

Botanical Strategies for ADHD Attention Deficit Hyperactivity Disorder Dr Mary Bove ND

Attention Deficit Hyperactivity Disorder

Characterized by developmentally inappropriate levels of;

- Hyperactivity
- Impulsivity
- Inattention

ADHD

6-8 % of pediatric population

Surveys show up to 60% of ADHD using CAM

20-30 % of children do not respond to stimulant medication

Medications associated with SE- facial tics, hypertension, anorexia; Psychiatry. 2012; 2012: 804127

Attention Deficit Hyperactivity Disorder

Key traits being, distractibility, confusion, faulty abstract thinking, inflexibility, poor verbal skills, aimlessness, perceptual difficulties, inattention to body states, constant movement, food cravings, sleep problems, coordination problems, self-centeredness, impatience, recklessness, and extreme emotionalism.

Children with ADHD have difficulties with

- Inhibiting behavior responds
- Working memory
- Planning and organizing
- Verbal fluency
- Motor sequencing
- Other frontal lobe functions

Contributors to ADHD

Genetic predisposition

Toxin – environmental, vaccine exposure, Lead has a statistically significant relationship to symptoms of ADHD, 10 baby study, Pesticide toxicity-farm regions of US

Inflammatory triggers

Poor GI function, microbiome, poor nutrition

Food Allergies

Prenatal environment – testosterone exposure, heavy metals (amalgam), stress, viral infection

ADHD & Probiotics

Stress & Children

Chronic stress leads to long term hyper-arousal of brain stem activity increasing heart rate, blood pressure, and arousal states

Children may experience a change in brain chemistry, which leads to hyperactivity and anxiety

Stress can alter or impair brain circuit formation. Resulting in a smaller brain size in young children

Children with higher cortisol levels

problems with physical, social, mental, and motor development, smaller brain electrical changes when forming memories, compromising new memory formation experience extreme hardship upholding attention, maintaining attention is a part of self regulation

HPA axis Deregulation

Poor sleep patterns are associated with higher HPA activity and with behavioral/emotional difficulties.

Interplay between unfavorable sleep patterns, deterioration of the HPA axis and behavioral/emotional difficulties is already apparent in pre-school children.

Memory, attention-span, and self regulation are influenced by cortisol production

SLEEP

Infants – 20-30% sleep fragmentation

Children -25-50% pre-schoolers - delayed sleep onset

School age children – strong association between lack of sleep and impairment of learning, memory, and other cognitive functions

Insomnia symptoms reported by 9.4% of adolescents
Increased inadequate sleep causes
 reduced attention
 cognitive dysfunction
 behavior challenges

Insomnia symptoms during adolescence present risk factor for mental health problems in young adulthood
*Beebe DW. "Cognitive, behavioral, and functional consequences of inadequate sleep in children and adolescents." *Pediatr Clin North Am* (2011 Jun) 58(3):649-65*
*Raikkonen K, Matthews KA, et al. "Poor sleep and altered hypothalamic-pituitary-adrenocortical and sympatho-adrenal-medullary system activity in children." *J Clin Endocrinol Metab* (2010 May) 95(5):2254-61*
*Roane BM, Taylor DJ. "Adolescent Insomnia as a Risk Factor for Early Adult Depression and Substance Abuse" *Sleep* (2008 Oct 1);31(10): 1351–1356. © 2008 Assoc. Prof Sleep Societies, LLC.*

Importance of Play

Play protects children's emotional development; whereas a loss of free time in combination with a hurried lifestyle can be a source of stress, anxiety, and may even contribute to depression for many children.

The Centers for Disease Control concludes that a major missing ingredient is an hour per day of moderate physical activity. *The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds*. 119.1 (2007). American Academy of Pediatrics, Jan. 2007

Children and Nature

.....having nature close to a home protects the psychological well-being of children.

The impact is strongest for children with the highest levels of stressful life events.

In addition, having green space around the home boosts their cognitive functioning.

Green schoolyards as havens from stress and resources for resilience in childhood and adolescence

Natural schoolyards decrease stress, strengthen attention, reduce behavior problems, and enhance factors associated with resilience in children of all ages 2014 | Chawla, L., Keena, K., Pevec, I., Stanley, E

www.childrenandnature.org/research

The Effect of Green Exercise on Blood Pressure, Heart Rate and Mood State in Primary School Children

Children engaging in "green exercise" have lower blood pressure than when engaging in standard exercise

Reality Check

Childhood obesity rates have more than doubled the last 20 years

United States is the largest consumer of ADHD medications in the world

Pediatric prescriptions for antidepressants have risen dramatically

ADHD & Nature is Stress Reduction

Cognitive Behavioral Interventions

Green Space Time

Animal Therapy

Light Therapy.....sunshine

Physical Activities Outside

Massage Therapy

Mindfulness Meditation

Yoga

Neurofeedback

The effect of an animal-assisted reading program on the reading rate, accuracy and comprehension of grade 3 students: A randomized control study

Third grade students significantly improve reading comprehension and retention when reading with a dog in an animal-assisted reading program 2014 | le Roux, M. C., Swart, E., Swartz, L

www.childrenandnature.org/research

Yoga

Impacts neurophysiological functions including oxygen consumption, lateralization patterns, and cognition, often these are atypical in ADHD children

A foundation exercise for ADHD, breath training with rhythmic inhalation & exhalation that reduces sympathetic nervous system activity while providing an attentional focus; *Atten Disord*. 2004 May; 7(4):205-16.

Massage Therapy

RCT on ADHD adolescents receiving weekly or biweekly 15 min massage for 10 days to 4 weeks

After 10 consecutive school days showed improved teacher rated classroom behavior, improved mood and task focus going from 47% to 75% , Adolescence. 1998 Spring; 33(129):103-8

Green Space based on Attention Restoration Theory (ART)-2 forms of Attention; voluntary and involuntary
Attention deficit stems from over use and fatigue of voluntary attention

Classroom learning requires voluntary attention, green space environments are calming and gentle restoring
voluntary attention while involuntary attention is functioning

Green Space based on Attention Restoration Theory (ART)

Study comparing children performing verbal tasks which require concentration after walking in a park verses a
residential or downtown setting

Overall children performed better after a walk in the park. -Atten Disord. 2009 Mar; 12(5):402-9.

Create a Healthy Living Space- Decorate with nature – GREEN, Use aromatherapy diffuser, Full spectrum lighting,
View from the windows, Windows? Colors, Animals

Why Botanical Medicines

Botanical medicines offer a unique way to support, strengthen, and regulate the neuro- endocrine system while
aiding in managing common symptoms of stress;

- Anxiety, depression, moodiness

- Insomnia, relaxation

- Poor focus, distraction, restlessness

- Cognitive enhancement, memory

- Stress protective, adaptation

- Gut restoration

- Detoxification

Role of Botanicals

- Botanical Adaptogen Agents focus on ANS

- Botanical detoxification liver, bowel, lymphatic

- GI function and microbiota support

- Botanical Nervines and Relaxant Agents focus on CNS and PNS

- Cerebral Vascular Agents

- Botanical Physic Gardens- plants heal in many ways

Ayurvedic approach for improving reaction time of attention deficit hyperactivity disorder affected children

Herbal formula of Bacopa monnieri, Withania somnifera, and Valerian wallichii (2/1/1)

160 – 320 mg daily, ages 6- 14 years, 14 weeks duration

Outcomes showed decreased reaction time leading to improved attention, improvement in memory, performance,
alertness, and mood enhancement; Ayu. 2010 Jul-Sep; 31(3): 338–342

Kids' Herbal Formula for Attention and Focus

Lemon balm, Gotu Kola, Chamomile Flowers, American Skullcap, Wild Oats, Passionflower

Adaptogen Herbs

Ashwaganda root (Withania somnifera)

Bacopa monnieri

Gotu Kola (Centella asiatica)

Holy basil (Ocimum sanctum),

Siberian Asiatic rose root (Rhodiola rosea)

Ashwagandha-Withania somnifera- Root, Solanaceae

Improves and conserves adaptive energy, Tonic and Adaptogen

Promoter of learning and memory retrieval, Cognitive enhancer, Promotes Sleep

5-10 mls/day 1:3 liquid extract, 1-3g/day dry root

Bacopa monnieri

Traditional Ayurvedic herb

Traditional use includes; memory enhancement, improve learning ability, calming

Adaptogen , modulates brain stress hormones, Restorative to CNS

Improvements in various parameters of cognition and affect, including recall, reaction times and depression/anxiety
Significantly improved verbal learning, memory acquisition, and delayed recall as measured by the ABLT (Rey Auditory verbal Learning Test)

160-320mg/day containing 55% bacosides bacoside A and bacoside B both triterpenoid glycosides

Age 6-14 years, for 14 weeks duration

Outcomes showed decreased reaction time leading to improved attention, improvement in memory, performance, alertness, and mood enhancement; J Altern Complement Med. 2012 Jul; 18(7):647-52

Gotu Kola; Centella asiatica

Brain Revitalizer

Traditionally used to enhance mental functions such as concentration, memory and alertness

Increases brain levels of GABA, processing a relaxing effect on the CNS

Protects brain from oxidative stress, Increases cognitive function

Inhibits the uptake of glutamate in the brain

Holy Basil; *Ocimum sanctum*

Mental cloudiness, Uplifting, Enhancing mental clarity and meditation, Tones CNS

4-10mls/day 1:5LE

250-1000mg/d dry herb

Anti-anxiety and anti-depressant action

Calming effect that leads to clarity of thought

Study (n=150) using 1200 mg/d extract

reduced general stress symptoms by 36% more than placebo*

Study of 35 people with GAD showed increased attention and improved mood with 500 mg BID**

*Saxena RC, et al. Evid Based Complement Alternat Med 2012; 894509

**Bhattacharyya D, et al. Nepal Med Coll J 2008; 10(3):176-9.

Magnolia ; *Magnolia officinalis*

Part used: Bark

Constituents: biphenolic compounds: honokiol and magnolol, other biphenolics, alkaloids and flavonoid glycosides

Actions: allosterically modulates GABA-A (thereby reducing the amount of GABA required to activate the receptor) [magnolol]; reduce cortisol secretion from adrenal glands; enhance acetylcholine release thereby supporting memory; honokiol exerts anxiolytic effects

Siberian Asiatic Rose; *Rhodiola rosea* -Cooling

Active markers- rosavins & salidroside

4-8 ml/d liquid extract; 200-600mg/d dried root

Enhances resistance to high altitude sickness, Anemia

Fertility enhancer Increases memory, endurance & productivity

Reduces mental and physical fatigue, Increase oxygen uptake in muscles

Depression, anxiety, Insomnia

Tonic, adaptogen, Stress protecting

Nerve Tonics, Relaxants, & Sedative

A second group of botanical medicines for mood enhancement, stress relief and management

Lemon balm (*Melissa officinalis*)

Chamomile Flower (*Chamomilla recutita*)

Passion Flower (*Passiflora incarnata*)

American Skullcap (*Scutellaria lateriflora*)

Valerian Root (*Valeriana officinalis*)

American Skullcap; *Scutellaria lateriflora*

Traditional Therapeutic Uses; Anxiety, Agitation, Restlessness, Nervous fear, Cardiac irritability, Nervous irritation of the CNS, Nervous Exhaustion- Trophorestorative, Depression, Drug/Substance Withdrawal

*For those who are hypersensitive to touch, highly sensitive, worry excessively.

RDBPC crossover study (n=43) had skullcap (350 mg) or placebo TID, each for two weeks. Skullcap showed significantly enhanced global mood without a reduction in energy or cognition, compared to placebo. Brock C, et al. *Phytother Res* 2014; 28(5):692-8.; Sarris J, et al. *CNS Drugs* 2013; 27(4):301-19.

Chamomile Flowers

Clinical studies indicate;

Chamomile essential oil inhalation – sedative and mood enhancing effect

Chamomile Infusion – induction of deep sleep

Chamomile Extract – increased T-lymphocyte rosette formation

Polysaccharides/heteroglycans- demonstrate immunostimulating activity

Apigenin binds GABA receptors

Generalized anxiety disorder – 6-8wks

Depression with long term use 12 wks or greater

Irritable bowel syndrome- reduction of symptoms in 2-4 wks – bisabolol and chamazulene compounds

Gingivitis, canker sores, dental plaque- oral mouthwash

Therapeutic Application with Kids- Insomnia; Relaxing, Calming to Restlessness, Mood Elevating, Anxiety, worry, agitation, nervousness, Stress related dermatitis, Ulceration of gastrointestinal tract, mucous membranes, Diarrhea in children with pectin

Lemon Balm *Melissa officinalis*

Uses and Indications for Kids - Insomnia, trouble falling to sleep, Restlessness, Hyperactivity, Anxiety(GAD), Nervousness, Agitation, Improves Cognitive Function and Focus, Antiviral- topical application, Antispasmodic and Analgesic for stomach discomfort, colic, and constipation. (Often combined with fennel seed and chamomile)

Double blind, placebo controlled study with 18 healthy volunteers

300 mg or 600 mg dose of a standardized lemon balm extract or placebo for 7 days

Outcome showed 600 mg dose of lemon balm increased mood and significantly increased calmness and alertness

Dose-specific increases in calmness, and dose-dependent decrements in timed memory task performance

“Lemon Balm Reduces Acute Anxiety” In children aged 6-7 years, lemon balm ethanol extract 6 mg/kg reduced anxious behaviors during a dental examination

Pardo-Aldave K, et al. *International Journal of Paediatric Dentistry* 2009;19(1):66-170

Lemon Balm and Valerian

A combination of valerian and lemon balm for effectiveness in the treatment of restlessness and nervous insomnia

Multi-center study 918 children, under 12 years; Children were evaluated for therapeutic efficacy and tolerability

In conclusion, was effective in younger children with restlessness and insomnia; Very well tolerated

Muller SF, Klement S, *Phytomedicine* (2006 Jun) 13(6):383-7

Passion Flower/*Passiflora incarnata*

CLINICAL INDICATIONS in Children and Teens

Attention Deficit Hyperactivity Disorder

Generalized Anxiety Disorder (GAD); Anxiety or nervousness

Insomnia, Palpitations

Double-blind, placebo-controlled investigation of the efficacy of *P. incarnata* tea on sleep quality

41 healthy young adults, using sleep diaries validated by polysomnography plus an anxiety inventory

Subjects with a history of sleep disorder were excluded

1 cup Passionflower or placebo tea (Parsley) for 1 week, followed by a 1 week ‘washout’ period and crossed over

Sleep quality was significantly better ($p < 0.01$) for those who drank Passionflower tea

Numerous pharmacological effects of *Passiflora incarnata* are mediated via modulation of the GABA system including affinity to GABA(A) and GABA(B) receptors, and effects on GABA uptake and release.

Botanical Nervine Summary

Lemon Balm

Attention, focus, cognitive function, memory

Insomnia, restlessness, hyperactivity

Mood elevation, anxiety

Passion Flower

Insomnia

Generalized anxiety

Hyperactivity, nervousness

American Skullcap

Nervous irritation, fear, anxiety

Depression

Substance withdrawal

Chamomile Flowers

Agitation, worry, nervousness, anxiety

Insomnia, restlessness

Mood elevation

Cerebral Vascular Support Botanicals

Ginkgo biloba

Rosemary officinalis

Pycnogenol

Ginkgo biloba in the treatment of attention-deficit/hyperactivity disorder in children and adolescents. RPCT

CONCLUSIONS:

The G. biloba is an effective complementary treatment for ADHD. Further studies with longer treatment duration are warranted in this regard.

Dose; 80-120 mg ginkgo Complement Ther Clin Pract, 2015 May;21(2):61-71

Pinus Pinaster Bark/ Pycnogenol

Vasodilator improves cerebral blood flow to brain regions involved in ADHD

May act to regulate and modulate possibly elevated catecholamines in ADHA children

One month RCT, 1mg/kg/day pycnogenol extract; decrease in inattention & improved teacher rated hyperactivity.

After washout period researchers noted a return of symptoms.

JEur Child Adolesc Psychiatry. 2006 Sep; 15(6):329-35