J. Oral Diagn 2026;11:e388
https://doi.org/10.5327/2525-5711.388

REVIEW ARTICLE

Cannabis in oral medicine: what should we know? — a narrative review

Yesica Lorena Castillo-García[1], Diana Sofia Pedraza-Alonso[1], Juan Pablo Rodríguez-Mora[1]*

Abstract:

Cannabis sativa, commonly known as cannabis or marijuana, is one of the most widely used psychoactive substances worldwide, according to the *2022 World Drug Report by the United Nations Office on Drugs and Crime*. The growing global movement toward legalization is driven primarily by the plant's potential medical and industrial benefits, rather than its recreational use. However, there is still a significant lack of understanding about its chemical composition, mechanisms of action, and physiological effects on the human body. This knowledge gap presents an ongoing challenge for healthcare providers. This narrative review compiles current scientific evidence from databases such as PubMed, SciELO, Scopus, and Google Scholar, focusing on the biological and physiological aspects of cannabis use and its implications in the context of oral medicine. Given the rapid expansion of cannabis-related research and its implications across multiple areas of healthcare, this review provides valuable clinical and scientific insights for healthcare professionals, researchers, and policymakers working in both oral and systemic health.

Keywords: Cannabinoid; Endocannabinoid system; Marijuana; Oral health; Systemic health.

INTRODUCTION

Cannabis sativa, commonly referred to as cannabis or marijuana, is classified as a psychotropic substance due to its ability to alter central nervous system (CNS) functions and physical, psychological, or combined dependence[1]. According to the 2022 World Drug Report published by the United Nations Office on Drugs and Crime (UNODC)[2], cannabis is the most widely used illicit substance worldwide. In 2019 alone, approximately 4% of the global population aged 15 to 64 — roughly 200 million people—reported using cannabis at least once[2]. This fact reflects an 18% increase over the past decade, highlighting a notable rise in consumption, particularly in countries like the United States, Uruguay, and Canada[2], where regulatory frameworks for both medical and recreational use have advanced significantly, setting an example for other nations. This evolving landscape reflects a profound shift in public policy and societal attitudes toward cannabis, signaling a major transformation in its global belief.

Currently, cannabinoids are categorized into three main types: endogenous, synthetic, and plant-derived (herbal). *Cannabis sativa* has more than 120 bioactive compounds known as phytocannabinoids[3,4]. Among these, Δ9-tetrahydrocannabinol (Δ9-THC) is the principal psychoactive responsible for euphoric and relaxing effects, while cannabidiol (CBD) is the main non-psychoactive compound, widely recognized for its therapeutic properties[3,4]. These two cannabinoids have become central to ongoing research on the medicinal potential of cannabis and its effects on human health.

Statement of Clinical Significance
Understanding the effects of cannabinoids on both oral and systemic health is crucial. While their full impact is not yet completely understood, it is clear that they influence biological processes that warrant further scientific investigation.

In recent years, cannabis has transitioned from being primarily a recreational substance to one with promising therapeutic applications. The term *medical cannabis* or *medical marijuana* refers to cannabis-derived products used to treat various medical conditions due to their anticonvulsant, analgesic, anxiolytic, anti-inflammatory, and neuroprotective properties[3-7]. These effects have made cannabis a subject of growing interest in the treatment of conditions such as

[1]School of Dentistry, Universidad Nacional de Colombia, Sede Bogotá — Bogotá, Colombia.
***Correspondence to:** Email: jrodriguezmor@unal.edu.co
Received on July 11, 2025. Accepted on October 31, 2025.
https://doi.org/10.5327/2525-5711.388

epilepsy, chronic pain, cancer, multiple sclerosis, and anxiety disorders[3-7].

Despite its increasing acceptance for medical, industrial, and recreational use, cannabis remains a topic of considerable debate within both scientific and political spheres. Unregulated or inappropriate use carries risks, including dependency and potential physical and mental health consequences[1-7]. As such, there is a pressing need for ongoing multidisciplinary research to better understand the long-term effects of cannabis use on the human body. Evidence-based research is essential to guide the development of public policies that maximize benefits while minimizing harm, thereby promoting safe and informed use.

Understanding the active compounds in cannabis, their mechanisms of action, and their potential biological and physiological effects on systemic and oral health is crucial. This review aims to present an overview of the current scientific understanding in this area and to provide healthcare professionals with relevant, up-to-date information to support informed clinical decision-making regarding cannabinoid use.

METHODS

A comprehensive literature search was conducted using PubMed, SciELO, Google Scholar, and Scopus databases. The following search equation was applied: *(cannabinoid OR cannabis OR marijuana OR endocannabinoid system) AND (oral medicine OR oral health OR oral mucosa OR systemic health)*. Eligible sources included systematic reviews, narrative reviews, cross-sectional studies, and case-control studies published in English. There were no restrictions on participant age, ethnicity, country, or race. Articles were included if they offered a thorough discussion of the history, pharmacology, systemic and oral health impacts of cannabinoids, and/or the endocannabinoid system and its clinical applications. Only full-text articles published between 2013 and 2024 were considered. One noted limitation of this descriptive review is the absence of a formal bias assessment tool.

LITERATURE REVIEW

Cannabis and its derivatives: history, chemical structure, and characteristics

The medicinal use of *Cannabis sativa* dates to 1729 B.C. (5), although the oldest archaeological evidence of its use originates from approximately 10,000 years ago in Taiwan (Figure 1)[5]. The term *cannabinoid* initially referred to natural compounds composed of C21 aromatic hydrocarbons found in *Cannabis sativa* (family Cannabaceae)[6]. Today, it broadly encompasses both synthetic derivatives that mimic the physiological effects of natural cannabinoids and compounds with similar chemical structures[6].

Since 1999, more than four hundred chemical constituents derived from *Cannabis sativa* have been found[6]. Numerous studies have since demonstrated that many of these compounds possess therapeutic potential for the treatment of chronic pain, muscle spasticity, nausea, vomiting, weight loss, sleep disorders, Tourette syndrome, anxiety, psychiatric disorders, as well as antimicrobial and antifungal infections[4,5,7,8].

The two most extensively studied cannabinoids are Δ9-tetrahydrocannabinol (Δ9-THC) and cannabidiol (CBD). Δ9-THC is the principal psychoactive component of cannabis and is largely responsible for the euphoria and relaxation commonly associated with cannabis use[5,7]. In contrast, CBD is a non-psychoactive compound that has garnered significant attention for its broad therapeutic properties[5,7]. Both compounds interact with the endocannabinoid system, which regulates physiological processes through activation of CB1 and CB2 receptors[5]. Cannabinoids are structurally characterized by an alkyl side chain with an odd number of carbon atoms, which is critical for receptor binding[6].

Δ9-THC possesses a tricyclic structure composed of 21 carbon atoms, lacks nitrogen, and contains two chiral centers in a trans configuration[6]. It naturally occurs as the [−] -enantiomer in a monocarboxylic acid form[6]. Its psychoactive effects arise from its partial agonism

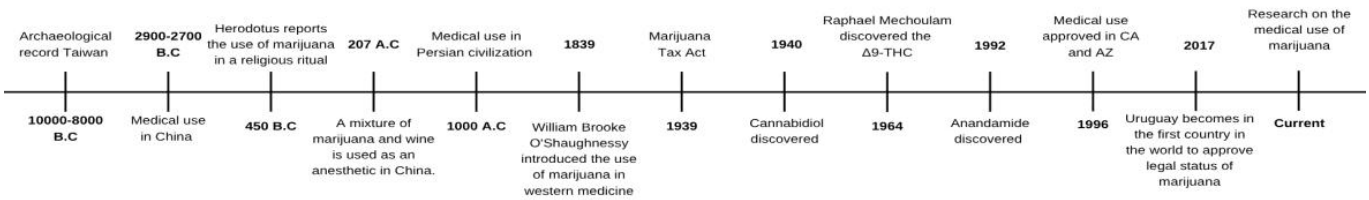

Figure 1. Timeline of cannabis use.

of CB1 receptors, which are predominantly located in the brain and central nervous system (CNS)[9], and to a lesser extent, CB2 receptors, which are primarily found in the immune system[9]. Activation of CB1 receptors results in sensory alterations such as impaired motor coordination, temporal distortion, drowsiness, dry mouth, conjunctival injection (red eyes), and mood fluctuations ranging from euphoria to anxiety[5]. At high or chronic doses, Δ9-THC may also cause transient cognitive impairment[9]. Despite these effects, it has shown efficacy in the treatment of chronic pain, particularly through CB1 receptor activation in the cerebral cortex, reducing pain feeling in patients with neuropathy and other pain-related disorders[6,9].

Cannabidiol (CBD), first isolated in 1940, is the second most abundant phytocannabinoids in *Cannabis sativa*, comprising approximately 15–16% of the plant's cannabinoid profile[10,11]. CBD is lipophilic, showing high affinity for adipose tissue, where it is stored after intestinal absorption and later distributed to the CNS. Unlike THC, CBD does not bind directly to the orthosteric sites of CB1 or CB2 receptors[11]. Instead, it acts as an allosteric modulator, functioning as a partial agonist or antagonist at CB1 and as an antagonist at CB2[11], which may explain its low toxicity and wide therapeutic range.

CBD continues to gain attention as a therapeutic possibility for its antiepileptic, anti-inflammatory, analgesic, and antiemetic properties[11]. It has shown effectiveness in treating drug-resistant epilepsies, including Dravet syndrome and Lennox–Gastaut syndrome. Asa result, it has been approved for medical use in some countries, most notably in the pharmaceutical formulation Epidiolex[11].

Beyond cannabis: the discovery of the endocannabinoid system

The first evidence supporting the existence of the endocannabinoid system (ECS) emerged in 1988, following the discovery of specific receptors in the brain that bind Δ9-tetrahydrocannabinol (Δ9-THC)[12]. Since then, the ECS has been recognized as a critical physiological system involved in maintaining homeostasis and regulating a wide range of functions, including pain modulation, memory, cognition, learning, sleep, mood, immune responses, metabolism, cardiovascular function, and more[12].

The ECS is composed primarily of G-protein-coupled receptors — namely CB1 and CB2 — and their endogenous ligands, the most extensively studied of which are anandamide (AEA) and 2-arachidonoylglycerol (2-AG)[12]. These ligands are synthesized on demand from membrane lipids and function as neuromodulators or immunomodulators, depending on the receptor and location of activity[12].

The CB1 receptor is densely distributed throughout the central nervous system (CNS), particularly in regions such as the cerebral cortex and hippocampus, which handle cognition and memory[13-15]. CB1 is also found in the basal ganglia and cerebellum, areas associated with motor coordination[13-15]. This receptor mediates most of the psychoactive effects of cannabinoids, especially Δ9-THC[13-15].

In contrast, the CB2 receptor, which shares approximately 44% genetic similarity with CB1, is predominantly expressed in immune cells, including macrophages, microglia, and osteoclasts[14,15]. CB2 plays a vital role in immune regulation and inflammation, making it a promising target for the treatment of autoimmune disorders, osteoporosis, and various chronic inflammatory diseases[13-15]. Notably, CB2 expression can be upregulated in pathological states, such as neuroinflammation, showing its therapeutic relevance in neurodegenerative diseases[13-15].

Among endogenous cannabinoids, anandamide (AEA) was the first to be discovered and isolated from the human brain[5,16]. AEA is derived from arachidonic acid; a polyunsaturated fatty acid found in phospholipid membranes[5,16]. It acts as a partial agonist of CB1 receptors and takes part in processes such as pain modulation, appetite regulation, memory, and emotional behavior[16]. Additionally, AEA binds to CB2 receptors, contributing to the regulation of immune responses and inflammation[5,16]).

Importantly, AEA also interacts with transient receptor potential vanilloid 1 (TRPV1) channel — also known as vanilloid receptors — which play a key role in nociception and thermoregulation[16,17]. This dual receptor activity suggests that anandamide may offer therapeutic benefits in conditions such as diabetic neuropathy, chronic inflammatory pain, and blood pressure regulation[16,17]).

Together, the CB1 and CB2 receptors, along with their endogenous ligands and associated enzymes responsible for their synthesis and degradation, constitute a complex regulatory network that continues to be explored for its therapeutic potential in a wide array of physiological and pathological conditions.

Highlighted findings of cannabis on oral health

Medical uses of cannabis in the oral and maxillofacial region

Although its application in oral medicine has not been extensively studied, some research has reported positive outcomes from the use of cannabinoid-based

medications as adjuvant therapy for the treatment of chronic orofacial pain[18-21], particularly due to their synergistic effects when used as a first- or second-line option alongside other drugs, such as opioids[22]. Cannabinoid derivatives have shown therapeutic potential in managing chronic pain in patients with persistent idiopathic facial pain, postherpetic neuralgia, myofascial pain syndrome, burning mouth syndrome, oral mucositis, trigeminal neuralgia, and even in alleviating symptoms associated with temporomandibular disorders[18-21,23,24].

The increasing use of medical cannabinoids for treating systemic musculoskeletal or neuropathic pain represents a promising outlook[22], especially for managing chronic and neuropathic pain related to oral and maxillofacial conditions, as well as pain induced by radiation or chemotherapy in head and neck cancer patients[25]. A cross-sectional cohort study by Elliot et al.[25] involving cannabis users undergoing cancer treatment for head and neck tumors reported a 65% reduction in pain, along with improvements in symptoms such as depression, dysphagia, increased appetite, and weight gain[25].

When it comes to controlling inflammatory processes, CBD is one of the choices of cannabinoids in medicine due to its action on CB2 receptors, as it exerts immunomodulatory activity[23]. These receptors are predominantly found in immune system cells[23], which explain their use in managing symptoms associated with burning mouth syndrome[23,24], trigeminal and post-herpetic neuralgia[23]. Its potential utility in patients with oral mucositis — a debilitating condition largely resulting from oncologic treatments such as chemotherapy or radiotherapy, due to the tissue damage caused by the accumulation of reactive oxygen species (ROS) in the oral mucosa — offers a promising outlook for clinical application in this patient population[23]. As noted by Cuba et al.[23], there are currently few effective strategies to prevent oral mucositis in patients undergoing chemotherapy and radiotherapy. Therefore, the potential usefulness of cannabis in cases of oral mucositis highlights an area of great research interest, given the complexity of pain management in this patient group[23].

Given the increasing popularity of cannabinoid-based therapies and the expanding range of indications for their use, it is imperative that future research focuses on elucidating their full pharmacological profile. This includes their metabolic pathways, potential drug-drug interactions, and variable effects across different patient populations. Only through rigorous, evidence-based research can clinicians safely and effectively integrate cannabinoids into mainstream medical practice.

Cannabis: dental caries, periodontal disease, and effects on the rate of salivation

Dental caries in cannabis users has been associated with decreased salivary flow and buffering capacity, likely due to the interaction of cannabinoids with the major salivary glands[26]. This is further compounded by increased food intake — attributed to the cannabis-induced effect on leptin, the hormone responsible for regulating appetite[27,28] — as well as poor oral hygiene practices[27-29]. As a result, elevated levels of dental biofilm and a predominance of cariogenic bacteria contribute to reduced oral pH and an increased risk of developing carious lesions[28,29].

However, these effects may depend on the type of cannabis use — whether recreational or medicinal—as well as the route and form of administration, such as smoking, oromucosal sprays, or oil extracts. In fact, a study conducted by Habid et al.[26] reported no significant changes in salivary pH or flow rate in a group of patients — 14 of whom had been diagnosed with fibromyalgia and were receiving cannabis-based medication over a four-week period. Nevertheless, alterations in salivary microbial levels were noted, particularly involving organisms such as *Streptococcus mutans* and *Lactobacilli*[26].

The chronic effects of cannabis on periodontal tissues are still unclear. However, consistent evidence links its use to alveolar bone loss, gingivitis, hyperkeratosis, gingival hyperplasia, leukoedema, and gingival leukoplakia[27,28]. Some authors suggest that these periodontal changes appear to be heavily influenced by reduced salivary flow and poor biofilm control resulting from cannabis use[27,28]. However, this must be analyzed meticulously and comprehensively, as the evidence supporting the potential xerogenic activity of cannabis itself is still somewhat controversial, and multiple contributing factors must be considered. In recreational users, it is important to investigate concurrent use of alcohol, tobacco, or other psychoactive substances[30]. In medical contexts, attention should be given to concurrent medications known to have direct or indirect effects on salivary flow reduction.

Some reports on healthy individuals have noted the expression of CB1 and CB2 receptors in periodontal tissues[31]. In fact, CB1 is predominantly expressed in the epithelium and periodontal ligament compared to CB2[31]. Both receptors have been implicated in inflammatory and wound healing processes[31]. Downregulation of CB1 and overexpression of CB2 have been documented in bacterial-induced inflammatory conditions[31,32]. However, a study conducted by Pellegrini et al.[33] found that

inflammation does not appear to predominantly affect one receptor over the other[33]. Furthermore, a study conducted by Gu et al.[34], which investigated how marijuana-derived cannabinoids activate a CB2/PI3K axis of suppression of the innate immune response against oral pathogens, found that cannabinol, cannabidiol, and Δ9-THC exhibit a degree of immunosuppressive activity in the oral environment against pathogens such as *Porphyromonas gingivalis* and *Treponema denticola*[34], both traditionally recognized as key periodontopathogens. As proposed by the authors, cannabinoids may exacerbate periodontitis through direct toxicity to specific oral bacteria, by compromising the vitality of innate immune cells, and/or by suppressing the innate immune response to periodontal pathogens via a CB2/PI3K signaling pathway[34]. Additionally, the immunosuppressive effect of Δ9-THC via CB2 receptor activation may increase the risk of opportunistic infections — such as those caused by *Candida* species — particularly in individuals who smoke, have poor oral hygiene, or wear ill-fitting dental prostheses[27,28]. Nevertheless, the effects of cannabinoids on the oral microbiota have been extensively explored in multiple studies, where both their antibacterial and antifungal properties have been evaluated[32]. A review by Carmona Rendón et al.[32] summarized evidence indicating that cannabis exhibits antimicrobial activity against *Candida albicans*, *Porphyromonas gingivalis*, *Filifactor alocis*, and *Streptococcus mutans*[32]. Moreover, cannabinoid-based mouthwashes have shown bactericidal efficacy comparable to that of chlorhexidine (CHX)[32]. However, the evidence on this topic is still controversial, and further high-quality studies are needed to clarify these findings.

Effects of cannabis on oral mucosa

Oral mucosal epithelial keratinocytes have been shown to express both CB1 and CB2 receptors, each with distinct physiological functions[35]. While CB2 is associated with proliferative activity, CB1 is related to the opposite effect[35]. The evidence regarding oral mucosal changes in cannabis users and users of other recreational drugs — excluding alcohol and tobacco — associated with oral cancer and potentially malignant oral disorders remains controversial. In fact, the association between cannabis use and oral cancer has been widely debated.

For example, a cross-sectional study conducted by Sordi et al.[30] in a population of marijuana and cocaine/crack users found no such association[30]. The authors reported that the oral lesions diagnosed in this adult population were aphthous stomatitis, frictional keratosis, candidiasis, tooth extraction scars, and tongue depapillation[30]. In contrast, a study in a similar population conducted by Mateos-Moreno et al.[36] found lesions such as leukoplakia in 4.8% of participants compared to the control group[36].

While studies such as those by Rosenblatt et al.[37] and Llewellyn et al.[38,39] found no direct association between cannabis use and oral cancer, other authors, such as Shekarchizadeh et al.[40], challenge this view, stating that cannabis abuse is associated with an increased risk of oral cancer[40], as well as other conditions previously discussed, including dry mouth and periodontitis. Along the same lines, Zhang et al.[41] proposed a dose-dependent association between cannabis use and head and neck cancer in a population of young users, although they noted that this relationship may be linked to the frequency and duration of cannabis use[41].

It is important to highlight that the possible association between oral cancer and cannabis use has been specifically linked to smoked cannabis, as — like tobacco — cannabis smoke releases carcinogenic compounds such as phenols, polycyclic aromatic hydrocarbons, and nitrosamines, which may increase the risk of oral cancer, particularly on the floor of the mouth and tongue[27,29]. Dysplastic changes in the oral mucosa, as well as oral potentially malignant disorders such as leukoplakia and erythroplakia, have also been reported[27-29]. Suggested associations have been made between cannabis use and head and neck cancers, including oropharyngeal cancer, particularly in cohorts of young, chronic users[27,28].

A recent review by Cretu et al.[42] highlighted studies showing an association between cannabis use and oropharyngeal cancer, noting that cannabis may be even more carcinogenic than tobacco and alcohol, particularly due to its THC concentration[42]. Although earlier studies reported a high incidence of head and neck cancers among young cannabis users — suggesting a possible dose-dependent relationship — the confounding effects of alcohol and tobacco use must be considered[42]. These substances may act as cofactors, introducing potential bias in study design. Additional limitations include small sample sizes and the use of retrospective methodologies. Therefore, there is a critical need to promote further research using robust methodologies, statistically representative samples, and long-term follow-up to more accurately assess the cannabis-oral cancer relationship. Such research must also control known confounding factors like alcohol and tobacco use, as well as others often overlooked, such as oral sexual practices and various lifestyle-related variables.

CONCLUSION

Given that current evidence on the biological and physiological effects of cannabinoids on the human body is still inconclusive, it is advisable to interpret the available information with caution. Furthermore, there is a pressing need to promote future research that explores in great depth the activity of cannabinoids across different tissues and systems, as well as their impact on oral and systemic health (Supplementary 1. *Effects of Cannabis on Systemic Health*). It is essential for healthcare professionals to understand the potential implications of cannabinoids in both oral and systemic health, whether patients use them for therapeutic or recreational purposes. This knowledge is crucial for preventing adverse health outcomes — whether when prescribing medications, assessing risk factors for oral mucosal lesions, or including cannabis use in the medical or dental history during clinical consultations or prior to surgical procedures (Supplementary 2. *Recommendations for Clinical Practice*).

ACKNOWLEDGMENT

The authors would like to express their gratitude to Dr. Andrés Rueda Jimenez, Dr. Lilia Jadith Bernal Cepeda and Dr. Laura Manuela Amaya Rincon for their comments during the manuscript writing process. This study benefited from revisions facilitated by ChatGPT (OpenIA) to improve the clarity and precision of the English language.

AUTHORS' CONTRIBUTIONS

YLCG: Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing. DSPA: Supervision, Writing – original draft. JPRM.: Conceptualization, Investigation, Methodology, Writing – review & editing.

CONFLICTS OF INTERESTS STATEMENT

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Competing interests: The authors have no relevant financial or non-financial interests to disclose.
Ethics approval: Not applicable.

DATA AVAILABILITY STATEMENT

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

REFERENCES

1. Volkow ND, Baler RD, Compton WM, Weiss SRB. Adverse health effects of marijuana use. N Engl J Med. 2014;370(23):2219-27. https://doi.org/10.1056/NEJMra1402309
2. United Nations Office on Drugs and Crime. World Drug Report 2022. Vienna: UNODC; 2022.
3. Schurman LD, Lu D, Kendall DA, Howlett AC, Lichtman AH. Molecular mechanism and cannabinoid pharmacology. In: Nader M, Hurd Y, eds. Substance use disorders. Handbook of experimental pharmacology. Nova York: Springer International Publishing; 2019. p. 323-53. https://doi.org/10.1007/164_2019_298
4. Andre CM, Hausman JF, Guerriero G. Cannabis sativa: the plant of the thousand and one molecules. Front Plant Sci. 2016;7:19. https://doi.org/10.3389/fpls.2016.00019
5. Childers SR, Breivogel CS. Cannabis and endogenous cannabinoid systems. Drug Alcohol Depend. 1998;51(1-2):173-87. https://doi.org/10.1016/s0376-8716(98)00075-1
6. Dinis-Oliveira RJ. Metabolomics of Δ9-tetrahydrocannabinol: implications in toxicity. Drug Metab Rev. 2016;48(1):80-7. https://doi.org/10.3109/03602532.2015.1137307
7. Sarris J, Sinclair J, Karamacoska D, Davidson M, Firth J. Medicinal cannabis for psychiatric disorders: a clinically-focused systematic review. BMC Psychiatry. 2020;20(1):24. https://doi.org/10.1186/s12888-019-2409-8
8. Gülck T, Møller BL. Phytocannabinoids: origins and biosynthesis. Trends Plant Sci. 2020;25(10):985-1004. https://doi.org/10.1016/j.tplants.2020.05.005
9. Fisar Z. Phytocannabinoids and endocannabinoids. Curr Drug Abuse Rev. 2009;2(1):51-75. https://doi.org/10.2174/1874473710902010051
10. Castillo-Arellano J, Canseco-Alba A, Cutler SJ, León F. The polypharmacological effects of cannabidiol. Molecules. 2023;28(7):3271. https://doi.org/10.3390/molecules28073271
11. Peng J, Fan M, An C, Ni F, Huang W, Luo J. A narrative review of molecular mechanism and therapeutic effect of cannabidiol (CBD). Basic Clin Pharmacol Toxicol. 2022;130(4):439-56. https://doi.org/10.1111/bcpt.13710
12. Lowe H, Toyang N, Steele B, Bryant J, Ngwa W. The endocannabinoid system: a potential target for the treatment of various diseases. Int J Mol Sci. 2021;22(17):9472. https://doi.org/10.3390/ijms22179472
13. Mackie K. Cannabinoid receptors: where they are and what they do. J Neuroendocrinol. 2008;20 Suppl 1:10-4. https://doi.org/10.1111/j.1365-2826.2008.01671.x
14. Brust CA, Swanson MA, Bohn LM. Structural and functional insights into the G protein-coupled receptors: CB1 and CB2. Biochem Soc Trans. 2023;51(4):1533-43. https://doi.org/10.1042/BST20221316
15. Joshi N, Onaivi ES. Endocannabinoid system components: overview and tissue distribution. In: Bukiya A, ed. Recent advances in cannabinoid physiology and pathology. Advances in experimental medicine and biology. Nova York: Springer International Publishing; 2019. p. 1-12. https://doi.org/10.1007/978-3-030-21737-2_1
16. Biringer RG. The rise and fall of anandamide: processes that control synthesis, degradation, and storage. Mol Cell Biochem. 2021;476(7):2753-75. https://doi.org/10.1007/s11010-021-04121-5

17. Martín Giménez VM, Noriega SE, Kassuha DE, Fuentes LB, Manucha W. Anandamide and endocannabinoid system: an attractive therapeutic approach for cardiovascular disease. Ther Adv Cardiovasc Dis. 2018;12(7):177-90. https://doi.org/10.1177/1753944718773690
18. Grossman S, Tan H, Gadiwalla Y. Cannabis and orofacial pain: a systematic review. Br J Oral Maxillofac Surg. 2022;60(5):e677-90. https://doi.org/10.1016/j.bjoms.2021.06.005
19. Longworth J, Szafron M, Gruza A, Silva K. Cannabis and cannabinoid medications for the treatment of chronic orofacial pain: a scoping review. Dent Rev. 2023;3(1):100063. https://doi.org/10.1016/j.dentre.2023.100063
20. McDonough P, McKenna JP, McCreary C, Downer EJ. Neuropathic orofacial pain: cannabinoids as a therapeutic avenue. Int J Biochem Cell Biol. 2014;55:72-8. https://doi.org/10.1016/j.biocel.2014.08.007
21. Votrubec C, Tran P, Lei A, Brunet Z, Bean L, Olsen BW, Sharma D. Cannabinoid therapeutics in orofacial pain management: a systematic review. Aust Dent J. 2022;67(4):314-27. https://doi.org/10.1111/adj.12934
22. Hill KP, Palastro MD, Johnson B, Ditre JW. Cannabis and pain: a clinical review. Cannabis Cannabinoid Res. 2017;2(1):96-104. https://doi.org/10.1089/can.2017.0017
23. Cuba LF, Salum FG, Cherubini K, Figueiredo MAZ. Cannabidiol: an alternative therapeutic agent for oral mucositis? J Clin Pharm Ther. 2017;42(3):245-50. https://doi.org/10.1111/jcpt.12504
24. Gambino A, Cabras M, Panagiotakos E, Calvo F, Macciotta A, Cafaro A, et al. Evaluating the suitability and potential efficiency of cannabis sativa oil for patients with primary burning mouth syndrome: a prospective, open-label, single-arm pilot study. Pain Med. 2021;22(1):142-51. https://doi.org/10.1093/pm/pnaa318
25. Elliott DA, Nabavizadeh N, Romer JL, Chen Y, Holland JM. Medical marijuana use in head and neck squamous cell carcinoma patients treated with radiotherapy. Support Care Cancer. 2016;24(8):3517-24. https://doi.org/10.1007/s00520-016-3180-8
26. Habib G, Steinberg D, Jabbour A. The impact of medical cannabis consumption on the oral flora and saliva. PLoS One. 2021;16(2):e0247044. https://doi.org/10.1371/journal.pone.0247044
27. Liu C, Qi X, Yang D, Neely A, Zhou Z. The effects of cannabis use on oral health. Oral Dis. 2020;26(7):1366-74. https://doi.org/10.1111/odi.13246
28. Joshi S, Ashley M. Cannabis: a joint problem for patients and the dental profession. Br Dent J. 2016;220(11):597-601. https://doi.org/10.1038/sj.bdj.2016.416
29. Cho C, Hirsch R, Johnstone S. General and oral health implications of cannabis use. Aust Dent J. 2005;50(2):70-4. https://doi.org/10.1111/j.1834-7819.2005.tb00343.x
30. Sordi MB, Massochin RC, Camargo AR, Lemos T, Munhoz EA. Oral health assessment for users of marijuana and cocaine/crack substances. Braz Oral Res. 2017;31:e102. https://doi.org/10.1590/1807-3107BOR-2017.vol31.0102
31. Bellocchio L, Inchingolo AD, Inchingolo AM, Lorusso F, Malcangi G, Santacroce L, et al. Cannabinoids drugs and oral health–from recreational side-effects to medicinal purposes: a systematic review. Int J Mol Sci. 2021;22(15):8329. https://doi.org/10.3390/ijms22158329
32. Carmona Rendón Y, Santiago Garzón H, Bueno-Silva B, Arce RM, Suárez LJ. Cannabinoids in periodontology: where are we now? Antibiotics (Basel). 2023;12(12):1687. https://doi.org/10.3390/antibiotics12121687
33. Pellegrini G, Carmagnola D, Toma M, Rasperini G, Orioli M, Dellavia C. Involvement of the endocannabinoid system in current and recurrent periodontitis: a human study. J Periodontal Res. 2023;58(2):422-32. https://doi.org/10.1111/jre.13103
34. Gu Z, Singh S, Niyogi RG, Lamont GJ, Wang H, Lamont RJ, et al. Marijuana-derived cannabinoids trigger a CB2/PI3K axis of suppression of the innate response to oral pathogens. Front Immunol. 2019;10:2288. https://doi.org/10.3389/fimmu.2019.02288
35. Bellocchio L, Patano A, Inchingolo AD, Inchingolo F, Dipalma G, Isacco CG, et al. Cannabidiol for oral health: a new promising therapeutical tool in dentistry. Int J Mol Sci. 2023;24(11):9693. https://doi.org/10.3390/ijms24119693
36. Mateos-Moreno MV, Del-Río-Highsmith NA, Riobóo-García R, Solá-Ruiz MF, Celemín-Viñuela A. Dental profile of a community of recovering drug addicts: biomedical aspects. Retrospective cohort study. Med Oral Patol Oral Cir Bucal. 2013;18(4):e671-9. https://doi.org/10.4317/medoral.18669
37. Rosenblatt KA, Daling JR, Chen C, Sherman KJ, Schwartz SM. Marijuana use and risk of oral squamous cell carcinoma. Cancer Res. 2004;64(11):4049-54. https://doi.org/10.1158/0008-5472.CAN-03-3425
38. Llewellyn CD, Linklater K, Bell J, Johnson NW, Warnakulasuriya KAAS. Squamous cell carcinoma of the oral cavity in patients aged 45 years and under: a descriptive analysis of 116 cases diagnosed in the South East of England from 1990 to 1997. Oral Oncol. 2003;39(2):106-14. https://doi.org/10.1016/s1368-8375(02)00026-x
39. Llewellyn CD, Linklater K, Bell J, Johnson NW, Warnakulasuriya S. An analysis of risk factors for oral cancer in young people: a case-control study. Oral Oncol. 2004;40(3):304-13. https://doi.org/10.1016/j.oraloncology.2003.08.015
40. Shekarchizadeh H, Khami MR, Mohebbi SZ, Ekhtiari H, Virtanen JI. Oral health of drug abusers: a review of health effects and care. Iran J Public Health. 2013;42(9):929-40. PMID: 26060654.
41. Zhang ZF, Morgenstern H, Spitz MR, Tashkin DP, Yu GP, Marshall JR, et al. Marijuana use and increased risk of squamous cell carcinoma of the head and neck. Cancer Epidemiol Biomarkers Prev. 1999;8(12):1071-8. PMID: 10613339.
42. Cretu B, Zamfir A, Bucurica S, Scheau AE, Fiedler IS, Caruntu C, et al. Role of cannabinoids in oral cancer. Int J Mol Sci. 2024;25(2):969. https://doi.org/10.3390/ijms25020969