



# NEWS

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### contents:

Attention Deficit -- Hyperactivity Disorder

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**Bureau of Disease Control and Epidemiology,  
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## ATTENTION DEFICIT - HYPERACTIVITY DISORDER

### HISTORY

Minimal Brain Damage (MBD), Minimal Brain Dysfunction, Hyperactivity, Attention Deficit Disorder (ADD), Attention Deficit - Hyperactivity Disorder (AD-HD), these are all terms which have been used to describe individuals who have problems with inattention, impulsivity, and overactivity.<sup>1</sup> In the past, many individuals with these problems went unrecognized and untreated. Children who had short attention spans were often labeled as "immature," "emotionally disturbed," "trouble-makers," or "slow learners." AD-HD was overlooked as the underlying reason for many children's learning and behavioral difficulties.

Recently, it has been recognized that AD-HD is a syndrome involving the core symptoms of deficits in attention and impulse control along with hyperactivity. This triad of symptoms was first established as a diagnostic category in the 1980 revision of the American Psychiatric Association's Diagnostic and Statistical Manual, 3rd edition (DSM III). At that time, the disorder was described as Attention Deficit Disorder with or without hyperactivity (ADD & ADDH). A more current edition of the DSM III (DSM III-Revised, 1987)<sup>2</sup> has eliminated the distinction between ADD and ADDH, and the disorder has been renamed Attention Deficit - Hyperactivity Disorder (AD-HD).

### DIAGNOSIS

Attention Deficit - Hyperactivity Disorder is a complex disorder which necessarily involves careful diagnosis and treatment. Some children with more severe AD-HD symptoms (eg, severe hyperactivity) are identified in the preschool years, but often these children are not identified as having a problem until they reach school-age. The school environment represents an increased demand for attentional skills and impulse control. In kindergarten, the child is expected to do such things as sit quietly in a small group to listen to a story, wait for a turn in games, or perform a series of academic tasks. If after four to six weeks of school, the child is not able to adjust to the demands of the classroom, the teacher may suspect a problem and may request a parent conference to discuss referring the child to the school nurse, counselor, or family physician.

If a significant problem is suspected, further assessment is necessary. A thorough physical examination is needed to rule out any medical condition (eg, absence seizures, hyperthyroidism, lead toxicity, etc) that may be causing AD-HD symptoms. A psychological and educational evaluation is helpful to rule out such underlying problems as learning disabilities, developmental delay, anxiety disorder, etc. A child neuropsychologist (a psychologist who has expertise in neurologically based disorders of childhood) may be a good resource to assist in the diagnosis of AD-HD. School personnel, the family physician, or a local AD-HD parent support group can often refer the family to other appropriate professionals.

Listed below are the major behavioral symptoms required for the diagnosis of AD-HD. According to the DSM III-Revised, eight or more of these characteristics must be present for the diagnosis of AD-HD:<sup>2</sup>

1. Restlessness, fidgeting
2. Difficulty staying seated
3. Easily distracted by extraneous stimuli
4. Difficulty waiting turn
5. Blurts out answers before questions are completed
6. Difficulty following through on instructions
7. Difficulty sustaining attention in tasks or play activities
8. Shifts from one uncompleted activity to another

- |                                      |   |
|--------------------------------------|---|
| 9. Difficulty playing quietly        | 12. Does not seem to listen to what is being said to him or her |
| 10. Talks excessively                | 13. Engages in dare-devil activity without regard for danger    |
| 11. Interrupts or intrudes on others |   |

## PREVALENCE OF AD-HD

Estimates of the prevalence of AD-HD vary depending on the criteria used for diagnosis. Conservatively, it is estimated that 2%-3% of the childhood population (approximately 1.2 million school-age children in the United States) have this disorder.<sup>3</sup>

## ETIOLOGY

**Family Association:** A family pattern does seem to exist with AD-HD. Studies have shown that about 20%-30% of children with AD-HD have a parent and/or sibling with similar attentional problems. Thus, there may be a subgroup of AD-HD children who have inherited neurologic factors that predispose them to problems with short attention-span and/or overactivity.

**Neurological Mechanisms:** There are several proposed brain mechanisms which may underlie the symptoms of AD-HD. It has been hypothesized that frontal lobe dysfunction, particularly hypoarousal of the inhibitory system of the frontal lobe, may be the basis for some of the symptomatology observed in AD-HD children.<sup>4</sup> The AD-HD child may be unable to inhibit cognitive or behavioral responses to novel or extraneous stimuli, thus they appear distractible and impulsive. Another related neural mechanism may be a neurodevelopmental lag in the frontal lobes of AD-HD children. It has been established that myelination of the frontal lobes continues into adolescence.<sup>5</sup> The symptoms of AD-HD may be related to a maturational lag in frontal lobe myelination.<sup>6</sup> It has also been proposed that there may be dysfunction in the feedback loop between the reticular activating system and the frontal regions of the brain.<sup>7</sup> This dysfunction may negatively affect the inhibitory and integrative function of the frontal-reticular system leading to deficits in impulse control and difficulty in screening out environmental or internal distractors.

**Allergies:** It has been theorized that ADD/Hyperactivity is caused by an allergic reaction to certain foods, dyes, additives, and other environmental toxins. However, researchers have found that there may be only a very small percentage of AD-HD children who show an adverse behavioral reaction to certain foods, and this negative reaction is more likely to be seen in children 6 years of age and younger. One popular theory in the mid- to late 1970s suggested that fluorescent lighting contributed to hyperactive behavior. Well-controlled studies have not shown any scientific support for this theory. Thus, while there may be some AD-HD children in which allergic reactions play a role, it is likely that this has been greatly overrated and particularly exaggerated by the lay press.

Several environmental toxins have been found to be associated with hyperactivity. Children who have a high amount of lead in their systems are known to exhibit hyperactivity. Similarly, some children who are exposed to abnormally high amounts of pesticides or other poisons may become hyperactive. However, the vast majority of hyperactivity in AD-HD children is probably not related to environmental toxins.

## LONG-TERM OUTCOME

Although hyperactivity and inattention do not appear to worsen with age, the number and severity of their consequences often do increase with age.<sup>3</sup> Numerous studies indicate that AD-HD children are at an increased risk for developing anti-social behavior,<sup>8</sup> alcoholism, substance abuse,<sup>9</sup> and school failure.<sup>10</sup> Two studies recently completed at Austin Neurological Clinic have also found increasingly negative repercussions of AD-HD in children identified at a later age.<sup>11,12</sup> The older children were found to show poorer performance on norm-referenced cognitive, neurologic, and academic measures than younger AD-HD children, indicating a widening discrepancy between AD-HD children and their age-peers. Also, older AD-HD children exhibited greater problems with social-withdrawal and depression, demonstrating the increasing emotional consequences of AD-HD. It should be noted that these results were found with children who had not been previously diagnosed as AD-HD, and thus, their AD-HD had not been directly treated. With earlier diagnosis and treatment, many of these associated problems can be prevented or minimized.

## TREATMENT

A number of approaches to treatment of AD-HD have shown varying degrees of success. Some of these treatment methods are: 1) medication, 2) educational remediation, 3) behavior modification, 4) counseling, and 5) diet. Although there is no cure for AD-HD, very effective methods are available to treat the symptoms, allowing the individual to lead a relatively normal life.

AD-HD is often a lifelong disorder<sup>13</sup>, however, there are certain individuals who appear to "outgrow" it. For example, where the underlying cause of AD-HD appears to be a developmental delay, there may be a gradual lessening of AD-HD symptoms as the child matures. By mid-puberty, these symptoms may no longer be treatment to deal with the secondary academic, emotional, and social problems often associated with a history of AD-HD.

**Medication:** Some medications (eg, stimulants such as Ritalin, Cylert, or Dexadrine) appear to help the AD-HD child's nervous system function more normally leading to a reduction in overactivity and distractibility and an increase in attention span. These medications have a "cognitive focusing" effect that allows the child to better focus attention on important information or tasks in the environment. Medication may also help to decrease impulsivity, so that the child can "think" before "doing." Reducing impulsivity can also allow the child to interact more appropriately in social and classroom situations.

Research has shown that medication is effective in managing many of the symptoms of AD-HD for 70%-80% of children who have been carefully diagnosed as having AD-HD.<sup>14</sup> However, it must be emphasized that drugs are not a "cure" or panacea for AD-HD. For example, they have not been found to substantially improve long-term academic achievement in AD-HD children despite the positive effects on classroom conduct. If the child has academic difficulties or learning disabilities, he will also need specific help with these disabilities.

**Educational Remediation:** Children with AD-HD frequently have learning disabilities (LD) too. Learning disabilities are also neurologically based and may be related to the brain dysfunction underlying the child's AD-HD. Because these two disorders are often so closely associated, it is very important to carefully evaluate for any possible LD. If a LD is diagnosed, the child will need a specialized educational plan to remediate the LD. This may include individual tutoring, special assistance in the regular classroom, and/or placement in the resource classroom for all or part of the school day.

Even if a LD is not found, most AD-HD children will need some special help in the regular classroom. The problems that they have with distractibility, impulsivity, and sometimes overactivity will almost always interfere with their behavior and performance in the classroom. In general, AD-HD children will function best in a classroom where the teacher is supportive but very firm in setting limits and clearly communicates behavioral expectations. Since these children often have difficulty adjusting to ambiguity and change, they need to be in a very structured classroom that has a set routine.

**Behavior Management:** Because AD-HD children are impulsive, they often have difficulty controlling their own behavior; they do things without thinking. And because they are distractible and inattentive, these children often do not seem to learn from their mistakes. Thus, many children with AD-HD develop negative behavior patterns and have difficulty learning new healthier patterns. Behavior problems are best dealt with early, before they become too deeply ingrained. A professional who has special expertise in behavior management, such as a psychologist or a behavior therapist, can be very helpful in developing an effective behavior management program.

**Counseling:** In addition to behavioral problems, AD-HD children often develop secondary social and emotional problems. Because of their impulsivity, many AD-HD children have difficulty with peer and family relationships. Their problems with poor academic performance and social relationships may lead to decreased self-esteem and depression. Thus, at some point, many AD-HD children may benefit from some form of counseling, such as social skills training, individual psychotherapy, or family counseling depending on the individual needs of the child.

A parent support group can also be another important resource for parents in dealing with their child's AD-HD. A support group can provide invaluable educational information about AD-HD, and members of the group can give needed emotional support for coping with a very difficult problem.

**Diet:** It has been proposed that there may be a number of dietary factors that may contribute to AD-HD, such as hypoglycemia, food additives, food allergies, etc. Researchers have not found any clear, empirical evidence to support these dietary theories as factors in the majority of AD-HD cases. However, there does appear to be a very small percentage of AD-HD children whose symptoms may be related to food allergies.<sup>3</sup> Thus, if food allergies are suspected, the child should be evaluated by an allergist. Any dietary changes should be discussed with the child's physician.

In summary, attention deficit-hyperactivity disorder is a complex disorder that can affect many aspects of a child's life. Thus, it requires the cooperation of parents, medical personnel, educators, and mental-health professionals to carefully diagnosis AD-HD and to develop a multifaceted, comprehensive treatment approach.

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#### REFERENCES:

1. Nussbaum NL, Bigler ED. Attention deficit disorder/hyperactivity. Austin, Texas: Pro-Ed (in press).
2. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 3rd ed, revised. Washington, DC: American Psychiatric Association, 1987.
3. Barkley RA. Hyperactive children: a handbook of diagnosis and treatment. New York: Gullford Press, 1981.
4. Mattes JA. The role of frontal lobe dysfunction in childhood hyperkinesis. *Comprehensive Psychiatry*, 1980;21:358-68.
5. Reines S, Goldman JM. The development of the brain. Springfield, IL: Thomas, 1980.
6. Chelune GJ, Ferguson W, Koon R, Dickey TO. Frontal lobe disinhibition in attention deficit disorder. *Child Psych and Human Dev*, 1986;16:221-34.
7. Picton TW, Campbell KB, Baribeau-Braun J, Proulx GB. The neurophysiology of human attention: a tutorial review. In Requin J, ed. *Attention and performance (Vol 7)*. Hillsdale, NJ: Erlbaum, 1978.
8. Satterfield JH, Hoppe CM, Schell AM. A prospective study of delinquency in 110 boys with attention deficit disorder and 88 normal adolescent boys. *Am J Psych* 1982;139:795-8.
9. Eyre SL, Rounsaville BJ, Kleber HD. History of childhood hyperactivity in a clinic population of opiate addicts. *J Nerv and Mental Disease* 1982;170:5229.
10. Cantwell DP, Satterfield JH. The prevalence of academic underachievement in hyperactive children. *J Pedi Psych* 1978;3:168-71.
11. Massman PJ, Nussbaum NL, Bigler ED. The mediating effect of age on the relationship between Child Behavior Checklist hyperactivity scores and neuropsychological test performance. *J Abnml Child Psych* (in press).
12. Nussbaum NL, Grant M, Roman M, Bigler ED. Attention deficit disorder and the mediating effect of age on academic and behavioral variables. *J Clin and Exper Neuropsych* 1988;10(1):29.
13. Wender PH. *The hyperactive child, adolescent, and adult: attention deficit disorder through the lifespan*. New York: Oxford University Press, 1987.
14. Barkley RA. The effects of methylphenidate on various types of activity level and attention in hyperkinetic children. *J Abnml Child Psych* 1977;4:327-48.

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