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The relationship between *Cannabis sativa* and periodontal disease: systematic review

A relação entre Cannabis sativa e doença periodontal: revisão sistemática

La relación entre Cannabis sativa y la enfermedad periodontal: revisión sistemática

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RESUMO

Objetivo: O objetivo desta revisão foi investigar os efeitos do uso da *Cannabis* sobre os tecidos periodontais saudáveis e doentes. **Métodos:** Para este trabalho foi realizada uma revisão integrativa de literatura nas bibliotecas virtuais: PubMed, EMBASE, Scopus e Web of Science para encontrar os estudos relevantes entre os anos de 2014 a 2023. **Resultados:** Após a remoção das duplicatas, dois autores avaliaram independentemente os títulos, resumos e textos completos. **Conclusão** Estudos avaliando seus efeitos devem ser considerados, inclusive no tratamento da inflamação periodontal. Mas há de se deixar claro que há grande diferença entre usar o canabidiol medicinal, que resulta em benefícios, e fumar a maconha, que, para a saúde bucal, é bastante deletéria.
Palavras-chave: Cannabis; Odontologia; Saúde; Uso Medicinal.

ABSTRACT

Objective: The objective of this review was to investigate the effects of Cannabis use on healthy and diseased periodontal tissues. **Methods:** For this work, an integrative literature review was carried out in virtual libraries: PubMed, EMBASE, Scopus and Web of Science to find relevant studies between the years 2014 and 2023. **Results:** After removing duplicates, two authors independently evaluated titles, abstracts and full texts. **Conclusion:** Studies evaluating its effects should be considered, including in the treatment of periodontal inflammation. But it must be made clear that there is a big difference between using medicinal cannabidiol, which results in benefits, and smoking marijuana, which, for oral health, is quite harmful.
Keywords: Cannabis; Dentistry; Health; Medicinal Use.

Resumen

Objetivo: El objetivo de esta revisión fue investigar los efectos del uso de Cannabis en los tejidos periodontales sanos y enfermos. **Métodos:** Para este trabajo se realizó una revisión integrativa de la literatura en bibliotecas virtuales: PubMed, EMBASE, Scopus y Web of Science para encontrar estudios relevantes entre los años 2014 y 2023. **Resultados:** Luego de eliminar duplicados, dos autores evaluaron de forma independiente títulos, resúmenes y textos completos. **Conclusión:** Se deben considerar estudios que evalúen sus efectos, incluso en el tratamiento de la inflamación periodontal. Pero hay que dejar claro que existe una gran

diferencia entre utilizar cannabidiol medicinal, que resulta beneficioso, y fumar marihuana, que, para la salud bucal, es bastante perjudicial.
Descriptores: Cannabis; Odontología; Salud; Uso medicinal.

INTRODUCTION

Various physical and psychological benefits have been attributed to cannabis being first reported in 2600 aC.[1] The properties of the plant *Cannabis sativa*, popularly known as marijuana, are well documented for its use in textile manufacturing, health benefits, and healing properties. It has always been one of the most widely used illicit drugs on a recreational level worldwide.[2] The recreational and ritual use of *Cannabis* and its derivative compounds (called cannabinoids) have an important historical significance, mainly due to the various psychological and physiological effects on the human body, particularly the intense experience of euphoria.[3]

However, acute and long-term cannabinoid intoxication has several adverse effects, ranging from health problems such as tachycardia, immune depression, and increased risk of cancer to motor impairment and catalepsy, interference with cognitive function, attacks of panic, and increased risk of developing psychosis. There are also additional intraoral conditions reported with *Cannabis* users, which include tongue carcinoma, gingival hyperplasia, xerostomia, swollen uvula (uvulitis), and gingivitis.[4,5]

The medicinal use of this plant dates back over 2000 years and has been described in almost all ancient cultures. Cannabinoids were always given to patients for treating and managing pain, regulating anxiety and depression, and treating other illnesses. [6,7,8]

In recent years, many countries legalized and promoted the use of cannabinoids for therapeutic purposes. In some, recreational *Cannabis* became legal, and the prevalence of its use increased markedly. Considering the current and future increase in health problems related to the consumption of cannabinoids, oral health professionals and dentists must know and understand the oral effects of *Cannabis*.[9]

Cannabidiol (CBD) is the most abundant non-psychotropic cannabinoid in the plant. CBD has antioxidant, anti-inflammatory, and immunomodulatory properties and is devoid of psychoactive properties, and it is safe for use in humans due to its minimal side effects.[10,11] This compound has shown promising results in controlling severe illnesses such as epilepsy, Alzheimer's disease, multiple sclerosis, chronic pain, cachexia, diabetes, and sepsis and in the treatment of various types of cancer.[12,13,14]

The use of CBD in dentistry has been poorly studied. As a result, its effects on the treatment of oral diseases are not yet well known. However, considering its properties,

mechanisms of action, and favorable results in the treatment of complex diseases, it may exert a positive therapeutic effect on some pathologies that are still challenging for the dentist.[15]

Recent studies showed a biological plausibility for a possible relationship between periodontal disease and *Cannabis* use, which seems to be associated with a higher prevalence of periodontitis.[16] Considering these aspects, this narrative literature review aimed to investigate the effects of *cannabis* use on healthy and diseased periodontal tissues.

MATERIAL AND METHODS

The search was carried out using PubMed, EMBASE, Scopus and Web of Science databases to find relevant studies between the years 2014 to 2023. After removing duplicates, two authors independently evaluated the titles, abstracts and full texts. We included the studies that were closest to the objective of the present study. The Health Descriptors (DeCs) used for this research were: Cannabis sativa, periodontal treatment with Cannabis, periodontal disease.

DEVELOPMENT

Periodontitis is a multifactorial chronic inflammatory disease associated with dysbiotic plaque biofilms and characterized by progressive destruction of the tooth support apparatus. Its main features include loss of periodontal tissue support, manifested by clinical attachment loss and radiographically assessed alveolar bone loss, presence of periodontal pockets, and gingival bleeding. Periodontitis is a significant public health problem due to its high prevalence. It is responsible for a substantial proportion of edentulism and masticatory dysfunction, resulting in expressive dental care costs, which generates a plausible negative impact on general health. [17]

There is strong evidence from prospective observational, randomized, and laboratory studies that smoking increases the risk of periodontitis. [18,19] *Cannabis* is the most smoked substance after tobacco. As a result, Baumeister *et al.*[20] sought to investigate whether *Cannabis* use also causally affects periodontitis. However, found no evidence of an association between *Cannabis* use and periodontitis.

Mederos *et al.*[21] point out that periodontal disease seems to be worsened by *Cannabis* consumption. However, the specific mechanism by which *Cannabis* acts on gingival tissues is unknown due to the insufficient number of studies carried out to date and differences in methodologies and populations studied. It is why health services must take steps to raise awareness of the strong likelihood that regular *Cannabis* users have this pathology.

With the legalization of the medical use of *Cannabis* in many countries and even allowing its recreational use in most of them, the prevalence of marijuana use has increased markedly in the last decade. Consequently, it was possible to observe a higher predominance of health problems related to the use and abuse of *Cannabis*, which makes it crucial for oral health professionals to understand and know how to manage the consequences and effects of its use concerning oral health.[22]

Although there is a long history of *Cannabis* use, knowledge of its effects on human health has only been enriched in recent decades. The most common way to consume *Cannabis* is to smoke the herb —and it has several direct and indirect deleterious effects on the oral cavity. However, the evidence linking *Cannabis* to oral disease is contradictory and, to put it mildly, limited. It is usually related to different personal risk factors, as well as a lack of detail in information about marijuana use. Even so, the literature pointed out that *Cannabis* consumption carries a higher risk of gum and periodontal disease, oral infection, and oral cancer.[9]

Cannabis smoking is a risk factor for periodontal disease and independent of confounding factors, such as tobacco use, since its frequent recreational use appears to be associated with adverse periodontal health, including higher probing depths, higher attachment loss clinic, and greater chances of having severe periodontitis compared to non-users.[23]

In a systematic review and meta-analysis, Chisini *et al.*[16] state that the use of *Cannabis* is associated with a higher prevalence of periodontitis, regardless of tobacco use. In addition, they highlighted the significant role of *cannabis* use in the development of periodontal disease and the need to adopt public health policies to control its use and the consequences of indiscriminate use.

Cannabis users have deeper periodontal pockets, higher levels of periodontal attachment loss, and, thus, a greater likelihood of severe periodontitis than non-users. Furthermore, *Cannabis* use, in the absence of tobacco use, appears to influence periodontal pathology, although the biological mechanisms linking the two processes are unknown. On the other hand, this risk factor is time-dependent, as the longer the habit lasts, the greater the subsequent loss of periodontal attachment. It is advisable to consider this risk factor when preparing a medical history, constantly inquiring about the use of *Cannabis* as a conduct with repercussions on oral hygiene.[24]

The prevalence of self-reported periodontitis among *Cannabis* users is considered high compared to available data for the general population with similar sociodemographic and behavioral conditions. It suggests that smoking *Cannabis* may have a potentially detrimental effect on oral health status. An exploratory study conducted by Perez-Rivoir[25] provided a basis

for further research, suggesting larger samples to assess how smoking affects the prevalence and progression of periodontitis in frequent *Cannabis* users.

Javed *et al.*[26] detected that the clinical-radiographic parameters related to periodontal problems are worse among marijuana smokers, cigarette smokers, and non-smokers with periodontitis than among non-smokers with periodontal health. Salivary levels of IL-17A and IL-23 were higher in marijuana smokers than in cigarette smokers and non-smokers with periodontitis. Therefore, it can be stated that marijuana and cigarette smokers have comparable clinical and radiographic status. However, the immunoinflammatory response of whole saliva may be moderately worse in marijuana smokers compared to heavy cigarette smokers and non-smokers with periodontitis.

A systematic review carried out by Mayiol *et al.*[27] concluded that frequent *Cannabis* smoking could be harmful to periodontal tissues, and this can be dose dependent. However, it suggested that larger sample longitudinal studies, including long-term *Cannabis* smokers and stratified for etiological factors of periodontitis and risk factors/indicators, pointedly age, biofilm control, and tobacco, are needed to support this claim. It is also essential to better report the quantity, frequency, consumption time, and composition of the "joints," as well as the relationship between these aspects and the periodontal status.

Traditionally, much of the focus of the treatment for periodontal disease was on reducing bacterial load. However, there is an opportunity to modulate the host's inflammatory response by using the anti-inflammatory properties of cannabinoids.[28] This is because cannabinoids have potent anti-inflammatory and analgesic effects, which make them very useful in the treatment of inflammation-based gum disease, as they play a role in modulating/suppressing inflammatory responses by periodontal ligament cells.[26]

In a critical assessment of the beneficial and deleterious effects of CBD on inflammatory periodontal diseases caused by bacterial virulence factors, Jirasek *et al.* [29] noted that it is still a crucial challenge, in terms of a realistic assessment of the usefulness of CBD in the prophylaxis and treatment of periodontal inflammation due to the absence of randomized clinical trials with a placebo group, in addition, there is also a lack of information about the effect of CBD analgesic in oral tissues.

Singh [30] observed that cannabidiol alters the immune response to *P. gingivalis* in mice, affecting the secretion of immunoglobulins and the expression of inflammatory markers. Suppression of the immune response by cannabidiol can lead to increased periodontal destruction in the presence of *P. gingivalis*. Although no difference in the bone loss was found

in the studied model, the effect on inflammatory mediators by cannabidiol was significant. It can impact chronic periodontitis in due course in the presence of persistent pathogenic infection.

FINAL CONSIDERATIONS

Although there is still lots of prejudice regarding the use of medicinal *Cannabis*, studies evaluating its effect on different diseases have shown positive results that should be considered, including in the treatment of periodontal inflammation. But it must be made clear that there is a significant difference between using medicinal CBD, which results in benefits, and smoking marijuana, which is quite deleterious for oral health, not to mention the presence of other systemic adverse effects that can lead to significant consequences.

Author Contributions

All authors contributed to the design of the study, analysis, and interpretation of the results and conclusions. All authors critically revised the manuscript, gave final approval, and agreed to be accountable for all aspects of the work.

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Conflict of Interest

The authors declare no conflict of interest.

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