



Pesquisa Brasileira em Odontopediatria e
Clínica Integrada

ISSN: 1519-0501

alessandrouepb@gmail.com

Universidade Estadual da Paraíba
Brasil

Samohyl, Martin; Nadazdyova, Anna; Hirjak, Martin; Hirosova, Katarina; Vondrova, Diana;
Argalasova, Lubica; Jurkovicova, Jana

The Analysis of Selected Malocclusion Risk Factors: A Pilot Study

Pesquisa Brasileira em Odontopediatria e Clínica Integrada, vol. 17, núm. 1, 2017, pp. 1-7

Universidade Estadual da Paraíba
Paraíba, Brasil

Available in: <http://www.redalyc.org/articulo.oa?id=63749543051>

- How to cite
- Complete issue
- More information about this article
- Journal's homepage in redalyc.org

redalyc.org

Scientific Information System

Network of Scientific Journals from Latin America, the Caribbean, Spain and Portugal

Non-profit academic project, developed under the open access initiative



Original Article

The Analysis of Selected Malocclusion Risk Factors: A Pilot Study

Martin Samohyl¹, Anna Nadazdyova², Martin Hirjak³, Katarina Hirosova¹, Diana Vondrova¹, Lubica Argalasova¹, Jana Jurkovicova¹

¹Institute of Hygiene, Faculty of Medicine, Comenius University in Bratislava, Slovak Republic.

²Department of Stomatology and Maxillofacial Surgery, Faculty of Medicine, Comenius University in Bratislava, Slovak Republic.

³Department of Public Health, St. Elizabeth's College of Health and Social Sciences, Bratislava, Slovak Republic.

Author to whom correspondence should be addressed: Martin Samohyl, Institute of Hygiene, Faculty of Medicine, Comenius University in Bratislava, 24 Spitalska, Bratislava 813 72, Slovak Republic. Phone: +421 902 660 880. E-mail: martin.samohyl@fmed.uniba.sk.

Academic Editors: Alessandro Leite Cavalcanti and Wilton Wilney Nascimento Padilha

Received: 03 September 2017 / Accepted: 28 September 2017 / Published: 04 October 2017

Abstract

Objective: To analyse selected malocclusion risk factors, their exposure time and overall malocclusion risk scores. **Material and Methods:** The self-prepared questionnaires were collected at dental practitioners' waiting rooms from 6/2014 to 12/2015. The study group consisted of patients treated by dental braces (n=82; 15.5±4.4 years) and the control group consisted of other patients not treated by dental braces (n=45; 17.6±4.7 years). Data were processed by the statistical program SPSS using descriptive statistics. To verify the hypothesis was used two sample t-test to compare the average exposure scores and the exposure time between the two groups. To determine associations between categorical variables was used Chi-square test. Statistical significance was set at p-value <0.05. **Results:** Our results confirmed longer exposure times in all studied malocclusion risk factors, in the case of pacifier sucking the difference was significant (p=0.001). The longest exposure time was found in mouth breathing in the study group (12.2±6.5 years). The lip sucking/chewing cannot be confirmed as a malocclusion risk factor. The study group had higher level of an overall mean risk score (19.8±11.5) compared the control group (16.1±12.1), although not significant. It can be concluded that non-nutritive sucking habits and/or mouth breathing could have damaging effect to normal teeth development. **Conclusion:** Malocclusions could be preventable, thus we recommend setting up educational programs for dentists and paediatricians as well as for parents focusing on the improvement of oral health knowledge.

Keywords: Malocclusion; Oral Health; Habits.

Introduction

Risk factors for oral health disorders include poor oral hygiene, tobacco use, harmful alcohol use [1,2], and unhealthy diet [3]. Taking care of oral health is an integral part of the overall health care [4]. Oral health has recently become an increasingly debated topic. Although it does not have a major impact on the overall morbidity and mortality, dental health significantly affects the quality of life. Appearance and aesthetics are an integral part of any social interaction, and, therefore, healthy and beautiful teeth are slowly becoming a very important beauty factor.

It may happen that erupted permanent teeth are too big for one's mouth and they simply do not fit in, hinder the growth of other teeth and the resulting effect is variously crooked teeth. The growth of the jaws improves this defect. However, if the defect persists after the age of nine, children are advised to visit an orthodontist. Various oral bad habits as thumb sucking, finger biting [5] and/or pacifier sucking [6], tongue thrusting, lip biting and/or sucking, bruxism, and mouth breathing can produce destructive effects on the dentoalveolar structures. Some factors, like duration of the bad habit per day, degree and intensity of bad habit, are responsible to produce lasting and detrimental effects [7].

Crooked teeth are not only an aesthetic but also health problem since oral hygiene is in this case more difficult – teeth are easily spoiled, there is a higher risk of gingivitis etc. [8]. Over- and underbites may cause problems with chewing, pronunciation, faster tooth abrasion, wrenching or premature teeth loss. Braces therefore make sense even in adulthood, although the ideal time to visit an orthodontist is around the age of seven.

The aim of this paper is to analyze selected malocclusion risk factors, their mean exposure time, and average point score for each risk factor in the sample of dentists' surgeries patients treated by dental braces.

Material and Methods

Sample

The sample was recruited from patients attending dental surgeries in Bratislava region. The requirement for patients' participation was age up to 25 years.

Data Collection

It was used a self-prepared questionnaire consisting of several questions regarding basic demographic data and 11 questions regarding selected malocclusion risk factors and their exposure time (finger and/or pacifier sucking, lips sucking/chewing, and mouth breathing) that are relevant in malocclusion development. Questionnaires were collected from June /2014 to December /2015. Subjects were excluded from the study in the case of an incompletely filled out questionnaire. Overall, we collected 127 completed questionnaires; the response rate was 90.1%. The questionnaire was anonymous and respected privacy of those involved.

The overall exposure risk score was calculated due to the exposure to multiple risk factors in some respondents, as follows: the exposure time was divided into four categories and assigned point scores (i) <2 y. = 0, (ii) $2-4$ y. = 5, (iii) $5-10$ y. = 10, (iv) >10 y. = 15 and a mean score was subsequently calculated for all exposed risk factors.

Statistical Analysis

Data were processed by the statistical program SPSS using descriptive statistics (percentages, means, and standard deviations). To verify the hypothesis we used two sample t-test to compare the average exposure scores and the exposure time between the two groups. To determine associations between categorical variables we used chi-square test. Statistical significance was set at p-value <0.05 .

Results

Respondents were divided into two groups. The first group consisted of patients treated with dental braces – the study group ($n=82$, 47.6% of males; mean age 15.5 ± 4.4 years) and in the second one were subjects without dental braces – the control group ($n=45$, 53.3% of males; mean age 17.6 ± 4.7 years). Basic characteristics of the sample are presented in Table 1. The majority of subjects in both groups were in the age group of 11–19 years, students, schoolchildren with incomplete elementary education, and those living in the urban area.

Table 1. Basic characteristics of the sample ($n=127$).

Variables		Study Group ($n=82$)		Control Group ($n=45$)	
		n	%	n	%
Gender	Male	39	47.6	24	53.3
	Female	43	52.4	21	46.6
Age [years]	Mean ($x\pm SD$)	15.5 ± 4.4		17.6 ± 4.7	
	8–10	15	18.3	3	6.8
	11–19	51	62.2	21	46.6
	20–25	16	19.5	21	46.6
Occupation	Student	57	69.5	27	60.0
	Unemployed	6	7.3	4	8.8
	Employed	19	23.2	14	31.2
Education level	Incomplete elementary	47	57.3	18	40.0
	Elementary	10	12.2	5	11.1
	Secondary	21	25.6	22	48.9
Place of residence	University	4	4.9	0	0
	Urban	43	52.4	39	86.7
	Rural	39	47.6	6	13.3

The analysis of selected malocclusion risk factors, mean exposure time, and mean scores in the study and control groups are presented in Table 2.

The mean exposure time for pacifier sucking was significantly longer in the study group than in the control group (2.2 ± 0.9 ; 1.6 ± 0.6 years, respectively; $p=0.001$). However, this risk factor prevalence was not significantly higher in the control group.

Finger (thumb) sucking prevalence was higher in the study group (36.6%). However, we did not find a significant difference in the exposure time between the study and the control group (6.3 ± 2.1 ; 5.1 ± 2.2 years, respectively; $p > 0.05$). Similar results we found in the case of lips sucking/chewing: a slightly higher prevalence in the study group, not significant difference in the mean exposure time.

The longest exposure time (in both study and control group) was found in the mouth breathing – 12.2 ± 6.5 years in the study group, 11.1 ± 4.1 years in the control group ($p > 0.05$).

The mean risk score (calculated as a mean of all risk factors exposition scores) was not significantly higher in the study group (19.8 ± 11.5) compared the control group (16.1 ± 12.1).

In the whole sample, the mean exposure time for finger/thumb sucking was significantly longer compared to pacifier sucking (5.9 ± 2.1 and 2.0 ± 0.8 years, respectively; $p = 0.000$). Effect of gender was not confirmed concerning neither the mean duration of finger/thumb sucking ($p = 0.236$) nor pacifier sucking ($p = 0.493$).

Table. 2. The analysis of selected malocclusion risk factors, mean exposure time, and mean score in the study and control groups (n=127).

DMD Risk Factors		Study Group (n = 82)	Control Group (n = 45)	p
Pacifier sucking				
	n	55	33	
	[%]	67.1	73.3	
	OR (95% CI)	0.74 (0.31–1.78)		0.464
Exposure time	[years] $\bar{x} \pm SD$	2.2 ± 0.9	1.6 ± 0.6	0.001
Finger/thumb sucking				
	n	30	13	
	[%]	36.6	28.9	
	OR (95% CI)	1.42 (0.60–3.36)		0.381
Exposure time	[years] $\bar{x} \pm SD$	6.3 ± 2.1	5.1 ± 2.2	0.110
Lips sucking/chewing				
	n	21	11	
	[%]	25.6	24.4	
	OR (95% CI)	1.06 (0.43–2.69)		0.885
Exposure time	[years] $\bar{x} \pm SD$	11.9 ± 4.0	11.8 ± 5.1	0.984
Mouth breathing				
	n	45	19	
	[%]	54.9	42.2	
	OR (95% CI)	1.66 (0.75–3.71)		0.172
Exposure time	[years] $\bar{x} \pm SD$	12.2 ± 6.5	11.1 ± 4.1	0.410
Mean score (n=127)	$\bar{x} \pm SD$	16.2 ± 10.8	13.3 ± 11.7	0.187

OR – odds ratio; CI – confidence interval.

Discussion

Unhealthy oral habits may be involved in the aetiology of a malocclusion, since they may affect development of the orofacial region. These bad habits (most often they are non-nutritive sucking habits), when repeated excessively, become harmful, contributing to orofacial muscular imbalance associated with alterations in bone growth, dental malposition, and dentofacial abnormalities [9,10].

The use of pacifier will not cause permanent changes in dentition if it is stopped until 2 or 3 years of age. However, the use of pacifier after 3 years of age has harmful effects on dentition development, and if it is used longer than up to the age of 5 years, these effects would be more severe [10-12]. According to some authors, pacifier sucking can be even more detrimental than finger sucking [13]. Our study showed that the mean exposure time for pacifier sucking in the study group was significantly longer (2.2 ± 0.9 years) than in the control group (1.6 ± 0.6 years; $p=0.001$), however, a higher percentage of pacifier sucking subjects was found in the control group. The continuous prolonged non-nutritive sucking habits produce changes in occlusal characteristics and dental arch [14].

Finger (thumb) sucking is the most common bad oral habit [15,16] and it is reported that its prevalence is between 13% to 100% in some societies [11]. This bad habit is usually stopped in 4-5 years of age [17]. While most pacifier-suckers usually break their habits in the first few years of life, finger-suckers are still active much later [18]. This fact has been confirmed by our study as well: the mean time of finger/thumb sucking in the whole sample was significantly longer than pacifier sucking. Because of not only the duration but also the intensity of the sucking habit can have a negative influence on teeth development, thumb sucking could be divided into 2 types. Active – a heavy force from the muscles. Passive – this habit is without skeletal changes. In the case of active thumb sucking habit, it is better for a child not to be blamed, teased, offended, humiliated or punished, because these methods will increase the anxiety and consequently increase the incidence of the habit [11,13].

The mean exposure time for finger sucking in our study group was longer, although not significantly (6.3 ± 2.1 years) compared the control group (5.1 ± 2.2 years). Some results suggest that there is a relationship between the parents' education level, the child feeding methods and the sucking habit, without significant effect of gender [18] the latter has been confirmed by our results as well. Some children, who do not stop this bad habit, will give it up when their permanent teeth erupt, but there is a tendency to continue the sucking habit even into adult life. Nowadays, the level of stress is increasingly higher, and stress is a powerful stimulus in sucking habit.

There are little information on the lower lip sucking or chewing, to which practitioners attribute less clinical consequences. However, lower lip sucking could be a harmful habit, which appears frequently in children, especially during situations requiring increased attention and mental concentration [19]. Our study did not confirm the detrimental effect of lip sucking on malocclusion – the mean exposure time for lip sucking in the study group (11.9 ± 4.0 years) is only a little different from the control group (11.8 ± 5.1 years) and the percentages of exposed subjects are nearly the same in both groups as well.

A previous study confirmed the relationship between mouth breathing as an aggravating factor for malocclusion [20]. In our study, a higher but not significant exposure time of mouth breathing was found in the study group (12.2 ± 6.5 years).

The mean score that represents the sum of expositions to all risk factors showed not significantly higher scores in the study group. It can be concluded that non-nutritive sucking habits and/or mouth breathing could have damaging effect to normal teeth development. However, our results are not fully relevant due to the sample size and its representativeness. Due to the smaller size of the control group, we were not able to achieve statistically significant results, and so we were unable to generalize the outcomes. Therefore, we will continue in data collection in order to increase the number of subjects in the control group.

Conclusion

Pacifier sucking was confirmed as the most relevant malocclusion risk factor. On the other hand, we cannot confirm lip sucking/chewing as a malocclusion risk factor. Malocclusions can be preventable by modifying non-nutritive sucking behaviours, thus we recommend setting up educational programs for dentists and paediatricians as well as for parents focusing on the improvement of oral health knowledge.

The results can be used in programs for pregnant women aiming at exclusive breastfeeding that reduces the risk of acquiring non-nutritive sucking habits. Health professionals should inform expectant mothers about detrimental effects caused by incorrect use of pacifiers or finger-sucking habits as well as about the dentofacial advantages of breastfeeding.

References

1. Stanciak J, Hrasnova K, Novotny J, Jansky P. Intoxications and habit forming substances in the elderly people. *J Health Sci Manage Public Health* 2007; 8(1):33-39.
2. Stanciak J. Alcohol intoxication and other addictive substances in pre-hospital care (in Slovak). In: Krzysztof J, Stanciak J. *Selected Aspects Medical Emergency in the Carpathian Euroregion*. Lublin: TP Media; 2014. p. 130-36.
3. World Health Organisation. Oral health (WHO). Oral health. [Accessed on 10 April 2012]. Available at: <http://www.who.int/mediacentre/factsheets/fs318/en/>.
4. Mazanek J, Kindl L, Milcova K, Stankova H. *Dentistry for dental hygienists and dental nurse* (in Czech). Praha: Grada Publishing; 2015.
5. Miotto, MHMB, Lima SMS, Barcellos LA, Campos DMKD, de Almeida ER. Early weaning as a risk factor for deleterious oral habits in 3-5 year-old children. *Pesq Bras Odontopediatria Clín Integr* 2016; 16(1):393-402. doi: 10.4034/PBOCI.2016.161.41.
6. Araújo LG, Coelho PR, Guimarães JP. Association between oral habits and temporomandibular disorders: Do children imitate parents in the adoption of certain habits? *Pesq Bras Odontoped Clin Integr* 2011; 11(3):363-9. doi: 10.4034/pboci.v11i3.789.
7. Kamdar J, Al-Shahrani I. Damaging oral habits. *J Int Oral Health* 2015; 7(4):85-7.
8. Ulehla T. Dental hygiene – the basis for good health (in Czech). *Prakt lékáren* 2014; 10(4):146-9.
9. Rangeeth BN, Moses J, Reddy VK. A rare presentation of mucocoele and irritation fibroma of the lower lip. *Contemp Clin Dent* 2010; 1(2):111-14. doi: 10.4103/0976-237X.68596.
10. Turgeon-O'Brien H, Lachapelle D, Gagnon PF, Larocque I, Maheu-Robert LF. Nutritive and nonnutritive sucking habits: a review. *ASDC J Dent Child* 1996; 63(5):321-7.
11. Shahraki N, Yassaei S, Moghadam MG. Abnormal oral habits: A review. *J Dent Oral Hyg* 2012; 4(2):12-15.
12. Poyak J. Effects of pacifiers on early oral development. *Int J Orthod Milwaukee* 2006; 17(4):13-16.
13. Lindner A, Modéer T. Relation between sucking habits and dental characteristics in preschoolchildren with unilateral cross-bite. *Scand J Dent Res* 1989; 97(3):278-83.

14. Warren JJ, Bishara SE, Steinbock KL, Yonezu T, Nowak AJ. Effects of oral habits' duration on dental characteristics in the primary dentition. *J Am Dent Assoc* 2001; 132(12):1685-93.
15. Warren JJ, Bishara SE. Duration of nutritive and nonnutritive sucking behaviors and their effects on the dental arches in the primary dentition. *Am J Orthod Dentofacial Orthop* 2002; 121(4):347-56. doi: 10.1067/mod.2002.121445.
16. Diwanji A, Jain P, Doshi J, Somani P, Mehta D. Modified bluegrass appliance: A nonpunitive therapy for thumb sucking in pediatric patients – A case report with review of the literature. *Case Rep Dent* 2013; 2013:1-4. doi: 10.1155/2013/537120.
17. Tarvade SM, Ramkrishna S. Tongue thrusting habit: A review. *Int J Contemp Dent Med Rev* 2015; 2015:1-5. doi: 10.15713/ins.ijcdmr.26.
18. Farsi NM, Salama FS. Sucking habits in Saudi children: prevalence, contributing factors and effects on the primary dentition. *Pediatr Dent* 1997; 19(1):28-33.
19. Barbería E, Lucavechi T, Cárdenas D, Maroto M. An atypical lingual lesion resulting from the unhealthy habit of sucking the lower lip: clinical case study. *J Clin Pediatr Dent* 2006; 30(4):280-282.
20. Ruellas ACO, Ruellas RMO, Romano FL, Pithon MM, Santos RL. Tooth extraction in orthodontics: an evaluation of diagnostic elements. *Dental Press J Orthod* 2010; 15(3):134-157. doi: 10.1590/S2176-94512010000300017.