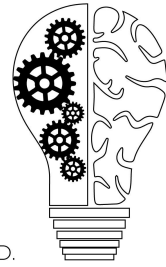


Episode 035: ADHD: Diagnosis, Symptoms & Treatment

David Puder, M.D.

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There are no conflicts of interest for this episode.

In this week’s episode of the podcast, I interview Dr. Michael Cummings about psychopharmacology for Attention Deficit/Hyperactivity Disorder (ADHD). We talk about the symptoms, the treatments, and the typical myths about the disorder.

What is ADHD?

ADHD is a brain neurotransmitter disorder that affects a person’s ability to concentrate, their social interactivity, and their impulsivity.

Diagnosing ADHD

People who truly have ADHD typically experience inattentive and hyper symptoms across all areas of their life. For example, if they are in a job that requires periods of attention to complete or organize a project, it will be inherently more difficult for people with ADHD.

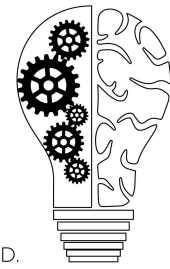
One of the things that’s important in diagnosing people (particularly younger people) is their collateral history. People around the person with suspected ADHD are often more aware of the person’s deficits than the person themselves. When they reach adulthood, the problems might be made more obvious when they integrate into normal society and notice they struggle with symptoms of ADHD (compared to other people).

Although not required for diagnosis, PhD level psychologists can do psychological testing, along with ADD/ADHD testing and IQ testing, to get a full idea of the patient’s symptoms. It helps confirm the diagnosis because these tests are widely used among the entire population, which provides a large sample mean to compare with. It’s also

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helpful to get a benchmark of performance before beginning treatment and then follow it up with later testing to see how effective the treatment has been.



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Myths about ADHD

If a child is hyper, he or she has ADHD.

ADHD diagnosis has, at times, been a fad in the public, leading to many misdiagnoses and overmedicating, especially in children. Children are inherently hyperactive and less attentive than adults are. Doctors who are performing diagnostic tests must really pay attention to the criteria in children to make sure that the magnitude of the problems truly cause stress and social dysfunction before they try to diagnose or medicate a child.

For example, the LA times published an article that $\frac{1}{3}$ of the children in Orange County suffered from ADHD. Real studies show that prevalence in children is around 6-8%, in adolescence about 2.8%, and in adults about 2.5% of the population.

ADHD disappears with the onset of puberty.

Attentional deficits sometimes remains into adulthood, while hyperactivity may disappear as a child matures.

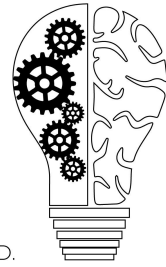
We are giving people methamphetamines as medication.

Methamphetamines and amphetamines are completely different drugs on a molecular level. The methyl group paired with amphetamines increases its absorption and effect on the brain. The amphetamines that are used to treat ADHD are essentially variants of dextroamphetamines.

There are even versions that are difficult to abuse, such as with vyvanse, where lysine (the amino acid) is bound to the amphetamine. The lysine make the amphetamines unabsorbable unless it's in the GI tract. It cannot be inhaled or injected and still be effective. Similarly, some of the slow-release versions are encapsulated in pills that won't release the drug easily, except very slowly in the GI tract, making it difficult to divert or abuse those formulations.

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Dopamine stimulants are the only treatments for ADHD.

There are other drugs that are useful for ADHD symptoms. They are (for the most part) drugs that increase brain norepinephrine. They can be used for people who don't tolerate increases in dopamine, or for other reasons cannot be treated with dopaminergic agents.

The most common side effect from amphetamines are increased anxiety, insomnia, increased sweating, hypertension, heart rate and blood pressure. These are things that can be overcome by titrating the drug more gradually, or being very attentive to the overall dosing of the drug.

Amphetamines are likely the first line of treatment, unless a person has anorexia, is still growing, or still has strong family genetics with a history of addictions.

What are true warning signs of child ADHD?

When the child is struggling socially, has attention deficit, is struggling academically, and the problems are noted by the educators and parents alike, it may be time to seek out a diagnosis. Most teachers get pretty good at recognizing the one or two children in the class that are most impulsive, most hyperactive, and less attentive, so it can be helpful to ask them first if they've noticed something disruptive about the child.

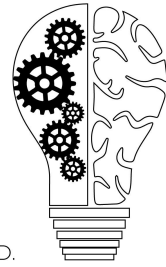
Often, boys with ADHD are easier to spot, because they tend to act out more. Girls tend to more often fall into the inattentive subtype, but may not be hyperactive or disruptive. They may not do as well academically, though intelligent, and that is a cue that they should be tested for the inattentive subtype. The problem is that unlike many disorders that have clear markers, attention—and the ability to modulate attention—always varies.

One of the characteristics of people with ADHD is that they tend to be impulsive, often acting without thinking through the consequences of their behavior, which can lead them in some cases to do things that will get them in trouble in school or in their social group.

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It can become a self-reinforcing phenomenon. If a child is often in trouble and begins to take on the “troublemaker” attitude, the behavior can continue as part of their identity. There is even an association between ADHD and the development of conduct disorder and/or antisocial personality disorder.



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ADHD in adults

Sometimes I treat young adults who were high functioning enough in high school to be able to get by academically, but they noticed a major difference in college when the coursework became more difficult. They’d procrastinate as long as they could, and only get things finished at the last minute when adrenaline kicked in and stimulated their brain to do the work.

ADHD has been recognized as a failure of the **reticular activating system** to adequately stimulate the portions of the brain stem (the cortex and basal ganglia) in a way that it works for non-ADHD people. It can feel a little like the brain is drowsy all of the time.

Another characteristic of ADHD is that patients tend to be more able to concentrate on subjects they are interested in. For example, medical students who prefer higher-risk, fast paced environments tend to not need their medication when they are in emergency room rotations. When they are in a subject matter that is not as interesting to them, they might need to take their medication to function at a higher level and retain the information. I try to help my ADHD patients increase the **meaning** in what they are doing on a daily basis as a form of treatment.

People with ADHD have a higher rate of injury than the general population. There are many circumstances in which not paying attention to your environment is dangerous.

One study shows that there is even a correlation between car accidents and ADHD. Driving requires attention and responses, and if people are prone to do impulsive things, but are not prone to pay attention, it can increase their rate of accidents.

There is a noted decrease in risk of drug abuse when someone is treated appropriately with dopaminergic drugs, than there is if someone with ADHD is untreated. One of the

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things that occurs in people who don't receive appropriate treatment and education (but they have ADHD) is that the first time a person takes a stimulant medication, maybe experimenting in college, illegally borrowing some for a test from a friend, they will report it as being the "first time they ever felt normal." It can be a powerful lure to revisit the experience of feeling more normal, and being able to pay attention (I am in saying this, not recommending you ever share your ADHD medications, but nevertheless it is commonly reported to me on history as how they found out they might need treatment.)

Without guidance and education, it can be a pathway to drug abuse rather than an appropriate treatment. Proper treatment can greatly enhance quality of life.

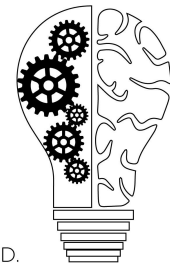
Treating ADHD

I once had a patient in the emergency room that told me she put a little bit of methamphetamines in her coffee every morning. She wasn't getting high off of it, but I did wonder if she was self-treating something she had naturally noticed was a problem for her—inattention.

People with ADHD should also be receiving a broad spectrum of psychosocial treatment and therapy, not just medication. If a child is under the age of 6, he or she should be given behavioral therapy as a first line treatment. The initial approach of diagnosis should be made carefully. If the person does have ADHD, the first treatment should be psychosocial interventions, afterwards, if that does not work, they can try medication.

The main category for pharmacological treatment of ADHD are dopaminergic stimulants. These drugs essentially serve to stimulate the production of dopamine (amphetamines) or to block its reuptake (with drugs like methylphenidate). Amphetamines increase and release proper neurotransmitters and block reuptake, while methylphenidate is more purely just a reuptake inhibitor for dopamine.

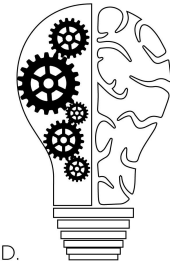
Medications that contain amphetamines will stimulate motor activity in healthy people, while it will actually return a hyperactive person to a calmer state as the dopamine regulates in their brain.



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For those who don't respond to dopamine increasing drugs, the other approach has been to increase norepinephrine with drugs like atomoxetine or some of the noradrenergic antidepressants, thereby increasing the person's alertness. About 70% of people respond to dopaminergic agents, and 30% don't respond, or can't tolerate the increase in dopamine because of either insomnia or increased restlessness.

Sometimes people with ADHD can also have comorbid anxiety. One professor explained that there is a survival advantage of both having ADHD and being willing to do high-fear tasks, but they also can have comorbidity with anxiety that keeps them from taking too high of risks and killing themselves.

Often, when a patient comes to see Dr. Cummings that has both ADHD and anxiety, his first line of defense is to try and increase serotonin through SSRIs, along with the drug they are taking for ADHD. Some could take an antidepressant as well. Most children and adolescents with ADHD do best with a dopaminergic agent, although those are also problematic in some people.

Exercise also has a positive effect on ADHD, specifically anaerobic exercise. It can aid several neurotransmitters, including norepinephrine and dopamine.

Issues with ADHD medication

Sometimes children who are on ADHD medication can experience a loss of proper growth hormone, causing different issues. If someone chronically takes a stimulant, they will be about an inch or an inch and a half shorter than if they did not take a dopamine stimulant. If that's a problem for them will depend on the inherent genetic makeup of the person. If the child comes from a family of very tall people, it might not be a problem to lose an inch or two. If the family is short, losing an inch or two might be more of an issue socially and culturally.

Also, anorexia can be an issue, because dopaminergic medications can decrease appetite. It occurs to some extent in everyone who takes a dopaminergic drug, definitely enough to cause widespread clinical concern. However, there are approaches, such as taking drug holidays from the medication, that can help regulate the decreased appetite. Whether someone should take a drug holiday, or break from taking their medication, will

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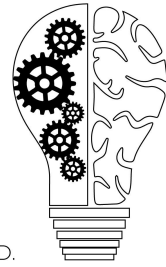
depend on how disruptive the person will become when they are not on a stimulant. If it will cost the person social interactions and friendships, it is usually better to keep them on the medication.

Other abuses of ADHD drugs are very similar to the abuse or appropriate use of any molecule. The person who is using a stimulant appropriately is using it to improve their functionality—they are using it to pay attention and have a normal life. The person who is abusing a stimulant is taking it for the purpose of getting high. They are seeking the euphoric effects of the stimulants rather than positive life change. Someone who is trying to get a “speed run” will take a gram of medication, while someone who is trying to medicate for ADHD will take 20,30, or 50mg of methylphenidate in order to maintain their ability to concentrate.

The true identification of abuse of amphetamine medication is a person’s deterioration in their ability to function in a balanced manor. Not sleeping for days because of stimulants, even if someone is able to get A’s on tests, is not improving their functionality and may hurt them long term.

In Conclusion

As a whole, doctors need to be more careful when diagnosing ADHD. There is a tendency to over-diagnose, leading to over-medicating. Even if you receive a diagnosis, there are also several cognitive behavioral therapies that have been developed to help people deal with the psychosocial components of having ADHD. These can be self-administered through computers. There are also mindfulness practices to help the person monitor themselves so they are better at social interactions. Exercise should also be optimized. Repeat psychological tests can help guide effective treatment. Patients who have had ADHD untreated for years might have subsequent low self esteem. Approaching the uniqueness of the patient and their presentation will help the patient thrive!



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