International Journal of Comprehensive Health, Medicine, and Dentistry

IJCHMD 2026;2(1) 57-70

Original Article

Impact of Chronic Cannabis Use on Oral and Periodontal Health: A Comprehensive Literature Review

Hashim Al-Hashimi
Hala Foundation For Research

Abstract

Chronic cannabis use has become increasingly prevalent due to its medicinal and recreational applications, necessitating a comprehensive understanding of its impact on oral and periodontal health. This review explores the multifaceted effects of cannabis consumption, focusing on periodontal health, salivary gland function, oral microbiome alterations, wound healing, and associated risks of oral cancer. Chronic cannabis use is linked to higher prevalence and severity of periodontitis, driven by its influence on inflammatory pathways and immune modulation. Salivary gland dysfunction resulting in xerostomia compromises oral health, increasing the risk of dental caries and mucosal infections. Changes in the oral microbiome, characterized by dysbiosis, contribute to periodontal disease progression and peri-implant complications. Furthermore, while cannabinoids offer therapeutic potential due to their anti-inflammatory and analgesic properties, chronic use poses significant risks, including delayed wound healing and increased oral cancer susceptibility. This review underscores the dual role of cannabis as both a therapeutic agent and a risk factor, emphasizing the need for further research to optimize clinical management strategies for cannabis users and improve oral health outcomes.

Keywords: Alveolar Bone, Cannabis, Cannabinoids, Dysbiosis, Immunomodulation, Oral Cancer, Oral Microbiome, Peri-Implant Health, Periodontal Disease, Salivary Glands, THC, Wound Healing, and Xerostomia.

Address for correspondence: Dr Hala Alsayed Medical Group, Bahrain.
E-mail: Hashim@drhalamedicalgroup.com **ORCID 0009-0006-0537-0942**

Received: 7 December 2025 **Revised:** 7 January 2026 **Accepted**: 27 January 2026
Published: 31 January 2026

Introduction

Cannabis, derived from the *Cannabis sativa*, *Cannabis indica*, and *Cannabis ruderalis* species, is a widely cultivated and consumed plant known for its diverse chemical composition and complex physiological effects. Rich in bioactive compounds, cannabis contains over 100 cannabinoids, with tetrahydrocannabinol (THC) being the principal psychoactive component and cannabidiol (CBD) recognized for its non-psychoactive, therapeutic properties. These cannabinoids interact with the body's endocannabinoid system (ECS), a sophisticated network that regulates numerous physiological processes, including pain perception, mood, and immune function. (Mccarberg, 2023)

The rising global use of cannabis for both recreational and medicinal purposes has intensified the need to explore its broader health implications, particularly its impact on oral health. As cannabis consumption becomes increasingly prevalent across various demographics—including older adults—it is essential to understand the long-term consequences of chronic cannabis use on oral and periodontal health.(Chaffee, 2021)

Emerging evidence suggests that chronic cannabis use is associated with increased prevalence and severity of periodontal disease, disruptions in salivary gland function resulting in xerostomia (dry mouth), and alterations in the oral microbiome. These effects are influenced by the dual anti-inflammatory and immunomodulatory properties of cannabinoids like THC and CBD, which can paradoxically contribute to both protective and harmful outcomes in the oral cavity.(Andreis et al., 2022)

The relationship between chronic cannabis use and oral health is multifaceted. Periodontal disease, a progressive inflammatory condition, may worsen due to immune system alterations and microbiome imbalances observed in cannabis users. Additionally, reduced salivary flow and changes in saliva composition can heighten the risk of dental caries, mucosal infections, and other oral complications.(Andreis et al., 2022)

Understanding the long-term effects of cannabis use on oral health is critical for developing evidence-based clinical guidelines and targeted interventions aimed at mitigating its adverse impacts. Further comprehensive research is necessary to uncover the underlying mechanisms and establish effective strategies for promoting optimal oral and periodontal health among cannabis users.

Methodology

A comprehensive and systematic literature search was conducted across major electronic databases, including PubMed, Scopus, Web of Science, Google Scholar, EMBASE, and the Cochrane Library. The search aimed to identify and retrieve relevant research articles addressing the impact of chronic cannabis use on oral and periodontal health, with a specific focus on its effects on salivary gland function. The time period for the search was set from 2005 to 2024, ensuring the inclusion of the most up-to-date and relevant studies. The search strategy utilized a combination of carefully selected keywords and Medical Subject Headings, such as "cannabis use," "periodontal disease," "oral health," "xerostomia," "salivary

glands," "oral microbiome," and "immunomodulation." This robust and comprehensive search approach ensured the identification of a broad and high-quality body of literature that reflects the current advancements and emerging trends in understanding the diverse impacts of chronic cannabis use on various aspects of oral health. Only articles published in the English language were included in this review.

Study Selection Process

1. **Initial Screening**:The initial screening process involved a detailed review of titles and abstracts of all retrieved studies to identify their relevance to the review's scope. This step ensured the selection of studies specifically addressing cannabis use in relation to oral and periodontal health.
2. **Abstract Evaluation**:Abstracts were evaluated against predefined inclusion criteria, which included:
    - Focus on chronic cannabis use and its effects on oral health, periodontal disease, or salivary gland function.
    - Relevance to mechanisms, clinical outcomes, or microbial changes in the oral cavity.
    - Emphasis on innovative methodologies, longitudinal studies, or notable clinical findings.
3. **Inclusion of Targeted Studies**:Studies meeting the inclusion criteria underwent full-text retrieval for detailed evaluation. Preference was given to peer-reviewed clinical trials, systematic reviews, epidemiological studies, and observational research that explored the oral health implications of cannabis use.
4. **Final Selection**:The full-text articles were rigorously analyzed to synthesize their findings. Only high-quality evidence directly addressing the objectives of the review was included. This ensured a focused and clinically relevant body of evidence.

Study Exclusion Process

1. Studies that did not focus on the oral cavity, periodontal health, or salivary gland function were excluded, as they lacked direct relevance to the review's objectives.
2. Articles that did not clearly address the implications of cannabis use for oral health were also excluded, as they did not align with the central purpose of the review.
3. Research employing outdated methodologies or lacking sufficient data to support their findings was excluded, to ensure the review relied on high-quality, up-to-date evidence.
4. Studies that failed to provide meaningful clinical insights, such as those focused solely on animal models without clear translational relevance, were excluded, as the review aimed to inform evidence-based clinical practice.
5. Grey literature, conference abstracts, and opinion pieces were excluded to maintain the academic rigor and reliability of the review, which focused on publishing peer-reviewed research.
6. Articles concentrating exclusively on recreational drug use without clear differentiation of cannabis, or studies with unrepresentative populations, were excluded to ensure the findings were generalizable and applicable to the target population of cannabis users.

Definitions and Key Terms

For the purpose of this literature review, the following key definitions and terms are provided:

- **Cannabis Use:** Chronic and habitual use of cannabis, encompassing both recreational and medicinal consumption. This includes the consumption of various cannabis-derived compounds, such as tetrahydrocannabinol and cannabidiol, which exert complex physiological and psychological effects.(Gugliandolo et al., 2018)
- **Periodontal Disease:** A chronic inflammatory condition affecting the supporting structures of the teeth, including the gingiva, periodontal ligament, and alveolar bone. This disease is characterized by progressive attachment loss and alveolar bone destruction, leading to tooth mobility and potential tooth loss.(Könönen et al., 2019)
- **Xerostomia:** The subjective sensation of dry mouth, often resulting from reduced salivary flow. Xerostomia is a common condition associated with chronic cannabis use and can have significant implications for oral health.(Špiljak, 2022)
- **Oral Microbiome:** The diverse and dynamic microbial ecosystem residing within the oral cavity. This complex microbial community can be influenced by various external factors, including the use of cannabis.(Scott et al., 2021)
- **Salivary Glands:** The exocrine glands responsible for the production and secretion of saliva, including the parotid, submandibular, and sublingual glands. These glands may be impaired or dysfunctional in the context of chronic cannabis consumption.(Javaid et al., 2015)
- **Immunomodulation:** The regulation and modulation of immune responses, which can be influenced by the pharmacological effects of cannabis and its constituent compounds. This immunomodulatory activity can impact various aspects of periodontal and oral health.(Gu et al., 2019)

Quality Assessment

To ensure rigorous methodological quality, this comprehensive review employed well-established guidelines to thoroughly evaluate the reporting quality and completeness of the included studies. Recognized and validated frameworks, such as the Cochrane Risk of Bias tool, were meticulously utilized to comprehensively assess potential sources of bias, including selection bias, detection bias, and reporting bias. This robust and rigorous evaluation process enhanced the overall reliability and validity of the synthesized findings, thereby strengthening confidence in the conclusions drawn from the body of evidence presented in this review.

Data Extraction and Synthesis

The data extraction process involved a comprehensive and systematic identification of key variables from the included studies. This included meticulously cataloging the study designs, patient demographics, and cannabis usage patterns observed across the literature. Particular attention was paid to extracting data on the clinical outcomes related to periodontal health, salivary gland function, and changes in the oral microbiome. The review also carefully documented any observed associations

between chronic cannabis use and specific oral diseases, such as periodontitis, xerostomia, and dental caries. Additionally, the data extraction process aimed to capture important mechanistic insights into how cannabis and its constituent compounds may modulate inflammatory pathways and influence the composition and dynamics of the oral microbiome. This thorough and rigorous approach to data extraction enabled the review to provide a nuanced and multifaceted understanding of the complex interplay between chronic cannabis use and oral and periodontal health.

The extracted data was carefully synthesized to identify overarching themes and emerging patterns that provided a more comprehensive understanding of the multifaceted impacts of chronic cannabis use on oral and periodontal health. Key findings included:

1. The complex role of cannabis and its constituent compounds, such as THC and CBD, in modulating inflammatory and immune responses within periodontal tissues. This highlighted the potential for both therapeutic and adverse effects on the progression of periodontal diseases.
2. The significant impact of reduced salivary flow, or xerostomia, associated with chronic cannabis use, and its cascading effects on various oral health outcomes, including an increased risk of dental caries, oral infections, and difficulties with swallowing and speaking.
3. Detailed insights into the alterations observed in the composition and dynamics of the oral microbiome among chronic cannabis users, and the potential contribution of these microbial shifts to the development and progression of periodontal diseases.
4. Critical gaps in current research, such as the need for longitudinal studies to elucidate the long-term implications of chronic cannabis use on oral and periodontal health, as well as potential directions for future research to guide evidence-based clinical management strategies.

This comprehensive literature review provided a nuanced understanding of the complex and multifaceted impacts of chronic cannabis use on oral and periodontal health, encompassing both clinical implications and areas requiring further targeted investigation.

Literature Review

Cannabis and Periodontal Health

Chronic cannabis use has been consistently associated with an increased prevalence and severity of periodontal disease, a significant public health concern that warrants further investigation. (Versteeg et al., 2008) (Bellocchio et al., 2021) (Cm et al., 2005) Studies have reported a higher incidence of periodontitis, characterized by gingival inflammation, attachment loss, and alveolar bone destruction, among cannabis users compared to non-users. (Bellocchio et al., 2021) (Chaffee, 2021) The underlying mechanisms contributing to this association are multifaceted and involve complex interactions between the pharmacological properties of cannabis, the modulation of the immune response, and alterations in the oral microbiome.

Chronic cannabis use has been linked to a higher prevalence and severity of periodontal disease, as evidenced by numerous studies. (Versteeg et al., 2008) (Bellocchio et al., 2021) (Cm et al., 2005) Cannabis users exhibit a greater incidence of periodontitis, a chronic inflammatory condition affecting the supporting structures of the teeth, including the gingiva, periodontal ligament, and alveolar bone. This heightened susceptibility to periodontal disease among cannabis users is particularly concerning, as it can lead to progressive attachment loss, alveolar bone destruction, tooth mobility, and potential tooth loss if left untreated. (Bellocchio et al., 2021) (Cm et al., 2005)

The cannabinoids found in cannabis, such as tetrahydrocannabinol and cannabidiol, have been shown to possess both anti-inflammatory and immunomodulatory properties. (Hoch et al., 2015) (Cm et al., 2005) These complex pharmacological effects can have paradoxical impacts on periodontal health. While the anti-inflammatory actions of cannabinoids may offer some protection against the chronic inflammatory processes that drive the progression of periodontal disease, the immunomodulatory effects can also impair the host's ability to effectively clear periodontal pathogens. This can lead to an increased susceptibility to periodontal infections and a heightened inflammatory response, ultimately contributing to the development and progression of periodontal diseases.

Furthermore, chronic cannabis use has been associated with alterations in bone remodeling processes, which can contribute to the observed alveolar bone destruction in periodontal disease. (Bellocchio et al., 2021) (Cm et al., 2005) The endocannabinoid system, which interacts with the pharmacologically active compounds in cannabis, plays a crucial role in regulating bone metabolism. Disruptions in this system due to chronic cannabis use may lead to an imbalance between bone formation and resorption, ultimately

Demographic and Lifestyle Influences on the Impact of Chronic Cannabis Use on Periodontal Health

Demographic factors and lifestyle influences, such as age, gender, socioeconomic status, and oral hygiene practices, can also play a crucial role in mediating the relationship between chronic cannabis use and periodontal health. Older individuals, those with lower socioeconomic status, and those with poorer oral hygiene habits tend to exhibit higher rates of periodontal disease, irrespective of cannabis use. Examining the interplay between these demographic and lifestyle variables and chronic cannabis consumption is essential to fully understand the complex etiology of periodontal diseases in this population.(Mederos et al., 2018)

Factor	Potential Impact on Periodontal Health	Interplay with Cannabis Use
Age	Older individuals are more likely to develop periodontal disease due to cumulative exposure to risk factors and reduced regenerative capacity of periodontal tissues.	Chronic cannabis use may exacerbate age-related periodontal degradation due to its immunosuppressive and pro-inflammatory effects.
Gender	Males exhibit a higher prevalence of periodontal disease, possibly due to hormonal differences and varying oral hygiene behaviors compared to females.	Cannabis use in males may compound existing risks, as studies suggest higher consumption rates among men.
Socioeconomic Status	Individuals with lower socioeconomic status often face barriers to accessing dental care, have limited awareness about oral health, and are more likely to have poorer oral hygiene.	Socioeconomic disadvantages may amplify the adverse effects of cannabis use on periodontal health, such as delayed treatment and increased disease progression.
Oral Hygiene Practices	Poor oral hygiene, such as infrequent brushing and flossing, facilitates plaque accumulation and periodontal inflammation.	Cannabis-induced xerostomia and altered microbiota may worsen the consequences of suboptimal oral hygiene.

(Meier et al., 2016)

The influence of these demographic and lifestyle factors on the relationship between chronic cannabis use and periodontal health warrants further investigation to elucidate the underlying mechanisms and guide targeted intervention strategies.(Chaffee, 2021)

Salivary Gland Function and Xerostomia

Chronic cannabis use has been linked to significant changes in salivary gland function, leading to a state of xerostomia, or dry mouth. Saliva plays a crucial role in maintaining oral health by regulating pH, reducing bacterial growth, and providing essential minerals for tooth remineralization. Reduced salivary flow, as observed in cannabis users, can compromise these protective functions and lead to an increased risk of dental caries, oral infections, and difficulties with swallowing and speaking.(Le & Palamar, 2018)

The endocannabinoid system, which interacts with the active compounds in cannabis, is known to modulate the function of salivary glands. Chronic cannabis use, particularly the psychoactive compound

THC, has been shown to disrupt the normal regulation of salivary gland secretion, resulting in diminished salivary flow and the development of xerostomia. This reduction in salivary volume not only increases the risk of dental caries and oral infections but also compromises the pH-regulating, antimicrobial, and remineralizing properties of saliva, further contributing to the deterioration of oral health in chronic cannabis users.(Robo, 2018)

In addition to the reduction in salivary flow, chronic cannabis use has also been associated with alterations in the composition of saliva. These changes in salivary pH and enzyme activity can influence the oral microbiome, potentially leading to dysbiosis and an increased susceptibility to opportunistic infections. Patients with cannabis-induced xerostomia are at an elevated risk of developing mucosal lesions, fungal infections, and dental caries. Effective management strategies include the use of saliva substitutes, increased hydration, and, if necessary, adjustments to the dosage or route of cannabis administration.(Derise et al., 2022)

Cannabis Effect on Caries

The association between chronic cannabis use and an increased risk of dental caries is well-documented and multifactorial in nature. Several key factors contribute to this relationship.

One pivotal factor is the impact of chronic cannabis use on salivary gland function and reduced salivary flow, leading to xerostomia or dry mouth. Saliva plays a crucial role in maintaining oral health by regulating pH, reducing bacterial growth, and providing essential minerals for tooth remineralization. The diminished salivary flow observed in chronic cannabis users can significantly compromise these protective functions, resulting in an increased susceptibility to dental caries.

Furthermore, chronic cannabis use has been shown to significantly alter the composition of the oral microbiome. This disruption of the delicate balance of the oral microbial community can lead to an overgrowth of cariogenic bacteria, such as Streptococcus mutans, and a reduction in beneficial commensal species. This state of oral microbial dysbiosis can further exacerbate the risk of dental caries by providing a more favorable environment for the proliferation of cavity-causing bacteria.

Additionally, the immunosuppressive effects of chronic cannabis use may impair the host's ability to effectively clear these cariogenic bacteria, allowing for their continued proliferation and the progression of dental caries. The complex interplay between the pharmacological properties of cannabis, the disruption of salivary gland function, and the alterations in the oral microbiome collectively contribute to the increased susceptibility to dental caries observed in chronic cannabis users.(Le & Palamar, 2018)(Robo, 2018)

Impact on Oral Microbiome and Host Immunity

Chronic cannabis use has been observed to significantly alter the composition of the oral microbiome, which can have far-reaching implications for oral and periodontal health. The endocannabinoid system,

which interacts with the active compounds in cannabis, plays a crucial role in regulating the immune response and maintaining a balanced oral microbiome.(Scott et al., 2021)

The immunomodulatory properties of cannabinoids, such as THC and CBD, can disrupt the delicate equilibrium of the oral microbial community, leading to a state of dysbiosis. This dysbiosis, characterized by an overgrowth of pathogenic bacteria like Porphyromonas gingivalis and Fusobacterium nucleatum, and a reduction in beneficial commensals, can contribute to the development and progression of periodontal diseases. The altered immune response associated with chronic cannabis use may impair the host's ability to effectively clear these pathogenic bacteria, further exacerbating the risk of periodontal infections.(Gu et al., 2019)

Furthermore, chronic cannabis use has been shown to compromise the host's immune response, impairing the body's ability to effectively clear periodontal pathogens. The anti-inflammatory and immunomodulatory effects of cannabinoids can suppress the immune system, potentially reducing the effectiveness of immune responses against oral pathogens. This altered immune landscape may exacerbate periodontal disease and impair wound healing post-surgery.(Scott et al., 2021)

Cannabis' Dual Role: Therapeutic Potential vs. Risk

The complex pharmacological properties of cannabis, encompassing both anti-inflammatory and immunomodulatory effects, present a unique challenge in understanding its impact on oral and periodontal health.

Therapeutic Potential: The anti-inflammatory and analgesic properties of cannabinoids like THC and CBD hold potential benefits for managing the chronic pain and inflammation associated with periodontal diseases. The ability of these compounds to modulate inflammatory pathways and immune responses could be leveraged to develop novel treatment strategies for periodontal conditions. By targeting the underlying chronic inflammation that drives disease progression, cannabinoid-based therapies may offer an alternative or complementary approach to traditional periodontal management.(Scott et al., 2021)

Adverse Effects: Paradoxically, chronic cannabis use may also contribute to the worsening of periodontal conditions. The immunomodulatory effects of cannabinoids can increase the risk of periodontal infections by impairing the body's ability to effectively clear oral pathogens. Additionally, the alterations in salivary gland function and the oral microbiome associated with chronic cannabis use can further compromise oral and periodontal health. The reduction in salivary flow and the dysbiosis of the oral microbial community can lead to an increased susceptibility to dental caries, oral infections, and the progression of periodontal diseases.(Luo et al., 2021)

Cannabis and Wound Healing in Oral Tissues

The impact of cannabis on wound healing in the oral cavity is a topic of increasing interest. Cannabinoids, the active compounds in cannabis, influence wound healing through their interaction with the endocannabinoid system, which regulates inflammation and cellular regeneration. However, chronic

cannabis use has been associated with delayed healing in oral tissues, potentially due to immune suppression and altered fibroblast activity.(Nogueira‐filho et al., 2023)

This has significant implications for periodontal surgical procedures and post-extraction healing. The anti-inflammatory and immunomodulatory properties of cannabinoids may disrupt the delicate balance of the wound healing process, leading to delayed healing, increased risk of infection, and suboptimal treatment outcomes. Impaired wound healing can have far-reaching consequences for periodontal procedures, such as scaling and root planing, periodontal surgeries, and dental implant placement. The delayed or impaired healing of these procedures can lead to complications, such as persistent inflammation, infection, and even compromised treatment success.(Shah et al., 2020)

This warrants further investigation into how cannabis impacts peri-implant tissue health and osseointegration. Poor wound healing may complicate periodontal surgeries, extractions, and implant placements, underscoring the need for a better understanding of the effects of cannabis on oral tissue repair and the development of strategies to mitigate these adverse outcomes.

Cannabis and Peri-Implant Health

The effects of cannabis on peri-implant tissues, such as implant osseointegration and peri-implantitis risk, are emerging areas of research. Bone Quality: Chronic cannabis use may impair bone metabolism, potentially compromising implant stability and osseointegration. The endocannabinoid system, which interacts with the active compounds in cannabis, plays a crucial role in regulating bone remodeling. Chronic cannabis use has been associated with altered bone turnover and reduced bone mineral density, which can negatively impact the integration of dental implants. This may increase the risk of implant failure and complications, especially in the long term.(Scott et al., 2021)

Microbiota: Dysbiosis associated with chronic cannabis use may also influence biofilm formation around dental implants, increasing the risk of peri-implantitis. The altered composition of the oral microbiome, characterized by an overgrowth of pathogenic bacteria and a reduction in beneficial commensals, can create an environment conducive to the development and progression of peri-implant diseases. This dysbiosis, combined with the immunomodulatory effects of cannabinoids, may impair the host's ability to effectively clear these pathogenic bacteria, further exacerbating the risk of peri-implantitis.(2019)

Clinical Relevance: Addressing cannabis use in pre-implant planning and postoperative care could improve implant outcomes. Careful patient assessment, including a thorough understanding of the patient's cannabis use history, is essential when considering dental implant treatment. Strategies to mitigate the potential adverse effects of cannabis on peri-implant health may include adjustments to the treatment plan, modifications to the surgical approach, and close monitoring during the healing and maintenance phases. By addressing the unique challenges posed by cannabis use, clinicians can optimize the long-term success of dental implant treatments.(Kochar et al., 2022)

Oral Cancer Risk and Cannabis Use

The potential link between chronic cannabis use and oral cancer has been a subject of ongoing investigation. Smoking cannabis introduces carcinogens, such as polycyclic aromatic hydrocarbons, which are linked to oral cancers and can induce precancerous changes in the oral mucosa. (2023) Chronic cannabis use has been associated with an increased risk of dysplastic lesions and pre-malignant changes within the oral cavity. (Cm et al., 2005) This heightened risk of oral cancer development underscores the importance of regular oral cancer screenings and the need for preventive strategies targeting cannabis users.

Chronic exposure to the carcinogenic compounds found in cannabis smoke may directly damage oral tissues and lead to the formation of precancerous lesions. Additionally, the immunomodulatory effects of cannabinoids may impair the body's ability to effectively clear pre-malignant cells, allowing them to progress further. Chronic cannabis use may impair immune surveillance, potentially increasing susceptibility to malignancies.(Cm et al., 2005)

The altered oral microbiome associated with chronic cannabis use may also create an environment that promotes the development of oral cancers. Further research is needed to elucidate the specific pathways by which cannabis use can increase the risk of oral cancer and to distinguish between the carcinogenic risks of smoked cannabis versus alternative consumption methods (e.g., edibles, vaporizers). Developing targeted prevention and early detection strategies for this population is crucial to address the potential link between chronic cannabis use and oral cancer.(Robo, 2018)

Conclusion

Chronic cannabis use has a profound and multifaceted impact on oral and periodontal health. The evidence highlights an increased prevalence of periodontal disease, characterized by gingival inflammation, attachment loss, and alveolar bone destruction among cannabis users. Salivary gland dysfunction leading to xerostomia further exacerbates oral health challenges, increasing susceptibility to caries, infections, and mucosal lesions. Changes in the oral microbiome, with dysbiosis favoring pathogenic bacteria, coupled with the immunomodulatory effects of cannabinoids, contribute significantly to the progression of periodontal disease and impaired wound healing.(2019)

Cannabis' dual role in oral health—offering therapeutic potential through its anti-inflammatory properties while simultaneously posing risks due to immunosuppression and microbiome alterations—underscores the complexity of its impact. Emerging concerns such as its effect on peri-implant health, delayed wound healing, and potential links to oral cancer further emphasize the need for a nuanced approach in clinical management and patient counseling.(Scarano et al., 2023)

While cannabis use continues to grow, both recreationally and medicinally, it is critical for oral health professionals to be aware of its implications. Integrating this knowledge into dental practice will enable

more personalized care, improve outcomes, and address the unique challenges posed by cannabis use on oral and periodontal health.(Chaffee, 2021)

Future Directions

1 ***Longitudinal Studies on Cannabis Use and Oral Health:*** Future research should focus on long-term, large-scale longitudinal studies to better understand the cumulative, dose-dependent effects of chronic cannabis use on periodontal health, salivary gland function, and the oral microbiome. These studies are crucial for establishing causative relationships and providing clear clinical guidelines to manage the oral health implications of chronic cannabis consumption.

2 ***Exploring Mechanistic Pathways:*** Investigating the underlying molecular mechanisms by which cannabinoids exert their immunomodulatory effects, and how these influence inflammatory pathways, bone metabolism, and microbiome dynamics, will be pivotal in developing targeted therapeutic strategies to address the oral health challenges associated with chronic cannabis use.

3 ***Cannabis Use and Peri-Implant Health:*** Additional in-depth studies are needed to thoroughly evaluate the effects of cannabis use on dental implant osseointegration, peri-implantitis risk, and long-term implant survival rates. Understanding these relationships can guide pre-implant planning, surgical protocols, and comprehensive postoperative care for cannabis-using patients to optimize implant outcomes.

4 ***Alternative Consumption Methods and Oral Health Outcomes:*** Conducting comparative analyses of different cannabis consumption methods, such as smoking, vaping, edibles, and tinctures, and their respective impacts on oral and periodontal health, would help identify safer alternatives and mitigate the risks associated with traditional combustible methods.

5 ***Development of Targeted Therapies:*** Leveraging the potential therapeutic benefits of cannabinoids, research should explore their controlled use in managing periodontal inflammation and pain. This includes identifying optimal dosages, delivery mechanisms, and administration strategies that can maximize the beneficial effects while minimizing the adverse outcomes.

6 ***Preventive Strategies and Public Health Initiatives:*** Designing comprehensive educational campaigns to raise awareness among cannabis users about the risks to oral health and promoting preventive measures can help mitigate these challenges. Emphasizing the importance of regular dental check-ups, personalized oral hygiene practices, and early interventions will be crucial in this regard.

7 ***Oral Cancer and Cannabis Use:*** Continued exploration of the relationship between chronic cannabis use and the risk of oral cancer is critical. Understanding the carcinogenic potential of cannabis smoke versus non-combustible consumption methods, as well as the role of cannabinoids in modulating oral cancer progression, can inform screening, early detection, and management strategies.

References

1. Andreis, K., Billingsley, J., Shirazi, K. N., Wager‐Miller, J., Johnson, C. T., Bradshaw, H. B., & Straiker, A. (2022). Cannabinoid CB1 receptors regulate salivation. In Scientific Reports (Vol. 12, Issue 1). Nature Portfolio. https://doi.org/10.1038/s41598-022-17987-2

2. Bellocchio, L., Inchingolo, A. D., Inchingolo, A. M., Lorusso, F., Malcangi, G., Santacroce, L., Scarano, A., Bordea, I. R., Hazballa, D., D'Oria, M. T., Isacco, C. G., Nucci, L., Serpico, R., Tartaglia, G. M., Giovanniello, D., Contaldo, M., Farronato, M., Dipalma, G., & Inchingolo, F. (2021). Cannabinoids Drugs and Oral Health—From Recreational Side-Effects to Medicinal Purposes: A Systematic Review [Review of Cannabinoids Drugs and Oral Health—From Recreational Side-Effects to Medicinal Purposes: A Systematic Review]. International Journal of Molecular Sciences, 22(15), 8329. Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/ijms22158329

3. Caio Fabio Baeta Lopes, Bruno Brandão De Angelis, Henrique Maciel Prudente, Universidade Federal de Sa ˜o Joa ˜o Del Rei, Campus Centro-oeste, Brazil, Bernardo Vieira Goulart De Souza, Sérgio Vitorino Cardoso, Rosy Iara Maciel De Azambuja Ribeiro. (2023). Concomitant consumption of marijuana, alcohol and tobacco in oral squamous cell carcinoma development and progression: recent advances and challenges. https://www.sciencedirect.com/science/article/pii/S000399691200177X

4. Chaffee, B. W. (2021). Cannabis Use and Oral Health in a National Cohort of Adults. In Journal of the California Dental Association (Vol. 49, Issue 8, p. 493). California Dental Association. https://doi.org/10.1080/19424396.2021.12222740

5. Cm, C., Hirsch, R., & Johnstone, S. J. (2005). General and oral health implications of cannabis use [Review of General and oral health implications of cannabis use]. Australian Dental Journal, 50(2), 70. Wiley. https://doi.org/10.1111/j.1834-7819.2005.tb00343.x

6. Derise, A., Ford, C. L., Hafiz, N., Pandit, S., Vyas, A., Igbinedion, S., Morris, J., Jordan, P., Cai, Q., & Alexander, J. S. (2022). Chronic Cannabis Intoxication and Propofol-Induced Salivation: Causes and Considerations. In Pathophysiology (Vol. 29, Issue 2, p. 223). Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/pathophysiology29020018

7. Gu, Z., Singh, S., Niyogi, R. G., Lamont, G., Wang, H., Lamont, R. J., & Scott, D. A. (2019). Marijuana-Derived Cannabinoids Trigger a CB2/PI3K Axis of Suppression of the Innate Response to Oral Pathogens. In Frontiers in Immunology (Vol. 10). Frontiers Media. https://doi.org/10.3389/fimmu.2019.02288

8. Gugliandolo, A., Pollastro, F., Grassi, G., Bramanti, P., & Mazzon, E. (2018). In Vitro Model of Neuroinflammation: Efficacy of Cannabigerol, a Non-Psychoactive Cannabinoid. In International Journal of Molecular Sciences (Vol. 19, Issue 7, p. 1992). Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/ijms19071992

9. Hoch, E., Bonnet, U., Thomasius, R., Ganzer, F., Havemann‐Reinecke, U., & Preuss, U. W. (2015). Risks Associated With the Non-Medicinal Use of Cannabis [Review of Risks Associated With the Non-Medicinal Use of Cannabis]. Deutsches Ärzteblatt International. Deutscher Ärzte-Verlag. https://doi.org/10.3238/arztebl.2015.0271

10. Javaid, M., Ahmed, A. S., Durand, R., & Tran, S. D. (2015). Saliva as a diagnostic tool for oral and systemic diseases [Review of Saliva as a diagnostic tool for oral and systemic diseases]. Journal of Oral Biology and Craniofacial Research, 6(1), 67. Elsevier BV. https://doi.org/10.1016/j.jobcr.2015.08.006

11. Kochar, S. P., Reche, A., & Paul, P. (2022). The Etiology and Management of Dental Implant Failure: A Review [Review of The Etiology and Management of Dental Implant Failure: A Review]. Cureus. Cureus, Inc. https://doi.org/10.7759/cureus.30455

12. Könönen, E., Gürsoy, M., & Gürsoy, U. K. (2019). Periodontitis: A Multifaceted Disease of Tooth-Supporting Tissues [Review of Periodontitis: A Multifaceted Disease of Tooth-Supporting Tissues]. Journal of Clinical Medicine, 8(8), 1135. Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/jcm8081135

13. Le, A., & Palamar, J. J. (2018). Oral health implications of increased cannabis use among older adults: Another public health concern? In Journal of Substance Use (Vol. 24, Issue 1, p. 61). Taylor & Francis. https://doi.org/10.1080/14659891.2018.1508518

14. Luo, Z., Fitting, S., Robinson, C., Benitez, A., Li, M., Wu, Y., Fu, X., Amato, D., Ning, W., Funderburg, N., Wang, X., Zhou, Z., Yu, X., Wagner, A., Cong, X., Xu, W., Maas, K., Wolf, B. J., Huang, L., … Jiang, W. (2021). Chronic cannabis smoking-enriched oral pathobiont drives behavioral changes, macrophage infiltration, and increases β-amyloid protein production in the brain. In EBioMedicine (Vol. 74, p. 103701). Elsevier BV. https://doi.org/10.1016/j.ebiom.2021.103701

15. Mccarberg, B. H. (2023). Cannabinoids: their role in pain and palliation. https://www.tandfonline.com/doi/full/10.1080/J354v21n03_04

16. Mederos, M., Francia, A., Chisini, L. A., Grazioli, G., & Andrade, É. (2018). ACTUALIZACIÓN Influencia del consumo de cannabis en la enfermedad periodontal: una Scoping Review. In Odontoestomatología (Vol. 20, Issue 31, p. 4). Universidad de la República. https://doi.org/10.22592/ode2018n31a2

17. Meier, M. H., Caspi, A., Cerdá, M., Hancox, R. J., Harrington, H., Houts, R., Poulton, R., Ramrakha, S., Thomson, W. M., & Moffitt, T. E. (2016). Associations Between Cannabis Use and Physical Health Problems in Early Midlife. In JAMA Psychiatry (Vol. 73, Issue 7, p. 731). American Medical Association. https://doi.org/10.1001/jamapsychiatry.2016.0637

18. Nogueira‐filho, G. R., Todescan, S., Shah, A., Rosa, B. T., Tunes, U. D. R., & Neto, J. B. C. (2023). Impact of cannabis sativa (marijuana) smoke on alveolar bone loss: a histometric study in rats. https://aap.onlinelibrary.wiley.com/doi/10.1902/jop.2011.100362

19. Robo, I. (2018). Marijuana Usage, the Effects in Oral Health. In International Journal of Dental Medicine (Vol. 4, Issue 1, p. 1). Science Publishing Group. https://doi.org/10.11648/j.ijdm.20180401.11

20. Scarano, A., Khater, A. G. A., Gehrke, S. A., Serra, P., Inchingolo, F., Carmine, M. D., Tari, S. R., Leo, L., & Lorusso, F. (2023). Current Status of Peri-Implant Diseases: A Clinical Review for Evidence-Based Decision Making [Review of Current Status of Peri-Implant Diseases: A Clinical Review for Evidence-Based Decision Making]. Journal of Functional Biomaterials, 14(4), 210. Multidisciplinary Digital Publishing Institute. https://doi.org/10.3390/jfb14040210

21. Scott, D. A., Dukka, H., & Saxena, D. (2021). Potential Mechanisms Underlying Marijuana-Associated Periodontal Tissue Destruction. In Journal of Dental Research (Vol. 101, Issue 2, p. 133). SAGE Publishing. https://doi.org/10.1177/00220345211036072

22. Shah, R., Domah, F., Shah, N., & Domah, J. (2020). Surgical Wound Healing in the Oral Cavity: a Review [Review of Surgical Wound Healing in the Oral Cavity: a Review]. Dental Update, 47(2), 135. Mark Allen Group. https://doi.org/10.12968/denu.2020.47.2.135

23. Špiljak, B. (2022). Sialorrhea and Xerostomia in Parkinson's Disease Patients [Review of Sialorrhea and Xerostomia in Parkinson's Disease Patients]. Acta Clinica Croatica. Croatian Dairy Union. https://doi.org/10.20471/acc.2022.61.02.19

24. Versteeg, P., Slot, D., Velden, U. van der, & Weijden, G. V. der. (2008). Effect of cannabis usage on the oral environment: a review [Review of Effect of cannabis usage on the oral environment: a review]. International Journal of Dental Hygiene, 6(4), 315. Wiley. https://doi.org/10.1111/j.1601-5037.2008.00301.x

25. Zhen Gu 1 ,. (2019). Marijuana-Derived Cannabinoids Trigger a CB2/PI3K Axis of Suppression of the Innate Response to Oral Pathogens - PubMed. https://pubmed.ncbi.nlm.nih.gov/31681262/