



CANNABIS AND ADHD

A CADDRA POLICY STATEMENT

Cannabis has been legal in Canada since 2018. Yet there is still much that we do not completely understand about cannabis, especially ADHD and cannabis. Research in this area is sparse but we do know enough to caution those with ADHD against using cannabis either recreationally or as a means of treating the symptoms of ADHD – particularly in those under the age of 25.

Cannabis is a term encompassing the many psychoactive preparations from the Cannabis sativa plant: marijuana (dried and crushed leaves and flower buds), hashish (resin of flower buds) and cannabis extracts (oils and waxes). Cannabis comprises over 400 chemicals and greater than 140 cannabinoids: Tetrahydrocannabinol (THC) and Cannabidiol (CBD) are the two most common cannabinoids in use. THC is responsible for the main psychoactive effects or ‘high’ (euphoria, calm, distorted perception and memory, variable mood effects and impairment of judgement). CBD lacks psychoactive effects and tends to be used for a small range of approved medicinal uses (spasm in multiple sclerosis, chemotherapy induced nausea, chronic neuropathic pain). CBD may offer some protection against the psychoactive effects of THC. It should be noted in this statement that our concerns are predominantly related to the psychoactive components of cannabis notably THC.

Cannabis today is potent. THC in cannabis plants has been engineered to 20-30% (previously 3%) and the ratio of THC to CBD is increasing. As a result of grassroots activism and the popular press in concert with political and private profiteering, the public perceives little risk. Parents are less concerned about adolescent marijuana use, while adolescents see it as risk-free and ‘natural’. Canadian youth are the top users of cannabis in the developed world according to a study by the World Health Organization.¹

Understanding the effect of cannabis on the brain is important especially for those with ADHD who struggle with impairment in the regions responsible for executive function - attention, planning, organization, time management, decision-making, working memory, impulse control, emotional regulation, etc.

The Cannabinoid system is essential for the hard wiring of the brain. From the earliest embryonic stages until the mid-twenties when development of the adult brain nears completion, the cannabinoid system is responsible for the maturation of nerve cells and the creation of the complex connections that make up the human brain.

Cannabinoids are the class of compounds that act on receptors in the Cannabinoid system. Endocannabinoids are the naturally occurring cannabinoids produced by the body. Phytocannabinoids are the compounds produced by the Cannabis plant (marijuana, hashish), whereas synthetic compounds (K2, Spice) are synthesized in a lab to bind to the body's natural receptors.

What happens when phytocannabinoids or synthetic cannabinoids are ingested is an overloading of the Cannabinoid system resulting in dysfunctional pathways that damage nerve cells preventing proper neuronal development. The adolescent brain is especially vulnerable to damage from cannabis. We know that the younger one uses cannabis and the more frequent the use, the greater the permanent damage to the brain.²

Neuroimaging studies of adolescent and adult users demonstrate structural alterations of the frontal, cerebellar and sub-cortical regions of the brain as well as impaired connections between these regions. Neuropsychological testing shows a decline in IQ in those who use cannabis consistently. Evidence also associates long-term heavy cannabis use with educational underachievement and impaired motivation leading to poorer personal outcomes in education, employment and social functioning. Particularly concerning is the association of cannabis use with the development of schizophrenia – THC can cause psychosis, and persistent use increases the risk of schizophrenia up to 6 times the normal risk.²

So, what does all this mean for the person with ADHD??

ADHD is a significant risk factor for substance use disorder and early use predicts much more problematic use and addiction³. We also know that ADHD significantly increases lifetime cannabis use. Children with ADHD are more than 1.5 times as likely to meet criteria for Cannabis Use Disorder than children without ADHD⁴.

The areas of the brain that are most involved in ADHD – the frontal cortex, the cerebellum and the sub-cortical brain are also the areas of the brain that are most impaired by the use of cannabis. Knowing that cannabis impairs the maturation of brain regions central to the deficits experienced in ADHD suggests that cannabis will further impair intellectual and psychological development. Regular cannabis use affects attention, memory, processing speed and planning abilities^{5,6} which compounds the usually noted impairments in these domains in individuals with ADHD.

Many individuals with ADHD perceive that cannabis improves their ADHD. Although anecdotal reports of this abound online or have been described in a few case studies, this is in stark contrast to studies on persistent cannabis users showing neuropsychological decline broadly across domains of functioning.⁷ Patients seeking information on cannabis and ADHD will find internet forums biased toward cannabis improving ADHD, consistent with trends of decreased perceived risk of cannabis use by the public at large.⁸

Based on the literature published to date, **CADDRA concludes that there is NO evidence that cannabis is an effective treatment for ADHD or that it improves attention and productivity.** Further the use of cannabis by individuals under the age of 25 can impair brain development that often does not recover.²

Long-acting stimulant medication is the most effective form of treatment for ADHD. Use of stimulants does not increase substance abuse – in fact, studies show that the treatment of ADHD prior to adolescence markedly diminishes the incidence of substance use disorder and cannabis use disorder in individuals with ADHD.⁹

We strongly urge clinicians to counsel patients about the risk of cannabis and ADHD, especially in youth. Although we may not convince our patients to completely abstain, here are some guidelines:

1. Cannabis should not be used by youth under the age of 25.
2. Cannabis should not be used during pregnancy or lactation.
3. Synthetic cannabinoids and concentrated forms of phytocannabinoids ('dabs', 'shatter') are especially potent and dangerous to the Cannabinoid system in the brain.
4. Driving under the influence of cannabis is like driving under the influence of alcohol.
5. Cannabis should not be a daily habit as this increases harm and risk.
6. Cannabis is not a proven or effective treatment for ADHD.

A concern that many clinicians have is whether to treat ADHD individuals who are actively using cannabis and/or other substances. This is truly challenging and requires effort on both the part of clinician and patient to come to a safe compromise. As ADHD is a huge risk factor for Substance and Cannabis Use Disorder, successful management requires treatment of both conditions. Refusing to treat ADHD while an individual is using cannabis makes abstinence or reduction much more difficult, leaving the most vulnerable without support. ADHD medications appear to have less effect when used concurrently with cannabis and other substances – a fact that may help individuals reduce their substance use.

Another concern commonly raised is whether or not cannabis and stimulants have adverse interactions when used together. There is no data concerning combination of cannabis and stimulants, however as cannabis use is ubiquitous, it is likely that many are using prescribed medications and cannabis without mishap.¹⁰

There is still somewhat limited research on the effects of cannabis in individuals with ADHD, but the evidence to date suggests a negative impact on neuropsychological functioning. The heightened risk especially for individuals under age 25 contributing to lower educational attainment, impaired motivation and increased risk of psychosis is of great concern. For these reasons, CADDRA recommends that individuals with ADHD avoid cannabis.

References:

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3. Wilens TE. *The nature of the relationship between attention-deficit/hyperactivity disorder and substance use.* J Clin Psychiatry. 2007;68 Suppl 11:4-8
4. Lee, Steve S. et al. *Prospective Association of Childhood ADHD and Substance Use and Abuse/Dependence: A Meta-analytic Review.* Clin Psychol Rev. 2011 April; 31(3): 328-341.
5. Jacobus J, et al. *Neuropsychological Performance in Adolescent Marijuana Users with Co-Occurring Alcohol Use: A Three-Year Longitudinal Study.* Neuropsychology. 2015; 29:829-843.
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7. Meier, Madeline H. et al. *Persistent Cannabis Users show Neuropsychological Decline from Childhood to Midlife.* PNAS. July 30, 2012.
8. Mitchell, John T. *I use Weed for My ADHD: A Qualitative Analysis of Online Forum Discussions on Cannabis Use and ADHD.* PLoS One 11(5): e0156614.
9. McCabe, Sean E. et al. *Age of Onset, Duration and Type of Medication Therapy for ADHD and Substance Use During Adolescence: A Multi-Cohort National Study.* JAACAP, 2016 Jun; 55(6); 479-486.
10. Barkla, Xanthe M et al. *Are there any Potentially Dangerous Pharmacological Effects of Combining ADHD Medication with Alcohol and Drugs of Abuse? A Systematic Review of the Literature.* BMC Psychiatry (2015) 15:270.

Resources for clinicians and patients:

1. Cannabasics. <https://www.cpha.ca/cannabasics>
2. Canadian Pediatric Society <https://www.cps.ca/en/cannabis>