

ADHD stimulants and their effect on height in children

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ABSTRACT

QUESTION Many more children today are diagnosed and treated for attention deficit hyperactivity disorder. Parents frequently ask me if the stimulant medications their children receive might affect their height as adults. What should I tell them?

ANSWER Stimulant medications, including methylphenidate and amphetamine, are safe and effective in children and adolescents with attention deficit hyperactivity disorder. Research on the issue of growth suppression is lacking, mostly owing to insufficient follow-up on patients' final heights. In general, the rate of height loss seems relatively small and is likely reversible with withdrawal of treatment. Clinical presentation and academic achievements should be the key to determining which drug to prescribe, the preparation, and the dose.

RÉSUMÉ

QUESTION De nos jours, on diagnostique et on traite le trouble déficitaire de l'attention avec hyperactivité chez un plus grand nombre d'enfants. Des parents me demandent souvent si les médicaments stimulants que prennent leurs enfants pourraient affecter leur taille à l'âge adulte. Que devrais-je leur répondre?

RÉPONSE Les médicaments stimulants, y compris le méthylphénidate et les amphétamines, sont sûrs et efficaces chez les enfants et les adolescents ayant un trouble déficitaire de l'attention avec hyperactivité. La recherche sur la question de l'arrêt de la croissance n'est pas abondante, principalement en raison d'un suivi insuffisant de la taille à l'âge adulte chez les patients. En général, le taux de perte de croissance semble relativement faible et est probablement réversible avec le retrait du traitement. La présentation clinique et le rendement scolaire devraient être les facteurs-clés pour déterminer les médicaments à prescrire, leur préparation et leur dose.

The prevalence of attention deficit hyperactivity disorder (ADHD) among school-aged children and adolescents is estimated to be 3% to 16%, depending on the classification system used, with boys 2 to 4 times more likely to be diagnosed with ADHD than girls.¹ Beyond childhood, ADHD is increasingly being discussed as a serious psychiatric disorder in adulthood, with high heterogeneity and comorbidity with other psychiatric disorders.¹ Typical psychiatric comorbidities in patients with ADHD include oppositional defiant disorder, conduct disorder, major depressive disorder, bipolar disorder, anxiety, substance abuse disorders, tic disorder, and Tourette syndrome.²

Children showing ADHD symptoms should be viewed as a group at high risk of suboptimal outcomes as young adults. Intervention programs for children with ADHD could be beneficial for preventing crime and drug abuse.³

Treatment of ADHD

Current research suggests that the combination of behavioural therapy (eg, behavioural parent training, school consultation, and direct contingency management) and

pharmacotherapy might benefit most patients. Stimulant medications remain the medical treatment of choice for patients with ADHD and are associated with an exceptional response rate.² Stimulant medications, including methylphenidate and amphetamine, are safe and effective in children and adolescents.⁴ These drugs come in numerous formulations, leading to some confusion and potential errors in prescribing and dispensing these drugs. Knowing and understanding the advantages and disadvantages of the different formulations can lead to individualized treatment.⁴

Although stimulants have a favourable risk-benefit profile, they do carry potential risks for children using them.⁵ Suppression of appetite and weight loss are commonly discussed adverse events. Sudden death was also reported in children using stimulants. A recent joint position statement by the Canadian Paediatric Society, the Canadian Cardiovascular Society, and the Canadian Academy of Child and Adolescent Psychiatry⁶ suggested that there should be a thorough history and physical examination with an emphasis on the identification of risk factors for sudden death before starting stimulant

medications. However, no routine electrocardiographic screening or cardiac subspecialist consultation is needed.

Stimulants and growth

Do stimulants have long-term effects on growth and adult height? There are 3 main mechanisms that can affect height growth in children receiving stimulant medications. First, suppression of appetite is described among children,⁷ and reduction in caloric intake can negatively affect potential growth in children. A second proposed mechanism is associated with the dopaminergic effect of stimulants.⁸ Dopamine might suppress growth hormone secretion and directly affect height development in children. Finally, some studies suggest that stimulants might slow down the growth of cartilage tissue, affecting growth of bones.⁸

Understanding growth

While there are numerous published studies in the medical literature, there are still more questions than answers. The main challenge is conducting a study that will follow up on children using stimulants for many years, until their adult lives.


In a recent meta-analysis, Faraone et al⁸ made an effort to determine if stimulants affected height in children. Despite a range of studies, comparison was not possible owing to different definitions of ADHD and outcome measures in those studies. The authors ended up summarizing a qualitative review. In most of the studies, height velocity was negatively affected by stimulants early in the treatment period but approached normalized growth later on. The investigators concluded that treatment with stimulants in childhood modestly reduced expected height (and weight). They recognized the fact that these effects attenuated over time and that some data suggested that ultimate adult growth parameters were not affected.

Most studies have concluded that while some effect on growth is apparent, discontinuation of treatment results in a rebound of growth to compensate for stimulant-induced loss in height. This is the basis for recommending “summer breaks”—when children forego stimulant treatment when on summer holiday from school. A study in the early 1970s showed the beneficial effect on growth after one summer of terminating treatment with stimulant drugs⁹; a decade later a study found that after 1 summer no group difference in height was found, but 2 summers of discontinuing methylphenidate treatment had a positive effect on height.¹⁰

As to a potential dose-dependent growth effect, studies reported conflicting results and were influenced by small sample sizes, sex selection, and other biases. Determining the smallest dose of stimulant that affects

ADHD symptom presentation is likely the best course of treatment for children.⁸

Conclusion

While follow-up by family physicians should include monitoring growth of children taking stimulants for ADHD, the rate of height loss seems relatively small and is likely reversible with withdrawal of treatment. Clinical presentation and academic achievements should be the key to determining the drug, the preparation, and the dose used. 

Competing interests

None declared

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Child Health Update is produced by the Pediatric Research in Emergency Therapeutics (PRETx) program (www.pretx.org) at the BC Children's Hospital in Vancouver, BC. Dr Goldman is Director of the PRETx program. The mission of the PRETx program is to promote child health through evidence-based research in therapeutics in pediatric emergency medicine.

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