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The Effectiveness of Stress-Management-Based Cognitive-Behavioral Therapy on Bruxism Severity, Anxiety, and Sleep Quality in Patients with Sleep Bruxism

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A B S T R A C T

Purpose: This study aimed to examine the effectiveness of stress-management-based cognitive-behavioral therapy on bruxism severity, anxiety, and sleep quality in patients with sleep bruxism.

Methods and Materials: A quasi-experimental pretest–posttest–follow-up design with experimental and control groups was used. Sixty patients with probable sleep bruxism were selected from dental and oral medicine clinics and assigned to an experimental group ($n = 30$) or a control group ($n = 30$). The experimental group received eight weekly 90-minute sessions of stress-management-based cognitive-behavioral therapy, while the control group received routine dental recommendations. Bruxism severity, anxiety, and sleep quality were assessed at pretest, posttest, and six-week follow-up. Data were analyzed using mixed-design repeated-measures ANOVA and Bonferroni comparisons.

Findings: Significant time × group interactions were found for bruxism severity, $F(2, 116) = 58.92$, $p < .001$, $\eta p^2 = .504$; anxiety, $F(1.71, 99.18) = 44.85$, $p < .001$, $\eta p^2 = .436$; and sleep quality, $F(1.82, 105.67) = 47.74$, $p < .001$, $\eta p^2 = .452$. Posttest and follow-up comparisons showed significantly greater improvement in the experimental group than the control group ($p < .001$).

Conclusion: Stress-management-based cognitive-behavioral therapy was effective in reducing bruxism severity, anxiety, and poor sleep quality in patients with sleep bruxism.

Keywords: *sleep bruxism; cognitive-behavioral therapy; stress management; anxiety; sleep quality; bruxism severity.*

1. Introduction

Sleep bruxism is an oral motor activity occurring during sleep and characterized by rhythmic or non-rhythmic activity of the masticatory muscles. Contemporary conceptualizations distinguish sleep bruxism from awake bruxism and avoid defining it exclusively as tooth grinding or clenching. According to the international consensus, sleep bruxism is considered a sleep-related masticatory muscle activity in otherwise healthy individuals rather than a disorder in itself; however, it may become clinically relevant when it is associated with harmful consequences, comorbid conditions, or substantial functional impairment (Lobbezoo et al., 2018). This distinction has shifted the clinical understanding of bruxism from a narrowly dental phenomenon toward a multidimensional behavior involving interactions among oral, neurological, psychological, behavioral, and sleep-related processes. Consequently, assessment and management increasingly require an interdisciplinary perspective that extends beyond the protection of dental structures.

Although sleep bruxism does not necessarily produce adverse consequences in every individual, persistent or intense masticatory muscle activity may be associated with tooth wear, fractures of teeth or restorations, hypersensitivity, periodontal overload, morning jaw fatigue, masticatory muscle pain, headache, and temporomandibular complaints. These consequences may affect oral functioning, comfort, sleep satisfaction, psychological well-being, and quality of life. The clinical relevance of sleep bruxism therefore depends not only on whether the behavior is present but also on its frequency, intensity, associated symptoms, risk factors, and consequences. The movement toward standardized bruxism assessment reflects the need to consider these multiple dimensions rather than relying exclusively on self-reported grinding or isolated dental signs (Manfredini et al., 2020). The development of the Standardised Tool for the Assessment of Bruxism further emphasizes the importance of integrating self-report, clinical assessment, potential etiological factors, comorbidities, and clinical consequences within a structured evaluation framework (Manfredini et al., 2023).

The etiology of sleep bruxism is multifactorial and cannot be attributed to a single occlusal, psychological, or neurological cause. Current models suggest that sleep bruxism may be influenced by central nervous system mechanisms, autonomic activation, sleep micro-arousals, respiratory events, genetic vulnerability, medication use, substance consumption, lifestyle factors, emotional distress, and maladaptive behavioral responses. This multifactorial perspective is clinically important because individuals with similar dental signs may have substantially different underlying pathways. For some patients, sleep-related respiratory or neurophysiological factors may be particularly relevant, whereas for others, psychological stress, anxiety, cognitive arousal, muscular tension, and poor sleep regulation may play a more prominent role. Therefore, comprehensive treatment should be selected according to the individual's symptom pattern, associated conditions, and modifiable risk factors rather than applying a uniform mechanical intervention to all patients.

Psychological factors have received increasing attention because sleep bruxism frequently occurs alongside stress, anxiety, depression, emotional dysregulation, and other manifestations of psychological distress. A systematic review of the relationship between bruxism, temporomandibular disorders, and psychological factors in adults indicated that stress, anxiety, depression, and related emotional variables are commonly associated with bruxism and temporomandibular symptoms, although the strength of these associations varies according to study methodology and diagnostic procedures (Balasubramaniam et al., 2025). This variability may partly result from differences in how bruxism is assessed, with some studies relying on self-report, others using clinical examination, and a smaller number using instrumental measures. Nevertheless, the recurring association between bruxism and psychological symptoms suggests that emotional and cognitive processes may contribute to the onset, exacerbation, perception, or maintenance of bruxism-related complaints.

Stress is among the most frequently investigated psychological factors in sleep bruxism. Stressful experiences activate neuroendocrine and autonomic systems, increase muscular tension, heighten vigilance, and interfere with the transition from wakefulness to restorative sleep. Individuals exposed to persistent stress may experience difficulty relaxing, recurrent worry, irritability, somatic tension, and increased awareness of physical symptoms. In some individuals, tension may be concentrated in the jaw and facial muscles, producing daytime clenching, pre-sleep jaw contraction, or increased sensitivity to nocturnal masticatory activity. A systematic review and meta-analysis examining stress and bruxism found evidence of an association between the two constructs, although the authors noted considerable heterogeneity in measurement and study quality (Melo et al., 2020). These findings indicate that stress is clinically

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relevant but should be examined through carefully designed studies using standardized assessments.

Evidence specifically addressing adults with sleep bruxism similarly supports the relevance of stress symptoms. A systematic review and meta-analysis reported an association between sleep bruxism and stress-related symptoms, suggesting that adults with greater stress may be more likely to report or demonstrate sleep bruxism manifestations (Santos Miotto Amorim et al., 2021). Although observational findings cannot establish a definitive causal pathway, several mechanisms may explain this relationship. Stress may increase autonomic arousal and muscular activation, disrupt sleep continuity, intensify sleep micro-arousals, and reduce the individual's capacity to recover physiologically from daily demands. Conversely, pain, tooth damage, sleep disruption, and concern about bruxism may themselves generate additional stress. Sleep bruxism and stress may therefore participate in a reciprocal cycle in which psychological tension aggravates physical symptoms and physical symptoms subsequently increase psychological distress.

Anxiety may represent another important mechanism connecting psychological arousal, sleep disturbance, and bruxism severity. Anxiety is characterized by excessive apprehension, anticipatory worry, threat monitoring, difficulty controlling negative thoughts, and physiological symptoms such as palpitations, trembling, restlessness, dizziness, shortness of breath, and muscular tension. The Beck Anxiety Inventory was developed to measure the severity of subjective, somatic, and cognitive symptoms of anxiety and has become a widely used instrument in clinical research (Beck et al., 1988). In patients with sleep bruxism, anxiety may be clinically significant because it can produce persistent sympathetic activation, heightened bodily tension, preoccupation with health-related consequences, and difficulty disengaging from worry before sleep.

Pre-sleep cognitive and physiological arousal may be especially relevant to nocturnal symptoms. Individuals experiencing anxiety may lie awake reviewing daily problems, anticipating negative events, monitoring bodily sensations, or worrying about whether they will sleep adequately. Such cognitive activity is often accompanied by increased muscle tone and autonomic activation. Jaw clenching or facial muscle tension may occur as part of this broader pattern of somatic arousal. Moreover, individuals who are anxious about dental damage, jaw pain, or the consequences of sleep bruxism may become increasingly attentive to symptoms, which can amplify perceived severity and reinforce maladaptive coping behaviors. Accordingly, reducing anxiety may not only improve emotional well-being but may also weaken one of the psychophysiological pathways through which bruxism-related complaints are maintained.

Empirical findings indicate that bruxism, emotional disorders, daytime sleepiness, and sleep quality are meaningfully interrelated. A relational study examining sleep quality, daytime sleepiness, emotional disorders, and bruxism found that bruxism was associated with adverse sleep and emotional characteristics, reinforcing the need to assess these variables jointly rather than as independent clinical problems (Alcolea-Ruiz et al., 2025). Such findings are consistent with a biopsychosocial model in which emotional distress can influence sleep and muscle activity, while disrupted sleep and bruxism-related discomfort can intensify emotional vulnerability. This interconnectedness has important implications for treatment because an intervention focused exclusively on dental protection may leave anxiety, stress-related arousal, and sleep dysregulation largely unchanged.

Sleep quality is a central concern in sleep bruxism because the behavior occurs during sleep and may coexist with non-restorative sleep, sleep fragmentation, daytime fatigue, reduced concentration, and emotional instability. Sleep quality is a multidimensional construct encompassing subjective satisfaction, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The Pittsburgh Sleep Quality Index was developed to provide a standardized assessment of these dimensions and remains one of the most extensively used measures of subjective sleep quality in clinical and research settings (Buysse et al., 1989). In bruxism research, assessing sleep quality is important because the frequency or consequences of nocturnal masticatory activity may be influenced by the broader organization and perceived quality of sleep.

A systematic review examining the relationships of sleep and awake bruxism with sleep quality and sleep duration in adults showed that poorer sleep characteristics are frequently reported in association with bruxism, although methodological differences limit definitive conclusions regarding causality (Tavares et al., 2025). The relationship may operate in both directions. Poor sleep can increase emotional reactivity, pain sensitivity, fatigue, and difficulty regulating stress, all of which may intensify bruxism-related symptoms. At the same time, jaw discomfort, muscle fatigue, headaches, concern about tooth damage, and

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recurrent sleep-related motor activity may contribute to perceptions of non-restorative sleep. Therefore, sleep quality should be treated as both a clinically important outcome and a potential mechanism within psychological interventions for sleep bruxism.

The interrelationship between anxiety and sleep disturbance is also well established. Insomnia symptoms can increase worry, emotional instability, and vulnerability to anxiety, whereas anxiety can delay sleep onset, increase nocturnal awakenings, and impair sleep satisfaction. A systematic review of insomnia, anxiety, and related disorders described this relationship as bidirectional and highlighted the clinical importance of addressing both sleep and anxiety symptoms when they coexist (Palagini et al., 2024). This reciprocal process may be particularly relevant in sleep bruxism. Anxiety-related arousal can impair sleep, poor sleep can reduce coping resources, and the resulting increase in stress sensitivity may further contribute to muscular tension and bruxism-related complaints. An intervention capable of simultaneously targeting anxiety, stress regulation, and sleep behavior may therefore have broader benefits than an approach focused on a single symptom domain.

Conventional management of sleep bruxism commonly includes patient education, behavioral advice, occlusal appliances, dental monitoring, pharmacological interventions, biofeedback, physiotherapy, and treatment of associated sleep or medical conditions. Occlusal splints are often prescribed to protect teeth and restorations from mechanical damage; however, they do not necessarily reduce psychological stress, modify maladaptive cognitions, improve coping, or resolve poor sleep quality. A systematic review of adult sleep bruxism management identified several available approaches, including oral appliances, pharmacological treatments, cognitive-behavioral strategies, and biofeedback, but emphasized that the evidence base remains limited and heterogeneous (Prado et al., 2022). Thus, while dental interventions are essential for preventing structural harm, they may be insufficient when bruxism is accompanied by significant anxiety, stress-related hyperarousal, or sleep disturbance.

An overview of systematic reviews similarly concluded that the effectiveness of interventions for bruxism remains uncertain because studies differ in diagnostic criteria, treatment protocols, outcome measures, follow-up periods, and methodological quality (Canales et al., 2023). These limitations make it difficult to identify a universally superior treatment and support the use of individualized, multimodal management. They also reveal a need for controlled intervention studies that evaluate not only dental or motor outcomes but also psychological and sleep-related variables. Because bruxism is a behavior with multiple possible determinants, interventions should be evaluated according to the mechanisms they are designed to modify. Psychological treatment is particularly justified when symptoms occur in the context of stress, anxiety, maladaptive coping, and poor sleep regulation.

Stress-management-based cognitive-behavioral therapy may be well suited to this purpose because it integrates cognitive, behavioral, physiological, and sleep-related techniques. Cognitive-behavioral approaches assume that emotional distress is influenced by interactions among thoughts, emotions, physiological responses, and behaviors. Stressful situations may activate catastrophic interpretations, perfectionistic expectations, helplessness beliefs, excessive responsibility, or threat-focused thinking. These cognitions can intensify anxiety and physiological arousal, which may then promote muscular tension, sleep disruption, and maladaptive coping. Cognitive restructuring helps patients identify and modify unhelpful thoughts, while behavioral skills such as problem-solving, time management, assertive communication, and behavioral activation improve their capacity to respond effectively to daily stressors.

Relaxation techniques constitute another important component of stress-management-based cognitive-behavioral therapy. Diaphragmatic breathing, progressive muscle relaxation, body scanning, guided relaxation, and jaw-release exercises may reduce sympathetic activation and increase awareness of habitual tension patterns. For patients with sleep bruxism, learning to detect and release tension in the jaw, shoulders, neck, and facial muscles may be particularly beneficial. These methods may also reduce pre-sleep arousal and facilitate the transition to sleep. When combined with psychoeducation about the stress–anxiety–sleep–bruxism cycle, relaxation training can help patients reinterpret symptoms as modifiable responses rather than uncontrollable events.

Cognitive-behavioral interventions have demonstrated broad effectiveness across psychological conditions involving maladaptive cognition, behavioral avoidance, and emotional dysregulation. A comprehensive meta-analysis of cognitive-behavioral therapy across hundreds of clinical trials demonstrated its effectiveness relative to control conditions and supported its status as a major evidence-based psychological treatment (Cuijpers et al., 2023). Although that evidence primarily concerned depression, the mechanisms targeted by cognitive-behavioral therapy—including cognitive restructuring, behavioral change, coping enhancement, and reduction of dysfunctional emotional processes—are also relevant to stress and anxiety in patients with sleep bruxism. A stress-management adaptation can therefore be designed to address the specific psychological and physiological processes associated with bruxism-related symptoms.

Sleep-focused behavioral strategies may further strengthen the intervention. Sleep hygiene education, reduction of evening stimulants, development of a consistent bedtime routine, management of bedtime worry, and stimulus-control principles can reduce behaviors that perpetuate poor sleep. Evidence regarding long-term remission of chronic insomnia indicates that cognitive-behavioral treatment is a central therapeutic option and may offer durable benefits by changing the behavioral and cognitive mechanisms that maintain sleep disturbance (Morin et al., 2024). Although patients with sleep bruxism may not all meet diagnostic criteria for insomnia, many experience poor subjective sleep quality, difficulty relaxing before bed, or non-restorative sleep. Incorporating sleep-regulation strategies into stress-management CBT may therefore improve sleep quality while simultaneously reducing anxiety and physiological arousal.

Despite increasing recognition of the psychological correlates of sleep bruxism, important research gaps remain. Much of the existing literature is cross-sectional and focuses on associations among bruxism, stress, anxiety, and sleep rather than testing whether modifying these factors produces clinical improvement. Intervention research has often emphasized oral appliances or other dental strategies, with fewer controlled studies evaluating structured psychological programs. Furthermore, studies do not always assess bruxism severity, anxiety, and sleep quality concurrently, making it difficult to determine whether psychological treatment produces coordinated improvement across these interdependent outcomes. Evaluating all three variables is necessary to clarify whether stress-management-based CBT can influence both the central bruxism complaint and the broader emotional and sleep-related difficulties that frequently accompany it.

A further gap concerns the maintenance of treatment effects. Stress and bruxism symptoms may fluctuate in response to occupational demands, interpersonal problems, health concerns, sleep deprivation, and changes in daily routines. Immediate post-intervention improvement does not necessarily demonstrate that patients can sustain treatment gains when new stressors occur. Follow-up assessment is therefore essential for determining whether participants continue to use cognitive restructuring, relaxation, problem-solving, sleep-management, and relapse-prevention skills after the formal intervention ends. Evidence of maintained improvement would support the clinical value of teaching self-regulation skills rather than relying solely on interventions that function only while actively applied.

Accordingly, the present study aimed to determine the effectiveness of stress-management-based cognitive-behavioral therapy in reducing bruxism severity and anxiety and improving sleep quality among patients with sleep bruxism.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed a quasi-experimental pretest–posttest–follow-up design with an experimental group and a control group to examine the effectiveness of stress-management-based cognitive-behavioral therapy on bruxism severity, anxiety, and sleep quality among patients with sleep bruxism. The independent variable was stress-management-based cognitive-behavioral therapy, and the dependent variables were bruxism severity, anxiety, and sleep quality. Measurements were conducted at three time points: before the intervention, one week after completion of the intervention, and six weeks after the posttest assessment. The statistical population consisted of adult patients with symptoms of sleep bruxism who attended dental clinics and oral medicine centers in Isfahan, Iran, during 2025–2026. Participants were recruited through purposive sampling after an initial screening of patients who reported grinding or clenching their teeth during sleep, morning jaw fatigue or discomfort, or dentist-observed signs suggestive of bruxism. Patients who met the initial screening criteria underwent a clinical examination by a dentist or oral medicine specialist to determine the presence of probable sleep bruxism. Probable sleep bruxism was identified based on a combination of self-reported symptoms and clinical signs in accordance with the international consensus framework for bruxism assessment. Self-reported indicators included awareness of tooth grinding or clenching during sleep, reports of grinding sounds by a sleep partner when available, morning jaw stiffness or fatigue, and recurrent discomfort in the masticatory muscles. Clinical indicators included tooth wear inconsistent with the participant's age, masseter muscle hypertrophy, tenderness of the masticatory muscles, linea

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alba on the buccal mucosa, tongue indentations, and evidence of excessive occlusal loading. Patients were included only when both self-reported symptoms and clinical examination findings supported a diagnosis of probable sleep bruxism.

The final sample consisted of 60 patients with probable sleep bruxism. Thirty participants were assigned to the experimental group and 30 participants were assigned to the control group. The required sample size was estimated using G*Power version 3.1 for a mixed repeated-measures design with two groups and three measurement occasions. A medium effect size, an alpha level of .05, a statistical power of .80, and a moderate correlation among repeated measurements were considered in the calculation. The minimum required sample size was estimated to be approximately 52 participants. To compensate for possible attrition, incomplete questionnaires, or withdrawal during the intervention, 60 patients were recruited. Participants were matched as far as possible according to age, gender, and baseline bruxism severity before group allocation. The participants were between 20 and 50 years of age. The inclusion criteria were a diagnosis of probable sleep bruxism based on both self-report and clinical examination, the presence of at least moderate bruxism-related complaints, willingness to participate in the study, ability to attend the intervention sessions, and provision of written informed consent. The exclusion criteria were current orthodontic treatment, severe temporomandibular disorder requiring immediate specialized intervention, untreated obstructive sleep apnea, neurological disorders affecting motor activity during sleep, unstable use of medications known to substantially influence bruxism, substance dependence, severe psychiatric conditions requiring urgent treatment, concurrent participation in structured psychotherapy, pregnancy, absence from more than two intervention sessions, and failure to complete the questionnaires in more than one assessment phase.

After the eligible participants received oral and written information about the purpose and procedures of the study, voluntary participation, confidentiality of information, possible benefits, and their right to withdraw without affecting their access to dental or psychological services, written informed consent was obtained. At the pretest stage, all participants completed the demographic and clinical information form, the bruxism severity assessment, the Beck Anxiety Inventory, and the Pittsburgh Sleep Quality Index. A dental examination was also conducted to document the clinical signs of probable sleep bruxism. The experimental group then participated in eight weekly sessions of stress-management-based cognitive-behavioral therapy in addition to receiving routine dental recommendations, whereas the control group received only routine dental recommendations during the study period. Routine dental recommendations included education about sleep bruxism, oral health advice, reduction of caffeine and stimulant intake close to bedtime, avoidance of daytime parafunctional habits, and referral for dental protection when clinically indicated. The posttest assessment was administered one week after the final intervention session, and the follow-up assessment was conducted six weeks after the posttest. The same instruments and clinical assessment procedures were used at all three measurement occasions. To reduce assessment bias, the dentist responsible for evaluating bruxism-related clinical signs was not involved in delivering the psychological intervention.

2.2. Data Collection

A demographic and clinical information form developed by the researchers was used to obtain background information about the participants. The form collected data on age, gender, marital status, educational level, occupation, medical history, medication use, dental history, duration of bruxism symptoms, caffeine consumption, smoking status, sleep-related complaints, history of temporomandibular pain, and use of an occlusal appliance. The information obtained through this form was used to describe the demographic and clinical characteristics of the sample and to examine the comparability of the experimental and control groups before implementation of the intervention. Information concerning medication use, sleep problems, neurological conditions, current psychological treatment, and dental status was also used during the eligibility screening process.

Bruxism severity was assessed using the sleep bruxism-related components of the Standardised Tool for the Assessment of Bruxism together with a structured clinical dental examination. The instrument provides a multidimensional framework for assessing bruxism status, self-reported masticatory muscle activity, associated symptoms, possible consequences, risk factors, and comorbid conditions. In the present study, the assessment focused on the self-reported frequency and perceived intensity of tooth grinding or clenching during sleep, morning jaw fatigue, masticatory muscle discomfort, tooth sensitivity, jaw stiffness, and the perceived effects of

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bruxism on daily functioning and sleep. Clinical examination indicators included the presence and severity of tooth wear, tenderness of the masseter and temporalis muscles, masseter hypertrophy, tongue indentation, linea alba, tooth or restoration damage, and evidence of excessive occlusal loading. Scores from the relevant self-report and clinical components were combined to obtain an overall index of bruxism severity, with higher scores indicating more severe symptoms and consequences. The clinical examinations were conducted by a dentist who had been trained in the assessment protocol and who remained unaware of the participants' intervention condition whenever possible.

Anxiety was assessed using the Beck Anxiety Inventory, developed by Beck and colleagues. The inventory is a 21-item self-report instrument designed to measure the severity of cognitive, emotional, and somatic symptoms of anxiety experienced during the preceding week. The items assess symptoms such as nervousness, inability to relax, fear of losing control, fear of the worst happening, dizziness, trembling, palpitations, difficulty breathing, and other manifestations of physiological arousal. Each item is scored on a four-point Likert scale ranging from 0, indicating that the symptom was not experienced, to 3, indicating that the symptom was experienced severely. The total score ranges from 0 to 63, with higher scores representing greater anxiety severity. Total scores are commonly interpreted as minimal anxiety from 0 to 7, mild anxiety from 8 to 15, moderate anxiety from 16 to 25, and severe anxiety from 26 to 63. The Beck Anxiety Inventory has demonstrated strong internal consistency, test–retest reliability, and convergent validity in clinical and nonclinical populations and is particularly useful for evaluating changes in anxiety-related physiological and cognitive symptoms.

Sleep quality was measured using the Pittsburgh Sleep Quality Index, developed by Buysse and colleagues. This self-report questionnaire assesses subjective sleep quality and sleep-related difficulties during the previous month. The instrument contains 19 self-rated items that are grouped into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each component is scored from 0 to 3, and the component scores are summed to produce a global score ranging from 0 to 21. Higher scores indicate poorer sleep quality and greater sleep-related disturbance. A global score greater than 5 is generally considered indicative of clinically meaningful poor sleep quality. The Pittsburgh Sleep Quality Index has been widely used in psychological, psychiatric, dental, and sleep research and has demonstrated acceptable reliability, validity, and sensitivity to changes in sleep quality over time. Validated Persian versions of the Beck Anxiety Inventory and Pittsburgh Sleep Quality Index were used in the present study.

2.3. Intervention

The experimental group received stress-management-based cognitive-behavioral therapy in eight weekly group sessions, each lasting approximately 90 minutes. The intervention was delivered by a clinical psychologist trained in cognitive-behavioral therapy and stress-management techniques. The program was designed to address psychological and behavioral mechanisms that could intensify sleep bruxism, including stress-related physiological arousal, anxiety, cognitive rumination, habitual jaw tension, maladaptive coping patterns, and poor sleep habits. The first session focused on establishing therapeutic rapport, explaining the objectives and structure of the program, introducing sleep bruxism as a multidimensional condition, and providing psychoeducation regarding the relationships among stress, anxiety, muscular tension, sleep disturbance, and bruxism symptoms. The second session focused on identifying personal stressors, daily tension patterns, daytime jaw-related habits, and situations associated with worsening bruxism symptoms. In the third session, participants were introduced to the cognitive-behavioral model and learned to identify connections among stressful situations, automatic thoughts, emotional responses, physiological arousal, and behavior. The fourth session focused on cognitive restructuring, including identification and modification of catastrophic interpretations, perfectionistic beliefs, threat-related thoughts, and maladaptive concerns about sleep and health. The fifth session included training in diaphragmatic breathing, progressive muscle relaxation, body scanning, and deliberate relaxation of the jaw, facial, neck, and shoulder muscles. The sixth session addressed sleep hygiene, reduction of caffeine and stimulating activities before bedtime, development of consistent sleep routines, management of bedtime worry, and application of basic stimulus-control principles. The seventh session focused on structured problem-solving, time management, adaptive coping, and assertive communication to improve participants' ability to manage daily stressors. The final session reviewed the skills learned throughout the program,

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identified individual warning signs of stress and symptom recurrence, and helped participants develop personalized maintenance and relapse-prevention plans. Participants were assigned brief home-practice exercises after each session, including daily monitoring of stress and jaw tension, practice of relaxation exercises, cognitive restructuring worksheets, and implementation of sleep-hygiene recommendations. The intervention was delivered as an adjunct to routine dental care and did not replace dental treatment or the use of an occlusal appliance when prescribed. A written treatment manual and session-specific fidelity checklist were used to maintain consistency of intervention delivery. Participant attendance and completion of home assignments were recorded, and attendance at a minimum of six of the eight sessions was considered an adequate treatment dose.

2.4. Data Analysis

Data were analyzed using IBM SPSS Statistics version 29. Before conducting the primary analyses, the data were screened for missing values, data-entry errors, univariate outliers, and violations of statistical assumptions. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to summarize participants' demographic and clinical characteristics and the distribution of bruxism severity, anxiety, and sleep-quality scores at pretest, posttest, and follow-up. Baseline equivalence between the experimental and control groups was assessed using independent-samples t tests for continuous variables and chi-square tests for categorical variables. The internal consistency of the self-report measures was examined using Cronbach's alpha and McDonald's omega coefficients, with values of .70 or higher considered acceptable.

The assumptions required for mixed-design repeated-measures analysis of variance were evaluated before testing the study hypotheses. The approximate normality of the distributions was examined through skewness and kurtosis indices. Homogeneity of variances across the experimental and control groups was assessed using Levene's test, equality of covariance matrices was evaluated using Box's M test, and the assumption of sphericity was assessed using Mauchly's test. When the sphericity assumption was violated, Greenhouse–Geisser-adjusted degrees of freedom were used. The effects of stress-management-based cognitive-behavioral therapy on bruxism severity, anxiety, and sleep quality were examined separately using mixed-design repeated-measures analyses of variance. Time, consisting of pretest, posttest, and six-week follow-up, was treated as the within-subjects factor, and group, consisting of experimental and control conditions, was treated as the between-subjects factor. The time × group interaction was regarded as the primary indicator of intervention effectiveness because it determined whether the pattern of change over the three assessment occasions differed between the two groups.

When a significant time × group interaction was identified, Bonferroni-adjusted pairwise comparisons were conducted to examine changes between pretest and posttest, pretest and follow-up, and posttest and follow-up within each group. Independent-samples t tests were also used to compare the experimental and control groups at posttest and follow-up. Effect sizes were reported as partial eta squared for the repeated-measures analyses and Cohen's d for between-group comparisons. Percentage improvement from pretest to posttest was calculated for each outcome to facilitate clinical interpretation of the magnitude of change. All statistical tests were two-tailed, and the level of statistical significance was set at $p < .05$.

3. Findings and Results

The final sample consisted of 60 patients with probable sleep bruxism, including 30 participants in the experimental group and 30 participants in the control group. The mean age of participants was 34.27 years (SD = 7.18) in the experimental group and 35.10 years (SD = 7.42) in the control group, and the difference between the groups was not statistically significant, $t(58) = 0.44$, $p = .661$. The experimental group included 17 women (56.7%) and 13 men (43.3%), whereas the control group included 16 women (53.3%) and 14 men (46.7%); the groups did not differ significantly in gender distribution, $\chi^2(1) = 0.07$, $p = .795$. In terms of marital status, 21 participants (70.0%) in the experimental group and 22 participants (73.3%) in the control group were married, with no significant between-group difference, $\chi^2(1) = 0.08$, $p = .774$. The educational-level distributions were also comparable between the groups, $\chi^2(2) = 0.10$, $p = .951$. The mean duration of bruxism symptoms was 3.84 years (SD = 1.76) in the experimental group and 3.69 years (SD = 1.81) in the control group, and this difference was not statistically significant, $t(58) = 0.33$, $p = .743$. In addition, 9 participants (30.0%) in the experimental group and 10 participants (33.3%) in the control group reported using an occlusal appliance, with no significant difference between the groups, $\chi^2(1) = 0.08$, $p =$

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.781. These findings indicated that the experimental and control groups were comparable in their demographic and clinical characteristics before the intervention.

Table 1

Means and Standard Deviations of Bruxism Severity, Anxiety, and Sleep Quality Across the Assessment Phases

Variable	Group	Pretest, M ± SD	Posttest, M ± SD	Follow-up, M ± SD
Bruxism severity	Experimental	28.63 ± 4.21	18.47 ± 3.96	19.12 ± 4.08
	Control	28.10 ± 4.36	27.42 ± 4.51	27.08 ± 4.44
Anxiety	Experimental	26.74 ± 6.18	15.63 ± 5.72	16.21 ± 5.81
	Control	25.96 ± 6.42	24.88 ± 6.37	24.51 ± 6.29
Sleep quality	Experimental	12.38 ± 2.91	6.84 ± 2.35	7.12 ± 2.48
	Control	12.07 ± 3.04	11.61 ± 2.96	11.42 ± 3.01

As shown in Table 1, the experimental and control groups had relatively similar mean scores for bruxism severity, anxiety, and sleep quality at pretest. In the experimental group, the mean bruxism severity score decreased from 28.63 at pretest to 18.47 at posttest and remained relatively stable at 19.12 at follow-up. In contrast, the control group showed only a small reduction from 28.10 at pretest to 27.42 at posttest and 27.08 at follow-up. A similar pattern was observed for anxiety, with the experimental-group mean decreasing from 26.74 at pretest to 15.63 at posttest and remaining at 16.21 at follow-up, whereas the control-group mean changed only slightly from 25.96 to 24.88 and 24.51 across the three assessments. For sleep quality, the experimental-group score decreased from 12.38 at pretest to 6.84 at posttest and 7.12 at follow-up, indicating improved sleep quality because lower scores represent fewer sleep problems. The control group showed only minor changes in sleep-quality scores, from 12.07 at pretest to 11.61 at posttest and 11.42 at follow-up. Overall, the descriptive findings indicated substantial improvement in all three outcomes in the experimental group, with these changes largely maintained at follow-up.

Before conducting the mixed-design repeated-measures analyses of variance, the relevant statistical assumptions were examined. Skewness and kurtosis values for bruxism severity, anxiety, and sleep quality at all three assessment phases were within the acceptable range of −2 to +2, supporting the approximate normality of the distributions. Levene's tests were nonsignificant for all outcome variables at pretest, posttest, and follow-up, indicating that the assumption of homogeneity of variances was met. Box's M test was also nonsignificant, Box's M = 18.42, $F = 1.37$, $p = .184$, confirming equality of the covariance matrices across the experimental and control groups. Mauchly's test indicated that the assumption of sphericity was met for bruxism severity but was violated for anxiety and sleep quality. Therefore, Greenhouse–Geisser corrections were applied to the analyses of anxiety and sleep quality. Collectively, these findings showed that the data were appropriate for mixed-design repeated-measures analysis of variance.

Table 2

Mixed-Design Repeated-Measures Analysis of Variance for Bruxism Severity, Anxiety, and Sleep Quality

Variable	Source	SS	df	MS	F	p	ηp^2
Bruxism severity	Time	2148.62	2.00	1074.31	65.41	< .001	.530
	Group	1052.38	1.00	1052.38	28.76	< .001	.331
	Time × Group	1934.75	2.00	967.38	58.92	< .001	.504
	Error	1905.14	116.00	16.42			
Anxiety	Time	2584.39	1.71	1511.34	49.37	< .001	.460
	Group	1746.82	1.00	1746.82	21.63	< .001	.272
	Time × Group	2347.56	1.71	1372.84	44.85	< .001	.436
	Error	3035.71	99.18	30.61			
Sleep quality	Time	642.28	1.82	352.90	52.16	< .001	.473
	Group	318.74	1.00	318.74	25.89	< .001	.309
	Time × Group	586.96	1.82	322.51	47.74	< .001	.452
	Error	714.84	105.67	6.76			

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As presented in Table 2, the analysis of bruxism severity showed a significant main effect of time, $F(2, 116) = 65.41$, $p < .001$, $\eta p^2 = .530$, indicating that bruxism severity changed significantly across pretest, posttest, and follow-up. The main effect of group was also significant, $F(1, 58) = 28.76$, $p < .001$, $\eta p^2 = .331$. More importantly, the time × group interaction was significant, $F(2, 116) = 58.92$, $p < .001$, $\eta p^2 = .504$, demonstrating that the pattern of change in bruxism severity differed significantly between the experimental and control groups. For anxiety, the main effect of time was significant, $F(1.71, 99.18) = 49.37$, $p < .001$, $\eta p^2 = .460$, as was the main effect of group, $F(1, 58) = 21.63$, $p < .001$, $\eta p^2 = .272$. The significant time × group interaction, $F(1.71, 99.18) = 44.85$, $p < .001$, $\eta p^2 = .436$, indicated that anxiety decreased more substantially in the experimental group than in the control group. The analysis of sleep quality similarly revealed significant effects of time, $F(1.82, 105.67) = 52.16$, $p < .001$, $\eta p^2 = .473$, and group, $F(1, 58) = 25.89$, $p < .001$, $\eta p^2 = .309$. The time × group interaction was also significant, $F(1.82, 105.67) = 47.74$, $p < .001$, $\eta p^2 = .452$, showing that improvement in sleep quality differed significantly between the two groups. The large partial eta-squared values for the interaction effects indicated that the intervention had substantial effects on all three outcomes.

Table 3

Bonferroni-Adjusted Pairwise Comparisons Across Assessment Phases in the Experimental Group

Variable	Comparison	Mean Difference	SE	p
Bruxism severity	Pretest – Posttest	10.16	0.71	< .001
	Pretest – Follow-up	9.51	0.76	< .001
	Posttest – Follow-up	−0.65	0.52	.214
Anxiety	Pretest – Posttest	11.11	0.94	< .001
	Pretest – Follow-up	10.53	0.97	< .001
	Posttest – Follow-up	−0.58	0.61	.286
Sleep quality	Pretest – Posttest	5.54	0.42	< .001
	Pretest – Follow-up	5.26	0.45	< .001
	Posttest – Follow-up	−0.28	0.29	.331

The Bonferroni-adjusted pairwise comparisons presented in Table 3 showed that bruxism severity decreased significantly from pretest to posttest in the experimental group, with a mean difference of 10.16, $p < .001$. The difference between pretest and follow-up was also significant, with a mean difference of 9.51, $p < .001$. However, the difference between posttest and follow-up was not statistically significant, $p = .214$, indicating that the reduction in bruxism severity was maintained during the follow-up period. Anxiety also decreased significantly from pretest to posttest, with a mean difference of 11.11, $p < .001$, and from pretest to follow-up, with a mean difference of 10.53, $p < .001$. The posttest-to-follow-up difference was nonsignificant, $p = .286$, suggesting stability of the reduction in anxiety. For sleep quality, the mean score decreased significantly from pretest to posttest by 5.54 points, $p < .001$, and from pretest to follow-up by 5.26 points, $p < .001$. The difference between posttest and follow-up was not significant, $p = .331$, indicating that the improvement in sleep quality was maintained. Overall, the post-hoc findings confirmed that the experimental group experienced significant improvement from pretest to both posttest and follow-up, with no significant loss of treatment gains during the follow-up period.

4. Discussion and Conclusion

The present study examined the effectiveness of stress-management-based cognitive-behavioral therapy in reducing bruxism severity and anxiety and improving sleep quality among patients with sleep bruxism. The findings demonstrated significant time × group interactions for all three outcome variables. Participants in the experimental group showed marked reductions in bruxism severity, anxiety, and poor sleep quality from pretest to posttest, whereas the control group demonstrated only minor and statistically nonsignificant changes. These improvements were maintained at the six-week follow-up, as no significant deterioration occurred between posttest and follow-up in the experimental group. The effect sizes for the interaction effects were large, and the between-group comparisons at posttest and follow-up also indicated substantial clinical

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differences in favor of the intervention. Specifically, bruxism severity decreased by 35.5%, anxiety decreased by 41.6%, and poor sleep quality decreased by 44.7% in the experimental group, compared with only minimal reductions in the control group. Overall, these findings suggest that stress-management-based cognitive-behavioral therapy can produce coordinated and relatively stable improvements in the oral, psychological, and sleep-related manifestations of sleep bruxism.

The significant reduction in bruxism severity is consistent with the contemporary understanding of bruxism as a multidimensional masticatory muscle activity rather than a purely dental or occlusal disorder. International consensus statements define sleep bruxism as rhythmic or non-rhythmic masticatory muscle activity occurring during sleep and emphasize that its clinical importance depends on associated risk factors, consequences, and comorbid conditions (Lobbezoo et al., 2018). From this perspective, bruxism severity may be affected by psychological arousal, muscular tension, sleep-related processes, and maladaptive behavioral patterns in addition to oral and dental factors. The reduction observed in the present study may therefore be explained by the intervention's ability to target modifiable psychological and physiological factors that contributed to the participants' symptoms.

The findings are also compatible with the movement toward comprehensive and standardized bruxism assessment. Earlier efforts to develop a standardized assessment framework emphasized that bruxism should be evaluated through multiple domains, including self-reported activity, clinical signs, risk factors, consequences, and associated conditions (Manfredini et al., 2020). The later development of the Standardised Tool for the Assessment of Bruxism further reinforced the need to examine bruxism status within a broader biopsychosocial context (Manfredini et al., 2023). In the present study, bruxism severity was assessed using a combination of self-reported symptoms and clinical indicators, including grinding or clenching frequency, jaw fatigue, muscle discomfort, tooth sensitivity, and observable signs. The improvement across these indicators suggests that the treatment may have affected not only participants' perceptions but also the broader symptom pattern associated with sleep bruxism.

One plausible explanation for the reduction in bruxism severity is that stress-management-based cognitive-behavioral therapy decreased psychophysiological arousal and habitual muscular tension. The intervention included diaphragmatic breathing, progressive muscle relaxation, body scanning, jaw relaxation, awareness of tension patterns, and bedtime stress-management techniques. These components may have helped participants recognize when psychological tension was being expressed through the jaw and masticatory muscles and provided them with alternative methods of regulating arousal. As participants learned to identify stress triggers and release bodily tension, the intensity of pre-sleep muscular activation and perceived nocturnal bruxism symptoms may have decreased.

This interpretation is supported by evidence concerning the association between stress and bruxism. A systematic review and meta-analysis found that stress was associated with bruxism, although the strength of the relationship varied across diagnostic methods and study designs (Melo et al., 2020). Similarly, a systematic review focused specifically on adults with sleep bruxism reported an association between sleep bruxism and stress symptoms (Santos Miotto Amorim et al., 2021). These studies primarily identified correlational relationships, whereas the present findings extend this literature by suggesting that directly reducing stress and improving coping may contribute to reductions in bruxism severity. Thus, stress may function not only as an associated variable but also as a clinically modifiable treatment target.

The stress-reduction components may also have interrupted a reciprocal cycle involving daily stress, physiological activation, jaw tension, disturbed sleep, and concern about bruxism symptoms. Patients who experience stress may develop greater autonomic activation and muscular tension, which may increase awareness of jaw discomfort or morning fatigue. These symptoms can then lead to further worry about tooth damage, pain, or sleep quality, thereby increasing psychological arousal. Through psychoeducation, cognitive restructuring, relaxation, and problem-solving, the intervention may have weakened several points within this cycle. Participants were taught to reinterpret stress responses, challenge catastrophic thoughts, manage daily demands, and use more adaptive coping strategies rather than responding through sustained muscular tension.

The significant reduction in anxiety is another major finding. Participants receiving the intervention reported substantially lower anxiety at posttest, and this improvement remained evident at follow-up. The Beck Anxiety Inventory assesses a range of cognitive, emotional, and physiological symptoms, including nervousness, inability to relax, fear, trembling, dizziness, and autonomic arousal (Beck et al., 1988). Therefore, the observed decline suggests that the

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intervention influenced both psychological worry and bodily manifestations of anxiety. This is particularly relevant in sleep bruxism because anxiety-related physiological activation may contribute to jaw tension, difficulty relaxing, and disturbed sleep.

The anxiety findings are aligned with research indicating that psychological factors are frequently associated with bruxism and temporomandibular symptoms. A systematic review of adults with bruxism and/or temporomandibular disorders showed that anxiety, stress, depression, and related psychological factors are commonly linked to these conditions (Balasubramaniam et al., 2025). Although the review highlighted methodological diversity across studies, it supported the clinical relevance of assessing psychological distress in individuals presenting with oral-motor complaints. The present results suggest that addressing anxiety through a structured psychological intervention may be beneficial when sleep bruxism occurs alongside heightened worry, somatic tension, and emotional dysregulation.

Cognitive restructuring may have been one of the principal mechanisms underlying the reduction in anxiety. Participants were trained to identify automatic thoughts related to stress, health concerns, sleep difficulties, perfectionistic demands, and perceived inability to cope. They were then encouraged to evaluate the evidence supporting these thoughts and replace them with more balanced coping statements. This process may have reduced catastrophic interpretations and increased perceived control over both daily stressors and bruxism-related symptoms. Problem-solving, time management, and assertive communication may also have reduced the number or intensity of unresolved daily stressors that contributed to anxiety.

The effectiveness of these components is broadly consistent with evidence supporting cognitive-behavioral therapy as an established psychological treatment. A comprehensive meta-analysis involving hundreds of trials showed that cognitive-behavioral therapy produces significant improvements across emotional disorders compared with control conditions and several alternative treatments (Cuijpers et al., 2023). Although that meta-analysis focused primarily on depression, the therapeutic mechanisms of cognitive-behavioral therapy, including cognitive change, behavioral activation, coping enhancement, and reduction of maladaptive emotional responses, are also relevant to anxiety and stress-related symptoms. The findings of the present study therefore support the application of these mechanisms within a bruxism-specific stress-management program.

The reduction in anxiety may have contributed directly to the reduction in bruxism severity. Anxiety is often accompanied by hypervigilance, muscular contraction, autonomic activation, and difficulty disengaging from threat-related thoughts. When such processes remain active before sleep, individuals may enter sleep with elevated physiological arousal and increased jaw tension. By reducing anxiety and teaching relaxation skills, the intervention may have created more favorable physiological conditions for sleep and reduced the intensity of bruxism-related symptoms. The parallel decline in anxiety and bruxism severity supports this interpretation, although the study did not formally test mediation.

The findings also indicated a significant improvement in sleep quality. The experimental group showed a large reduction in Pittsburgh Sleep Quality Index scores from pretest to posttest, reflecting improvements in subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, and daytime functioning. The Pittsburgh Sleep Quality Index is a widely used measure that captures several interrelated dimensions of sleep over the preceding month (Buysse et al., 1989). The sustained improvement at follow-up suggests that participants were able to continue applying the sleep-related and stress-management skills learned during the intervention.

The sleep-quality finding is consistent with recent research showing that bruxism, emotional difficulties, and disturbed sleep commonly coexist. A relational study examining bruxism, sleep quality, daytime sleepiness, and emotional disorders found meaningful associations among these variables (Alcolea-Ruiz et al., 2025). Similarly, a systematic review of sleep and awake bruxism reported that poorer sleep quality and altered sleep duration are frequently examined in relation to bruxism, although the direction and strength of the association vary across studies (Tavares et al., 2025). The present study contributes to this literature by showing that sleep quality can improve following an intervention that targets stress, anxiety, bedtime arousal, and maladaptive sleep habits.

The improvement in sleep quality may be attributed to several intervention components. Participants received training in sleep hygiene, reduction of evening stimulant use, establishment of consistent bedtime routines, management of pre-sleep worry, relaxation before bed, and stimulus-control principles. These strategies may have reduced cognitive and physiological arousal during the period

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preceding sleep. They may also have helped participants develop stronger associations between the bed and sleep rather than worry, tension, or symptom monitoring. In addition, reductions in anxiety and jaw discomfort may have improved perceptions of sleep continuity and restoration.

The relationship between anxiety and sleep is bidirectional, which may explain why both outcomes improved concurrently. Anxiety can delay sleep onset, increase nocturnal awakenings, and reduce subjective sleep satisfaction, whereas poor sleep can heighten emotional reactivity, worry, and physiological sensitivity. A systematic review emphasized this reciprocal relationship and noted that sleep disturbances can contribute to the development or maintenance of anxiety-related conditions while anxiety can also perpetuate insomnia symptoms (Palagini et al., 2024). In the present study, simultaneous attention to cognitive worry, stress regulation, relaxation, and sleep habits may have disrupted this reciprocal cycle.

The findings are also consistent with evidence supporting cognitive-behavioral approaches for persistent sleep problems. A systematic review and network meta-analysis of interventions for chronic insomnia identified cognitive-behavioral treatment as an important option for achieving durable remission (Morin et al., 2024). Although the intervention in the present study was not a full cognitive-behavioral therapy for insomnia protocol, it incorporated several related elements, including sleep hygiene, stimulus control, reduction of bedtime arousal, and cognitive management of worry. These components may explain the substantial improvement in sleep quality and the maintenance of gains after treatment completion.

The maintenance of treatment effects at the six-week follow-up is clinically important. There were no significant differences between posttest and follow-up scores for bruxism severity, anxiety, or sleep quality, indicating that the improvements were relatively stable. This stability may reflect the skills-based nature of the intervention. Participants were not merely given information about sleep bruxism; they repeatedly practiced cognitive restructuring, relaxation, stress monitoring, problem-solving, and sleep-management strategies. The relapse-prevention session also encouraged them to identify warning signs and develop individualized plans for continued skill use.

The present findings are relevant to current concerns about the limited and heterogeneous evidence available for sleep bruxism management. A systematic review of management approaches in adults identified oral appliances, pharmacological strategies, cognitive-behavioral methods, and biofeedback among the available interventions but concluded that the evidence was not sufficiently consistent to establish a single optimal treatment (Prado et al., 2022). An overview of systematic reviews likewise found substantial variation in the methods and outcomes of bruxism interventions and emphasized the need for stronger clinical studies (Canales et al., 2023). The current study contributes to this evidence by evaluating a structured stress-management-based cognitive-behavioral program using an experimental-control design, repeated assessments, and follow-up measurement.

The large between-group effect sizes suggest that the intervention produced changes that were not only statistically significant but also clinically meaningful. At posttest and follow-up, participants in the experimental group reported substantially lower bruxism severity and anxiety and better sleep quality than those receiving routine dental recommendations alone. These results do not imply that psychological intervention should replace dental treatment. Rather, they support an adjunctive model in which dental care protects teeth and oral structures while psychological treatment addresses stress, anxiety, maladaptive coping, muscular tension, and poor sleep regulation. Such an integrated approach is consistent with contemporary multidimensional models of bruxism.

The study had several limitations. The sample was relatively small and was recruited through purposive sampling from dental and oral medicine clinics in a single geographical area, which may restrict the generalizability of the findings. The diagnosis was based on probable sleep bruxism determined through self-report and clinical examination rather than definitive instrumental assessment. Bruxism severity, anxiety, and sleep quality were also assessed partly through self-report, making the findings potentially vulnerable to response expectations and reporting bias. The control group received routine dental recommendations rather than an active psychological placebo condition, so nonspecific effects such as therapist attention and group support cannot be excluded. In addition, the follow-up period was limited to six weeks, and the study did not assess perceived stress as a separate outcome or formally test whether changes in anxiety and sleep quality mediated reductions in bruxism severity.

Future research should replicate the study with larger and more diverse samples recruited from multiple clinical centers. Longer follow-up periods of three months, six months, or one year would help determine the durability of treatment effects. Future studies should combine self-report

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and clinical examination with electromyography, polysomnography, actigraphy, or ecological momentary assessment where feasible. Comparative trials could examine stress-management-based cognitive-behavioral therapy against occlusal splints, biofeedback, relaxation-only interventions, cognitive-behavioral therapy for insomnia, or combined dental and psychological treatment. Researchers should also investigate mediating mechanisms such as perceived stress, pre-sleep arousal, muscle tension, emotional regulation, and sleep improvement, as well as moderators including baseline anxiety, symptom duration, medication use, temporomandibular complaints, and sleep-disordered breathing.

In clinical practice, patients presenting with sleep bruxism should be assessed for anxiety, perceived stress, sleep quality, bedtime worry, daytime clenching, and habitual muscular tension in addition to dental signs. Dentists and oral medicine specialists may benefit from collaborating with psychologists and sleep clinicians when psychological distress or sleep disturbance accompanies bruxism. A practical adjunctive program can include psychoeducation, self-monitoring of stress and jaw tension, diaphragmatic breathing, progressive muscle relaxation, cognitive restructuring, problem-solving, sleep hygiene, bedtime routines, and relapse-prevention planning. Patients should nevertheless continue appropriate dental monitoring and use prescribed protective appliances when indicated, because psychological treatment addresses stress-related and behavioral pathways but does not replace management of tooth wear, restoration damage, or other oral consequences.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

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