

# Investigation of the Relationship Between Stress Levels and TMJD in the Exam Period of Dentistry Students in Transition to Face-to-face Education after the Pandemic

Diş hekimliği Öğrencilerinin Pandemi Sonrası Yüzyüze Eğitime Geçişte Sınav Dönemi Yaşadıkları Stres Düzeyinin TMED ile İlişkisinin incelenmesi

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## ABSTRACT

The aim of this study is to determine the stress perceptions of dentistry students and to investigate relationship with Temporomandibular Joint Dysfunction (TMJD) about returning to face-to-face education after remote learning after the pandemic.

The sample of this qualitative observational study consists of 147 volunteer preclinical dentistry students studying at the Faculty of Dentistry of Kafkas University. Perceived Stress Scale and Fonseca Anamnestic Index were used as data collection tools in the study. Data were collected using questionnaires created in Google Forms. ANOVA test ( $p<0.05$ ) and Pearson correlation test ( $p<0.01$ ) were used for data analysis.

In the Perceived Stress Scale, it was observed that the majority of the students, with a rate of 70.7%, experienced moderate stress. It was determined that the prevalence of TMJD at any level was 71.4% of the students. When the results of both questionnaires were analyzed according to grade levels, it was seen that there was no significant difference ( $p>0.05$ ). When the relationship between perceived stress level and TMJD was examined, it was found that there was a positive correlation ( $p=0.009$ ).

There is a strong correlation between students' stress levels and TMJD prevalence during the exam period. In this period, strategies that will positively affect the instincts of coping with stress should be developed in exam administration.

**Keywords:** Dentistry Students, Fonseca Anamnestic Index, Perceived Stress Scale

## INTRODUCTION

The novel coronavirus 2019 (COVID-19) was severe and highly contagious. With the declaration of a worldwide pandemic, it required the implementation of social distance policies. This situation affected education as well as many socioeconomic factors.<sup>1</sup> In this period, education was mostly carried out through online platforms.<sup>2</sup>

The online education system is very advantageous in terms of ensuring that students' education programs are not disrupted and making it easier to return to face-to-face activities when schools are allowed to open. However, these systemic transitions expose students to stress factors both in the process of getting used to the online system and later in the transition to face-to-face education.<sup>3,4</sup>

Stress refers to a situation that triggers the development of many biological, physical and cognitive reactions in the body.<sup>5</sup> Stress is a situation that puts a person's well-being at risk and has debilitating and compelling effects. Therefore, it causes pain and contractions, parafunctional habits, especially in the head, neck and jaw regions.<sup>6</sup> One of the most used questionnaires in the investigation of stress factor is those related to Temporomandibular Joint Dysfunction (TMJD). "Fonseca Anamnestic Index (FAI)", a questionnaire consisting of 10 questions from these indexes, is highly preferred because of its low cost and easy application.<sup>7</sup> This questionnaire was used in our study.

## ÖZ

Bu çalışmada amaç pandemi sonrası uzaktan eğitimden yüz yüze eğitime dönüş konusunda diş hekimliği öğrencilerinin stres algılarını belirlemek ve Temporomandibular Eklem Disfonksiyonu (TMED) ile ilişkisini araştırmaktır.

Bu çalışmanın örneklemini Kafkas Üniversitesi Diş Hekimliği Fakültesinde öğrenim görmekte olan 147 gönüllü preklinik dönemi öğrencilerinden oluşmaktadır. Araştırmada veri toplama aracı olarak Algılanan Stres Düzeyi Ölçeği ve Fonseca Anamnestic İndeks kullanıldı. Veriler, Google Formlar'da oluşturulan anketler kullanılarak toplandı. Verilerin analizinde ANOVA testi ( $p<0.05$ ) ve Pearson korelasyon testi ( $p<0.01$ ) kullanıldı.

Algılanan stres ölçeğinde öğrencilerin %70.7 oranı ile büyük bir çoğunluğunun orta düzeyde stres yaşadığı görülmüştür. Öğrencilerin herhangi bir düzeyde TMED prevalansının %71.4 olduğu belirlenmiştir. Her iki anket verilerinin sonuçları sınıf düzeylerine göre incelendiğinde anlamlı fark olmadığı görülmüştür ( $p>0.05$ ). Algılanan stres ile TMED arasındaki ilişki incelendiğinde pozitif yönlü bir korelasyon olduğu saptanmıştır ( $p=0.009$ ).

Sınav döneminde öğrencilerin stres seviyeleri ve TMED prevalansları arasında güçlü bir ilişki vardır. Bu dönemde sınav yönetiminde stresle başa çıkma içgüdülerini olumlu etkileyecek stratejiler geliştirilmelidir.

**Anahtar Sözcükler:** Diş Hekimliği Öğrencileri, Fonseca Anamnestic İndeks, Algılanan Stres Ölçeği

Emotional stress is expressed as a part of a person's mood change. During and after the pandemic, individuals experience difficulties such as distance from the social environment and difficulty in communicating.<sup>8</sup> It is thought that this situation may cause emotional stress in students in the transition from online education to face-to-face education. One of the most common questionnaires used to understand the relationship between stress and changes in an individual's life is the Perceived Stress Scale. It was developed by Cohen, Kamarck and Mermelstein in 1983.<sup>9</sup> It was standardized by Baltaş in 1998 for use in Turkish language.<sup>10</sup>

Anxiety in the human body has been associated with observable malnutrition behaviors, pain caused by the transformation of various mental problems into physical problems, autonomic nervous system dysfunctions resulting in pathological changes, and constant oral habits such as bruxism.<sup>11</sup> Therefore, it is important to examine the relationship between perceived stress and TMJD.

When the literature is examined, studies on this subject were mostly carried out during the pandemic period. Little is known about students' perceptions and experiences of returning to face-to-face education during the exam period after the pandemic period.<sup>11-13</sup> Therefore, it is important to carry out studies to understand and manage these perceptions.

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Therefore, the aim of this study is to observe the stress perceptions of dentistry students in the transition from remote learning to face to face education with the Perceived Stress Scale and to investigate its relationship with TMJD after the pandemic. The null hypothesis of the study is that there is no difference between the Perceived Stress Scale and the TMJD.

**MATERIAL AND METHODS**

The study was approved by the Clinical Research Ethics Committee of the Faculty of Medicine, Kafkas University (80576354-050-99/223).

The study consists of 147 preclinical students studying at the Faculty of Dentistry of Kafkas University. Perceived Stress Scale and Fonseca Anamnestic Index were used as data collection tools in the study. Data were collected using surveys created in Google Forms.

The Perceived Stress Scale consists of 14 items in total (Table 1). The total score obtained from the scale determines the stress level of the person. A score of 11-26 indicates a low level of stress, a score of 27-41 indicates a moderate level of stress, and a score of 42-56 indicates a high level of stress.<sup>9,10</sup>

**Table 1. Perceived Stress Scale Questionnaire**

1. In the last month, how often have you been upset because of something that happened unexpectedly?
2. In the last month, how often have you felt that you were unable to control the important things in your life?
3. In the last month, how often have you felt nervous and "stressed"?
4. In the last month, how often have you dealt successfully with day to day problems and annoyances?
5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?
6. In the last month, how often have you felt confident about your ability to handle your personal problems?
7. In the last month, how often have you felt that things were going your way?
8. In the last month, how often have you found that you could not cope with all the things that you had to do?
9. In the last month, how often have you been able to control irritations in your life?
10. In the last month, how often have you felt that you were on top of things?
11. In the last month, how often have you been angered because of things that happened that were outside of your control?
12. In the last month, how often have you found yourself thinking about things that you have to accomplish?
13. In the last month, how often have you been able to control the way you spend your time?
14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

The Fonseca Anamnestic Questionnaire, which evaluates pain in the ear and chewing muscles, parafunctional habits, limitation of movement of the jaw, headache, joint noise and emotional stress in the TMJ region, was applied to the individuals participating in the study. This survey consists of 10 questions (Table 2). Volunteer students were asked to give only one answer to each question: "Yes (10 points)", "No (0 points)" and "Sometimes (5 points)". According to the collected scores, there is a threshold value of 15 points, those below it are classified as 'No TMJD' and those above it are classified as 'TMJD Yes'. Those with TMJD were classified into three groups according to their scores as Mild (20-40 points), Moderate (45-65 points) and Severe (70-100 points).<sup>7</sup>

**Table 2. Fonseca Anamnestic Questionnaire**

1. Do you have difficulty opening your mouth wide?
2. Do you have difficulty moving your jaw to the sides?
3. Do you feel fatigue or muscle pain when you chew?
4. Do you have frequent headaches?
5. Do you have neck pain or stiff neck?
6. Do you have earaches or pain in that area (temporomandibular joint)?
7. Have you ever noticed any noise in your temporomandibular joint while chewing or opening your mouth?
8. Do you have any habits such as clenching or grinding your teeth?
9. Do you feel that your teeth do not come together well?
10. Do you consider yourself a tense (nervous) person?

SPSS (Statistical Package Program for Social Science) 23.0 software was used in the analysis of the data in the study. The relationship between two independent numbers was interpreted with the Pearson correlation coefficient. Differences between more than two independent groups were examined by One-Way Analysis of Variance (ANOVA). In the interpretation of the data, the p value for the significance level of the ANOVA test was used as p<0.05, and the p value for the significance level of the Pearson correlation test was used as p<0.01.

**RESULTS**

Perceived Stress Scale Scores data are shown in Table 3. When the data were examined, it was determined that 25.9% of the students experienced low level stress, 70.7% moderate level stress, and 3.4% high level stress. When the comparison was made according to grade levels, it was determined that there was no significant difference between them (p>0.05).

**Table 3. Comparison of Perceived Stress Scale (PSS) by Grade Levels**

PSS Scores		Grade Level			Total	p
		1	2	3		
Low	n	15	12	11	38	0,138
	%	26.4	24	27.5	25.9	
Moderate	n	40	36	28	104	
	%	70.1	72	70	70.7	
High	n	2	2	1	5	
	%	3.5	4	2.5	3.4	
Total	n	57	50	40	147	
	%	100	100	100	100	

\*:p<0,05 (11-26 points; low level, 27-41 points; moderate level, 42-56 points; high level)

Fonseca Anamnestic Index data are shown in Table 4. According to the analysis of the data, 28.6% of the students did not have TMJD, 40.1% had mild level TMJD, 23.8% had moderate level TMJD, and 7.5% had severe level TMJD. When the comparison was made according to grade levels, it was determined that there was no significant difference between them (p>0.05).

**Table 4. Comparison of Temporomandibular Joint Dysfunction According to Fonseca Anamnestic Index (FAI) Scores among Grade Levels**

FAI Scores		n	Grade Level			Toplam	p
			1	2	3		
No		17	17	8	42	0,649	
	%	29.9	34	20	28.6		
Mild		25	21	13	59		
	%	43.8	42	32.5	40.1		
Moderate		9	11	15	35		
	%	15.8	22	37.5	23.8		
Severe		6	1	4	11		
	%	10.5	2	10	7.5		
Total		57	50	40	147		
	%	100	100	100	100		

\*:p<0,05 (0-15 points; No TMJD, 20-40 points; Mild, 45-65 points; Moderate, 70-100; Severe)

Pearson correlation test was used for the relationship between TMJD and Perceived Stress Scale. A significant positive correlation was found between Perceived Stress Scale and TMJD scores ( $p<0.01$ ). It was determined that as the perceived stress level increased, the severity of TMJD also increased. (Table 5)

**Table 5. Correlation of Fonseca Anamnestic Index and Perceived Stress Scale Means**

	Correlation	FAI	PSS
FAI	Pearson Correlation	1	,216**
	Sig. (2-tailed)		0
	N	147	147
PSS	Pearson Correlation	,216**	1
	Sig. (2-tailed)	0,009	
	N	147	147

\*\* Correlation is significant at the 0.01 level (2-tailed). FAI: Fonseca Anamnestic Index PSS: Perceived Stress Scale

## DISCUSSION

After the online education policies caused by the pandemic, necessary precautions were taken and face-to-face education was started. It took a process for dentistry students to get used to the social order during the education period.<sup>13,14</sup> Therefore, the aim of this study is to investigate the relationship between TMJD and the Perceived Stress Scale analysis, which measures the mood changes of dental students during the exam period during the transition from online education to face-to-face education.

The etiology of TMJD is multifactorial. In addition, the effects of etiological factors are still controversial and the exact etiology of TMJD has not been clarified. The most accepted model in the etiology of TMJD in recent years is the psychosocial condition.<sup>14,15</sup> In this study, a significant relationship was found between TMJD and perceived stress level and the null hypothesis was rejected.

Paulino et al<sup>16</sup> found that temporomandibular disorders were significantly associated with emotional stress and parafunctional habits in university preparatory students. A survey of a large population concluded that bruxism can trigger ongoing stress at work.<sup>17</sup> In the study of Göğremis et al<sup>18</sup> on the determination of the prevalence of Temporomandibular Joint Dysfunction in university students, it was determined that 14.1% of the students who participated in the study did not have TMJD, while 85.9% of the students had TMJD at any level of severity, according to Fonseca questionnaire evaluation. In another study conducted with dental students, the prevalence of TMJD at any level was found in 72.3% of the students participating in the questionnaire, according to the Fonseca questionnaire.<sup>19</sup> Similarly, in our study, TMJD was absent in 28.6% and present in 72.4%. The difference between these two studies is that although there were preclinical students in our study, there was an almost equal prevalence of TMJD, which is thought to indicate that

students in the exam period have higher TMJD scores. In our study of severe TMJD scores, 1st grade and then 3rd grade students are seen the most. We can conclude that the 2nd grade students are least affected by this situation.

In previous studies, it has been determined that students who have coped with interpersonal relationships, gaining identity, emotional independence and academic success are perceived to be moderately stressed.<sup>20,21</sup> In the study of Garcia et al<sup>22</sup>, it was determined that dental students perceived high levels of stress during the transition from remote learning to clinical training. Klaassen et al<sup>23</sup> showed that the transition period from online education to face-to-face education prevents students from communicating with their teachers and other students, and they experience tension. In our study, it is seen that the level of stress experienced by the students who took the online exam during the pandemic period is at a moderate level during the transition to the face-to-face exam period. Factors such as the lack of practical training in dentistry during the pandemic period and the educational environment may have contributed to the students' unpreparedness for returning to face-to-face classes. In addition to the conflicting feelings in this period, this situation may have caused the students to perceive the return as difficult in the beginning.

The advantage of the perceived stress level questionnaire used in our study is that this scale can be predicted not only in academic terms, but also in students' daily lives and personal problems related to health profession. Similar to our study, in a study conducted by Güven et al<sup>24</sup>, it was determined that there was a positive correlation between bruxism and perceived stress values of university students, and TMJD scores were observed at a high rate. In another similar study, a positive correlation was found study examining the relationship between anxiety and depression and TMJD.<sup>19</sup> In another study on occupational stress, it was reported that there is a positive relationship between stress and bruxism.<sup>25</sup> In studies examining the effect of stress on university students, it was concluded that stress may increase the general prevalence of temporomandibular disorders.<sup>26-29</sup> These results confirm our study. In addition, in recent studies, it has been observed that the rate of night bruxism self-reported by students is higher than the normal population.<sup>30</sup>

It is known that stress brings many negativities in human life.<sup>31</sup> For this reason, it is stated in the studies that different methods should be used in coping with stress.<sup>32</sup> Research findings in previous studies show that participation in regular exercise and sports activities prevents the formation of stress and helps to reduce the current stress level.<sup>33</sup> In a study comparing the stress levels of students in physical education and sports college and other faculties, it was found that physical education students had higher self-efficacy perceptions and lower stress levels.<sup>34</sup>

This current study may explain students' perceptions that, after initial difficulties with the sudden onset of remote learning, this process does not prepare them to return to face-to-face learning. Students can develop coping strategies to cope with the return to face-to-face learning and to reduce their stress levels. Individuals with moderate or higher stress levels can be informed about methods of coping with stress. Considering that it is one of the steps that students have the most difficulty with, it is possible to assist students with coping methods of strategies that students can develop themselves during the preparation stage for the exam period.

## CONCLUSION

It can be concluded that preclinical dentistry students perceive a high rate of moderate stress during the transition from remote learning to face-to-face education. It has been shown that perceived stress is directly related to TMJ dysfunction. During this period, basic coping strategies adopted by students should be developed.

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**Etik Beyan / Ethical statement**

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It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

**Benzerlik Taraması / Similarity scan**

Yapıldı - ithenticate

**Etik Bildirim / Ethical statement**

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