Evaluation of Anxiety Levels in Children and Their Mothers and Appearance of Sleep Bruxism in Turkish Children and Associated Risk Factors: A Cross-Sectional Study

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Aims: To evaluate the anxiety of children and their mothers in relation to sleep bruxism (SB) and associated risk factors. **Methods:** A total of 96 children (48 with and 48 without bruxism) and their mothers participated in this study. A form with comprehensive history and oral and parafunctional habits associated with SB was used. Screen for Child Anxiety and Related Disorders (SCARED) was used to measure anxiety in children. The anxiety levels of the mothers were evaluated with the State-Trait Anxiety Inventory (STAI). SPSS version 21.0 was used for the analyses. Chi-square test was used to compare categorical data. Student *t* test or Mann-Whitney *U* test was used for the comparison of continuous data, and multiple logistic regression model was applied to detect the real factors associated with SB. **Results:** The comparisons of SCARED total ($P = .005$), factor 3 (separation anxiety; $P = .015$), factor 4 (social anxiety; $P = .011$) and factor 5 (school fear; $P = .005$) showed significant differences between groups. State anxiety scores of the mothers were significantly higher in the bruxism group ($P < .001$). Statistically significant differences were seen for learning/behavioral/anger problems, mouth breathing, snoring, bad breath, parasitic infections, sleep difficulty, chewing a pen or pencil, and sleeping in their own room ($P < .05$). The real risk factors associated with SB were learning/behavioral/anger problems, an experience causing stress, snoring, and increased anxiety levels of mothers and children. **Conclusion:** Elevated anxiety levels of mother or children, learning/behavioral/anger problems, experience causing stress, and snoring increased the risk of having SB in children. *J Oral Facial Pain Headache 2022;36;147–154. doi: 10.11607/ofph.3011*

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Bruxism is an involuntary movement of the jaw muscles in a repetitive manner occurring during the day and/or at night during sleep.[1] The factors associated with bruxism are diverse; its etiology is multifactorial and not fully understood.[3–6]

SB is also associated with many chronic diseases, respiratory disorders, sleep problems, and psychologic disorders.[3,7,8] Even the digestive system has been shown to affect SB, such as with parasitic infections[9] and gastroesophageal reflux disease (GERD).[6] The relationship between SB and dental caries is controversial; some studies show an association between dental caries and SB, while others do not.[10,11] Among parafunctional habits, nail biting, biting objects, and clenching teeth while awake have been shown to be related to SB.[7,9] SB is also related to sleeping with light, a nightly shorter sleep duration, noise in the children's room, nightmares, snoring, restless sleep, stomach position during sleep, and lack of sleep.[3,7,8,12]

Recent studies have also examined genetic risk factors for SB and awake bruxism. Studies in twins have suggested that genetics may play a role in the existence of bruxism; however, there are studies denying the parents' transmission of bruxism to their children.[13] A large population-based cohort study of young adult twins indicated that genetic factors account for a substantial proportion of the phenotypic variation of the susceptibility to sleep-related bruxism, with no gender difference in its genetic architecture.[14] The gender association of SB is uncertain.[3,15] Also, another study reported a higher correlation in monozygotic twins

than in dizygotic twins, which suggests the influence of genetic factors on both SB and awake bruxism.[16] Kuhn and Türp identified bruxism in the family as a risk factor.[8] In the light of this information, genetics may have an effect on the emergence of bruxism among children, and bruxism in the family could be a risk factor for bruxism.

According to Guo et al, family problems like occupation of family, maternal marital status, family income, and responsibility given to the child may be associated with SB.[10] The mother's stress can also be a contributor to bruxism in the child.[9] There are studies showing a weak relationship between anxiety and TMJ disorders in children.[17] Indirect indicators of stress, such as gagging during dental care, were associated with SB.[18]

Psychologic factors and emotional stress may play an important role in SB and trigger SB among an adult population.[19] Restrepo et al reported a relationship between anxiety and SB in children aged 8 to 11 years, but the study used parent's reports on children to measure the anxiety levels.[20] Bruxism, which has a highly complex etiology, is regulated by the central nervous system and can be associated with different causes, including emotional factors, in children. Indeed, the literature has supported the association between bruxism and mental disorders. The study by Türkoğlu et al in children with psychiatric disorders revealed that psychiatric disorders, depression, and anxiety were risk factors for SB.[21] Furthermore, the literature supports that attention and hyperactivity disorder, emotional and behavioral problems, learning difficulties, stress sensitivity, drowsiness, poor school results, and personality characteristics may be associated with SB.[22–25] The relationship between anxiety in children and their mothers among healthy children with SB is not fully enlightened. The effect of genetics for SB may arise from transmission of anxiety from parents to children. Self-reported separate questionnaires for the evaluation of anxiety in children and their mothers could add to the knowledge on this topic. Anxiety levels in children can play an important role when it comes to the appearance of risk factors related to SB.

The aim of this study was to evaluate the anxiety in children and their mothers in relation to SB and additionally to evaluate associated risk factors related to SB among Turkish children between 7 and 11 years of age.

Materials and Methods

This cross-sectional study was carried out in children and their families who came to the Çukurova University Faculty of Dentistry Department of Pediatric Dentistry Clinics and University Faculty of Medicine Department of Child and Adolescent Psychiatry between March 2019 and December 2019. A total of 96 children and their mothers participated in this study; 48 children had bruxism, and 48 children in the control group had no history of bruxism.

Permission to participate in the study and informed consent from their mothers were obtained from a total of 96 children. Ethical approval of the study was given by the university ethics committee (meeting number: 91; September 4, 2019).

Inclusion and Exclusion Criteria

Child patients between the ages of 7 and 11 years who came to the Pediatric Dentistry Clinics who did not have a health problem that could affect bruxism systemically, had normal facial morphology, and had no history of trauma were included.

Children with bruxism (n = 48) were selected according to the American Academy of Sleep Medicine (AASM) criteria: The parents of the child said that the child gritted or grinded their teeth during sleep.

- The child did not have any medical or mental disorders associated with SB (eg, sleep-related epilepsy, abnormal movements during sleep).
- No other sleep disorders (eg, obstructive sleep apnea). All mothers stated that they followed their children at least once a day during sleep. The children in the control group were also compatible with the second and third AASM criteria.

The sample size was calculated as 90 in total to make comparisons when the CI was 95%, the statistical power was 90%, and the effect size was 0.35. The study sample size was determined according to the results of a previous study.[20]

Applied Questionnaires and Scales

A comprehensive history form with information on bruxism was applied to all mothers. The content of the form included gender, systemic disease, learning/behavioral/anger problems, an experience causing stress (new school, new neighborhood, new sibling, death of a family member, etc), upper respiratory infection frequency, acid reflux, asthma, mouth breathing, snoring, bad breath, sleeping with open mouth, intestinal parasites, gag reflex, waking up crying, mother with bruxism, mother age, father with bruxism, father age, smoking in the family, dental pain (related to caries), dental fracture or sensitivity, the age of sleeping in their own room, the duration of watching television, the duration of using cell phone/computer/tablet, and number of siblings. Oral and parafunctional habits associated with bruxism were also added to the history, including thumb sucking, finger sucking, nail biting, lip biting, and chewing a pen or pencil. For

the temporary questions, the phrase "during the last 3 months" was used. Additionally, dental examination according to the World Health Organization (WHO) was performed.

The Screen for Child Anxiety and Related Disorders (SCARED) was used to measure anxiety disorders in children. This scale was constituted by Birmaher et al (1999), and its Turkish validity and reliability were verified by Karaceylan Çakmakçı.[26,27] A score of 25 or more is considered as a warning for anxiety disorder. SCARED consists of 41 items. The scale also includes somatic/panic (factor 1), generalized anxiety (factor 2), separation anxiety (factor 3), social anxiety (factor 4), and school fear (factor 5) subscales. The Cronbach alpha coefficient of the SCARED instrument was between 0.77 and 0.93, and test-retest validity was between 0.70 and 0.90. In order to evaluate the anxiety levels of the mothers, the State-Trait Anxiety Inventory (STAI) was used. The STAI is constructed from two parts; each part has 20 questions to measure the state and trait anxiety levels. The lowest and highest scores of these subscales are 20 to 60. Higher scores are associated with high-stress situations.[28,29]

Statistical Analysis

Chi-square test was used to compare categorical data. Student *t* test or Mann-Whitney *U* test were used for the comparison of continuous data, depending on whether the data were parametric or nonparametric. A P value < .05 was considered significant. According to the statistical significance of chi-square test, *t* test, and Mann Whitney *U* test analyses (P < .05), the independent factors associated with bruxism were determined and added to the multiple logistic regression model (step 1). Stepwise regression analysis was used to select the factors. The risk factors associated with SB were set with logistic regression backward Wald method. SPSS version 21.0 (IBM) software package was used for the analyses.

Results

The mean age of children with bruxism was 8.3 ± 1.4 years, and without bruxism was 8.7 ± 1.4 years (P = .235). There were no differences in the distribution of gender between groups (P = .539).

Table 1 shows evaluation of the data from medical anamnesis, information about bruxism, and dental anamnesis. Statistically significant differences were seen for learning/behavioral/anger problems (P = .001), experience causing stress (P = .001), mouth breathing (P = .027), snoring (P = .002), bad breath (P = .017), parasitic infections (P = .047), and sleep difficulty (P = .031) between children with and without bruxism.

Among parafunctional habits, the only differences between groups were for chewing a pen or pencil (P = .004) (Table 2).

"Starting age of sleeping in their own room" was older in the bruxism group (P = .033). The comparisons of SCARED total (P = .005), factor 3 (P = .015), factor 4 (P = .011), and factor 5 (P = .005) showed statistically significant differences between groups. State anxiety (STAI) scores of the mothers were statistically significantly higher in the child bruxism group (P < .001) (Table 3).

According to the logistic regression analysis, the higher scores of SCARED factors 4 and 5 and STAI were independent risk factors for sleep bruxism. The lower scores and frequencies of learning/behavioral/anger problems, an experience causing stress, snoring, and SCARED total were protective factors for sleep bruxism (odds ratio was lower than 1 for those two factors; Table 4).

Discussion

The aim of this study was to evaluate the anxiety of children and their mothers in relation to SB and additionally to evaluate associated risk factors related to SB among Turkish children between 7 and 11 years of age. Comparisons of the risk factors previously linked to bruxism show that many problems associated with respiratory disorders, sleep problems, and psychologic problems have an impact on bruxism. However, this relationship is somewhat uncertain because those factors can originate from other real risk factors of bruxism or because those factors can cause bruxism-related factors. In order to understand the real risk factors, a multivariate regression model was applied in this study. The model showed that the anxiety level of children and mothers affected SB. The existence of systemic diseases, learning/behavioral/anger problems, bad breath, waking up while crying, and sleeping with parents were other potential predictors of bruxism among children.

GERD is known as a risk factor for SB among adults; it was not a risk factor in the present study, but the children with GERD did show SB more frequently.[6] Tendency for gagging during dental care slightly increases the odds of self-reported SB, which may have an association with personality traits and anxiety levels in children.[18] A limited number of studies found that parasitic infections were also related to SB.[10] Although the scientific evidence of the relationship between parasites and bruxism is weak, the authors of the present study added the parasites to their

Table 1 Evaluation of Groups According to Self-Reported Demographic Data, Medical Anamnesis, and Dental Anamnesis During the Last 3 Months

		Bruxism, n (%)	Control, n (%)	*P* value*
Gender	Woman	24 (50.0)	28 (58.1)	.539
	Man	24 (50.0)	20 (41.7)	
Systemic disease	No	35 (72.9)	43 (89.6)	.065
	Yes	13 (27.1)	5 (10.4)	
Learning/behavioral/anger problems	No	35 (72.9)	47 (97.9)	.001*
	Yes	13 (27.1)	1 (2.1)	
An experience causing stress[a]	No	24 (50.0)	40 (83.3)	.001*
	Yes	24 (50.0)	8 (16.7)	
Upper respiratory infection more than 4 times/y	No	22 (45.8)	25 (52.1)	.540
	Yes	26 (54.2)	23 (47.9)	
Acid reflux	No	44 (91.7)	48 (100.0)	.117
	Yes	4 (8.3)	0 (0.0)	
Asthma	No	41 (85.4)	47 (97.9)	.059
	Yes	7 (14.6)	1 (2.1)	
Mouth breathing	No	38 (79.2)	46 (95.8)	.027*
	Yes	10 (20.8)	2 (4.2)	
Snoring	No	32 (66.7)	45 (93.8)	.002*
	Yes	16 (33.3)	3 (6.3)	
Bad breath	No	26 (54.2)	38 (79.2)	.017*
	Yes	22 (45.8)	10 (20.8)	
Sleeping with open mouth	No	29 (60.4)	36 (75.0)	.190
	Yes	19 (39.6)	12 (25.0)	
Intestinal parasites	No	33 (68.8)	42 (87.5)	.047*
	Yes	15 (31.3)	6 (12.5)	
Gag reflex	No	40 (83.3)	46 (95.8)	.091
	Yes	8 (16.7)	2 (4.2)	
Waking up crying	No	40 (83.3)	46 (95.8)	.091
	Yes	8 (16.7)	2 (4.2)	
Sleep difficulty	No	40 (83.3)	47 (97.9)	.031*
	Yes	8 (16.7)	1 (2.1)	
Child sleeping in their own room	No	18 (37.5)	9 (18.8)	.068
	Yes	30 (62.5)	39 (81.3)	
Mother bruxism	No	32 (66.7)	41 (85.4)	.054
	Yes	16 (33.3)	7 (14.6)	
Father bruxism	No	37 (77.1)	41 (85.4)	.433
	Yes	11 (22.9)	7 (14.6)	
Smoking in the family	No	20 (41.7)	18 (37.5)	.835
	Yes	28 (58.3)	30 (62.5)	
Dental pain	No	17 (35.4)	18 (37.5)	1.000
	Yes	31 (64.6)	30 (62.5)	
Dental fracture and sensitivity	No	46 (95.8)	47 (97.9)	1.000
	Yes	2 (4.2)	1 (2.1)	

*Statistically significant ($P < .05$) according to chi-square test or Fisher exact test.
[a] New school, new neighborhood, new sibling, death of a family member, etc.

anamnesis form. It can be hypothesized that sleep quality can be affected from such an infection. On the other hand, previous studies show that there is a relation between oral ulcers, dysfunction of the gastrointestinal track, and caries with SB.[10,11] Souza et al reported that exhibiting involuntary movements and gastroesophageal reflux are factors associated with bruxism in children with developmental disabilities.[30] In this previous study, intestinal parasites were statistically significantly more frequent in children with SB. However, the results of the present study showed no association between caries, dental pain, or dental sensitivity and SB.

According to previous knowledge on SB, respiratory system problems may be associated with self-reported bruxism.[11] In the present study, mouth breathing was related to SB. These systemic problems may have contributed to bad sleep quality or systemic infections related to the respiratory track, which can cause altered anxiety and stress both for children and their parents. Ahlberg et al revealed that insufficient sleep and insomnia were related to sleep bruxism,[31] and, according to the International Classification of Sleep Disorders (ICSD), SB is a sleep-related movement disorder.[2] Nocturnal agitation and nightmares were found to be associated

Table 2 Comparison of Oral Parafunctional Habits and Other Dysfunctions Between Groups During the Last 3 Months

	Bruxism (n = 48)		Control (n = 48)		
	n	%	n	%	*P* value*
Thumb sucking	3	6.3	2	4.2	1.000
Finger sucking	2	4.2	2	2.1	1.000
Nail biting	17	35.4	8	16.7	.062
Lip biting	15	31.3	6	12.5	.057
Chewing a pen or pencil	13	27.1	2	4.2	.004*

Statistically significant (*P* < .05) according to chi-square test.

Table 3 Results of the Comparison of the Continuous Output Related To Bruxism Between the Groups

	Bruxism, mean ± SD / median	Control, mean ± SD / median	*P* value
Age	8.3 ± 1.4 / 8	8.7 ± 1.4 / 8	.2351
Age when the child began sleeping in their own room	5.6 ± 2.8 /5.5	4.3 ± 3.0 / 4	**.0331**
Mother's age	37.4 ± 5.2 / 37	37.8 ± 4.8 / 38	.7281
Father's age	41.5 ± 5.0 / 41	41.6 ± 4.9 / 42	.9191
Television time (last 3 mo)	1.9 ± 1.9 / 1.75	2.3 ± 1.9 / 2.00	.2202
Cell phone, computer, tablet time (last 3 mo)	1.4 ± 1.7 / 0.75	1.1 ± 1.2 / 1	.8412
Number of siblings	1.4 ± 0.9 / 1	1.3 ± 1.2 / 1	.3111
SCARED total	26.7 ± 13.1 / 23.5	19.9 ± 9.8 / 23.5	**.0051**
Factor 1	5.4 ± 5.3 / 5	4.4 ± 3.9 / 3	.6062
Factor 2	5.1 ± 3.8 / 4	3.8 ± 2.8 / 5	.0771
Factor 3	7.4 ± 3.4 / 7	5.7 ± 3.1 / 5	**.0151**
Factor 4	7.0 ± 3.9 / 7.5	4.8 ± 3.2 / 5	**.0111**
Factor 5	1.6 ± 1.5 / 1	0.8 ± 0.9 / 1	**.0051**
State anxiety	36.5 ± 9.2 / 36.5	29.9 ± 8.4 / 30	**< .0011**
Trait anxiety	43.2 ± 8.1 / 43.5	40.0 ± 8.7 / 41	.6601
Decayed	0.72 ± 1.1	1.02 ± 1.5	.4762
Missing	0.04 ± 0.2	0.1 ± 0.3	.2412
Filling	0.29 ± 0.8	0.62 ± 1.7	.2272
Decayed primary teeth	2.27 ± 3.1	2.70 ± 2.8	.2872
Missing primary teeth	0.47 ± 0.7	0.66 ± 1.2	.9472
Filled primary teeth	1.06 ± 2.0	0.70 ± 1.2	.6522
DMFT permanent teeth	1.06 ± 1.4	1.75 ± 2.4	.2812
dmft primary teeth	3.81 ± 3.5	4.08 ± 2.9	.4892
DMFT total	4.87 ± 4.1	5.83 ± 2.6	.0772

Bolded numbers are statistically significant (*P* < .05).

with SB.[32] A possible relationship between SB and several sleep disorders was evaluated in a large sample of school children. A significant correlation between parental-reported tooth grinding and several sleep disorders concerning bedtime problems, night awakenings, nocturnal symptoms, and morning symptoms has been found.[33] Similarly, Restrepo et al suggested that some sleep disorders are associated with parent-reported tooth grinding.[34] Anxious children may have problems with sleeping alone or waking up crying. Any type of sleep difficulty may stem from anxiety or stress. On the other hand, problems causing disturbed sleep, like breathing problems, GERD, and mouth breathing, can stimulate daytime stress due to lack of decent sleep. Children with SB experienced sleep difficulty more often according to the present study. Similarly, the age of starting to sleep alone in the child's own room was related to SB. This is a complex situation because sleep habits can be formed due to the stress levels of children or parents. Conversely, stress and SB can stem from bad sleep quality.

Twin studies have shown evidence of genetic effects on sleep and awake bruxism.[13,14,16] Moreover, studies about parents' transmission of bruxism to their children show contradictory results, as

Table 4 Multivariate Regression Model Applied with Backward Stepwise Technique

							95% CI	
	B	SE	Wald	df	*P*	OR	Lower	Upper
Step 1								
Learning/behavioral/anger problems	–2.182	1.291	2.855	1	0.091	0.113	0.009	1.418
An experience causing stress[a]	–1.413	0.742	3.623	1	0.057	0.243	0.057	1.043
Mouth breathing	–0.464	1.153	0.162	1	0.688	0.629	0.066	6.033
Snoring	–2.616	0.939	7.758	1	0.005	0.073	0.012	0.461
Bad breath	–0.835	0.683	1.495	1	0.221	0.434	0.114	1.654
Intestinal parasites	–0.871	0.799	1.189	1	0.276	0.419	0.087	2.004
Sleep difficulty	–1.977	1.387	2.033	1	0.154	0.138	0.009	2.097
Age child began sleeping in their own room	0.128	0.111	1.329	1	0.249	1.137	0.914	1.414
SCARED total	–0.136	0.065	4.363	1	0.037	0.873	0.768	0.992
Factor 3	0.181	0.138	1.713	1	0.191	1.198	0.914	1.571
Factor 4	0.256	0.134	3.661	1	0.056	1.292	0.994	1.679
Factor 5	0.912	0.391	5.458	1	0.019	2.490	1.158	5.354
State anxiety (STAI)	0.084	0.037	5.244	1	0.022	1.088	1.012	1.169
Constant	4.509	3.101	2.115	1	0.146	90.797		
Step 7								
Learning/behavioral/anger problems	–2.820	1.222	5.329	1	0.021	0.060	0.005	0.653
An experience causing stress[a]	–1.249	0.668	3.494	1	0.062	0.287	0.077	1.062
Snoring	–3.030	0.839	13.025	1	0.000	0.048	0.009	.250
SCARED total	–0.079	0.046	2.884	1	0.089	0.924	0.844	1.012
Factor 4	0.251	0.116	4.660	1	0.031	1.285	1.023	1.613
Factor 5	0.637	0.322	3.903	1	0.048	1.890	1.005	3.555
State anxiety (STAI)	0.097	0.035	7.697	1	0.006	1.102	1.029	1.180
Constant	2.217	1.874	1.400	1	0.237	9.178		

[a]New school, new neighborhood, new sibling, death of a family member, etc.

supporting and nonsupporting outcomes exist.[8,13] In the present study, mother, father, and sibling bruxism were not associated with the child's SB; however, anxiety levels of the mother and child were risk factors for SB. Further studies on genetic transmission of anxiety can illuminate the tendency for SB in children.

Oral habits and parafunctions, defined as nonfunctional activity or behaviors involving the masticatory system, are common behaviors and are not always harmful or related to some degree of TMD.[35] Nail biting and biting objects are possible risk factors for SB.[9,10] Similar results were found in the present study, showing that chewing a pen or pencil was related to SB. These parafunctions and SB may originate from analogous physiologic factors.

High levels of neuroticism and responsibility traits can cause emotional tension, which was related to SB; however, some studies have found no associations between SB and anxiety.[35,36] In this study, SB and levels of measured anxiety were related. SCARED total, factor 3, factor 4, and factor 5 were related to SB. SCARED shows the overall levels of stress of children, while the subscales show specific facets: factor 3 is separation anxiety, factor 4 is social anxiety, and factor 5 is school anxiety. Factors 4 and 5 and the total SCARED were associated with SB and were also independent risk factors for SB. The decrease in the SCARED total is also a protective factor for SB in children. This study shows that anxiety has strong connections to SB.

Renner et al reported that mental health problems were associated with bruxism, teeth clenching, and grinding at night.[37] A study evaluating the association of level of anxiety in children with and without SB revealed that anxiety levels in children with bruxism reached higher scores than in the nonbruxism group and showed a direct relationship between the presence of anxiety disorder and the onset of bruxism.[24] Katayoun et al assessed the existence of an association between bruxism and psychosocial disorders in adolescents. They reported that the prevalence of psychosocial disorders, including conduct disorders and antisocial disorders, was significantly higher in bruxism, and an adolescent with bruxism had a 16-times greater probability for psychosocial disorders than an adolescent without.[38] In another study, separation anxiety was related to SB in early childhood.[23] Moreover, Türkoğlu et al stated that at least one psychiatric disorder, trait and state anxiety, anxiety sensitivity, and the severity of depression symptoms, were higher in children and adolescents with SB.[21]

Drumond et al showed that a mother's level of anxiety was related to children's SB with other parafunctional habits; however, they did not show any

associations between the child's level of stress and SB.[9] Parallel to Drumond et al, the present study found that state anxiety levels of mothers were associated with SB, but added that children's anxiety is another risk factor for SB. Mother's state anxiety was also an independent risk factor for SB among children. Also, from the perspective of mothers, "an experience causing stress" and "learning/behavioral/anger problems of children" were related to SB. It must be also added that the lack of learning/behavioral/anger problems among children was also a protective risk factor for children with SB. These two questions were connected to the levels of anxiety in children and their mothers.

Anxiety of mothers and children increased the risk of having SB among children, as previously hypothesized. In order to eliminate SB and SB-related health issues, the treatment may start from the stem of this problem. Clearly, children's and mother's anxiety levels are one of the predictors, and decreased levels of those are protective factors against SB. The treatment strategies of SB may start from a psychologic point of view. As limitations of the study, it must also be added that it is difficult to assess SB with the self-report method. Additionally, the sample size was selected from a pediatric dentistry clinic of a university hospital, and so the chances of children having caries and other oral health problems were higher than the normal population. Also, an objective method like electromyographic recording was not used for the detection of SB. The results of the present study depend on the subjective views of mothers and their children. Further research on fathers and both of the parents' anxiety levels can give more accurate results on the effect of parent anxiety on SB. Other variables related to anxiety, such as number of family members, living conditions, living with grandparents, and parents being together or separate, should be added to the design of future studies.

Conclusions

This study revealed that elevated anxiety levels in mothers or in children are related to SB. Also, higher levels of anxiety in children and their mothers increased the risk of having SB among children. Additionally, learning/behavioral/anger problems, experience causing stress, and snoring increased the risk of having SB in children.

Clinical Implications

- If a child undergoing dental treatment has learning/behavioral/anger problems, experience causing stress or a snoring problem suggest that further examination and detailed anamnesis for SB should be made, as they can be risk factors for SB.
- The anxiety measurements could be a part of a dental anamnesis form for children with SB.
- While anxiety in mothers and children is a major cause of SB, collaboration of pediatric psychiatry and pediatric dentistry is highly recommended for an efficient treatment plan.

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