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SYSTEMATIC REVIEW

Therapies in pain management in patients with bruxism

Terapias en el manejo del dolor en pacientes bruxistas

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ABSTRACT

Bruxism is a highly prevalent clinical problem that causes persistent orofacial pain and functional alterations, significantly affecting the quality of life of adult patients. The central problem of this research focuses on the absence of a comprehensive and clearly defined therapeutic approach that effectively combines pharmacological, dental, and psychological therapies for pain management in bruxism patients. Objective: to analyze the different therapies available for the management of pain associated with bruxism, determining the main dental alterations, describing the pharmacological alternatives, identifying the dental treatments, and detailing the psychological therapies applied. Materials and Methods: A qualitative, non-experimental, exploratory, and documentary desing was developed, based on the review and analysis of 84 scientific documents published between 2020 and 2025. Results: Dental wear due to attrition, dentin sensitivity, and fissures are the main dental alterations, with no direct relationship between the severity of wear and the intensity of pain. Conclusion: Occlusal splints are the first line of treatment at the dental level, pharmacological treatment plays a complementary role, and psychological therapies, especially cognitive-behavioral therapy and biofeedback, are essential for more effective and sustained pain control. Therefore, the management of bruxism requires a multimodal, interdisciplinary, and patient-centered approach.
Keywords: Bruxism. Occlusal splints. Cognitive behavioral therapy. Biofeedback.

RESUMEN

El bruxismo constituye una problemática clínica de alta prevalencia que genera dolor orofacial persistente y alteraciones funcionales, afectando de manera significativa la calidad de vida de los pacientes adultos. El problema central de esta investigación se enfoca en la ausencia de un abordaje terapéutico integral y claramente definido que articule de forma efectiva las terapias farmacológicas, dentarias y psicológicas para el manejo del dolor en pacientes bruxistas. Objetivo: analizar las diferentes terapias disponibles para el manejo del dolor asociado al bruxismo, determinando las principales alteraciones dentarias, describiendo las alternativas farmacológicas, identificando los tratamientos odontológicos y detallando las terapias psicológicas aplicadas. Materiales y Métodos: Se desarrolló una investigación cualitativa, no experimental, exploratoria y documental, basada en la revisión y análisis de 42 documentos científicos publicados entre 2020 y 2025. Resultados: el desgaste dental por atrición, la sensibilidad dentinaria y las fisuras son las principales alteraciones dentarias, sin una relación directa entre la severidad del desgaste y la intensidad del dolor. Conclusión: las férulas oclusales constituyen la primera línea de tratamientos a nivel dentario, el tratamiento farmacológico cumple un rol complementario y las terapias psicológicas, especialmente la terapia cognitivo-conductual y el biofeedback, resultan fundamentales para un control más efectivo y sostenido del dolor. Por lo tanto, el manejo del bruxismo requiere un enfoque multimodal, interdisciplinario y centrado en el paciente.
Palabras Claves: Bruxismo. Férulas oclusales. Terapia cognitivo-conductual. Biofeedback

INTRODUCTION

Bruxism is a functional disorder of the stomatognathic system characterized by clenching or grinding of the teeth, occurring both during wakefulness and sleep; therefore, it presents a multifactorial etiology [(1)]. In addition, its high prevalence and various repercussions have led to increased scientific interest due to its direct impact on oral and general health. Thus, this disorder is not only a parafunctional habit but a complex condition involving neuromuscular, psychological, and occlusal factors, which has driven the search for comprehensive therapeutic approaches, particularly those aimed at controlling associated pain [(2)].

A report by the World Health Organization [(3)] highlighted that nearly 50% of the global population suffers from some type of oral disease, mostly associated with chronic conditions that are not treated in a timely manner, including functional disorders such as bruxism. Consequently, it not only affects the individual's quality of life but also increases the economic and social burden on healthcare systems, especially in settings where access to specialized treatments is limited. Indeed, the importance of this issue lies in recognizing that orofacial pain, tension-type headaches, dental hypersensitivity, and temporomandibular disorders are frequent consequences in patients with bruxism.

Arias et al. [(4)] identified stress, anxiety, sleep disorders, and certain lifestyle habits as the main triggers or perpetuating factors of bruxism, also considering them relevant risk factors in adults. In this regard, Fuentes and Blásquez [(5)] emphasize a direct relationship between anxiety and bruxism, demonstrating that treatment and follow-up exclusively from a dental perspective are insufficient to address persistent pain, which has encouraged the incorporation of complementary therapies such as manual therapy.

Given the above, the issue requires a deeper analysis of the real effectiveness of the various therapies used to control pain in patients with bruxism, including occlusal splints, pharmacotherapy, physiotherapy, and manual techniques. Since discrepancies persist regarding their individual and combined efficacy, as well as the clinical criteria for their selection, a multidisciplinary analysis is promoted. In cases such as sleep bruxism, neurological and muscular aspects are involved that may prolong pain [(6)].

In this sense, the present study aims to develop an in-depth analysis of the therapies used in pain management for patients with bruxism by identifying their foundations, scope, and limitations, thus enabling optimal clinical care. Likewise, it proposes the development of a solution based on a comprehensive approach that considers not only symptomatic pain relief but also the associated psychological and functional factors, thereby contributing to a sustained improvement in the patient's quality of life.

MATERIALS AND METHODS

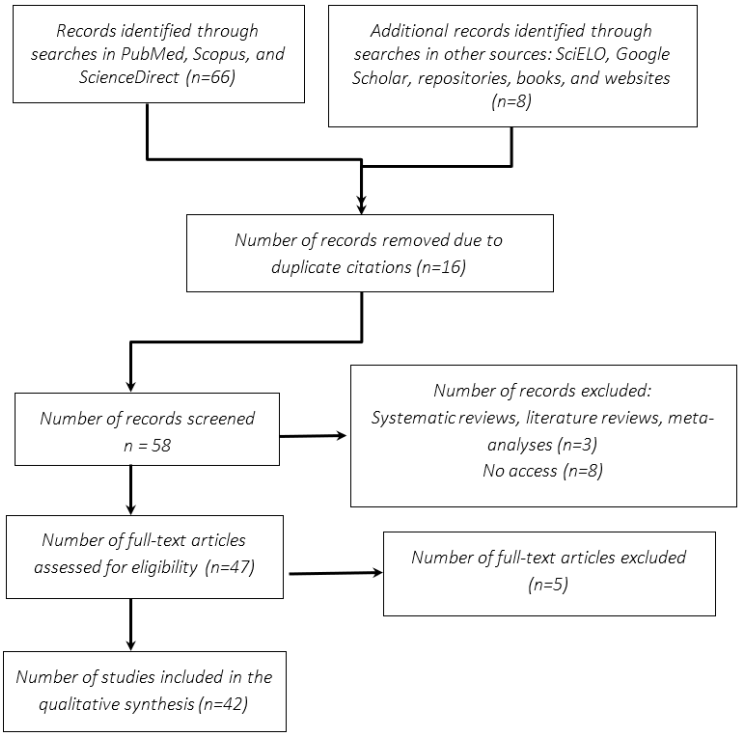
The study was conducted under a qualitative approach, aimed at a deep and interpretative understanding of the phenomenon studied. This approach allowed for the analysis of how pharmacological, psychological, and dental therapies have been addressed in the scientific literature for managing pain associated with bruxism in adults, considering clinical contexts, reported experiences, and therapeutic criteria described by different authors.

The study corresponded to a non-experimental, exploratory, and documentary research design. The non-experimental design was based on the absence of direct manipulation of variables, as the analysis was conducted using previously published information. The exploratory nature allowed for an approach to a topic that, although studied, presents diverse perspectives and results regarding therapies specifically aimed at relieving bruxism-related pain. Complementarily, documentary research was based on the systematic review of scientific articles, academic theses, and specialized reviews, facilitating the organization and comparison of existing knowledge.

It was also descriptive in nature, as it focused on understanding and explaining, based on the review of recent scientific studies, how bruxism manifests and which therapies are used to relieve pain through a detailed and organized analysis of the available information.

The research used the PRISMA flow diagram for the search, review, analysis, and selection of articles. A total of 74 articles were initially considered, including original manuscripts, systematic reviews, narrative reviews, clinical studies, meta-analyses, and academic theses, mainly published between 2020 and 2025. These sources were obtained from indexed scientific journals, specialized databases, university repositories, and international organizations, ensuring the validity, timeliness, and relevance of the analyzed information. Following the inclusion and exclusion criteria, 42 articles with significant contributions to the research were selected. Figure 1.

Figure 1. Diagram of the article selection process. PRISMA analysis.



RESULTS

Main Dental Alterations Associated with Bruxism

Bruxism is one of the oral parafunctions with the greatest clinical impact on dental structures, especially when persistent and not addressed in a timely manner. In this study, the analysis of dental alterations allowed for understanding how the repetitive and involuntary activity of the masticatory muscles generates progressive changes in dental integrity, affecting not only enamel and dentin structure but also occlusal stability and the functionality of the stomatognathic system.

The most frequent dental alterations observed in patients with bruxism were mainly related to pathological tooth wear, dentin hypersensitivity, fissures and microfractures, as well as changes in the occlusal relationship. These alterations were more intense in posterior sectors, particularly in premolars and molars, coinciding with areas of greater functional load.

Likewise, the wear did not present uniformly but showed patterns consistent with attrition, characterized by flat and polished surfaces, suggesting prolonged and repetitive dental contact. In several cases, this wear was accompanied by dentin exposure, explaining the sensitivity reported by patients during clinical anamnesis.

Table 1. Main Dental Alterations Derived from Bruxism

Alteration	Observed Clinical Characteristics	Functional Impact
Dental wear (attrition)	Flat occlusal surfaces, loss of cusp anatomy	Impaired masticatory efficiency
Dentin hypersensitivity	Pain in response to thermal or mechanical stimuli	Functional limitation and persistent discomfort
Fissures and microfractures	Fracture lines in enamel, mainly in posterior teeth	Risk of major fractures
Occlusal alterations	Changes in occlusal contacts and anterior guidance	Muscular and joint overload

The findings obtained make it possible to understand that bruxism generates a progressive impact on dental integrity, manifested through structural changes that compromise both the surface and functionality of the teeth. These alterations reflect the constant action of non-physiological forces that exceed the tooth's natural protective mechanisms, favoring cumulative deterioration processes. The preferential location of damage in posterior teeth suggests a direct relationship with the magnitude of masticatory load exerted in these areas, while the presence of sensitivity indicates involvement that goes beyond structural damage and directly affects the patient's pain experience.

Main Pharmacological Therapies Used in Pain Management in Patients with Bruxism

The analysis of studies on botulinum toxin type A shows that its application to the masseter and temporalis muscles produces a significant reduction in pain, bite force, and the frequency of bruxism episodes, with perceived improvements in sleep quality and patient satisfaction. However, its effect is temporary and does not address the etiological origin of the disorder, which requires considering its use as a complementary symptomatic alternative rather than a definitive treatment.

Regarding low-dose tricyclic antidepressants, clinical trials and reviews show a progressive reduction in chronic orofacial pain and improvement in quality of life, especially with amitriptyline. However, selective serotonin reuptake inhibitors (SSRIs) may induce or worsen bruxism as an adverse effect, requiring clinical monitoring. Clonazepam, in turn, demonstrates short-term effectiveness in reducing nocturnal episodes, although prolonged use entails risks of dependence and side effects.

Table 2. Pharmacological Treatments

Treatment	Method, Materials, and Study Group	Key Results
Botulinum toxin type A	Clinical trials in adults with sleep bruxism. Application to masseter/temporalis muscles. 3–6 month follow-up. Evaluation with polysomnography and EMG (7).	Decreases pain and bite force. Improves sleep. Temporary effect (3–4 months).
	Prospective study in 25 women (24–67 years). Dose 30–95 U. Evaluation at 2 weeks and 4 months with ultrasound and clinical assessment (8).	24% free of bruxism; 76% with significant improvement. Reduced masseter thickness and pain. Mild side effects.
	Systematic review (2015–2020) of clinical trials in adults (9).	Reduces pain and episode intensity. Limited evidence due to small samples and short follow-ups.
Low-dose tricyclic antidepressants	Review 2019–2024 in orofacial pain and TMD. Dose 10–25 mg/day (amitriptyline/nortriptyline) (10).	Reduces chronic pain and improves sleep. Requires monitoring for adverse effects.
	Experimental study in 64 patients. Comparison: splint, citalopram 10 mg, and amitriptyline 25 mg. 9-week follow-up (11).	All improved; amitriptyline showed greater progressive pain reduction.
Fluoxetine-derived antidepressants (SSRIs)	Review 2014–2024 in patients treated with fluoxetine, sertraline, paroxetine, and other SSRIs (12).	Associated with onset or worsening of bruxism as an adverse effect. Evidence inconclusive.
	Case report: 22-year-old woman with sertraline 50 mg/day. Bruxism at 4 weeks. Switched to bupropion XL (13).	Complete resolution in 3 weeks after medication change. Confirms possible SSRI–bruxism relationship.
Benzodiazepines (Clonazepam)	Clinical trial in 21 adults with sleep bruxism. 1 mg/day. Evaluated with polysomnography (14).	Significant reduction in nocturnal episodes. Effective short term.
	Clinical review in bruxism and TMD associated with anxiety. Progressive nocturnal use (15).	Decreases muscle tension and pain. Risk of dependence with prolonged use.

Main Dental Therapies Applied in Patients with Bruxism

The analysis of studies related to occlusal splints shows that this treatment constitutes an effective conservative therapeutic alternative for managing bruxism and its associated muscular and joint manifestations. Results from different methodological designs, both clinical and experimental, demonstrate a significant reduction in muscle hyperactivity, temporomandibular joint pain, and parafunctional habits, as well as progressive improvement in masticatory function and oral quality of life. However, the need for periodic clinical follow-up and interdisciplinary management suggests that its benefits largely depend on patient adherence and control of psycho-emotional factors involved.

Regarding occlusal adjustment and orthodontic treatment, findings suggest that correcting premature contacts and discrepancies between centric relation and habitual occlusion promotes mandibular stability, reduces functional interferences, and contributes to decreased muscular and joint pain. Orthodontic treatments also show a tendency to reduce symptoms associated with bruxism, although with possible transient increases during initial adaptation phases. This variability indicates that while structural intervention improves occlusal load distribution, its impact on parafunctional behaviors may depend on treatment duration and individual patient characteristics. The relevant aspects of the reviewed dental treatments are summarized below:

Table 3. Dental Treatments

Treatment	Materials, Methods, and Study Group Characteristics	Results
Occlusal splints	Case report. 62-year-old man with bruxism, facial pain, and TMD. Comprehensive clinical evaluation and deprogramming splint with follow-up and psychological support (16).	Reduced muscle hyperactivity and TMJ pain. Functional improvement and greater comfort. Required interdisciplinary management.
	Experimental study in 120 adults with bruxism. 60 with splint vs. 60 without treatment. Clinical evaluation and follow-up (17).	Significant influence (p=0.010). Reduced muscle pain (75%), joint pain (78.9%), and clinical signs. Functional improvement in treated group.
Occlusal adjustment	Case report. 23-year-old man with bruxism and unilateral TMD. Selective grinding and anterior restoration. VAS evaluation (18).	Pain ↓ from VAS 7 to 1. Correction of centric discrepancy and improved mandibular function.
	Case report. 52-year-old man with premature contact and mandibular displacement (1 mm frontal, 3 mm sagittal). Selective adjustment (19).	Elimination of interferences. Correction of displacement (3 mm sagittal, 1 mm frontal). Decreased muscle pain.
	Case report. 56-year-old man with nocturnal bruxism. Phased oral rehabilitation + night guard (20).	Restored occlusal stability and functional guidance. Reduced muscle hyperactivity. Reported restorative survival rate: 97.7%.
Orthodontic treatment	Longitudinal study (2021–2022). 100 patients (18–45 years). Evaluation at 0, 3, and 6 months (21).	Initial bruxism 64%. Clenching ↓ 34% to 9%. Muscle pain ↓ 31% to 6%. TMJ pain ↓ 22% to 0%. Significant reduction (p=0.0001).
	Prospective study in 32 adults with aligners. Behavioral monitoring in three phases (22).	No significant differences in awake bruxism. Aligner use does not modify short-term frequency.

Main Psychological Therapies Applied in Pain Management in Patients with Bruxism

The analysis of studies focused on cognitive behavioral therapy (CBT) shows that its incorporation into the management of temporomandibular disorders not only reduces pain perception but also improves mandibular functionality and the way patients cope with their condition in daily life. Reported evidence indicates that when this intervention is integrated with conventional treatments, clinical outcomes are enhanced, achieving significant reductions in both pain intensity and functional disability, suggesting sustained effects beyond the short term. In contrast, results associated with biofeedback reflect a more focused effect on modifying behavioral patterns linked to awake bruxism, especially in reducing muscle activity recorded through electromyography. However, this improvement does not necessarily translate into significant changes in clinical variables such as facial pain, functional limitation, or emotional status. This suggests that although biofeedback may be useful as a complementary strategy, its therapeutic scope may be limited if not combined with interventions targeting the psychological components of the disorder.

Table 4. Psychological Treatments

Treatment	Materials, Methods, and Study Group Characteristics	Results
Cognitive Behavioral Therapy (CBT)	Systematic review (9 RCTs, adults with TMD). Programs 4–8 sessions, alone or combined. Follow-up up to 12 months (23).	↓ pain ≈45% (similar to splint 48%). With amitriptyline ↓ ≈55%. Mouth opening ↑ 35→43 mm (p<0.05). Stable medium- and long-term effects.
	RCT (n=41). CBT + app vs conventional treatment (~6 weeks) (24).	↓ VAS pain −3.3 vs −1.5 (p≈0.008). ↓ tender points −5.8 vs −1.8 (p=0.008). Mouth opening ↑ +3.5 mm (p=0.042). No changes in stress.
Biofeedback	Systematic review (69 adults). Portable EMG with auditory/visual signal (25).	↓ tonic and phasic daytime and nighttime events (p≤0.04). No clear evidence in pain or quality of life.
	Single-blind RCT (60 adults; 6-month follow-up). 4 weekly 10-min sessions with EMG on masseter + mobile monitoring (26).	↓ sustained dental contact (p=0.004) and ↓ overall awake bruxism behavior (p=0.008). No significant changes in pain, anxiety, or disability (p>0.05). Greater behavioral than clinical effect.

DISCUSSION

The findings obtained in this research confirm that bruxism represents a multifactorial condition with structural, functional, and psycho-emotional repercussions that largely coincide with what has been described in recent literature. Regarding dental alterations, the predominance of attrition wear, dentin hypersensitivity, and fissures in posterior sectors is consistent with Sánchez et al. [(1)] and Aliberas et

al. [7], who describe bruxism as one of the main causes of progressive enamel deterioration and loss of cusp anatomy. The preferential location in molars and premolars also aligns with Oyarzoa et al. [6], who highlight that the greatest functional loads fall on these teeth, favoring the occurrence of repetitive traumatic contacts.

Likewise, the results are consistent with the epidemiological data reported by Alcolea & Mkhitaryan [8] and Stanisic et al. [27], who demonstrate significant prevalence in both sleep bruxism and awake bruxism, helping to explain the magnitude of the clinical impact observed. In this regard, the presence of sensitivity associated with dentin exposure reinforces what was reported by Moreno et al. [28], who link progressive wear with muscle pain and concomitant temporomandibular disorders. Similarly, the conceptual update proposed by Verhoeff et al. [29] supports the current interpretation of bruxism as a masticatory behavior that is not always pathological in itself, but may become harmful when it exceeds the adaptive capacity of the stomatognathic system, a situation evidenced in the analyzed cases.

Regarding pharmacological therapies, the results on botulinum toxin type A clearly coincide with the studies by Balanta et al. [30] and Marcos et al. [9], who report a significant reduction in pain and bite force after application to the masseter and temporalis muscles. The temporary nature of the therapeutic effect, approximately three to four months, also aligns with what was described by Tomás et al. [7] and comparative trials that highlight its usefulness as a symptomatic rather than curative alternative. In contrast, although benefits in pain reduction are consistent, some authors, such as Minakuchi et al. [31] warn, that the evidence still presents methodological heterogeneity, an aspect also observed in the reviewed studies.

With respect to low-dose tricyclic antidepressants, particularly amitriptyline, the results are consistent with those reported by Brakus et al. [11] and de Sousa et al. [12], who demonstrate a significant reduction in chronic pain associated with temporomandibular disorders. The improvement in quality of life and functionality reported in these trials supports the analgesic usefulness of these drugs in the context of persistent orofacial pain. However, the recommendations for rational use described by Romero et al. [10] and the pharmacological guidelines indicated by Zumba et al. [32] agree on the need for monitoring due to possible adverse effects, especially anticholinergic and cardiovascular effects.

In contrast, findings related to selective serotonin reuptake inhibitors (SSRIs) show a different perspective. Fernandes et al. (33) and Cliatt et al. (13) describe the association between SSRIs and the onset or exacerbation of bruxism as a side effect, which fully coincides with the analyzed results. This evidence presents an important contrast with the use of tricyclics, as while the latter show a favorable analgesic effect, SSRIs may aggravate the parafunction, possibly due to alterations in dopaminergic modulation. This aspect reinforces the need for an individualized pharmacological approach. Regarding clonazepam, the results are consistent with De Baat et al. [14], who report short-term reduction of nocturnal bruxism episodes. However, as noted by Dal Fabbro et al. [15], its effectiveness is limited to symptomatic control, with a potential risk of dependence in prolonged treatments. This consistency among studies supports the interpretation that benzodiazepines should be considered as a temporary alternative under strict supervision.

At the dental level, the use of occlusal splints demonstrated a significant reduction in muscle pain and functional improvement, results consistent with the reviews by Freire et al. [34] and the clinical analyses by Góra et al. [35]. The improvement in muscular signs and symptoms observed is also related to what was described by Ponce [17] and Santamaría [36], who emphasize their conservative nature and effectiveness when adequate adherence exists. Furthermore, the comparative trial by Chisini et al. [37] supports that both splints and botulinum toxin can reduce muscle pain, although through different mechanisms. Regarding occlusal adjustment, the clinical findings are consistent with Morales [18] and Garcia et al. [19], who describe the importance of reestablishing a stable centric relation and eliminating functional interferences. However, Gallardo and Ascanio [38] warn that occlusal management should be evidence-based rather than grounded in traditional mechanistic concepts, which aligns with the need to individualize each case. Similarly, Aldowish et al. [39] highlight the relevance of occlusion in restorative longevity, reinforcing the preventive value of properly indicated adjustment.

In orthodontic treatment, the results showed a progressive reduction in symptoms, although with transient increases during initial phases, a finding consistent with the variability described in recent longitudinal studies. This suggests that load redistribution may improve functional stability but does not directly address the behavioral component of bruxism.

In the psychological domain, the results show strong agreement with Nagi et al. [40] and Hasani et al. [41], who demonstrate that cognitive behavioral therapy significantly reduces pain and functional disability. The magnitude of reduction reported in some studies, close to or exceeding 50%, supports the value of integrating psychological interventions into comprehensive management. In contrast, although biofeedback showed a decrease in electromyographic activity, as reported by Viera et al. [42] and Foscaldo et al. [26], its impact on pain and emotional variables was limited, consistent with its classification as low-to-moderate evidence.

Among the main limitations of the study is the reliance on secondary evidence and the methodological heterogeneity of the analyzed works, which makes it difficult to establish definitive conclusions regarding the comparative effectiveness of therapies. Likewise, the clinical interaction between different therapeutic approaches was not jointly evaluated. Future research should incorporate longitudinal designs, controlled clinical samples, and comprehensive assessments that include psychological, dental, and functional variables in order to strengthen clinical decision-making and optimize pain management in patients with bruxism.

CONCLUSIONS

Bruxism is confirmed as a multifactorial oral parafunction with clinical impact that extends beyond the dental domain, involving muscular, functional, and psycho-emotional components. The results show that its sustained presence generates progressive structural alterations, mainly dental attrition wear, dentin hypersensitivity, and fissures, with greater involvement of posterior teeth, compromising masticatory efficiency and the functionality of the stomatognathic system.

It was determined that the severity of dental wear does not maintain a proportional relationship with pain intensity, demonstrating that pain associated with bruxism responds to more complex mechanisms than structural loss alone, including muscle hyperactivity and central pain modulation. Pharmacological management showed clinical usefulness mainly as a complementary therapy, highlighting botulinum toxin type A in severe cases for its effectiveness in reducing muscle hyperactivity and pain, although with a temporary effect. Other drugs showed variable benefits and limitations associated with adverse effects, restricting their prolonged use.

Dental therapies, especially occlusal splints, are consolidated as first-line management for protecting dental structures and providing symptomatic pain relief. However, their results are greater when integrated with educational and self-regulation strategies, confirming their functional rather than curative role.

Psychological therapies, particularly cognitive behavioral therapy and biofeedback, contribute significantly to pain management in patients with bruxism by addressing behavioral and neurophysiological factors that perpetuate the parafunction, strengthening a comprehensive therapeutic approach. In this sense, it´s important the need for a multimodal and interdisciplinary approach to bruxism, with direct implications for clinical practice and for promoting preventive strategies aimed at improving patient quality of life and reducing the progression of dental damage.

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