

Cannabis and Dentistry

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Over the past decade, marijuana usage has significantly increased in the U.S. population due to legalization of the drug both medically and recreationally. Medical marijuana is now legal in thirty states and recreational in nine. The ADA reported that since this change in legislation, the usage by adults ages 50 to 64 doubled whereas adults over 65 increased by seven-fold.¹ In a 2017 Gallop poll, it was shown that nearly 64% of Americans support legalization of medical marijuana. This growing positive support of usage of this drug rings for the medical community to take note of how this drug can affect treatment of patients who use marijuana and how marijuana can be an effective treatment for particular medical conditions. Dentists should be keenly aware of these benefits and adverse effects as now in certain states, including Maryland, they can be issued certificates to prescribe medical marijuana. There is still a great deal to be understood about this FDA Schedule I drug, but with this large spike in usage by the American community, it is vital to note the potential for applications in pain management for dental procedures as well as post-operative anesthesia management.

The notable pharmacological properties of marijuana are tetrahydrocannabinol, THC, and cannabionoids, CB. Strains of marijuana are classified by their ratio and varying concentrations of THC and CB. The strain Cannabis Sativa has a higher ratio of THC to CBD. THC is the psychoactive component of marijuana, which holds to Sativa's effects of euphoria and paranoia.⁸ Sativa is a mild sedative, mood enhancer and has antiemetic properties.⁸ Cannabis Indica has a higher ratio of CBD to THC, and studies done by *Pearce et al* have shown that it is effective in relieving pain, nausea, headaches, neuropathy, seizures, joint pain, appetite loss and insomnia.⁸ Biochemical research finds that THC binds to CB receptors which are present in the brain as well as spinal and peripheral nervous tissue where as CB is a negative allosteric modulator of CB receptors.⁸ Cannabinoids have been shown to produce analgesic, anti-inflammatory, anti-anxiety

and anti-psychotic effects. Similar studies find that cannabis has a superior safety index when compared to other medications as there are no CB receptors present in the brainstem that contains the cardiorespiratory centers.⁶ There are no reported deaths due to an overdose of marijuana. A review by MacCallum and Russo reported that numerous randomized controlled trials have shown that predominantly CBD preparations given to patients with chronic non-cancer pain are safe and affective.⁶ The detailed mechanism of how these chemicals work in the human body still remains to be discovered.

The pharmacological aspect of marijuana demands further research as well as the oral effects of marijuana. Dental implications for patients that use marijuana include xerostomia and increased risk of caries due to poor oral hygiene of users and THC, which is appetite stimulant that leads users to eat cariogenic snack foods.¹ Marijuana usage also has periodontal effects it is associated with gingival enlargement, and some studies have shown it is a factor associated with periodontal disease.¹ Another major dental implication is the association with leukoedema and hyperkeratosis of the oral mucosa, which has malignant potential.¹ It is not clear whether these conditions are caused by smoking irritants of marijuana itself. Finally, marijuana usage has been associated with candidiasis due to various mechanisms. Cannabis is known to be immunosuppressive which can promote the growth of *Candida albicans*, and hydrocarbons produced by smoking cannabis are thought to be an energy source for *candida albicans*.¹

There are many considerations of the role of marijuana's effect with dental anesthesia during procedures as well as it's potential to be used for post-operative anesthetic management. The main consideration is for patient's who have recently used marijuana before any procedure as the acute affects can last up to three hours. Cannabis usage can cause immediate cardiovascular effects such as tachycardia and acute hypertension.¹ Therefore, recent usage by

patients could be a contraindication to treatment with any anesthetics that contain epinephrine and/or other drugs involved in anesthesia and sedation that have potential to increase heart rate. While these risks are notable it is also important to consider the potential for post-operative anesthetic management. In a study done by *Holdcroft et al*, patients following major operations were given either five, ten or fifteen milligram capsules of THC and CBD.³ Pain relief in these patients was measured by eight assessments, and mood was evaluated with a visual analog scale. This study found that the higher dosage capsules reduced demands and extended the lag time for rescue analgesia (morphine).³ The study found the optimal dosage was ten milligram to avoid dose-related side effects such as dizziness and sedation. This study as well as one by *Sandoval et al* shows that marijuana has opioid-sparing effects which are crucial as opioids have high abuse potential as well as fatal risks.⁹ This study shows the potential use of marijuana as an analgesic alternative.

With over 100 million American adults affected by chronic pain conditions, dentists should be well versed in how to manage these unique patients. The current pharmacotherapy treatment of chronic pain conditions has been shown to be less than satisfactory and therefore important to look at alternative treatments. In a study done by *Ware et al*, patients with chronic pain were provided 12.5% THC to take in the evening.¹⁰ There were 350 in both the treatment group and the control group. In the treatment group, there was significant reduction in average pain intensity over one year, significant improvement in quality of life, greater improvement of physical function, total symptom distress decreased and significant improvement in total mood scale.¹⁰ Also, this study did find any statistical significant differences in either group when analyzing changes in the patients' neurocognitive function or their blood tests.¹⁰ In another study done by *Haroutounian et al*, showed similar results where patients with chronic non-cancer pain

were provided with standard dosages of cannabis. The pain symptom score improved in nearly 66% of patients, the quality of life improved from baseline in all patients and nearly half of these patients stopped using prescription opioids.² In addition a study done by *Sandoval et al* showed that patients who used cannabis together with opioids had a better analgesic effect than taking opioids alone.⁹ A study by *Manzanares et al* repeats this sentiment reporting that cannabinoid and opioid receptors may operate synergistically in pain circuits that together can potentiate anti-nociceptive actions.⁷ This mechanism is furthered by cannabinoid agonists, which induce the release of endogenous opioid peptides in the spinal cord. This study also noted an interaction between cannabinoids and NSAIDs which produces convergence of their transduction signals.⁷ These studies done on marijuana's effectiveness in managing chronic pain has great implications for similar usage in management of post-operative pain in dental procedures as well managing chronic conditions such as TMD and myofascial pain.

In analyzing these studies and their findings, the use of marijuana has positive future implications for the dental field. Its adverse effects and pharmacology requires further research to ensure the safety of patients. The opioid crisis has become a daunting epidemic in the U.S., and the opioid sparing effect of marijuana shows great potential to be used in post-operative pain management. The lack of effective methods in treating patients with chronic pain as well as post-operative pain leads the medical community to search for alternative options to provide patient comfort. These studies seem to have promising results in benefiting patients suffering from chronic pain conditions. In conclusion, with the rapid increase in U.S. usage of marijuana along with its track to become federally legal shows the need for more information in its medical and clinical usage. The valued potential of this drug in anesthesia and dentistry could prove to be a great addition to patient treatment.

References

1. Center for Scientific Information, ADA Science Institute. (2018, January 22). *Cannabis: Oral Health Effects*. Retrieved from <https://www.ada.org/en/member-center/oral-health-topics/cannabis>
2. Haroutounian, Simon, et al. "The Effect of Medicinal Cannabis on Pain and Quality-of-Life Outcomes in Chronic Pain." *The Clinical Journal of Pain*, vol. 32, no. 12, Dec. 2016, pp. 1036–1043., doi:10.1097/ajp.0000000000000364.
3. Holdcroft, Anita, et al. "A Multicenter Dose-Escalation Study of the Analgesic and Adverse Effects of an Oral Cannabis Extract (Cannador) for Postoperative Pain Management." *Anesthesiology*, vol. 104, no. 5, May 2006, pp. 1040–1046., doi:10.1097/00000542-200605000-00021.
4. Howlett, Allyn C., et al. "Cannabinoid Physiology and Pharmacology: 30 Years of Progress." *Neuropharmacology*, vol. 47, no. 1, 18 May 2004, pp. 345–358., doi:10.1016/j.neuropharm.2004.07.030.
5. Joshi, S., and M. Ashley. "Cannabis: A Joint Problem for Patients and the Dental Profession." *British Dental Journal*, vol. 220, no. 11, 10 June 2016, pp. 597–601., doi:10.1038/sj.bdj.2016.416.
6. Maccallum, Caroline A., and Ethan B. Russo. "Practical Considerations in Medical Cannabis Administration and Dosing." *European Journal of Internal Medicine*, vol. 49, 4 Jan. 2018, pp. 12–19., doi:10.1016/j.ejim.2018.01.004.
7. Manzanares, J., et al. "Role of the Cannabinoid System in Pain Control and Therapeutic Implications for the Management of Acute and Chronic Pain Episodes." *Current Neuropharmacology*, vol. 4, no. 3, 1 Oct. 2006, pp. 239–257., doi:10.2174/157015906778019527.
8. Pearce, Daniel D., et al. "Discriminating the Effects of Cannabis Sativa and Cannabis Indica: A Web Survey of Medical Cannabis Users." *The Journal of Alternative and Complementary Medicine*, vol. 20, no. 10, 2014, pp. 787–791., doi:10.1089/acm.2013.0190.
9. Romero-Sandoval, Alfonso et al. "Cannabis for Chronic Pain: Challenges and Considerations." *Pharmacotherapy*, vol 38, no. 6, 2018, pp. 651-662., doi: 10.1002/phar.2115
10. Ware, Mark Adrian. "Cannabis for Management of Pain: Assessment of Safety Study: COMPASS." *The Journal of Pain*, vol. 16, no. 12, 6 Dec. 2012, pp. 1233–1242., doi:10.1186/isrctn19449752.