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Analysis of Family Physicians' Awareness and Knowledge about Orthodontic Treatment

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Abstract

Aim: The aim of this study was to determine the level of awareness and knowledge of family physicians regarding oral and maxillofacial evaluations and orthodontic treatment.
Methods: The survey was designed as 21 questions and sent to family physicians in Turkey. The participants were asked about their age, gender, place of work, years of experience, regions evaluated during the routine examination, and level of orthodontic awareness and knowledge.
Results: A total of 400 family physicians completed the survey. There was a significant difference in the referral rate of family physicians working in university hospitals ($p<0.01$), years of experience ($p<0.001$), whether evaluating the head and neck region ($p<0.05$), and the jaw positions during a routine examination ($p<0.001$) and for those who performed an intraoral examination and who checked dental crowding ($p<0.001$). When evaluating the head and neck region and dental crowding in routine examinations, a significant difference was found in the number of experienced family physicians ($p<0.05$).
Conclusion: Awareness of the facial profile and having orthodontic knowledge was relatively high in the family physicians who participated in our study; however, their number of oral and maxillofacial evaluations were found to be low in routine examinations. It would be beneficial to organize seminars, conferences, and symposiums to increase the awareness and knowledge of family physicians on the oral and maxillofacial region and how to conduct efficient orthodontic evaluations.

Keywords*:* Awareness, Family Physicians, Malocclusion, Orthodontics

Background

Oral and dental health problems are among the most common globally, and most people are affected by at least one of these health problems during their lifetime (1, 2). Oral and dental health affects people physically and psychologically, as well as affecting people's enjoyment of life, and common activities such as speaking, chewing, tasting food, socializing, and their social well-being (3). One of the most common dental problems is malocclusion. Malocclusion in terms of orthodontics means not only dental disorders but also skeletal incompatibilities between the jaws (4). Although individuals with malocclusion do not have specific signs and symptoms, they may have difficulty in chewing and speaking, and have aesthetic complaints (5). In studies evaluating the Dental Health Component Index (DHC) of the Index of Orthodontic Treatment Need (IOTN), the need for orthodontic treatment (4-5) was found to be 34% in 534 children aged 12-14 in Jordan, 15% in 3500 children aged 12-14 in England, and 37% in 219 children aged 13-14 in Turkey (6).

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The oral region is an integral part of the body, and there are oral manifestations of many systemic diseases that need to be treated in both healthy and medically frail children. It is important to inform parents about orthodontic treatment as early orthodontic treatment can help prevent further malocclusion (4,7). Traditionally, general medical education regarding oral and dental health is limited. If primary care physicians can evaluate oral and dental health, diagnose these patients, and refer them to the appropriate dentist or orthodontist, it is possible to reduce the symptoms of patients and accompanying costs (7).

Orthopedic treatment prior to the pubertal growth spurt of a developing adolescent patient is an appropriate first step before considering the correction of a mild to moderate skeletal class II problem by orthognathic surgery. Skeletal class III patients with maxillary insufficiency gain significant benefits from early orthopedic treatment as well (8). There are many studies in the literature demonstrating that the skeletal effects obtained by early orthopedic treatment of class III malocclusions are greater than those of late treatment (9,10). Moreover, patients who undergo correction of class III malocclusions by orthognathic surgery in adulthood will mostly probably incur increased treatment costs, and there is a possibility of complications such as paresthesia, infection, recurrence, bleeding, and development of resorptive events in the temporomandibular joint (11,12). The challenge to make orthognathic surgery financially feasible has led to many oral and jaw surgeons to lose interest in orthognathic surgical procedures; hence, leading to a decrease in the number of surgeons agreeing with the correction of dentofacial deformities. These reasons have forced orthodontists and patients to settle for suboptimal treatment results without surgical correction (12).

It has been suggested that family physicians and other primary care providers should play a role in improving oral health in children. However, there is little published information on the willingness of family physicians or other non-dentistry healthcare professionals to follow their patients' oral health (7). The aim of this study was to investigate whether family physicians examine their patients for orthodontic problems and whether they have sufficient knowledge and awareness about basic orthodontic principles.

Methods

A survey was conducted on family physicians who were randomly selected from all family physicians in Turkey. The study was approved by the Ordu University clinical research ethics committee (No: 2021/218). The questionnaire was specially designed by the researchers using Google Forms© and sent to family physicians via email and social media platforms. The sample size was calculated in G*Power software (version 3.1.9.2; Axel Buchner, Universität Düsseldorf, Düsseldorf, Germany), and the total sample size (effect size: 0.50) required to detect a moderate effect with 95% power was found to be 80 family physicians for this study. However, the study was performed with 400 family physicians to strengthen the results of the study. The survey consists of three parts and 21 questions. The first part, which consisted of demographic information such as age, gender, place of work, and year of occupation was recorded. In the second part, the participants were asked what the average number of patients was they examined daily and about the regions they evaluated during the routine examination. In the third part, questions about orthodontic awareness and knowledge were asked by the participants.

Statistical Analysis

Statistical analysis was performed using SPSS software (SPSS for Windows version 20.0; SPSS Inc, Chicago, Illinois). Data were evaluated for normal distribution using the Shapiro-Wilks test. Pearson's chi-square and Fisher's exact tests were used to measure family physicians' awareness and knowledge of orthodontic treatment. Logistic regression analyses were performed to evaluate orthodontic treatment awareness and knowledge by age, gender, workplace location, the average number of patients examined daily, and professional years. Model fit was confirmed using the Hosmer-Lemeshow test. Statistical significance was adopted as $p<0.05$.

Results

The demographic data of the family physicians regarding the study and their knowledge of orthodontic treatments are presented in Table 1. The number of female family physicians (216/400, 54%) was higher than male family physicians (184/400, 46%). When the family physicians participated in the study, they were grouped according to the years of professional experience; those with five years or less experience were 203 (50.75%), while those with more than five years of experience were 197 (49.25%). When the working places of the family physicians participating in the study were evaluated, the number of employees working in a university hospital was found to be higher (183/400, 45.75%). The number of family physicians who had knowledge of orthodontic

treatment was high (349/400, 87.5%), and most family physicians learned about orthodontic treatment during their medical school education (140/400, 35%).

Parameters of family physicians related to the referral status of their patients to an orthodontist are presented in Table 2. While there was a significant difference in the referral rate of family physicians' workplace (p=0.004), it was determined that gender was not associated with referral to an orthodontist (p>0.05). A significant relationship with work experience existed among family physicians regarding referral to an orthodontist (p<0.001), and they were found to evaluate the head and neck region (p=0.014) and jaw positions during a routine examination (p<0.001), and perform an intraoral examination and check dental crowding (p<0.001).

Table 1. Demographic characteristics and orthodontic knowledge of family physicians participating in this study (n=400)

	Parameter	N	%
Gender	Female	216	54
	Male	184	46
Total examined patients per day	0-20	91	22.75
	21-40	112	28
	41-60	100	25
	60 and Over	97	24.25
Experience	5 or fewer than 5 years	203	50.75
	More than 5 years	197	49.25
Workplace	University Hospital	183	45.75
	State Hospital	41	10.25
	Family Health Center	176	44
Knowledge of orthodontic treatment	Yes	349	87.25
	No	51	12.75
Where did you first hear about orthodontic treatment?	Family	45	11.25
	Friends	72	18
	My Dentist	119	29.75
	Internet/social media/TV	24	6
	During Medicine Education	140	35
Have you had orthodontic treatment?	Yes	94	23.5
	No	306	76.5
Do you have any first-degree relatives or people you know who have had orthodontic treatment?	Yes	259	64.75
	No	141	35.25
Do you refer your patients to the orthodontist when you see a mismatch in their facial profile, jaws or dental crowding?	Yes	270	67.5
	No	130	32.5
What do you think about the time of the first orthodontist examination?	Before puberty	52	13
	After puberty	14	3.5
	Once the first permanent teeth have erupted	221	55.25
	Once the first deciduous teeth have erupted	113	28.25

Table 2. Comparison of responses of family physicians based on the patients they referred to an orthodontist

	Answer	Referral to Orthodontist-Yes	Referral to Orthodontist-No	P-value
Gender	Male	131	53	0.145[P]
	Female	139	77	
Workplace	University Hospital	113	70	0.004[F]
	State Hospital	23	18	
	Family Health Center	134	42	
Total examined patients per day	0-20	57	34	0.548[P]
	21-40	74	38	
	41-60	72	28	
	60 and over	67	30	
Experience	5 or less than 5 years	120	83	<0.001[P]
	More than 5 years	150	47	
Do you evaluate the head and neck region of your patients in your routine examination?	Yes	229	97	0.014[P]
	No	41	74	
Do you evaluate your patients' jaw positions in your routine examination?	Yes	103	20	<0.001[P]
	No	167	110	
Do you evaluate respiratory disorders and snoring in your routine examination?	Yes	172	68	0.029[P]
	No	98	62	
Do you perform oral cavity evaluation in your routine examination?	Yes	175	62	0.001[P]
	No	95	68	
Do you look for dental crowding in your oral examination?	Yes	125	22	<0.001[P]
	No	145	108	
Do you think jaw disorders will affect the facial profile?	Yes	270	129	0.325[F]
	No	0	1	
Do you think early detection of the facial profile disorders is important?	Yes	268	122	0.003[F]
	No	2	8	
Do you think oral habits such as thumb sucking, Nail biting, mouth breathing will spoil the facial profile and dental occlusion?	Yes	264	123	0.095[P]
	No	6	7	

P: Pearson chi-square test, F: Fisher's Exact test

A comparison of the answers of family physicians according to their professional experience is presented in Table 3. When evaluating the head and neck region and dental crowding in routine examinations, a significant difference was found in the number of experienced family physicians ($p<0.05$). Also, awareness of bad oral habits such as thumb sucking, nail-biting, and mouth breathing that may impair the occlusion of the teeth and facial profile was found to be statistically significantly lower in experienced family physicians compared to inexperienced physicians ($p<0.001$).

Table 4 shows the multivariate analysis results for the effect of gender, workplace, experience, and the number of patients examined daily when referred to the orthodontist. The effect of any of these parameters on the referral of patients to an orthodontist by family physicians does not create a statistically significant result ($p>0.05$).

Table 3. Comparison of responses of family physicians based on their years of experience

	Answer	Inexperienced	Experienced	P-value
Gender	Male	64	120	<0.001[p]
	Female	139	77	
Workplace	University Hospital	144	39	<0.001[p]
	State Hospital	33	8	
	Family Health Center	26	150	
Total examined patients per day	0-20	69	22	<0.001[p]
	21-40	63	49	
	41-60	34	66	
	60 and Over	37	60	
Do you evaluate the head and neck region of your patients in your routine examination?	Yes	151	175	<0.001[p]
	No	52	22	
Do you evaluate your patients' jaw positions in your routine examination?	Yes	55	68	0.108[p]
	No	148	129	
Do you evaluate respiratory disorders and snoring in your routine examination?	Yes	128	112	0.206[p]
	No	75	85	
Do you perform oral cavity evaluation in your routine examination?	Yes	116	121	0.384[p]
	No	87	76	
Do you look for dental crowding in your oral examination?	Yes	47	100	<0.001[p]
	No	156	97	
Do you think jaw disorders will affect the facial profile?	Yes	202	197	1.000[F]
	No	1	0	
Do you think early detection of facial profile disorders is important?	Yes	196	194	0.338[F]
	No	7	3	
Do you think oral habits such as thumb sucking, nail biting, mouth breathing will spoil the facial profile and dental occlusion?	Yes	201	186	0.011[F]
	No	2	11	
Referral to orthodontist	5 or less than 5 years	120	150	<0.001[p]
	More than 5 years	83	47	

P: Pearson chi-square test, F: Fischer's Exact test

Table 4. Multivariate analysis for the effect gender, experience, workplace, and number of cases on referral to orthodontist

		P-value	Wald	95% CI
Gender	Male	0.801	0.064	0.672-1.675
	Female*			
Experience	5 or less than 5 years	0.057	3.629	0.331-1.016
	More than 5 years*			
Total examined patients per day	0-20	0.719	0.130	0.579-2.211
	21-40	0.787	0.073	0.591-2.001
	41-60	0.643	0.214	0.618-2.181
	60 and over*			
Workplace	University Hospital	0.280	1.165	0.383-1.320
	State Hospital	0.183	1.777	0.251-1.301
	Family Health Center*			

*Reference parameter

Discussion

It is critical to determine the level of awareness and knowledge of family physicians regarding orthodontic treatment. While there are studies in the literature evaluating the knowledge of family physicians on oral health (7-13), no comprehensive research has been found on the orthodontic knowledge and awareness of family physicians. The purpose of this research was to investigate whether family physicians have enough awareness and knowledge about basic orthodontic principles and whether they guide their patients in terms of orthodontic problems.

Children are affected by numerous oral and facial disorders that have the potential to impair function and compromise their quality of life (14). Although oral and dental diseases are preventable

problems, their effects can last a lifetime if left untreated. Family physicians working in primary care are the first professionals who can diagnose problems and provide guidance, especially for patients who have limitations in accessing oral health services (13). It has been reported that one of the most cited reasons for the low physician participation in oral health care is the lack of oral health competencies in the education and training of physicians (15,16).

Besides the fact that early orthodontic treatments help prevent further development of malocclusion, they also reduce plaque accumulation in individuals. Dentofacial anomalies may also lead to increased peer bullying among children and adolescents. In the orthodontic literature, it has been reported that people experience ridicule because of their teeth and facial features (17). With early correction of malocclusions, children's self-esteem may increase, and hence the probability of being bullied due to their teeth and jaw appearance may decrease (18).

Regarding the responses of pediatricians' awareness and knowledge of the prevalence of common orthodontic anomalies, it ranged from 31% to 95% in their patients (19). In our study, it was determined that family physicians reported jaw discrepancies that could affect the facial profile (399/400, 99.75%) and that early diagnosis of jaw disorders was important (390/400, 97.5%).

Regarding responses of pediatricians' awareness of the prevalence of common orthodontic anomalies reported, it ranged from 31% to 95% in their patients (19). In our study, it was determined that family physicians reported jaw discrepancies that could possibly affect the facial profile (399/400, 99.75%) and that early diagnosis of jaw disorders was important (390/400, 97.5%).

Early diagnosis of orthodontic anomalies and referral to relevant specialties are important in terms of orthodontic treatment costs and preventing possible complications (8,10,11). In a study, while there was no significant relationship between the demographic characteristics of pediatricians, such as age and gender, and their referral rates to an orthodontist, the referral rate of pediatricians who had over 21 years of experience to an orthodontist was found to be 12.75 times higher (19). Mahmood et al. (20) reported that male dentists and dentists with more than six years of professional experience had higher orthodontic awareness. In our study, it was determined that the gender of family physicians did not affect the referral rates to an orthodontist, and in cases where their professional experience was more than five years, the referral rate was increased by 17%. It was observed that professional experience has an important role in the awareness of non-orthodontist dentists, pediatricians, and family physicians, regarding referring their patients for orthodontic treatments.

Koufatzidou et al. (19) reported that the rate of examination of teeth (52/96, 54%) and jaws (49/96, 51%) was lower, although pediatricians examined the oral mucosa (95/96, 99%), tongue (93/96, 97%), and teeth (83/96, 86%) of the patients a. Gonsalves et al. (7) reported that 95% of family health service directors consider oral health care knowledge to be included in specialization education. According to the results of our study, the rate of family physicians who evaluated the oral cavity in their routine examination was 59.25%, family physicians who evaluated dental positions were 36.75%, and family physicians who evaluated jaw positions were 30.75%. These rates were found to be lower compared to the rates of the pediatricians surveyed by Koufatzidou et al. (19). Orthodontic referral of patients by family physicians who did not evaluate their jaw, mouth, and teeth in their routine examination was found to be significantly lower in our study. Although it is thought that family physicians do not have enough time to detect oral, dental health, and orthodontic anomalies, there is no statistically significant result in our study that indicates that the average number of patients examined per day affects the rate of referral to the orthodontist. It would be beneficial to organize seminars, conferences, and symposiums to increase the level of evaluation of oral cavity regions, dental health, and jaw positions in routine examinations by family physicians, and to increase their awareness and knowledge of orthodontics.

There are studies in the literature on the level of orthodontic awareness of teachers, which is another profession that can detect malocclusion disorders in the early stages (21-23) In the study conducted by Rafighi et al. (21) in Iran, it was found that 21% of teachers did not know about orthodontics, this rate was 67.2% for India in the study by Mhatre et al. (22), 20.2% for Türkiye in the study by Çınarsoy Ciğerim et al. (23), and 60% for Nigeria in the study by Aikins et al. (24). In our study, the rate of family physicians lack of knowledge on orthodontic treatment was determined as 12.75%. Also, the referral rate of family physicians with a high level of knowledge of orthodontic treatment who received medical school education was found to be 67.5% in this study.

There are studies in the literature investigating other groups that can detect malocclusion in early stages such as parents, the general population, and

the patients themselves (25-27). Kumar et al. (25) reported that the general population shows moderate orthodontic awareness, on the other hand, Oshagh et al. (26) in their study reported that parents' orthodontic awareness was increased with the help of educational brochures. Grzywacz's research on 84 children aged 12 years in Poland stated that children's awareness of aesthetic disorders caused by dental and jaw anomalies was 84.5% and that girls were higher (27). In our study, the knowledge of family physicians that dental and jaw disorders can distort the facial profile was determined to be 99.7%.

To increase orthodontic awareness and knowledge, we suggest that every professional group focused on children and young people should be informed about the importance of early diagnosis of malocclusion through meetings such as symposiums, scientific conferences, and publications such as books, magazines, and brochures. Moreover, we think that dentoskeletal malocclusions should be included more in the education curricula of family physicians. We also suggest that dental education, which includes oral health, become an integral part of medical education, as it is an integral part of general health.

Conclusion

Family physicians establish a relationship with both pediatric patients and their parents from an early age. Since family physicians usually examine pediatric patients even before orthodontists, they are more likely to give advice, guidance, and referrals when necessary. Although the facial profile and orthodontic knowledge and awareness of the family physicians participating in our study were relatively high; their oral and maxillofacial evaluations were found to be low in their routine examinations. It is necessary to increase the awareness and knowledge of family physicians so they can include oral and maxillofacial checkups in their routine examinations.

Conflicts of interest: None to declare.

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