

**Translating Research Into Practice:
Current Evidence in the Management of ADHD**

Jacqueline O. Navarro, MD, FPPS, FPSDBP, MClinEpid
Developmental-Behavioral Pediatrician
The Medical City

Outline

- Management of ADHD: General Principles
- Evidence for Non-Pharmacological Management
- Evidence for Pharmacological Management
- Evidence for Complementary and Alternative Medicine

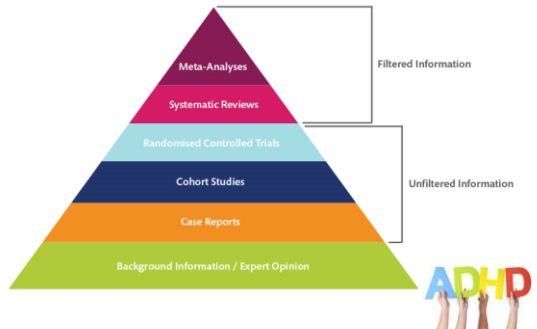


**Management of ADHD
General Principles**

- Non-Pharmacological Management
 - Behavior Therapy
- Pharmacological Management
 - Stimulant and non-stimulant medications
- Complimentary and Alternative Medicine
 - Diet, Mind-Body Practices, Neurofeedback



Appraising Evidence



Appraising Evidence

Best Current Evidence



Management By Age Groups



American Academy of Pediatrics (AAP) Practice Guidelines

- **Preschool Age**
 - **FIRST LINE:** evidence based parent- and/or teacher administered behavior therapy
 - May prescribe medication when:
 - No improvement with behavior interventions
 - Moderate to severe continuing disturbance with the child's functions

AAP. 2011. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of ADHD in Children and Adolescents.



American Academy of Pediatrics (AAP) Practice Guidelines

- **School Age**
 - FDA approved medications for ADHD
 - And/or Evidenced based parent and/or teacher administered behavior therapy

AAP. 2011. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of ADHD in Children and Adolescents.



American Academy of Pediatrics (AAP) Practice Guidelines

- **Adolescent Age**
 - FDA approved medications for ADHD
 - Obtain assent from adolescent
 - Behavior therapy

AAP. 2011. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of ADHD in Children and Adolescents.



Management By Modality



Behavior Therapy

- Represents a broad set of specific interventions that have a common goal of modifying the physical and social environment to alter or change behavior




Behavior Therapy

- Behavioral Parent Training
- Behavioral Classroom Management
- Behavior Therapy with Children
- Behavioral Peer Intervention



Behavior Therapy

- Behavioral Parent Training
 - Focus on strengthening parenting skills to help parents manage children’s behavior problems and increase positive parent-child interactions



Behavior Therapy

- Behavioral Parent Training
 - Incredible Years by Carolyn Webster Statton
 - Triple P Positive Parenting Program (Sanders and Colleagues)
 - Parent Child Interaction Therapy
 - New Forest Parenting Program (developed specifically for ADHD)

ESTABLISHED EVIDENCE



Behavior Therapy

Articles in Support of Behavioral Parent Training

<p>Zwi M et al. Parent training intervention for ADHD in children aged 5-18 years (Review). The Cochrane Library 2011 Issue 12</p>
<p>Sanders et al. Evidenced-based parenting programs: integrating science into school-based practice. Handbook of Australian School Psychology © 2017</p>
<p>Furlong M et al. Behavioral and cognitive-behavioral group-based parenting programmes for early –onset conduct problems in children aged 3-12 years (Review). Evidence-Based Child Health 2012 2:318-692</p>

ESTABLISHED EVIDENCE




Behavior Therapy

Articles in Support of Behavioral Parent Training

<p>Coates J, Taylor JA and Sayal. Parenting interventions for ADHD: A systematic literature review and meta-analysis. Journal of Attention Disorders 2014</p>
<p>Evans SW, Owens J, Bunford N. Evidence-based psychosocial treatments for children and adolescents with ADHD. J. Clin Child Adolesc Psychol. 2014; 43(4):527-551.</p>


ESTABLISHED EVIDENCE



Behavior Therapy


- Behavioral Parent Training: What studies say:
 - Outcome: improved compliance with parental commands, improved parental understanding of behavioral principles, high levels of parental satisfaction with treatment

ESTABLISHED EVIDENCE



Behavior Therapy

- Behavioral Classroom Management
 - Behavior modification principles provided for teachers for implementation in classroom settings



Behavior Therapy

Articles in Support of Behavioral Classroom Management

Evans SW, Owens J, Bunford N. Evidence-based psychosocial treatments for children and adolescents with ADHD. *J. Clin Child Adolesc Psychol.* 2014; 43(4):527-551.

Richardson M et al. Non-pharmacological interventions for ADHD delivered in school settings: systematic review of quantitative and qualitative research. *Health Technology Assessment* Vol. 19 (45) June 2015.

ESTABLISHED EVIDENCE

Behavior Therapy

- Behavioral Classroom Management: What Studies say:
 - Outcome: improved attention to instruction, improved compliance with classroom rules, decreased disruptive behavior, improved work productivity

ESTABLISHED EVIDENCE

Behavior Therapy

- Behavior Therapy with Children and Behavioral Peer Intervention
 - Well established treatments
 - Cognitive training improves working memory performance but limited effects on ADHD symptoms

Evans SW, Owens J, Bunford N. Evidence-based psychosocial treatments for children and adolescents with ADHD. *J. Clin Child Adolesc Psychol.* 2014; 43(4):527-551.

European ADHD Guidelines Group. Cognitive Training for ADHD: Meta-Analysis of Clinical and Neuropsychological Outcomes from RCTs. *J. Am Acad Child Adolesc Psychiatry* 2015; 54(3): 164-174.

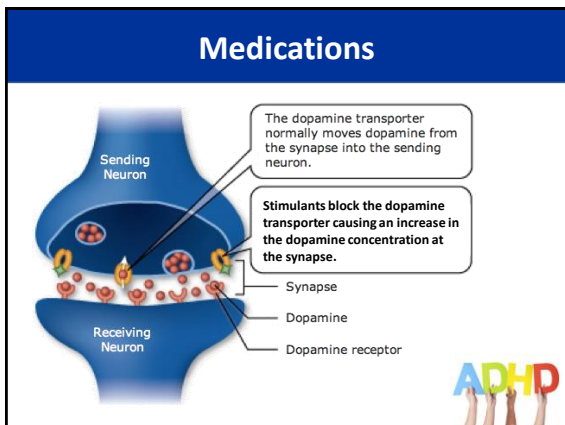
ESTABLISHED EVIDENCE

Medications

- Stimulant medications are highly effective for most children in reducing core symptoms of ADHD (effect size 1.0)
- Nor-epinephrine reuptake inhibitor (atomoxetine) and alpha 2-adrenergic agonists (extended-release guanfacine and extended-release clonidine) have also demonstrated efficacy in reducing core symptoms. (effect size 0.7)

ESTABLISHED EVIDENCE

AAP. 2011. ADHD: Clinical Practice Guideline for the Diagnosis, Evaluation and Treatment of ADHD in Children and Adolescents.




Medications

Type of Medicine	Brand Name
Stimulants:	
Mixed Amphetamine Salts	Adderall, Adderall XR
Dextroamphetamine	Dexedrine
Lisdexamfetamine	Vyvanse
Methylphenidate	Concerta, Ritalin, Ritalin LA, Ritalin SR, Metadate ER, Metadate CD, Methyline, Methylin ER, Daytrana, Focalin, Focalin XR

Medications

Type of Medicine	Brand Name
Non Stimulants:	
Atomoxetine	Strattera
Clonidine hydrochloride	Kapvay
Guanfacine ER	Intuniv



Medications


Articles in Support of Medications

The MTA Cooperative Group. A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. Multimodal Treatment Study of Children with ADHD. [Arch Gen Psychiatry](#). 1999 Dec;56(12):1073-86.

Storebo OJ et al. Methylphenidate for children and adolescents with ADHD. Cochrane Database of Systematic Reviews 2015, Issue 11, Art. No: CD009885.

Storebo OJ et al. Methylphenidate for ADHD in children and adolescents: Cochrane systematic review with meta-analyses and trial sequential analyses of RCTs. *BMJ* 2015; ; 351:h5203

ESTABLISHED EVIDENCE



Medications

Articles in Support of Medications


Shier AC et al. Pharmacological treatment of ADHD in children and adolescents: clinical strategies. *Journal of Central Nervous System Disease* 2013;5 1-17

Punja S et al. Amphetamines for ADHD in children and adolescents. *Cochrane Database of Systematic Reviews* 2016, Issue 2. Art No: CD009996

Brias L., Todd T. A review of pharmacological management of ADHD. *J. Pediatr Pharmacol Ther* 2016; 21(3): 192-206.


Chan,E. Fogler JM, Hammerness PG. Treatment of ADHD in Adolescents, A Systematic Review. *JAMA* 2016; 315 (18): 1997-2008

ESTABLISHED EVIDENCE



Medications

- NIMH-funded Multimodal Treatment Study of Children with ADHD (MTA)
 - The MTA was the first major multi-site trial comparing different treatments for ADHD in childhood
 - 14 month initial phase
 - 2 year follow up
 - 8 year follow up



Medications

- MTA study 14 month initial phase

Medication Alone

➤


Psychosocial/ Behavioral Treatment Alone/ Usual community care

Combined Medication and Psychosocial/ Behavioral Treatment

➤

Psychosocial/ Behavioral Treatment Alone/ Usual community care

The MTA Cooperative Group. A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. Multimodal Treatment Study of Children with ADHD. [Arch Gen Psychiatry](#). 1999 Dec;56(12):1073-86



Medications

MTA Study Follow Up


2 Year Follow Up

Half of the initial benefits of the intensive medication management and combination treatments dissipated

8 Year Follow Up

- Most children had maintained improvement three years after the trial began
- Initial advantages of intensive medication management alone or in combination with behavioral treatment had waned

Molina et al and the MTA Cooperative Group. *The MTA at 8 years: Prospective follow-up of children treated for combined type ADHD in the multisite study.* J Am Acad of Child and Adolescent Psychiatry. March 2009
<https://www.nimh.nih.gov/funding/clinical-research/practical/mta/multimodal-treatment-of-attention-deficit-hyperactivity-disorder-mta-study.shtml>



Medications

- MTA Study: Analysis of 8 yr follow up results
 - revealed no differences in symptoms or functioning among the youths assigned to the different treatment groups as children
 - youths who had responded well to treatment and maintained their gains for two more years after the end of the trial tended to be functioning the best at eight years.



Molina et al and the MTA Cooperative Group. *The MTA at 8 years: Prospective follow-up of children treated for combined type ADHD in the multisite study.* J Am Acad of Child and Adolescent Psychiatry, March 2009

Medications

- MTA Study: Analysis of 8 yr follow up results
 - A majority (61.5 %) of the children who were medicated at the end of the 14-month trial had stopped taking medication by the 8 year follow-up, **suggesting that medication treatment may lose appeal with families over time**
 - Children who were no longer taking medication at the eight-year follow-up were generally functioning as well as children who were still medicated



Molina et al and the MTA Cooperative Group. *The MTA at 8 years: Prospective follow-up of children treated for combined type ADHD in the multisite study.* J Am Acad of Child and Adolescent Psychiatry, March 2009

Medications and Behavior Therapy

- Medications (Stimulants) have higher short-term efficacy for ADHD symptoms and are relatively safe
- Behavioral interventions have better long term benefits (e.g. executive functioning, organizational skills and learning parameters)



Rajeh A et al. Interventions in ADHD: A comparative review of stimulant medications and behavioral therapies. *Asian Journal of Psychiatry* <http://dx.doi.org/10.1016/j.ajp.2016.09.005>

Complementary and Alternative Medicine (CAM)

- Complementary and alternative medicine (CAM) is a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine



National Institute of Health, <https://www.nlm.nih.gov/tsd/acquisitions/cdm/subjects24.html>

Complementary and Alternative Medicine

- Do not take all CAM claims at face value.
- Do your homework when considering CAM therapies.



<http://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/alternative-medicine/art-20046087>

Complementary and Alternative Medicine


- How to evaluate treatment claims
 - Look for solid scientific studies
 - Weed out misinformation
 - Check Dates
 - Check Documentation
 - Double Check



<http://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/alternative-medicine/art-20046087>

Complementary and Alternative Medicine (CAM)


- Supplements: 'Natural' doesn't always mean safe
- Watch out for scams
- Choose practitioners wisely
- CAM starts with complementary
 - Do not change conventional treatment



<http://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/alternative-medicine/art-20046087>

A Commonsense Guide to CAM Treatment Recommendations


		Is the therapy effective?	
		YES	NO
Is the therapy safe?	YES	Recommend	Tolerate
	NO	Monitor closely or discourage	Discourage



Kemper K, Cohen M. Ethics: meet complementary and alternative medicine: new light on old principles. Contemp Pediatr. 2005;21:65.

Complementary and Alternative Medicine (CAM)


Type of Intervention	Level of Evidence
Elimination Diet	Mixed Results
Dietary supplements: Polyunsaturated Fatty Acids (Omega 3, DHA, EPA)	Significant results for inattentive and hyperactive symptoms
Dietary Supplements: Melatonin	Effective for ADHD with sleep problems
Iron, Zinc	Effective if with deficiency
Neurofeedback	Some improvement but needs more studies



Herbert A & Esparham A. Mind-Body Therapy for Children with Attention-Deficit/Hyperactivity Disorder. Children 2017, 4, 31; doi:10.3390
Sharma A, Gerbarg PL, Brown RP. Non-Pharmacological Treatments for ADHD in Youth. Adolesc Psychiatry. 2015; 5(2): 84-95

Complementary and Alternative Medicine (CAM)


Type of Intervention	Level of Evidence
Mind Body Practice: Yoga	Good adjunct to pharmacology
Mind Body Practice: Mindfulness	Reduction in attention and behavioral problems but did not persist
Physical Activity	Improved executive functioning and cognitive functioning Improved attention



Herbert A & Esparham A. Mind-Body Therapy for Children with Attention-Deficit/Hyperactivity Disorder. Children 2017, 4, 31; doi:10.3390
Sharma A, Gerbarg PL, Brown RP. Non-Pharmacological Treatments for ADHD in Youth. Adolesc Psychiatry. 2015; 5(2): 84-95


Putting it Together

- Use age appropriate recommendations as stated by AAP
- Consider combined behavior therapy and medications
- Duration of medication use would depend on the response of the child
- Behavior therapy is for long term use
- May use CAM with established evidence, but should not interfere with conventional treatment



Caution

- Use interventions as directed



When Behavior Therapy Does Not Seem to be Effective

- Therapy strategies not applied in the standardized way (e.g. proper parent/teacher training)
- Therapy does not match the child's needs
- Lack of parental involvement
- Inconsistency in approach among caregivers and teachers
- The child's environment has changed



When Medications Do Not Seem to be Effective

- Dose is not appropriate for age and weight
- Dosing schedule is not appropriate
- Compliance is poor
- Medication is not appropriate



When Medications Do Not Seem to be Effective

- The child's environment has changed
- Is it just ADHD? Is there another disorder?



Important Points

- Use best current evidence to manage ADHD
- May need to combine different evidence-based approaches
- Use intervention strategies as specified
- Evaluate what works best for the child and his family

