

a mild but common side-effect

Xerostomia (better known as Cotton Mouth)

When exogenous cannabinoids are consumed, increased activation of CB1 and CB2 receptors in the salivary glands causes saliva levels to drop.

By Joshua Ahn

A dry feeling in the mouth, often described as “cotton mouth,” is a fairly common side effect of consuming cannabis. In medical literature this condition is known as *xerostomia*.

As reported in 2006 by Juan Pablo Prestifilippo and colleagues at the Centro de Estudios Farmacologicos y Botanicos in Buenos Aires, cotton mouth from cannabis is caused by increased activity at cannabinoid receptors (both CB1 and CB2) located in saliva glands. This results in reduced saliva output—hyposalivation).

A 2011 study by Olga Kopach and Juliana Vats at The State Key Laboratory of Molecular Biology in Kiev confirmed that under normal conditions, cells in saliva glands use endocannabinoid signaling as part of a feedback mechanism to prevent excess amounts of saliva from accumulating in the mouth.

When exogenous cannabinoids are consumed, increased activation of CB1 and CB2 receptors causes saliva levels to drop significantly, producing feelings of dryness in the mouth.

Kopach also found that the two receptors produce slightly different effects on a cellular level.

CB1 receptors predominantly modulate the flow of saliva, while CB2 receptors seem to influence consistency and content of saliva (such as sodium levels).

Drugs that antagonize the cannabinoid receptors induce an increase in saliva output. Kopach used AM251 (which targets CB1) and AM630 (targets CB2) to show that the decreased saliva output caused by THC consumption is reduced or even blocked when antagonist drugs are administered.

Cells in the salivary glands can synthesize anandamide. Exploration of the endocannabinoid system in the mouth may lead to new therapies for people with serious salivary problems.

It may even be possible to develop a cannabinoid antagonist chew that would reduce cotton mouth or help people with other forms of dry mouth. This chew could be spit out before being swallowed so the

effects stay localized in the mouth.

Although the mouths of cannabis consumers may feel dry on occasion, THC and the other plant cannabinoids do not cause dehydration throughout the body. This is why cannabis does not cause severe hangovers the way alcohol does. The body is not becoming dehydrated—saliva remains inside the glands instead of being secreted. The moisture is there, it's just not being released into the mouth and throat.

Cotton mouth may be bothersome, but it is readily resolved by drinking water—a healthful thing in and of itself.

A Possible Concern

“Our saliva washes away sugars and other substances that help promote cavities. It neutralizes the acids in our mouths,” explains Gene Watson, D.D.S., Ph.D.

A comprehensive Index-Medicus review by J Guggenheimer from the University of Pittsburgh shows that dry mouth in different types of cases (not just cannabis-induced) may be connected with greater risk of dental cavities. Saliva contains compounds that protect teeth from decay. When salivation decreases parts of teeth which are normally protected from cavities become more vulnerable to damage.

Although no pattern of tooth decay has been associated with cannabis consumption, some anecdotal evidence is concerning. A consumer we'll call Valerie recently needed extensive dental work due to multiple cavities. She was told by her dentist that the pattern of decay suggested that the cause was oral dehydration. The dentist asked if she was consuming anything that would make her mouth dry? The only thing she could think of was her frequent episodes of cotton mouth which she didn't tell the dentist about. She now makes a better effort to stay hydrated.

One study by Swiss researchers compared 43 cannabis consumers and 42 cigarette smokers and found no increase of decayed or filled surfaces, plaque or gingivitis amongst the cannabists. But the cannabis consumers were found to have more

cavities on smooth tooth surfaces when compared to a group of abstinent Swiss Military recruits.

Water is the antidote.

Other negative side effects from cotton mouth are mostly trivial. Stale breath may be a concern, as is the need to make sure the mouth is hydrated before biting into dry foods. Eating crackers with severe cotton mouth can become quite a challenge without a good sip of water first. Exercise with cotton mouth can also lead to a very parched sensation in the throat. Water is the antidote.

A Beneficial Effect?

Because cannabis increases the desire to drink fluids while not actually causing problematic dehydration, it may improve water intake allowing for a large variety of health benefits. My consumption of cannabis has made me much more mindful of the amounts of water I consume.

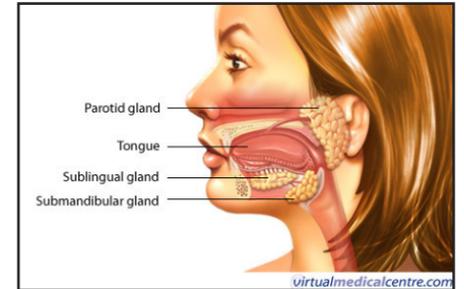
Nutrition experts such as the European Food Safety Authority recommend that the average adult should drink eight to 10 glasses of water per day. Those who exercise or perform physical labor may need as many as 12 glasses per day for optimal well-being.

43% of adults in the U.S., according to the CDC, only drink three cups of water per day, or less.

Yet 43% of adults in the U.S., according to the CDC, only drink three cups of water per day, or less. Low water intake is connected with impaired immune response, lack of focus, kidney and digestive problems, dry skin, blemishes, slow metabolism, increased blood clot risk and migraines. Sufficient water consumption is associated with mental clarity, better weight control, clearer skin, improved muscle function, enhanced immune response, effective digestion, good kidney health and feelings of wellness.

Minimizing Cotton Mouth

The unwanted effects of cotton mouth are mainly reduced through being mindful



SALIVARY GLANDS

of oral hydration. When consuming cannabis, regularly, sip on water and if possible maintain proper electrolyte balance.

Eating juicy fruits is recommended. Chewing gum or sucking on hard candy is also recommended by some consumers. One friend has made a ritual of always preparing tea with his cannabis to keep his fluid intake up.

Breathing through one's nose rather than mouth may also be helpful. This is known to reduce moisture loss in the mouth and throat and has helped me deal with cotton mouth. I used to smoke cannabis daily and my sinuses would be constantly congested, making breathing through my nose essentially impossible. I have since switched to only eating and vaporizing it and now my nasal passages are clear. This has significantly allowed me to breathe better through my nose.

Alcohol, caffeine, salt and sugary foods can all contribute to dehydration. Pharmaceutical drugs and medications may also induce dry mouth. Almost two thirds of the most popular prescription drugs list oral dehydration as a side effect. Reducing intake of these substances or drugs may help to alleviate cotton mouth symptoms.

A reminder to stay hydrated

It's reassuring that cannabis use won't dehydrate us in a way that can be incapacitating (as is the case with alcohol). Next time some surprisingly strong cannabis causes your mouth to feel dry, use it as a reminder to increase your water intake. That way, you can turn a mild symptom into an important health benefit.

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O'Shaughnessy from previous page

Sharif in Dum-Dum [near Calcutta]. Dr. Sharif healed 13 Europeans through the use of some narcotic-type medicine. It was much less toxic than quinine.

Similarly, a surgeon named Dicken in Balasore treated three Europeans and didn't notice any negative reactions. In the cases where a lot of people hesitate to use Quinine, this can be used safely.

Many members of the Society use rusot for eye inflammations. This medicine is found in all markets. It is extracted from the bark and trunk of a tree called Barberry. It is equivalent to Osisa written about by Greek and Arab authors. O'Shaughnessy used berberine for patients afflicted with fever. For patients afflicted with gonorrhea he used aloe, which is found everywhere in India.

He mentioned a narcotic-type medicine produced from the weed Nux Vomica. This plant is found in abundance in Sylhet. Its local name is 'kuchilaka malong.' Its use in patients afflicted with rheumatism and paralysis is particularly noteworthy. In Cuttuck, its price is one mon per rupee.

On Indian Hemp

O'Shaughnessy wrote an article about the use of Indian ganja. It described the use of bhang in:

- Treatment of patients inflicted with rheumatism with the use of bhang.

A well-known person named Amir made majoon in front of O'Shaughnessy quite a few times.

- Treatment of patients inflicted with hydrophobia [rabies]
- Treatment of cholera
- Treatment of tetanus
- A case of deformed limbs

O'Shaughnessy acknowledged those who supplied him with facts about ganja —Said Kermat Ali Mutali of Hooghly's Imambara and Hakim Mirza Abdul Rajes of Tehran, foremost. According to them, during this time ganja was used in contemporary Kabul, Kandahar, and the regions between Sindh and Herat.

He got to know the opinions of ancient Sanskrit pundits from Pundit Madhusudan Gupta. Asiatic society's Pundit Kamlakanta Chakravarty informed him about Hindu plant science. M.D. Kasta provided him data about plant science published in Parsi and Hindi languages. Many contemporary Indians used to mix vegetables, siddhi, and bhang together as a drinkable liquid. During that time, there was a particular process used to make siddhi. Even well-to-do Muslims were familiar with this process.

One of the established processes during that time was to use tobacco mixed with ganja. During that time, majoon or a type of narcotic confection was made by

mixing sugar, butter, flour, milk and sid-dhi or bhang. A well-known person called Amir in Calcutta made majoon in front of O'Shaughnessy quite a few times. In contemporary Calcutta, seven or eight people were familiar with this process.

Customers used to get their majoon made from these people according to their own needs. Contemporary Arabian and Parsi doctors used to think that using majoon for a long time did not lead to bad results such as insanity and infertility. They observed increased appetite and libido...

O'Shaughnessy did not limit himself only within medical science and chemistry. His contribution in transmitting telegraph news through electrical science was unparalleled. In November 1853, the work of the first telegraph transmission was started between Calcutta and Agra, and it ended the following March. In January 1855, the work from Agra to Bombay and Atak was started.

He was an Honorary Fellow of the London Royal Medico-Botanical Society. He was a corresponding member of the Enland Medical Association and Washington's National Institution.

He retired from work in 1862 and on January 22, 1889 he died at 80 years of age.