

CBD Oil For Athletes

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CBD is one of the two principal components of the cannabis plant with the psychedelic substance Tetrahydrocannabinol (THC) being the other. While THC is prohibited during competition, since January 1st 2018 CBD underlies no restrictions at all.

The specific ruling is that synthetic CBD without any THC residues is allowed. The practical problem is that there is no synthetic CBD available on the market at this point. Only naturally extracted CBD oils, which potentially have THC residues. So as you can see CBD for Athletes is an untapped market and many people tread really careful here.

I have prescribed CBD only in a medical context with the indication of epilepsy, but have not used CBD with athletes. Currently, the risk of THC contamination is too large for me to suggest CBD to any athlete. But I think there is a big potential that will be uncovered in the next months and there will be THC free products for athletes. So I want to get you up to speed what CBD is and how it can help athletic performance. Then you will be prepared when safe CBD hits the market.

I suggest you read my article „BLISS : The biochemistry of happiness“ first, to understand the basics of the human endocannabinoid system, because in my opinion a well functioning endocannabinoid system is necessary to get the best out CBD. Without an optimal endocannabinoid system it is possible that you need larger amounts of CBD to achieve a good effect.

Also, you can check out an interview I did with an MMA Fighter, who has experience taking CBD.

THE BASICS

In simple terms it is easy to think of CBD doing exactly the opposite of what THC does in our body.

THC stimulates appetite – CBD suppresses appetite
THC is psychoactive – CBD is anti-psychotic
THC „gets you high“ – CBD makes you clear-headed
THC disrupts the nervous system – CBD balances the nervous system
THC can increase anxiety – CBD decreases anxiety

This is because THC activates our cannabinoid receptors CB1 and CB2, while CBD does not act on them directly. It only modulates them. It makes the receptors easier accessible for other (endo)cannabinoids.

What makes CBD very special compared to THC is that it inhibits the enzyme FAAH. If you read my article „BLISS : The biochemistry of happiness“ you remember that FAAH is responsible for breaking down the human endocannabinoid anandamide (the bliss molecule). This means that CBD effectively increases our bodies own levels of anandamide and thereby giving us more bliss. Because CBD also makes the endocannabinoid receptors easier accessible for this anandamide you can think of CBD as an amplifier of the human cannabinoid system.

But CBD being the amplifier also means that pure CBD (without THC) is basically useless if an individuals endocannabinoid system (receptor density + anandamide levels) is really bad to non-existent. This is an absolute KEY piece of information! When you will dive into the literature about CBD you will quickly discover that CBD alone is pretty inefficient. Only in combination with other cannabinoids will it develop its full efficacy. Now this can be THC, this can also be other cannabinoids from the cannabis plant, but this can also be anandamide, which is produced by our bodies if our endocannabinoid system functions right. The significance of this becomes evident, when we realise that the WADA only allowed ISOLATED CBD. So how can ISOLATED CBD be of any effect? The only way we can maximise its potential is by improving our own bodies endocannabinoid system with adequate production of anandamide.

The individual variance in the functioning of the endocannabinoid system is also the main reason why CBD dosing ranges are widely fluctuating inter-individually. So again, before embarking on the CBD journey, implement habits that improve your own endocannabinoid system.

How CBD Can Benefit Athletes

It has been found that CBD has positive effects on a wide array of medical conditions ranging from epilepsy, depression, anxiety, cardiomyopathy (heart muscle damage) and alcoholic liver disease to nephrotoxicity (kidney disease), neuroinflammation, colitis (inflammatory bowel), and cancer. But studies on the effects of CBD for athletes are close to non-existent. I will try to translate the medical findings to possible benefits for athletes.

Inflammation

CBD is a powerful anti-inflammatory. We see this by the positive effect it has on inflammation of the nervous system, the bowel or the liver. When speaking to athletes I sometimes say : „Inflammation is the opposite of regeneration“. And this is true in the sense that doing or consuming things that produce inflammation will prolong our recovery. Sugar, alcohol, lack of sleep and also training all increase inflammation to some degree. So when we want to maximise regeneration and thereby the results we get out of training and life, we need to minimise inflammation between training sessions.

On the other hand inflammation is NECESSARY to improve anything in the body. When you play guitar your fingers need to get inflamed and sore, before they will grow thicker skin for you to play the guitar longer. When you want to become stronger your muscles and nervous system need to become inflamed to attract the construction team (immune system) to increase muscle proteins and neural wiring. For optimal results in training we need to spike inflammation hard for a couple of days and then minimise inflammation on the other days. This is basically the biochemical foundation of all periodisation models.

To go harder in training (produce more inflammation) we might consume coffee (or other stimulants) or listen to loud music. But what are we doing to go harder in recovery? And that's where anti-inflammatory substances like CBD come in.

A research team from Canada tested the effects of CBD on joint inflammation in mice. They chemically induced arthritis in the knees of mice (yeah they can do that). When they then injected the knees of the mice with CBD, the inflammation got better and the mice had significantly less pain. They even showed that when CBD is being applied BEFORE the development of arthritis it can partially prevent the development of arthritis in the first place. Another joint research team from the UK and Israel showed that a local injection in the knee is not necessary to achieve these results. They used CBD oil orally and achieved similar results. When they applied CBD, the progression of arthritis stopped completely. When they later autopsied the mice they also found that the mice that consumed CBD had a lot less joint damage.

An interesting pattern across these and other similar studies is that the effects are bell-shaped dose-dependant. This means there seems to be an optimal dose. Taking too little or too much CBD will reduce the positive effects. „The more the better“ does not apply here. When taking too much CBD the positive effects disappear. Pain seems to be (at least from the animal models) a good monitoring tool to find the optimal dose. The same dose that had the best effects on acute pain also had the best effects on long-term inflammatory status and joint health.

So this is big time. Arthritis is a debilitating condition. The mechanisms between chronic arthritis and joint pain during intense training periods are not exactly the same, but they very similar. So if only parts of the animal models translate to humans there is big potential for CBD to manage inflammation and pain between training sessions/competition.

Neurogenesis And Stress Management

CBD also has many interesting effects on the nervous system. It not only reduces inflammation in the central nervous system and has cancer fighting properties for a special type of brain tumour, but it also increases neurogenesis. Neurogenesis is the growth of new brain cells. It was found that brain cells that suffered “stroke” recover faster with CBD. What happens in a stroke is that areas of the brain don't get enough oxygen and die. This can lead to speech or

movement impairment. Some never recover from that and have a limb arm or similar for the rest of their lives. All strategies that improve the growth of new nerves improve the chance of recovery.

What does that mean for athletes? They might not have a stroke but neurogenesis is part of their everyday lives as well. Think : Skill Acquisition. When learning a new skill it is nothing more than the re-wiring of neuronal connections. The more efficiently the wiring, the more efficient the skill, and the less „brain power“ it requires. When something becomes „intuitive“ it only means the re-wiring has maximised in efficiency. So the more re-wiring happens on a daily basis, the faster skill acquisition will be. I will be interested to see some further studies specific to CBD in skill acquisition in humans.

A research team from Brazil also tested what CBD can do for people with social anxiety (fear of public speaking). A single dose of 600mg CBD significantly reduced the levels of anxiety and cognitive impairment when public speaking, compared to other individuals who only took a placebo. The research team found out that this is mainly because the CBD group completely stopped „self-evaluation“ during the public speaking performance. They did not „overthink“ how they may appear in front of the audience. They just performed. It is fairly easy to conclude what this can mean for athletes. If there was a pill to stop “overthinking” in athletes, or maybe even a pill that catapulted them into the “flow state”...yeah...that'd be very interesting.

On a very similar note CBD seems to selectively kill off some memories while keeping others. What adaptive sense does it make to kill some memories? Well let me explain with a study they did on mice. They did a basic Pavlov conditioning drill with them. They rang a bell and a second later they zapped them with an electrical shock. They did this so many times that the mice already panicked when the bell rang; even before they got the shock. They did this many times per day for weeks.

They then split the mice in two groups. One group received a placebo and another group received CBD. They continued the experiment with a slight variation. They stopped applying the shock after the bell. They only rang the bell without the shock. It turns out the mice still panicked after hearing the bell, even though there was no electrical shock. They were conditioned with panic. The bell rang and the mice panicked. They got a stress response even though the shock never came.

But what happened over the next days was interesting. The mice that received the CBD forgot faster about the connection between bell and shock. While the placebo mice still jumped after the mere sound of the bell, the CBD mice were already calm and relaxed when the bell rang. The CBD mice just “forgot” that the bell should lead to panic. This is where forgetting something can be quite adaptive. This is called the fear-extinguishing mechanism and it has been researched quite well. CBD improves the fear-extinguishing mechanism.

Do you know of a situation where athletes or yourself associate a stimulus with a bad feeling? For example you played a terrible game the last time 5 times you played in Atlanta, and the next time you play in Atlanta a fear in you rises that you might repeat a bad performance? Wouldn't it be nice to just go out and play to the best of your abilities and not let the fear about what happened last time reign over your performance?

This is the mechanism behind the anxiety-reducing effects of CBD that have been shown over and over. Don't get me wrong. Anxiety, Fear and also fear-based memories are not exclusively bad. It would be terrible to not have those, because then we would touch the hot stove everytime or cross the streets without looking left and right. But sometimes the „worrying“ and anxiety can go overboard. Many athletes struggle with that. CBD can be one part of a solution.

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Sleep Improvement

Anecdotally, CBD is very good for improving sleep quality. When I researched this topic in the medical literature I found this to be true. When I dug deeper to find out WHY it improved sleep I found just the opposite. CBD does not improve sleep. CBD improves wakefulness. When mice are injected with CBD they are more awake and their levels of dopamine, noradrenaline and serotonin all rose higher. A clear indication of CBD improving wakefulness and alertness.

How can it be that many reports exist that show that CBD will improve sleep disturbances in humans, while the biochemistry speaks a different language?

Lets think of it this way: There are two ways of improving sleep. First, to make somebody sleepy at bedtime. Second, to make somebody alert and awake at daytime, and thereby making him sleepy as soon as the sun goes down. So when we think of somebody being sleepy during the day we might conclude that he did not sleep well. But maybe it is the other way around! Maybe he did not sleep well because he never woke up during the day! And this is where CBD does its magic. It does not improve sleep. It improves being awake.

What to look for in a CBD product

The most important thing to consider when trying out CBD as an athlete is safety with regards to WADA regulations. I will not give specific product recommendations, but we can look at some principles.

CBD is always being extracted from the Cannabis plant (to my current knowledge of the market). Therefore every CBD product always carries the risk of THC contamination. CBD can be extracted from industrial cannabis (hemp), which is almost THC free. The quality of the CBD oil from industrial hemp is not very good and it can also be quite expensive, because they need a lot of industrial hemp to get some CBD out of it. I think a CBD oil should come from medical (real) cannabis.

There are three steps in the process of creating a good and safe CBD product.

- 1) Choosing the right plant to begin with
- 2) CBD extraction
- 3) separation of CBD from THC

The base plant has to be carefully chosen, because the levels of THC and CBD can vary greatly. It makes sense to start with a plant that is very high in CBD and very low in THC. Only companies that specialise in CBD production are able to do that. There are some companies that handle marijuana mainly for its THC content who also produce CBD oils. I wouldn't not recommend buying from these companies when you are an athlete. Only buy from companies that specialise in CBD oils.

The two main methods to extract the CBD from cannabis are oil extraction and CO2 extraction. In oil extraction, an oil (e.g. canola or olive oil), will get heated together with the plants and the fat soluble substances from the plant (THC and CBD) will diffuse into the oil. This is also the first step in making hash brownies and as you can imagine there is a high risk of the end-product containing THC, even when the base plant is low in THC. The better method of extracting the CBD is called supercritical CO2-extraction. This process needs heavy machinery. The advantage is that, by being able to closely control pressures and temperatures in each step of the process, the CBD and THC can be separated during the process to get a much cleaner CBD product with minimal risk of contamination.

A good producer will answer your E-mail or call and give you detailed lab reports of the contents of the final product. But, like stated in the beginning, I haven't found a supplier who is able to be completely transparent about origin of the plants, THC/CBD contents of the plant, production **PROCESS**, lab reports of the final product, and secured stability of the final product.