




ORIGINAL RESEARCH ARTICLE

A Survey Study on Sleep Breathing in Individuals with Malocclusion Characterized by Maxillary Transversal Deficiency and Snoring Problem

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Abstract

Purpose: The aim of this survey study is to evaluate the awareness of parents on sleep disorders and their side effects, and to measure their level of awareness to those respiratory problems can lead to dental and jaw disorders.

Materials & Methods: A survey was applied to the parents of 30 children whose average age was 11.86, who had snoring, mouth breathing, and narrow maxilla, who applied to the Department of Orthodontics, Faculty of Dentistry, Ankara University. While the first six questions of the questionnaire are about general information, the next 37 questions are about the smoking status of the parents, the child's snoring characteristics, and apnea, day and night complaints that are typically seen in children with Obstructive Sleep Apnea Syndrome.

Results: In our survey study, it was determined that the awareness of people that snoring in children can be a symptom of a disease is weak. 40% of parents do not have information on this issue. In addition to that, parents do not think that snoring seen in children while sleeping at night may influence school success.

Conclusion: In our study, it was found that the level of awareness of parents about the effects of breathing problems during sleep on jaw development was also low. Because of that, orthodontists and physicians interested in sleep should inform the society more about this issue.

Key words: maxillary transversal deficiency; sleep disorders; snoring

Introduction

Sleep is a physiological state that allows the body to rest and repair, and the communication with the environment is temporarily off. Quality sleep is an indispensable need for all people of all ages for the protection of health. Sleep disorders are diseases that negatively affect the lives of individuals.¹ Sleep disorders are defined as clinical situation that emerge from changes in the breathing pattern during sleep at a level that can be evaluated as pathological and lead to increased morbidity and mortality in these patients. Obstructive sleep apnea syndrome (OSAS) is the most important and most common situation among sleep breathing disorders.

The incidence of OSAS in the pediatric population has been reported as 0.69–3%.² However, snoring alone is more common in children. According to the reported prevalence studies, the prevalence of snoring varies between 3.2% and 12.1%^{3–8}.

If sleep breathing disorders occurring at various levels are not treated, they can cause behavioral disorders as well as significant

cardiovascular, metabolic and neurocognitive disorders.^{9–13} For this reason, it is very important for every individual to have a healthy sleep process starting from the first years of life. Physicians should be more careful in this regard and to carry out the necessary examinations and precautions as soon as possible to make appropriate interventions without delay in children with suspected sleep-related disorders.¹⁴ In this context, it has been mentioned before that dentists should be actively involved in identifying potential apnea patients and in treatment teams.^{15,16}

The incidence of OSAS in children is equal in boys and girls. Most of the children with OSAS are normal weight.¹⁴ If diagnosis or treatment is neglected or delayed, serious problems can arise for the child. Besides orthodontic and orthopedic problems; enuresis (incontinence), growth disorder, educational problems, behavioral problems, heart and respiratory disorders, and even death.^{9,17} Bourke et al., in their study in 2011, similarly reported that the academic success of children with sleep-disordered breathing decreased.¹⁸

According to the results of the survey conducted by Ersu et al. on 2746 children aged 5–13 in primary schools in Istanbul, the prevalence of habitual snoring was found to be 7%.⁵ Söğüt et al. found no difference between boys and girls in terms of snoring and OSAS prevalence in their survey conducted with Turkish children aged 3–11, and they found the prevalence of snoring to be 3.3% and OSAS prevalence to be 1.3%.⁸ Fidan et al. found the percentage of habitual snoring to be 4.8% in their study on 786 primary school children aged 7–15 years in Afyonkarahisar.⁷ According to the results of M. Şahin's (2006) thesis in Istanbul, the prevalence of snoring in adolescents aged 14–17 was found to be 4.7%. According to the results of the study conducted by Söğüt and Yılmaz among adolescents aged 12–17, the prevalence of habitual snoring was found to be 4%.⁸ With respect to the results of the survey conducted by Zaimoğlu et al. on 1516 children aged 8–12 in primary schools in Ankara, the prevalence of continuous snoring in children was found to be 6.33%.¹⁹ In the same study, although a small majority of parents (61.56%) thought that snoring could be a sign of a medical disorder, less than half (47.18%) of parents believed that snoring could cause orthodontic problems. Only one-third of parents believe that snoring can reduce school performance and/or cause hyperactivity. As a result, it can be clearly understood that OSAS is common in both Turkey and other countries.

During physical examination in children with maxillary transversal deficiency, nonspecific findings related to tonsil and/or adenoid enlargements such as nasal congestion, mouth breathing, adenoidal face and hyponasal speech may be seen during physical examination.

In addition to these findings in children, the presence of a small and retrognathic mandible increases the probability of having OSAS. In countries such as Turkey, where childhood upper airway infections are common, maxillary hypoplasia and a narrow maxilla are also one of the most important causes of OSAS. Tongue should be especially evaluated. Macroglossia is a very common finding of OSAS.

The aim of this study is to evaluate the awareness of the parents of pediatric patients with maxillary transversal deficiency on sleep breathing disorders and their side effects, and to measure the level of awareness that respiratory problems can lead to dental and jaw disorders.

Materials and Methods

This study was carried out on individuals who applied to Ankara University Faculty of Dentistry, Department of Orthodontics for treatment, had snoring and mouth breathing, understood by taking anamnesis, and had narrow maxilla in clinical examination. This study was approved by Ankara University Faculty of Dentistry Research Ethics Committee with the date of 02.07.2012 and decision number 37/4.

The inclusion criteria of these individuals are as follows: 1. Having mouth breathing problem, 2. Having an openbite profile, 3. Having frequent snoring problem during night sleep, 4. Having maxillary transversal deficiency (individuals with unilateral/bilateral lateral crossbite or head-to-head bite between the posterior teeth during clinical examination, when the mandible is positioned anteriorly in the maximum intercuspal position or class I molar/canine relationship), 5. Having a negative soft tissue profile, 6. Being in a growth and development period, 7. Does not have a systematic disease, 8. Not using medication due to an ENT-related illness in the last 6 months, 9. Absence of dysmorphism or severe craniofacial anomaly, 10. Absence of cleft lip and palate, 11. Not having chromosomal syndrome, 12. Absence of any pathology in the oropharyngeal or nasal region, 13. No history of allergy or allergic rhinitis, 14. Having sufficient physical and cognitive development. Considering all these criteria, a total of 30 individuals, 16 boys and 14 girls, were included in the study in order to apply a survey to their parents. The

mean age of the 30 individuals included in the study was calculated as 11.86 ± 2.46 years. A questionnaire about respiratory disorders was applied to everyone included in the study. Questionnaire questions were prepared by adapting the questionnaires prepared by Brouillette et al. (1984) and Carroll et al. (1995).^{2,14} The first six questions of the questionnaire are about general information such as the child's identity information, height, weight, and date of birth. The next 37 questions are multiple-choice, and include smoking status of the parents, educational status of the parents, snoring characteristics of the child, and apnea, typical of children with OSAS at night (drooling on the pillow, sweating, sleepwalking, delirium during sleep, grinding teeth, bed wetting) and daytime complaints (drowsiness, hyperactivity). At the same time, school success was asked. In addition, questions about mouth breathing and the effects of mouth breathing on jaw development were also asked in the questionnaire Table 2. Individuals were asked to answer the questions as yes, no, or sometimes, and options such as never, rarely, often, or constantly were written for the answers given as yes, to determine the incidence of the situation. Individuals who responded as 'often and always snoring' were included in the study. Frequency and percentage findings of the data were calculated Table 2.

Results

According to the findings obtained as a result of the survey, it has been determined that 30% of the patients with snoring complaints have many nights of snoring. The rate of feeling that the child's breathing stopped or struggling to breathe during sleep was determined as 23.3%. The rate of parents worried about their child's breathing during sleep was found to be 36.7%. Despite these data, which can cause serious problems, the rate of parents who do not know that snoring may be a symptom of a disease in the same group is 40%. In the study, the rate of those who did not think that snoring seen at night while sleeping could have an impact on school success was found to be 30%, while the anxiety of failing at school or falling behind in classes was 50%.

The rate of those who do not know that mouth breathing can cause tooth and jaw disorders was found to be 60%. In our study, the rate of teeth grinding during sleep was found to be 43.3%.

It was observed that the rate of sleeping with mouth open at night was 100%. It was found that the rate of children who frequently and constantly saw wetness on their morning pillow due to drooling was 57%. It was determined that the rate of delirium during sleep was 53.3% and the rate of bedwetting was 16.7%. In addition, the rate of those who did not think that situations such as talking, walking, and bedwetting during sleep could be a sign of illness and were unaware was found to be 53.3%.

Discussion

Sleep is a phenomenon that is necessary for a healthy life, and we spend one third of our lives. With sleep, our body physically and spiritually rests, renews, and prepares for a new day. There are some changes seen in every healthy individual during sleep. The system most affected by these changes is the respiratory system. Sleeping breathing disorder constitutes the whole picture of diseases ranging from simple snoring to obstructive sleep apnea syndrome (OSAS). If upper airway obstruction, which occurs at various levels, is not treated, it causes behavioral disorders as well as significant cardiovascular, metabolic, and neurocognitive disorders.^{9–13} Subjective data obtained from the patient or his/her parents guide the family and the doctor regarding the prognosis of the disease. Although snoring is the most defining symptom of upper respiratory tract disorders, the presence of pronounced day and night symptoms is remarkable in children who snore when compared to those who do not snore. Poor quality sleep has a nega-

Table 1. Frequency and percentage findings on information obtained as a result of survey

No	Questions	Answers	Frequency	Percentile
1	Who does answer the form	Mother	22	73.3
		Father	8	26.7
		Other	0	0
2	Is mother alive?	Yes	30	100
		No	0	0
3	Is father alive?	Yes	29	96.7
		No	1	3.3
4	If parents are alive	Married and living together	28	93.3
		Married and living separately	1	3.3
		Divorced	1	3.3
5	Education status (mother)	Primary school	14	46.7
		Secondary school	6	20
		High school	7	23.3
		University	3	10
		Master/Doctorate	0	0
6	Education status (father)	Primary school	3	10
		Secondary school	10	33.3
		High school	10	33.3
		University	6	20
		Master/Doctorate	1	3.3
7	Does smoking at home harm the child's health?	Yes, it does affect	30	100
		No, it does not affect	0	0
8	Does the mother smoke?	Yes	8	26.7
		No	22	73.3
9	Does the mother smoke near the child?	Yes	2	6.7
		No	28	93.3
10	Does the father smoke?	Yes	16	53.3
		No	14	46.7
11	Does the father smoke near the child?	Yes	5	16.7
		No	25	83.3
12	Is there a smoker in the house other than the mother or father?	Yes	2	6.7
		No	28	93.3

tive effect on emotional stability and cognitive function as well as physical growth.^{1,5,7} In the study conducted by Parkkinnen et al. in 2009, maxillary transversal deficiency was observed in all of the 41 patients with complaints of snoring according to the examination of the dental arches.²⁰ When we look at the studies, it is clear that there is a close relationship between respiratory problems and dental-jaw disorders. For this reason, it was thought that parents of pediatric patients with maxillary transversal deficiency should be more aware of this issue and orthodontists should be more sensitive in guiding patients on this issue. In the survey study we conducted for this purpose, in the group of 30 patients with narrow maxilla, the rate of night snoring was 100%, and the frequency of snoring was found to be many nights in 30% of the patients. The rate of feeling that the child's breathing stops or struggling to breathe during sleep was determined as 25% on average. The rate of parents who are worried about their child's breathing during sleep is more than 30%. Despite these data, the rate of parents who do not know that snoring may be a symptom of a disease in the same group is 40%. Although the number of individuals included in the survey study we conducted was not high, the fact that a high rate of various complaints were detected from a homogeneous group of 30 people with a complaint of snoring and narrow maxilla, at close ages and with a close ratio of girls to boys, showed the importance of the data. In the study of Bourke et al. in 2011 on children aged 7-12, it was reported that the academic achievement of children with sleep-disordered breathing decreased and caused neurocognitive deficiencies.¹⁸ In the study conducted by Ali et al. in 1993, it was determined that children between the ages of 4-5 with high-risk sleep breathing disorders were more hyperactive and inattentive than the control group.³ In addition, in our study, the rate of those who did not think that snoring seen at night while sleeping could have an impact on

school success was found to be 31%, and the anxiety of failing at school or falling behind in classes was found to be 50% in children. Ali et al., in their study in 1993, found that although the mother's smoking was associated with the development of sleep-disordered breathing in children, the father's smoking had no effect.³ In this group, where the rate of sleeping with the mouth open at night was 100%, the rate of seeing wetness on the pillow in the morning due to saliva flow was found to be more than 50%. It was determined that the rate of delirium during sleep was more than 50%, and the rate of bedwetting was 17%. In addition, the rate of those who do not think that situations such as talking, walking, and bedwetting during sleep may be a sign of illness and who do not have knowledge is more than 50%. Galeotti et al. found the prevalence of malocclusions to be 89.9% in 139 children aged 2 to 10 years with obstructive sleep apnea (OSA) in 2018. In addition, in our study, the rate of those who did not know that mouth breathing could cause tooth and jaw disorders in children was found as 60%.²¹ In our study, the rate of delirium during sleep was 53%, and the rate of teeth grinding during sleep was 43%. Similarly, in a study conducted by Ng et al. (2002) on pediatric patients with a habit of snoring, the habit of clenching their teeth during sleep was detected in 17 of 29 patients.¹² It has been found that teeth grinding and snoring are associated with sleep. In addition to daytime sleepiness, hyperactivity findings are also common in children with sleep disorders. In recent years, when the number of children diagnosed with hyperactivity has increased, it should not be overlooked that the cause of hyperactivity may be sleep disorders. Kaplan et al. found that parents of children with hyperactivity thought their child had many sleep disorders such as obstructive sleep apnea.²² In our survey study, the awareness of people that snoring in children may be a sign of illness is weak. With this; Parents do not think that snoring seen

Table 2. Frequency and percentage findings on information obtained as a result of survey

No	Questions	Answers	Frequency	Percentile
1	Which of the following do you think snoring in children may be a symptom of a disease?	Yes	18	60
		No	0	0
		I have no idea	12	40
		Rarely	12	40
2	If she/he is morning, what is your hearing status?	1-4 times a month	3	10
		More than once a week	6	20
		Many night	9	30
3	What is the noise level of her his snoring?	Very light	14	46.7
		A little noisy	13	43.3
		Noisy	2	6.7
		Very noisy	1	3.3
4	Have you ever seen your child stop breathing (even for a few seconds) while sleeping?	Yes	7	23.3
		No	23	76.7
5	Have you felt your child struggling to breathe while sleeping?	Yes	8	26.7
		No	22	73.3
6	Have you ever had to shake your child while she "s/he's sleeping so she can breathe again?	Yes	2	6.7
		No	28	93.3
7	Have you noticed that your child has bruises on her his lips or face while sleeping?	Yes	4	13.3
		No	26	86.7
8	Have you watched your child sleep, have you ever worried about their breathing?	Yes	11	36.7
		No	19	63.3
9	How often does your child have a sore throat?	None	1	3.3
		Rarely	20	66.7
		1-4 times a month	7	23.3
		More than once a week	2	6.7
10	Which of the following does your child complain of morning headaches?	None	8	26.7
		1 time per month	14	46.7
		1 time per week	5	16.7
		Almost every day	3	10
11	Which of the following do you think mouth breathing can cause tooth and jaw disorders in children?	Yes, can lead	12	40
		No, won't	0	0
		I don't know	18	60
12	What is the frequency of mouth breathing in your child?	None	2	6.7
		Rarely	11	36.7
		Often	10	33.3
		Continually	7	23.3
13	Which of the following does your child sleep with her/his mouth open at night?	None	0	0
		Rarely	7	23.3
		Ofen	11	36.7
		Continually	12	40
14	When you wake up in the morning, you see wetness on your child's pillow due to drooling?	None	2	6.7
		Rarely	11	36.7
		Often	10	33.3
		Continually	7	23.3
15	Which of the following states do you think that situations such as talking, walking, and bedwetting during sleep may be a symptom of a disease ?	Yes,I think	14	46.7
		No,I don't think	4	13.3
		I don't know	12	40
16	Which of the following does your child experience sweating during sleep (especially in the head and neck region)?	Yes	15	50
		No	15	50
17	Which of the following is sleepwalking in your child?	Yes	1	3.3
		No	29	96.7
18	Which of the following is your child's delirium in sleep?	Yes	16	53.3
		No	14	46.7
19	Is your child's bedwetting at night?	Yes	5	16.7
		No	25	83.3
20	Does your child grind their teeth while sleeping?	Yes	13	43.3
		No	17	56.7
21	Does your child fall asleep while watching TV or in public places?	Yes	15	50
		No	15	50
22	Would you worried about your child being sleepy during the daytime?	No, I wouldn't worry	3	18.7
		Yes, I would worry	13	81.2
23	Do you think that snoring seen at night while sleeping in children can have an effect on school success?	Yes, I think	9	69.2
		No, I don't think	4	30.7
24	Does your child have anxiety about failing at school or falling ehind in classes?	Yes	15	50
		No	15	50
25	Does your child have problems with hyperactivity or talking a lot at school or at home?	Yes	21	70
		No	9	30

in children while sleeping at night may have an effect on school success. In our study, it was found that the level of awareness of parents about the effects of breathing problems during sleep on jaw development was also low. For this reason, orthodontists and dentists should inform the society more about this issue.

Conclusion

The awareness of parents of children with orthodontic problems that snoring may be a symptom of disease is poor. 40% of parents do not have information on this issue. In addition, it was found that the level of awareness about the effects of breathing problems during sleep on jaw development was also low. For this reason, orthodontists and physicians dealing with sleep should investigate the complaints of patients who apply with the complaint of snoring during sleep, reveal the severity of respiratory problems and make necessary guidance to the patients. In addition, orthodontists and physicians should inform patient's parents that breathing problems during sleep may be a symptom of illness and/or cause jaw development disorders, and should increase the patient's parents awareness on this issue.

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Author Contributions

Study Idea / Hypothesis: S.H., T.U.T.M. Study Design: S.H., T.U.T.M. Data Collection: S.H. Literature Review: S.H., E.G.E. Analysis and/or Interpretation of Results: E.G.E., T.U.T.M. Article Writing: E.G.E. Critical Review: T.U.T.M.

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