LETTER TO THE EDITOR

Bruxism, perceived anxiety and stress in university students

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To the Editor,

Bruxism is defined as a repetitive jaw-muscle activity characterized by clenching or grinding of the teeth and/or by bracing or thrusting of the mandible (1). In particular, two distinct circadian manifestations of bruxism can be identified: Awake Bruxism (AB), a repetitive or sustained tooth contact and/or by bracing or thrusting of the mandible; Sleep Bruxism (SB), a rhythmic (phasic) or a non-rhythmic (tonic) masticatory muscle activity (1). These two different types of bruxism may overlap (2). Several classification schemes have been proposed for bruxism based on different criteria, the most accepted being: i) Possible, based on a positive self-report only; ii) Probable, based on a positive clinical inspection, with or without a positive self-report; iii) Definite, based on a positive instrumental assessment, with or without a positive self-report and/or a positive clinical inspection (1). A large variety of cases is present in the literature regarding the prevalence of bruxism, between 6–91% (2). Although widely distributed among the population and extensively investigated, bruxism remains an enigmatic condition requiring further scientific evaluation (3). It is considered a multifactorial disorder and its etiology is not well defined. Bruxism is much more than just tooth wearing as it is currently linked to orofacial pain, headaches, sleep disorders, sleep breathing disorders, behavior disorders, or those associated with the use of medications (4). While morphological and pathophysiological factors are thought to be related to bruxism, the importance of psychosocial factors, such as anxiety and stress, in its etiology is becoming clearer, particularly in the case of awake bruxism (5). University students may experience an important amount of stress and anxiety, resulting in negative outcomes (6) in terms of academic performance and personal, emotional or health consequences. One of the main manifestations of these situations is bruxism or grinding teeth occurring without a functional purpose (7). The aim of the current study was to verify the correlation between possible bruxism and perceived anxiety and stress in university students by using questionnaires.

MATERIALS AND METHODS

The study project was approved by the Ethics Committee of the University of Rome "Tor Vergata" (protocol n.139/2019), and informed consent was obtained from all subjects. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. The sample included pre- and post-graduate Italian students enrolled in the Department of Orthodontics

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of the University of Rome "Tor Vergata" from January to December, 2019. Participation was on a voluntary basis and all participants signed an informed consent before the study onset. The inclusion criteria considered for the study were: age over 18 years, sufficient cognitive and mental capacity to fill out a questionnaire and willingness to participate in the study. The exclusion criteria were: severe systemic diseases, secondary bruxism induced by systemic diseases and/or drugs, use of medicines that could significantly affect the function of the nervous and muscular systems, severe mental illness or significant mental disorders.

From an initial group of 567 subjects, 65 were excluded according to the exclusion criteria or for incomplete records. The final sample was composed of 502 students (304 females, 198 males, mean age of 26.5±8.4 years).

Data collection

Each member of the sample submitted three questionnaires in order to verify the incidence of sleep or awake bruxism and the possible association with sleep and psychological factors such as anxiety and stress. All three surveys were prepared by Google Drive application, so the subjects were able to fill in the forms comfortably on smartphone, tablet or PC, without being conditioned by the presence of an operator, and the results were directly accessible on the Google Sheets app.

Oral Behaviors Checklist (OBC)

The first completed questionnaire was the Oral Behaviors Checklist (OBC), a 21-item self-reporting survey to quantify the frequency of observable and non-observable oral behaviors (e.g. grinding, clenching, biting, chewing) (8). Five response options (scored 0-4) based on the last 30 days (https://buffalo. app.box.com/s/2czrz7hjl0jynpgcfiqjvxj40wo1b1u3) were prepared. The five response options are: none of the time =0, <1 time/month =1, 1-3 times/month =2, 1-3 times/week =3 and 4-7 times/week =4. The OBC includes 2 items regarding sleep bruxism and 19 items investigating the frequency of different wake-time oral behaviors. A total score of 0 suggests no reported parafunctions, scores ranging from 1 to 24

and from 25 to 84 denote low and high parafunctions respectively, as indicated by the scoring manual for self-Report Instruments of Diagnostic Criteria for Temporomandibular Disorders (DC/TMD) (8).

Symptom Checklist 90 questionnaire (SCL-90)

Perceived anxiety and anxiety symptoms were assessed and reduced to 10 specific items from the version of the Symptom Checklist 90 questionnaire (SCL-90, Derogatis 1975). SCL-90 is a self-report measure for persons aged at least 13 years. The SCL items assess psychopathological or somatic disturbances on a 4-point scale ranging from 0 (absence of the symptom) to 4 (maximum disturbance). The General Severity Index (GSI) is the average score for all responded items and serves as an overall measure of psychiatric distress. GSI considered interest scores equal to or greater than 1. Lower scores indicate a low level of anxiety while higher scores a high level of anxiety.

Perceived Stress Scale (PSS)

Stress, a conditions where an environmental demand exceeds the natural regulatory capacity of an organism in particular situations that include unpredictability and uncontrollability (9), was determined and reduced to a four-item version of Perceived Stress Scale (PSS, Cohen 1988). In this study, the 4-item PSS version was used, each item was scored on a 5-point scale: never (0), almost never (1), sometimes (2), fairly often (3), very often (4). In the 4-item PSS, two items are negative (e.g., "in the last month, how often have you felt that you were unable to control the important things in your life?"; "in the last month, how often have you felt difficulties were piling up so high that you could not overcome them?"; Cohen et al., 1983; Cohen & Williamson, 1988) and two items are positive (e.g., "in the last month, how often have you felt confident about your ability to handle your personal problems?"; "how often have you felt that things were going your way?"). In scoring the stress measure, positive items are reversed scored, and then all items are summed (scores ranging from 0 to 16 for the 4-item scale, and from 0 to 40 for the 10-item scale). Higher scores indicate greater stress.

Statistical analysis

All statistical analyses were performed using SPSS statistical software (Statistical Package for Social Sciences, version 23.0, SPSS Inc., Chicago, USA). Descriptive statistics were used to describe the studied sample. Correlation analysis between sleep behaviors and psychological factors such as anxiety and stress were performed using Pearson correlation coefficient. *t*-test for unpaired data was applied for assessing the comparison of the quantitative variables. All reported p-values are two-sided and a value of p<0.05 was considered statistically significant.

RESULTS

The sample was composed of 502 subjects (198 females, 304 males) between 18 and 34 years of age with a mean age of 26.5±8.4 years. The answers to the OBC questionnaire were used to classify the participants of the study into three groups: No parafunctions (n=4, 0.8%), Low level of parafunctions (n=158, 31.5%) and High level of parafunctions (n=340, 6.7%). Perceived anxiety and anxiety symptoms were perceived in 29.1% of the sample while not in the other 70.9%. Stress was recorded in mean of 7.4±2.6 (Table I).

Table II shows the relationship among high levels of parafunction, perceived anxiety and stress. Specifically, a significative correlation was highlighted between high level of parafunction and stress (p=0.02) and between perceived anxiety and stress (p=0.02).

Table I. *Descriptive analysis of the study group*

Study Group n = 502 (198 M, 304 F)			
	Min	**Max**	**Mean (SD)**
Age	18.1	34.9	26.5±8.4
OBC	0	67	31.4±12.7
SCL-90	0	38	8.3±7.4
PSS	2	15	7.4±2.6

Table II. *OBC, SCL-90 and PSS correlation*

	OBC	**SCL-90**	**PSS**
OBC	1	0.35	0.02*
SCL-90	0.35	1	0.02*
PSS	0.02*	0.02*	1

Level of significance p<0.05

DISCUSSION

The purpose of the present investigation was to verify a correlation between possible bruxism and perceived anxiety and stress in university students by using questionnaires. Literature on bruxism etiology and regarding the role of psychosocial factors in the multifactorial bruxism generator pattern has not been conclusive due to the lack of homogeneity in the diagnostic criteria adopted in most studies (10). There is emerging evidence showing that both sleep and awake bruxism often mirror psychological conditions in individuals with certain personality features (i.e. trait anxiety, stress sensitivity, avoidance pattern) (11). The duration of sleep-time MMA is associated with trait anxiety and less with state anxiety or with other psychological symptoms (8). In other words, personality features seem to be more important than acute episodes of anxiety in the aetiology of sleep-time MMA and to explain muscle activity (emotional overload) (11).

The correlation between stress and bruxism is reported in the current literature (8) and, more specifically in university students, stress can lead to neuromuscular alterations in the mouth and jaw, increasing the overall prevalence of temporomandibular disorders (12). Psychosocial factors such as anxiety and stress are as important as somatic causes in the onset and maintenance of bruxism (5). The present study emphasized that subjects with a high score in the OBC-it had a high or medium level of stress. Regarding perceived anxiety, no correlation with bruxism was found, however, further studies are needed to confirm our finding in a larger cohort with more varied psychosocial determinants.

The limitation of the study is a subjective evaluation of the disorders that should be investigated in depth and objectified by diagnostic tests. In fact, the current study is based on possible sleep bruxism since risk of bruxism and psychological factors were subjectively determined using a questionnaire.

In conclusion, associations between oral parafunctional behaviours and perceived stress have been observed in the investigations. These associations show that the analysis of psycho-social-economic factors is essential to better appraise the impact of these conditions on the quality of life.

REFERENCES

1. Lobbezoo F, Ahlberg J, Raphael KG, et al. International consensus on the assessment of bruxism: Report of a work in progress. J Oral Rehabil 2018; 45(11):837-44.

2. Lobbezoo F, Ahlberg J, Manfredini D, Winocur E. Are bruxism and the bite causally related? J. Oral Rehabil 2012; 39:489-501.

3. Laganà G, Osmanagiq V, Malara A, Venza N, Cozza P. Sleep bruxism and SDB in Albanian growing subjects: a cross-sectional study. Dent J (Basel) 2021; 9(3):25.

4. Firmani M, Reyes M, Becerra N, Flores G, Weitzman M, Espinosa P. Bruxismo de sueño en niños y adolescentes [Sleep bruxism in children and adolescents]. Rev Chil Pediatr 2015; 86(5):373-9.

5. Przystańska A, Jasielska A, Ziarko M, et al. Psychosocial predictors of bruxism. Biomed Res Int 2019; 2019:2069716.

6. Marshall LL, Allison A, Nykamp D, Lankea S. Perceived stress and qual- ity of life among doctor of pharmacy students. Am J Pharm Educ 2008; 72(6):137-45.

7. Cavallo P, Carpinelli L, Savarese G. Perceived stress and bruxism in university students. BMC Res Notes 2016; 9(1):514.

8. Donnarumma V, Cioffi I, Michelotti A, Cimino R, Vollaro S, Amato M. Analysis of the reliability of the Italian version of the Oral Behaviours Checklist and the relationship between oral behaviours and trait anxiety in healthy individuals. J Oral Rehabil 2018; 45(4):317-22.

9. Koolhaas JM, Bartolomucci A, Buwalda B, et al. Stress revisited: a critical evaluation of the stress concept. Neurosci Biobehav Rev 2011; 35(5):1291-301.

10. Manfredini D, Fabbri A, Peretta R, Guarda-Nardini L, Lobbezoo F.Influence of psychological symptoms on home-recorded sleep- time masticatory muscle activity in healthy subjects. J Oral Rehabil 2011; 38:902-11.

11. Manfredini D, De Laat A. Why not stop looking at bruxism as a black/white condition? Aetiology could be unrelated to clinical consequences. J Oral Rehabil 2016; 43(10):799-801.

12. Akhter R, Morita M, Esaki M, Nakamura K, Kanehira T. Development of temporomandibular disorder symptoms: a 3-year cohort study of university students. J Oral Rehabil 2011; 38(6):395403.