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Research Article

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Prevalance and Related Factors of Bruxism in Children, A Preliminary Study

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Abstract

Aim: *Bruxism is a parafunctional habit that is frequently observed in children and is characterized by unconscious clenching and grinding of teeth. The aim of this study was to determine the prevalence of bruxism in children aged 3-12 years in Uşak, Turkey and to evaluate the factors associated with bruxism.*

Materials and Methods: *A cross-sectional study was conducted with parents of 346 children aged 3-12 years who attended the Usak University School of Dentistry Pediatric Dentistry Clinic within 3 months. The children were diagnosed with bruxism using a questionnaire based on the American Academy of Sleep Medicine criteria administered to their parents. With this questionnaire consisting of six questions, factors related to bruxism were also assessed. The data were analyzed using SPSS version 22 for Windows (SPSS, Chicago, Il.,USA). Chi-square and Fisher's exact tests were used to assess the statistical differences between categorical variables.*

Results: *The prevalence rate of bruxism was 24.9%. There was a significant correlation between bruxism and pain around the temple and gums in the morning. Bruxism was more common in children reported to be stressed by their families. A statistically significant relationship was found between stress and bad habits such as nail biting and thumb sucking p<0,005).*

Conclusion: *The prevalence of bruxism is high in childhood and associated with many factors. Early diagnosis and treatment of bruxism are important to reduce the incidence of future temporomandibular dysfunctions.*

Keywords: Children, Prevalence, Bruxism, Stress

1. Introduction

Bruxism is an involuntary, dysfunctional activity of the masticatory system and is characterized by clenching or grinding of teeth [1]. Two different types of bruxism have been described; sleep bruxism (rhythmic or non-rhythmic) and awake bruxism (repetitive or sustained tooth contact and/or by supporting or pushing the mandible) [2].

Bruxism is a common habit, especially in the pediatric population. It can be considered as a normal behavior; however it can also be a disease with the presence of severe dental abrasions, muscle pain, grinding sounds that disturb family members and sleep disorders [3].

Several different methods can be used to diagnose bruxism. A questionnaire based on parental reports is often used in the diagnosis of bruxism and is supported by the American Academy of Sleep Medicine (AASM) [4]. The polysomnography technique applied in sleep laboratories is considered the gold standard for the diagnosis of sleep bruxism, nevertheless its high cost and difficulty in applying it in children are disadvantageous [5]. Clinical symptoms such as tooth wear are not sufficient to diagnose bruxism alone, since it may occur for many reasons. The diagnosis of bruxism in children is often based on teeth grinding sounds

reported by parents, which is an easy and reliable method [6].

The prevalence of bruxism (day and night) varies between 2% and 40% [6-8].The prevalence of bruxism is higher in children in the general population and decreases with increasing age compared to the majority in the literature [8,9]. There is no consensus on the effect of gender on the prevalence of bruxism [3,7,8]

Bruxism has a multifactorial etiology and is more common in individuals with a stressful character [10,11]. Among the systemic factors, asthma, intestinal parasites, central nervous system diseases, allergies and some drugs can cause bruxism [12,13].

Tooth wear, fracture of restorations, periodontal damage, masseter muscle hypertrophy, joint pain and temporomandibular disorders may occur as a result of bruxism [1,14]. Sleep bruxism has been associated with respiratory problems and dental caries, among many other factors [15].

This study aimed to determine the prevalence of bruxism in children aged 3-12 years in Uşak and to evaluate the relationship between bruxism and oral parafunctions, stress, and temporal and gingival pain.

2. Materials and Methods

This study was approved by the Faculty of Medicine Ethics Committee, in Uşak University (*121-13-13*). The parents/guardians signed an informed consent form.

A cross-sectional study was conducted with parents of 346 children aged 3-12 years who attended the pediatric dentistry department. All the children aged 3-12 years who attended the pediatric dentistry department within 3 months were asked to involve in the study and participation in the study was voluntary. A questionnaire was administered to the 400 patients. However, 54 patients were excluded due to incomplete or incompatible answers and/or other sleep disturbances. The study was continued with the remaining 346 patients. The children were divided into three groups according to age. These groups consisted of children aged 3-6, 7-9 and 10-12 years old.

2.1. Eligibility Criteria

2.1.1. Inclusion Criteria

- Parents/cargivers of children aged 3-12 years awaiting treatment at a pediatric dentistry clinic of the Uşak University.
- Parents/caregivers accompanying the child on the first visit to the dentist.

2.1.2. Exclusion Criteria

- illiterate parents/caregivers;
- Parents/caregivers with special needs (psychological, psychiatric or neurological disorders) that preclude reliable responses.
- Children with any mental disorders and sleep problems, such as obstructive sleep apnea and sleep epilepsy.

2.2. Data Collecting

A questionnaire according to the criteria of the American Academy of Sleep Medicine (AASM) was created [4]. The self-administered questionnaire was completed by parents in the waiting room of the pediatric clinic, without any assistance from the researcher.

Sleep bruxism was diagnosed based on the reports of the parent/caregiver, which is a criterion of the AASM for children in this age group. The diagnosis of sleep bruxism was supported by the classification criteria recommended by the AASM. The AASM criteria are [16]:

- Parents who report a tooth grinding sound at night;
- No other medical or mental disorders (sleep-related epilepsy is responsible for abnormal movements during sleep); and
- No other sleep disorders (obstructive sleep apnea syndrome).
- After completing the questionnaire, it was immediately returned to the researcher.

The questionnaire included 6 questions about awake or sleep bruxism, parafunctional habits, pain and stress (Table 1). It also included general information about the children, such as age, gender, and systemic status. Those who answered 'yes' to at least one of the first or second questions were considered as bruxists. Sleep and awake bruxism were also assessed. The following data on parents/guardians were recorded: whether they suffered from sleep bruxism and whether they had knowledge of sleep bruxism and its causes.

The intraoral examination was performed by a single specialist. Dental caries were recorded using World Health Organization criteria (dft and DMFT indices). Decayed, missing, and filled teeth were counted and classified according to the age group. The number of dental caries was also categorized as no caries(caries-free, 1-3 caries, 4-6 caries and > 7 caries).

2.3. Statistical analysis

All data were analyzed using SPSS for Windows, Version 22(SPSS, Chicago, Il.,USA) within 95% confidence intervals. Descriptive analyses were performed for age, sex, bruxism, systemic disease, pain, parafunctional habits, and stress. Chi-square and Fisher's exact tests were used to evaluate statistical differences between categorical variables. Spearman's rho correlation was performed to show the relationship between the variables and bruxism.

3. Results

A total of 346 children (175 girls and 171 boys) and their parents participated in this study. Table 1 presents a frequency analysis of the responses to the survey questions. Children who were reported by their parents to have bruxism while asleep or awake were considered bruxists. The prevalence of bruxism was 24.9%. Bruxism was detected in 11 children, both asleep and awake. While the prevalence of sleep bruxism was 22.3%, this rate was 6.4% for awake bruxism.

		YES	NO
Q1	Have you noticed that your child clenches and grinds their teeth in sleep?	77 (%22.3)	269 (%77.7)
Q2	Have you noticed your child clenching and grinding their teeth while awake?	22 (%6.4)	324 (%93.6)
Q3	Does your child feel pain around the temple when he wakes up?	22 (%6.4)	324 (%93.6)
Q4	Does your child feel a pain in the teeth and gums in the morning?	74 (%21.4)	272 (%78.6)
Q5	Does your child have parafunctional habits such as nail biting, pen biting, thumb sucking?	87 (%25.1)	259 (%74.9)
Q6	Is your child stressed?	110 (%31.8)	236 (%68.2)

Table 1: Frequency Analysis of the Answers to the Questions

The frequency of age groups, gender and presence of bruxism are shown in Table 2. The frequency of bruxism was found to be higher among children aged 3-6 years with the ratio of 30.4%. Among children with bruxism, it seems to be most common in children aged 7-9 years(47.6%). However, no statistically significant relationship was found between age and bruxism. Despite the prevalence of bruxism was higher in boys, no significant relationship was found between gender and bruxism.

The association of bruxism with age, gender, oral parafunction, and pain in the temple and gums upon waking in the morning are shown in Table 3. A positive correlation was found between pain in the temple area when awakening in the morning and bruxism (p=0,037). In addition, a significant correlation was found between pain in the teeth and gums upon waking in the morning and bruxism (p = 0,015).

Variables		**Frequency n - %**
Gender	Male	171 – 49.4%
	Female	175 – 50.6%
Agea	3-6 years	95 – 27.5%
	7-9 years	174 – 50.3%
	10-12 years	77 – 22.3%
Bruxism	Present	86 – 24.9%
	Absent	260 – 75.1%

Table 2: Demographic Characteristics of the Samples

		With Bruxism N (%)	**Without Bruxism N (%)**	**Total N**
Gender	Male	47 (27.4%)	124 (72.6%)	171
	Female	39 (22.2%)	136 (77.8%)	175
Age	3-6 years	29 (30.5%)	66 (69.5%)	95
	7-9 years	41 (23.5%)	133 (76.5%)	174
	10-12 years	16 (20.7%)	61 (79.3%)	77
Oral parafunctions	yes	25 (28.7%)	62 (71.3%)	87
	no	61 (23.5%)	198 (76.5%)	259
Stress	yes	42 (38.1%)	68 (61.9%)	110
	no	44 (18.6%)	192 (81.4%)	236
Temporal pain	yes	10 (45.4%)	12 (54.6%)	22
	no	76 (23.4%)	248 (76.6%)	324
Teeth and gums pain	yes	27 (36.4%)	47 (63.6%)	74
	no	59 (21.6%)	213 (78.4%)	272

Table 3: Factors Associated with Bruxism

Oral parafunctions such as nail biting and thumb sucking were also found in 29% of children with bruxism, but no statistically significant relationship was found between bruxism and oral parafunctions. The majority of children who were not stressed did not have bruxism. A significant relationship was found between bruxism and stress (p<0,005). It was determined that children with bad habits such as nail biting and thumb sucking were mostly stressed (p<0,005).

Bruxism was found in 16.6% of the children with systemic diseases other than those excluded from the study. There was no statistically significant relationship between systemic diseases and bruxism. Only 10% of parents of a child with bruxism applied to the clinic complaining of bruxism. It has been reported that children whose application reason is bruxism are often stressed (p=0,032).

The incidence of dental caries is high in children with bruxism. 40.7% of the patients with bruxism have a dft value > 7. The dental caries results according to age group are shown in Table 4. Dental caries were detected in all patients aged 3-6 years, 87.8% of patients aged 7-9 years, and 75% of patients aged 10-12 years.

Age group	Caries free	1-3 caries	4-6caries	>7 caries	Dft
3-6 years	0	5	13	11	6.17 ± 3.05
7-9 years	5	13	12	11	5.29 ± 3
10-12 years	4	8	3	1	4.06 ± 2.81

Table 4: Distribution of the number of caries and dft scores in patients with bruxism by age groups

4. Discussion

Bruxism is defined as repetitive jaw-muscle activity characterized by clenching/grinding and pushing or exerting force on the mandible [2]. Bruxism is a habit that affects masticatory system and temporomandibular joint, therefore early diagnosis is valuable [17]. While diagnosis of bruxism is a complex process; questionnaires, anamnesis from parents, extraoral and intraoral clinical examinations and various devices can be used to diagnose bruxism [18].

The diagnosis of bruxism using polysomnographic records is considered the gold standard, however it is expensive and difficult to access [5]. It is thought that anamnesis obtained from parents who are close to their children while sleeping and who are conscious of the sound of teeth grinding at night provides reliable results for diagnosing bruxism in children [19]. The questionnaire method, which is based on parent reports, which is frequently used in the diagnosis of bruxism, is supported by many studies and is recommended by AASM [3,6,20,21]. Tooth wear can be associated with bruxism but it can be caused by many different reasons and also it can show personal differences due to the fact that primary teeth has lower mineralization degree. Therefore, it is stated that tooth wear should not be considered as a diagnostic criterion for bruxism [22]. Consequently, a questionnaire that uses the AASM criteria is the most accurate diagnostic criterion among the tests evaluated [23].

This study contributes to the literature on the prevalence of bruxism and its related factors in children aged 3-12 years. The prevalence of bruxism in children ranges from 14% to 36.8% in the literature [24,25]. This wide range may be related to the change in the prevalence of bruxism according to the age group. It is stated in most of the studies that bruxism is seen in children at younger ages and the prevalence of bruxism decreases with age [8,9,26]. On the other hand, in some studies, it was observed that the prevalence of bruxism increased in children with increasing age [6,27]. In this study, the prevalence of bruxism was found to be 24.9% and which seems to decrease with age, in line with the literature.

The prevalence of sleep bruxism was 22.3%. In systematic reviews, the prevalence of sleep bruxism was found to be around 30%, which is consistent with this result [8,28]. Some studies indicate that bruxism is more common in mixed dentition [7,19,29]. Occlusal irregularities and early contacts in mixed dentition may be related to this condition. On the contrary, there are studies reporting that bruxism is more common in primary dentition [8,26]. Consistent with previous studies, bruxism was reported more frequently in the primary dentition in the current study. This may be the result of parents' close relationships with their children in this age group. This may also be related to getting older; as children get older, their parents visit their bedrooms less.

The gender has not a significant effect on bruxism [3,7,8]. Clementino et al. found that the prevalence of bruxism was higher in girls than in boys [30]. On the contrary, the prevalence of bruxism was found higher in boys [31]. In the present study, bruxism was observed more frequently in boys, nonsignificantly.

Serra Negra et al. stated that oral parafunctions such as nail and pencil biting are associated with bruxism [21]. One other study reported that children with oral parafunctions were less likely to develop bruxism [7]. This may be a particular result of the habit of thumb sucking, which may prevent children from clenching their teeth. In aggreement with the literature, no significant relationship was found between bruxism and oral parafunctions in this study.

Many authors have argued that stress has an effect on bruxism [6,28]. Oliveira et al. have shown that anxiety and stress are especially prevalent in patients with bruxism [32]. It has been reported that children tend to release the tension accumulated during the day and experience chronic bruxism during sleep [25]. In accordance with the literature, the prevalence of bruxism was found to be significantly higher in children who were reported to be stressed by their parents in the present study.

Some studies have reported that patients with bruxism experience more headaches when they wake up in the morning [31,33]. In this study, bruxism was found to be effective for complaints of pain in the temporal region when waking up in the morning, and this result was found to be statistically significant.

It has been reported that bruxism may be effective in the development of dental caries [12,34]. While Motta et al detected dental caries in 76.9% of children with bruxism, Antunes et al found

that the prevalence of dental caries was to be 33.3% in children with bruxism, which was higher than that in the controls [12,34]. In agreement with these studies, the present study reported a high rate of dental caries in children with bruxism. The reason for these high caries rates may be related to the exposure of dentin due to occlusal wear on teeth as a result of tooth grinding.

The early treatment of bruxism may reduce the incidence of Temporomandibular Disorders in the future [35]. Therefore, it is important to diagnose bruxism in childhood and to seek treatment alternatives. In the current study, only 10% of the parents were aware of their child's complaints of bruxism. This may be related to the fact that parents have difficulty in understanding the problems associated with bruxism. This result shows us the need to raise awareness on society about bruxism in children. Further studies are needed on childhood bruxism.

5. Conclusion

According to the results of this study, the prevalence of bruxism in children living in Uşak was found to be 24.9%. There was no significant relationship between bruxism and gender&age. In children with bruxism:

- The pain in the temple area is more common
- According to parent reports, children with bruxism are more stressed.
- There appears to be a relationship between bruxism and dental caries.

Early diagnosis and treatment of childhood bruxism are important to prevent future complications.

Study Limitations

One of the limitations of this study can be considered as the diagnosis of sleep bruxism based on parental reports, although parental reports were accepted by the AASM4. Many parents sleep in separate rooms with their children, so they may not be aware that the child is grinding their teeth at night. Therefore, the prevalence of bruxism may have been lower than the actual number. Another limitation is the small sample size. Some of the results from this study may be meaningful for a larger number of children. A larger sample size should be considered to clarify the results of this study.

This study was planned as a pilot study to assess the children assumed bruxist and to diagnose clinically afterwards.

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Conflict of Interest

None of authors have any conflicts of interest to report.

Author Contributions

S.A. conceived the idea, S.A. and S.E. collected and analyzed the data, S.A. and S.E. led the writing and revised the manuscript and gave final approval of the version to be published and agreed to be accountable for all aspects of the study.

Ethical Approval

This study was approved by the Faculty of Medicine Ethics Committee, in Uşak University (*121-13-13*).

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