### Ask the MD: Medical Marijuana and Parkinson's Disease

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When it comes to treating Parkinson's symptoms, especially with non-traditional approaches, many people are curious if and how medical marijuana might work, and what research supports it.

As of May 2018, the U.S. Food and Drug Administration (FDA) has not approved medical marijuana for any use. But 29 states and the District of Columbia have legalized medical marijuana for certain conditions; in some states, this includes Parkinson's disease (PD).

Here we answer common questions about medical marijuana and Parkinson's.

**What Is Medical Marijuana?**
Medical marijuana is marijuana used to treat disease or ease symptoms of disease.

Marijuana, or cannabis, comes from the plant Cannabis sativa. Marijuana contains approximately 100 different compounds called cannabinoids. The main cannabinoid, **tetrahydrocannabinol (THC)**, causes the "high" -- variably described as happiness, amusement or contentment -- that comes with marijuana. THC may help nausea, pain or muscle spasms, but it also can affect mood, behavior and thinking. The second most common cannabinoid, **cannabidiol (CBD)**, doesn't cause mind-altering effects and could potentially have beneficial effects for treating disease.

Marijuana and cannabinoids can be taken several different ways -- smoking dried leaves, swallowing pills or spraying liquid under the tongue are a few examples. The amount of THC, CBD and other cannabinoids varies in each different formulation (and plant).

**What Is the Research on Cannabinoids and Parkinson's?**
**Our bodies make natural cannabinoids** that control sleep, appetite, mood and other processes by binding to receptors throughout the body and brain. These receptors are found in particularly high numbers in the basal ganglia, a circuit of brain cells that controls movement and is affected in Parkinson's. Because the cannabinoids in marijuana bind to the receptors in our body and brain, researchers have looked at whether they could bind to basal ganglia and other receptors to modify the course of PD or help ease symptoms of disease.

Pre-clinical work, including several studies funded by MJFF, shows that **cannabinoids may protect brain cells** through antioxidant and anti-inflammatory mechanisms.

Clinical studies have evaluated whether marijuana can ease Parkinson's motor and non-motor symptoms as well as [levodopa-induced dyskinesia](https://www.michaeljfox.org/understanding-parkinsons/living-with-pd/topic.php?dyskinesia&navid=dyskinesia), involuntary movements that may result with long-term use of levodopa and many years of living with PD. In general, trials show mixed results (some positive, some negative), which leaves patients, doctors and researchers with **insufficient evidence that medical marijuana and cannabinoids are an effective treatment for Parkinson's**.

Notable trials on motor symptoms (tremor, slowness, stiffness):

* A randomized, placebo-controlled, double-blind trial\* of two different doses of [CBD capsules improved quality of life but not motor symptoms](https://www.ncbi.nlm.nih.gov/pubmed/25237116) in 21 people with PD.
* An open-label study\*\* of [smoked marijuana decreased tremor and slowness](https://www.ncbi.nlm.nih.gov/pubmed/24614667) in 22 people with PD.

For non-motor symptoms:

* An open-label study\*\* of [CBD tablets decreased psychosis](https://www.ncbi.nlm.nih.gov/pubmed/18801821) -- hallucinations (seeing things that aren't there) and delusions (having false, often paranoid, beliefs) -- in six people with PD.
* An open-label study\*\* of [CBD tablets lessened symptoms of REM sleep behavior disorder](https://www.ncbi.nlm.nih.gov/pubmed/24845114) (acting out dreams) in four people with Parkinson's.

Formal studies on other non-motor symptoms have not been conducted, but many individuals cite anecdotal benefit on pain, anxiety and sleep problems (as well as motor symptoms).

Noteworthy trials on levodopa-induced dyskinesia:

* A randomized, placebo-controlled, double-blind trial\* of a [capsule containing THC and CBD did not improve dyskinesia or motor symptoms](https://www.ncbi.nlm.nih.gov/pubmed/15477546) in 17 people with Parkinson's.
* A randomized, placebo-controlled, double-blind trial\* of [nabilone (an FDA-approved man-made cannabinoid for chemotherapy-related nausea/vomiting and AIDS-related weight loss) improved dyskinesia](https://www.ncbi.nlm.nih.gov/pubmed/11739835) in seven people with PD.

\*In a randomized, placebo-controlled, double-blind trial, one group of participants receives the study drug while another receives placebo (an inactive substance that looks exactly like the study drug). Neither participant nor researcher knows who is getting study drug or placebo.
\*\*In an open-label study, there is no placebo group, and both participants and researchers know what treatment is being given.

**Why Is Researching Marijuana Difficult?**
Several factors limit the ability to perform research on marijuana and interpret results.

Regulations surrounding marijuana research may deter investigators. The federal government classifies marijuana as a **Schedule I drug**, a category reserved for drugs that have no current acceptable medical use and a high potential for abuse. [The Michael J. Fox Foundation and others have previously called for a reclassification of marijuana](https://www.michaeljfox.org/foundation/news-detail.php?mjff-signs-letter-supporting-medical-cannabis-research), which would make it easier to conduct research.

Interpretation of research results is hampered by many variables, such as **lack of standardized or known doses**, and **variable CBD and THC concentrations**. Parkinson's research uses many different formulations (oral cannabinoids and smoked marijuana, for example) and varied doses. This difference in formulation and dosing from person to person and study to study makes it challenging to guide the use of marijuana for medical purposes. **Study size and design also can limit interpretation**. Most marijuana studies include small numbers of patients. When few patients test drugs, it's less likely the group represents the larger Parkinson's population and results (either positive or negative) can be easily applied to most people with PD. Some studies use questionnaires where people report their symptoms and marijuana use; others lack a placebo group. Results from such trials can make it difficult to determine how much potential benefit may be due to drug versus placebo effect.

**What Should You Know about Medical Marijuana and Parkinson's?**
If you're considering medical marijuana, you and your doctor should weigh the potential benefits and risks, just as you would with any therapy. In low doses, cannabinoids appear to be relatively well tolerated. But like any other drug, medical marijuana has potential side effects. These may include nausea, dizziness, weakness, hallucinations, and mood, behavior or memory/thinking (cognitive) changes. Discuss possible influences on cognition, mood and balance, especially if you are already experiencing changes in these areas. It's unclear how and to what extent marijuana could exacerbate these symptoms.

The potential for drug interactions between marijuana and prescription or over-the-counter medications is largely unknown, but adding marijuana to a complex regimen of medications could present a risk. As when adding any new therapy, review all your medications with your doctor and pharmacist.

Risks of long-term marijuana use haven't yet been established. Outside of clinical trials however, many years of marijuana use are associated with an increased risk of mood disorders and, particularly with smoking, lung cancer. And estimates state that about nine percent of users become addicted.

**Is Medical Marijuana for You?**
As of May 2018, the District of Columbia and 29 states have passed legislation allowing the use of marijuana-based products for medical purposes. The authorized medical conditions, formulations, and patient and physician requirements are different in each state. Typically patients must register in order to possess and use cannabinoids, and a physician must document an authorized condition in order for a patient to register. Under federal law, doctors cannot prescribe marijuana or cannabinoids, but certain states allow qualified doctors to issue "certifications" that permit patients to obtain medical marijuana. (Note that many doctors choose not to pursue qualification and therefore are not able to issue certifications.) Also, even if Parkinson's is an authorized condition for use, there may be additional requirements. In New York State, for instance, a person must have PD plus at least one associated condition -- extreme malnutrition, severe or chronic pain, severe nausea, seizures, or severe or persistent muscle spasms.

Talk to your doctor if you're thinking about medical marijuana. Your personal physician can help you review the latest research, the pros and cons, and how the therapy might fit into your regimen.

**What Are the Next Research Steps?**
The work to date on marijuana and cannabinoids has given promising but conflicting signals on potential benefit for motor and non-motor symptoms as well as levodopa-induced dyskinesia. This therapy may represent a future treatment option for PD, but the correct dose and formulation are not clear, full side effects and drug interactions are unknown, and benefits have not been rigorously determined. Future studies should be large and well designed to provide clear data on the safety and efficacy of marijuana and cannabinoids in Parkinson's.