used effectively to ease hyperactivity, calm the nervous system, ease anxiety and depression, improve sleep and contribute to overall balance of the individual. Studies using acupuncture to treat ADHD are generally not well designed and need to be consistent in terms of methods of diagnosis, criteria to measure improvement and frequency/duration of treatment. It appears that while acupuncture can make a significant contribution to improving symptoms of ADHD, more rigorous studies with large numbers of participants are clearly needed.

Traditional herbal medicine and Amino Acid Therapy show promise in significantly reducing the symptoms of ADHD with the added benefit of diminishing comorbidity symptoms in many individuals. Traditional herbal medicine combines groups of herbs in such a way that the formulas may be tailored to individual needs. Amino Acid Therapy may be individualized as needed with urine lab testing to reduce

symptoms of ADHD while also helping with comorbidity such as anxiety, depression and insomnia.

Prescribing medication is largely based on the dopamine deficit model of ADHD causality. While this often helps with focus and impulsivity it often does little to help with emotional dysregulation. Research is beginning to expand the horizons for other causes of ADHD besides genetics and dopamine deficiency. This is beginning to give rise to more research showing possible help from food therapy (elimination diets), essential fatty acids, antioxidants, including specific vitamins and minerals and other natural non-drug methods.

Implications for Theory

The findings in this synthesis review of literature indicate that there are viable modalities using acupuncture, herbs, amino acids and other nutrients to develop a modular treatment approach for individuals who have ADHD at any stage in their lives. ADHD is a very complex condition that manifests in unique ways from person to person. The author believes that it is effective, safe and sustainable over time to treat a person based on their individual expression of ADHD symptoms using this non-drug modular approach. This is not a case where I am recommending only one modality to treat ADHD and any comorbidity that is present. Instead the recommended program would be a set of therapies chosen to address the key presenting symptoms of each individual coupled with dietary strategies, exercise, healthy lifestyle choices and enhanced communication in relationships.

Implications for Practice

The implications for practice point to other ways to support individuals with ADHD who do not tolerate medication or would prefer to treat the condition without prescription drugs. It has been the author's experience over the past 11 years that in most cases very good results can be realized by a person with ADHD who is willing to consistently follow a program using this modular approach, possibly consisting of acupuncture, traditional herbal medicine, amino acids, other nutrients and modified food consumption. Depending on the person, not all of these modalities need to be put into place. Often times two primary therapies along with a healthy diet, exercise and effective communication from parents, teachers and family will make a significant reduction in the symptoms of ADHD.

Treating ADHD has been a personal journey for the author. Our daughter was diagnosed with ADHD in the third grade and medication was suggested as a treatment to pursue by the Ph.D. who tested our daughter. My wife and I decided that I should continue researching a non-drug method to reduce or resolve her symptoms. This was over 11 years ago. The story of my daughter and two other children I have treated for ADHD in a non-drug strategy, while not part of the research synthesis, are added as a potential guide for those wanting examples of how an effective program using Chinese medicine and clinical nutrition to treat ADHD looks. Over the past 11 years I have had many more successful cases than those listed here.

In the fall of our daughter Moorea's fourth grade, I attended a seminar on Amino Acid Therapy and learned of a way to treat ADHD by balancing both serotonin and

dopamine to resolve the symptoms and comorbidities. Our daughter was the classic ADHD hyperactive predominant type and became anxious and frustrated when reading.

About 10 days after we started our daughter on amino acids we attended a parent teacher conference regarding our daughter. The first thing the teacher asked was, "Have you done anything different lately with Moorea?" When I responded, "Why are you asking?" she said that she noticed a difference in her during the last week or so. The difference was that for the first time this semester she was tracking the teacher, and keeping her eyes on her as she walked around the room teaching. The teacher also remarked that during a class project earlier in the week our daughter was very focused as she worked on creating an architectural design model, even though there was a lot of noise and distraction with all the other students working on their projects. My wife and I then realized we were on to something significant in treating our daughter's ADHD.

During this time I also began treating my daughter with acupuncture and acupressure for ADHD. I continued treating her with both amino acids and acupuncture for 15 months. During this period of time the symptoms of ADHD basically resolved, including anxiety with reading, and our daughter thrived in school for the first time. She had no adverse response while taking amino acids and has continued to do well since. In terms of her lifestyle she exercises vigorously on a regular basis and eats an excellent diet. During her high school years she was an honor roll student every semester. Currently she is a Sports Medicine major at Pepperdine University.

A fourteen-year old boy with ADHD received great results when treated by the author. The boy was diagnosed with ADHD Inattentive Type and was not able to do well academically in public school. This boy was frequently in trouble for not completing his

assignments and occasionally had behavior problems at school that threatened suspension. His parents transferred him to a smaller, private school with a more conducive setting that helped students with learning and focus issues.

This boy was treated with acupuncture and amino acid therapy guided with laboratory testing of serotonin and dopamine. Initially the results were mixed and when I asked about the boy's compliance in taking amino acids, I found out he was missing some doses each week. With Amino Acid Therapy it is imperative that the daily dose is taken in order to maintain a therapeutic effect.

The boy's symptoms improved once he was consistent in taking the amino acids and as acupuncture point selection was expanded from body points to include auricular points for oppositional behavior and ADHD. I also recommended that he increase his physical exercise. His parents took their son to boxing lessons two times a week, along with one of his good friends. Weekly reports from the boy's teacher indicated a noticeable trend toward improvement and increasing success at turning in assignments when due. His father also remarked that his son was doing much better overall and that his relationship with his son was much improved. One interesting observation was that from time to time the boy protested at taking the amino acids and would stop. Within a week or so, he would tell his parents that he wanted to restart the amino acids because he wasn't doing well in school and was getting into trouble more frequently. He would restart the program and his ADHD symptoms would improve significantly.

A 12-years old girl who was diagnosed with ADHD, primarily Inattentive Type, was often anxious and worried about making various mistakes. She had done well academically until 6th grade, yet was anxious and at times obsessive. She now grew more

anxious about completing homework assignments and her ability to keep up in math class. Initially I recommended amino acids. However, due to her holiday schedule at the time of start up, a timely lab test was not performed and she did not feel any change from taking the amino acids. She decided to quit and wasn't willing to take the pills.

Approximately 60% of the time, Amino Acid Therapy takes a process of three or four lab tests and subsequent dosage changes in order to reach a therapeutic level where ADHD symptoms resolve or greatly improve. This process can take six to eight weeks or more before an effective therapeutic dose is achieved.

I then recommended two Chinese liquid herbal formulas based on the girl's presenting symptoms according to Chinese medicine and her preference for liquid herbs rather than pills. I told her mother that she must have her daughter take the herbs three times per day in order to achieve results. The girl's focus improved and her anxiety and worry dramatically decreased over a period of two to three weeks, according to her mother and tutor. I also noticed a change in her poise and demeanor. She is currently only taking the Chinese herb formulas based on her presenting symptoms and not coming regularly for acupuncture. The two formulas were Bupleurum and Peony drops (a classic Chinese formula) and a combination of Chinese herbs for focus and inattentiveness containing; He Huan Pi, Ye Jiao Teng, Gou Teng, Fu Ling, Chuan Xiong, Chai Hu, Bai Zhu, Dang Gui, Huang Qin, Ban Xia, Shi Chang Pu and mix-fried Gan Cao.

Other Important Considerations: Elimination Diet & Mindfulness Meditation

Other factors that impact ADHD and may be secondary causes are toxins in our environment such as heavy metals, pesticides, food coloring, food preservatives, organophosphates as well as food sensitivities or allergies. Diet and nutrition are often

overlooked as important influences on ADHD, hyperactivity and behavior in children. While research indicates certain subgroups of ADHD children may be influenced by foods, others seem to be only marginally affected (Schnoll, R., Burshteyn, D., Cearavena, J., 2003; Stevenson, J., 2006).

A study in the Netherlands published 2009, treated children with ADHD using an Elimination Diet for 6 months and found a 50% improvement at week 9 in symptoms of 62% of the participants with ADHD. This is a major result using no drugs, herbs or supplements. For people willing to follow this method coupled with exercise and other communication and social skills guidance it appears that very good results could be realized (Pelsser, L.M.J., et al. 2009).

An example of an Elimination Diet is one that excludes these items for 3 weeks or more: Sugar, Alcohol, Soy, Wheat, Rye, Barley, Oats, Kamut, Spelt, Rice, Corn, Millet, Milk, Cheese, Ice Cream, Butter, Yogurt, Baker's & Brewers Yeast, Fermented Foods, Oranges, Lemon, Lime, Tangerine, Grapefruit, Tomato, Peppers, Potato, Eggplant, Synthetic Colors, Flavors, Sweeteners, Preservatives & Additives.

Foods that are included in the Elimination Diet Include: Legumes & Beans in moderation, Healthy Fats like Seeds, Nuts & Nut Butters, Avocado, Coconut, Healthy Oils such as Coconut Oil, Flax Oil and Olive Oil, High-Quality Animal Proteins, Non-Starchy Vegetables, Low Glycemic Fruits in small amounts, Starchy Vegetables in small amounts, Unsweetened Almond Milk, Rice Milk and Coconut Milk.

Meditation also has shown very good, repeated results for improving focus and emotional health. Dr. David Rabiner, at Duke University, recommends mindfulness meditation as a way of training adolescents and adults with ADHD to notice when they

are becoming distracted and then gently bring their attention back to an “attentional anchor” such as breathing.

Basically one focuses on the breath as they meditate and then notices when they drift away from focusing on the breath, followed by bringing their attention back to the breath. In this way the end result is an attention training session that occurs during meditation and participants also tend to feel more emotional calm during the session.

In a Study on Mindfulness Meditation in adults and adolescents with ADHD, 78% reported subjective improvement in attention and the adults also felt a reduction in anxiety and depression. Interestingly, the adolescents did not report a reduction in anxiety and depression. The participants met an average of 7 times over an 8-week period for meditation training. The adults practiced at home an average of 4.6 times per week for 20 minutes, while the adolescents practiced an average of 4 times per week for 11 minutes. Numerous other ADHD and Meditation research has shown similar improvements in ADHD. Meditation is reasonably easy to learn and something that can be done at home.

In a 2014 study called “Mindfulness-Based Intervention of Children’s Attention Regulation”, the results showed improvement in attentional self-regulation of children (Felver, J. C., Tipsord, J.M., Morris, M.J., Racer K.H., Dishion, T.J., 2014).

There are also programs being offered to teachers and school district administrators in mindfulness in the classroom. One such resource for this training is UCLA Mindful Awareness Research Center. In general the benefits for mindfulness in the classroom may include improved levels of attention, more self-control, improvements in relationships among students and staff. Other benefits could be better decision-making and more even emotions in the classroom.

Limitations of the Study

The very nature of ADHD is quite complex. Even though The DSM-IV lists 3 separate types of ADHD, experts on the subject have discovered 7 types of ADHD.

Research shows that ADHD and its comorbidities are difficult to treat with only one drug or one non-drug modality. Research synthesis of non-drug methods, such as acupuncture, is typically not standardized; often resulting in limited evidence. The size of the population being researched was often small and it is not quite clear how frequent the treatment sessions should occur and how long the study needs to be conducted to show legitimate results. If we have a larger population and standardize the duration and frequency of acupuncture treatment, this may show that acupuncture is even more effective than current research indicates.

Recommendations for Future Research

International standards need to be set for diagnosis and rating scales for the symptoms of ADHD. These standards can be used as a baseline and then as criteria to measure improvement from the chosen treatment modalities. Future studies on the non-drug treatment of ADHD should use multiple modalities and account for lifestyle and diet of the individual as well. This strategy allows for fitting the treatment plan to the individual and the unique way that each individual with ADHD is presenting. A strategy, which combines multiple modalities, allows each modality to contribute toward the resolution of specific symptoms, covering a wider range of symptoms, including the comorbidities that so frequently accompany ADHD.

Conclusion

After a thorough review and research synthesis of acupuncture, traditional herbal medicine and amino acids in the treatment of ADHD, the hypothesis was correct that using the Traditional Chinese Medicine approach to treating the individual in a non-drug manner shows significant improvement in the symptoms of ADHD when these modalities are used together rather than separately. An integral part of this strategy includes dietary modification or an elimination diet, healthy lifestyle choices, regular exercise, mindfulness meditation, and improving skills and awareness through behavioral intervention.

If we use acupuncture treatment to reduce the symptoms of hyperactivity and improve sleep, Traditional Herbal Medicine to improve attentiveness and reduce impulsivity, amino acids to improve focus, impulsivity and mood regulation, and modify the diet to further support behavior and focus; we can achieve clinically significant results that are safe, holistic and effective. This strategy takes into account the wide range of individual variations in ADHD and combines the appropriate modalities most suited to the individual to reduce or resolve symptoms and improve quality of life.

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Appendix A: IRB Approval Letter



October 28th, 2014

Michael Maguire
142 Paradise Cove
Malibu, CA 90265

Dear Michael,

Your research proposal has been approved, with no additional recommendations effective through March 31, 2016.

Should there be any significant changes that need to be made which would alter the research procedures that you have explained in your proposal, please consult with the IRB coordinator prior to making those changes.

Sincerely,

R.R:



Penny Weinraub, L.Ac.
IRB Coordinator

13315 W Washington Blvd, Los Angeles 90066