To Determine the Effects of Bruxism on School Success of 7-12-years-old Children

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Abstract

Objective: To evaluate the effects of bruxism on school success of 7-12-years-old children

Research design: Case control study.

Clinical setting: In Karadeniz Technical University, Faculty of Dentistry, Paediatric Dental Clinic from February 1st, 2011 to February 1st, 2012.

Participants: The study was conducted on 7-12 years old children diagnosed with bruxism by a dentist. During research period 62 children were diagnosed with bruxism, but 53 children completed the study.

Interventions: Children with no bruxism problem were chosen for the control group depending on their age-related characteristics. In order to collect data, the researchers designed a survey that contains 22 questions and report cards of previous semesters were brought by families to be used in this study.

Main outcome: To evaluate the effects of bruxism on school success of 7-12-years-old children

Results: There were no significant differences in demographic characteristics of case and control group except for birth type (X^2=8.285 $p<0.05$). There were statistically significant differences ($p<0.05$) in pacifier usage (X^2=10.63), eating disorder (X^2=6.07), sleeping time in different rooms (X^2=17.0), class level (X^2=8.256), night waking (X^2=10.63), halitosis (X^2=6.11), nail biting habit (X^2=16.83), pencil biting (X^2=53.59), mouth breathing during sleep (X^2=33.56), snoring (X^2=31.62), lip biting (X^2=28.94), and enuresis nocturne (X^2=33.56). Comparison of class and behaviour on school success shows that there were statistically significant differences ($p<0.005$) in Turkish (F=12.908), Music (F=12.908), Communication and Social Interactions (F=0.432), Team work and Responsibility (F=0.061), Efficient Studying (F=7.312), and Environmental Sensitivity (F=78.66).

Conclusion: The present study shows that bruxism had no effect on school success of children. However, there were differences in children's behavior and study habits in school.

Key Words: Bruxism, Demographic characteristics, Behavior, Study habit, School success

Introduction

Bruxism is defined as a stereotypical hyperactivity of the masseter characterized by clenching and grinding of the teeth. Etiopathology of bruxism still remains unclear. Its symptoms overlap with other pathologies making diagnosis and treatment at times difficult [1-3]. Bruxism is a habit that affects around 8-10% of the population.

Bruxism occurs in both children and adults. Bruxism is reported in about 20% of children up to the age of 11 years, although this is probably an under estimate as the condition is sometimes unnoticed by parents [1,2].

The consequences of Bruxism in children are often manifested in behavioural problems. Research has found that children with bruxism have a tendency towards anxiety, stress and hyperactivity. It is also strongly associated with Attention Deficit Hyperactivity Disorder (ADHD) [1-3]. An interesting study found that behavioural problems and bruxism in children were linked to maternal depression [3,4]. The increased arousals and behavioural problems in children were significantly correlated with parents who reported psychological or physical complaints [3,4]. Successful school life helps children towards their desired goals. There are many studies on determining the reasons why children fail at school. Various factors are known to affect school success. These factors can be social; study environment of children, economic conditions, family relations, irregular study schedule, environment, as well as problems related to child's health [1,2]. Children can have some diseases caused by their own physiology. There are studies that have found relation between attention deficit and anaemia [4,5]. Many studies show that etiology of bruxsizm is hyper activity, onychophagy (nail biting) and enuresis (bedwetting) [2,6-8]. Another different behaviour of children is bruxism [1,9,10], that is characterized by teeth clenching and/or teeth grinding. It affects 8% - 21% of population and is a common clinical problem [9]. Epidemiological studies showed that bruxism can be seen in all age groups but more common in young population. The prevalence of bruxism in children varies between 14% and 20% while in adults varies between 6% and 8% and it decreases with age [7,10]. Bruxism can occur during day or night [9,11,12]. The number of studies on etiology of bruxism has been increasing day by day. Since the effects of age, sex, race, etc. factors on bruxism are not well documented, thus, making it hard to understand this problem. Also, there is no consensus on description and identification of bruxism in literature [12]. Studies on children argued that the reason for Bruxism might be related to various factors such as anxiety and stress [9,13,14]. Studies showed that Bruxism

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patients have increased muscle tone. On electromyography attenuation, patients with bruxism have twice the maximal muscle tension than normal people. Patients can experience pain in masseter muscle and, especially on mornings, tiredness and burning sensation in temporal and masseter regions. Also, bilateral or unilateral hypertrophy can be seen in masseter muscle. Continuous motion of muscles can cause different symptoms and syndromes. The first symptom is tiredness. Even if there is no tiredness, hypertrophy can occur in time. Muscles that continuously work without sufficient rest can develop painful involuntary contractions and spasms. One of the results of this is Trimsus. Another symptom of spasm is coordination disorder. Click sound along with deviation can be heard when patient opens his/her mouth. Teeth apparatus can be given to patients to wear it during night for treatment. Some studies suggested that psychological support can help children with bruxism [15-17]. There are not enough statistical data of number of children with bruxism in Turkey. Stress is one of the main factors that cause bruxism in children. In a previous study it was stated that family problems, communication problems or violence cause bruxism [9]. However, there are scarcely any studies in literature on causes of bruxism in children [18,19]. Diagnosis of bruxism can be guiding for treatments on children's teeth health and other problems. The main purpose of this study is to determine the effects of bruxism on school success of 7-12-years-old children with bruxism.

Materials and Methods

This study is a case control study. The study was conducted on 7-12-year- old children diagnosed with bruxism by a dentist. The study was carried out at the Faculty of Dentistry, Pediatrics Dental Clinic, Karadeniz Technical University, from Feb 1st, 2011 to Feb 1st, 2012. During this period 62 children were diagnosed with bruxism, 53 of whom were chosen as the study participants.

The whole study group consisted of all children who come to the clinic and were diagnosed with Bruxism (N=63). Every month, approximately five children with Bruxism came to the clinic. In the same year three children who were recently diagnosed with this habit were include into the present study. The researchers created a control group with equal number of patients for these children. In order to insure the participation of each child from the control group in the study, the volunteer children who came to the clinic on the first Monday and the last Friday of each month were chosen as the study participants (N=63). However, 11 children in the control group were excluded on the grounds that their parents did not bring their report cards to the researchers after the study. After the consent was taken from the parents and participants, questionnaire items developed from the existing literature were asked to the participants face to face. While ten of these items were related to demographic information of the participants, the rest were about Bruxism. After the questionnaires were completed, the parents were asked to bring their children's report cards with the permission of their school principals. In the light of the data gathered from these report cards, classes and behaviors of both control and experimental groups were conducted (School report cards show not only course achievement reports but also behavior

Table 1. *Demographic Characteristics. ront view showing fused left mandibular teeth with lingual talon cusp.*

Age	n	%	n	%	X^2	P
7-9	35	37.4	45	42.6	0.288	0.200
10-12	15	12.6	12	14.4		
Sex						
Male	31	29.1	22	23.9	0.570	0.295
Female	31	32.9	29	27.1		
Number of siblings						
0-1	36	32.4	32	35.6	4.334	0.228
2-3	16	29.6	25	21.4		
Birth type						
Normal	21	28.6	40	32.4	8.285	0.03
Caesarean	32	24.4	20	27.6		
Breastfeed status						
Yes	47	42.2	58	55.8	2.729	0.99
No	6	3.8	2	4.2		
Post birth problem						
Yes	7	4.3	2	57	3.642	0.082
No	46	48.7	47.0	54.3		
Are parents alive?						
Yes	51	51.5	58	57.9	0.016	0.643
No	2	1.9	2	2.1		
Mother grinds her teeth?						
Yes	*1	1.8	*3	5.1	3.121	0.759
No	52	98.2	57	94.9		
Father grinds his teeth?						
Yes	*2	3.7	*1	1.6	2.643	0.371
No	51	96.3	59	98.4		
Total	53	100	60	100		

Table 2. *Some Children Characteristic in Case and Control Group.*

Case			**Control**			
	n	**%**	**n**	**%**	**X^2**	**P**
Feeding bottle usage						
Yes	36	67.9	41	68.4	0.010	0.541
No	16	32.1	19	31.6		
Pacifier usage						
Yes	30	56.6	26	43.4	10.63	0.021
No	23	43.4	34	56.6		
Eating Disorder						
Yes	24	45.2	14	23.3	6.075	0.012
No	29	54.8	46	76.7		
Child has his/her own room						
Yes	37	69.8	49	81.6	2.17	0.105
No	16	30.2	11	18.4		
When did child sleep in another room?						
1 month – 2 years old	13	24.5	29	48.3	17.07	0.017
3-4 years old	23	43.3	21	35.0		
5-6 years old	5	9.4	5	8.3		
7 years old and above	2	3.7	4	6.6		
Still sleeping with mother	10	19.1	1	1.8		
Grade						
1-2	14	26.4	27	45.0	8.256	0.046
3-4	32	60.3	23	38.3		
5-6	7	13.3	9	16.7		
Night Waking						
Yes	20	37.7	13	21.6	3.515	0.04
No	33	62.5	47	78.4		
Tiredness						
Yes	11	20.7	8	13.3	1.108	0.212
No	42	79.3	52	86.7		
Halitosis						
Yes	29	54.7	19	31.6	6.11	0.011
No	24	45.3	41	68.4		
Teeth grinding						
Night	43	81.1	-	-	-	-
Day	10	18.9	-	-	-	-
Nail Biting Habit						
Always	12	22.6	11	18.3	16.83	0.001
Never	20	37.7	43	71.6		
Sometimes	21	39.7	6	10.1		
Pencil Biting						
Always	30	56.6	5	8.3	53.59	0.000
Never	18	33.9	9	15.0		
Sometimes	5	9.5	46	76.7		
Thumb Sucking						
Always	11	20.6	11	18.3	0.232	0.890
Never	23	43.3	25	41.6		
Sometimes	19	36.1	24	40.1		
Mouth Breathing During Sleep						
Always	15	28.2	7	11.6	33.56	0.000
Never	11	20.6	45	75.0		
Sometimes	27	51.2	8	36.6		
Snoring						
Always	24	45.2	3	5	31.62	0.000
Never	23	43.3	28	46.6		
Sometimes	6	11.5	29	48.4		
Sleeping on Back						
Always	4	7.5	8	13.3	2.53	0.470
Never	45	84.9	46	76.6		
Sometimes	3	7.6	5	10.1		
Headache						

Always	3	5.6	9	15.0	6.86	0.076
Never	17	32.1	20	33.3		
Sometimes	33	62.3	30	51.7		
Lip Biting						
Always	2	3.6	9	15.0		
Never	17	32.1	40	66.6	28.94	0.000
Sometimes	34	64.3	11	18.4		
Bedwetting						
Always	15	28.2	7	11.6	33.56	0.000
Never	11	20.6	45	75.0		
Sometimes	27	51.2	8	36.6		
School success						
Average	7	13.2	6	10.0		
Good	12	22.6	16	26.6	2.981	0.225
Excellent	34	64.2	38	63.4		
Total	53	100	60	100		

Table 3. *Comparison of Classes and Behaviors on School Success in Case and Control Groups.*

CLASSES	**Mean ± Sd**	**F**	**P**
Turkish			
Case	3.45 ± 1.01	12.908	0.000
Control	4.13 ± 0.99		
Mathematics			
Case	4.26 ± 0.76	0.642	0.425
Control	4.13 ± 0.94		
Social Studies			
Case	3.92 ± 0.64	1.090	0.299
Control	4.08 ± 0.92		
Visual Art			
Case	4.26 ± 0.76	0.642	0.425
Control	4.13 ± 0.94		
Music			
Case	3.45 ± 1.01	12.908	0.000
Control	4.13 ± 0.99		
Sports			
Case	4.26 ± 0.76	0.642	0.425
Control	4.13 ± 0.94		
Free time			
Case	4.26 ± 0.76	0.642	0.425
Control	4.13 ± 0.94		
BEHAVIOUR			
Adaptation to school culture			
Case	2.05 ± 0.84	0.887	0.348
Control	2.20 ± 0.84		
Self-care			
Case	2.05 ± 0.84	0.887	0.348
Control	2.20 ± 077		
Self-awareness			
Case	2.05 ± 0.84	0.887	0.348
Control	2.20 ± 0.77		
Communication and social interactions			
Case	1.75 ± 0.58	0.432	0.000
Control	2.38 ± 0.71		
Compliance with common values			
Case	2.05 ± 0.84	0.887	0.348
Control	2.20 ± 0.77		
Solution oriented			
Case	2.05 ± 0.84	0.887	0.348
Control	2.20 ± 077		
Attendance to Social Activity			
Case	2.43 ± 0.72	0.061	0.806
Control	2.20 ± 0.74		

Team work and responsibility			
Case	1.67 ± 0.80	30.999	0.000
Control	2.46 ± 0.70		
Efficient Studying			
Case	1.77 ± 0.66	7.312	0.000
Control	2.28 ± 0.73		
Environmental Sensitivity			
Case	1.52 ± 0.63	78.665	0.000
Control	2.60 ± 0.64		
School Mark Degree			
Case	2.28 ± 0.63	0.71	0.790
Control	2.31 ± 0.70		

evaluation).

The children of parents giving consent and stating that no tooth grinding was present were selected for the treatment as the control group. The dental practitioners firstly asked the parents whether the children grinded their teeth or not in order to form the groups. Individual tooth abrasion was checked in order to evaluate the level of tooth grinding after having asked questions about "clinical and anamnestic indicators", "diagnostic criteria of sleep bruxism", and "clinical diagnostic criteria of sleep bruxism" in order to evaluate the children regarding bruxism. According to these criteria, children with this habit were diagnosed with the consensus of at least 3 dentists. However, eleven children left the study after the study started. Having signed the informed consent, children and their mothers were asked to complete the questionnaires with items prepared according to the literature by the researchers in the presence of the researchers.

The study was explained to families, their permissions and also permission of those children who can read and write were obtained. Permissions of ethical committee and institution were obtained before study began.

SPSS v11.0 (Statistical Package for Social Sciences) for Windows was used in evaluating the data. The findings were presented as arithmetic mean, ±, standard deviation and percentages (%). The findings were evaluated at 95% confidence interval, and significance at $p<0.05$ level. Chi-square test was used in the between-groups comparison of the grouped data.

Results

Table 1 shows that there were no significant differences in demographic characteristics of case and control group except for birth type ($X^2=8.285$ $p<0.05$) *(Table 1)*.

Table 2 shows that some children characteristic in case and control group**.** There were statistically significant differences ($p<0.05$) in pacifier usage ($X^2=10.63$), eating disorder ($X^2=6.07$), sleeping time in different rooms ($X^2=17.0$), class level ($X^2=8.256$), night waking ($X^2=10.63$), halitosis ($X^2=6.11$), nail biting habit ($X^2=16.83$), pencil biting ($X^2=53.59$), mouth breathing during sleep ($X^2=33.56$), snoring ($X^2=31.62$), lip biting ($X^2=28.94$), and enuresis nocturnal enuresis ($X^2=33.56$) *(Table 2)*.

Table 3 shows that the comparison of classes and behaviours on school success in case and control groups. Comparison of class and behavior on school success shows that there were statistically significant differences ($p<0.005$) in Turkish ($F=12.908$), Music ($F=12.908$), Communication and Social Interactions ($F=0.432$), Team work and Responsibility ($F=0.061$), Efficient Studying ($F=7.312$), and Environmental Sensitivity ($F=78.66$) *(Table 3)*.

Discussion

Management of bruxism should embrace dental, pharmacological and psycho behavioural procedures. It requires a wider analysis in the aspect of concomitant disorders.

Even though there are many studies on bruxism, this problem is still hard to understand and open to discussion [8]. Involuntary jaw muscle spasm and teeth clenching are more common than teeth clenching and teeth grinding while the patient is awake. This type of bruxism occurs under stress and anxiety and approximately 20% of population has this type. The most common type of bruxism is Nocturnal Bruxism (NB) (American Psychiatric Association, 2005). NB affects approximately 8% [5%-10%] of adult population but it is hard to determine the real frequency since most people are not aware of the problem. It is more frequent on youth, but decreases with age [20,21]. The frequency for both sexes is similar. Again it is more frequent on youth, but decreases with age. The present study 19% of children have day, 81% of children have night bruxism. The number of children with bruxism on 3rd and 4th grades is more than number of children with bruxism on 5th and 6th grades and this data supports the argument that bruxism decreases with age.

Morphological factors such as ocular disorders and anatomy of orofacial region, and other pathological factors such as some dysfunctional neurotransmitters on central nerve system, stress, anxiety, genetic factors and upper respiratory tract problems can cause NB [15,21,22]. Studies on children showed that growing body of children's and central nerve system relation, ocular, psychological, and environmental factors, drugs, stress and anxiety are related to NB [14]. There are some studies that relate to emotional disorders with NB [23,24].

The present study, statistically significant differences were found between the case and control group regarding halitosis, mounth breathing during sleep, snoring, lip biting, pacifier usages, eating disorder, time of sleeping in another room, night waking, nail biting habit, and pencil biting. This result seems to support the symptoms of Bruxim.

The present study, the fact that bedwetting was more frequent in the case group supports the relationship between Bruxim and psychological factors. Neurotic symptoms such as nail biting, bedwetting can be inherited disorders; however, they can be caused by internalized problems of child's early life that could not be solved during childhood [25,26].

However, in our study there was no parent with bruxism. In addition, it was found that none of them had experienced this problem in their childhood.

Children who have coping problems reflect these problems on their communication ability, school life, making friends or family [27,28]. There is some evidence that children suffering from bruxism have more emotional problems than children with no bruxism but there are not enough studies on effects of bruxism on school success in literature. In this study the effects of bruxism on school success were analyzed. Children with bruxism scored lower in Turkish and Music classes than the participants in the control group, and this shows differences between two groups. Studies of academicians show that classes like Turkish, Music, Art, etc. help children to express themselves [27-32]. It is true that children with communication problems will be less active in activities like group work, team work, etc. The present study, children with bruxism also differ by their team work and responsibility, social interactions and communication, environmental sensitivity, and efficient studying averages. Despite these differences in behaviour there were no significant differences between school mark degrees of these two groups. Studies on quality of life of those with bruxism and those who do not have this problem showed no differences between two groups by quality of life aspect [15]. These results indicate that there are no differences for school mark degree between children, even though children with bruxism suffer from neurotic problems.

The present study bruxism had no effects on school success of children. However, there were differences in children's behaviour and study habits in school. New studies on explaining Bruxism are required and have potential to contribute to the development period of children. Understanding the main reasons behind children's behavior would help behavioural development of children in school.

Limitations of the Study

This study was carried out between February 1st, 2011 and February 1st 2012, at the Faculty of Dentistry, Pediatric Dental Clinic, in Karadeniz Technical University Trabzon, Turkey with bruxism children who lived in the city center and who were diagnosed with this habit by the dentist of this clinic. In addition, as 11 students were excluded from the study on the grounds that they did not bring their report cards at the end of the process, the control group was not equal to its case counterpart. Therefore, we recommend that this study can be replicated with a different duration, in a different clinic and with different children groups.

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