



EVALUATION OF THE PREVENTIVE AND INTERCEPTIVE ORTHODONTIC TREATMENT NEED OF AN INNER CITY GROUP OF ANATOLIAN TURKISH CHILDREN

ABSTRACT



Objectives: The aim of this study is to examine the oral and dental health among the primary school children in a city in Turkey and to identify the need for preventive and interceptive practices.

Materials and Methods: Our study was carried out on total 334 individuals, which include 135 male and 199 female primary school students between 6 and 9 years of age in Sivas, Turkey. These individuals were examined intraorally in the school environment. In order to determine the need for preventive and interceptive orthodontic treatment, pre-prepared data forms were filled in during the examination and existing problems were recorded. Collected data were evaluated through the program of SPSS (Ver:15.0).

Results: The number of the individuals, who needed at least one of the preventive and interceptive orthodontic treatments was 319 (95.5%). The most required one among these practices was found as fissure sealant with a ratio of 52.1%. When the relationship between age and gender data and other parameters was evaluated, a significant relation was observed only between age and the fissure sealant, space maintainer need and posterior cross bite.

Conclusions: The need for preventive and interceptive treatments was quite high and it is a fact that a special attention should be paid to these applications.

Keywords: Preventive orthodontics, interceptive orthodontics, malocclusion.

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INTRODUCTION

Malocclusion is a defect in the craniofacial complex which effects the development of teeth, jaw and facial area and chewing system.¹ Malocclusion is not a public health threat, however it is a prevalent public health problem.² While the preventive orthodontic applications are used to allow the development of normal occlusion and prevent the occurrence of malocclusion,³ the interceptive orthodontic practices are used for the cases of early stage of malocclusion to allow the development of normal occlusion.³

These applications are applied with fixed orthodontic appliances during the primary or early mixed dentitions, and used in order to reduce the length and severity of orthodontic treatments.⁴ With the help of these practices, the skeletal malocclusions at early ages could be rehabilitated and the possibility of extraction could be lowered despite the need of orthodontic treatment at later ages. Meanwhile, the length of treatment shortens and risk of enamel decalcification and periodontal disease after the treatment decreases. Accordingly, the treatment satisfaction rates of the parents increase.⁵⁻⁶ Other advantages of these practices are that they are easier and cheaper than the treatments with fixed orthodontic appliances and could be applied by experienced dentists.⁷⁻⁹

Various studies were carried out in order to determine the preventive and interceptive treatment need in other countries and populations.^{10,11} Onyeaso *et al.*¹⁰ found out that 60.5% of the study group needed at least one of the preventive and interceptive treatments, and Prabhakar *et al.*¹¹ found out that 63.5% of the study group needed orthodontic treatment. In these studies, the parameters such as cross bite, caries of primary and permanent teeth, deleterious oral habits, molar relationship, need for a habit breaker were examined.

The need for these treatments should be determined in order to popularize the preventive and interceptive practices and establish the skilled employment. Thus, required social policies can be developed accordingly.¹² When the literature was reviewed, it was found out that there has been no

study in Turkish society to identify the need for preventive and interceptive treatments, although a few studies were carried out in order to identify the need for orthodontic treatment.^{13,14}

The objective of this study is to predetermine the conditions, effecting the primary school children, which can cause malocclusion at later ages, to identify the need for preventive and interceptive applications and to arrange the necessary guidance by raising an awareness among the parents about the benefits of early intervention.

MATERIALS AND METHODS

Ethical Consideration

Before the screening study, the necessary permission was obtained from the directorates and parents. This study was approved also by the ethics committee. (Ethics committee decision no: 2018-12/13, Date: 05.12.2018)

This study was carried out on 350 children at the ages of 6-9 who have participated in oral health screening studies conducted in the village primary schools in Sivas.

Inclusion criteria

Healthy children of the ages 6-9 were included in the study, who received no orthodontic treatment before and diagnosed with no mental or physical disorder.

Exclusion criteria

Children, who are out of the determined age range, who were diagnosed with any physical or mental disturbance, previously received or still receiving orthodontic treatment were excluded from this study. Accordingly, one child who was diagnosed with a mental disorder and 15 children who were out the age range were excluded from the study, and the study was carried out on total 334 individuals.

Examination

Two certified orthodontists, working blind to each other's findings, examined every child. Before the study, two researchers were trained on the examination method and calibrated. Intra-examiner agreement was set at 93%.

The children in upright sitting position on chair were examined by using mouth mirror and sond. Following parameters were evaluated during the examination: age, gender, DMFT, dft scores, oral hygiene, openbite, deepbite, anterior cross bite, posterior cross bite, anterior crowding, space maintainer need, fissure sealant need, fluorine need, impacted teeth, habit breaker appliance need. Previous studies have been used to construct the parameters.

Need for habit breaker, we look at thumbsucking habit and tongue thrusting. Need for fluorine, we look at the scoring of dmft. It was said that the need for fluoride in caries active mouth with high dmft score. A caliper was used to measure crowding. It is thought that there is a need for treatment in patients with a diameter of more than 7mm crowding. The presence of a negative overjet was described as anterior crossbite. The presence of more than 2-4 mm overbite was described as deepbite.

Statistical Method

Data collected from our study were uploaded to the SPSS program (Ver: 15.0, IBM Corp. New York, USA). Average, standard deviation and frequency distributions were studied in data evaluation. Chi square test was applied in the evaluation of the relationship between results and data of age and gender, and differences of $p < 0.05$ were accepted as statistically significant. Inter and intra examiner agreement were evaluated by using the weighted kappa statistics.

RESULTS

Gender distribution of the children included into our study was 135 (40.4%) boys and 199 (59.6%) girls. The average age of the children was found as 7.55. Number of the individuals who needed at least one of the preventive and interceptive treatments was 319 (95.5%).

Average DMFT and dft scores and statuses of oral hygiene can be seen respectively in Table 1 and Figure 1.

Table 1. Distribution of DMFT and dft scores of the individuals

	n	Minimum	Maximum	Mean	SD
DMFT	334	0	8.00	0.34	0.84
dft	334	0	13.00	3.32	3.01

SD: Standart deviation

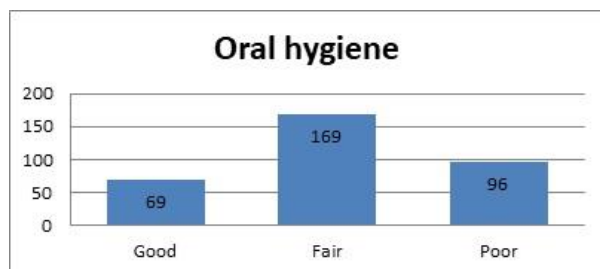


Figure 1. Distribution of participants according to their oral hygiene statuses

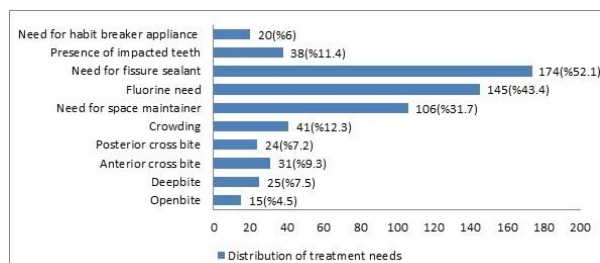


Figure 2. Distribution of participants based on the data obtained from the survey

Distribution of individuals according to the data obtained from the study is shown in Figure 2. Relationships between the results and data of age and gender are shown in Table 2 and Table 3. There is a significant relationship between age and fissure sealant need, space maintainer need and posterior cross bite ($p < 0.05$). There is no significant relationship between other parameters and age and gender ($p > 0.05$).

Table 2. Distribution of participants' needs for preventive and interceptive treatments by age and gender

Preventive and interceptive applications		Gender		Age			
		Female	Male	6	7	8	9
Fissure sealant							
	Presence	104	70	31	37	55	51
	Absence	95	65	46	38	45	31
				p=0.941		p=0.041*	
Habit breaker appliance							
	Presence	13	7	2	7	4	7
	Absence	186	128	75	68	96	75
				p=0.648		p=0.194	
Fluorine							
	Presence	84	61	25	30	49	41
	Absence	115	74	52	45	51	41
				p=0.653		p=0.078	
Space maintainer							
	Presence	57	49	17	21	46	22
	Absence	142	86	60	54	54	60
				p=0.152		p=0.003*	

* Significant at p<0.05

Table 3. Distribution of participants with various malocclusions by age and gender

Malocclusions	Gender		Age				
	Female	Male	6	7	8	9	
Open bite							
	Presence	10	5	4	4	1	6
	Absence	189	130	73	71	99	76
				p=0.789		p=0.205	
Deep bite							
	Presence	11	14	7	4	9	5
	Absence	188	121	70	71	91	77
				p=0.137		p=0.718	
Anterior cross bite							
	Presence	20	11	7	10	6	8
	Absence	179	124	70	65	94	74
				p=0.701		p=0.429	
Posterior cross bite							
	Presence	16	8	2	2	13	7
	Absence	183	127	75	73	87	85
				p=0.523		p=0.018*	
Crowding							
	Presence	25	16	7	10	16	8
	Absence	174	119	70	65	84	74
				p=0.846		p=0.462	
Impacted teeth							
	Presence	27	11	13	7	13	5
	Absence	172	124	64	68	87	77
				p=0.160		p=0.161	

* Significant at p<0.05

DISCUSSION

Early diagnosis and treatment of malocclusions can prevent the possible future orthodontic disorders. The severity of malocclusions which may occur at later terms can be reduced through early treatments.¹⁵

Usha Mohandas *et al.*¹⁶ have found that the incidence of any malocclusion and the need for early orthodontic treatment was approximately 63%. The study carried out by Onyeaso *et al.*¹⁷ in Ibadan region of Nigeria has revealed that 27% of the children at the ages of 7-10 needed at least one of the preventive and interceptive treatments. This rate was found in our study as 95.5%. It can be

considered that the reason of this high rate is that the study was carried out in a region of low socioeconomic level.

Burhan *et al.*¹⁸ could not find a significant relationship between the preventive and interceptive treatment need and gender. This finding jibes with the findings of Prabhakar *et al.*¹¹ and Haider *et al.*¹⁹ However, our study has revealed a significant relationship between age and the needs for fissure sealant and space maintainer.

Presence of untreated caries in primary teeth may result in malocclusion because of the reasons such as shortening of dental arch, deterioration of contact surfaces and early loss of these teeth.³ Haider's¹⁹ study on 6-year-old children has determined caries or restoration affected at least one surface of primary first molars (37.5%), primary second molars (40.6%), permanent first molars (17.24%) and primary canines (0.0%); these rates in the 9-year-old age group are 61.1%, 66.36%, 21.82% and 0.0%.¹⁹ The scores of DMFT and dft were examined in our study and the average values of 0.347 and 3.326 were found respectively. DMFT score is quite low and dft score is relatively high.

Oral hygiene was classified as good, mean and bad. The objective of oral hygiene examination was to estimate the potential risk of caries. The oral hygiene was determined good for 69 individuals, mean for 169 individuals and bad for 96 individuals. Our study has revealed that the region, where the screening was carried out, needed a training on oral hygiene.

Early loss of primary teeth is considered as the most common local factor of malocclusion. Karaiskos *et al.*³ carried out a study in Canada in 2005 and determined early primary teeth extraction with a rate of 29.4% in the age group of 9-year-olds and with a rate of 11.9% in the age group of 6-year-olds. Another study carried out in South Africa has revealed a high prevalence for both untreated caries and early extraction of primary teeth.²⁰ Preservation of the space has a big importance in the presence of early extraction of primary teeth, since the remaining tooth in the posterior of the cavity may use this space. A space

maintainer can be used to protect the extraction space. It has been found in our study that 106 individuals (31.7%) needed space maintainer. The reasons for this are that the families do not know the importance of space maintainer and they can not go to the university or hospital to receive health services due to low socioeconomic conditions.

During the evaluation of the need for fissure sealant, we have planned our study on the assumption that fissure sealant application is needed for the individuals with high risk of caries and with colored fissure; and during the evaluation of the need for fluorine application, we have based our study on the fact that the person had a carious-active mouth. In our study, the need for fissure sealant application was found as 52.1% and the need for fluorine application was found as 43.4%.

Oral habits and their potential effects should be determined early.²¹ Olatokunbo da Costa *et al.*¹² found that almost half of the population they studied had an oral habit. Büyükbayraktar *et al.*²² determined oral habits in 62.5% of the girls and 52.1% of the boys. In our study, we have found that 20 individuals (6%) had oral habits and all of them needed habit breaker appliances.

Karaiskos *et al.*³ determined open bite in 10.0% of the 6-year-old group and 6.7% of the 9-year-old group. In our study, we determined open bite in 15 (4.5%) individuals. Open bite can be observed in the presence of oral habits like thumb-sucking. During the medical history taking in our study, the common reason was determined as thumb-sucking, as well.

Some of the occlusal characteristics (increased overjet, posterior cross-bite, anterior cross-bite, etc.), which occur during the primary dentition and continue during the mixed dentition as well, may cause malocclusion in the early mixed dentition.²³ Posterior cross bite should be treated early, since the presence of posterior cross bite may result in dental malocclusions and skeletal deviations. Likewise, the affected tooth in the presence of anterior cross bite may display periodontal problems such as mobility and

fracture. Grippauda *et al.*²⁴ found that cross bite was one of the most common malocclusions. Karaiskos *et al.*³ found a higher prevalence for anterior cross bite than the posterior cross bite. The anterior cross bite was 10.5% in the group of 6-year-olds and 11.9% in the group of 9-year-olds, however the posterior cross bite was 7.8% in the group of 9-year-olds and 3.0% in the group of 6-year-olds. Similarly, Olatokunbo da Costa *et al.*¹² found a prevalence for anterior cross bite higher than the posterior cross bite. In our study, the prevalence for anterior cross bite (9.3%) was higher than the prevalence of posterior cross bite (7.2%) as well.

A study carried out in Lagos University Teaching Hospital has revealed that the most common dental feature was anterior and posterior crowding.²⁵ In another study, severe crowding (> 7mm) in the upper teeth was highest (30.5%) in Class II division 2 malocclusion group.²⁶ The most common dental feature determined in our study was crowding with a rate of 41%.

Prabhakar *et al.*¹¹ found deep bite in 56 and impacted teeth in 15 of 337 individuals. In our study, the incidences of impacted teeth and deep bite were 38 (11.4%) and 25 (41%) respectively.

This study has several limitations. Firstly, X-rays could not be obtained during the examination due to the ethical principles and physical conditions, therefore congenital missing teeth, supernumerary teeth and different dental anomalies could not be determined.

Number of the patients examined is limited and the results concern only one region. In order to generalize the results, more extensive studies should be carried out in larger patient populations.

CONCLUSIONS

This study has revealed a very high prevalence of preventive and interceptive treatment need, therefore not only corrective treatments but also preventive and interceptive treatments should be given more importance. In the light of these findings, we believe that the preventive and interceptive practices should be included in the educational health programs and the families

should be informed about the importance of this issue.

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None.

CONFLICT OF INTERESTS STATEMENT

None.

Belli Bir Yöreye Ait Türk Çocuklarında Koruyucu ve Durdurucu Ortodontik Tedavi İhtiyacının Değerlendirilmesi

ÖZ

Amaç: Bu çalışmanın amacı Sivas ili ilköğretim çocuklarında ağız ve diş sağlığı ile ilgili değerlendirme yapmak ve koruyucu ve durdurucu uygulamalara olan ihtiyacı belirlemektir. **Gereç ve Yöntemler:** Çalışmamız Sivas ili ilköğretim okullarında eğitim gören, 6 ile 9 yaş arası 135 erkek ve 199 kız toplam 334 birey üzerinde yürütülmüştür. Bireyler okul ortamında ayna ve sond kullanılarak muayene edilmiştir. Koruyucu ve durdurucu ortodontik tedavi ihtiyacını belirleyebilmek için önceden hazırlanmış olan veri formları muayene sırasında doldurularak mevcut problemler kaydedilmiştir. Elde edilen veriler SPSS (Ver:22.0) programında değerlendirilmiştir. **Bulgular:** Koruyucu ve durdurucu tedavilerden en az birine ihtiyaç duyan bireylerin sayısı 319 (%95,5) olarak bulunmuştur. Bu uygulamalar içerisinde %52,1 oranıyla en çok fissür örtücüye ihtiyaç duyulmaktadır. Yaş ve cinsiyet verilerinin diğer parametrelerle ilişkisine bakıldığında sadece yaş ile fissür örtücü, yer tutucu ihtiyacı ve posterior cross bite arasında anlamlı ilişki bulunmuştur. **Sonuçlar:** Koruyucu ve durdurucu tedavilere duyulan ihtiyacın yüksek olması, bu uygulamalara özel önem verilmesi gerektiğini göstermektedir. **Anahtar Kelimeler:** Koruyucu ortodonti, durdurucu ortodonti, maloklüzyon.

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