

# ADHD Explanation 5: Medications used in ADHD

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- The aim of treatment is efficient functioning and achieving goals in life
- It is most important to find the dose of medications that works best
- As children grow they may need a dose increase
- The medication is continued for as long as necessary
- Rating scales are useful for documenting how effectively the medication is working.

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## ■ The aim of treatment: achieving and being able to function

The aim of treatment in ADHD is to enable a person to function efficiently and achieve the goals that are realistic for their level of ability. Children who have significant difficulties in coping with life due to ADHD and oppositional defiant disorder (ODD) are sometimes recognisable as those who do not respond to good, consistent management strategies. These strategies may work much better for the non-ADHD siblings or peers. Behaviour management can be very successful, but sometimes there are still problems associated with the underlying ADHD.

- For a person to learn and remember, they have to be able to attend.
- Control of behaviour may not be readily achievable without control of emotions.

If attention is inconsistent a person with ADHD may have difficulty learning, remembering and organising their tasks, and thinking sufficiently well to make rational choices. They would still experience

mental fatigue with tasks that require sustained concentration. The tendency to act quickly and impulsively without the opportunity for adequate decision-making can greatly reduce the efficacy of behavioural management strategies.

Similarly, although a person may become better at understanding their emotions and managing their anger, the effort required may generate stress. In adults even the occasional episode of anger getting out of control can have a devastating effect at home or in the workplace. Furthermore, the low mood that is associated with reward deficit will tend to lead to a negative, unco-operative attitude.

People with ADHD often get better at managing their lives as they mature and develop strategies that work and help them to function. These may include routines, lists and reminders. However, the particular difficulties with efficiency remain. Therefore a person may need additional help from medication to get them functioning at an adequate level of efficiency. Medication is continued for as long as necessary.

## ■ Stimulants improve the symptoms of ADHD and oppositional defiant disorder (ODD)

The medications used most frequently in ADHD are the stimulants. They enhance the levels of neurotransmitters, which are the chemicals that

enable the different cells in the brain to communicate. This generally results in improvements in the efficiency of the 'thinking' brain. Stimulants also

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improve the mood and behaviour, which may be an effect of enhancing the activity of the dopamine reward pathway.

The beneficial effect of stimulants in ADHD was first recognised in the 1930s. Since then numerous trials comparing them with placebo (inactive tablets) have confirmed that the stimulants are effective for treating ADHD. In fact the stimulants are almost certainly the most studied and the most effective

drugs used in psychiatry. They work in preschoolers, school aged children, adolescents and adults, reducing the level of hyperactivity and improving the ability for sustained attention. They also suppress the appetite. Although usually combined with behavioural interventions, the stimulants often have a more immediate and more obvious effect than behaviour therapy.

## ■ Practical considerations with using the stimulants

### Side effects

The most significant side effect of using stimulant medication for treating ADHD in children is usually the effect on appetite and weight. It is as if the stimulant resets the appetite at a lower level. This is a bit like turning down the thermostat when heating a room. The heater goes off and the room cools down until it reaches the temperature where the heater starts up again. Therefore the child loses weight initially, but after some weeks the appetite picks up and the child starts gaining weight and then gains weight normally. After a year of treatment the weight is usually approximately the same as it was at the time that medication was started. In effect this means that there is no net weight gain for a year. Because weight gain is important growth in height, children also grow more slowly. This generally amounts to about 1cm less growth per year for the first three years. After

that the growth rate normalises, but there is some evidence that puberty may progress more slowly, with a later growth spurt. Appetite suppression appears to correlate closely with the therapeutic effect. This means that a dose that does not cause any weight loss is likely to be too low to be effective.

Stimulant medication also increases the heart rate and blood pressure and can cause insomnia, irritability and feelings of sadness. The sadness usually improves over the first 2-3 weeks although some people continue to feel lower in their mood while on stimulants.

Stimulants have been associated with tics (habit spasms, such as twitches of the face or eyes, or repeated throat clearing). However, tics are common in school aged children, particularly children with ADHD. Tics tend to come and go, getting worse for a few months and then improving. They

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may therefore coincide with starting stimulant medication. Sometimes medication may be ceased, to find out whether this makes the tic resolve. With any side effects, whether documented weight loss or the possibility of tics being caused or worsened by medication, the pragmatic approach is to weigh up the benefits against the possible or likely disadvantages. Treating ADHD with medication is a process of constant reassessment, always looking at the advantages and disadvantages of treating versus not treating. If the benefits of medication in reducing the effect of ADHD on a child's life are sufficiently substantial, some side effects may be tolerated, keeping in mind that no medication is perfect.

## Using short acting medications

The stimulant medications dexamphetamine and methylphenidate are short acting, with an effect that lasts around 3-4 hours. (Methylphenidate is the stimulant used in Ritalin and Concerta). In children who have significant hyperactivity or oppositional symptoms the effect is usually obvious within 30 minutes. In children who only have inattention the effect may be more subtle. As the effect wears off there may be rebound, as if the behaviour that is held in check by the medication is released as the medication wears off, leading to irritability and worsening of symptoms.

The beneficial effect may be prolonged by using capsules that release the medication slowly over several hours. Formulations of methylphenidate include short acting Ritalin tablets (duration 3-4

hours) and the longer acting Ritalin LA (6-8 hours) and Concerta (8-10 hours). Dexamphetamine is also available as lisdexamfetamine (Vyvanse), in which the dexamphetamine has been inactivated by combining it with a protein molecule. It is reactivated in the body but this process means that it is retained longer, usually lasting 8-12 hours; it is therefore only taken once daily. Slow release capsules also wear off more slowly, which may reduce the rebound effect. Because the stimulants can cause difficulty with settling off to sleep at night, medication is often targeted to be effective earlier in the day while the child is at school, wearing off into the evening. This also allows the appetite to recover so that the child eats more, making up for the reduced appetite through the day.

Using a short acting medication can be inconvenient because it is regularly wearing off. It also means that the child wakes up unmedicated until the first dose of the day takes effect. However, there are also advantages. Firstly there is always the opportunity to compare the child's functioning on and off medication. This is important because children change as they mature. They usually become better at understanding and controlling their behaviour, so they may not need to be so consistently medicated, perhaps only taking medication for school and for tasks that require more intense and sustained concentration. It is also useful for teenagers to become increasingly responsible in making decisions about when they do and do not need to take medication.

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## Choosing the right stimulant and establishing the dose

The stimulants dexamphetamine and methylphenidate are similar in their beneficial effects and their side effects. Most people with ADHD will have a good response to both medications but some people definitely do better on one or the other. One of the most important aspects of these medications is to find the dose that works best for the individual. This is usually done by starting at a low dose and gradually increasing the dose while observing the changes in functioning. Behavioural rating scales may assist with comparing effects of different doses of medication. Careful dose titration while monitoring the changes in concentration and behaviour on medication and adjusting the dose to target those symptoms that are the most troublesome can be very effective. As the dose is gradually increased, there is usually progressively more improvement in functioning until a level is reached where further increases do not lead to any further improvement. This is the optimal dose. If the optimal dose is exceeded the behaviour may worsen: some people become more angry; others become withdrawn and depressed. As children grow the stimulant may become less effective, so that they need a dose increase. The behaviour may take longer to settle and the effect wears off sooner. Sometimes the stimulant appears to lose its effect completely - this can happen quite suddenly. There may also be an obvious increase in the appetite and a corresponding weight gain. Rating scales that score various aspects of behaviour

can be very useful for documenting how effective the medication is for controlling the symptoms of ADHD and ODD. It is important that the rating scale includes items relating to concentration and to mood and behaviour. Rating scales can be used to guide dose titration and for ongoing monitoring of the effectiveness of the medication.

## Abuse potential

One ongoing concern about using the stimulants is the risk of abuse and diversion. Although chemically similar to cocaine and methamphetamine, the stimulants used in ADHD are far less addictive. This is because they take longer to enter the brain and bind with the dopamine receptors, which makes them less euphoric. This means that people who abuse stimulants are more likely to use them as cognitive enhancers, so that they can work or study for longer. It is reassuring that even though they have been used in ADHD for more than half a century, there is still very little evidence that people treated for ADHD are at risk of becoming addicted to their stimulant.

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## Other medications used in ADHD

### Atomoxetine

Atomoxetine (Strattera) has been developed for treating ADHD. It is not a stimulant and therefore lacks the abuse potential of the stimulants. It is also longer acting than the stimulants, giving a more consistent effect over the course of the day. Because of the longer time that it stays in the body, it is given as a low dose and may take several weeks to build up to give an adequate effect. Although studies have shown that the majority of people with ADHD respond to atomoxetine, the response is more variable than the stimulants. Atomoxetine has been shown to be beneficial for people with ADHD and anxiety.

### Clonidine

Clonidine (Catapres) is a medication that can be helpful in ADHD. It can improve the symptoms of ADHD but is usually less effective than the stimulants and may need to be given more frequently to give a consistent effect. Sometimes it is used to prolong the effect of a stimulant or to balance out the side effects, as it causes sleepiness and may increase the appetite. It can also be helpful for anger and aggression. It was developed to treat high blood pressure and it drops the blood pressure and heart rate, which can be a problem in overdose.

### Guanfacine

Guanfacine (Intuniv) is similar to clonidine but is longer lasting, requiring only once daily dosing. It is therefore more convenient and also more effective than clonidine.

### Risperidone and antipsychotics

Risperidone was developed for treating schizophrenia, but is very useful for treating anger from any cause. Therefore people with ADHD and ODD who experience significant problems with anger despite an adequate dose of stimulant may also be given risperidone or other atypical antipsychotics. Although antipsychotic medication is usually highly effective for reducing the level of anger, these medications have troublesome side effects. The most significant side effect is that hunger is increased and this can lead to obesity or worsen existing obesity. They can also cause increased muscle tone (muscle stiffness) and abnormal, repetitive movements (tardive dyskinesia). They also cause drowsiness, which may be an advantage later in the evening. These are less likely with the newer atypical antipsychotics.



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