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THE USE OF CANNABIDIOL IN PEDIATRIC DENTISTRY PATIENTS WITH AUTISM SPECTRUM DISORDER: INTEGRATIVE REVIEW

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REVIEW ARTICLE

ABSTRACT

This research project aims to conduct a literature review on the use of cannabidiol (CBD) in pediatric dental patients diagnosed with Autism Spectrum Disorders (ASD). The focus will be on the intersection between pediatric dentistry and ASD treatment, aiming to fill a substantial gap in the scientific and clinical understanding of the subject. The integrated approach provides a solid foundation for informed decision-making by healthcare professionals, family members, and caregivers. The central problem of the research lies in the need for substantial evidence supporting the efficacy and safety of CBD in this specific patient group. The absence of reliable data poses significant challenges for making informed decisions about the pediatric dental treatment of children with ASD, impacting the quality of life for these patients. Therefore, the adopted methodology will involve a literature search, using exclusively recently published articles from the last 5 years, available in databases such as PUBMED and SCIELO, among other relevant sources. The main objective of this literature review is to assess the efficacy of CBD in managing symptoms associated with ASD in pediatric dental contexts, considering its potential therapeutic benefits and possible side effects. The research aims to fill this gap by establishing a comprehensive investigation into the use of CBD in children with ASD, directing its attention to specific implications for oral health.

Keywords: Autistic Disorder. Cannabidiol. Dental Specialties. Pediatric Dentistry.

USO DE CANNABIDIOL EN PACIENTES ODONTOPEDIÁTRICOS CON TRASTORNOS DEL ESPECTRO AUTISTA

RESUMEN

Este proyecto de investigación tiene como objetivo realizar una revisión bibliográfica sobre el uso del cannabidiol (CBD) en pacientes odontopediátricos diagnosticados con Trastornos del Espectro Autista (TEA). El enfoque se centrará en la intersección entre la odontología pediátrica y el tratamiento del TEA, con el objetivo de llenar una brecha sustancial en la comprensión científica y clínica del tema. La aproximación integrada busca proporcionar una base sólida para la toma de decisiones informadas por parte de profesionales de la salud, familiares y cuidadores. El problema central de la investigación radica en la falta de evidencia sustancial que respalde la eficacia y seguridad del CBD en este grupo específico de pacientes. La ausencia de datos confiables presenta desafíos significativos para tomar decisiones informadas sobre el tratamiento odontopediátrico de niños con TEA, afectando la calidad de vida de estos pacientes. Por lo tanto, la metodología adoptada implicará una búsqueda bibliográfica, utilizando exclusivamente artículos recientemente publicados en los últimos 5 años, disponibles en bases de datos como PUBMED y SCIELO, entre otras fuentes relevantes. El objetivo principal de esta revisión bibliográfica es evaluar la eficacia del CBD en la gestión de síntomas asociados al TEA en contextos odontopediátricos, considerando sus posibles beneficios terapéuticos y efectos secundarios. La investigación busca llenar esta brecha al establecer una investigación integral sobre el uso del CBD en niños con TEA, dirigiendo su atención a implicaciones específicas para la salud bucal.

Palabras-clave: Trastorno Autístico. Cannabidiol. Especialidades Odontológicas. Odontología Pediátrica.

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1. INTRODUCTION

The use of cannabidiol (CBD) in pediatric dental patients diagnosed with Autism Spectrum Disorders (ASD) has been the subject of interest and research in recent years (Alonso *et al.*, 2022; Oliveira, 2020). The growing recognition of the challenges faced by children with ASD, associated with the search for effective and safe therapeutic alternatives, has directed the emphasis towards the potential of cannabidiol as a promising intervention (Simonato *et al.*, 2021).

The concern centers on the lack of substantial evidence supporting the efficacy and safety of CBD use in pediatric dental patients with ASD (Alonso *et al.*, 2022). This information emptiness produces a significant gap in the understanding of health professionals, family members and caregivers, hindering informed decision-making about the treatment of these patients (Alonso *et al.*, 2022).

Given this scenario, the present study aims to fill this gap by establishing a comprehensive investigation into the use of cannabidiol in children with ASD, focusing especially on pediatric dentistry aspects (Oliveira & Oliveira, 2020; Fernandes, 2023). The study's main objective is to evaluate CBD's efficacy in managing symptoms associated with ASD in pediatric dentistry patients contexts, considering its potential therapeutic benefits and possible side effects.

Contextualizing the topic is essential, assuming the worrisome increase in ASD diagnosis rates and the complexity associated with treating these disorders in younger patients (Alonso *et al.*, 2022; Oliveira & Oliveira, 2020). Families and healthcare professionals face significant challenges when searching for effective therapeutic options that minimize symptoms and improve the quality of life of autistic children (Babayeva *et al*., 2022).

By understanding the comprehensive context of CBD use in pediatric dental patients with ASD, this study aims to provide a solid scientific basis and contribute to recent shreds of studies with more knowledgeable and evidence-driven health policies (Famp, 2022). Promoting an integrated and holistic approach to the care of children with ASD, including pediatric dentistry considerations, is essential to advance the understanding and effective treatment of these disorders (Oliveira & Oliveira, 2020). Cannabinoids have also been shown to be a promising therapeutic option in

inflammatory diseases and other pathological aspects (Marinho & Silva, 2023).

Autism Spectrum Disorder (ASD) is a complex neurobiological condition that affects the development of communication, socialization and behavior (Alonso *et al.,* 2022). The diagnosis of ASD at an early age has become more common, resulting in a growing need for innovative and effective therapeutic approaches (Babayeva *et al.,* 2022). Nevertheless, the lack of consensus on specific interventions has shown a relentless search for promising treatment modalities (Marinho & Silva, 2023). In this context, cannabidiol (CBD), one of the active compounds in the cannabis plant, has emerged as an option that has aroused interest due to its neuroprotective and anti-inflammatory properties (Mimura, Ferreira & Pereira, 2023).

The families of these children, as well as health professionals, face difficulties in making informed treatment decisions, given the scarcity of reliable data. In addition, pediatric dental considerations are often underestimated in this context, despite the vital interconnection between oral health and general well-being (Oliveira & Oliveira, 2020). Although the prevalence of autism is increasing, a pharmaceutical has not been conceived for the treatment of the core symptoms of ASD. Management of ASD reaches for a multidisciplinary approach and mainly involves behavioral and educational interventions (Mimura, Ferreira & Pereira, 2023).

The objectives of this literature review are multifaceted. Firstly, it seeks to evaluate the efficacy of CBD in managing the symptoms associated with ASD in children, with a specific emphasis on pediatric dentistry aspects (Alonso *et al.*, 2022). In addition, it seeks to analyze possible side effects and complications related to the use of CBD in this specific group of patients. The research aims to provide a comprehensive overview, considering safety, efficacy and impact on odontopediatric conditions.

The contextualization of the topic reveals the inherent complexity of treating ASD in younger patients (Oliveira & Oliveira, 2020). The need for individualized and holistic therapeutic approaches is evident, and the role of oral health in this context is highlighted. Children with ASD often face specific challenges related to oral health, such as oral hygiene difficulties, selective eating and self-injurious behaviors. These issues, when combined with the need for effective treatment of ASD symptoms, highlight the importance of an integrated approach (Mimura, Ferreira & Pereira, 2023).

When considering the wider context, it is essential to recognize not only the

increasing prevalence of ASD but also the diversity of manifestations and individual needs (Oliveira & Oliveira, 2020). Each child is unique, and the autistic spectrum encompasses a variety of clinical profiles. Therefore, a successful therapeutic approach must take this diversity into account, considering both behavioral aspects and those related to physical health. This article aims to provide an integrated opinion concerning the applicability, efficacy and pieces of information about cannabidiol as a therapeutic option to autistic pediatric patients.

2. METHODOLOGY

The methodology adopted for this study consists of a comprehensive bibliographic integrative review, which seeks to critically examine the existing literature on the use of cannabidiol (CBD) in pediatric dental patients diagnosed with Autism Spectrum Disorders (ASD). Producing research on and relating it to existing knowledge is the structure union of all academic analysis activities, regardless of discipline. A literature review can considerably be defined as a systematic method of collecting and synthesizing previous research (Jesus et al., 2024).

An effective and well-conducted review as a research strategy creates a strong foundation for advancing learning and promoting theory development (Snyder, 2023). The literature review is a method that allows for the synthesis and analysis of literature reviews, theories and approaches that have already been published, offering a broad and in-depth view of the current state of knowledge on the topic in question. The search for articles and publications was conducted in renowned scientific databases such as Scielo, Wiley Library, Springer, PubMed, Scopus and Google Scholar, using a combination of relevant terms such as “cannabidiol”, “Autism Spectrum Disorders”, and “pediatric dentistry”, among others.

The selection of articles included an analysis of titles, abstracts and keywords, prioritizing identifying studies that specifically addressed the use of CBD in pediatric dental contexts and patients with ASD. The inclusion of publications was based on predefined criteria, considering the content's relevance, the studies' methodological quality and contribution to a comprehensive understanding of the topic. Articles that did not complete the inclusion criteria or had poor methodologies were excluded, thus

ensuring the consistency and reliability of the review. The entire number of studies included integrally in the final review is n=27.

The critical analysis and synthesis of the data were carried out to identify patterns, trends, and gaps in the literature. The information obtained was organized to provide a cohesive view of the current state of literature reviews on the use of CBD in pediatric dental patients with ASD.

This literature review seeks to contribute to scientific knowledge by providing an in-depth and critical analysis of the available evidence on the subject. By adopting a rigorous and systematic methodological approach, the study aims to provide a solid basis for understanding the use of CBD in pediatric dental patients with ASD, thus promoting informed reflection on the clinical implications and future directions of literature review in this field.

3. RESULTS AND DISCUSSION

The results of the literature review highlight a variety of findings related to the use of cannabidiol (CBD) in pediatric dental patients diagnosed with Autism Spectrum Disorders (ASD). A critical analysis of the existing literature reveals valuable insights into the potential therapeutic benefits of CBD (Sabo & Baptista, 2023), as well as its implications for the management of symptoms associated with ASD in dental and pediatric environments (Pedrazzi *et al*., 2022).

3.1. Evidence of Cannabidiol Properties

One of the main findings concerns the growing attention of the scientific community to the role of CBD as a promising therapeutic option for children with ASD (Loss *et al.*, 2021). Several studies highlight the neuroprotective and anti-inflammatory properties of CBD, suggesting that these characteristics may be beneficial in reducing repetitive behaviors, anxiety and aggression observed in children with ASD (Ernsen *et al.,* 2023).

As reported by Mandolini et al., (2018), Cannabidiol (CBD) represents the second most abundant phytocannabinoid in the Cannabis plant after the psychoactive

tetrahydrocannabinol (Δ9-THC) and, in recent years, an increasing body of evidence emphasized its promising role as a treatment in several medical conditions. **Table 1** describes the primordial and most important properties analyzed by studies collected and directed to many pathologies and conditions.

Table 1. Evidence of cannabidiol properties on numerous pathologies and conditions.

Article Title	Author & Year	Results
Pharmacological properties of cannabidiol in the treatment of psychiatric disorders: a critical overview	Mandolini et al., 2018	Evidences suggests that CBD may have an effective therapeutic role in the treatment of psychiatric disorders.
A molecular basis for the anti-inflammatory and anti-fibrosis properties of cannabidiol	Falone Sunda & Afolake Arowolo, 2020	CBD shoes immense promise as a possible treatment for chronic inflammation and the progression or development of fibrosis.
Antioxidative and Anti-Inflammatory Properties of Cannabidiol	Atalay, Karpowicz & Skrzydlewska, 2019	The use of CBD for the treatment of diabetes, diabetes-related cardiomyopathy, cardiovascular diseases (including stroke, arrhythmia, atherosclerosis, and hypertension), cancer, arthritis, anxiety, psychosis, epilepsy, neurodegenerative disease and skin disease is being considered.
Cannabidiol for the treatment of autism spectrum disorder: hope or hype?	Pedrazzi et al., 2022	CBD emerges as a possible strategy for treating ASD symptoms since it has relevant pharmacological actions on the endocannabinoid system and shows promising results in studies related to disorders in the central nervous system.
Evaluation of the efficacy and safety of cannabidiol-rich cannabis extract in children with autism spectrum disorder: randomized, double-blind, and placebo-controlled clinical trial. 2024.	Silva Junior et al., 2024	CBD-rich cannabis extract is effective and can be used safely, at least in the short term, to relieve some important symptoms related to ASD in children, such as social interaction, psychomotor agitation, and anxiety.
Is Cannabidiol During Neurodevelopment a Promising Therapy for Schizophrenia and Autism Spectrum Disorders?	Loss et al., 2021	Clinical long-term, placebo-controlled trials using pharmaceutical grade cannabinoids, involving different doses and neurodevelopmental treatment periods, would be timely to elucidate these compounds' potential in predicting better outcomes.
Children and adolescents with ASD treated with CBD-rich cannabis exhibit significant improvements particularly in social symptoms: an open label study.	Hacohen et al., 2022	CBD-rich cannabis may produce benefits for some individuals with ASD.

Source: elaborated by authors (2024).

According to Atalay, Karpowicz & Skrzydlewska (2019), the endocannabinoid system is an important molecular system responsible for controlling homeostasis and is becoming an increasingly popular target of pharmacotherapy. Endocannabinoids are ester, ether, and amide derivatives of long-chain polyunsaturated fatty acids (PUFAs), such as arachidonic acid, and they act mainly as cannabinoid receptor ligands. Endocannabinoids belong to a large group of compounds with a similar structure and biological activity called cannabinoids.

Endocannabinoids, including anandamide (AEA) and 2-arachidonoyl glycerol (2-AG), are lipid neuromodulators that regulate excitatory and inhibitory synaptic transmission through the activation of cannabinoid receptors and impact a variety of behavioral indices, including cognitive function, emotional regulation, social motivation, and reward processing (Hacohen *et al.*, 2022).

3.2. Pediatric Patients, Autism Spectrum Disorder (ASD) and Cannabidiol

When looking specifically at pediatric dentistry, there was an absence of bibliographic reviews on this intersection between pediatric dentistry and ASD (Lam *et al.*, 2020). However, some evidence indicates that children with ASD may face unique challenges related to oral health, such as a higher prevalence of dental caries, poor oral hygiene and selective eating behaviors, likewise, when comparing children and adolescents diagnosed with and without autism spectrum disorder, significantly higher prevalence of bruxism was identified. Understanding these issues is fundamental for an integrated and holistic approach to caring for these patients (Minella & Linartevichi, 2021).

As for the studies included, there was considerable methodological diversity (Marinho & Silva, 2023; Silva & Lourenco, 2023). Some studies adopted experimental approaches, investigating the effects of CBD on specific samples of pediatric dental patients with ASD (Marinho & Silva, 2023). These studies often employed behavioral assessment scales, physiological measures and clinical evaluations to measure the results. However, the heterogeneity of the protocols and study designs limits the generalizability of the results (Ernsen *et al.,* 2023).

In line with Hacohen *et al*., (2022), in the last two decades, parents of children

with ASD have documented anecdotal success in autonomously treating their children with medicinal cannabis despite a lack of clinical guidelines on the subject.

Following the legalization of cannabis for medicinal use in many Western countries and its approval for compassionate use in ASD, several open-label studies have reported that children with ASD respond well to treatment with CBD-rich cannabis and that this treatment is both safe and effective. Several recent reviews have suggested that treatment with cannabinoids may have the potential to improve core ASD symptoms as well as comorbid symptoms (Hacohen *et al*., 2022).

When evaluating studies exploring the impact of CBD on improving the quality of life in children with ASD, a general trend of positive reports from caregivers and family members was observed (Gharib *et al*., 2018). However, it is essential to recognize that many of these reports are based on subjective perceptions, which highlights the need for more robust studies with objective and quantifiable outcome measures (Silva & Lourenco, 2023).

The study also included literature reviews that focused on the difficulties related to assisting autistic people in healthcare settings, addressing the challenges faced by healthcare professionals when dealing with patients with ASD (Mimura, Ferreira & Pereira, 2023). These studies highlight the importance of awareness-raising and adequate training for providing pediatric dental care to children with ASD, underscoring the need for an individualized, patient-centered approach (Minella & Linartevichi, 2021).

Additionally, the review explored studies analyzing mothers' perceptions of the breastfeeding process of premature newborns in the neonatal unit (Pedrazzi *et al.,* 2022). Although this topic is not directly related to the use of CBD in pediatric dental patients with ASD, the findings of these studies highlight the importance of a multidisciplinary approach to health care, recognizing the complexities and specific needs of different patient groups (Pedrazzi *et al*., 2022).

In the context of the study, bibliographic reviews were also examined that address the approach of epileptic patients in the medical-dental context (Tertuliano *et al.*, 2021). Although the focus is on patients with epilepsy, considerations of the dental management of neurological conditions offer valuable insights into understanding the complexities involved in caring for children with ASD (Costa *et al.,* 2024; Tertuliano *et*

al., 2021). Recognizing the lack of consensus and the need for additional literature review highlights the importance of more robust scientific approaches to inform future clinical practice and health policy (Lullo *et al.*, 2020).

Discussion of the results should also address the lack of objective and quantifiable outcome measures in some studies (Karmur & Kulkarni, 2018). Although positive reports on the impact of CBD on improving the quality of life in children with ASD are frequent, the predominance of subjective perceptions highlights the need for more robust studies, with clinical assessments and standardized measurement instruments (Loss *et al.*, 2021). This is essential to provide more solid evidence on the real effects of CBD in this specific group of patients (Karmur & Kulkarni, 2018).

The inclusion of studies that discuss the importance of breastfeeding, shaken child syndrome, assessment of knowledge about violent head trauma by Brazilian parents and other topics not directly related to CBD in ASD patients adds a layer to the discussion (Houtrow *et al.*, 2020). These studies highlight the need for a holistic approach to health care, recognizing the interconnection between different aspects of children's physical and mental health (Loss *et al.*, 2021).

3.3. Knowledge of Adverse Effects

A few symptoms were reported concerning adverse effects. As shown by previous studies analyzed by Costa *et al.,* (2024), the manifestation of drowsiness, decreased appetite, diarrhea, and weight loss also showed side effects reported in a few cases (Karmur & Kulkarni, 2018). Despite this, the results showed sufficient efficacy to attest that the joint administration of cannabidiol oil (CBD) and delta-9-tetrahydrocannabinol (THC) improves the treatment of symptoms associated with Autism Spectrum Disorder (Costa *et al.*, 2024)

A particularly intriguing aspect is the lack of consensus on the ideal dosage of CBD in children with ASD. Most of the studies reviewed show a wide variation in the doses administered, making it difficult to determine an effective and safe dosage. Furthermore, the lack of standardization in the CBD formulations used in the studies adds a layer of complexity to the interpretation of the results (Pedrazzi *et al*., 2022).

3.4 Ethical Sphere and General Aspects

In the ethical sphere, the discussion about the use of CBD in children with ASD also raises important questions (Houtrow *et al.*, 2020). The administration of therapeutic substances to children, especially those with special health needs, requires careful consideration of the potential benefits concerning the known and unknown risks. In addition, obtaining informed consent from parents or guardians and transparency in communication about the goals and possible side effects of treatment are crucial elements to consider (Oliveira *et al.*, 2019).

In conclusion, the discussion on the use of CBD in pediatric dental patients with ASD is intricate and involves a careful analysis of several factors. Although the results suggest potential benefits, the lack of specific literature reviews, methodological diversity, potential risks and the absence of objective outcome measures highlight the need for a more in-depth and standardized approach (Pedrazzi *et al.*, 2022).

The debate on the use of cannabidiol (CBD) in pediatric dental patients with Autism Spectrum Disorders (ASD) is a complex and multifaceted topic that involves scientific, ethical and clinical considerations (Loss *et al.*, 2021). From the results presented by the literature review, it is possible to shed light on various aspects that permeate this subject, providing a basis for informed discussion.

Today, there are more and more children, and even adults, diagnosed with ASD. For instance, in 2023 data published reveal an increase in prevalence with 1 in 36 children or over 2.7% of 8- year-old children diagnosed with an ASD in 2020, and for the first time reveals higher prevalence rates among Black non-Hispanic, Hispanic, and Asian or Pacific Islander children compared to White non-Hispanic children (Campos *et al.*, 2024).

CBD may represent an innovative therapeutic alternative for children facing significant challenges in their development (Babayeva *et al*., 2022). Use of cannabinoids for autism has a growing interest in social media. Several anecdotal self-reported cases show that ASD children who failed traditional pharmacologic therapy have responded to cannabis treatment (Babayeva et al., 2022). Parents of these children have reported remarkable improvements (Houtrow *et al.*, 2020). A child with autism has spoken first words after receiving cannabis oil and finally, developed significant language skills

(Babayeva *et al.*, 2022).

From a broader perspective, it is important to note that CBD is just one piece of the puzzle in the comprehensive treatment of ASD. Multidisciplinary approaches involving health professionals, educators and therapists are essential to meet the diverse needs of these children. In addition, the active involvement of parents in the development and implementation of treatment strategies is crucial to ensure long-term success.

4. FINALS CONSIDERATIONS

Conclusively, a comprehensive analysis of the use of cannabidiol (CBD) in pediatric dentistry patients with Autism Spectrum Disorders (ASD) always requires a multidisciplinary, ethical and patient-centered approach to provide reliable answers and, above all, improve the quality of life of these children. Cannabidiol is effective in the treatment of some neurodevelopmental conditions including ASD.

The results of the literature review point to a growing interest in investigating the potential therapeutic benefits of CBD in children with ASD. Understanding the complex interactions between ASD symptoms and dental needs is essential for developing effective and personalized treatment strategies.

In ASD, non-pharmacological treatment, which includes parents training together with a multidisciplinary approach by specialists, is the method of choice. However, many patients require drugs to control signs and symptoms such as aggressiveness, irritability, restrictive and repetitive behavior, anxiety, and sleep disorders.

Oral health, along with other aspects related to well-being, must be considered in a broad, interdisciplinary context. On an ethical level, the administration of CBD to children with ASD requires a meticulous and transparent guideline. Obtaining informed consent, effective communication with parents or guardians, and continuous monitoring are fundamental pillars of ethical practice in this scenario.

The need for an individualized approach, taking into account the specific characteristics of each child, is crucial to ensure that the intervention is personalized and safe. Thus, cannabidiol (CBD) emerges as a possible strategy for treating ASD symptoms since it has relevant pharmacological actions on the endocannabinoid system and shows

promising results in studies related to disorders in the central nervous system.

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