

Investigation of the relationship between alexithymia, dental and general anxiety levels in orthodontic patients

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Original Article

Abstract

BACKGROUND AND AIM: The aim of this study was to examine the relationship between alexithymia and anxiety levels in patients accepted to orthodontics for the first time and patients admitted for orthodontic treatment.

METHODS: The study enlisted the participation of 200 individuals ranging in age from 11 to 20 years. The Toronto Alexithymia Scale-20 (TAS-20), State-Trait Anxiety Inventory (STAI), Orthodontic version of modified dental anxiety scale (MDASO), and orthodontic concerns list (OCL) questionnaires were used to assess the patients' alexithymia and anxiety levels. The level of statistical significance was set at $P < 0.05$.

RESULTS: The "alexithymia" values evaluated using the TAS-20 questionnaire were found to be higher in boys than in girls. "state and trait anxiety" evaluated using STAI questionnaire did not differ between patients who applied to the orthodontic clinic for the first time and patients who were accepted for orthodontic treatment. "Orthodontic anxiety" evaluated using the MDASO questionnaire was found to be higher in individuals in the 11-15 age group compared to the individuals in the 16-20 age group.

CONCLUSION: The assessment of various personality and psychological conditions such as anxiety and alexithymic characteristics of individuals who applied for orthodontic treatment and were accepted for treatment should not be overlooked and should be performed at the start of long-term treatments such as orthodontic treatment.

KEYWORDS: Orthodontic Treatment; Alexithymia; Anxiety

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Orthodontic treatment is a treatment option that is mostly applied depending on the preferences of the individuals.^{1,2} Orthodontic treatment differs from other dental treatments in that it follows a different path. Following the start of treatment, the orthodontist monitors the patients on a monthly basis, and this process continues for many years. Not only dental development but also mental development of child patients are under the observation of the orthodontist. It has been said that an orthodontist is also the first psychiatrist of the patient.³

Dental anxiety is a state of severe discomfort and tension that develops due to the fear felt

because of dental treatment and cannot be clearly expressed.^{4,5} Although dental anxiety can be seen at any age, it occurs more frequently in childhood or adolescence.⁶ Alexithymia is a condition that is defined as the difficulty in recognizing, knowing, distinguishing, and expressing emotions. It would be more correct to talk about the level of alexithymic characteristics rather than whether alexithymia is present or not. It has been suggested that alexithymia is not a disease but a condition related to personality traits.^{7,8}

It is essential for patients to share their feelings and thoughts with the physician comfortably for the healthy progress of the treatment. When the orthodontist who has

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communication problems with her/his patient investigates the cause of this situation, she/he can realize the alexithymic characteristics of the patients. It has been stated that it is necessary to know how the psychological changes of individuals affect orthodontic treatment.⁹ It has been reported that patients' psychology changes during orthodontic treatment and with proper patient-physician communication and relationships, factors such as fear, anxiety, and stress that contribute to an individual's psychological structure can be reduced.¹⁰ Providing the patient-physician relationship at the beginning of the treatment allows the negativities that may occur during the treatment to be eliminated in advance. Therefore, before starting treatment, it is necessary to determine whether individuals have alexithymic characteristics in terms of the health of the patient-physician relationship.¹⁰ Considering the high demand for orthodontic treatment and the importance of patients' ability to express their fear, anxiety, and feelings towards treatment, these relationships need to be examined. A study investigating anxiety and alexithymia in orthodontic patients together has not been found in the literature. The purpose of this study was to investigate the association between alexithymia and anxiety levels in orthodontic patients aged 11 to 20.

Methods

This prospective cross-sectional study included 100 patients who applied to the Department of Orthodontics, School of Dentistry, Van Yuzuncu Yil University, Van, Turkey, between 2015 and 2016 and were randomly selected and accepted for orthodontic treatment, as well as 100 patients who were admitted to the orthodontic clinic for the first time during the same time period (total patients: 200). Power analysis was performed using the G*Power (version 3.1.7) program to determine the number of samples. The power of the study is expressed as $1-\beta$ (β = probability of type II error), and in general, studies should have 80% power.

According to Cohen's effect size coefficients and the calculation made by assuming that the anxiety and alexithymia assessments to be made between two independent groups will have a medium effect size ($d = 0.44$), it should be noted that there should be at least 83 people in each group in order to achieve 80% power at the $\alpha = 0.05$ level and there may be losses in the study process. Taking this number into consideration, it was decided to take 100 people in each group. The Ethics Committee of School of Medicine, Van Yuzuncu Yil University gave their clearance (08.10.2015/11). The Toronto Alexithymia Scale-20 (TAS-20), State-Trait Anxiety Inventory (STAI), Orthodontic version of modified dental anxiety scale (MDASO) and orthodontic concerns list (OCL) questionnaires were used to assess the patients' alexithymia and anxiety levels. Those who received a TAS-20 score of 61 or higher were classified as alexithymic.¹¹ The threshold for statistical significance was set at $P < 0.05$. The goal of the study, its duration, and the questionnaires to be utilized in the study were all explained in detail to the patients. Patients who volunteered by signing the Ethics Committee-approved "Informed Consent Form" were enrolled in the study once their parents gave their consent. Patients with any systemic disease and previous orthodontic treatment were not included in the study. First, gender and age values of the patients who fitted the selection criteria were determined. The patients were evaluated by dividing them into 11-15 and 16-20 age groups. In the study, the mean age was 15.96 years and the median value was 16. Based on these values, age group classification was made. Later, the patients who were accepted for orthodontic treatment formed the study group, whereas the patients who applied to the clinic for the first time formed the control group. Patients in the study group were admitted to orthodontic treatment during the session, whereas patients in the control group were assessed for the first time in the orthodontics clinic and questionnaires were filled out.

Reliability of MDASO and OCL questionnaires:

By using the back-translation technique, the orthodontic-adapted versions of the MDASO and OCL questionnaires were translated into Turkish. For the reliability of MDASO and OCL questionnaires adapted to Turkish, internal consistency was evaluated with the Cronbach's alpha (α) coefficient, and the relationship of each question to the total score was evaluated with the Spearman's correlation coefficient.

Evaluation of method error: Approximately one month after the first evaluation, 50 randomly selected patients were recalled and asked to fill in the questionnaires again in order to determine the method error regarding the repeatability of their measurements. The Wilcoxon test was used to evaluate whether there was a difference between the first and second measurements of the questionnaire evaluations made by the patients.

Statistical analysis was performed using SPSS (version 21, IBM Corporation, Armonk, NY, USA) statistical package program. The mean, standard deviation (SD), minimum, and maximum values of each measurement were calculated. Kolmogorov-Smirnov test was performed for normality and it was determined that the data did not show normal distribution. Therefore, non-parametric statistical analysis methods were used in our research. The Mann-Whitney U test was used to evaluate whether the difference between the two groups was statistically significant in the data obtained. Chi-square test was used to evaluate whether the difference between categorical variables was statistically significant or not. Spearman's correlation coefficient was used to determine the relationships of the data with each other. Statistical significance level was determined as $P = 0.05$. The results obtained were

evaluated at the 95% confidence interval (CI).

Results

This study included 200 individuals who sought treatment at orthodontics clinic of School of Dentistry, Van Yuzuncu Yil University, between 2015 and 2016. Female patients ($n = 32$) had a mean age of 16.14 years, whereas male patients ($n = 68$) had a mean age of 15.60 years. The average age of all patients who took part in the trial was 15.96 years. Table 1 shows the distribution of demographic parameters of a total of 200 patients enrolled in the study, 132 girls (66%) and 68 boys (34%). There were 107 people in the 11-15 age group (72 girls, 35 boys), and 93 people in the 16-20 age group (60 girls, 33 boys). There were 100 individuals (62 girls, 38 boys) in the study group and 100 individuals (70 girls, 30 boys) in the control group. We can say that the groups show a homogeneous distribution.

Descriptive statistical values of the scores given to the TAS-20, STAI, and MDASO questionnaires examined within the scope of the study were as follows: mean TAS-20 value was 48.66 ± 8.61 , mean STAI-state anxiety (STAI-S) value was 42.13 ± 6.13 , mean STAI-trait anxiety (STAI-T) value was 46.50 ± 6.29 , mean MDASO value was 9.92 ± 3.68 , and the mean OCL value was 31.91 ± 10.85 . When the descriptive statistical values of the scores of the answers given to 5 different questions in the MDASO questionnaire examined in the study are examined; the 1st question (How did you feel or do you feel yourself when you visited the orthodontist for the first time?) was the MDASO question with the highest mean, while the 5th question (How would you feel when you thought your teeth were measured?) was the MDASO question with the lowest mean.

Table 1. Comparison of the distribution of demographic characteristics of the patients participating in the study by gender

Demographic characteristics		Total	Girls	Boys	χ^2	P
		n (%)	n (%)	n (%)		
Age (year)	11-15	107 (53.5)	72 (54.5)	35 (51.5)	0.680	NS
	16-20	93 (46.5)	60 (45.5)	33 (48.5)		
Group	Study	100 (50.0)	62 (47.0)	38 (55.9)	1.426	NS
	Control	100 (50.0)	70 (53.0)	30 (44.1)		

NS: Not significant

The data obtained as a result of the research were first examined by considering the gender factor. As a result of comparing the mean scores of the questionnaires with the Mann-Whitney U test within themselves according to gender, a statistical difference was found only in TAS-20 values when the gender factor was taken into account ($P < 0.05$). Male individuals had higher levels of alexithymia than female ones, and this difference was statistically significant ($P < 0.05$). For this reason, while evaluating, TAS-20 data were examined separately for boys and girls. While evaluating the other questionnaires, the data of male and female individuals were combined and examined together.

Within the scope of the study, patients who came to the orthodontics clinic for the first time (control group) and those who were accepted to orthodontic treatment and waiting for bonding (study group) were included in the study. The analysis of TAS-20 scores with gender differences for boys and girls separately according to age factor is shown in table 2. There was no statistical difference between the groups ($P > 0.05$). The analysis of STAI-S, STAI-T, MDASO, and OCL scores in terms of gender, in which no gender differences were observed, is shown in table 3. According to the results of the test, there was a difference in the MDASO and OCL questionnaires between the age groups, and this difference was statistically significant ($P < 0.05$). Orthodontic anxiety levels of the patients in the 11-15 age group were found to be higher than the patients in the 16-20 age group ($P < 0.05$).

Analysis of data in individuals admitted to orthodontic treatment (study group) and individuals who applied to the clinic for the first

time (control group): The analysis of mean TAS-20 scores separately in male and female individuals based on the study and control group factors is shown in table 4. Mean TAS-20 scores did not show a statistically significant difference between the study and control groups ($P > 0.05$). The analysis of the mean STAI-S, STAI-T, MDAS, and OCL scores according to the study and control groups is shown in table 5. According to the results of the test, the difference in STAI-S, STAI-T, MDAS, and OCL questionnaires between the study and control groups was not statistically significant ($P > 0.05$).

Correlations: A positive and statistically significant correlation was observed between TAS-20 questionnaire and MDAS ($r = 0.216$). A positive and statistically significant correlation was observed between the STAI-S questionnaire and the STAI-T questionnaire ($r = 0.216$). A positive and statistically significant correlation was observed between the STAI-T questionnaire and the STAI-S and MDASO questionnaires ($r = 0.216$, $r = 0.173$, respectively).

Discussion

Procedures performed before orthodontic treatment (first examination and recording material collection) can cause fear and anxiety, like other dental procedures.¹² The evaluation of patients' various personalities and psychological circumstances, such as alexithymic characteristics, should not be disregarded and should take place at the start of long-term treatments, such as orthodontic therapy. Another key aspect influencing the patient-physician connection and treatment outcome is taking into account the alexithymic characteristics of persons seeking orthodontic treatment.

Table 2. Comparison of Toronto Alexithymia Scale-20 (TAS-20) averages according to age groups with the Mann-Whitney U test

Veri	Age group (year)	N	Mean \pm SD	Mann-Whitney U
TAS-20 (girls)	11-15	72	47.02 \pm 7.91	NS
	16-20	60	48.61 \pm 8.78	
TAS-20 (boys)	11-15	35	49.82 \pm 10.47	NS
	16-20	33	51.06 \pm 7.07	

TAS-20: Toronto Alexithymia Scale-20; SD: Standard deviation; NS: Not significant

Table 3. Comparison of the mean scores of the questionnaires [except Toronto Alexithymia Scale-20 (TAS-20)] between ages groups with the Mann-Whitney U test

Veri	Age group (year)	N	Mean \pm SD	Mann-Whitney U
STAI-S	11-15	107	42.43 \pm 6.50	NS
	16-20	93	41.77 \pm 5.68	
STAI-T	11-15	107	46.00 \pm 6.75	NS
	16-20	93	47.08 \pm 5.70	
MDASO	11-15	107	10.47 \pm 3.98	*
	16-20	93	9.28 \pm 3.20	
OCL	11-15	107	33.85 \pm 11.05	**
	16-20	93	29.67 \pm 10.22	

*P < 0.05; **P < 0.01

STAI-S: State-Trait Anxiety Inventory-state anxiety; STAI-T: State-Trait Anxiety Inventory-trait anxiety; MDASO: Modified Dental Anxiety Scale; OCL: Orthodontic concerns list; SD: Standard deviation; NS: Not significant

The association between alexithymia and anxiety levels in orthodontic patients aged 11-20 years was investigated in this study. Orthodontic anxiety was observed to be higher in children. It was observed that male individuals had higher levels of alexithymia and the level of anxiety increased as the level of alexithymia increased in individuals.

Few studies have been conducted to determine the fear and anxiety felt by patients before orthodontic treatment. This is due to the lack of special questionnaires and scales related to orthodontic procedures.¹⁰ There is no study in the literature that examines situations of individuals who are admitted to treatment, to express their feelings before orthodontic treatment. When the literature is reviewed, it is observed that there is a limited number of studies examining the effect of standard orthodontic procedures on the patients' psychological state.^{13,14}

It has been reported that conditions such as anxiety disorders, psychological disorders, and alexithymia in patients receiving orthodontic treatment significantly affected the pain severity caused by orthodontic practices.¹⁵ Moreover, it has been reported

that individuals generally do not have enough information about how their treatment will progress and what will happen during the treatment.¹⁰ This fact shows that patients are not well informed about orthodontic treatment. It has been stated that the trust-based relationship between the orthodontist and the patient plays an important role in reducing dental anxiety.¹⁰ Negative stories shared by the environment and family may cause an increase in dental anxiety associated with orthodontics. The relationship of families with the orthodontist and the cost of orthodontic treatment is another factor that causes dental anxiety in orthodontic patients.¹⁰

Ozdemir et al.¹⁶ reported that male individuals had higher trait and state anxiety values than female ones in the analysis conducted according to gender in their study. There was no statistical difference in the analysis based on the age factor. Yusa et al.¹⁷ reported that the STAI-S scores of patients who would have their wisdom tooth removed for the first time were higher than those who would have the same procedure for the second time.

Table 4. Comparison of Toronto Alexithymia Scale-20 (TAS-20) averages according to the study and control groups with the Mann-Whitney U test

Veri	Group	N	Mean \pm SD	Mann-Whitney U
TAS-20 (girls)	Study	62	46.58 \pm 8.72	NS
	Control	70	48.78 \pm 7.87	
TAS-20 (boys)	Study	38	49.21 \pm 8.70	NS
	Control	30	51.96 \pm 9.14	

TAS-20: Toronto Alexithymia Scale-20; SD: Standard deviation; NS: Not significant

Table 5. Comparison of the mean scores of the questionnaires [except Toronto Alexithymia Scale-20 (TAS-20)] between the study and control groups with the Mann-Whitney U test

Veri	Group	N	Mean \pm SD	Mann-Whitney U
STAI-S	Study	100	42.32 \pm 5.81	NS
	Control	100	41.94 \pm 6.46	
STAI-T	Study	100	46.18 \pm 5.79	NS
	Control	100	46.83 \pm 6.77	
MDASO	Study	100	9.91 \pm 3.82	NS
	Control	100	9.93 \pm 3.55	
OCL	Study	100	31.61 \pm 11.36	NS
	Control	100	32.21 \pm 10.36	

STAI-S: State-Trait Anxiety Inventory-state anxiety; STAI-T: State-Trait Anxiety Inventory-trait anxiety; MDASO: Modified Dental Anxiety Scale; OCL: Orthodontic concerns list; SD: Standard deviation; NS: Not significant

This outcome was interpreted as the patients' anxiety levels decreasing as a result of their experience with the procedures.

In the study on patients waiting for orthodontic treatment and patients receiving orthodontic treatment for 1 year by Sari et al.,¹⁴ they reported that the state anxiety levels of the patients were higher at the beginning of orthodontic treatment. Vaida et al.¹⁸ found that the anxiety level of patients who requested orthodontic treatment was higher in terms of state anxiety. No difference was found in terms of trait anxiety. The anxiety levels of orthodontic patients were determined higher than those who did not receive orthodontic treatment. In this study, on the other hand, no difference was found between the study and control groups in terms of state anxiety. Pervez et al.¹⁹ investigated the change in anxiety levels in the first three months of orthodontic treatment. They reported that the anxiety levels of the patients decreased over time. Accordingly, it was reported that patients' compliance with the orthodontist and clinic improved as a result of orthodontic treatment.

In this study, state and trait anxiety levels of individuals were evaluated with STAI-S and STAI-T questionnaires. In our study, unlike the studies of Sari et al.¹⁴ and Vaida et al.,¹⁸ no difference was found between the state anxiety values of individuals who started orthodontic treatment and those who did not. In our study, there was no difference observed in the analysis of trait anxiety according to age, gender, and study-control group. In the studies

in the literature, Ozdemir et al.¹⁶ found that state anxiety values were higher in male individuals than female ones. In our study, state and trait anxiety values did not differ according to gender.

In the literature review, it has been observed that there are many studies on alexithymia in different fields. Studies in the field of alexithymia in Turkey are limited and the number of studies related to alexithymia in the field of dentistry is almost nonexistent. Yemez²⁰ reported that alexithymic characteristics increased with age and alexithymic features were higher in female individuals compared to male ones. Mattila²¹ investigated alexithymic characteristics in the population and reported that there was no gender difference in terms of alexithymia. In the studies of Pohjola et al.,⁸ Feiguine et al.,²² Viinikangas et al.,²³ and Sezer et al.,²⁴ alexithymia level was found to be higher in male individuals. Similarly, in this study, the alexithymia level was found to be higher in male individuals. Kamm et al.²⁵ reported that alexithymia was not associated with age. In this study, similarly, it was observed that there was no difference in the level of alexithymia according to age. Mattila²¹ reported that alexithymia increased with age. Since the majority of the patients who applied to our orthodontics clinic for treatment were between the ages of 11 and 20, the individuals examined in this study were selected from this age range. We think that this difference is due to the fact that the individuals in our study and Mattila's study have different ages and

geographical features.

Viinikangas et al.²³ reported that the incidence of alexithymia was higher in individuals with high dental anxiety and there was no difference by gender in terms of the incidence of alexithymia. Pohjola et al.⁸ concluded that there was no difference in the incidence of high dental fear between individuals with and without alexithymia. In a study examining patients who underwent tooth extraction for orthodontic reasons, it has been reported that there is a positive relationship between alexithymia and dental fear.⁷ In this study, it was observed that as the level of alexithymia increased in individuals, the level of anxiety increased as well.

Sipila et al.²⁶ reported in their study that temporomandibular joint (TMJ) disorders and orofacial pain were associated with alexithymia. Sezer et al.²⁴ reported in their study that alexithymia was associated with chronic periodontitis. Stein et al.²⁷ reported a relationship between poor oral hygiene and alexithymia in their study. Jerlang²⁸ reported that alexithymic features were observed in patients with burning mouth syndrome (BMS). As stated in the above studies, some associations have been reported between alexithymia and different problems in oral health and orofacial region. In addition, as the level of alexithymia increases, it is seen that dental fear and dental anxiety also increase. Similarly, in our study, it was concluded that individuals with high anxiety levels had higher alexithymia levels. A harmonious and balanced patient-doctor relationship may not be established in alexithymic patients who want to have dental and orthodontic treatment. Patients who are

thought to have dental fear in the clinic should be examined for alexithymia. In order to examine the level of alexithymia and anxiety associated with orthodontic treatment, different studies should be conducted in different age groups, socio-cultural structures, and geographical regions.

The limitations of this study are that the patients who came to the clinic for the first time and those who were admitted to orthodontic treatment were not the same patients and the patients' level of knowledge about orthodontic treatment was not included in the evaluation.

Conclusion

The level of orthodontic anxiety was found to be higher at younger ages within the limitations of this study. It was observed that male individuals had higher levels of alexithymia and the level of anxiety increased as the level of alexithymia increased in individuals. A harmonious and balanced patient-doctor relationship may not be established in alexithymic patients who want to have dental and orthodontic treatment. Patients who are thought to have dental fear in the clinic should be examined for alexithymia. In order to examine the level of alexithymia and anxiety associated with orthodontic treatment, different studies should be conducted in different age groups, socio-cultural structures, and geographical regions.

Conflict of Interests

Authors have no conflict of interests.

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