Characteristics of Patients with Bruxism in College of Dental Medicine, Rangsit University

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Abstract

This cross-sectional study aimed to clarify patients' characteristics with bruxism at the College of Dental Medicine, Rangsit University. Data from 250 patients' occlusion chart records were reviewed. Bruxism was more prevalent in females (108 patients; 59%) than males (75 patients; 41%), with no age difference between bruxism and non-bruxism. Having a sleep well at night ($p = 0.037$), clenching, or grinding awareness ($p < 0.001$), open mouth problems ($p = 0.006$), and jaw joint problems ($p < 0.001$) had a significant association with bruxism and non-bruxism patients. Regarding the jaw movement of dental patients, it was shown that patterns of mandibular movement ($p = 0.002$) and pain during mandibular movement ($p < 0.001$) had a significant association with bruxism and non-bruxism patients. Patients with deviation or deflection mandibular movement had a 61% decreased risk of bruxism (OR = 0.392, 95%CI = 0.212,0.725). Patients with no pain during mandibular movement had a 9.4 times higher risk of bruxism (OR = 9.381, 95%CI = 3.830, 22.981). Midline shift ($p = 0.024$) and interference ($p = 0.035$) were significantly associated with bruxism and non-bruxism, respectively. Patients with no midline shift had 2.3 times (OR = 2.29, 95%CI = 1.120,4.720) higher risk of having bruxism, and patients with no interference had 2.5 times (OR = 2.541, 95%CI = 1.117, 5.780) higher risk to have bruxism. Dental patients with bruxism had a significantly wider range of mouth opening than non-bruxism patients ($p = 0.023$). The range of mouth opening in bruxism patients ranged between 23 and 60 millimeters, with a median range of 42 (37, 46 millimeters), while the range of mouth opening in non-bruxism patients ranged between 19 and 52 millimeters, with a median range of 40 (35, 45 millimeters). According to oral status, bruxism patients had a higher chance of experiencing tooth wear compared to non-bruxism patients. When all the bruxism-related factors were entered into multivariate analysis, having a history of clenching or grinding awareness (OR = 5.04, 95%CI = 2.39, 10.66; $p < 0.001$) and a history of mandibular movement problems (OR = 2.28, 95%CI = 1.17, 4.43; $p = 0.016$) were associated with bruxism without the influence of age, sex or other related factors.

***Keywords**: Bruxism, Multifactorial, Sleep*

1. Introduction

The prevalence of bruxism is 8-31.4% (Uma et al., 2021). Nowadays, bruxism is one of the interesting issues, and people have been facing this phenomenon. A similar increase in the number of patients with bruxism has been observed at the College of Dental Medicine, Rangsit University Clinic. If the associated factors are elucidated, the dentist can perform the best dental care for patients with bruxism. Therefore, we conducted a cross-sectional study so that the related information to the bruxism assessment in the College of Dental Medicine, Rangsit University, will be clarified.

2. Objectives

1) To study the characteristics of patients with and without bruxism
2) To determine the association between bruxism and its related factors

3. Materials and Methods

The study was performed at the College of Dental Medicine, Rangsit University, and was approved by The Ethics Committee of the Research Institute of Rangsit University. Dental occlusion charts and diagnosis chart

records of patients receiving dental treatment in the College of Dental Medicine Rangsit University during 2017-2021 were collected.

Dental occlusion chart records of 250 patients from the College of Dental Medicine, Rangsit University, were studied. The patients' evaluated data, including age, sex, loss of posterior support, stress, Angle's classification I, II, III, parafunctional habits, occlusal scheme, occlusal interference, sleep disturbance, orofacial trauma, and diagnosis of bruxism, were retrieved.

Dental students recorded the documented diagnosis of bruxism under the supervision of dental clinic supervisors. Bruxism was diagnosed based on the following clinical diagnostic criteria proposed by the American Academy of Sleep Medicine (AASM) (Palinkas et al., 2015). The criteria are as follows: (i) the patient reports or is aware of the sounds of grinding teeth during sleep, confirmed by a roommate, and (ii) and presents at least one of the following adjunctive criteria: (a) observation of abnormal tooth wear; (b) reports masticatory muscle fatigue or pain on waking the morning; (c) masseteric hypertrophy upon digital palpation. Besides, there was no better explanation for the jaw muscle activity given by other current sleep disorders, medical or neurological disorders, medication use, or substance use disorders.

Systematic randomization was applied for the sampling of dental occlusion chart records. From the statistics of the number of patients from the College of Dental Medicine computer database, Rangsit University, 100 patients had received dental occlusion charts examinations and yielded data in 2017. Therefore, approximately 500 dental occlusion charts were recruited between 2017 and 2021. From sample size calculation, 200 samples were needed to be studied (500/200=2.5 charts will be compiled), resulting in 250 dental chart records required to be collected in this study. Finally, 250 dental occlusion charts and diagnosis charts were collected for analysis. The selection of dental occlusion charts was randomly assigned to every two-file interval, with the occlusion charts code ending with __0001, __0003, __0005 ....., respectively.

Inclusion criteria. Dental occlusion charts of patients who received examination and treatment at the College of Dental Medicine, Rangsit University, included patients with bruxism from 2017 to 2021.

Exclusion criteria. The patients were receiving dental occlusion chart examination at the College of Dental Medicine, Rangsit University, which included patients with bruxism patients from 2017 to 2021, but the conditions as the following; occlusion chart disappeared, incomplete charting, had a systemic disease shown to be chronic inflammation in the head neck and shoulders, odontogenic infection and inflammation, had tumors in the head and neck region.

3.1 Data analysis

The data were analyzed using IBM SPSS Statistics for Windows version 22.0 software (IBM Corp., Armonk, NY, USA). A p-value of <0.05 indicates statistical significance. The Kolmogorov-Smirnov test tested the normal distribution of collected data. Descriptive statistics were applied in frequency and percentage of minimum, maximum, and median for the data collected. The difference between groups was analyzed by the Mann-Whitney U test where appropriate. Cross-tabulations, followed by multivariate analysis, evaluated the association between bruxism. Logistic regression analysis was finally entered to search for the association of the collected data controlling for confounding factors according to the research objectives.

4. Results and Discussion

4.1 Results

Two hundred fifty dental patients were studied and classified into patients with bruxism and non-bruxism.

Table 1 Demographic data, sleep condition, and personal habits of dental patients according to bruxism

Variables		Dental patients		
		Bruxism	**Non-bruxism**	***p***
Sex	Male	75 (41%)	23 (34.3%)	0.382
	Female	108 (59%)	44 (65.7%)	
Age (years)		26 (21,43)	23 (20,38)	0.155
Sleep well at night (n=244)	Yes	141 (79.7%)	61 (91%)	0.037
	No	36 (20.3%)	6 (9%)	
Clenching or grinding awareness (n=234)	Yes	153 (90%)	23 (34.3%)	<0.001
	No	17 (10%)	41 (61.2%)	
Open mouth problem (n=242)	Yes	21(11.9%)	18 (27.3%)	0.006
	No	155 (88.1%)	48 (72.7%)	
Jaw / Joint problem (n=244)	Yes	58 (32.8%)	43 (64.2%)	<0.001
	No	119 (67.2%)	24 (35.8%)	

Table 1 shows that sex was not significantly associated with bruxism and non-bruxism patients. Furthermore, these two groups had no significant difference in median age. Sleep conditions were significantly associated with bruxism and non-bruxism patients ($p = 0.037$). Patients who did not sleep well had a 2.6 times higher risk of having bruxism (OR = 2.596, 95%CI = 1.040, 6.481). However, psychological conditions, including tense and depression frequency, were not significantly associated with bruxism and non-bruxism. Clenching or grinding awareness ($p < 0.001$), open mouth problems ($p = 0.006$), and jaw joints problem ($p < 0.001$) had a significant association with bruxism patients and non-bruxism patients. Patients with clenching or grinding awareness had 16.0 times (OR = 16.034, 95%CI = 7.845, 32.809) higher risk of bruxism, while patients with no open mouth problem had 2.8 times (OR = 2.768, 95%CI = 1.364, 5.618) higher risk of bruxism and patients with no jaw or joint problem had 3.7 times (OR = 3.676, 95%CI = 2.038, 6.630) higher risk to have bruxism. Nevertheless, smoking history and alcohol consumption were not significantly associated with bruxism and non-bruxism patients.

Table 2 Jaw movement and oral status of dental patients according to bruxism

Variables		Dental patients		
		Bruxism	**Non-bruxism**	***p***
Pattern of mandibular movement (n=248)	Straight	89 (48.9%)	18 (26.9%)	0.002
	Deviation / Deflection	93 (51.1%)	48 (71.6%)	
Pain during mandibular movement (n = 225)	Presence	8 (4.8%)	19 (32.2%)	<0.001
	Absence	158 (95.2%)	40 (67.8%)	
Midline shift (n=247)	Presence	124 (68.9%)	56 (83.6%)	0.024
	Absence	56 (31.1%)	11 (16.4%)	
Range of mouth opening (mm.)		42 (37,46)	40 (35, 45)	0.023
Tooth wear (n=186)	consistent with age	78 (55.7%)	35 (76.1%)	0.015
	accelerated wear and/or consistent with age	62 (44.3%)	11 (23.9%)	
Interference (n=240)	Presence	15 (8.2%)	12 (19%)	0.035
	Absence	162 (88.5%)	51 (81%)	

Table 2 According to jaw movement of dental patients, it was shown that patterns of mandibular movement ($p = 0.002$) and pain during mandibular movement ($p < 0.001$) had a significant association with

bruxism and non-bruxism patients. Patients with deviation or deflection mandibular movement had a 61% decreased risk of bruxism (OR = 0.392, 95%CI = 0.212,0.725). Patients with no pain during mandibular movement had 9.4 times (OR = 9.381, 95%CI = 3.830, 22.981) higher risk of bruxism. Midline shift (p = 0.024) and interference (p = 0.035) were significantly associated with bruxism and non-bruxism, respectively. Patients with no midline shift had 2.3 times (OR = 2.29, 95%CI = 1.120,4.720) higher risk of having bruxism, and patients with no interference had 2.5 times (OR = 2.541, 95%CI = 1.117, 5.780) higher risk to have bruxism. Dental patients with bruxism had a significantly wider range of mouth opening than non-bruxism patients (p = 0.023). The range of mouth opening in bruxism patients ranged between 23 and 60 millimeters, with a median range of 42 (37, 46 millimeters), while the range of mouth opening in non-bruxism patients ranged between 19 and 52 millimeters, with a median range of 40 (35, 45 millimeters). According to oral status, bruxism patients had a higher likelihood of experiencing tooth wear compared to non-bruxism patients.

Table 3 Bruxism with associated factors

Variables	**Bruxism [OR (95%CI)]**							
	Model 1	***p***	**Model 2**	***p***	**Model3**	***p***	**Model 4**	***p***
General information								
Age	1.1 (0.99,1.03)	0.387	1.01 (0.99,1.030)	0.424	1.01 (0.99,1.04)	0.385	1.01 (0.99,1.03)	0.463
Sex (Female)	1.13 (0.62, 2.06)	0.692	1.13 (0.62,2.06)	0.859	1.11 (0.58,2.11)	0.750	1.11 (0.58,2.13)	0.752
Patient's history								
Sleep problem			2.53 (1.00,6.36)	0.049	2.75 (1.04,7.28)	0.042	2.68 (1.01,7.11)	0.048
Clenching or grinding awareness					**5.42 (2.60,11.32)**	**<0.001**	**5.04 (2.39,10.66)**	**<0.001**
Mandibular movement problem							**2.28 (1.17,4.43)**	**0.016**

Table 3 When all bruxism-related factors were entered into multivariate analysis, a history of sleep disturbance was a marginally significant association (p = 0.048). Without the influence of age, sex, or other covariates, a history of clenching or grinding awareness (p < 0.001) was strongly associated with bruxism, besides a history of mandibular movement problems (p = 0.016) respectively. Without the influence of age, sex, or other covariates, patients with a history of sleep problems had 2.7 times (OR = 2.68, 95%CI = 1.01, 7.11 p = 0.048) higher risk of having bruxism. In contrast, patients who have a history of clenching or grinding awareness had 5.0 times (OR = 5.04, 95%CI = 2.39,10.66; p <0.001) higher risk of having bruxism and patients who have a history of mandibular movement problem had 2.3 times (OR = 2.28, 95%CI = 1.17,4.43; p = 0.016) higher risk to have bruxism than the other patients.

4.2 Discussion

The current study aimed to demonstrate the characteristics of bruxism in dental patients visiting for treatment at the College of Dental Medicine, Rangsit University Clinic. The prevalence of patients with bruxism in this study is higher than in the other study in the Thai population (Uma et al., 2021), possibly due to this study focused on the patients with dental occlusion charts who received examination. Khoury et al.'s studies reported

that the prevalence of sleep bruxism was noted in women aged 45-54 years and tended to decrease with age. In contrast, our study found that bruxism did not significantly occur in females more than in males. In addition, our study found that the average number of patients with sleep bruxism occurs in the middle of age, around 20-39 years old. As in our study, we found significant sleep well at night between bruxism and non-bruxism patients. However, according to Serra Negra et al., sleep disturbances such as sound and light stimuli and decreased sleep time (≤ 8 h) were found to have a strong association with bruxism (Bulanda et al., 2021). The present study also demonstrated that dental patients with clenching or grinding awareness were significantly associated with bruxism. This study agreed with the studies by Machado et al., which found that bruxism, including grinding and clenching, causes attrition (Machado et al., 2014). In the present study, Angle's classification was not associated with bruxism. This study agreed with other studies by Ribeiro-Lages et al., which found no association between Angle's classification I, II, and III malocclusion and bruxism (Ribeiro-Lages et al., 2020). Moreover, according to psychological conditions, we found that tense and depressed frequencies were not significantly associated with bruxism and non-bruxism patients. This finding was in contrast to Chemelo et al., study, which reported that bruxism functions as a kind of perpetual motion machine, as intensifying symptoms resulting from an organism's abnormal functioning, increase a feeling of being stressed, and in consequence, lead to an increased muscle tone and teeth grinding (Chemelo et al., 2020). The limitation of our study is that the data was obtained from patient's occlusion chart records, which may not fully capture all relevant factors associated with bruxism. For example, patients may not have reported all their symptoms or behaviors related to bruxism, leading to potential underestimation of the prevalence of bruxism. Moreover, not all dental charts have proper forms to collect information; different forms may have different collection methods. Our cross-sectional study can affect some data that cannot be collected or does not exist in the dental occlusion charts. These study's limitations included some relationships that could not find cause and effect. We did not investigate potential underlying causes of bruxism, such as stress or anxiety, which could have been useful in further understanding the characteristics of patients with bruxism. For example, we could not find out that bruxism induced stress or stress-induced bruxism. Further research is needed to confirm these findings and investigate potential underlying causes of bruxism.

5. Conclusion

This research has revealed the characteristics of bruxism. Clenching and grinding awareness and mandibular movement patterns were related to bruxism. This study's methodology can serve as a model for future studies in the field of dental medicine, specifically, those focusing on patient characteristics and patterns of mandibular movement. Moreover, it can inform clinical practice, helping dental practitioners identify patients with a higher risk of bruxism and providing appropriate treatments to manage the condition.

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