

Evaluation of Sleep Quality and Relationship with Orofacial Dysfunction in Children

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Abstract

Objective: To evaluate sleep quality and its relationship with orofacial dysfunction in children aged 6 to 14 years. **Methods:** A cross-sectional observational study was carried out in a sample of 47 children and adolescents between 6 and 14 years of age who attended the Disciplines of Children's Clinic and Oral Health Promotion Clinic from June to August 2016 at the University Tuiuti of Paraná. To evaluate the orofacial function, the Nordic Orofacial Test - Screening - NOT-S was used and the Pittsburgh sleep quality questionnaire was used for sleep evaluation. **Results:** The analysis of the questionnaires showed that 55% of the children had good sleep quality, 38% had poor sleep quality, and 7% presented sleep disorders. Relating sleep to orofacial dysfunction measured through NOT-S, the results showed that the score ranged from 1 to 6 with a mean of 4.0 (± 1.23). This revealed an average of 4 domains of orofacial function compromised. It is observed as domain more frequently involved the domain face at rest followed by habits. **Conclusions:** The relationship between sleep quality and orofacial dysfunction revealed, for this sample, that children with poor sleep quality presented greater orofacial impairment.

Key Words: Prevalence, Orofacial function, Children, Sleep quality

Introduction

The stomatognathic system consists of bones, muscles, joints, teeth, lips, tongue, cheeks, glands, arteries, veins and nerves that perform suctioning, chewing, swallowing, phonoarticulation and breathing functions. These structures act together, so that any specific anatomical or functional modification can lead to imbalances and various types of alterations [1].

From the moment the balance of this system is modified, by factors such as the presence of parafunctional habits, oral breathing, modification of the tonicity of the masticatory muscles, modification of the pattern of chewing and swallowing, depending on the magnitude of duration and frequency we can have a panorama of orofacial dysfunction [2].

Oral dysfunction is, therefore, any muscular and/or functional alteration that interferes negatively in craniofacial growth and development, being characterized by changes in the normal pattern of the functions of the stomatognathic system [3].

The prevention of myofunctional disorders involves monitoring the growth and development of the facial skull [4]. It is of fundamental importance that oral function evaluation be performed in the first years of life and follow-up throughout childhood and adolescence, so that treatment protocols can be proposed if intervention is required [5].

Often the symptoms of sleep disorders are linked to some type of orofacial dysfunction and are underdiagnosed. Therefore, the evaluation of children in relation to orofacial function and sleep quality is of paramount importance [6].

Therefore, this study aimed to evaluate the quality of sleep and its relationship with orofacial dysfunction in children aged 6 to 14 years.

Materials and Methods

Study design

A cross-sectional observational study was developed.

Calibration and pilot study procedures

The data were collected by a single researcher, who received training and calibration.

The training and calibration process took place in two stages, the first one being theoretical and the second practicing, performed in a group of children with the same socioeconomic and age characteristics of the population to be studied. The minimum intra-examiner agreement allowed was a Kappa value of 0.80.

Data collection sample

The sample consisted of 47 children and adolescents from 6 to 14 years of age, who attended the Disciplines of Children's Clinic and Oral Health Promotion Clinic, from June to August 2016. Children or adolescents that submitted to orthodontic treatment before or during the investigation, with craniofacial lesions and patients with systemic diseases were excluded.

Research Plan for Research Subjects

At the Tuiuti University of Paraná, parents and/or guardians of children were clarified about the study, through a brief oral report of the researcher and the Free and Informed Consent, and their signature will be requested to allow the child to participate in the study.

On the day of the clinical examination, the parents were asked to complete a questionnaire on the evaluation of children's symptoms, a questionnaire on the child's sleep quality, the PSQI, and applied the examination of the orofacial functions NOT-S.

Evaluation of Orofacial Dysfunction

To evaluate the orofacial function, the Nordic Orofacial Test - Screening - NOT-S was used. This instrument with twelve items divided into interviews (six questions) and clinical examination (six clinical evaluations) presents items related to orofacial function.

In the interview, sensory function, breathing, habits, chewing and swallowing, salivation and dryness of the mouth are evaluated. In the clinical examination, the face is evaluated at rest, nasal breathing, facial expression, masticatory muscles and mandibular function, oral motor function and speech. Each domain contains 1 to 5 sub items. The examiner reads the question explaining the question and asks supplementary questions if he or she deems it necessary. The examiner then interprets the response based on evaluation criteria and records the results.

Interview responses are categorized as "yes", "no" and "unrated item". For each "YES" answer, the item receives a value of 1. Functions that have more than one question having a "YES" answer in one or more of the questions receive a score 1. In the clinical evaluation the individual performs some actions requested by the examiner. From the comparison with photographic standards contained in a standard illustrated manual the examiner classifies the function performed by the individual as "impaired" or "unimpaired." The domain of a function receives value 1 if it has at least one function classified as "impaired". Thus, the NOT-S score ranges from 0 to 12 (with 6 points from the interview with the 6 points of the clinical examination). The higher the score, the greater the number of functions or domains involved. Infants or coryza will be scheduled for another occasion.

Evaluation of Sleep Quality

For sleep evaluation, the Pittsburgh Sleep Quality Questionnaire was used. This instrument was translated and validated for use in the Portuguese language of Brazil⁷ and consists of 10 questions.

The questionnaire consists of 19 self-administered questions and 5 questions answered by your roommate. The 19 questions are grouped into 7 components with weight distributed in a scale of 0 to 3. The scores of these components are then summed to produce a global score, which ranges from 0 to 21, where the higher the score, the

worse the quality of sleep. An overall PSQI score > 5 indicates that the individual is experiencing major difficulties in at least 2 components, or moderate difficulties in more than 3 components [7].

Statistical Analyzes

The data collected in this study were organized and submitted to univariate statistical analysis (descriptive: frequency of variables), bivariate (association tests and/or correlation and comparison between groups) using the SPSS 20.0 IBM program.

Ethical Aspects

According to Resolution No. 466 of the National Health Council, of December 12, 2012, the research began after the approval of the Research Ethics Committee of the INC with registration of document number 1.651.689).

Results

The study consisted of 47 children aged 6 to 14 years, who attended the UTP health clinic and/or child health clinic from June to August, 2016. The mean age of the children was 8.82 years with standard deviation of 2.13. Analysis of the responses revealed that 55% of the children had good sleep quality, 38% had poor sleep quality, and 7% had a sleep disorder.

Regarding orofacial dysfunction measured through NOT-S, the results showed that the score ranged from 1 to 6 with an average of 4.0 (± 1.23). This revealed an average of 4 domains of orofacial function compromised.

The frequency of the compromised domains is shown in *Table 1*. The domain face at rest followed by habits is observed as the most frequently affected domain.

The relationship between sleep quality and the NOT-S score revealed that children with poorer sleep quality presented higher scores on NOT-S, that is, they were related to a greater number of domains of orofacial function compromised (*Table 2*).

The relationship between sleep quality and the symptoms of the children reported by the parents revealed that frequent headaches and night-grinding habits were related to poorer sleep quality (*Table 3*).

Table 1. Distribution of orofacial impairment in children. (n=47)

Domain	Condition	Frequency	%
Sensory Function	Not committed	41	87,2
	Committed	6	12,8
Breathing related to snoring	Not committed	32	61,8
	Committed	15	31,9
Habits	Absent	9	19,1
	Presence	38	80,9
Chewing and swallowing	No	15	31,9

	Yes	32	68,1
Salivation	Not committed	40	85,1
	Committed	7	14,9
Dry mouth	Not committed	21	44,7
	Committed	26	55,3
Face at rest	Not committed	7	14,9
	Committed	40	85,1
Nasal Breathing	Not committed	42	89,4
	Committed	5	10,6
Facial expression	Not committed	37	78,7
	Committed	10	21,3
Masticatory muscles and mandibular function	Not committed	47	100
	Committed	0	0
Oral motor function	Not committed	47	100
	Committed	0	0
Speaks	Not committed	38	80,9
	Committed	9	19,1

Table 2. Distribution of NOT-S score in sleep quality categories. (n=47)

SCORE / NOT-S					P*
Sleep Quality	Mean (DP)	Medium	Minimum	Maximum	0,004
Good	3,54	3,50	1	6	
Bad	4,39	4,00	3	6	
Sleep Disorder	5,67	6,00	5	6	
*Kruskall – Wallis					

Table 3. Distribution of symptoms reported by parents in relation to sleep quality. (n=47)

		Good	Bad	Sleep Disorder	P
Does your child have frequent headaches?	YES	6	6	3	0,025
	NO	20	12	0	
Does your child have pain to move the jaw?	YES	2	3	1	0,370
	NO	24	15	2	
Have you noticed if your child has noises in TMJs when he chews or opens his mouth?	YES	4	3	0	0,750
	NO	22	15	3	
Does your child feel stiffness or tiredness or pain in the jaw?	YES	3	6	1	0,193
	NO	23	12	2	
Does your child have difficulty or pain in opening his mouth?	YES	2	0	0	0,430
	NO	24	18	3	
Does your child complain of TMJ pain, forehead, tempora around the ears or cheeks?	YES	5	6	2	0,174
	NO	21	12	1	
Does your child have a habit of chewing gum?	YES	13	6	3	0,089

	NO	13	12	0	
Does your child have a nail biting habit?	YES	14	8	2	0,709
	NO	12	10	1	
Does your child have a habit of grinding teeth at night?	YES	5	12	2	0,004
	NO	21	6	1	
Does your child have a habit of grooming his teeth?	YES	7	7	2	0,333
	NO	19	11	1	
Does your child feel fatigue or pain in the jaw when he chews?	YES	7	7	2	0,333
	NO	19	11	1	
Does your child have anxious nervous tense behavior?	YES	21	16	3	0,573
	NO	5	2	0	
*qui-square					

Discussion

In this study we had a relatively high prevalence of children with the presence of sleep disorders and poor sleep quality. In a study evaluated the frequency of childhood sleep problems in 2 pediatric clinics in Las Vegas in a larger sample [8], the prevalence of children with sleep disorders was lower compared to our study, probably due to the size and recruitment plan of the sample.

In the analysis of the relationship between sleep quality and orofacial dysfunction through the NOT-S questionnaire, it was observed that children with poorer sleep quality presented greater orofacial impairment. Thus, we can understand a reported in other study [9]: sleep disturbances may occur due to craniofacial morphology. Thus, we understand that with the correction of maxillofacial structure and oral function, help can be given in the treatment of sleep disorders.

The relationship between sleep quality and the symptoms of the children reported by the parents revealed that the presence of frequent headaches and the habits of grinding teeth at night were related to poor sleep quality. Two studies conducted in 2009 [10, 11] report in their articles that morning headaches are daytime manifestations of OSAS, and according to Chaves Junior CM, et al [12], OSAS is a disease of anatomical alterations of the upper airway and craniofacial skeleton associated with changes necrosis of the pharynx, thus being an orofacial dysfunction.

Other studies [13-16] mention that teeth grinding and/or clenching during sleep may be associated with sleep bruxism, which is a disorder of stereotyped and periodic movements resulting from the rhythmic contraction of the masticatory muscles. This condition is not a disease, but when exacerbated it can cause imbalance and alteration of the orofacial structures.

By factors such as these, it is understood these authors [6,15,16] report that the symptoms of sleep disorders are linked to some type of orofacial dysfunction and are underdiagnosed. For this reason, the evaluation of children in relation to orofacial function and sleep quality is of paramount importance.

Conclusion

For this sample, we conclude that children with poorer sleep quality presented greater orofacial impairment. Complaints about sleep disorders in children are common, and they can be signs of both psychiatric and systemic disorders. However, the sleep of the children is not approached in a correct way by the health professionals. Thus, it is considered of fundamental importance to perform the evaluation of sleep quality and oral function in the first years of life, and follow-up throughout childhood and adolescence, so that treatment protocols can be proposed if any intervention.

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