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## Managing Medication for Children and Adolescents with ADHD

Treating ADHD in children requires medical, educational, behavioral and psychological interventions. This comprehensive approach to treatment is called “multimodal” and consists of parent and child education about diagnosis and treatment, behavior management techniques, medication, and school programming and supports. Treatment should be tailored to the unique needs of each child and family.

### The Role of Medication

For most children with ADHD, medication is an integral part of treatment. It is not used to control behavior. Medication, which can only be prescribed by medical professionals, is used to improve the symptoms of ADHD so that the individual can function more effectively. In some instances, the first medicine tried may not be the right one, or perhaps a higher dose may be needed. In addition, sometimes the medication does not work because the individual isn’t taking it or isn’t taking it as prescribed.

Each family must weigh the pros and cons of choosing medication as part of the treatment plan for ADHD. Research does show that children and adults who take medication for symptoms of ADHD usually attribute their successes to themselves and not to the medication.



### Psychostimulant medications

Psychostimulant compounds are the most widely used medications for the management of ADHD symptoms. Psychostimulant medications were first administered to children with behavior and learning problems in 1937. Despite their name, these medications do not work by increasing stimulation of the person. Instead, they help important networks of nerve cells in the brain to communicate more effectively with each other. Between 70–80 percent of children with ADHD respond positively to these medications. For some, the benefits are extraordinary; for others, medication is quite helpful; and for still others, the results are more modest. Attention span, impulsivity and on-task behavior often improve, especially in structured environments. Some children also demonstrate improvements in frustration tolerance, compliance and even handwriting. Relationships with parents, peers and teachers may also improve.

Medication does not cure ADHD; when effective, it eases ADHD symptoms during the time it is active. Thus, it is not like an antibiotic that may cure a bacterial infection, but more like eyeglasses that help to improve vision only during the time the eyeglasses are actually worn.

Common psychostimulant medications used in the treatment of ADHD include methylphenidate (Ritalin, Concerta, Metadate, Focalin); mixed salts of a single-entity amphetamine product (Adderall, Adderall XR); and dextroamphetamine (Dexedrine, Dextrostat). Methylphenidate, amphetamine and mixed salts of amphetamine are now available as both short- and long-acting preparations. Short-acting preparations generally last approximately 4 hours; long-acting preparations are more variable in duration—with some preparations lasting 6–8 hours and newer preparations lasting 10–12 hours. Of course, there can be wide individual variation that cannot be predicted and will only become evident once the medication is tried.

The specific dose and timing of medication must be determined for each individual. However, there are no consistent relationships between height, age and clinical response to a medication. A medication trial is often used to determine the most beneficial dosage. The trial usually begins with a low dose that is gradually increased at 3–7 day intervals until clinical benefits are achieved.

It is common for the dosage to be raised several times during the trial.

In addition, the individual is monitored both on and off the medication. For children, observations are collected from parents and teachers, even coaches and tutors, and parent and teacher rating scales are often used. In all cases, the appropriate dose must be tailored to the individual patient and monitored by the prescribing medical professional to make any needed adjustments.

Since effective longer-acting formulations of stimulants became available, many children, adolescents and adults have found these preferable. Longer-acting medications may cause fewer “ups and downs” over the day and may eliminate the need for taking additional doses at school or during work. Although there is little research on utilizing short-acting and long-act-

ing medications together, many individuals, especially teenagers and adults, find that they may need to supplement a longer-acting medication taken in the morning with a shorter-acting dose taken in the mid to late afternoon. The “booster” dose may provide better coverage for doing homework or other late afternoon or evening activities and may also reduce problems of “rebound” when the earlier dose wears off.

Hundreds of controlled studies involving more than 6,000 children, adolescents and adults have been conducted to determine the effects of psychostimulant medications—far more research evidence than is available for virtually any other medication. There are no studies on the use of psychostimulant medications for more than a few years, but many individuals have been taking these medications for many years without adverse effects. Longer term controlled studies cannot be done because withholding treatment over many years from some patients suffering significant impairments, which is required in a controlled study, would be unethical.

### Nonstimulant medications

Although stimulants are the best tested and most widely used medications for the treatment of ADHD, some children, adolescents and adults respond just as well or better to treatment with other medications that are not stimulants. Nonstimulants may be used when psychostimulant medications have been ineffective, unacceptable side effects have resulted, or the individual or child’s parents prefer a nonstimulant for other reasons.

Atomoxetine (Strattera) is neither a stimulant nor an antidepressant. It alleviates inattention and hyperactivity/impulsivity symptoms of ADHD by affecting specific aspects of the norepinephrine system. Atomoxetine has been tested on more than 1,600 children, adolescents and adults. It is a prescription medication, but it is not a controlled substance like a stimulant. This allows medical professionals to give samples and to place refills on the prescriptions. It does not start working as quickly as the stimulants do. Reports suggest that the full effects are often not seen until the person has been taking atomoxetine regularly for 3 or 4 weeks.

Medications initially developed as antidepressants are used less frequently for ADHD but have been shown

to be effective. Antidepressants, for example the tricyclics and novel medications like bupropion, that have active effects on the neurotransmitters norepinephrine and dopamine can have a positive effect on ADHD symptoms. Antidepressants that only affect the serotonin system—serotonin selective reuptake inhibitors (SSRIs), such as fluoxetine (Prozac), sertraline (Zoloft) and citalopram (Celexa)—have not been shown to be effective for treating primary symptoms of ADHD but may be effective against co-existing conditions. Recent research has shown that long-acting clonidine (Catapres) and guanfacine (Tenex), which are sometimes prescribed to reduce excessive hyperactivity or severe insomnia in children with ADHD, can also improve attention span in children with ADHD.

### Possible side effects of medications for ADHD

Most immediate side effects related to these medications are mild and typically short term. The most common side effects are reduced appetite and difficulty sleeping. Some children experience stimulant rebound, a brief period of negative mood, fatigue or increased activity when the medication is wearing off. These side effects are usually managed by changing the dose and scheduling for short-acting medications or by changing to a prolonged-release formulation. Headaches and stomachaches can also occur; these often disappear with time or, if necessary, a reduction in dose. Some children may have an initial, slight effect on height and weight gain, but studies suggest that ultimate height and weight are rarely affected. A few studies suggest that some children with ADHD reach puberty later than their peers, but this does not appear to be a result of medication treatment.

Tics are involuntary motor movements, such as eye blinking, facial twitching, shrugging and throat clearing. Sometimes children who are given stimulant medication may appear to develop tics. The medication, however, does not actually cause the tics, but may instead bring them to notice earlier, or make them more prominent than they would be without medica-

tion, but they often eventually go away, even while the individual is still on medication.

Tourette's syndrome is a chronic tic disorder that involves vocal and motor tics. Experts estimate that 7 percent of children with ADHD have tics or Tourette's syndrome that is often mild but can have social impact in the severe but rare form, while 60 percent of children with Tourette's have ADHD. Recent research



suggests that the development of Tourette's syndrome in children with ADHD is not related to psychostimulant medication. However, a cautious approach to treatment is recommended when there is a family history of tics or Tourette's syndrome, as certain patients will experience worsening of their tics with stimulant treatment. In these cases, treatment with nonstimulant medications may be considered as an alternative.

For any questions about possible side effects, consult a physician or other medical professional. Starting medication

Each person considering medication treatment for ADHD should first have a careful, comprehensive assessment to clarify the diagnosis, identify other medical, psychological or learning problems that may be present with ADHD, and learn about ADHD. After the diagnosis has been made, a treatment plan should be developed in consultation with the physician or other medical professional. In this planning session, the patient, family and medical professional can work together to consider the various options for treatment. If medication is going to be used, the medical professional will prescribe a specific medication.

The medication trial should be monitored very carefully, especially in the early weeks of treatment, so needed adjustments can be made to dose and timing. If the first medication tried is not helpful or produces unpleasant side effects, the prescribing professional will probably make adjustments. If the adjustments are not sufficient to bring a good response, another medication option can be tried. Most persons with ADHD

respond well to any of the frequently used medications for ADHD. Some respond much better to one than another. If the first medication tried does not produce a satisfactory response, it is usually wise to try a different type of ADHD medication.

### Continued monitoring

Ultimately, success with treatment depends on a collaborative effort between the patient and a committed team of caregivers. Medication can help the complete multimodal treatment program be more effective. Medication treatment without monitoring, appropriate education about ADHD, and other appropriate treatment interventions is often not enough to help.



Parents sometimes report that medication that had previously worked during childhood no longer works once the child reaches adolescence. Often this problem can be solved by

adjusting the dose or switching to another medication. Adolescence is not usually the time to give up on medical management for ADHD if it was helpful in past years. If such problems occur with your adolescent, discuss your observations and concerns with your doctor.

### Frequently asked questions

*Q. How long does it take to achieve a therapeutic dose of medication?*

A. The effects of psychostimulant medications are usually noticeable within 30–60 minutes once an appropriate dose for that individual has been found. However, determining the proper dosage and medication schedule for each individual often takes a few weeks. Nonstimulant medications often require several weeks before their full effects can be observed.

*Q. As a child grows, will the dosage need to be changed?*

A. Not necessarily. Many adolescents and adults continue to respond well to the same doses of psy-

chostimulant medication. However, many others will require higher doses. Some children may respond well initially to a low dose of medication and then require a modest dose increase after a few weeks or months once a “honeymoon period” has passed.

*Q. Will my child need to take medication forever, even into adulthood?*

A. Not necessarily. These medications can be stopped at any time. However, ADHD is a chronic condition. Its severity and developmental course are quite variable in duration and severity. Up to 60 percent of children with ADHD continue to exhibit problematic symptoms into adolescence and adulthood. For these individuals, continuing effective treatment modalities, including medication, can be helpful.

*Q. Should medication only be taken when the child is in school?*

A. This should be decided with the prescribing medical professional and the therapeutic team. Children can often benefit from medication outside of school because it can help them succeed in social settings, peer relations, home environment and with homework. Medication can be of help to children who participate in organized sports and activities that require sustained attention, such as musical programs, debate or public speaking activities.

*Q. What about individuals who do not respond to medication, either psychostimulants or antidepressants?*

A. In general, two or three different stimulant medications should be tried before determining that this group of medications is not helpful. Similarly, several different antidepressant medications can also be tried. Most individuals will respond positively to one of these medication regimens. Some individuals, because of the severity of their disability or the presence of other conditions, will not respond. And some individuals will exhibit adverse side effects. In such cases, the entire treatment team—family, physician, mental health professional and educators—must work together to develop an effective intervention plan. Other medications such as clonidine may be helpful, and occasionally, combinations of medication may be needed. When all medication appears to be ineffective, consideration needs to be given to whether the diagnosis of ADHD

is accurate, whether other conditions are affecting functioning, whether appropriate criteria for improvement have been established, and whether objective and accurate feedback is being provided regarding the effectiveness of medication.

*Q. Are children who take psychostimulant medications more likely to have substance abuse problems later in life?*

A. No. Multiple studies that have followed children with ADHD for 10 years or more support the conclusion that the clinical use of stimulant medications does not increase the risk of later substance abuse. In fact, many studies have shown that individuals with ADHD who are not effectively treated with medication during childhood and adolescence have an increased risk of developing significant alcohol or drug abuse problems later in life. When treated, the risk of later drug or alcohol problems is the same as individuals who do not have ADHD.

Although there is potential for abuse when misused, psychostimulant medications do not cause addictions to develop in those being treated appropriately. Unfortunately, research does show that children who demonstrate conduct disorders (delinquent behaviors) by age 10 and who are smoking cigarettes by age 12 are at higher risk for substance abuse in the teenage years, possibly persisting into mid-life. Therefore, it is important to recognize this subgroup early and get them involved in an effective multimodal therapeutic program.

### **Overview of medications often used in the treatment of ADHD**

The information presented on the following pages provides an overview of the current classes of medications currently being used to treat ADHD. It is provided for educational purposes only. Discuss the specifics of any medication with your physician or medical professional. The names used below are the generic (chemical) names of the compounds, with names of common brands made by different pharmaceutical companies. New medications for the treatment of ADHD continue to be formulated and researched every day. Similarly, researchers continue to explore the use and effectiveness in the treatment of ADHD of

medications that were used previously to treat other conditions.

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