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# Bruxism awareness and self-assessment in dental clinical students: a questionnaire-based study

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## Abstract

**Background** Bruxism is a recurrent parafunctional habit characterized by clenching or grinding teeth and/or jaw contractions. It is quite common among dental students and is associated with psychosocial factors such as stress and anxiety. This study aimed to compare bruxism awareness and self-assessment among clinical students with and without bruxism.

**Methods** This study included systemically healthy individuals aged 18 to 27 years. Intraoral and extraoral examinations were performed on 128 4th- and 5th-grade dental students with (64) and without bruxism (64), 4th and 5th-grade dental students at Bolu Abant İzzet Baysal University who met the inclusion criteria. The diagnosis of bruxism was based on the 2018 International Consensus and data collected through a validated 33-item questionnaire covering general information and bruxism awareness. The questionnaire included multiple-choice questions on bruxism types, risk factors, symptoms, and impact on periodontal tissues. Statistical analyses were performed via IBM SPSS Statistics, and  $p < 0.05$  was considered statistically significant.

**Results** Clenching and teeth grinding during sleep, tooth wear, muscle fatigue, pain in the temples, jaw pain, joint trismus, neck pain, and jaw joint pain and clenching while awake were significantly different in bruxism patients ( $p < 0.05$ ). There was no significant difference between the two groups in terms of bruxism type, symptoms, treatment methods, periodontal tissues, occlusal trauma, diagnostic methods, or the relationship between lifestyle and bruxism ( $p > 0.05$ ). While 71.9% of those diagnosed with bruxism stated that they had bruxism, 68.8% of those who were not diagnosed stated that they did not have bruxism.

**Conclusion** Although dental students are aware of bruxism, their understanding of its multifactorial nature and treatment options needs improvement. Increasing this knowledge could reduce the prevalence of bruxism among dental students and improve patient care.

**Clinical trial registration** The clinical trial was retrospectively registered on ClinicalTrials.gov under the identifier NCT06583044, with a registration date of 03/09/2024. <https://register.clinicaltrials.gov/prs/beta/studies/S000EUYA00000023/recordSummary>.

**Keywords** Awareness, Bruxism, Dental students, Questionnaire

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## Background

Bruxism is a repetitive masticatory muscle activity characterized by clenching or grinding of the teeth and jaw contractions and can often occur in daily life [1–3]. Sleep bruxism (SB) is defined as masticatory muscle activity (MMA) during sleep, characterized by either rhythmic (phasic) or non-rhythmic (tonic) contractions, and is not considered a movement or sleep disorder in otherwise healthy individuals. On the other hand, awake bruxism (AB) refers to masticatory muscle activity during wakefulness, characterized by repetitive or sustained tooth contact and/or bracing or thrusting of the mandible, and is not classified as a movement disorder in otherwise healthy individuals [3]. The prevalence of awake bruxism (AB) in adults is estimated to range from 22 to 30%, while for sleep bruxism (SB), it is reported to be between 8% and 16% [5]. Due to the diverse range of symptoms and the complexity of associated issues, diagnosing and treating temporomandibular disorders requires a multifaceted approach [4]. Diagnostic tools for bruxism include self-assessment questionnaires, clinical evaluation forms, and polysomnography. Treatment requires a multidisciplinary approach that integrates dental, psychosocial, and medical perspectives [2, 5, 6]. Additionally, in the treatment of bruxism, pharmacological management (botulinum toxin type A (BTX-A), clonazepam, and clonidine), oral appliances (stabilizing splints and mandibular advancement devices (MADs)), biofeedback, and physical therapy are also used [7]. Bruxism can result in complications such as advanced mechanical tooth wear, musculoskeletal pain, and fractures and failures of dental restorations and implants [8]. It also leads to cervical dentin hypersensitivity, which may affect oral hygiene [9, 10]. Bruxism in healthy individuals should be considered a behavior that could be a risk (and/or protective) factor for specific clinical outcomes rather than a disorder [3]. Bruxism has multiple etiologies [6]. Alcohol, smoking, caffeine, recreational substances, and certain medications (such as selective serotonin reuptake inhibitors) may have a stimulating effect on SB [11]. SB can also affect night sleep and general health [12]. There is a relationship between bruxism and stress, whereas muscle pain, pain in the temporomandibular joint (TMJ), and sounds in the TMJ are consequences of bruxism [13]. There is a lower level of association, or even a negative correlation, between sleep bruxism and TMJ pain [14]. Stress and anxiety are two psychosocial factors frequently associated with bruxism [5]. Bruxism prevalence increases in association with stress, medications, lifestyle changes, poor nutrition, and sleep problems. The therapists should monitor the signs and symptoms to provide the best treatment plan for the patient [15]. Owing to clinical factors that make students more stressed, bruxism can be common among dental students [16, 17]. The stress level

among students in the clinical courses was impacted by their academic performance, gender, year level, and the type and duration of treatment provided, with completing course requirements being a major source of stress [18]. Studies have been conducted in various countries to measure the prevalence, awareness, and knowledge of treatment methods related to bruxism among dental students [15, 19, 20].

Measuring the awareness and knowledge of bruxism among clinical students by comparing those with and without bruxism constitutes the unique value of this study. In this study, it is hypothesized that 4th and 5th-grade students with bruxism achieve significantly higher scores in terms of bruxism awareness and self-assessment levels than students without bruxism. This study aims to compare bruxism awareness and self-assessment in 4th- and 5th-grade students with and without awake and sleep bruxism, evaluated using Grade 2 classification for assessing the severity of bruxism.

## Methods

The study protocol was approved by the Bolu Abant İzzet Baysal University Clinical Research Ethics Committee (decision number 2024/141, dated 04.06.2024) and was conducted in accordance with the Declaration of Helsinki [21]. Before participation, all dentistry student were thoroughly briefed on the questionnaire's purpose and content, and informed consent was obtained in writing. The informed consent form was obtained from all participants. Compliance with the STROBE guidelines for cross-sectional studies was documented. The research was carried out in June 2024 at the Faculty of Dentistry Periodontology Department, with 4th and 5th-year dental students serving as participants. The clinical trial was retrospectively registered on ClinicalTrials.gov under the identifier NCT06583044, with a registration date of 03/09/2024.

### Sample size calculation

In the study conducted with the G Power program (G \* Power 3.1 software; Heinrich Heine University, Düsseldorf, Germany), at margin of error ( $\alpha$ )=0.05, effect size ( $w$ )=0.35, power value ( $1-\beta$ )=0.95 at 2 degrees of freedom, and a minimum of 128 samples in total were determined to be sufficient. IBM SPSS Statistics (Version 26.0. Armonk, NY: IBM Corp.) was used for statistical analysis.

### Eligibility criteria

Systemically healthy individuals between 18 and 27 years who could understand the questions were included in the study. Individuals with mental retardation, suicidal tendencies, dementia, or psychosis were excluded.

### Study design

Intraoral and extraoral examinations were performed on one hundred ninety-four 4th- and 5th-grade 230 students at Bolu Abant İzzet Baysal University Faculty of Dentistry. Of the 128 dentistry students who met the inclusion criteria, 93 were female and 35 were male, with an average age of 22–23 years. Efforts were made to include a sufficiently large and diverse sample of 4th and 5th-year students to ensure representativeness.

### Bruxism assessment instruments

**Intraoral and extraoral clinical examination** According to the International Consensus on the Assessment of Bruxism report in 2018, bruxism diagnosis is based on extraoral and intraoral examinations. Extraoral examination includes findings such as pain in the masseter muscle and masseter muscle hypertrophy, while intraoral examination includes signs like dental attrition, the presence of linea alba on the cheek mucosa, and recurrent restoration failure. At least two of these findings are required to diagnose bruxism in a patient [3]. To determine whether the dental students had bruxism, the examination was conducted by a single physician (T.Ş.). Standardized diagnostic criteria were used to assess bruxism, minimizing the risk of subjective judgment during the diagnostic process. The diagnosis of bruxism was conducted independently before the self-assessment survey to prevent any influence of personal evaluation on the clinical diagnosis.

**Self-report bruxism** Lobbezoo et al. suggested a system for grading bruxism assessments to determine the likelihood that a given evaluation provides a valid result. In this system, possible sleep or awake bruxism is determined solely based on self-reported information [22]. While the diagnosis of AB involves self-assessment, SB involves self-assessment as well as self-reports from cohabiting partners or parents.

### Questionnaire

The patient was asked 33 questions, including 10 general information about bruxism and 23 about bruxism awareness. The data were gathered through self-administered structured questionnaires, some modified on the basis of the relevant literature [19, 20, 23] (Supplementary File 1). General information about bruxism included questions about the type, etiology, risk factors, symptoms,

treatment, and diagnostic methods of bruxism. In addition, in this section, questions about bruxism affecting periodontal tissues, causing occlusal trauma, and follow-up of the patients with bruxism were also asked. There were two to thirteen response options for each question. Regarding the awareness section on bruxism, the subject needed to be self-aware and recognize the symptoms of bruxism. The participants reported waking up with pain, tenderness, or difficulty opening their mouths. Additionally, they experienced symptoms such as jaw fatigue, tooth wear, clicking sounds, trismus, and neck pain. These could be signs of bruxism, and being aware of them is the first step in taking control of one's dental health. There were two to three response options for each question. There was an additional “do not know” option for inquiries that included information. Some were asked yes/no questions.

Previous studies [19, 23] have validated this method's precision and significance, which was the chosen instrument because it covers all the critical areas of our study goals. This method has demonstrated dependability and validity to guarantee consistent and accurate data collection. Moreover, it incorporates measures that are relevant and specific to the study population, addressing the research questions and making it an appropriate selection for achieving the study's objectives. The assessment was conducted by completing a structured questionnaire by the participants to determine whether the dental students had bruxism (T.Ş.). The clinician was aware of the treatment allocation and was not blinded during the assessment process. If necessary, the physician assisted by asking questions in Turkish.

### Statistical analyses

IBM SPSS Statistics (Version 26.0. Armonk, NY: IBM Corp.) was used for statistical analysis. Categorical data are expressed as numbers and percentages. The study was completed with 64 participants with bruxism and 64 participants without, with 128 total participants. The chi-squared test was used to compare the evaluations of participants with and without bruxism regarding the questions in the questionnaire. Independent sample t-tests were used to compare the ages of the participants according to the presence of bruxism. The statistical significance level was accepted as  $p < 0.05$ .

## Results

### Demographic characteristics

The age and sex distributions of the clinical students with and without bruxism were homogeneous (Table 1).

### Awareness of bruxism among clinical dental students

There were significant differences observed in symptoms such as teeth clenching or grinding during sleep or while

**Table 1** Demographic characteristics of the participants

		Without Bruxism (n:64)	With Bruxism (n:64)	p
<b>Gender</b>	Female	46 (71.9%)	47 (73.4%)	0.841
	Male	18 (28.1%)	17 (26.6%)	
<b>Age (Mean ± S.d.)</b>		22.69 ± 0.97	22.34 ± 1.21	0.079

awake; excessive tooth wear; feelings of fatigue, tension, or pain in the neck, jaw, temples, and teeth upon waking; a sense of tension in the jaw joint; the urge to move the lower jaw to relieve it; and symptoms of joint trismus ( $p < 0.05$ ). No statistically significant differences were found among participants regarding difficulties in opening their mouths wide upon waking, hearing a “click” sound in the jaw joint, experiencing headaches, experiencing pain during mouth opening and closing, tinnitus (ringing in the ears), or teeth clenching when anxious, angry, or concentrating ( $p > 0.05$ ) (Table 2).

### Clinical knowledge of dental students about bruxism

No statistically significant differences were found regarding bruxism type, risk factors, diagnosis, signs, or symptoms ( $p > 0.05$ ). Additionally, there were no significant differences regarding the impact of bruxism on periodontal tissues, its potential to cause occlusal trauma, the administration of or assistance with bruxism treatment, patient follow-up, improvement in bruxism-related symptoms after treatment, or methods of treatment ( $p > 0.05$ ) (Table 3).

There was a statistically significant difference between the groups with and without bruxism in response to the question, “Do you think you have bruxism?” Among

**Table 2** Participants’ awareness regarding bruxism TMJ: temporomandibular joint

		Without Bruxism (n:64)	With Bruxism (n:64)	Total	p
Do you clench your teeth during sleep?	Yes	14 (21.9%)	43 (67.2%)	57 (44.5%)	0.001*
	No	50 (78.1%)	21 (32.8%)	71 (55.5%)	
Do you clench your teeth while awake?	Yes	16 (25.0%)	30 (46.9%)	46 (35.9%)	0.008*
	No	48 (75.0%)	34 (53.1%)	82 (64.1%)	
Are you aware that you frequently grind your teeth during sleep, or does someone hear you do while you are sleeping?	Yes	4 (6.3%)	19 (29.7%)	23 (18.0%)	0.001*
	No	60 (93.8%)	45 (70.3%)	105 (82.0%)	
Are you aware that your teeth are wearing down more than they should?	Yes	4 (6.3%)	14 (21.9%)	18 (14.1%)	0.020*
	No	60 (93.8%)	50 (78.1%)	110 (85.9%)	
Do you feel fatigue, tension, or pain in your jaw after waking up?	Yes	9 (14.1%)	36 (56.3%)	45 (35.2%)	0.001*
	No	55 (85.9%)	28 (43.8%)	83 (64.8%)	
Have you ever felt your teeth clenched or your mouth sore when you woke up?	Yes	11 (17.2%)	37 (57.8%)	48 (37.5%)	0.001*
	No	53 (82.8%)	27 (42.2%)	80 (62.5%)	
Do you experience pain in your temples when you wake up?	Yes	5 (7.8%)	21 (32.8%)	26 (20.3%)	0.001*
	No	59 (92.2%)	43 (67.2%)	102 (79.7%)	
Do you have difficulty opening your mouth wide after waking up?	Yes	7 (10.9%)	11 (17.2%)	18 (14.1%)	0.309
	No	57 (89.1%)	53 (82.8%)	110 (85.9%)	
Do you feel tension in your TMJ when you wake up, and do you need to move your lower jaw to relieve it?	Yes	5 (7.8%)	21 (32.8%)	26 (20.3%)	0.001*
	No	59 (92.2%)	43 (67.2%)	102 (79.7%)	
Do you hear a ‘click’ in your TMJ when you wake up, which later disappears?	Yes	6 (9.4%)	14 (21.9%)	20 (15.6%)	0.087
	No	58 (90.6%)	50 (78.1%)	108 (84.4%)	
Do you have symptoms such as a headache?	Yes	16 (25.0%)	23 (35.9%)	39 (30.5%)	0.179
	No	48 (75.0%)	41 (64.1%)	89 (69.5%)	
Do you experience pain when closing and opening your mouth?	Yes	5 (7.8%)	11 (17.2%)	16 (12.5%)	0.109
	No	59 (92.2%)	53 (82.8%)	112 (87.5%)	
Do you experience symptoms of TMJ trismus when you wake up in the mornings?	Yes	1 (1.6%)	11 (17.2%)	12 (9.4%)	0.002*
	No	63 (98.4%)	53 (82.8%)	116 (90.6%)	
Do you have symptoms of pain around your neck?	Yes	11 (17.2%)	22 (34.4%)	33 (25.8%)	0.026*
	No	53 (82.8%)	42 (65.6%)	95 (74.2%)	
Do you have symptoms of tinnitus (ringing in the ears)?	Yes	8 (12.5%)	10 (15.6%)	18 (14.1%)	0.611
	No	56 (87.5%)	54 (84.4%)	110 (85.9%)	
Do you clench your teeth when you feel anxious?	Yes	37 (57.8%)	43 (67.2%)	80 (62.5%)	0.273
	No	27 (42.2%)	21 (32.8%)	48 (37.5%)	
Do you clench your teeth when you get angry?	Yes	36 (56.3%)	44 (68.8%)	80 (62.5%)	0.144
	No	28 (43.8%)	20 (31.3%)	48 (37.5%)	
Do you clench your teeth when you concentrate?	Yes	25 (39.1%)	33 (51.6%)	58 (45.3%)	0.155
	No	39 (60.9%)	31 (48.4%)	70 (54.7%)	

TMJ: Temporomandibular joint

**Table 3** Participants' knowledge about bruxism

		Without Bruxism (n:64)	With Bruxism (n:64)	Total	<i>p</i>
<b>How many types of bruxism are there?</b>	1	5 (7.8%)	3 (4.7%)	8 (6.3%)	0.625
	2	26 (40.6%)	25 (39.1%)	51 (39.8%)	
	I do not know	33 (51.6%)	36 (56.3%)	69 (53.9%)	
<b>Which of the following is considered a risk factor for the development of nocturnal bruxism (Multiple answers may apply)?</b>	Alcohol Consumption	9 (5.8%)	12 (7.5%)	21 (6.7%)	0.475
	Smoking	10 (6.5%)	11 (6.9%)	21 (6.7%)	
	Caffeine	13 (8.4%)	16 (10.0%)	29 (9.2%)	
	Psychosocial Factors	39 (25.3%)	45 (28.1%)	84 (26.8%)	
	Sleep Disorders	41 (26.6%)	34 (21.3%)	75 (23.9%)	
	Obstructive Sleep Apnea, etc.	24 (15.6%)	24 (15.0%)	48 (15.3%)	
	I do not know	18 (11.7%)	18 (11.3%)	36 (11.5%)	
<b>What are the signs and symptoms of bruxism? (Multiple answers may apply)</b>	Attrition	62 (25.0%)	63 (25.7%)	125 (25.4%)	0.222
	Pain in the masticatory muscles	60 (24.2%)	61 (24.9%)	121 (24.5%)	
	TMJ problems	60 (24.2%)	59 (24.1%)	119 (24.1%)	
	Headache	61 (24.6%)	58 (23.7%)	119 (24.1%)	
	I do not know	5 (2.0%)	4 (1.6%)	9 (1.8%)	
<b>Does bruxism affect periodontal tissues?</b>	Yes	62 (96.9%)	63 (98.4%)	125 (97.7%)	0.604
	No	1 (1.6%)	1 (1.6%)	2 (1.6%)	
<b>Does bruxism cause occlusal trauma?</b>	Yes	61 (95.3%)	63 (98.4%)	125 (97.7%)	0.362
	No	1 (1.6%)	1 (1.6%)	2 (1.6%)	
	I do not know	2 (3.1%)	0 (0.0%)	2 (1.6%)	
<b>Which of the following can be used to diagnose bruxism (Multiple answers may apply)?</b>	Clinical assessment	62 (27.9%)	59 (26.9%)	121 (27.4%)	0.166
	Self-assessment	50 (22.5%)	48 (21.9%)	98 (22.2%)	
	Sleep depth recording (Polysomnography recording)	37 (16.7%)	31 (14.2%)	68 (15.4%)	
	EMG analysis of chewing muscles (Electromyographic recordings)	52 (23.4%)	50 (22.8%)	102 (23.1%)	
	Usage of intraoral appliances	20 (9.0%)	27 (12.3%)	47 (10.7%)	
	I do not know	1 (0.5%)	4 (1.8%)	5 (1.1%)	
<b>Did you learn about bruxism and its treatment methods during your pre-clinical/clinical years?</b>	Yes	57 (89.1%)	58 (90.6%)	115 (89.8%)	0.77
	No	7 (10.9%)	6 (9.4%)	13 (10.2%)	
<b>Have you ever treated or assisted in the treatment of a patient with bruxism?</b>	Yes	33 (51.6%)	38 (59.4%)	71 (55.5%)	0.374
	No	31 (48.4%)	26 (40.6%)	57 (44.5%)	
<b>Have you ever monitored a patient with bruxism?</b>	Yes	12 (18.8%)	9 (14.1%)	21 (16.4%)	0.474
	No	52 (81.3%)	55 (85.9%)	107 (83.6%)	
<b>Do you think there was an improvement in the patient's bruxism-related signs and symptoms after treatment?</b>	Yes	48 (75.0%)	49 (76.6%)	97 (75.8%)	0.837
	No	16 (25.0%)	15 (23.4%)	31 (24.2%)	
<b>Can lifestyle changes improve outcomes in patients with bruxism?</b>	Yes	63 (98.4%)	62 (96.9%)	125 (97.7%)	0.559
	No	1 (1.6%)	2 (3.1%)	3 (2.3%)	
<b>Should the patient with bruxism be followed up?</b>	Yes	64 (100.0%)	62 (96.9%)	126 (98.4%)	0.154
	No	0 (0.0%)	2 (3.1%)	2 (1.6%)	

**Table 3** (continued)

		Without Bruxism (n:64)	With Bruxism (n:64)	Total	<i>p</i>
<b>How is bruxism treated (Multiple answers may apply)?</b>	Informing	51 (17.5%)	59 (22.7%)	110 (19.9%)	0.254
	Biofeedback mechanism	52 (17.8%)	53 (20.4%)	105 (19.0%)	
	Hypnosis	34 (11.6%)	34 (13.1%)	68 (12.3%)	
	Psychoanalysis	42 (14.4%)	45 (17.3%)	89 (16.1%)	
	Pharmacological Approaches	42 (14.4%)	47 (18.1%)	89 (16.1%)	
	Masseter Botox	23 (7.9%)	14 (5.4%)	37 (6.7%)	
	Stabilization splints	18 (6.2%)	3 (1.2%)	21 (3.8%)	
	Anterior repositioning splint	6 (2.1%)	0 (0.0%)	6 (1.1%)	
	Anterior bite plate, partial anterior splints	6 (2.1%)	1 (0.4%)	7 (1.3%)	
	Soft splint	10 (3.4%)	2 (0.8%)	12 (2.2%)	
	Occlusal adjustment	8 (2.7%)	0 (0.0%)	8 (1.4%)	
<b>Do you think you have bruxism?</b>	I do not know	0 (0.0%)	2 (0.8%)	2 (0.4%)	0.001*
	Yes	18 (28.1%)	44 (68.8%)	62 (48.4%)	
	No	46 (71.9%)	20 (31.2%)	66 (51.6%)	

TMJ: Temporomandibular joint

those diagnosed with bruxism, 71.9% believed they had the condition, whereas 68.8% of those not diagnosed with bruxism believed they did not have it (Table 3).

## Discussion

This study hypothesizes that 4th- and 5th-grade students who have bruxism have noticeably higher scores for bruxism awareness and self-assessment levels than students who do not have bruxism. The results revealed no significant differences in symptoms such as mouth-opening difficulties, jaw joint clicks, headaches, pain during jaw movement, tinnitus, or teeth clenching related to anxiety, anger, or concentration. Dental students correctly identified their bruxism diagnosis in 68–71% of cases.

Uma et al. (2021) reported that the prevalence of self-reported nocturnal and diurnal bruxism is high among Thai dental students. Awareness of bruxism increased significantly as students progressed in their academic years, although the overall awareness level remains moderate, indicating a potential knowledge gap [20]. The prevalence of awake bruxism (AB) among students has been reported to range from 16.7 to 50.6%, while sleep bruxism (SB) has been reported between 25.9% and 49.7% [24]. Additionally, the proportion of individuals with high bruxism-related findings during sleep was 6.0%, whereas the proportion of those with high bruxism-related findings while awake was 44% [25]. In a study conducted on 328 medical students in Romania, sleep bruxism was detected in 16.28% of participants, while awake bruxism was detected in 68.99% [26]. The prevalence of bruxism among American dental students was observed to be 55.3% [27]. Another study found that 55.5% of individuals self-reported bruxism, with 36.6% receiving an official diagnosis [28]. In Finnish university

students, sleep bruxism was reported by 21.0% of women and 12.5% of men, while awake bruxism was reported by 2.0% of women and 2.8% of men [29]. In another research, 31.7% of dental students reported clenching their teeth. The findings indicate that a significant number of students experience bruxism-related symptoms, particularly during periods of stress, highlighting the high prevalence of bruxism among younger adults under academic and psychological pressure. This study emphasizes the need for greater attention to the contributing factors and advocates for further research on effective interventions, especially those focused on stress reduction and behavioral modification [13]. In this study, 33% of the dental students were identified as having probable bruxism. Among those in the group which probable bruxism was detected, 68.8% believed they had bruxism, whereas 28.1% of participants in the group without detected probable bruxism also thought they had this condition.

The most common treatment method for diurnal bruxism reported by participants was relaxation techniques (79.4%), followed by splint therapy (40.8%), and pharmacological treatment (35%). However, for sleep bruxism, the most common treatment method reported by participants was splint therapy (80.3%), followed by relaxation therapy (45.3%). The results indicate a varied level of understanding and confidence among students and interns regarding diagnosing and managing bruxism [19]. In one study, 59.1% of Thai dental students reported that behavioral modification could be used to treat bruxism, 56.68% mentioned occlusal splints, 49.57% cited relaxation techniques, 2.8% suggested botulinum injections, and 1.29% indicated pharmacological treatment, whereas 8.41% stated that they did not know the treatment for the condition. This emphasizes the need for enhanced education on bruxism in dental curricula to improve students'

diagnostic and management skills for better patient care [20]. In this study, 16.1% of the students indicated that psychoanalysis should be used to treat probable bruxism. In comparison, an equal percentage (16.1%) recommended a pharmacological approach, and 8.4% suggested using occlusal splints. The probable bruxism among the dental students did not significantly influence their responses.

According to Bahammam et al. (2022), 59.4% of bruxism patients reported fatigue, tension, or pain in the jaw area upon waking, with 43.5% experiencing teeth clenching or mouth pain, 45.9% reporting temple pain, 20% hearing a 'click' sound, 6.5% experiencing headaches, and 45.9% feeling neck pain. Additionally, 42.4% of patients experienced trismus, and 40% reported tinnitus upon waking. This study supports the validity of the questionnaire as a tool for assessing sleep bruxism; it is significantly correlated with symptoms such as jaw pain and restricted movement [23]. In Romanian medical students, the primary manifestation of bruxism was reported as teeth grinding, with fatigue being a common clinical sign associated with both bruxism [26]. In university students, TMD pain was reported by 25.9% of women and 11.4% of men, while temporomandibular joint (TMJ) pain during jaw movement was reported by 9.6% of women and 4.2% of men [29]. In a separate study, 74.4% of participants reported experiencing pain in their masticatory muscles upon waking, and 73.5% reported pain in the temporal region. Only 3.1% of the participants responded, "I don't know". This study highlights significant variations in understanding bruxism treatment among students and interns, calling for updated dental curricula to better equip them in diagnosing and managing this common condition [19]. Soares et al. (2016) reported that 25.7% of dental students experienced head, neck, and back pain. Additionally, 17% of the students had TMJ pain, and 24.8% reported sounds emanating from the TMJ [13]. It has been observed that the stress factor increases bruxism symptoms in Serbian dental students [30]. In another study conducted at a dental school, 40% of the students reported experiencing headaches, 53.3% reported tinnitus, 80% reported TMJ pain, and 66.7% reported experiencing a clicking sound. The findings indicated a high prevalence of bruxism within this student population, with many students reporting symptoms, particularly during periods of stress and academic pressure. A better understanding of bruxism can help students manage stress more effectively and reduce its prevalence, leading to better health outcomes and improved academic performance [31]. In this study, 35.2% of participants with probable bruxism reported jaw pain upon waking, 30.5% experienced headaches, 20.3% experienced pain in their temples, 15.6% reported a 'click' sound from their joint, 25.8% had neck pain, and 14.1% experienced tinnitus.

In diagnosing bruxism, 87.4% of the students indicated that a clinical examination should be conducted, 54.3% mentioned self-assessment, 35.0% suggested polysomnography recording as a diagnostic method, and 6.3% stated that they were unaware of the diagnostic methods for bruxism [19]. One study highlights the importance of combining subjective and objective data in diagnosing bruxism in temporomandibular disorder patients and calls for further research to refine diagnostic criteria. Self-reported bruxism is valuable but should be supplemented with clinical assessments for accuracy [24]. In this study, 27.4% of the students indicated that clinical evaluation is a diagnostic method for probable bruxism, 22.2% mentioned self-assessment, 15.4% suggested polysomnography recording, and 1.1% responded with "I don't know".

Among the dental students, 78.5% reported receiving education on bruxism and its treatment. Additionally, 36.8% had treated or assisted in treating a patient with bruxism, 46.9% had followed up with the patient, and 72.8% had observed a reduction in symptoms after treatment [19]. In this study, 89.8% of the participants reported having received the necessary information about probable bruxism during their education, 55.5% had treated or assisted in treating a patient with probable bruxism, 16.4% had followed up with the patient, and 75.8% had observed improvement in the patient's condition.

The authors have discussed the potential mechanisms connecting bruxism to periodontal disease, proposing that excessive occlusal forces from bruxism may damage tooth-supporting structures, thus worsening periodontal disease. This trauma could intensify inflammation and accelerate periodontal deterioration in bruxism patients. These findings emphasize the need for further research to develop improved diagnostic and treatment strategies for patients suffering from both bruxism and periodontal disease [25]. The present study shows that probable bruxism is associated with periodontal disease. Bruxers showed increased odds of periodontitis, indicating a potential link between bruxism and periodontal status [28]. In this study, more than 95% of dental students, regardless of probable bruxism status, believed that bruxism could affect periodontal disease or cause occlusal trauma.

This study's strengths include using a comprehensive and validated instrument that thoroughly addresses critical aspects of bruxism and ensures the collection of relevant and reliable data. The consistency in diagnosis, achieved by having a single physician conduct all examinations and surveys, further strengthens the study by minimizing variability in data collection. Additionally, the focus on a targeted population, specifically dental students, enhances the relevance of the findings within

this group. However, the study's limitations include its limited generalizability because the population is confined to dental students from a single university, which may not reflect the broader population. The reliance on self-reported data introduces potential bias, as participants may inaccurately report their symptoms or knowledge. The lack of blinding introduces potential bias in the evaluation process, as the clinician's understanding of the treatment could influence their subjective judgment. This limitation may affect the objectivity of the results, making it difficult to rule out observer bias in the findings entirely. It includes the absence of validated questionnaires for assessing bruxism and TMD, which limits the ability to capture the full spectrum of behavior. Additionally, a single clinician's involvement in all stages of the study may have introduced bias into the results. Lastly, while stress was highlighted as a critical factor in the prevalence of bruxism, perceived stress was not assessed, hindering a comprehensive understanding of the stress-bruxism relationship.

## Conclusion

The article concludes that while dental students are aware of bruxism, there is room for improvement in their knowledge, particularly regarding the multifactorial nature of the condition and the breadth of treatment options. Addressing these gaps in knowledge and practice is essential for improving the overall health outcomes of dental patients and for better preparing future dental professionals. It is believed that increasing awareness and knowledge of bruxism could reduce its prevalence among dental students.

## Abbreviations

STROBE	The strengthening the reporting of observational studies in epidemiology
TMJ	Temporomandibular joint
SPSS	Statistical package for the social sciences

## Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12903-024-04997-x>.

Supplementary Material 1

Supplementary Material 2

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## Author contributions

T.S. found the study idea/hypothesis. T.S. made the study design. T.S. collected data. T.S. made analysis and/or interpretation of results. T.S. wrote the article. T.S. made a critical review.

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## Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

## Declarations

### Ethics approval and consent to participate

The study was conducted according to the guidelines of the Declaration of Helsinki. The Ethics Committee of Bolu Abant İzzet Baysal University approved the research before its initiation (protocol number 2024/141 and 04.06.2024). This clinical study was registered at ClinicalTrials.gov (NCT06583044-03/09/2024). Participants were informed verbally and in writing about the design of the study. The study was conducted with respect to the Helsinki Declaration. The informed consent form was obtained from all participants.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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