ATTENTION–DEFICIT/ HYPERACTIVITY DISORDER

KEY POINTS

- **Characterized by problems with attention, impulsivity, and/or hyperactivity.**
- **Symptoms can lead to peer rejection and academic struggles, which can cause long-term issues.**
- **Proper diagnosis is critical because some medical and mental health disorders, including post-traumatic stress disorder, have similar symptoms.**
- **A combination of behavioral and pharmacological treatments has the most evidence-based support.**

OVERVIEW

All children sometimes show inattention, distractibility, impulsivity, or hyperactivity, but children with ADHD show severe and frequent symptoms that interfere with healthy functioning. If symptoms are not managed, children with ADHD frequently experience peer rejection, academic struggles, and social and behavioral difficulties, all of which can have long-term effects.

ADHD is classified as a chronic, neurodevelopmental disorder that emerges during childhood. The majority of children with ADHD do not outgrow the disorder, although they may experience some reduction in symptoms, particularly of hyperactivity and impulsivity, by adolescence or adulthood.

ADHD is classified as falling into one of the three subcategories listed below. Each of these subcategories can be classified as mild, moderate, or severe based on the number of symptoms present.

1. Predominantly hyperactive-impulsive presentation
2. Predominantly inattentive presentation
3. Combined presentation

Table 1 outlines common symptoms of ADHD. Several of the symptoms must have been present before the age of 12, must be present in two or more settings, and must interfere with quality of life.

Before diagnosing a child with ADHD, the clinician should rule out other potential reasons for the child's behavior. For instance, behaviors that mimic ADHD may be the result of trauma or post-traumatic stress disorder, a sudden change in the child's life, undetected seizures, a middle ear infection causing hearing problems, medical disorders affecting brain functioning, a specific learning disorder, communication disorders, anxiety, or depression. In addition, children with high energy levels, who are immature when compared to their peers, or who have been deemed "difficult" by parents or teachers can also be misdiagnosed with ADHD.

Getting a proper diagnosis is critical because many disorders and behaviors can be mistaken for ADHD. Qualified mental health professionals are the only individuals with the ability to properly diagnose and treat this disorder (and all mental health conditions). Qualified mental health professionals include child psychiatrists, psychologists, developmental/behavioral pediatricians, behavioral neurologists and, in some cases, clinical social workers, nurse practitioners, and licensed professional counselors.

Table 1
Common Signs and Symptoms of ADHD

Symptoms of Inattention	Symptoms of Hyperactivity and Impulsivity
• Trouble paying attention • Inattention to details and making careless mistakes • Easily distracted • Losing school supplies; forgetting to turn in homework • Trouble finishing class work and homework • Trouble listening • Trouble following more than one instruction at a time	• Blurts out answers • Is impatient or easily frustrated • Fidgets or squirms • Frequently leaves seat, runs about, or climbs excessively • Seems "on the go" or "driven by a motor" • Talks too much and has difficulty playing quietly • Interrupts or intrudes on others

In addition, co-occurring conditions and disorders can accompany ADHD and should be assessed during an evaluation for ADHD. The presence of a co-occurring disorder will influence treatment planning, especially pharmacological interventions.

CAUSES AND RISK FACTORS

Mounting evidence has demonstrated a neurological and a genetic basis for ADHD. A child diagnosed with ADHD is more likely than one without ADHD to have family members with the disorder. The heritability of ADHD averages approximately 80 percent, rivaling the heritability factor for the trait of height.[1] In fact, according to the National Institutes of Health (NIH) one-third of fathers who have or had ADHD will have children who will be diagnosed with ADHD.

ADHD has also been linked to certain environmental factors. A study of children with ADHD showed that most of ADHD development is genetically driven, but in certain cases, ADHD may also result from, or be exacerbated by, very early adverse childhood experiences. Children who have experienced negative experiences early in life are diagnosed sooner than those with only genetic connections. In these cases, the associated impulsivity and inattention is more severe, while the hyperactivity is less severe than in those children without negative experiences.[2]

[1] Barkley, R. (2007). Defiant children: A clinician's manual for assessment and parent training (2nd ed.). New York, NY: Guilford.
[2] Webb, E. (2013). Poverty, maltreatment, and attention deficit hyperactivity disorder. *Archives of Diseases in Childhood, 98*(6), 397-400.

EVIDENCE-BASED TREATMENTS

ADHD is a chronic disorder; therefore, management of symptoms and reduction of impairment is the goal of treatment. Treatment must be provided over long periods to assist those with ADHD in the ongoing management of their disorder. Current research suggests that a combination of behavioral and pharmacological treatments is the most effective. Treatments are summarized in Table 2.

Effective intervention also includes developing and utilizing appropriate educational supports. For this reason, it is important that parents advocate for their children in academic settings. Children with ADHD may be eligible for special educational services in the public schools through the Other Health Impairment classification under the Individuals with Disabilities in Education Act (IDEA), which governs special education requirements, and Section 504 of the Rehabilitation Act of 1973, which provides for reasonable accommodations for children with disabilities. Examples of Section 504 accommodations include:

- Reducing the number of homework problems without reducing level or content of material
- Providing students with a quiet place to take exams or study
- Providing students with additional time on exams
- Providing the student with access to counseling services

Psychological Treatments

Behavior therapy is the psychological treatment of choice for ADHD. Behavior therapy uses contingency management strategies that employ reward systems. These systems are designed to provide reinforcements to increase desired behaviors, including following directions, attentiveness, or turn-taking. Reward systems can take many forms, including, but not limited to, points, stickers, poker chips, or other tokens that can be traded for small prizes or special privileges. These strategies can also remove a reinforcer when undesirable behavior occurs in order to reduce that behavior.

Behavioral intervention systems can be put in place both in the classroom and at home. Through behavior management, parents, guardians, and other adults should focus on positive behaviors and seek to find the youth behaving properly as much as possible (e.g., aiming for feedback on three positive behaviors to every one misbehavior). A focus on positive behaviors is a more effective way to support short and long-term growth than a focus on problem behaviors.

Pharmacological Treatments

Stimulant medications are most frequently prescribed for the treatment of ADHD. Studies have found a significant majority of children with ADHD derive benefits from these medications and that they are effective at reducing ADHD symptoms in the short-term.

Two frequently prescribed stimulant medications for ADHD are methylphenidate (e.g., Ritalin or Concerta) and amphetamines (e.g., Adderall). The tolerability and safety of stimulant medications are comparable, with all medications demonstrating similar side effects, including effects on cardiovascular functioning, sleep disturbance, appetite suppression, and anxiety. The American Academy of Child & Adolescent Psychiatry has a

detailed guide for ADHD medication and monitoring side effects. There is also a potential for abuse of stimulant medications due to their effects on the brain. As a result, methylphenidate and dexamphetamine are listed as Schedule II drugs with the U.S. Food and Drug Administration (FDA), and public schools may not require any student to take these medications.

The FDA has also approved atomoxetine, a medication for treating ADHD that is not a stimulant and does not carry the same risk of addiction. The side effects of atomoxetine are similar to those of stimulant medications, but are milder.

Table 2
Summary of Treatments and Interventions for ADHD

What Works	
Behavioral classroom management (BCM)	BCM uses contingency management strategies, including teacher-implemented reward programs, token systems, time-out procedures, and daily report cards (DRCs). Clinicians or parents may work in consultation with teachers to develop a classroom treatment plan.
Behavioral parent training (BPT)	BPT teaches the parent to implement contingency management strategies similar to BCM techniques at home.
Intensive behavioral peer intervention (BPI)	Intensive BPI is conducted in recreational settings, such as summer treatment programs (STPs). STPs have demonstrated effectiveness and are considered well-established. However, STPs are less feasible to implement than other evidence-based practices.
Stimulant: d-Amphetamine	Short-acting: Adderall, Dexedrine, DextroStat Long-acting: Dexedrine Spansule, Adderall XR, Lisdexamfetamine
Stimulant: Methylphenidate	Short-acting: Focalin, Methylin, Ritalin; Intermediate-acting: Metadate ER, Methylin ER, Ritalin SR, Metadate CD, Ritalin LA; Long-acting: Concerta, Daytrana patch, Focalin XR
Non-stimulant: Serotonin and norepinephrine reuptake inhibitor (SNRI)- atomoxetine	SNRIs do not carry the same risk for addiction as some other medications.
Non-stimulant: Alpha-agonists: guanfacine and clonidine	Can be an alternative for children who do not tolerate stimulants well; both are available in short and long-acting forms.
What Seems to Work	
Non-stimulant: Serotonin and norepinephrine reuptake inhibitor (SNRI)- viloxazine	FDA-approved in April 2021 for ADHD in youth ages 6 to 17.
Not Adequately Tested	
Dietary interventions	Interventions include elimination of food additives, elimination of allergens/sensitivities, and use of nutritional supplements. Best viewed as a potential complementary intervention.

Interactive metronome training	Involves synchronizing of hand and foot exercises to audible tones.
Neurofeedback	Involves monitoring brain waves and rewarding focused attention through computerized games and exercises.
Antidepressants	These include bupropion (Wellbutrin), imipramine (Tofranil), nortriptyline (Pamelor, Aventil).
What Does Not Work	
Some cognitive, psychodynamic, and client-centered therapies	Some talk therapies and some forms of play therapy have been demonstrated to have little to no effect on ADHD symptoms. ADHD is best treated with intensive behavioral interventions in the youth's environment.
Office-based social skills training	Once-weekly, office-based training, either one-on-one or in a group setting, has not led to significant improvement in social skills. However, intensive group social skills training that uses behavioral interventions is considered well-established.

RESOURCES AND ORGANIZATIONS

American Academy of Child & Adolescent Psychiatry (AACAP)
ADHD Resource Center
http://www.aacap.org/AACAP/Families_and_Youth/Resource_Centers/ADHD_Resource_Center/Home.aspx
ADHD Parents' Medication Guide
https://www.aacap.org/App_Themes/AACAP/docs/resource_centers/resources/med_guides/ADHD_Medication_Guide-web.pdf

American Psychiatric Association (APA)
https://www.psychiatry.org/patients-families/adhd/what-is-adhd

Attention Deficit Disorders Association – Southern Region
http://www.adda-sr.org/

Centers for Disease Control and Prevention (CDC)
Attention-Deficit/Hyperactivity Disorder
https://www.cdc.gov/ncbddd/adhd/

Children and Adults with Attention Deficit Disorders (CHADD)
http://www.chadd.org/

National Institute of Mental Health (NIMH)
Attention-Deficit/Hyperactivity Disorder
https://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd
Attention-Deficit/Hyperactivity Disorder in Children and Teens
https://www.nimh.nih.gov/health/publications/attention-deficit-hyperactivity-disorder-in-children-and-teens-what-you-need-to-know

Society of Clinical Child and Adolescent Psychology
https://sccap53.org/

U.S. Department of Education
Identifying and Treating Attention Deficit Hyperactivity Disorder: A Resource for School and Home
https://files.eric.ed.gov/fulltext/ED502959.pdf

US Department of Health and Human Services
Centers for Medicare and Medicaid Services
https://www.cms.gov/Medicare-Medicaid-Coordination/Fraud-Prevention/Medicaid-Integrity-Education/Pharmacy-Education-Materials/Downloads/stim-pediatric-factsheet11-14.pdf

VIRGINIA RESOURCES AND ORGANIZATIONS

Children and Adults with Attention Deficit Disorders (CHADD)

http://www.chadd.org/

Central Virginia Chapter

804-385-3139

Northern Virginia CHADD

24-Hour Information Line - 703-641-5451

CHADD of Tidewater

866-633-4871 (Toll free)

CHADD Shenandoah Valley Satellite

540-241-4754

Parent Educational Advocacy Training Center

www.peatc.org

Virginia Department of Education

Attention-Deficit/Hyperactivity Disorder

https://www.doe.virginia.gov/programs-services/special-education/specific-disabilities/other-health-impairment/some-specific-conditions

Virginia Department of Health

Publication:

Guidelines for Healthcare Procedures in Schools (Page 405, ADHD)

http://www.vdh.virginia.gov/content/uploads/sites/58/2016/12/VDH-Guidelines-for-Healthcare-Procedures-in-Schools_2017.pdf

Virginia Tech

Child Study Center

http://childstudycenter.wixsite.com/childstudycenter

Psychological Services Center

https://support.psyc.vt.edu/centers/psc

The Collection of Evidence-based Practices for Children and Adolescents with Mental Health Treatment Needs, 9th Edition

Virginia Commission on Youth, 2023

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