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Attention Deficit Hyperactivity Disorder

Learning is a complex process, requiring much effort and time on the part of a child. Parents and teachers expect a child to learn academic skills and facts. Families expect children to learn the skill of self-regulation. Friends and relations expect children to learn social skills. And children themselves expect to learn and increase their competence.

A child who has difficulty learning might frustrate the most patient adult, and more importantly, can frustrate himself.

How can learning go wrong?

There can be several impediments to learning. Hearing or visual problems obviously can be impediments. Emotional upset, such as a difficult school situation or stress at home, can distract a child from learning. Physical problems, such as insufficient sleep or a chronic illness, will inhibit performance. Some children have innate stumbling blocks to learning, called Learning Disabilities.

When a child is in school, several things happen in order for learning to occur.

1. The child hears the teacher speak, or reads words on a page.
2. The words are put into short-term memory.
3. In short-term memory, the words are processed into concepts.
4. The new concepts are related to other concepts already held in long-term memory. They then are stored (with their connections) in long-term memory.

Learning by watching a demonstration or a video follows a similar path. Writing or speaking follow roughly the same process, but in reverse.

The common thread is that the child must pay attention at each step, long enough for the learning sequence to be completed. The child must be able to filter out distractions as he listens to the teacher, absorbs the lesson from the chalkboard, or finds the main idea in a reading passage. If not, the child does not learn. An innate attentional impairment is called Attention Deficit Hyperactivity Disorder, or ADHD. These children frequently have short-term memory difficulties as well.

Who has ADHD?

ADHD is a common problem in children. Estimates are that 5% to 8% of all school children have some degree of ADHD. Also, 30% to 50% of children with ADHD have learning disabilities in addition to their attention problems. For many (but not all) children with ADHD, there are clear familial tendencies towards distractibility and attention problems.

What are the characteristics of children with ADHD?

The diagnosis of ADHD rests on identifying easy distractibility, a short attention span, and impulsivity.

“Easy distractibility” means that the child is easily distracted by other stimuli from tasks he is interested in. If the child is distracted by *external* stimuli, he will be pulled from task to task, and may flit around the room; these children may be called “hyperactive.” If the child is distracted by *internal* stimuli such as their own thoughts, they may seem “dreamy” or “inattentive.” [Some researchers consider ADHD with hyperactivity and ADHD-H without hyperactivity (ADHD-NH) as separate entities, but most experts now believe that they are two sides of the same coin, and (aside from obvious behavioral differences) can be treated similarly. In fact, many children with ADHD exhibit both hyperactivity and inattention during a day; about 30% of children with ADHD are diagnosed with the “combined” type.]

“Short attention span” means that, once the child has been distracted, when he returns to the original activity, he forgets what he was doing and has to start the task over again. This makes his progress with any activity (schoolwork, play, or chores) slow and disorganized. Many reminders from adults may be required to finish a task.

“Impulsivity” may actually be thought of as a coping mechanism: children who have lived with their own distractibility and short attention may eventually learn that in order to accomplish their task, it must be done quickly and without careful consideration, right or wrong, or it will never be completed. The child may impulsively talk out of turn, make careless errors, or be prone to injury because he rushes to avoid leaving a thought unsaid or a task unfinished.

What are children with ADHD like?

These three personality traits, in combination, may lead to several characteristic behaviors:

1. Children with ADHD tend to focus on the wrong stimulus at the wrong time, which wastes much of their working time. Staying organized becomes very difficult, and the disorganized state of their work itself becomes a distraction.
2. These children are aware on some level that they have an attention problem, and they have found that they are more likely to finish a task if they do it very quickly. Thus, they may talk out of turn, or they may work quickly with many careless mistakes. Handwriting tends to be sloppy.
3. Children with ADHD may impulsively decide that a long or difficult task is “too hard to do,” and they are quickly (and loudly) frustrated.
4. Socially, children with ADHD have trouble paying attention to non-verbal cues, rules of games others are playing, or other children’s attempts at conversation. Their own thoughts and desires distract them from others’ needs. For this reason, they may seem self-centered, or “bossy.” They may choose to play with younger children whom they can direct, older children whose behavior is more predictable and repetitive, or same-age children who themselves have similarly ADHD-like behavior.
5. The attention problem can be noted to vary over time. Children with ADHD have good hours and bad hours, good weeks and bad weeks. Frustrated adults will notice that a child will easily perform a task one day, and the next day seem completely unable to do so. For this reason, these children are sometimes labeled as “lazy,” although in fact they are usually expending tremendous effort to perform.
6. Many children with ADHD are in fact very bright, and can overcome their difficulty by developing coping strategies. They may find idiosyncratic ways of organizing their work, so that restarting after a distraction is easier. Mannerisms, such as jiggling the knee, may help them block out distractions and stay on task. For children with ADHD who are able to perform well in school, their difficulties may escape notice entirely, or recognition by adults may be delayed until the upper grades.
7. Fidgetiness may be a sign of hyperactivity. But it may also be an unrecognized attempt to create “white noise,” to try to drown out distractions in an attempt to focus on a task. Walking or talking while working, tapping a pencil, jiggling a knee, or sitting in an unusual posture may actually be helping a child focus. A

creative teacher may allow such behavior, as long the classroom is not disrupted.

8. The attention deficit is very frustrating to the child. Tasks he wants to do, to please an adult or for his own pleasure, cannot reliably be performed. The frustration of repeated reprimands from parents and teachers, or of taking long hours to finish schoolwork while other children are outside playing, takes its toll over the years. As the unfinished tasks mount, the child may begin to feel "stupid" compared to his peers. Eventually, the child may stop trying to learn, feeling that the effort is not rewarded. This compounds the sinking self-esteem and the feelings of inferiority.

When does a child with ADHD need treatment?

Everyone shows the characteristics of distractibility, short attention span, and impulsiveness from time to time. These are simply three aspects of personality, not a disorder by themselves. But problems arise when there is a mismatch between the personality and the environment, to the point that the child's life is disrupted.

Children with ADHD typically have trouble in three areas: at school, at home, and socially with friends.

1. At school, these children may have academic difficulties. They may have trouble remembering things they have already been taught. Handwriting may be very sloppy and hard to read. Reading can be difficult, especially reading with comprehension, because the short attention span makes them forget what they read before the paragraph is finished. The impulsiveness may cause careless errors. These children often forget to hand in homework assignments, even if completed. Teachers understandably may protest if a child with ADHD repeatedly disrupts the classroom.
2. At home, homework may be a struggle, because the disorganization and distractibility makes homework last an excessive time. For younger children, cooperation with household chores may be difficult because they cannot follow multi-step directions, or they may be distracted halfway through the job. Frequently, many reminders are needed to finish a task. Older children, if chronically frustrated, may become oppositional and defiant with parents.
3. Socially, children with ADHD can be frustrating to make friends with. Other children may have difficulty staying friendly with a child who is impulsive, interrupts, has difficulty following rules, or has emotional outbursts. Children with ADHD may gravitate towards other children like them. Or they may withdraw to spend long hours with TV or video games.

Excessive difficulty in any of these three areas (school, home or social life) because of distractibility, short attention span, and impulsiveness may warrant treatment. In particular, a child who expresses repeated frustration with his own performance needs urgent attention.

What happens over time to children with untreated ADHD?

In some children, an attention deficit may go unnoticed. Occasionally, it may seem to disappear over the years; some children' hyperactivity and distractibility have resolved by their mid-teens. Other children with attentional symptoms may develop effective strategies to counteract them, and they perform well. But for many children with ADHD, the academic and social struggles through the early grades may cause their self esteem to drop and their motivation to falter. In addition, if basic skills (such as reading or arithmetic facts) are not solidly established in 1st and 2nd grade because ADHD has interfered with learning, performance in later grades will suffer. Some children eventually lose interest in a social and educational system that rarely rewards them, and by early adolescence they may begin to engage in antisocial behavior.

How can I find out if my child has ADHD?

Usually, the diagnosis of ADHD is initially suspected through observations of parents and teachers. A medical exam is required to rule out physical causes for poor attention. Hearing and vision tests are a good idea. Blood tests, X-rays and other laboratory tests are rarely needed, unless as a baseline if certain medications are to be prescribed.

Many parents and teachers fill out extensive forms, called rating scales, to help with the diagnosis. These may be of value to make an initial diagnosis, but generally their information is supplementary to the direct observations of the child's behavior and capabilities by the parents and competent teachers, in the child's daily environment. Rating scales may not always distinguish ADHD from other causes of inattention or poor performance. They are most useful to monitor a child's response to treatment over time.

Some psychologists use computerized games and tests of attention and distractibility (TOVA tests etc.). These may give some information, but they are not diagnostic by themselves.

Review of past reports about behavior, or keeping a behavior diary for a period of time, is quite helpful. It is useful for teachers to keep notes about:

- academic progress,
- reading ability (especially compared to grade level, and especially with regard to reading comprehension),
- attention and participation in class activities,
- ability to follow directions,
- ability to complete work quickly and accurately,
- organization,
- interactions with peers in structured and free-time activities, and
- self-esteem.

It is useful for parents to keep notes about:

- cooperation with adults,
- ability to follow directions and do chores,
- social interactions with friends,
- self-esteem,
- organization,
- attention span,
- distractibility during family activities and homework, and
- impulsiveness.

Evaluation by a psychologist is sometimes a first step. A behavioral psychologist may help screen for other conditions, such as an anxiety disorder or childhood depression, that might mimic or complicate a diagnosis of ADHD. It can be quite useful to have an educational psychologist test for academic or intellectual skills, looking for difficulties with attention or for learning disabilities. Ultimately, though, the medical diagnosis of ADHD generally must be made by a medical doctor: usually a pediatrician, family doctor, psychiatrist or neurologist.

How is ADHD treated?

There are several aspects of the proper treatment of ADHD.

1. All possible distractions in the environment must be eliminated. The child may need to sit at the front of the class, to help him ignore distractions from around the classroom. His desk at school and at home must be kept clear of extra books, toys, and other objects. Noisy appliances, such as the TV or dishwasher, should be turned off during homework.
2. Organizational strategies for work can be developed. The child may need a written

list of books and materials he needs to bring home at the end of the day. (The teacher should be able to provide one; some children fortunately can identify a reliable friend to act as a "homework buddy.") Homework time can be budgeted. (*"How long does a math problem take? How many problems does tonight's assignment have?"*) Assignments may need to be broken into small, easily finished pieces, perhaps using an egg timer or other device, so that the child does not impulsively decide that the task is overwhelming, and so that a completed section gives a sense of reward. (*"Can you answer the next problem (or paragraph or assignment) before the bell rings?"*)

3. The home life must be organized; if the family's routines are hectic and unpredictable, a distractible child will have difficulty. It is a good idea to prepare the backpack, clothes, and lunch the previous night (and keep them in a designated spot). Also, if parents similarly prepare themselves each evening for the next day, the morning routine is much simpler. It is comforting for a child to review the next day's schedule and plans before the child goes to bed. Keeping a master calendar up-to-date and visible in the kitchen not only helps the child plan his week, but role-models an organized life-style. Keeping the house neat and organized also reduces distractions.
4. Tutoring may be required for the child to catch up on skills that his classmates have already acquired. Often, tutoring in study skills is helpful. It is critical to keep the reading skills in the upper half of the class; a child who reads slowly is more likely to be distracted.
5. The child's self esteem must be nurtured. Frequent praise, for completing even small tasks, is essential. A child can take pride in accomplishment in noncompetitive sports (dancing, karate, etc.) or hobbies that emphasize a child's natural talents. Occasionally, if a child is very discouraged or the family situation is stressful, counseling can be very helpful, especially with older children.
6. Children with ADHD have a hard time learning to predict the consequences of their behavior because they tend to be impulsive. However, they can learn to control their behavior. Children can learn to control their impulsiveness when parents use a "choices and consequences" style of parenting. Some parents find parenting classes (such as those at Child, Inc.) to be helpful.
7. TV is dangerously attractive for children with ADHD. It offers a very strong stimulus, but makes no demands, so their time is wasted. I recommend limiting TV (including video games and movies) to 10 hours per week.
8. Demystifying the disorder for the child is important. The child must be reassured (usually repeatedly) that he is not "retarded," or even "slow," but that he is just as smart as other children. He simply has a problem with a certain part of his

memory, and needs help to learn to use it effectively. The child (and his friends and family) can learn that having ADHD and needing a tutor or medicine doesn't make you "dumb," any more than being nearsighted and needing glasses makes you "dumb." (This is less problematic now than in years past, as public awareness of ADHD has grown.)

9. Medication is not necessary for every child with ADHD, but many children benefit from it.

What medications help ADHD?

Stimulant medications are the mainstay of traditional medical treatment of ADHD. They “stimulate” the attention centers of the brain, allowing heightened concentration and retention. Generally these medications do not induce “hyperactive” behavior at the commonly prescribed doses.

- The short-acting stimulants, methylphenidate (Ritalin®, Methylin®) and dextroamphetamine (Dextrostat®, Adderal®), have been in use for half a century, and they are still useful. Their effects often last 3½ to 4 hours; patients must take several doses per day. They are inexpensive, since generic formulations are available.
- Longer acting stimulants generally are controlled-release formulations of methylphenidate, dextroamphetamine, and related compounds.
- Ritalin-SR® was the first such formulation introduced, but its effectiveness is only 4-5 hours, less than the 8 hours initially claimed.
- Concerta® was introduced more recently. A Concerta® pill releases an initial burst of short-acting methylphenidate; then the remaining medicine slowly diffuses through a laser-drilled hole in the plastic pill case over the next 8 hours.
- Ritalin-LA®, Adderal-XR® and Metadate-CD® contain small beads of stimulants that dissolve at staggered rates. They can be sprinkled over food; such formulations are advantageous for younger children who have difficulty swallowing pills.
- Daytrana®, introduced in 2006, delivers methylphenidate slowly through a skin patch, similar to a nicotine or birth control patch. Because it is relatively new, there is less experience with it.
- Focalin® and Focalin-XR® are marketed as more “purified” forms of methylphenidate. The manufacturer states that patients receive the same beneficial effect with fewer side effects; in practice, some but not all patients find this to be true. Focalin® is relatively expensive, and may not be covered by some health insurance plans.

Recently, short-acting stimulants have been used as drugs of abuse, and sold illegally on the street. Some children have been unable to resist the temptation to resell their prescription medications illegally. However, long-acting stimulant medications have less potential for misuse.

Non-stimulant medications have also been used to treat ADHD. Strattera® was introduced in 2003; chemically similar to some anti-depressants, it also has some beneficial effect for inattention and hyperactivity. Many practitioners find Strattera® somewhat less effective than stimulant medication, and the side effects are sometimes as distressing. Strattera may be a good second choice for patients who cannot tolerate stimulant medication. Wellbutrin was originally used to treat depression, but has also been used as an adjunct treatment in patients with ADHD.

In practice, if a patient gets a suboptimal benefit from one preparation, a trial of another may give a more satisfactory result.

What schedule should be followed for medication administration?

A few children with ADHD need medicine only during school. However, most children function better at home and in social situations when taking their medicine at those times, and they are less likely to injure themselves. Most children with ADHD do better by taking medicine all day, 7 days per week.

The practice of giving stimulants only on school days, and allowing “drug holidays” on weekends and holidays, is falling out of favor. Newer formulations have fewer side effects, reducing the need for drug holidays. Safety considerations for teens who drive or engage in active sports, and social considerations for children whose main social time may be on weekends, have encouraged daily use of medicines, with beneficial effects.

Non-stimulant medications such as Strattera® must be given 7 days per week, since their half-life in the body is long.

What are the side effects of stimulant medication?

Most children on stimulants have no side effects. A few will get sleepy or overstimulated, requiring a reduction or cessation of the medication dose. Insomnia, headache, abdominal pains, fatigue, or rashes have been reported; their persistence may require stopping the drug. Loss of appetite is a common side effect; often the child “makes up for” the lost appetite by eating a large breakfast before the morning dose, and by eating more at the end of the day.

Larger than usual doses may cause poor growth, but the commonly used doses do not generally have this effect. However, periodic weight and height measurement at checkups is recommended. (Generally I ask for follow-up visits every 4 to 6 months.) Infrequently, a relative slowing of height growth is noted over time. In some cases, this may be because an unrecognized growth hormone deficiency has been revealed, requiring treatment; in others, the patient shows “catch-up” growth after peers have stopped growing, resulting in a normal eventual adult height.

Some teenagers acknowledge that their stimulant medication improves attention and concentration, but they complain that the medicine makes them less “fun” with their friends. The distress caused by this side effect must be weighed against the benefits of the medicine in the individual child.

Occasionally, a child on stimulants will develop tics (involuntary movements or sounds). Some experts feel that the medication does not cause the tic, but merely precipitates its early appearance in a child who would have developed it later. This may be inferred by the fact that sometimes the tic does not go away once the medicine is stopped. This is an unusual side effect, but if you have noticed that your child has had tics or if there is a family history of tics, please discuss it with me prior to starting the medication.

In summary, permanent side effects from stimulant medications are extremely rare. Parents are often concerned about starting medicines for ADHD because of the concern about side effects. However, it is reassuring to know that side effects are generally limited to the time that the child takes the drug; once the body has cleared the medication, then the side effects are ended. So a trial of stimulants is generally safe; nothing is lost by trying a medication, and stopping it if the side effects are intolerable. Occasionally a second or third formulation may be tried, to find one that gives an acceptable benefit without unacceptable side effects in a particular child.

Many myths exist about the side effects of stimulant medicines. They are not addictive, and there is no withdrawal effect when medication is stopped. In fact, a recent dramatic study confirmed that in children with ADHD, proper treatment with stimulant medication cut the risk of subsequent drug addiction in half.

Stimulant medications (in proper doses) do not cause seizures. They do not lose their effectiveness with long-term use (although as the child grows, the dosage may need to be adjusted). They do not cause learning disabilities, although ADHD sometimes is accompanied by other learning disabilities, as described above. A certain number of children with ADHD have other emotional disabilities, but the medication is certainly not their cause.

How are stimulants prescribed?

Stimulants usually are prescribed in pill form. Normally, a child starts at the lowest dose, with breakfast. Every week or two, after consulting the doctor, the dose is increased until a beneficial effect is noted. If a maximal dose is reached without noticeable effect, or if side effects are seen, the drug is stopped. The medication can only be filled with a written, dated prescription, not a telephone order. No refills are permitted by law.

You must call for refills well before the medication runs out; don't wait until the bottle is empty! I will ask you for follow-up information on the child's progress with each refill; this is time-consuming but important. Please try not to call on Friday for refills.

It is very important to remember that medication is only part of the treatment of ADHD. It would be a mistake to "let the pill do the work." The other interventions described above (altering the environment, organizational strategies, and so on) are just as important.

The need for medication should be reevaluated before beginning each school year. The child's mood and health should be periodically reviewed. As mentioned above, a checkup every 4 to 6 months is strongly recommended.

How long does a child exhibit ADHD symptoms and need treatment?

The characteristics of distractibility, short attention span and impulsiveness are life-long personality traits; it is unusual to "grow out of" them. But one can learn to compensate for them, capitalizing on one's strengths and working around one's weaknesses.

Many children do not learn the insight to recognize their own distractibility and short attention span (or the beneficial effect of their medication) until late in middle school. But by high school (and occasionally earlier) many children have learned coping skills that help them reduce or eliminate their need for medication. However, this is highly dependent on the environment the children find themselves in; some need to restart medication in college, for example, when workloads increase and supervision is more distant. The adult ADHD syndrome is now well recognized and can be successfully treated by neurologists and psychiatrists.