

Evaluation of temporomandibular disorder and oral health-related quality of life in adolescents with parents' divorce applying to the orthodontic clinic

Ortodonti kliniğine başvuran ebeveyni boşanmış adölesanlarda temporomandibular rahatsızlık ve ağız sağlığı ile ilişkili yaşam kalitesinin değerlendirilmesi

Ahmet KARAMAN¹ 

Esra GENÇ² 

Hikmetnur DANIŞMAN³ 

¹Department of Orthodontics, İstanbul Aydın University, Faculty of Dentistry, İstanbul, Turkey

²Orthodontic Private Practice, Kayseri, Turkey

³Department of Orthodontics, Nuh Naci Yazgan University, Faculty of Dentistry, Kayseri, Turkey

ABSTRACT

Objective: The aim of this study was to evaluate the effects of parents' divorce on temporomandibular disorders (TMDs) and quality of life in adolescents.

Methods: The study was conducted with 200 patients (124 female, 76 male), 98 of whom had married parents, and 102 of whom had divorced parents. The mean age of the patients was 16.17 ± 1.42 years. The study was a questionnaire study, and Fonseca Questionnaire and Oral Health Impact Profile-14 (OHIP-14) forms were used.

Results: It was found that patients whose parents were divorced had higher mean Fonseca TMD and OHIP-14 scores than patients whose parents were married. There is no statistically significant difference between the Fonseca and OHIP-14 scores of females and males whose parents were divorced and married.

Conclusion: The adolescents whose parents were divorced had statistically significantly higher means of the Fonseca TMD and OHIP-14 scores than those with married parents, and these adolescents had a higher rate of having moderate Fonseca TMD.

Keywords: Fonseca's questionnaire, oral health, quality of life, divorced parents, temporomandibular joint disorders

ÖZ

Amaç: Bu çalışmanın amacı, ebeveyn boşanmasının adölesanlarda temporomandibular bozukluk ve yaşam kalitesi üzerindeki etkilerini değerlendirmektir.

Yöntemler: Çalışma 98'i evli anne babaya sahip, 102'si anne babası boşanmış 200 hasta (124 kadın, 76 erkek) ile yapılmıştır. Hastaların yaş ortalaması $16,17 \pm 1,42$ yıl idi. Çalışma anket çalışması olup, Fonseca Anketi ve Ağız Sağlığı Etki Profili-14 (OHIP-14) formları kullanıldı.

Bulgular: Anne-babası boşanmış hastaların Fonseca TMD ve OHIP-14 puan ortalamalarının, anne-babası evli olan hastalara göre daha yüksek olduğu bulunmuştur. Anne-babası boşanmış ve evli olan kadın ve erkeklerin Fonseca ve OHIP-14 puanları arasında istatistiksel olarak anlamlı bir fark yoktur.

Sonuç: Anne-babası boşanmış ergenlerin Fonseca TMD ve OHIP-14 puan ortalamaları evli ebeveynlere göre daha yüksek olup bu farklar istatistiksel olarak anlamlıdır ve bu ergenlerin orta düzeyde Fonseca TMD'ye sahip olma oranı daha yüksektir.

Anahtar Kelimeler: Fonseca anketi, ağız sağlığı, yaşam kalitesi, boşanmış ebeveynler, temporomandibular eklem rahatsızlıkları

INTRODUCTION

The American Academy of Orofacial Pain defines temporomandibular disorder (TMD) as a group of painful and/or dysfunctional cases related to masticatory muscles, temporomandibular joints, and the associated structures.¹ The TMD prevalence and symptoms differ significantly across populations.² The World Health Organization (WHO) ranks the TMD as the third most prevalent stomatological disorder following dental caries and periodontal diseases.³ Studies indicated that approximately 60%-70% of the general population exhibited a sign or symptom of a type of TMD at a certain point in life; however, only 5% of them needed treatment in this respect.⁴ TMD has multi-factor etiology with both somatic and psychological components. Its most common symptoms are jaw pain, restricted and painful jaw movements, neck pain, headache, and clicking and frictional sounds.⁵

Received/Geliş Tarihi: 18.10.2021

Accepted/Kabul Tarihi: 21.01.2022

Corresponding Author/Sorumlu Yazar:
Ahmet KARAMAN
E-mail: ahmeet.ka@hotmail.com

Cite this article: Karaman A, Genc E, Danişman H. Evaluation of temporomandibular disorder and oral health related quality of life in adolescents with parents' divorce applying to the orthodontic clinic. *Curr Res Dent Sci.* 2022; 32(3): 208-214.



Content of this journal is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.

Temporomandibular disorder signs and symptoms are often observed in children and adolescents such that most adults with TMD stated that these symptoms developed in the adolescence period.⁶ In a study that was performed in Brazil on children and adolescents aged 6-14 years, the prevalence rate of moderate or severe TMD symptoms was found as 37.4%.⁷ According to a study in Sweden, 2.9% of the adolescents had painful TMD.⁸ In addition, it was reported that 12.9% of Japanese children and adolescents exhibited TMD symptoms.⁹ In general, females have a higher TMD prevalence rate than males.¹⁰⁻¹² Kim et al.¹³ set forth that the reason for females to have a higher prevalence rate was likely to be based on biological differences, including hormonal and psychosocial factors. This situation can be associated with neuropsychological and physiological factors, as females have a lower pain threshold and are more vulnerable to stress than males.¹⁴

Psychological problems such as stress and anxiety gradually become more prevalent among adolescents.¹⁵ Recently, the biopsychosocial situation came to the forefront, and the effect of emotional factors on the TMD etiology was brought more frequently to the agenda. Therefore, stress, anxiety, and depression were identified with TMD signs and symptoms in numerous populations. By leading to muscular hyperactivity and parafunctional oral habits, these factors, in particular, stress and anxiety, can give rise to TMD microtraumas and muscular lesions.¹⁶ In a study conducted on Japanese children and adolescents, the TMD group had statistically significant higher trait anxiety, headache, neck pain, and toothache scores.⁹ Moreover, there was a significant relationship between high TMD prevalence and emotional stress levels in children and adolescents in southern Portugal.¹⁰

All sorts of physical, emotional, or sexual negative and traumatic experiences occurring in the family before the age of 18 years such as domestic violence, divorce, and separation give rise to adverse childhood experiences (ACEs).¹⁷ The major reasons are economic challenges, family conflicts, parents with alcohol or drug addiction, negative family circumstances, and parents' divorce or loss.¹⁸ Considering that almost one in every two adults has an adverse childhood experience, this situation has an unignorable dimension.¹⁷ Parents' divorce or separation was reported as the second most common ACE.¹⁹

Divorce rate had significant growth in several countries in the past five decades.²⁰ Parents' divorce is one of the most stressful life circumstances for children and adolescents. Being generally associated with emotional and behavioral problems, it is a common childhood problem connected with the rising risk of psychosis.²¹ In a study that addressed the characteristics of personality disorders in China, it was put forward that individuals with single parents were more inclined toward personality disorders than individuals with both parents.²² Today, numerous studies underlined the importance of good relations between the child and parents in the context of both promoting child health and well-being and laying the groundwork for good health in the subsequent periods of life.²³ In a study by Pace et al²⁴ it was ascertained that the high score obtained from the childhood trauma survey was associated with depression and high cortisol levels. Moreover, the level of oxytocin that was a significant factor affecting the social relations and emotional behaviors was found to be lower in urine samples of adults with a history of parental divorce.²⁵

Upon the evaluation of all these data, it is obvious that parents' divorce gives rise to psychological problems that are risk factors for TMD. Therefore, this study aims to evaluate the effects of par-

ents' divorce on TMD and the oral health-related quality of life in adolescents.

MATERIAL AND METHODS

This study was approved with the decision taken in Istanbul Aydin University meeting of the Ethics Committee of Istanbul Aydin University. (Date: June 19,2019, No: 2019/127)The minimum sample size was identified as 94 individuals (n = 94) as per the power analysis (alpha error probability = .05) that was conducted by using the G*Power 3.1 software.

The study was performed on 200 patients (124 female, 76 male) who applied to the Department of Orthodontics of Istanbul Aydin University to have orthodontic treatment. The patients were divided into two groups according to the marital status of their families: parents divorced and parents not divorced. Whereas 98 patients had married parents, 102 patients had divorced parents.

The patients were informed about the aims and uses of the research. The patients who volunteered to take part in the study upon being informed about the research were asked to consent to participate in the study in both written and verbal formats. Inclusion criteria for the study were that the parents had been divorced for at least 1 year, they were not remarried, the participant had not received orthodontic treatment before, the participant had no congenital disease or not had a temporomandibular joint trauma before, and the family has sufficient income.

Content of the Survey Form

1. The demographic questions including parents' material status
2. Fonseca's Anamnestic Index
3. Oral Health Impact Profile-14 questionnaire

Fonseca's Anamnestic Index

Fonseca's anamnestic index (FAI) is useful in the early diagnosis and prevention of TMD. It consists of 10 questions that scan the presence of pain in the temporomandibular joint (TMJ), head, and back. FAI can be used for the prediagnosis and disease classification of patients with TMD; however, after FAI is complete, clinical examination is required to ensure correct diagnosis.

The patients were asked to fill in the index that was composed of 10 questions. The patients were required to select only one choice as the answer for each question, and each question was scored as "yes = 10" or "sometimes = 5" or "no = 0." Upon the summation of index scores, the patients were categorized as having no TMD (0-15 points), mild TMD (20-40 points), moderate TMD (45-65), and severe TMD (70-100).²⁶

Oral Health Impact Profile (OHIP)

It is one of the scales utilized to evaluate the oral health-related quality of life. The reliability and validity of this scale that was developed by Slade and Spencer were tested, and the scale has been widely used in dentistry.²⁷

A shorter version of the scale, the OHIP-14, was developed from the original version. The OHIP-14 comprises seven parts with two questions, that is, a total of 14 questions. The answers are scored on the basis of a five-point Likert scale (never = 0, seldom = 1, sometimes = 2, frequently = 3, and always = 4). The minimum and maximum OHIP-14 scores are 0 and 56 points, respectively. A higher score on the OHIP-14 indicates worse oral health and quality of life.²⁸

Statistical Analysis

In the evaluation of the findings obtained in the study, the IBM Statistical Package for Social Sciences 22.0 (IBM SPSS Corp., Armonk, NY, USA) was used for statistical analysis. Whether the parameters were normally distributed was checked via the Kolmogorov-Smirnov and Shapiro-Wilk tests, and it was found that the parameters were normally distributed. In the analysis of research data, in addition to the descriptive statistical methods (mean, standard deviation, and frequency), the Kruskal-Wallis test was used for the intergroup comparisons of quantitative data, and the Dunn's test was used to identify the group leading to the statistically significant difference. The Mann-Whitney U test was used for comparison of parameters between the two groups. The chi-squared test was employed for comparison of the qualitative data. In the examination of relationships between parameters, the Spearman rank correlation was used. Statistical significance was identified if the *P* value was lower than .05 (*P* < .05).

RESULTS

The study was performed on a total of 200 patients aged 13-18 years, and 124 of these patients were female, whereas 76 were male. The patients' mean age was 16.17 ± 1.42 years. Although 98 of the patients had married parents, 102 patients' parents were divorced.

It is discerned that, of all participant patients, 44% had no TMD, 41% had mild TMD, and 15% had moderate TMD (Table 1). There was no statistically significant difference in the mean Fonseca TMD and OHIP-14 scores of female and male patients (*P* > .05) (Table 2). It was found that patients whose parents were divorced had a higher mean Fonseca TMD scores than patients whose parents were married, and this difference was statistically significant (*P* < .05) (Table 3). Likewise, it was ascertained that the participant

Table 1. Distributions of Fonseca levels

Fonseca level	n	%
No	88	44.0
Mild	82	41.0
Moderate	30	15.0
Total	200	100

Table 2. Evaluation of Fonseca and OHIP-14 values according to gender

Gender	Fonseca TMD		OHIP-14	
	Mean ± SD (median)		Mean ± SD (median)	
Female	23.39 ± 17.05 (20)		4.15 ± 3.97 (3)	
Male	22.76 ± 18.18 (20)		4.03 ± 4.3 (3)	
P	.679		.741	

Mann-Whitney U test

Table 3: Evaluation of Fonseca and OHIP-14 values according to the marital status of the family

Marital Status		Fonseca		OHIP-14	
		Mean ± SD (median)		Mean ± SD (median)	
Married	Married	18.16 ± 13.22 (15)		2.96 ± 3.67 (1)	
	Divorced	27.94 ± 19.60 (25)		5.20 ± 4.16 (4)	
	P	.022*		.003*	
Divorced	Female	26.97 ± 19.20 (20)		5.18 ± 4.10 (5)	
	Male	29.72 ± 20.76 (32.5)		5.22 ± 4.47 (4)	
	P	.729		.953	
Married	Female	19.31 ± 13.41 (20)		2.97 ± 3.54 (2)	
	Male	16.5 ± 13.09 (15)		2.95 ± 3.94 (1)	
	P	.329		.651	

**P* < .05. Mann-Whitney U test

patients whose parents were divorced obtained a higher mean scores from the OHIP-14 than the participant patients whose parents were married, and this difference was statistically significant (*P* < .05) (Table 3).

There was no statistically significant difference in the means of female and male patients' Fonseca TMD levels (*P* > .05) (Table 4). The rate of observing moderate TMD in the participant patients whose parents were divorced (23.5%) was higher than that in patients whose parents were married (6.1%), and this difference was statistically significant (*P* < .05) (Table 4).

Age had a statistically significant moderate positive relationship with the mean Fonseca TMD scores (*r* = .520) (*P* < .05). Similarly, there was a statistically significant moderate positive relationship between age and mean OHIP-14 scores (*r* = .419) (*P* < .05) (Table 5).

There was a statistically significant difference in the means of patients' age as per the means of their Fonseca TMD scores (*P* < .05). The patients with no TMD had a lower mean age than patients with mild and moderate TMD, and this difference was statistically significant (*P* < .05). There was no statistically significant differ-

Table 4. Evaluation of Fonseca values according to gender and marital status of the family

		Fonseca			P
		No n (%)	Mild n (%)	Moderate n (%)	
Gender	Female	52 (41.9)	54 (43.5)	18 (14.5)	.802
	Male	36 (47.4)	28 (36.8)	12 (15.8)	
Marital Status	Married	50 (51.0)	42 (42.9)	6 (6.1)	.045*
	Divorced	38 (37.3)	40 (39.2)	24 (23.5)	

**P* < .05. Chi-squared test

Table 5. Correlation of age with Fonseca and OHIP-14 values

	Age	
	r	P
Fonseca	.520	< .001*
OHIP-14	.419	< .001*

**P* < .05. Spearman's rho correlation test

Table 6. Evaluation of age according to Fonseca levels

Fonseca level	Age	
	Mean ± SD	Median
No	15.42 ± 1.48	15.6
Mild	16.65 ± 1.13	16.8
Moderate	17.05 ± 0.81	16.8
P	< .001*	

**P* < .05. Kruskal-Wallis test

Table 7. Evaluation of the correlation between Fonseca value and OHIP-14 value

Fonseca-OHIP-14	
r	.600
P <	.001*

**P* < .05. Spearman rho correlation analyses

Table 8. Evaluation of OHIP-14 according to Fonseca levels

Fonseca level	OHIP-14	
	Mean ± SD	Median
No	1.6 ± 1.98	1
Mild	5.0 ± 3.75	5
Moderate	9.0 ± 4.17	10
P	< .001*	

**P* < .05. Kruskal-Wallis test

ence in the mean age of patients with mild TMD and moderate TMD ($P > .05$) (Table 6). There was a statistically significant positive relationship between the means of participant patients' Fonseca TMD scores and OHIP-14 scores ($r = 0.600$) ($P < .05$) (Table 7).

There was a statistically significant difference in the mean OHIP-14 scores in terms of mean Fonseca TMD scores ($P < .05$). Patients with moderate TMD had a higher mean OHIP-14 scores than patients with no TMD and mild TMD ($P < .05$). Patients with mild TMD obtained a higher mean OHIP-14 scores than patients with no TMD ($P < .05$) (Table 8).

DISCUSSION

The previous studies revealed that ACEs acted as a significant risk factor for the development of emotional disorders.^{29,30} It is important to determine the predisposing factors in the management of pediatric and young adult patients, who are in a dynamic development and change process, in terms of TMDs.³¹ The hypothesis of this study created under these data is that the adolescents whose parents are divorced are more likely to have temporomandibular joint problems, and this situation is likely to affect the quality of life adversely.

The reason for selecting the FAI is that its reliability was proved, and it was validated as per the diagnosis criteria for TMD.^{12,32} It is also practical to use and gives reliable and accurate results in a short time.^{12,32}

In a survey study performed by Minghelli et al.¹⁰ to evaluate TMD by applying the FAI to 3260 students aged 5-19 years (46.1% male and 53.9% female), 709 of the participants with TMD (86.3%) described themselves as strained or nervous. The data about the emotional stress indicated that the probability of having TMD was 8.74-fold higher for students who perceived themselves as strained or nervous. In a study conducted by De Resende et al.¹¹ on 120 patients, the relationship of TMD with anxiety, quality of life, and sociodemographic aspect was evaluated. According to the study, patients with TMD had a higher rate of having anxiety (75%) than patients with no TMD. The patients with anxiety had a five-fold higher likelihood of having TMD than individuals with no anxiety. The patients with no TMD had a higher quality of life. As seen in the literature, there is a significant relationship between temporomandibular joint problems and psychological disorders.

In the relevant literature, there was only one study that evaluated the relationship between parents' divorce and TMD.³³ This study was carried out by Østensjø et al.³³ on 562 adolescents aged 13-19 years and evaluated the prevalence of having painful temporomandibular disorder (TMD-P) and the relationship of having this situation with lifestyle. According to this study, the patients with TMD-P had a higher likelihood of living with a divorced or single parent than the patients in the control group. It was discerned that 51.3% of the patients in the case group and 30.1% of the patients in the control group had parents who were divorced. In a similar vein to the aforementioned study, this study found that the patients whose parents were divorced obtained a higher mean of Fonseca TMD scores than those whose parents were married even if a different methodology was employed in this study to identify TMD. Supporting all these studies, in this study, the participant patients with divorced parents (23.5%) had a higher rate of having moderate TMD than the patients with married parents (6.1%). Based on these data, the results obtained in this study could be interpreted as depending on the psychological and emotional state of patients with divorced parents; the

adolescents had TMJ disorders, and their Fonseca TMD scores are high. This result verifies the hypothesis proposed under this study.

In several studies conducted to explore the effect of gender on TMD, it was found that females had a higher prevalence of TMD than males.^{10-12,34,35} In addition, females had higher anxiety and depression levels than males.¹⁰ Cross-sectional population-based studies showed that the women exhibited more pain and TMD symptoms alongside pubertal development, and in addition, the hormonal changes could play a significant role in the etiology of TMD.⁹ Unlike the previous studies, this study found no statistically significant difference in female and male patients' mean Fonseca TMD scores. There are also studies in the literature that support our study results.^{9,36,37} Likewise, in a study conducted by Karibe et al.⁹ on 1415 individuals aged 11-15 years, it was discerned that there was no statistically significant difference in having TMD in terms of gender. In a study performed by Jain et al.³⁷ with the FAI, approximately 18.75% of the male patients and 12.28% of the female patients, all of whom were aged 12-18 years, had TMD to a certain degree; however, the difference was not statistically significant. A study by Lei et al.³⁶ analyzed the TMD symptoms exhibited by Chinese adolescents and found no statistically significant difference between male and female participants in terms of the TMD symptoms except for one symptom, joint sound. It is considered that the reason for no significant difference in TMD scores between genders could be the pubertal development differences among patients who were included in this study.

Temporomandibular joint disorders tend to come into being after the adolescence period, and the increase in the severity of symptoms generally reaches its peak in the reproductive age. Although TMD signs and symptoms are less prevalent in children, they are more prevalent in adolescents and young adults.^{10,36,38} Lei et al.³⁶ put forward that individuals aged 16-18 years were significantly more likely to have TMD, stress, depression, and anxiety than individuals aged 12-15 years. Minghelli et al.¹⁰ asserted that the age group of the individuals had statistically significant associations with anxiety and depression, and the anxiety and depression levels went up as the age increased. Likewise, Karaman and Buyuk³⁵ stated that there was a statistically significant relationship between age and TMD-P. In support of the relevant literature, this study also found that there was a statistically significant moderate positive relationship between age and the mean of Fonseca TMD scores (52%). Patients with no TMD as per the FAI had a lower mean age than patients with mild TMD and moderate TMD. As a result, it seems likely that TMD problems in adolescents will increase as age increases in parental divorce.

In a study conducted by Chandak et al.³⁹ with 200 participants aged 18-27 years in Vidarbha population in India, it was identified that of all the participants, 30% had no TMD, whereas 55% had mild TMD, 14% had moderate TMD, and 1% had severe TMD. In a study performed by Minghelli et al.¹⁰ on a Portuguese population aged 5-19 years, the rate of cases exhibiting TMD symptoms was 25.2%, whereas of all the cases exhibiting TMD symptoms, 22.4% were mild TMD cases, 2.5% were moderate TMD cases, and 0.3% were severe TMD cases. In a study conducted by Taneja et al.¹² on 300 adolescents aged 12-15 years, it was set forth that 9.7% of the participants exhibited no TMD symptom, whereas of the participants exhibiting a TMD symptom, 71% had mild TMD symptoms, 13.7% had moderate TMD symptoms, and 5.3% had severe TMD symptoms. In several studies in the relevant literature, it

is discerned that mild TMD was more prevalent than moderate TMD and severe TMD, and this result is similar to the findings of this study. In this study, of the participant patients, 41% had mild TMD and 15% had moderate TMD, whereas 44% had no TMD. In the change of these rates, the differences in factors such as age range and the region where the study was conducted should also be considered.

The oral health-related quality of life reflects the effect of oral health or oral disorders on the person's daily routine, health, or overall quality of life.⁴⁰ The OHIP-14 is a well-structured tool developed to evaluate the effect of the TMDs on the oral health-related quality of life.⁴¹ In a study by Yap et al.⁴² the experimental group with TMD symptoms had a significantly higher mean of OHIP-14 scores than the group with no TMD. In addition, subjects with moderate TMD and severe TMD had a significantly higher mean of OHIP-14 scores than those with mild TMD. However, no statistically significant difference was found in the means of OHIP-14 scores obtained by those with moderate TMD and severe TMD. Moreover, the aforementioned study put forth that there was a moderate correlation between the means of FAI and OHIP-14 scores. In a study by Karaman and Sapan⁴³, it was found that there was a statistically significant positive relationship between the mean Fonseca TMD scores and OHIP-14 scores. Participants with higher Fonseca TMD scores had higher OHIP-14 scores, and likewise, participants with higher OHIP-14 scores had higher Fonseca TMD scores. Paulino et al.⁴⁴ stated that volunteers who were aged 15-25 years and had TMD symptoms had higher OHIP-14 scores than those with no TMD symptoms, and this, in turn, indicates that the TMD had a negative effect on the oral health-related quality of life. Volunteers who were in need of TMD treatments had a higher mean of OHIP-14 scores than those who needed no TMD treatment, and the more severe the TMD was, the higher its effect on the oral health-related quality of life was.

In this study, there was a statistically significant positive relationship between the means of Fonseca TMD scores and OHIP-14 scores. Patients whose parents were divorced had higher means of Fonseca TMD scores and OHIP-14 scores than those whose parents were married. Participant patients with moderate TMD had a higher mean of OHIP-14 scores than those with no TMD and mild TMD. In addition, participant patients with mild TMD had a higher mean of OHIP-14 scores than those with no TMD. In line with the relevant literature, these results demonstrate that TMD affected the quality of life negatively. A survey study performed by Gillborg et al.⁴⁵ on a Swedish population aged 20-89 years examined the prevalence of TMD and its effect on the quality of life. It was found that there was no statistically significant difference in the means of male and female participants' OHIP-14 scores, whereas participants with TMD-P had a higher mean of OHIP-14 scores than those with no TMD-P. As per this study, there is no statistically significant difference in the means of female and male participant patients' OHIP-14 scores. This is because no statistically significant difference was found in the means of female and male participant patients' Fonseca TMD scores.

In a study that De Oliveira and Sheiham⁴⁶ conducted on adolescents by using OHIP-14, it was identified that female participants had a higher mean of OHIP-14 scores than male participants. Again, in the same study, it was indicated that there was a statistically significant relationship between increase in age and OHIP-14 scores. Also in this study, there was a statistically significant moderately positive relationship between age and the mean of

OHIP-14 scores (41.9%), and this is consistent with Fonseca TMD scores, which increased with age.

In this study, the effect of parents' divorce on TMD and oral health-related quality of life in adolescents was analyzed, and the following results were obtained:

In the study, 41% of the adolescents had mild TMD and 15% of them had moderate TMD as per the FAI, and the mean of participant patients' OHIP-14 scores was 4.1 points.

Female patients obtained higher means of the FAI scores and OHIP-14 scores; however, there was no statistically significant difference between female and male patients in this regard. In contrast, the age had statistically significant positive relationships with the means of FAI scores and OHIP-14 scores.

Adolescents whose parents were divorced had higher means of the FAI scores and OHIP-14 scores than those with married parents, and these differences were statistically significant, and these adolescents had a higher rate of having moderate Fonseca TMD.

There was a statistically significant moderately positive relationship between the means of the FAI scores and OHIP-14 scores (60%). The increase in the OHIP-14 scores along with the rising FAI scores is at a striking level.

Ethics Committee Approval: Ethics committee approval was received for this study from the ethics committee of Istanbul Aydın University (Date: June 19,2019, Decision Number: 2019/127).

Informed Consent: Written informed consent was obtained from patients who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – A.K.; Design – A.K.; Supervision – A.K., E.G., H.D.; Resources – A.K.; Data Collection and/or Processing – A.K.; Analysis and/or Interpretation – A.K., E.G., H.D.; Literature Search – A.K., E.G., H.D.; Writing Manuscript – A.K., E.G., H.D.; Critical Review – E.G., H.D.

Declaration of Interests: The authors have no conflicts of interest to declare.

Funding: The authors declared that this study has received no financial support.

Etik Komite Onayı: Bu çalışma için etik komite onayı İstanbul Aydın Üniversitesi'nden (Tarih: 19 Haziran 2019, No: 2019/127) alınmıştır.

Hasta Onamı: Yazılı hasta onamı bu çalışmaya katılan hastalardan alınmıştır.

Hakem Değerlendirmesi: Dış bağımsız.

Yazar Katkıları: Fikir – A.K.; Tasarım – A.K.; Denetleme – A.K., E.G., H.D.; Kaynaklar – A.K.; Veri Toplanması ve/veya İşlemesi – A.K.; Analiz ve/veya Yorum – A.K., E.G., H.D.; Literatür Taraması – A.K., E.G., H.D.; Yazıyı Yazan – A.K., E.G., H.D.; Eleştirel İnceleme – E.G., H.D.

Çıkar Çatışması: Yazarlar çıkar çatışması bildirmemişlerdir.

Finansal Destek: Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

KAYNAKLAR

1. De Leeuw R. *Dor orofacial: guia de avaliação, diagnóstico e tratamento*. 4th ed. São Paulo: Quintessence; 2010.
2. Topuz MF, Oghan F, Ceyhan A, et al. Assessment of the severity of temporomandibular disorders in females: Validity and reliability of the Fonseca Anamnestic Index. *Cranio*. 2020;1-4. [Crossref]

3. Pihut M, Szuta M, Ferendiuk E, Zeńczak-Więckiewicz D. Differential diagnostics of pain in the course of trigeminal neuralgia and temporomandibular joint dysfunction. *BioMed Res Int*. 2014;2014:563786. [\[Crossref\]](#)
4. Poveda Roda R, Bagán JV, Díaz Fernández JM, Hernández Bazán S, Jiménez Soriano Y. Review of temporomandibular joint pathology: Part I: Classification, epidemiology and risk factors. *Medicina Oral, Patología Oral y Cirugía Bucal*. 2007;12(4):E292-298.
5. Dolwick MF. Temporomandibular joint surgery for internal derangement. *Dent Clin North Am*. 2007;51(1):195-208. [\[Crossref\]](#)
6. Jedel E, Carlsson J, Stener-Victorin E. Health-related quality of life in child patients with temporomandibular disorder pain. *Eur J Pain*. 2007;11(5):557-563. [\[Crossref\]](#)
7. Branco LP, Santis TO, Alfaya TA, Godoy CH, Fragoso YD, Bussadori SK. Association between headache and temporomandibular joint disorders in children and adolescents. *J Oral Sci*. 2013;55(1):39-43. [\[Crossref\]](#)
8. Nilsson IM, List T, Drangsholt M. Incidence and temporal patterns of temporomandibular disorder pain among Swedish adolescents. *J Orofac Pain*. 2007;21(2):127-132.
9. Karibe H, Shimazu K, Okamoto A, Kawakami T, Kato Y, Warita-Naoi S. Prevalence and association of self-reported anxiety, pain, and oral parafunctional habits with temporomandibular disorders in Japanese children and adolescents: a cross-sectional survey. *BMC Oral Health*. 2015;15:8:1-7. [\[Crossref\]](#)
10. Minghelli B, Cardoso I, Porfirio M, et al. Prevalence of temporomandibular disorder in children and adolescents from public schools in southern Portugal. *NAJMS*. 2014;6(3):126-132. [\[Crossref\]](#)
11. de Resende CMBM, da Silva Rocha LGD, de Paiva RP, et al. Relationship between anxiety, quality of life, and sociodemographic characteristics and temporomandibular disorder. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 2020;129(2):125-132. [\[Crossref\]](#)
12. Taneja P, Nagpal R, Marya CM, Kataria S, Sahay V, Goyal D. Temporomandibular disorders among adolescents of Haryana, India: A cross-sectional study. *Int J Clin Pediatr Dent*. 2019;12(6):501-505. [\[Crossref\]](#)
13. Kim TY, Shin JS, Lee J, et al. Gender difference in associations between chronic temporomandibular disorders and general quality of life in Koreans: A cross-sectional study. *PLoS One*. 2015;10(12):e0145002. [\[Crossref\]](#)
14. Sena MF, Mesquita KS, Santos FR, Silva FW, Serrano KV. Prevalence of temporomandibular dysfunction in children and adolescents. *Rev Paul Pediatr*. 2013;31(4):538-545. [\[Crossref\]](#)
15. Abebe DS, Frøyland LR, Bakken A, Von Soest T. Municipal-level differences in depressive symptoms among adolescents in Norway: Results from the cross-national Ungdata study. *Scandinavian Journal of Public Health*. 2016;44(1):47-54. [\[Crossref\]](#)
16. Medeiros SP, Batista AUD, Forte FDS. Prevalência de sintomas de disfunção temporomandibular e hábitos parafuncionais em estudantes universitários. *RGO*. 2011;59(2):201-208.
17. Kovács-Tóth B, Oláh B, Papp G, Szabó IK. Assessing adverse childhood experiences, social, emotional, and behavioral symptoms, and subjective health complaints among Hungarian adolescents. *Child Adolesc Psychiatry Ment Health*. 2021;15:12:1-12. [\[Crossref\]](#)
18. Kabani F, Lykens K, Tak HJ. Exploring the relationship between adverse childhood experiences and oral health-related quality of life. *J Public Health Dent*. 2018;78(4):313-320. [\[Crossref\]](#)
19. Kennedy S, Bumpass L. Cohabitation and children's living arrangements: New estimates from the United States. *Demogr Res*. 2008;19:47:1663-1692. [\[Crossref\]](#)
20. Sheykhi MT. Worldwide increasing divorce rates: A sociological analysis. *Konfrontasi: Jurnal Kultural, Ekonomi Dan Perubahan Sosial*. 2020;7(2):116-123. [\[Crossref\]](#)
21. Tullius JM, De Kroon ML, Almansa J, Reijneveld SA. Adolescents' mental health problems increase after parental divorce, not before, and persist until adulthood: a longitudinal TRAILS study. *Eur Child Adolesc Psychiatry*. 2022;31:969-978. [\[Crossref\]](#)
22. Tan Y, Liu Y, Wu L. Screening results correlating to personality disorder traits in a new employee population of people's Republic of China. *Neuropsychiatr Dis Treat*. 2016;12:2553-2560. [\[Crossref\]](#)
23. Meland E, Bredablik HJ, Thuen F. Divorce and conversational difficulties with parents: Impact on adolescent health and self-esteem. *Scand J Public Health*. 2020;48(7):743-751. [\[Crossref\]](#)
24. Pace TWW, Mletzko TC, Alagbe O, et al. Increased stress-induced inflammatory responses in male patients with major depression and increased early life stress. *Am J Psychiatry*. 2006;163(9):1630-1633. [\[Crossref\]](#)
25. Boccia ML, Cook C, Marson L, Pedersen C. Parental divorce in childhood is related to lower urinary oxytocin concentrations in adulthood. *J Comp Psychol*. 2021;135(1):74-81. [\[Crossref\]](#)
26. Bevilacqua-Grossi D, Chaves TC, de Oliveira AS, Monteiro-Pedro V. Anamnestic index severity and signs and symptoms of TMD. *Cranio*. 2006;24:112-118. [\[Crossref\]](#)
27. Slade GD, Spencer AJ. Development and evaluation of the oral health impact profile. *Community Dent Health*. 1994;11(1):3-11.
28. Liu Z, McGrath C, Hagg U. Changes in oral health-related quality of life during fixed orthodontic appliance therapy: an 18-month prospective longitudinal study. *Am J Orthod Dentofacial Orthop*. 2011;139(2):214-219. [\[Crossref\]](#)
29. Chapman DP, Whitfield CL, Felitti VJ, Dube SR, Edwards VJ, Anda RF. Adverse childhood experiences and the risk of depressive disorders in adulthood. *J Affect Disord*. 2004;82(2):217-225. [\[Crossref\]](#)
30. Ayerbe L, Pérez-Piñar M, Foguet-Boreu Q, Ayís S. Psychosis in children of separated parents: A systematic review and meta-analysis. *Eur Psychiatry*. 2020;63(1):e3. [\[Crossref\]](#)
31. Selvi Kuvvetli S, Sandallı N. Çocuklarda ve genç erişkinlerde temporomandibular rahatsızlıklar: literatür derlemesi. *Atatürk Üniv Disz Hek Fak Derg*. 2007;(Suppl 2):1-9.
32. Stasiak G, Maracci LM, de Oliveira Chami V, et al. TMD diagnosis: Sensitivity and specificity of the Fonseca Anamnestic Index. *Cranio*. 2020;27:1-5. [\[Crossref\]](#)
33. Østensjø V, Moen K, Storesund T, Rosén A. Prevalence of painful temporomandibular disorders and correlation to lifestyle factors among adolescents in Norway. *Pain Res Manag*. 2017;2017::2164825. [\[Crossref\]](#)
34. Nilsson IM, Drangsholt M, List T. Impact of temporomandibular disorder pain in adolescents: differences by age and gender. *J Orofac Pain*. 2009;23(2):115-122.
35. Karaman A, Büyük SK. Evaluation of temporomandibular disorder symptoms and oral health-related quality of life in adolescent orthodontic patients with different dental malocclusions. *Cranio*. 2019;40(1):1-9. [\[Crossref\]](#)
36. Lei J, Fu J, Yap AU, Fu KY. Temporomandibular disorders symptoms in Asian adolescents and their association with sleep quality and psychological distress. *Cranio*. 2016;34(4):242-249. [\[Crossref\]](#)
37. Jain S, Chourse S, Jain D. Prevalence and severity of temporomandibular disorders among the orthodontic patients using Fonseca's questionnaire. *Contemp Clin Dent*. 2018;9(1):31-34.
38. Bertoli F, Antoniuk S, Bruck I, Xavier G, Rodrigues D, Losso E. Evaluation of the signs and symptoms of temporomandibular disorders in children with headaches. *Arq Neurop-siquiatr*. 2007;65(2A):251-255. [\[Crossref\]](#)
39. Chandak RM, Pandhripande RM, Sonule SS, Chandak MG, Rawlani SS. To assess the prevalence of signs and symptoms of temporomandibular disorders in Vidarbha population by Fonseca's questionnaire. *J Oral Res Rev*. 2017;9(2):62-66. [\[Crossref\]](#)
40. Chen M, Feng ZC, Liu X, Li ZM, Cai B, Wang DW. Impact of malocclusion on oral health-related quality of life in young adults. *Angle Orthod*. 2015;85(6):986-991. [\[Crossref\]](#)
41. Dahlström L, Carlsson GE. Temporomandibular disorders and oral health-related quality of life: a systematic review. *Acta Odontol Scand*. 2010;68(2):80-85. [\[Crossref\]](#)
42. Yap AU, Chen C, Wong HC, Yow M, Tan E. Temporomandibular disorders in prospective orthodontic patients. *Angle Orthod*. 2021;91(3):377-383. [\[Crossref\]](#)

43. Karaman A, Sapan Z. Evaluation of temporomandibular disorders, quality of life, and oral habits among dentistry students. *Cranio*. 2020;1-7. [\[Crossref\]](#)
44. Paulino MR, Moreira VG, Lemos GA, Silva PLPD, Bonan PRF, Batista AUD. Prevalence of signs and symptoms of temporomandibular disorders in college preparatory students: associations with emotional factors, parafunctional habits, and impact on quality of life. *Cien Saude Colet*. 2018;23(1):173-186. [\[Crossref\]](#)
45. Gillborg S, Åkerman S, Lundegren N, Ekberg EC. Temporomandibular disorder pain and related factors in an adult population: A cross-sectional study in Southern Sweden. *J Oral Facial Pain Headache*. 2017;31(1):37-45. [\[Crossref\]](#)
46. de Oliveira CM, Sheiham A. Orthodontic treatment and its impact on oral health-related quality of life in Brazilian adolescents. *J Orthod*. 2004;31(1):20-27. [\[Crossref\]](#)