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Evaluation of the relationship between TMD pain and toothache and dental anxiety

Zeynep Dilan Orhan[1], Levent Ciğerim[1], Mehmet Güzel[2], İbrahim Doğru[1], Nazlı Hilal Kahraman[1], Abdalrahim Hussein[1], Hayrettin Baş[1]

[1]*Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Van Yüzüncü Yıl University, Van, Turkiye*
[2]*Hatay Oral and Dental Health Center, Hatay, Turkiye*

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ABSTRACT

Aims: The aims of the study were to evaluate the relationship between pain experienced and dental anxiety in patients presenting to the department of oral and maxillofacial surgery with tootache and TMD pain.

Methods: This retrospective, observational study was conducted on patients who applied to the oral and maxillofacial surgery clinic between January and June 2022. Patients were divided into 2 groups according to the reason for visiting the clinic. Patients in group 1 had toothache and patients in group 2 had temporomandibular disorder pain. Pain was assessed by VAS and dental anxiety by MDAS. The statistical significance level was accepted as $p<0.05$.

Results: Of the 108 patients included in the study, 56 were female and 52 were male, and the mean age was 34.71±14.66 years. It was found that the VAS scores were negatively and weakly correlated with age ($r=-0.203$, $p=0.035$), there was a positive and weak correlation between the patients' VAS and MDAS scores ($r=0.265$, $p=0.006$), and the VAS scores of the patients with toothache were higher ($p<0.05$).

Conclusion: In this study, it was observed that individuals presenting to the clinic with toothache had higher pain levels. It was found that as patients pain levels increased, so did their dental anxiety scores.

Keywords: Temporomandibular disorders, pain, toothache, TMD pain

INTRODUCTION

Anxiety is a feeling of apprehension caused by the anticipation of a threatening event or circumstance. Despite all the technical advances in dentistry, dental anxiety, which is defined as fear, worry or tension in the dental environment, is a fairly common occurrence and prevents many patients from receiving the dental care they need.[1,2] The impact of fear and avoidance on patients' oral health is clear. If dental care is postponed for a long time, the patient's oral health can deteriorate to the point where multiple interventions such as tooth extractions, endodontic treatment and surgery are required.[3–5] Compared to non-anxious patients, they had more missing teeth, fewer teeth to fill, and were four times more likely to need immediate treatment for pain or a tooth infection.[6,7] Anxious patients' avoidance of treatment has been associated with a deterioration in their quality of life.[8]

Pain is a negative, subjective experience associated with potentially injured tissue.[9] It is a very common reason for patients to visit the dental clinic. Toothache has been shown to affect and disrupt sleep, and individual responses to pain perception can vary and depend on several variables, including gender, age and previous pain experiences.[10,11] Pain is the main reason people seek dental care. 60% of all complaints were related to pain, including more than 61% of oral mucosal disorders and tooth damage and 79.5% of pulpitis, 70.7% of 3rd dentition eruption problems.[12]

People were more anxious if they had had a bad experience at the dentist.[13] An important factor associated with dental anxiety was pain at the last dental visit or before the current visit. Therefore, effective pain management helps to regulate anxiety.[13,14] Dental anxiety is a common and widespread problem, and we believe that pain may increase the current level of anxiety in people who present to the clinic.[15] The aim of this study was to evaluate the relationship between perceived pain and dental anxiety in patients presenting to the department of oral and maxillofacial surgery with toothache and TMD pain.

METHODS

This retrospective observational study was conducted on patients who applied to the Department of Oral and Maxillofacial Surgery Clinic, Faculty of Dentistry, Van Yüzüncü Yıl University between

Corresponding Author: İbrahim Doğru, dt.ibrahimdogru@gmail.com

January and June 2022. The study was approved by the Clinical Researches Ethics Committee of Van Yüzüncü Yıl University Faculty of Medicine (Date: 09.09.2022, Decision No: 2022/09-02). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Patients were included if they were 18 years of age or older, had ASA1 systemic status, had a complete medical history, and complained of dental or temporomandibular disorders (TMD) pain in the orofacial region. Patients were excluded if they were receiving psycho-psychiatric support and/or medication for any reason, if they had both dental and TMD pain, if the source of the current pain could not be accurately determined, or if there was no consensus on the diagnosis of the source of the pain. The study sample size was calculated to be at least 82 people (41 per group) with 95% power at α=0.05, ß=0.05 and effect size=0.83 (effect size calculated from Sanikop et al.[16] study) using G-power 3.1.[16] The records of 54 patients with temporomandibular disorder pain between the specified dates were found to meet the inclusion criteria. Therefore, 54 patients were randomly selected from the patients with toothache to form the other group of the study, and a total of 108 patients were included in the study. The assessment was carried out using the medical history form, which was completed by the researcher doctor using a question-answer method after obtaining written consent from the patients at the first visit. The medical history forms included patients' demographic data, reasons for attending the clinic, and patients' MDAS and VAS scores at the first visit. Patients were divided into 2 groups according to their reasons for attending the clinic. Patients in the first group had toothache and patients in the second group had TMD pain. Clinical and radiological examinations were performed to determine the source of the pain. The differential diagnosis included maxillary sinus pain, neuropathic pain, neuralgia-like pain, impacted tooth pain, and pain due to pathological formations. The diagnosis of the source of pain was made by 2 authors. Patients with toothache underwent tooth extraction and/or were prescribed medication. For patients with temporomandibular disorder pain, soft food and bilateral chewing were recommended as initial treatment, and additional medication was prescribed. There were 5 questions in the MDAS assessment and scores ranging from 0 to 5 were given according to the answers to each question. A score of 0-11 was considered low anxiety, 12-18 was considered moderate anxiety, and 19 and above was considered high anxiety.[17]

Statistical Analysis

Statistical analyses were performed using IBM® SPSS© 25 software. Normal distribution of numerical variables was assessed using visual (histogram and probability plots) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). Descriptive analyses were presented using median and interquartile range for non-normally distributed variables, and frequency/percentile tables for categorical (nominal and ordinal) variables. Intergroup significance of normally distributed VAS and MDAS scores was assessed using the parametric independent groups t-test. Correlation coefficients and statistical significance were calculated using Spearman's test when at least one of the variables was non-normally distributed or ordinal. According to the correlation coefficient, the degree of correlation was interpreted as low correlation between 0.05-0.4, moderate correlation between 0.4-0.7 and high correlation between 0.7-1.0. Cases where the p value was less than 0.05 were considered to be statistically significant results.

RESULTS

Of the 108 patients included in the study, 56 were female and 52 were male, and the mean age was 34.71±14.66 years (range, 18-79 years). The distribution of body-mass index (BMI), sex, marital status, blood group, occupation, smoking habit and tooth brushing frequency of the patients is shown in Table 1. When the frequency of visiting the dentist was examined in the patients included in the study, it was found that those who visited the dentist occasionally were the most frequent with a rate of 86.1% (Table 1).

Table 1. Distribution of demographic characteristics of patients

Age		34.71±14.66	
BMI		24.66±3.91	
		n	%
Gender	Male	52	48.1
	Female	56	51.9
Marital status	Married	42	38.9
	Single	66	61.1
Blood type	Unknown	56	51.9
	A	24	22.2
	0	19	17.6
	B	6	5.6
	AB	3	2.8
Profession	Student	33	30.6
	Self-employment	23	21.3
	Housewife	27	25.0
	Public employee	25	23.1
Smoking	Smoker	78	72.2
	Non-smoker	30	27.8
Frequency of tooth brushing	Not brushing	34	31.5
	Occasionally	41	38.0
	Twice a day	29	26.9
	Three times a day	4	3.7
	More than three times a day	0	0
Frequency of visiting the dentist	Occasionally	93	86.1
	Never	10	9.3
	Regular	5	4.6

BMI: Body-mass index, n: Number of patients, %: Percentage of patients

It was found that the difference between the frequency of visiting the dentist and the demographic characteristics of the patients was not statistically significant (p>0.05) (Table 2).

Table 2. Evaluation of the relationship between frequency of dental visits and demographic characteristics

	Gender	Marital status	Age	BMI	Blood type	Profession	Smoking	Frequency of tooth brushing
Frequency of visiting the dentist	r=-0.009 p=0.923	r=0.146 p= 0.131	r=0.076 p=0.437	r=-0.048 p=0.621	r=0.06 p=0.537	r=-0.046 p=0.638	r=0.043 p=0.662	r=-0.036 p=0.712

BMI: Body-mass index, *r: Spearman correlation coefficient, (p<0.05)

The relationships between the patients' VAS and MDAS scores and their demographic characteristics are shown in Table 3. It was found that the VAS scores were negatively and weakly correlated with age (r=-0.203, P=0.035, p<0.05). The difference between VAS scores and other demographic characteristics was not statistically significant (p>0.05). No significant correlation was found between MDAS scores and demographic characteristics (p>0.05). It was found that there was a positive and small correlation between patients' VAS and MDAS scores (r=0.265, p=0.06) (Table 3).

When analysing intra-group comparisons of VAS scores by gender, the difference between genders was not statistically significant (p>0.05). In the intra-group comparisons, there was a difference in MDAS scores according to gender. In both groups, women's MDAS scores were higher than men's (p<0.05) (Table 4).

According to the intra-group evaluations, the difference between the VAS scores of the toothache and TMD pain groups was found to be significant. The VAS scores of individuals with toothache were found to be higher (p<0.05). The difference between the MDAS scores of the toothache and TMD pain groups was not significant (p>0.05) (Table 5).

DISCUSSION

Dental anxiety is a common type of anxiety that has a negative impact on the patient.[18] According to Southard and Hoogstraten,[19] 5-7% of people avoid going to the dentist at all or only occasionally because of their anxiety. Kvale et al.[21] found that 50-60% of these individuals have a specific phobia of dental procedures and dental stressors, while the remaining individuals meet the criteria for a psychiatric disorder that could negatively affect the provision of dental care.[20] As a result, de Jongh and Adair found that it's crucial to assess the severity of patients' problems, taking into account factors such as their level of dental anxiety, their coping techniques, any psychiatric symptoms and the specific treatments they need.[15] Using standardised questionnaires, the Dental Anxiety Scale is probably the best known and most widely used measure of the severity of dental anxiety.[22] In this study, the MDAS, which is one of the most commonly used methods to assess dental anxiety, was preferred because of its advantages such as being simple, understandable and easy to use and calculate.

Sardar KP et al.[23] investigated the effect of age and gender factors on dental anxiety levels and concluded that anxiety levels were higher in women and young people. Sinha et al,[24] conducted a study to investigate the impact of socio-demographic factors on dental anxiety. Among various socio-demographic characteristics, Sinha et al. found that gender, income and previous unpleasant dental experiences were significantly associated with dental anxiety. These findings suggest that a person's sociodemographic background may play a role in their likelihood of experiencing dental anxiety. This study concluded that gender, height, weight, marital status, blood group, smoking habits, occupation, frequency of tooth brushing and dental visits had no effect on dental anxiety. The level of current pain was found to be negatively correlated with age and to be low. In their study, Ürer et al.[25] found a relationship between pain and age. The highest pain was observed in the 40-49 age group, and the lowest pain was observed in the 30-39 age group. In our study, unlike the Ürer et al. study, we examined the relationship with pain regardless of age group and found a small negative relationship between pain and age. In the present study, women's MDAS scores were higher than men's. This study looked at people with orofacial pain and included toothache and TMD pain as a cause of pain. It was found that the pain felt by people with TMD problems was less than that felt by people with toothache. We think that the reason why dental and TMD problems cause different levels of pain is due to differences in the mechanism of pain generation, apart from different aetiologies and factors.

Ogbebor and Azodo[26] found that the most common presenting problem for patients (71.1%) was toothache, with others including tartar build-up (6.0%), broken or lost teeth (3.8%), defects in teeth (3.1%), missing teeth requiring replacement (2.3%), routine dental examinations (2.3%) and bad breath (2.0%). More than half (58.6%) of the patients were diagnosed with dental caries and its consequences. In another study, Akaji et al.[27] found that asymptomatic visits to dental clinics were rare; instead, most patients were there for pain (49.2%), swelling in the mouth (7.6%) and routine dental examinations (5.7%). Previous studies have shown that pain is the most common reason for people to visit dental clinics, and this finding highlights the importance of investigating anxiety levels in patients with pain. The patients in this study were therefore people with dental or temporomandibular

Table 3. Evaluation of the relationship between VAS and MDAS scores and demographic characteristics

	Gender	Marital status	Age	BMI	Blood type	Profession	Smoking	Frequency of tooth brushing	MDAS
VAS	r=0.173 p=0.074	r=-0.047 p=0.627	r=-0.203* p=0.035	r=-0.169 p=0.081	r=0.04 p=0.680	r=0.013 p=0.896	r=0.096 p=0.324	r=0.125 p=0.198	r=0.265* p=0.006
MDAS	r=0.154 p=0.111	r=0.004 p=0.969	r=-0.030 p=0.754	r=-0.130 p=0.179	r=-0.019 p=0.842	r=-0.009 p=0.928	r=0.092 p=0.346	r=0.089 p=0.360	-

*r: Spearman correlation coefficient, (p<0.05), BMI: Body-mass index, VAS: Visual Analogue Scale, MDAS: Modified Dental Anxiety Scale

Table 4. Evaluation of VAS and MDAS scores within groups by gender

	Gender	VAS		MDAS	
		X±SD	p	X±SD	p
Toothache (n=52)	Male (n=23)	5.43±2.74	0.540*	9.65±5.04	0.023*
	Female (n= 29)	5.90±2.29		12.31±3.98	
TMD pain (n=56)	Male (n=29)	3.07±2.39	0.119*	8.66±3.35	0.01*
	Female (n=27)	3.7±1.94		11.44±3.96	

*: Mann-Whitney U test, X: Mean, SD: Standart deviation, p<0.05, VAS: Visual Analog Skala, MDAS: Modified Dental Anxiety Scale, TMD: Temporomandibular disorders,

Table 5. Evaluation of the VAS and the MDAS scores in the groups

		X±SD	Mann-Whitney U	p
VAS	Toothache (n=52)	5.69±2.49	710.50	0.000*
	TMD pain (n=56)	3.38±2.19		
MDAS	Toothache (n=52)	11.13±4.63	1248.50	0.200
	TMD pain (n=56)	10.0±3.89		

*: Mann-Whitney U test, X: Mean, SD: Standart deviation, p<0.05, VAS: Visual Analog Skala, MDAS: Modified Dental Anxiety Scale, TMD: Temporomandibular disorders,

disorder (TMD) pain. Dou et al,[13] in their research on patients with irreversible pulpitis, investigated the effect of pain experienced by patients in their previous dental experience on dental anxiety. They found that the level of anxiety was higher in patients who had experienced pain on previous dental visits, and that this was a factor influencing attendance at follow-up appointments. The study by Ürer et al.[25] questioned negative dental experiences, examined pain perception and its correlation with anxiety, and concluded that negative dental experiences alter anxiety and pain perception. Dikmen et al,[28] in their investigation of the relationship between predicted and experienced pain levels on electromyography (EMG) and anxiety and depression, found that the experience of pain can vary between people depending on gender, age, expectations and previous experience. According to the study by Dikmen et al, no relationship was found between anxiety levels and pain severity. However, Frot et al.[29] and Thibodeau et al.[30] found a direct relationship between pain severity and anxiety levels. This study found that dental anxiety scores increased as the level of pain experienced increased. These results were found to be consistent with the studies by Frot et al. and Thibodeau et al. This result showed that pain is associated with anxiety. It is possible that people with orofacial pain will experience difficulties in obtaining patient compliance and cooperation during dental treatment due to these increased levels of dental anxiety. We believe that in the treatment of patients with orofacial pain, prompt and effective treatment of the pain prior to other orofacial treatments is important in managing both the patient's existing dental anxiety and dental anxiety that may become permanent. We also believe that toothache and dental anxiety directly influence each other, and that treatment of one will affect recovery from the other. In this study, the average VAS was 5.7 for people with toothache and 3.4 for people with temporomandibular disorder pain. Although the perceived pain was different, it was found that the dental anxiety scales of people with toothache and TMD pain were similar. When the two groups were compared, the levels of anxiety were low (dental anxiety scores were below 12). These results suggest that the pain experienced does not influence/increase the level of anxiety in people with low levels of dental anxiety. There are few studies in the literature evaluating the relationship between pain and anxiety. The present study found a low and positive relationship between pain and anxiety in people with TMD pain and dental pain. It was observed that dental pain caused more severe pain. These findings will contribute to the literature in terms of a better understanding of the relationship between pain and anxiety in the orofacial region.

Limitations

It is possible that the individuals included in the study had different pain thresholds and also different psychology when assessing their dental anxiety and pain due to different personality, and the assessment of dental anxiety at a single point in time was the limitation of the study due to the retrospective study design.

CONCLUSSION

This study showed that patients presenting to the oral and maxillofacial surgery clinic complaining of temporomandibular disorder pain had lower pain scores than patients complaining of toothache. It was found that patients' dental anxiety scores increased with their pain levels. Pain levels were also found to decrease with age. In addition, this study demonstrated the relationship between pain and anxiety and the importance of prompt and effective treatment of pain, regardless of the orofacial factor causing the pain, in the management of patients' dental anxiety.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was approved by the Clinical Researches Ethics Committee of Van Yüzüncü Yıl University Faculty of Medicine (Date: 09.09.2022, Decision No: 2022/09-02).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflicts of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

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

Author Contributions

All of the authors declare that they have all participated in the design, conduct and analysis of the work, and that they have approved the final version.

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