

Incidence of Sleep Disturbances, Stress and Possible Bruxism Presence among Dental Students *

Incidencia de alteraciones del sueño, estrés y presencia de bruxismo posible en estudiantes de odontología

Incidência de distúrbios do sono, estresse e presença de possível bruxismo em estudantes de odontologia

Claudia Bazán Puig^a
Universitat Internacional de Catalunya, Barcelona, España
od119709@uic.es
<https://orcid.org/0009-0006-9177-5785>

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Jordi Tomàs Aliberas
Universitat Internacional de Catalunya, Barcelona, España
jtomas@uic.es
<https://orcid.org/0000-0002-5054-2719>

Óscar Figueras Álvarez
Universitat Internacional de Catalunya, Barcelona, España
ofigueras@uic.es
<https://orcid.org/0000-0002-8210-4844>

Natalia Felipe Spada
Universitat Internacional de Catalunya, Barcelona, España
nfelipe@uic.es
<https://orcid.org/0000-0002-7283-1386>

Authors' Note: ^a **Correspondence:** od119709@uic.es; jtomas@uic.es; ofigueras@uic.es; nfelipe@uic.es

ABSTRACT

Background: One of the most prevalent conditions in the population is bruxism, which is defined as the repetitive activity of the jaw muscles that involves clenching, grinding of the teeth, and jaw thrusting. There is no scientific evidence about the stress levels that dental students are subjected to and its relationship with waking and sleeping bruxism and its poor quality.

Objective: To determine the relationship between the presence of waking or sleeping bruxism with the level of sleep quality and stress in students in the 3rd and 5th year of Dentistry and to analyze whether there are significant differences according to gender and between courses. **Methods:** An observational study was carried out based on data collection through surveys and a descriptive design. 125 students participated in the study by completing three questionnaires. These three variables to be studied were evaluated using the Pittsburgh Sleep Quality Index, Perceived Stress Scale and Self-reported Bruxism Questionnaire. **Results:** 3rd and 5th year undergraduate dental students presented a high prevalence of sleep disorders and a low prevalence of waking and sleeping bruxism. Statistically significant differences were found at the gender level and between courses. **Conclusions:** It is established that poor sleep quality and high levels of stress can have a negative impact on student concentration and performance as well as being part of the initiation and development of parafunctional habits.

Keywords: dental student; dentistry; possible bruxism; questionnaires; sleep bruxism; stomatognathic diseases; stress

RESUMEN

Antecedentes: Una de las condiciones más prevalentes en la población es el bruxismo que se define como la actividad repetitiva de los músculos mandibulares que conllevan apretamiento, rechinar de los dientes y empuje mandibular. No existe evidencia científica acerca de los niveles de estrés que se ven sometidos los estudiantes de odontología y su relación con el bruxismo de vigilia y sueño y la mala calidad de este. **Objetivo:** Determinar la relación entre la presencia de bruxismo de vigilia o de sueño con el nivel de calidad del sueño y el estrés en alumnos de 3º y 5º curso de Odontología y, analizar si existen diferencias significativas según género y entre cursos. **Métodos:** Se realizó un estudio observacional basado en la recogida de datos mediante encuestas y de diseño descriptivo. 125 alumnos participaron en el estudio mediante la cumplimentación de tres cuestionarios. Estas tres variables para estudiar se evaluaron mediante el Índice de Calidad de Sueño de Pittsburgh, Escala de Estrés Percibido y Cuestionario de Bruxismo Autoinformado. **Resultados:** Los estudiantes de grado en odontología de 3º y 5º curso presentaron una alta prevalencia de trastornos del sueño y una baja prevalencia de bruxismo de vigilia y sueño. Se encontraron diferencias estadísticamente significativas a nivel de género y entre cursos. **Conclusiones:** Se establece que una mala calidad del sueño y altos niveles de estrés pueden tener un impacto negativo en la concentración y el rendimiento estudiantil, así como formar parte en el inicio y desarrollo de hábitos parafuncionales.

Palabras clave: bruxismo posible; bruxismo del sueño; cuestionarios; enfermedades estomatognáticas; estrés; estudiante de odontología; odontología

RESUMO

Antecedentes: Uma das condições mais prevalentes na população é o bruxismo, que é definido como a atividade repetitiva dos músculos da mandíbula que envolve cerrar, ranger os dentes e empurrar a mandíbula. Não há evidências científicas sobre os níveis de estresse a que os estudantes de odontologia estão submetidos e sua relação com o bruxismo de vigília e sono e sua má qualidade. **Objetivo:** Determinar a relação entre a presença de bruxismo em vigília ou durante o sono com o nível de qualidade do sono e estresse em estudantes do 3º e 5º ano de Odontologia e analisar se existem diferenças significativas segundo gênero e entre cursos. **Métodos:** Foi realizado um estudo observacional baseado na coleta de dados por meio de inquéritos e desenho descritivo. 125 estudantes participaram do estudo preenchendo três questionários. Essas três variáveis a serem estudadas foram avaliadas por meio do Índice de Qualidade do Sono de Pittsburgh, Escala de Estresse Percibido e Questionário de Bruxismo Autorreferido. **Resultados:** Estudantes do 3º e 5º ano do curso de Odontologia apresentaram alta prevalência de distúrbios do sono e baixa prevalência de bruxismo de vigília e sono. Foram encontradas diferenças estatisticamente significativas ao nível do gênero e entre cursos. **Conclusões:** Está estabelecido que a má qualidade do sono e os elevados níveis de estresse podem ter um impacto negativo na concentração e no desempenho dos alunos, além de fazerem parte da iniciação e desenvolvimento de hábitos parafuncionais.

Palavras-chave: bruxismo do sono; doenças estomatognáticas; estresse; estudante de odontologia; odontologia; possível bruxismo; questionários

INTRODUCTION

According to the World Health Organization (WHO), health is defined as “a state of complete physical, mental and social well-being.” When a causal agent affects one or more of the three aforementioned spheres, a decompensation arises that can lead to an adaptation of the individual and over time manifest symptoms and/or signs, thus generating dysfunction (1,2). In the oral field, one of the most prevalent entities or conditions in the population is bruxism, which is defined as the repetitive activity of the mandibular muscles that involves clenching and/or grinding of the teeth or thrusting of the jaw (bracing). There are two types of bruxism: sleeping and waking, with waking bruxism being more prevalent in all age ranges studied (3,4). Stress and the release of cortisol play a crucial role in inducing bruxism during wakefulness and even during sleep and can be initiated by psychosocial issues since they activate the dopaminergic system (5).

The etiology of bruxism is multifactorial such as circadian, psychosocial, genetic aspects and even certain neurotransmitters can induce, perpetuate or aggravate the pathology (5-7). There are also external factors such as diet and lifestyle that can influence bruxism, such as caffeine intake, nicotine and alcohol consumption, and also certain drugs or medications (7). The literature has shown that bruxism is usually more common in women than in men, especially between 20 and 40 years of age (1,5,8).

The link established between bruxism and stress has been widely described and, in turn, associated with poor quality of sleep (7), which can cause irregular sleep patterns. It is considered that a sleep duration between 4-5 hours negatively affects the neuronal and psychological behavior of human beings (3). Hence, good quality sleep not only significantly improves quality of life, but also reduces the probability of suffering from cognitive, cardiovascular, neuroendocrine and/or emotional problems (9-12).

Dentistry has long been associated with occupational stress and is considered one of the most stressful healthcare professions. This stress can occur prematurely in the student process during the dental degree and/or during the transition from academic life to work life (13-18). There is no scientific evidence in the literature about the stress levels that dental students are subjected to and its relationship with waking and sleeping bruxism and its poor quality. Hence, it was decided to combine all the variables and determine the relationship between them through a study based on surveys and questionnaires.

The main objective was to determine the relationship between the presence of waking or sleeping bruxism with the level of sleep quality and stress in students in the 3rd and 5th year of Dentistry and, secondarily, to analyze whether there are significant differences according to gender and between courses (3rd and 5th).

MATERIALS AND METHODS

An observational study was carried out based on data collection through surveys and a descriptive design. The study was approved by the ethics committee of the International University of Catalonia's Dental School. To carry out the study, an approximate participation of 250 people was calculated to obtain statistically significant differences and a minimum of 122 subjects were required. The questionnaires were sent through the Google Forms platform and the data obtained was collected anonymously. Inclusion criteria were established for all students who were enrolled in the 3rd and 5th Degree of Dentistry and who voluntarily agreed to participate in the study. The exclusion criteria were only based on all poorly completed surveys or all individuals who did not give their consent to participate in the study.

The three questionnaires to complete to study the three variables of interest and subsequently relate them were PSQI (Pittsburgh Sleep Quality Index), PSS-14 (Perceived Stress Scale) (and CBA (Self-reported Bruxism Questionnaire) (appendixes 1-3). The 3 questionnaires used are considered the gold standards in the analysis of sleep quality, stress levels and possible diagnosis of bruxism (self-reported). The standard measurement values for the PSQI were taken, a total score greater than 5 was determined as good sleep quality and, finally, poor sleep quality was determined as less than or equal to 5. On the PSS-14 questionnaire, three score ranges were established: values between 0-18; a low level of stress was considered, score 19-37 as a moderate level of stress; and finally values 38-56 as a high stress level.

For the analysis of possible or self-reported bruxism, the following cut-off points were determined: score values between 0-18 were considered unlikely symptoms of bruxism; 19-24 as probable symptoms of bruxism; and 25 or more as definitive symptoms of bruxism.

After obtaining all the data, the statistical analysis was performed with the JAMOVI statistical software, version 2.2.5 and SPSS version 26 for Windows. The sample was considered non-normal thanks to the Shapiro-Wilk p-value. In addition, chi-square tests, contingency tables and descriptive statistics were developed, determining as a significant result all those in which p-value ≤ 0.05 .

RESULTS

After data collection, a final sample size of 125 individuals was obtained with a total of 34 men (27.2 %) and 91 women (72.8 %), with a mean age obtained of 23.2 years (± 3.82). In total, 50 3rd year

Dentistry students registered (40 %) and 75 5th year Dentistry students (60 %). Obtaining a sample greater than the initial sample calculation established as 122.

To establish the prevalence of bruxism, the values were recoded; a value of 0 was established as unlikely bruxism; A value of 1 was determined if the patient presented any possible symptoms of bruxism; and any symptom that indicated definitive bruxism was set as value 2 (Table 1).

TABLE 1
Prevalence of bruxism according to gender, academic year and self-report.

Possible bruxism	Male	Female	3rd Course	5th Course	Total	Percentage
0	30	74	43	61	104	83,2
1	2	8	3	7	10	8,0
2	2	9	4	7	11	8,8

It was observed that a large part of the population did not self-report episodes of sleep-wake bruxism. If the different conditions of sleep bruxism are analyzed, emphasis must be placed on how the patient reports their quality of sleep. After analysis, it was shown that both genders had poor sleep quality. It was established that the male sex had worse sleep quality (70.6 %) compared to the female sex (62.6 %). The same happened in the evaluation according to the academic years.

A value of 0 was determined as any individual who reported good sleep quality, and a value of 1 as any individual who reported poor sleep quality (Table 2).

TABLE 2
Evaluation of sleep quality according to gender and grade, value 0 as good sleep quality and value 1 as poor sleep quality

PSQI	Male	Female	3rd Course	5th Course
0	10	34	19	25
1	24	57	31	50

After obtaining the results of the perceived stress scale (annexes) questionnaires, it was determined that 16.5 % of the sample showed low levels of stress; 70.1 % reported moderate levels and 13.4 % evidenced high stress with a predominance of moderate stress in the total sample. Analyzed by gender and grade, a greater prevalence of moderate stress was observed in both categories (table 3).

TABLE 3
Prevalence of perceived stress according to gender, academic year and self-report

Perceived stress	Male	Female	3rd Course	5th Course	Total	Percentage
0	6	13	8	11	19	16,5
1	22	67	35	54	89	70,1
2	6	11	7	10	17	13,4

It should be remembered that high levels of stress, whether episodic or chronic, have a direct link with the appearance of waking and sleeping bruxism, due to high levels of cortisol and serotonin.

It was decided to evaluate the two variables that were presented as initial questions, the relationship between gender and course based on the 3 factors described. After performing the statistical analysis between variables, the Spearman correlation statistical test was used and it was determined that there is a weak but significant correlation between bruxism and sleep (p-value 0.036), in the same way as between bruxism and stress (p-value 0.011). However, between stress and sleep the correlation turned out to be stronger, with the presence of statistically significant differences (p-value < 0.001) (table 4).

TABLE 4

Spearman correlation between bruxism, sleep and stress for the entire sample and separated by sex and academic year.

	Bruxism vs Sleep	Bruxism vs Stress	Stress vs Sleep
Total	0.188 (0.036)	0.226 (0.011)	0.583 (< 0.001)
Male	0.354 (0.040)	0.309 (0.075)	0.467 (0.005)
Female	0.147 (0.165)	0.213 (0.043)	0.619 (< 0.001)
3rd Course	0.255 (0.133)	0.130 (0.449)	0.552 (< 0.001)
5th Course	0.205 (0.078)	0.233 (0.044)	0.620 (< 0.001)

The working hypotheses that were formulated were rejected, which related to the existence of a high prevalence of sleep disorders and bruxism in Dentistry Degree students. But the one that established a strong relationship between the presence of bruxism and stress was accepted.

The working hypothesis was accepted, which defined that there were no differences between gender and academic year.

DISCUSSION

The results obtained show a prevalence of 16.8 %, not differentiating between wakefulness and sleep. At the same time, it is described that 63.8 % of the population had poor sleep quality. According to the literature, studies such as Phuong *et al*, describe a prevalence of bruxism of 51.2 %, with 38.2 % for sleep bruxism and 23.4 % for waking bruxism (2). However, other studies differ from these results, which showed 21.5 % (19), 25.2 % prevalence for sleep bruxism and 36.5 % (19), 37.9 % (9) for sleep bruxism. vigil (9). A systematic review carried out on adult subjects described a prevalence of between 8 and 31 % for bruxism (2), so the present investigation agrees with these data, being 16.8 % and thus forming part of the mentioned range.

Other studies show a high prevalence of bruxism 31.6 % (6), 36.5 % (19), 37.9 % (17), 31.7 % (6) and 26 %, where it was also highly related with the presence of temporomandibular disorders (8,20).

A significant association was also found between bruxism and sleep, where it is observed that bruxism can have an impact on the quality of life and quality of sleep (17,21), as well as on oral health and hygiene habits (2,22).

According to the evidence consulted with similar populations, in one study it was shown that 23.7 % of individuals presented waking bruxism: 32.8 % women and 39 % men (18). Despite showing divergences between the bibliographic data reviewed, numerous studies reported that it is usually more frequent in women than in men (9).

According to the results obtained, it is concluded that there is a relationship between the presence of bruxism with the quality of sleep and stress. Due to the presence of high levels of cortisol, serotonin and dopamine are highly linked to stress. High levels of cortisol prevent there from being an increase in melatonin, an essential hormone in inducing and falling asleep. Hence, interruptions during sleep, due to stress, are linked to the presence of bruxism and orofacial pain.

Inadequate sleep increases the risk of accidents and illnesses, so missing hours of sleep causes daytime sleepiness, poor psychomotor and neurocognitive performance that would translate into academic fatigue and increased stress (19,21). 14.9 % of the total reported having nightmares often or almost every night (21), so sleep bruxism, which occurs in the REM phase, can be associated with the

moment in which nightmares occur (9,21). Although in the present study it was not decided to assess the nightmare factor or the use of sleep-inducing drugs.

It should be noted that despite not analyzing screen time and use in the population, an influential factor in sleep quality, the total prevalence of poor sleep quality (63.8 %) is close to similar data. 60.1 % of individuals evaluated in a cross-sectional study carried out in Brazil had poor sleep quality (23). The literature again confirmed that students have an inadequate index of sleep quality (24).

The individuals who reported that it took more than half an hour to fall asleep was 20.8% of the total sample, unlike the study by Shokry *et al*, where 51.7 % of individuals reported that it took 60 minutes or more to fall asleep (21), and 8.2 % in another study representing those who took more than 30 minutes to fall asleep (19).

In the present sample, 2.4 % consumed sleeping pills once or twice a week and 4.8 % three or more times a week. At the same time, in the study by Shokry *et al*, they reported on 1.2 % of individuals who take them almost every night (21), in the study carried out by Serra-Negra *et al*, 5.5 % (19) and in another. In the study carried out, 8.7 % were individuals who took them one or more times a week (23), so in comparison there is a high incidence in UIC dentistry students who take pills to fall asleep.

Another similarity found was in an article on the quality of sleep in dental students and its association with academic performance where 35 % of the sample reported having poor or very poor quality of sleep, as approximately happens in research with 30.6 % (25).

On the other hand, the average number of hours slept in this study was 6.41 hours (with a range of 3-9 hours), data similar to some of the literature consulted where 6.8 hours were reported (with a range of 3-11 hours). 5.85 hours, 6.7 hours and 6.9 hours (with a range of 3-9 hours).

Students' homework and associated stress levels can influence the number of hours slept per night (19,23,25). Likewise, the World Health Organization recommends sleeping at least 8 hours per night as the ideal number for good quality sleep in young adults, so in the present project and in the reviewed literature it is well below the recommendation (9).

Only 28 people (22.4 %) have not had any difficulty carrying out activities such as driving, eating or carrying out any other activity while drowsy. 32 % of the sample indicated that they did have difficulties one to two times a week, 30.4 % less than once a week and 16 % three or more times. That is, a total of 78.4 % of the sample presented some difficulties, no matter how minimal. This is contrasted with the percentage of daytime dysfunction in other studies, such as the one reported at 79.2 % (19).

On the other hand, the strongest relationship of the three variables in this study was obtained between stress and sleep. That is, the more stress, the worse the quality of sleep, regardless of grade and gender.

Unlike women, men presented a significant association between bruxism and sleep. On the contrary, women had a significant association between bruxism and stress. The latter happens the other way around in the study by Cavallo *et al*, where it was found that the significant association was between bruxism and stress in males.

However, in this study, variables such as gastroesophageal reflux or the presence of OSA (Obstructive Sleep Apnea) were not considered, factors that would be closely linked to episodes of sleep bruxism (27).

It is not surprising that the emotional factor has more strength in the female sector, where not only is this reflected in different studies, but it could be said in a solid way that the correlation that exists between bruxism and stress is real (27- 29).

The correlations studied showed that women suffer more stress than men and that the correlation between stress and sleep is greater.

Women are more likely to express their negative experiences more openly and thus more easily seek psychological help to cope with problems than men, making them more likely to use mental health services more (22,30).

In addition to this, it can be concluded that there are significant differences between the male and female sex.

A greater number of people suffering from stress was observed in 5th grade than in 3rd grade. In other studies that also compare the academic year, it was found that individuals in the last year reported more stress (15,28). The differences could be due to the fact that clinical practices begin in the 3rd year, so the nerves of facing situations at the level of treatments, such as patient treatment, are increased and in the 5th year it gives rise to the uncertainty of tomorrow and the new entrance. to the world of work.

Stress can be helpful in motivating individuals to respond to life changes, meet challenges, and complete tasks, but excess stress can ruin physical and psychological health (15,31).

The relationship that exists between psychosocial factors and chronic pain is bidirectional (8).

Some of the greatest sources of stress for students are exams, the objectives to meet and learn in clinical practice, the presence of supervisors or professors, and social interactions both with them and with patients (18).

In the study conducted by Drachev *et al*, the majority of dental and medical students reported moderate perceived stress and it turned out to be higher in women than in men, as in the present study (22). Unlike other investigations, stress levels turned out to be high for the majority (30).

We live in a world where screens predominate and it is difficult to do without them, especially in the academic and work environment, but they also perpetuate unhealthy postural habits.

Most students spend most of their time in front of their mobile phones and, over time, the prevalence of screen addiction is increasing (31). Furthermore, the relationship between excessive mobile phone use and the presence of bruxism was demonstrated (32).

That is why more stress management strategies should be adopted and the recommendations for a full life made more visible where the main driving force is to prioritize the internalization and solidification of healthy behaviors.

However, more studies are needed to investigate other factors that may influence sleep, stress and bruxism, such as personality type, cultural context, social support and resources, spiritual and religious beliefs.

One of the main limitations of the study is that it was not possible to perform a physical examination and have an evaluation of probable bruxism. A larger sample size could not be obtained due to the low involvement of the students. The strengths of the study are based on the novelty of the study, on combining three essential variables in the development of orofacial pain and the appearance of parafunctions.

CONCLUSIONS

3rd and 5th year undergraduate dental students had a high prevalence of sleep disorders and a low prevalence of waking and sleeping bruxism. It has been shown that there is a strong relationship between the presence of bruxism with poor sleep quality and a high stress index and statistically significant differences were also determined at the gender level and between courses.

According to the results of this analysis, the female sex and the 3rd grade are those with the best sleep quality. Regarding stress, women presented more stress than men and in 5th grade compared to 3rd grade, as well as a greater tendency to suffer from bruxism among 5th grade students.

It is established that poor sleep quality and high levels of stress can have a negative impact on concentration and student performance as well as play a part in the initiation and development of parafunctional habits.

The role that the dentist plays in detecting parafunctional habits to prevent their consequences is of vital importance.

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Appendices

Appendix 1 Perceived Stress Scale

	Never	Almost never	Sometim es	Often	Very Often
1. In the last month, how often have you been affected by something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous or stressed?	0	1	2	3	4
4. In the past month, how often have you successfully handled life's small irritating problems?	0	1	2	3	4
5. In the last month, how often have you felt that you have effectively coped with the important changes that have been occurring in your life?	0	1	2	3	4
6. In the last month, how often have you been confident about your ability to handle your personal problems?	0	1	2	3	4
7. In the last month, how often have you felt that things are going well for you?	0	1	2	3	4
8. In the last month, how often have you felt like you couldn't handle all the things you had to do?	0	1	2	3	4
9. In the last month, how often have you been able to control the difficulties in your life?	0	1	2	3	4
10. In the last month, how often have you felt like you had everything under control?	0	1	2	3	4
11. In the last month, how often have you been angry because things that happened to you were out of your control?	0	1	2	3	4
12. In the last month, how often have you thought about the things you still have to do?	0	1	2	3	4
13. In the last month, how often have you been able to control how you spend your time?	0	1	2	3	4
14. In the last month, how often have you felt that difficulties are piling up so much that you cannot overcome them?	0	1	2	3	4

Appendix 2 Pittsburgh Sleep Quality Index

During the last month, what has your bedtime usually been?

1. How long did it take you to fall asleep, normally, on the nights of the last month?

Less than 15 min Between 16-30 min Between 31-60 min More than 60 min

2. During the last month, what time have you usually gotten up in the morning?

3. How many hours do you estimate you have slept each night during the last month?

4. During the last month, how many times have you had problems sleeping because of:

a. Not being able to fall asleep in the first half hour:

Not once in the last month Less than once a week
Once or twice a week Three or more times a week

b. Waking up during the night or in the early morning:

Not once in the last month Less than once a week
Once or twice a week Three or more times a week

c. Having to get up to go to the toilet:

Not once in the last month Less than once a week
Once or twice a week Three or more times a week

- d. Not being able to breathe well:**
 Not once in the last month Less than once a week
 Once or twice a week Three or more times a week
- e. Coughing or snoring loudly:**
 Not once in the last month Less than once a week
 Once or twice a week Three or more times a week
- f. Feeling cold:**
 Not once in the last month Less than once a week
 Once or twice a week Three or more times a week
- g. Feeling too hot:**
 Not once in the last month Less than once a week
 Once or twice a week Three or more times a week
- h. Have nightmares or bad dreams:**
 Not once in the last month Less than once a week
 Once or twice a week Three or more times a week
- i. Suffer pain:**
 Not once in the last month Less than once a week
 Once or twice a week Three or more times a week
- j. Other reasons. Please describe them:**
 Not once in the last month Less than once a week
 Once or twice a week Three or more times a week
- 6. During the last month, how would you overall rate the quality of your sleep?**
 Very good Fairly good Fairly bad Very bad
- 7. During the last month, how many times have you taken medicine (on your own or prescribed by your doctor) to help you sleep?**
 Not once in the last month Less than once a week
 Once or twice a week Three or more times a week
- 8. During the last month, how many times have you felt drowsy while driving, eating, or doing some other activity?**
 Not once in the last month Less than once a week
 Once or twice a week Three or more times a week
- 9. During the last month, has it been a big problem for you to find the courage to do any of the activities detailed in the previous question?**
 No problem Just a slight problem A problem A serious problem
- 10. Do you sleep alone or with someone?**
 Alone With someone in another room In the same room, but in another bed In the same bed

Appendix 3
 Self-reported Bruxism Questionnaire

Scale	Not at all	A little	Regularly	Moderate	A lot
1. Have you noticed that you grind or clench your teeth?					
2. Is it frequently during sleep?					
3. Has anyone heard you grind your teeth at night?					
4. Have you felt your jaw fatigued or pain when waking up in the morning?					
5. Do you ever get a momentary headache?					
6. when you wake up in the morning?					
7. Have you noticed that you grind your teeth during the day?					
8. Do you have difficulty opening your mouth wide when you wake up?					
9. Have you noticed that there is wear considerable in your teeth?					
10. Do your teeth feel pain when in contact with cold air or liquids?					
11. Have you noticed that you clench your teeth during the day?					
12. Do you feel your jaw joint getting stuck, or that it makes a clicking sound when you move it?					
13. Do your teeth or gums feel sore when you wake up in the morning?					