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## **Assessment of anxiety associated with endodontic treatment: a literature review**

*Evaluation of anxiety associated with endodontic treatment: a literature review*

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### **Summary**

Endodontic treatment is one of the procedures most feared by patients, mainly due to the pain and anxiety it can cause. Dental anxiety directly interferes with treatment completion, potentially leading patients to postpone or even avoid treatment. Therefore, it is essential to understand the factors that trigger this fear and the strategies used to manage it. The objective of this study was to evaluate anxiety associated with endodontic treatment, identifying its main causes and the most effective management methods described in the literature.

This is a literature review conducted in the PubMed, SciELO, and BVS Salud databases, using the descriptors "Endodontics," "Dental Anxiety," "Phobic Disorders," "Nitrous Oxide," and "Dental Hypnosis," covering the period 2015 to 2025. Articles that specifically addressed the relationship between anxiety and endodontic treatment in patients of different ages and profiles were included, and those that did not directly address the topic were excluded. The results showed that conscious sedation with nitrous oxide, the use of benzodiazepines, and non-pharmacological techniques such as music therapy, detailed explanation of the procedure, and dental hypnosis are effective in reducing fear and improving the patient experience. The conclusion is that adequate anxiety management is essential for the success of endodontic treatment, promoting more humane, safe, and comfortable care.

**Keywords:** Endodontics; Dental Anxiety; Phobic Disorders; Nitrous Oxide; Dental Hypnosis.

### **Abstract**

Endodontic treatment is one of the procedures most feared by patients, mainly due to the pain and anxiety it can cause. Dental anxiety directly interferes with treatment, and can lead patients to postpone or even avoid care. Given this, it is essential to understand the factors that trigger this fear and the strategies used to control it. The aim of this study was to evaluate the anxiety associated with endodontic treatment, identifying its main causes and the most effective control methods described in the literature. This is a literature review conducted in the PubMed, SciELO, and BVS Salud databases, using the descriptors Endodontics, Dental Anxiety, Phobic Disorders, Nitrous Oxide, and Dental Hypnosis, with a time frame between 2015 and 2025. Articles that specifically addressed the relationship between anxiety and endodontic treatment in patients of different ages and profiles were

Year V, v.2 2025 | submission: October 23, 2025 | accepted: October 25, 2025 | publication: October 27, 2025

included, and those that did not directly address the topic were excluded. The results showed that conscious sedation with nitrous oxide, the use of benzodiazepines, and non-pharmacological techniques, such as music therapy, detailed explanation of the procedure, and dental hypnosis, are effective in reducing fear and improving the patient experience. It is concluded that proper anxiety management is essential for the success of endodontic treatment, promoting a more humanized, safe, and comfortable care.

**Keywords:** Endodontics; Dental Anxiety; Phobic Disorders; Nitrous Oxide; Dental Hypnosis.

## Introduction

The objective of endodontic treatment is to eliminate microorganisms through disinfection of the root canals, carrying out an adequate chemical-mechanical preparation, using substances adjuvants and performing a precise obturation with biocompatible endodontic cements. These steps are essential to ensure the success of endodontic therapy (Zoletti *et al.*, 2011; Da Costa *et al.*, 2012)).

This therapy is a common dental procedure and stands out as one of the most feared. The fear of experiencing pain, discomfort after the procedure and anxiety are factors that lead patients to postpone undergoing this treatment (Dou, *et al.*, 2018).

The International Association for the Study of Pain (IASP) defines pain as an experience unpleasant sensory experience that is linked to subjective notions of emotion, memory, and cognition. This experience involves peripheral nerve damage and is described as a complex association between sensory, central and peripheral stimuli (Raja *et al.*, 2020).

Discomfort related to the procedure can be triggered by several reasons, including root instrumentation, intracanal medication accumulation, and occlusal trauma. Although dentists are able to prevent it during the clinical procedure through local anesthesia and sedation techniques, their control after surgery remains a significant challenge (Oliveira *et al.*, 2019).

The elements that contribute to this pain during and after treatment can originate from multiple sources, making it challenging for the clinician to reverse this process. Therefore, it is crucial carefully evaluate the patient's pre-existing pathology during the consultation and discuss it with him/her about the possible sensations you may experience during the procedure (Palma *et al.*, 2016).

In addition to the physical aspect, the approach to pain must also consider the patient's emotional state. patient for more comprehensive and effective management. Anxiety is an emotional state that arises when someone perceives a threatening situation, real or imagined, and is generally associated with fear and is temporary. This condition can intensify the perception of pain, increasing sensitivity of the nervous system and amplifying emotional responses (Botam *et al.*, 2015).

In dental consultations, it can be associated with previous traumatic experiences, psychological issues, feelings of lack of control, helplessness and fear (Soares *et al.*, 2015). Some symptoms are typical of a physical response to stress and anxiety, including feeling cold in the stomach ache, tachycardia, sweating, nausea, dizziness, palpitations, and tremors. In addition, visible tremors, chest pains, feeling of weakness, stomach pain and pins and needles sensation on the fingers and around the mouth, another common symptom is hyperventilation, characterized by breathing quick and superficial (Singh *et al.*, 2012)

Within the dental field, especially in Endodontics, several elements, such as instruments, noises and odors, contribute to a negative patient experience during the treatment. Items such as needles, drills, syringes, and files are essential for procedures endodontic procedures, which may cause discomfort or pain. For example, the administration of anesthesia, often associated with anxiety, is especially worrying in care (Babaji *et al.*, 2017).

It is essential that the dentist knows how to identify these symptoms and has knowledge about techniques to mediate anxiety. Sedation is a common method for controlling anxiety in endodontic treatments. Other techniques, such as massage, acupuncture, and music, are also being explored to manage stress in medical and dental procedures (Weisfeld *et al.*, 2021).

This research helps to understand the relationship between anxiety and treatment endodontic, since the feeling of discomfort and concern can influence significantly improve the experience and results of this type of treatment.

To investigate the prevalence of anxiety in patients facing endodontic treatment, identify its triggering factors and evaluate the management strategies that can be used are essential steps to provide more effective dental care and comfortable for patients. In addition, understanding the consequences of anxiety on the success of the endodontic treatment is essential to improve clinical protocols and improve results of the procedures. Thus, this review has the potential to provide valuable information that can benefit both dental professionals and patients.



## 2 Theoretical Framework / Results

### 2.1 Patient anxiety

The dental experience often triggers emotional reactions in patients intense, such as fear and anxiety. These feelings can manifest even before the onset of care, being triggered by previous negative experiences, memories of pain, sounds characteristics of dental instruments or even the clinical environment itself. Anxiety associated with dental treatment constitutes a recurring and widely investigated phenomenon, due to its potential to compromise the quality of oral health care, adherence to proposed treatments and the patient's psychological well-being (Alves *et al.*, 2018; Santos *et al.*, 2022).

This fear and anxiety pose a significant barrier to seeking care. preventive dental care, leading anxious patients to avoid or abandon necessary treatments. This neglect can result not only in oral health problems, but also in serious impacts. negative effects on overall quality of life (Assunção *et al.*, 2013).

Anxiety has several effects in relation to consultations, such as interruption several times during the procedure, recurring absences, limited mouth opening, stress, irritations associated with fear, anxiety, and distress. Such situations are common in patients with high level of anxiety (Barreto and Barreto, 2003)

The cause of fear in dental treatments is complex and not yet completely understood. understood, involving negative past experiences, psychological traumas and factors psychosocial. Anxiety and fear of pain are the main reasons for avoiding procedures dental procedures, with endodontic therapy being one of the most feared. This aversion may be related to the patient's general psychological state, and oral treatments are often classified among the situations most feared by the population (Gupta *et al.*, 2019).

Several aspects of the dental routine cause anxiety in patients, such as the moment anesthesia, muscle tension in the chair, procedures such as cavity preparation and scraping periodontal, in addition to the use of drills. Instruments such as tweezers and probes, along with sensations such as the noise of the drills, also contribute to discomfort during treatment (Mento *et al.*, 2014).

Despite technological advances in dentistry to reduce pain, anxiety is still seen as a common obstacle for patients to seek dental treatment, as they are worried about the possibility of feeling pain during the procedures. This causes the

patients become less willing to undergo these procedures over time (Martins *et al.*, 2017).

## 2.2 Anxiety regarding endodontic treatment

The anxiety expressed by patients during endodontic procedures is frequently associated with various factors of psychological discomfort, which result, in largely due to the invasive nature of this type of treatment (Di Nasso *et al.*, 2016). In Endodontics, elements such as objects, sounds and odors characteristic of the clinical environment contribute significantly to the patient's negative experience. Instruments such as needles, drills, syringes and files, although essential to the procedure, can cause apprehension and discomfort, especially during the administration of anesthesia (Babaji *et al.*, 2017).

The prevalence of fear and anxiety in dental settings is considered alarming. Clinical studies show that patients affected by these emotions tend to seek dental care only in cases of acute pain or infection, avoiding consultations preventive measures and postponing simple treatments until they become more complex (Costa *et al* 2011.; Brito *et al.*, 2019). Furthermore, it was observed that fear prior to endodontic treatment is often influenced by the simple visualization of dental instruments. However, the absence of pain during the intervention has been shown to be a determining factor in improving the postoperative perception, considerably reducing the report of fear among patients (Rocha, 2024).

Understanding anxiety related to endodontic treatment is essential, since that it is closely linked to the perception of pain during the procedure. **Adequate** control this anxiety can favor the clinical management of the patient, promoting greater acceptance and increasing the chances of satisfactory treatment completion (Khan *et al.*, 2016).

In this context, Bansal and Jain (2020) identified that the application of dental anesthesia represents the second leading cause of anxiety among 450 patients undergoing treatment endodontic. Similarly, Carter, Carter and George (2015), when examining 594 patients over 20 years, found that multiple factors contribute to the emergence of anxiety, cognitive conditioning being the most relevant (62.2%). Although it was not observed statistically significant association between the different factors analyzed, the study indicated that women are more susceptible to anxiety resulting from vicarious conditioning. Furthermore, 51% of the participants showed interest in the use of sedation during endodontic treatment, if that option were available.



Year V, v.2 2025 | submission: October 23, 2025 | accepted: October 25, 2025 | publication: October 27, 2025

Therefore, it is essential that professionals adopt a differentiated approach in front of anxious patients, avoiding stimuli that may intensify emotional tension. It is up to the endodontist to develop strategies that make the clinical experience more positive, ensuring comfortable, stress-free procedures carried out in an efficient and humanized manner.

### 2.3 Anxiety control methods

When anxiety symptoms become so bothersome that they affect significantly affect daily functioning, drug treatment may be a valid option. Anxiolytic medications are recommended to manage acute anxiety resulting from periods of temporary stress. In the dental context, its use is appropriate for sedation before of invasive procedures, provided there is a careful analysis of the medical history, as well as the the patient's physical and emotional state. To improve endodontic treatment, it is crucial to investigate the effectiveness of pharmacological techniques for controlling anxiety, such as conscious sedation, and their impact on pain during the procedure. Conscious sedation is an alternative to control pain nervousness and fear of the patient during endodontic treatment and is a very effective method interest of patients, as many want to avoid any kind of painful sensation during the endodontic treatment, providing sedation during treatment helps to reduce stimuli that cause anxiety (Huh *et al.*, 2015; Weissheimer *et al.*, 2016)

Anxiety caused by dental treatment can be effectively controlled with the reduction of the patient's level of consciousness. Thus, sedation is one of the methods that dentists may choose to reduce fear during endodontic treatment, which can make it even odorless (Khademi AA *et al.*, 2012)

This method, often performed with oral benzodiazepines, reduces consciousness of the patient, maintaining his ability to respond to mild stimuli (AMERICAN SOCIETY OF ANESTHESIOLOGISTS, 2019).

Music therapy has demonstrated significant benefits in several areas of medicine, including reducing anxiety during medical procedures, treating patients with dementia, burns, chronic pain and depression, as well as improving quality of life in cancer patients. These effects have been corroborated by several studies. In the context dental, music therapy has also shown effectiveness in reducing anxiety and other aspects psychological, as confirmed by recent research (Aravena *et al.*, 2020; Weijden *et al.*, 2021).

Studies have explored other options for managing anxiety and stress in consultations and dental procedures. These alternatives include techniques such as massage, relaxation,



anxiety), endodontic interventions, methods of mediation and control of anxiety, in addition to main results and conclusions presented.

Data analysis was conducted through a narrative synthesis, considering the methodological approaches and the main findings of each included study. Throughout the process, the ethical principles governing scientific research were observed, ensuring that all the studies used in this review had been previously approved by ethics committees in research and conducted in accordance with international ethical standards and guidelines for studies involving human beings.

## Results and discussion

By applying the descriptor search, studies on from the evaluation of anxiety in patients undergoing endodontic treatment, a total of of articles that will correspond to the theme.

AUTHOR\YEAR	TITLE	OBJECTIVE	CONCLUSION
Bottan et al (2015)	Relationship between dental treatment anxiety and sociodemographic factors: a study with adults in Santa Catarina (Brazil)	To identify the influence of sociodemographic factors in determining anxiety regarding dental treatment, among a sample of adults living in Santa Catarina.	The majority of the group classified as having a low level of anxiety (Group A) were men, aged 50 or over, and with a higher level of education.
Ferreira et al (2018)	Patients' anxiety level before entering the dental appointment.	Assessed the anxiety level of patients who attended appointments at the dental clinic.	The patient should feel as relaxed as possible when going to a dental appointment, so discussions with dental health providers are needed about different techniques to reduce the patient's dental anxiety.
Gupta et al (2019)	Evaluation of the efficacy of inhaled sedation with nitrous oxide on anxiety and pain levels of patients undergoing endodontic treatment in vital teeth: a prospective randomized controlled clinical trial.	Observed the effectiveness of nitrous oxide in relieving patient anxiety and pain during endodontic treatment of a vital tooth.	Conscious sedation with nitrous oxide is a useful technique to add to the armamentarium used in the treatment of teeth with symptomatic irreversible pulpitis.
Chen et al (2019)	Pathways of fear and anxiety associated with root canal treatments in a population of East Asian origin.	Identified and compared the pathways of endodontic fear and anxiety among patients of East Asian origin attending the Griffith University Dental Clinics in Gold Coast, Australia.	It demonstrates that the Cognitive Conditioning pathway was the main pathway of fear and anxiety. Understanding how patients develop fear and anxiety can help dentists discuss triggers with patients and alleviate undue anxiety before treatment.

Silva et al (2019)	Factors associated with patients during endodontic treatment.	Investigated the presence of anxiety among patients undergoing endodontic treatment and its associated factors.	Endodontic patients presented mild/minimal anxiety; this emotional state needs to be better understood in order to ensure atraumatic treatment with lower risks of abandonment.
Neto, HEC (2023)	Assessment of patients' anxiety and fear regarding endodontic treatment.	It verified the main factors that trigger fear and anxiety regarding endodontic treatment and thus, listed possibilities of minimizing or avoiding such disorders during the treatment.  dental	There are several factors that trigger these feelings in the dental field, and it is also possible to note several ways to alleviate these disorders in the face of  treatment. Therefore, technological resources and pharmacology are some of the main methods adopted.
Maria et al (2024)	Strategies used by dentists to alleviate dental anxiety and fear during endodontic procedures: a literature review	Investigated the literature on strategies used by dentists to alleviate anxiety and fear  dental during endodontic procedures.	Music therapy, detailed explanations to the patient about the procedure to be performed, and conscious sedation with nitrous oxide are the most effective methods for controlling anxiety/phobia in patients undergoing endodontic treatment. Studies have shown that not all dentists use techniques to alleviate dental anxiety in endodontic procedures and that they  are also exposed to the state of anxiety during dental treatment.
Leal et al (2025)	Fear and anxiety regarding endodontic treatment.	Investigated the impacts of fear and anxiety on endodontic treatment, highlighting how these emotions directly influence patients' decisions to seek or avoid dental care.	The success of endodontic treatment depends not only on the technique but also on the dentist's ability to identify and manage the patient's emotions, adapting strategies according to their individual profile. The professional must promote safety, explain the procedure, and adopt effective measures to minimize fear and anxiety, contributing to a more peaceful and efficient treatment.

The studies analyzed in this review show that anxiety regarding treatment endodontic treatment remains a frequent challenge in dental practice. Chen *et al.* (2019)



Year V, v.2 2025 | submission: October 23, 2025 | accepted: October 25, 2025 | publication: October 27, 2025

demonstrated that personal experiences and the clinical environment directly influence perception of fear, reinforcing the need for the professional to understand the patient's history and adapt the individualized care plan, creating a welcoming and safe environment.

It is essential to understand how feelings of fear and anxiety impact treatment. dental, just as the dentist must have knowledge of different management techniques of the situation, which suits each patient. Endodontic treatment is often overestimated by patients, who feel fear even without having ever gone through the experience (Leal *et al.*, 2025).

Neto (2023) highlighted that, even with technological advances and the evolution of techniques less invasive, endodontic treatment continues to be one of the main causes of anxiety before and during the procedure. This demonstrates that the psychological component must receive as much attention as the clinician. In this sense, it is essential that the dentist recognizes the condition emotional state of the patient and be able to apply pharmacological and non-pharmacological methods of anxiety control.

Among the pharmacological strategies, conscious sedation with nitrous oxide and the use of Benzodiazepines, such as midazolam, have been shown to be effective and safe in reducing fear and provide greater comfort during treatment (Gupta *et al.*, 2019). On the other hand, Maria *et al.* (2024) point out that non-pharmacological measures, such as a detailed explanation of the procedure, music therapy and the creation of a bond of trust also produce positive results and favor adherence to treatment. Thus, it is clear that the combination of different methods can enhance anxiety management, promoting more positive experiences for the patient.

Another relevant aspect is the biopsychosocial impact of anxiety. Bottan *et al.* (2015) showed that factors such as age, gender, and education can influence anxiety levels. In addition, addition, previous traumatic experiences, fear of pain and cognitive conditioning are factors that explain why some patients are more resistant to treatment (Carter *et al.*, 2015). These variables reinforce that the approach must be individualized and sensitive to the needs of each patient.

The literature also indicates that anxiety can lead to postponement or abandonment of treatment, damaging not only oral health but also the patient's quality of life (Bottan *et al.*, 2015). In this sense, clear communication, empathy and humanization of care become essential for the patient to feel safe, favoring the success of the treatment.

Despite the advances, it is important to highlight some limitations of the studies already carried out on the subject. Many were carried out in university clinics, with restricted samples and specific contexts, which may limit the generalization of the results. Furthermore, there are still



Year V, v.2 2025 | submission: October 23, 2025 | accepted: October 25, 2025 | publication: October 27, 2025

lack of longitudinal research assessing the impact of anxiety management on outcomes  
long-term endodontic treatments.

Therefore, future research should consider broader and more diverse samples, in addition to explore new strategies for managing anxiety, both pharmacological and alternative. integration of different methods and strengthening the professional-patient relationship appears as promising ways to make endodontic treatment more effective, comfortable and humanized.

## Final Considerations

Given the above in the literature review, it is concluded that anxiety regarding treatment Endodontic treatment still represents a challenge for dentistry, which can lead to evasion or postponement of care. Pharmacological methods, such as conscious sedation, and non-pharmacological methods, such as music therapy and explanation of the procedure are shown to be effective in controlling fear. Thus, the dentist must be able to recognize and manage anxiety, providing a humanized, safe and effective care.

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Year V, v.2 2025 | submission: October 23, 2025 | accepted: October 25, 2025 | publication: October 27, 2025

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Year V, v.2 2025 | submission: October 23, 2025 | accepted: October 25, 2025 | publication: October 27, 2025

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