

Cannabis Treatment of the Pediatric Patient

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I have been a pediatrician for 25 years and a medical cannabis specialist for the last nine years, assisting thousands of adults and children with serious medical conditions in using cannabis treatment. I have evaluated hundreds of children with severe epilepsy, autism, and cancer and have seen many obtain an incredible improvement in their quality of life with cannabis medicine.

In medical school, I was taught that cannabis was a drug of abuse. I never thought of it as medicine until I saw a friend with a serious illness have incredible benefits from it. I started researching the scientific literature and was shocked to find that cannabis had so many medicinal properties. Since cannabis is classified by the federal government as an illegal substance, clinical trials in humans have been largely prohibited here in the US. Thanks to curious and diligent scientists, however, both here and abroad, we have an advanced understanding of how cannabis works as medicine. The medicinal compounds in the plant called phytocannabinoids and terpenoids work by interacting with a complex system in the brain and body called the endocannabinoid system. The endocannabinoid system is a signaling system responsible for maintaining balance of the chemical messages that are sent between our cells. We humans make compounds called endocannabinoids, “cannabis-like” molecules that are quite similar to the cannabinoids found in the cannabis plant, that work to maintain homeostasis - balance - of our cells. If you have an imbalance in these compounds, disease may result. We have only known about this system since 1988, but recent research has allowed us to understand that it is critical in the manifestation of disorders that have previously not been well understood or effectively treated.

There is a growing body of evidence that children with epilepsy, autism and psychiatric disease have a dysfunction within their endocannabinoid system. When this system is not working properly, the chemical messages in the brain are not balanced, and this imbalance is expressed as seizures, abnormal behaviors and thought processes.

I am often asked why I recommend cannabis to children despite the popular understanding that THC, the main cannabinoid responsible for psychoactivity, the “high” if you will, is bad for the brain. Studies have shown that a normal functioning endocannabinoid system is required for the maturation of the developing brain, and that by using THC, the brain may not develop as it should. Adolescence is a time when the developing brain is quite vulnerable, and interference in the normal changes that lead to a healthy adult brain can dramatically alter brain maturation. Research looking at otherwise healthy teenagers who use chronic heavy doses of THC has shown that there is some risk for increased problems with executive function, impulsivity, memory deficits, attention deficits, problems with decision-making, and lower overall and verbal IQ. There are many other variables involved in assessing these attributes, but the bottom line is that in a child or adolescent who is *medically well*, cannabis should be avoided so that the endocannabinoid system can do its thing - function uninterrupted and lead to the desired end result: a healthy and mature adult brain. What about children that are not medically well? Again, since we are lacking critical studies, we don’t necessarily know long-term effects. What we do know is that the cannabis plant gives us cannabidiol, also known as CBD, a compound that is not psychoactive but has tremendous medicinal value with its

anticonvulsant, antioxidant, antianxiety, antipsychotic, antiinflammatory and antitumoral properties. Strains of cannabis are being grown with higher amounts of CBD and lower amounts of THC, so-called CBD-rich strains. There is still a small amount of THC in these strains, but the overall effect is dominated by the CBD. It is important to note that there are no long term studies of CBD use in children, but those of us who are treating children with CBD are not witnessing any negative effects. In fact, we are seeing children who previously had very poor prognoses with uncontrolled seizures, developmental delay and cognitive dysfunction now *progressing* developmentally instead of regressing. Many are able to stop using toxic medications that may have not been effective. We cannot compare the healthy teenagers that are chronic heavy users of THC-rich cannabis, behavior which may result in interference of normal development, with severely ill children using CBD-rich cannabis which may repair the dysfunctional endocannabinoid system. My approach in treating children with cannabis is case-by-case; however, children suffering severe disease and not responding to conventional treatment and/or experiencing intolerable side effects, should have an option to use cannabis medicine, as the underlying cause may be within the endocannabinoid system.

I have found excellent results using CBD-rich medicine for children who have intractable epilepsy. Most of these patients have tried numerous antiepileptic medications without success and have the devastating consequences of ongoing seizures. The burden of this difficult disorder and subsequent negative impact on quality of life has triggered a parent-led movement advocating use of CBD-rich cannabis. Scientists have responded with a focus on research into how the endocannabinoid system may be a target of treatment for these patients. There is scientific evidence that people with epilepsy may have an endocannabinoid deficiency, leading to overexcitation of the flow of neurotransmitters in the brain, which leads to abnormal firing of the brain cells. Evidence also points to significant neuroinflammation in the seizing brain. The way that CBD works to reduce and stop seizures is being researched and so far, this is what we know: CBD enhances the brain's own endocannabinoid levels, enhancing the endocannabinoid system; CBD modulates the flow of calcium and potassium in neurons, thereby stabilizing these cells, and CBD works as an antiinflammatory, blocking formation of pro-inflammatory compounds and reducing toxic substances, resulting in a brain that is less inflamed. As you can see, CBD, with its multiple mechanisms of action, acts at multiple targets in the brain. This is why we think it works well for epilepsy. Since CBD does not activate the cannabinoid receptor the way THC does, it does not cause tolerance, and as it is not psychoactive, it is an ideal compound for pediatric patients.

A number of surveys of parents who are using CBD-rich cannabis oil to treat intractable epilepsy in their children report that over 75% have seen a reduction of seizures with little to no side effects, and approximately 15% report seizure freedom. In my practice, approximately 75% of patients had a 25% or greater reduction of seizures after three months of treatment. Approximately 38% of patients had greater than 75% reduction of seizures and 12% became seizure-free. Ten percent of patients discontinued use due to no effect. Approximately 16% did not see seizure reduction but saw reduced severity or duration of seizures. Beneficial side effects reported by parents included better sleep, more alertness, better mood, better appetite, improved focus and memory, more energy for therapy and play, and less emergency room visits and hospitalizations. One particular little boy came to my office on four seizure medications still having frequent seizures and experiencing many negative side effects. He was one of five children, and his mother said that life was terribly difficult because of his illness. She told me that all she wanted was to be able to take her kids to the park, which was something they hadn't been able to do since his seizures had become so frequent. After two months on cannabis oil, I received a text message from his mother asking "Guess where we are? At

the park!” This boy has been on oil for over two years with significant seizure reduction and a life-changing improvement in his (and his family’s) quality of life.

In most cases, the oil is administered under the tongue, swallowed by mouth, or given through a gastrostomy tube. I insist that my patients use laboratory tested solvent- and pesticide- free cannabis oil. Adjustments in dosing and the CBD:THC ratio are often required after periods of observation, and sometimes different strains of CBD-rich cannabis must be tried before seeing a clinical response.

Many parents also come to my office seeking help for their children suffering with autism. The three main symptoms that are challenging for these families are communication difficulties, repetitive behaviors, and social challenges, including tantrums and self-injurious behavior. Although the FDA has approved two medications, both antipsychotics, for treating the irritability associated with autism, they have very significant side effects, may not be effective and thus leave these families without a solution.

Preliminary evidence links genetic mutations with autism and a deficit in the endocannabinoid system. The endocannabinoid system regulates emotional responses, including anxiety, behavioral reactivity to context, social interaction, and the function of the immune system, all of which are aspects of autism. Right now it is unclear, based on current understanding of the alterations in the endocannabinoid system in children with autism, if activating the system or blocking the system will help with the symptoms. However, one case report and numerous anecdotal reports reveal that cannabinoids may help some children with this disorder have better communication, less repetitive behaviors, less anxiety and better social interaction. I have medically supervised the administration of CBD-rich, THC-rich and combination CBD+THC cannabis preparations, often taken as sublingual or swallowed oil or edible preparations. Approximately 50% of parents report improvement with less anxiety, better sleep, improved speech, better focus and learning, and less tantrums with cannabis treatment. Some patients showed worsening symptoms, and after the treatment was discontinued, the patients returned to baseline. In those who have responded positively, there are no reports of adverse side effects. Since autism is a spectrum disorder, it is difficult to generalize results. I treat each patient based on their unique characteristics, but it is clear to me that some are responding to cannabis treatment with improvement in their quality of life and without unwanted side effects.

I am often asked to see children who are suffering with advanced cancers. Parents seek cannabis medicine to help their children with relief of symptoms from the adverse side effects of chemotherapy and radiation. In some cases, having been told the cancer treatment is not working, parents are desperate to find a cure. I teach parents what we know and what we don’t know about cannabis use for cancer, knowing that they must have the data to make an informed decision.

Cannabinoids have been shown in animal studies to inhibit tumor growth, cause cancer cells to commit suicide, inhibit metastasis and inhibit growth of new blood vessels in tumors. Additionally cannabinoids have also been shown to enhance effects of certain chemotherapeutic agents. There is only one published study in humans that used THC in nine patients with glioblastoma multiforme, an aggressive brain tumor. Human trials have been prohibited in the U.S. due to the Schedule I designation of cannabis in the Controlled Substance Act. We are lacking critical human research that answers the questions of which specific cancers respond to cannabis, which cannabinoids to use, what dose to use and what duration of treatment is needed to achieve survivorship.

Although most reports of cancer “cures” are anecdotal, a case report from Canada of a 14-year-old girl with an extremely aggressive form of leukemia successfully documented a dose response to cannabis oil. After not responding to numerous conventional treatments, her parents decided to try treatment with concentrated cannabis oil. This patient was not on other treatment while using cannabis, and the blast cell count (which is the leukemia count) responded to adjustments in dosing frequency and dose potency of the cannabis oil. Her physicians documented this response and were able to note that dosing intervals (how long between doses) and the potency of oil had a direct impact on the death of the leukemia cells.

I have used cannabis medicine to treat a number of children with advanced and life-threatening cancers, either to help them tolerate the terrible side effects of the cancer treatment, or in a compassionate effort to try to save the child’s life. The parents of my patients are convinced that the addition of cannabis to the child’s regimen has helped them to achieve reduction of disease. Some patients come to me too late in their course, and all I can offer them is relief from symptoms and a decent quality of life before they pass.

One particular case of a teenager with metastatic bone cancer is worth noting. The patient had been diagnosed two years prior to starting cannabis and was sent to me by the oncologist as the cancer had stopped responding to treatment and was spreading to more parts of the body. The parents had been told that the child was not going to survive. I started the patient on high dose cannabis oil in a CBD:THC ratio of 1:1. The palliative dose of chemotherapy was continued as an animal study showed that cannabinoids, when added to this particular chemotherapeutic agent, worked synergistically to enhance cancer cell death. This patient is now cancer free after nine months of cannabis oil added to chemotherapy. The prognosis at the time cannabis treatment was initiated was extremely poor, and it is still unclear what worked to achieve these results. We must be very careful with claims of “cancer cure,” but cannabis has certainly extended life for this child. If cannabis can be freely studied by scientists, we will be able to save so many.

There are a number of criteria that I require for the cannabis products used by my pediatric patients. Most pediatric patients are using cannabis in the form of oil. I recommend that the oil be *concentrated*. Children with epilepsy and cancer often require high doses and if the oil is not concentrated, larger amounts must be taken, which can be challenging with an uncooperative child. The more concentrated the oil, the smaller the volume that needs to be taken. *Consistency of strain* is extremely important. Many pediatric epilepsy patients have tried numerous CBD-rich oils and have only found one to work, showing that for some, the strain of the oil is very important to achieving a successful response. CBD-rich strains are not interchangeable for many of these patients. Additionally, *all oils must be tested* for potency, terpenoid content, presence of contaminants, residual solvents and pesticides. A parent of one of my patients received oil from a neighbor who generously donated it to her ill child. I insisted that she have it tested prior to use, and it was found to contain 9% rubbing alcohol, teaching us that despite all good intentions, testing is mandatory before use. The oil supply must be *reliably available* as many of these children are able to wean off of other drugs. It is life-threatening for a child with severe epilepsy who is on lower doses of or who has discontinued other medications to not get their oil. Also, the oil should be *affordable*. Some parents report that they cannot increase doses because the out of pocket cost is too much.

The concerns that many have about using cannabis in these patients is mostly related to THC and its psychoactive effects, but I have found that CBD is an effective treatment for many. Children previously

devastated by uncontrollable seizures regain control and have developmental progression instead of regression. Some of my patients with autism have had results that now allow them to attend school, have less anxiety and achieve a quality of life that was thought to be unattainable. Children suffering with cancer can tolerate treatment and some have had extended life. I don't use the word "cure" as we desperately need more studies; however, I believe that we can get there if allowed to proceed with proper research. While important to note that cannabis may not work for everyone, after witnessing some of the sickest children who were alive but not living, finally get a decent quality of life, I feel quite strongly that cannabis needs to be an option for all those who are ill. As Dr. Raphael Mechoulam, who has led the investigation into cannabis as medicine over the last fifty years, stated, "plant cannabinoids are a neglected pharmacological treasure trove."

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