Socio-environmental Factors Associated with Dental Malocclusion

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Worldwide, with the economic growth malocclusions recorded a significant increase, which has led to their ranking as the third most widespread oral health problem after dental caries and periodontal disease being considered the third priority among oral problems by the World Health Organization. The aim of this study consisted of an evaluation of the socio-environmental factors associated with dental malocclusion. The clinical characteristics of 125 children (from 5 to 12 years old, with no previous orthodontic treatment), were evaluated by means of a visual examination . Information about the socio - environmental characteristics of the children's families were collected by means of a questionnaire addressed to their parents/guardian. The prevalence of malocclusions was 67.5% (84). Regarding the types of malocclusions included in this study and the most prevalent were: increased overjet 33.33% (28), deep overbite 21.42% (18), posterior crossbite 9.52% (8) and anterior open bite 2.38% (2). The results underline the need to reduce social disparities in oral health among children. In conclusion, it was observed that the socio-environmental factors influence the curative dental needs of children. Some associations were found between malocclusion and societal/ behavioral parameters

Keywords: socio-environmental factors, dental malocclusion, mixed dentition

Malocclusions are described as developmental disorders which affect the craniofacial complex, that result from the interaction of genetic and environmental factors [1]. Malocclusions are not a disease but rather a set of dental deviations which, in some cases, can influence quality of life by causing changes in dental and facial aesthetics and function [2]. Worldwide, with the economic growth malocclusions recorded a significant increase, which has led to their ranking as the third most widespread oral health problem after dental caries and periodontal disease being considered the third priority among oral problems by the World Health Organization [3]. Studies regarding the evolutionary approach of human behavior evidenced changes in occlusal characteristics of population most likely due to predominance of softer foods in their dietary habits, non-nutritive sucking habits such as the use of pacifier and thumb sucking, respiratory problems, lack of breastfeeding or early weaning [4, 5]. Additionally, the concept of some dentists that caries of temporary teeth is left untreated because they fall anyway, lead to extensive untreated caries lesions and premature primary tooth loss compromising the occlusion of children [4].

The importance of various environmental risk factors in the incidence of malocclusion have been previously reported. These include socioeconomic status and behavioral factors. Socioeconomic status is assessed by variables such as income, educational level and occupation, which fundamentally structure the condition or environmental circumstance [6]. Socioeconomic status determines social and material circumstances, individual psychological and behavioral factors, accessibility to health services, and even biological predispositions and processes [7]. Prevention is also an attractive and viable alternative for the treatment of occlusal changes, given the possibility of controlling the environmental variables that contribute to its occurrence. Furthermore, prevention and interception simplify or even avoids orthodontic corrective treatments, which are often costly and can be inaccessible to most of the population. However, there have been relatively few studies on malocclusion and socio-economic status, and such studies are mainly from Europe and Brazil [8, 9].

Taking into account the changes caused by modern living conditions and the consequent development of certain types of malocclusion, the present study aimed to evaluate the occurrence of malocclusions in mixed dentition, checking the most widespread malocclusion in children of Constana, and investigate its association with socio -environmental factors.

Experimental part

Material and methods

This study consisted of an evaluation of the oral health condition of the child population estimating malocclusions and associated factors. The study complied with all aspects of ethics and protection of anonymity for those participating in the study. The inclusion of children and parents to participate in this study depended on obtaining permission from the children's parents/guardians, for this purpose. Parents/guardians that agreed on their children's participation expressed their verbal agreement.

The sample for malocclusion analysis consisted of 125 children of both genders with primary and mixt dentition. Every examined child was within the selected age group (from 5 to 12 years old, with no previous orthodontic treatment), and had previous consent of their parents. The exclusion criteria were children who were outside the stipulated age of 5 to 12 years; those with debilitated health; whose parents did not grant permission for participation in the study; or who did not respond satisfactorily to the questionnaire.

Examination method

The clinical characteristics of the children were evaluated by means of a visual examination performed by a team that included an examiner (dentist) and two fifth grade dental students (note taker) from the Faculty of

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Dental Medicine from Constana. The visual inspection of the children's oral cavity was performed in the faculty facilities under the dental unit light, using a dental probe and mirror, respecting all precautions regarding patient biosafety. The children were seated on a dental unit chair, facing the source of light and the examiner sat near the child. The note taker stood a meter away facing the examiner, allowing correct data recording and the visualization of the procedure. Data obtained from the examination and the identification information of children were written down on a clinical chart. The clinical examination recorded aspects of anterior open bite, deep overbite, overjet, and crossbite. At the end of the examination, parents received information on their child's examination and oral health.

Questionnaire

Information about the socio - environmental characteristics of the children's families were collected by means of a questionnaire addressed to their parents/ guardian. This instrument addressed issues related to socio-economic characteristics (family income, parents' educational level, home ownership, government assistance, parents' occupation), and family environment (number of residents in the house, children living with both biological parents, schoolchildren's caregivers outside of school hours) and behavioral - type of lacteal feeding and non-nutritive sucking habits. Data on the children's gender were also collected. The questionnaire used was adapted in Romanian language by the psychologists from the Center for Counselling and Career Guidance, Ovidius University of Constanta, based on previous studies from Paula et al. [10].

Results and discussions

From the initial sample size, the dropout rate was 3.84% (5). The dropout was caused by children unauthorized to participate in the research, those who refused to be examined. A total of 125 children were examined. The gender distribution was similar, 51.2% female (64) and 48.8% male (61). Other sample characteristics are shown in table 1. Regarding the answer rate, highest number of unanswered information was 18,4% (23) for the family income variable.

In this sample the prevalence of malocclusions was 67.5% (84). Regarding the types of malocclusions included in this study the and the most prevalent were: increased overjet 33.33% (28), deep overbite 21.42% (18), posterior crossbite 9.52% (8) and anterior open bite 2.38% (2). There was a high prevalence of increased overjet, showing association with an inverse linear trend regarding children's age and maternal level of education. A direct linear trend was found concerning pacifier use and the duration of use. An association was found between anterior open bite and frequency of pacifier use, as well as number of children. There was no association between anterior open bite and thumb sucking or between this malocclusion and family income.

Children with sucking habits were almost twice more likely to have at least one tooth in posterior crossbite compared to those with no sucking habit.

The results indicated that a subject older than 8 years were at higher risk to have an increased overjet. Family income was positively associated with overjet, children of lower income families showed a greater probability for increased overjet.

Children of 8-11 years showed a higher risk of having mild and moderate to severe overbite. Also, children with increased sucking habit duration showed a lower risk of moderate to severe overbite.

This study addressed for the first time the malocclusion conditions in preadolescent children and the association of social and behavioral factors with a wide range of malocclusion features.

Analyzing the findings of this study and comparing them with the literature we may consider that the prevalent sucking habits, possibly reflecting the reported increase in sucking habits of children feeling insecure, lonely, or stressed [11].

Also, the association between overbite and sucking duration [12, 13], can be possibly explained by the link of sucking habits with tongue thrust and abnormal swallowing pattern [14].

Presence of posterior crossbite can be associated with age and the presence (and duration) of a sucking habit [15].

Malocclusions have been treated as a public health issue for being a prevalent condition in modern society [16]. Early orthodontic intervention is beneficial because younger children have high self-esteem and body image and expect orthodontics to improve their lives [17-19]

The results underline the need to reduce social disparities in oral health among children. The inequality starts from living conditions and unequal access to proper dental awareness/education and care. Short and long-term strategies should be considered as a remedy for these issues of modern society to reduce inequalities as much as possible. Considering these aspects, we propose some possible recommendations.

Variables		n	(%)
Age (years)	5-6	10	8
	7-8	33	26.4
	9-10	42	33.6
	11-12	40	32
Gender	Female	64	51.2
	Male	61	48.8
Bottle feeding	Never	12	9.6
	< 2 years	43	34.4
	>2 years	70	56
Pacifier sucking	Never	51	40.8
	< 2 years	33	26.4
	>2 years	41	32.8
Thumb sucking	Never	117	93.6
	< 2 years	2	1.6
	>2 years	6	4.8

Table 1
SAMPLE DESCRIPTION ACCORDING TO AGE, GENDER, FAMILY INCOME, AND CHILDREN'S SUCKING HABITS (n = 125)

Short-Term recommendations:

-annual dental screening, including orthodontic screening starting at age 7 years, the time recommended by the American Association of Orthodontists [20-22] or at least by the age of 8-8.5 years, the expected time for achieving the early mixed dentition.

-documentation of mouth breathing and sucking habits, followed by referral for treatment of these habits by the pediatrician, during the child's regular medical screening.

For long-term recommendations, we can take into account situations already existing:

In Scandinavian countries characterized by their universal healthcare coverage, severe malocclusion is treated free of charge until a certain age (usually 18 years) and at low cost thereafter [23-25].

In USA, for the Medicaid patients, interceptive orthodontic treatment has been effective in reducing malocclusion severity; some subjects might not require additional comprehensive orthodontic treatment at later stages [26-28]. Focus on prevention may be more effective in the initial phases.

Conclusions

In conclusion, it was observed that the socio-environmental factors influence the curative dental needs of children. Malocclusion was more severe in preadolescent school children from lower socioeconomic background, indicating social disparities in oral health. Some associations were found between malocclusion and societal/behavioral parameters (e.g., sucking habits, with open bite and posterior crossbite; anterior open bite was closely associated with the use of pacifier, the duration and frequency of use, and the number of children.). It should be considered the fact that this study did not analyze the degree of cavity presence and its possible association with other types of abnormalities, eg crowding among mandibular incisors with DMFT score (indicative of oral hygiene) and these aspects can be considered for further studies.

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