



How to treat Patients with ADHD

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Attention-deficit hyperactivity disorder (ADHD) is characterized by an age-inappropriate level of inattention, hyperactivity and impulsivity.¹⁻³ ADHD is the most common neurobehavioral disorder in children.^{4,5} The prevalence of the disorder is about 3% to 5% in school-aged children.⁶⁻¹⁰ More boys are affected than girls.¹⁰ This disorder can affect a child's education, peer relationships and self-esteem.¹¹ Parents often feel exhausted, frustrated, and guilty because of their inability to help their child.³ Children with ADHD may present diagnostic and therapeutic challenges. Physicians are usually consulted to establish the diagnosis and provide guidance to the family. This article outlines ADHD and offers a practical approach to patient care.

How to Diagnose ADHD?

The criteria to diagnose ADHD are listed in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR™)*.¹ In addition to the symptoms having persisted for at least six months, they must exist to a degree that is maladaptive and inconsistent with developmental level. There must also be clinically significant impairment in social, academic or occupational functioning.¹ The diagnosis is essentially a clinical one, based on the history from the parents, review of the school record and direct assessment of the child.⁷



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There are many developmental, behavioral and medical conditions that may coexist with, and mimic, ADHD.^{1,3,10,12} In early childhood, it may be difficult to distinguish symptoms of ADHD from age-appropriate behaviors in active children.¹

Epidemiologic studies have documented high rates of concurrent psychiatric and learning disorders among individuals with ADHD. Many children with ADHD experience academic failure, peer rejection, adult disapproval, and loss of self-esteem. Chronic academic or social failure may result in loss of motivation and learned helplessness.³ Children with ADHD are at increased risk for child abuse and accidental injuries.^{8,13}

Adolescents and adults with ADHD are at an increased risk for cigarette smoking, alcohol use, substance abuse, and antisocial behavior.^{14,15} They are also more likely to be involved in motor vehicle collisions.¹⁶

Clinical Evaluation

History: Physicians must rely on parents and teachers to provide the diagnostic evidence of ADHD, because symptoms may be minimal or absent in a one-to-one situation, such as an office visit.³ A comprehensive history should be obtained including details of the mother's pregnancy, labor, and delivery. The child's developmental milestones, speech and language function, early temperament, and daily activities should be reviewed. School performance, including behavioral problems and peer relationships, are also important. Information on the child's school performance, attention span, distractibility, and activity level should be obtained from teachers. The medical history, including the child's age at onset of ADHD and early symptoms, and a review of current symptoms and their severity, should be thorough. A history of pica, enuresis, encopresis, and sleep disorder should be sought. Social and family



history-taking should include inquiry into possible emotional stressors on the child, such as domestic disharmony, the impact of the disorder on the family and parental attitude and expectations toward the problem. The presence of ADHD, specific learning disabilities, conduct or anxiety disorders, and psychiatric disturbances in other family members is also of relevance.

Physical Examination: Most children with ADHD have no abnormalities on physical examination, but a thorough examination should be performed to rule out neurologic disorders, dysmorphic features, visual and hearing impairment, and other disorders that may mimic ADHD. Children with ADHD have a higher incidence of soft neurologic signs (*i.e.*, mixed laterality, clumsiness, dysdiadochokinesis) than is noted in the general population.

Other Evaluation: Tests of intelligence (*i.e.*, Wechsler Intelligence Scale) and educational achievement (*i.e.*, Woodcock-Johnson Psychoeducational Battery, Revised) help to rule out intellectual deficits and learning disabilities.¹⁷

Laboratory Evaluation

There is no diagnostic laboratory test specific to ADHD. Quantitative electroencephalography has shown increased theta and decreased alpha or beta activities in some children with ADHD.^{18,19} However, many affected children have normal electroencephalographs (EEG). Magnetic resonance imaging and neuroimaging studies are of little help because their findings are inconsistent.¹² Until more conclusive findings emerge from these studies, the routine use of these studies in the evaluation of ADHD is not indicated.

Treatment

Treatment of ADHD should include pharmacologic, educational, and behavioral interventions and should be individualized for optimal results.³

Pharmacologic intervention: Many well-designed, placebo-controlled studies have demonstrated beyond doubt that the use of stimulant medications is the most effective intervention for ADHD.^{2,20,21} Stimulant medications have been shown to induce short-term enhancement of behavioral, academic, and social functioning in the vast majority of children treated. This, in turn, leads to positive, lasting effects on self-esteem, maternal child relationships, and peer relationships.^{22,23} Stimulant medications increase the concentrations of norepinephrine and dopamine at the neuronal synapse, increase the release of catecholamines from the presynaptic neurons, block reuptake of catecholamines, and inhibit monoamine oxidase.²⁴ The available catecholamines, acting as neuro-

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transmitters, stimulate the reticular activating system, limbic system, and other areas of the brain that control attention, arousal, and the inhibitory process.²⁴

The most commonly used stimulants are methylphenidate and dextroamphetamine. Doses should begin in the low end of the range and titrate upward until an effective response is obtained or significant side effects are noted.^{3,20,25} In general, most side effects are dose-dependent and diminish or resolve with reduction in dosage or passage of time.^{3,16} The most common side effects are loss of appetite, insomnia, and rebound moodiness.^{22,26} At higher doses, some children may experience headaches or stomach aches.²⁶ Other side effects include motor tics, dry mouth, dizziness, drowsiness, constipation, euphoria, dysphoria, irritability, anxiety, social withdrawal, nightmares, tachycardia, and hypertension.^{22,25} Transient growth delay may occur when the daily doses of methylphenidate and dextroamphetamine exceed 1 mg/kg and 0.5 mg/kg, respectively.²⁷ Ultimate adult height, however, is unaffected.²⁸

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The response rate for any single stimulant medication is approximately 75%. Up to 90% of children with ADHD will respond to at least one stimulant medication without major side effects.²⁶ Lack of response to treatment should lead clinicians to assess the accuracy of the diagnosis and

the possibility of undiagnosed coexisting conditions.²⁰ The most frequent causes of treatment failure are noncompliance, over-reporting of adverse effects by medication-weary parents, and attempting to treat symptoms other than the core symptoms of ADHD.²⁹

Tricyclic antidepressants, such as desipramine and imipramine, have been found to be effective alternatives for patients who do not benefit or do not tolerate stimulant medications. They are particularly useful for individuals with concomitant depression, anxiety, conduct disorder, or tic disorder.^{14,25,30} Tricyclic antidepressants can produce improvement in over 70% of children with ADHD.³¹ Although these medications work fairly well to improve mood, impulsivity and tolerance of frustration, they work less well



for inattention.³² Side effects include dry mouth, blurred vision, constipation, dizziness, sedation, postural hypotension, and cardiac arrhythmias.^{14,33} Four deaths of children treated with desipramine have been reported.³⁴ However, independent evaluation of these cases has failed to support a causal link.¹⁴

Alpha-adrenergic antagonists, such as clonidine and guanfacine, have been found to be beneficial in about 50% of ADHD patients, particularly those with aggressive or oppositional features, tic disorder, or insomnia.^{30,32} Alpha-adrenergic antagonists have positive effects on the reduction of impulsivity and hyperactivity, but do not have much effect on inattention.⁵ Side effects include drowsiness and sedation.

Some physicians recommend drug holidays on weekends and during school vacations.³⁵ Others believe that drug holidays destabilize control of the patient's behavior.³⁰ In addition, many learning opportunities occur on non-school days. Further, learning is enhanced in a child with ADHD where attentiveness is controlled with medication.³ Factors that need to be considered include severity of symptoms, pervasiveness across settings, and the side effects profile.²⁶

Pharmacologic intervention should be continued as long as it provides clear benefit without causing significant adverse effects. Some patients require treatment throughout adulthood.^{24,36} Periodic discontinuation for a brief period is often used to reaffirm the need for continuing drug therapy.³⁶

**E d u c a t i o n a l
I n t e r v e n t i o n:** Most children with ADHD do best in small, orderly, structured classrooms where there is a minimum of extraneous distraction and stimulation. Small-group or individualized teaching is very helpful. The classroom seating arrangement should facilitate close



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supervision of a child with ADHD.²⁹ Teachers should be sympathetic, understanding, tolerant, and adjust their expectations and the work assignments to the short attention span of a child with ADHD. Frequent reminders may be necessary and should be given tactfully to avoid embarrassing the child. The child's strengths and interests should be encouraged and accomplishments recognized to build a positive self-image and to enhance self-esteem.³

Behavioral Intervention:

Behavioral modification may enhance the therapeutic out-

come.²⁹ Parents should be advised to keep goals realistic and attainable. In general, good behavior should be reinforced with rewards (*i.e.*, a smile, verbal praise, special attention, physical affection, extra privileges, material benefits) and undesirable behavior discouraged with mild punishment (*i.e.*, verbal disapproval, temporary isolation ["time-out"], temporary removal of a privilege).³⁷ If punishment is required, it should be immediate and inevitable. However, since the inability to modify behavior based on previous experience is a particular problem for many children with ADHD, punishment should be used only cautiously and with moderation. Corporal punishment is unacceptable.³⁷

Other Interventions: Parents should be counseled to establish realistic expectations for their child. Household routines should be predictable. There should not be very many rules, but they should be simple and clear. Excessive fatigue and overstimulation should be avoided. Checklists prepared for the child may help the child remember articles and assignments.

Family therapy may be necessary to relieve parents' guilt, frustration, and

exhaustion and to help siblings cope with the jealousy that often results when extra attention is devoted to a child with ADHD.³ Children with ADHD who have significant conduct disorder, antisocial behavior, aggressiveness, depression or anxiety may benefit from psychotherapy.

Various dietary measures have been proposed for treating ADHD.³⁸ These include elimination of salicylates, artificial coloring, artificial flavoring, and antioxidant preservatives (*i.e.*, the Feingold diet), restriction of sugar intake, and megavitamin therapy.³⁸ To date, controlled studies have not substantiated the efficacy of any of these treatments. The placebo effect may account for the favorable results in some of the uncontrolled studies. At present, most authorities believe that dietary manipulations are not indicated in most children with ADHD.^{20,25} Nevertheless, if a parent notes that a specific food seems to increase the symptoms of ADHD, the food should be excluded from the diet.

Prognosis

Prospective followup studies have found that approximately 78% of adolescents and 33% of adults who had ADHD as children continue to exhibit symptoms and meet the DSM criteria for diagnosis.^{2,39,40} Factors that may predict the persistence of ADHD into adulthood include severity of symptoms, comorbidity, IQ of the child, family history of ADHD, and family adversity.^{14,41}

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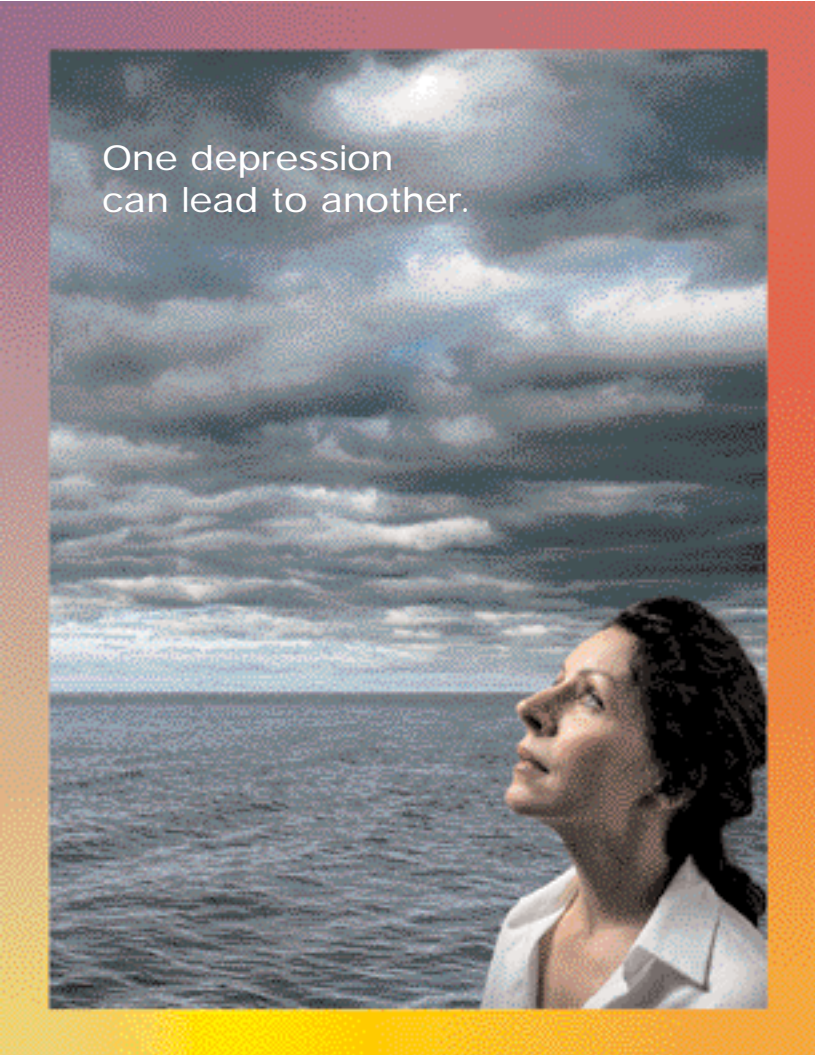
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A photograph of a woman with dark hair, wearing a white shirt, looking upwards towards a cloudy sky over a body of water. The image is framed by a thick orange border. The text "One depression can lead to another." is overlaid on the upper part of the image.

One depression
can lead to another.