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Psychologia i współpraca z pacjentem w ortodoncji: czy istnieje pomiędzy nimi związek?

Psychology and Patient Cooperation in Orthodontics: Is There a Relationship between Them?

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Streszczenie

Współpraca z pacjentem jest bez wątpienia istotna dla powodzenia leczenia ortodontycznego. W związku z tym ważne jest poznanie czynników, które mogą wpłynąć na taką współpracę. **Cel.** Zbadanie wpływu zaburzeń psychicznych, takich jak zespół stresu pourazowego (ang. post-traumatic stress disorder, PTSD), depresja i lęk, na współpracę z pacjentem, która jest ważnym elementem leczenia ortodontycznego. **Materiał i metody.** Badanie przeprowadzono z udziałem 215 pacjentów w wieku od 11 do 17 lat (143 dziewczynki, 72 chłopców), po leczeniu ortodontycznym. Dane zbierano przy pomicy: skali oceny depresji u dzieci (ang. Children's Depression Inventory, CDI), skali oceny stanu i cech lęku

Abstract

Patient cooperation is undoubtedly important in orthodontic treatment success. As a result, it is critical to understand the factors that can influence cooperation. **Aim.** To investigate the effect of psychological disorders such as post-traumatic stress disorder (PTSD), depression, and anxiety on patient cooperation, an important part of orthodontic treatment. **Material and methods.** This study was conducted on 215 patients between aged 11 and 17 years of age (143 girls, 72 boys), who just received orthodontic treatment. Data collection tools included the Children's Depression Inventory (CDI), the State-Trait Anxiety Inventory for Children (STAIC), the Post-Traumatic Stress Symptoms Severity Scale

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u dzieci (ang. State-Trait Anxiety Inventory for Children, STAIC), skali nasilenia objawów stresu pourazowego u dzieci w wieku 11-17 lat (ang. Post-Traumatic Stress Symptoms Severity Scale Child Form 11-17) / skróconej skali nasilenia objawów pourazowych po zdarzeniach stresujących (ang. National Stressful Events Short Form, NSESSS), kwestionariusza traumy u dzieci (ang. Childhood Trauma Questionnaire, CTQ-28) oraz formularza danych socjodemograficznych. **Wyniki.** Stwierdzono, że 59,5% uczestników (128 pacjentów) było współpracujących. Ponadto istniała statystycznie istotna różnica między płciami (p=0,001; p<0,01). Dziewczynki były bardziej chętne do współpracy niż chłopcy. Stwierdzono istotną statystycznie różnicę pomiędzy matkami uczestników pod względem statusu zatrudnienia (p=0,010; p<0,05). Nie wykazano statystycznej różnicy pomiędzy współpracą a całkowitymi wynikami w skalach CDI, STAIC, NSESSS i CTQ-28. **Wniosek.** Nie stwierdzono zależności między współpracą pacjentów a PTSD i innymi powiązanymi schorzeniami psychiatrycznymi. Zaobserwowano, że matki mają korzystny wpływ na to, czy ich dzieci będą współpracować czy nie. W związku z tym dzieci matek, niepracujących, które mogą poświęcić więcej czasu dzieciom, charakteryzują się tendencją do zwiększonej współpracy. **(Büyükbayraktar ZC, Yelboğa Z. Psychologia i współpraca z pacjentem w ortodoncji: czy istnieje pomiędzy nimi związek? Forum Ortod 2021; 17 (4): 269-77).**

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Słowa kluczowe: współpraca z pacjentem, depresja, lęk, pourazowe, ortodoncja

Child Form 11-17/ the Post-Traumatic Stress Disorder National Stressful Events Short Form (NSESSS), the Childhood Trauma Questionnaire (CTQ-28), and Socio-demographic Data Form. **Results.** It was found that 59.5% of the participants (128 patients) were cooperative; moreover, there was a statistically significant difference between the genders (p=0.001; p<0.01). The girls were more cooperative than the boys. A statistically significant difference was found between the subject's mothers in terms of employment status (p=0.010; p<0.05). There were no statistically significant differences between the cooperation and total scores of CDI, STAIC, NSESSS, and CTQ-28.**Conclusion.** There was no relationship between patient cooperation and PTSD or the other related psychiatric conditions. It was found that mothers had a positive effect on whether their children cooperate or not. Therefore, the children of mothers who do not work and can devote more time to them tend to have an increased cooperation. **(Büyükbayraktar ZC, Yelboğa Z. Psychology and Patient Cooperation in Orthodontics: Is There a Relationship between Them? Orthod Forum 2021; 17 (4): 269-77).**

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Introduction

Various epidemiological studies have revealed that malocclusions affect between 20 and 93% of the population (1, 2). Malocclusion is a common disorder in the society; thus treating it critical (3). Undoubtedly, patient cooperation plays a significant role in the success of orthodontic treatment. Uncooperative patients can prolong their own treatment, tooth and periodontal damage. They may also require extra tooth extraction, suffer from relapse, and put additional stress on their orthodontist (4). Thus, before beginning orthodontic treatment, it is critical to assess clinical collaboration first (4). Patient cooperation is not limited only to the regular use of the applications. Patient cooperation is also required when it comes to improving dental hygiene, maintaining orthodontic appliances, and attending appointments on time (5).

Many factors influence patient cooperation, including age, gender, socio-economic status, psychosocial orientation, the patient's family/spouse, and the interaction between the dentist/doctor and the patient (6, 7). According to the literature, adherence to treatment may be influenced by the patient's personality traits (8). Research on whether or not personality traits predict how patients adhere to orthodontic treatment has received considerable attention (9-11). Subjects who cooperate well tend to be energetic, enthusiastic, social, self-controlling, responsible, and/or hardworking Subjects who do not cooperate well, on the other hand, tend to be stubborn, independent, impatient, selfish, and/or have low tolerance (12).

Post-traumatic stress disorder (PTSD) refers to a set of emotional, cognitive, social, and behavioral disorders that develop after an individual experiences or witnesses trauma

that adversely affects their physical integrity and life. Before reaching adulthood, one out of every four children experiences a major traumatic event such as domestic violence, abuse, vehicle accidents, serious medical illnesses, terrorist incidents, or war (13). Trauma and how the child responds to trauma can both disrupt normal brain development and have an impact on a child's adaptability, cognitive function, attention, social skills, personality traits, sense of self-concept, and impulse control (14).

Mild fear and anxiety are normal developmental experiences, but when they increase disproportionately, they interfere with daily functioning and thus may require treatment (15). There are two forms of anxiety: state and trait. One study showed that subjects who cooperated well had lower levels of state anxiety (5).

Aim

The aim of this study is to find out whether or not cooperation is associated with PTSD, depression, and anxiety. To the best of our knowledge, no previous research has been conducted on this particular topic.

Material and methods

The subjects who visited Orthodontic Clinic at the Sivas Cumhuriyet University Faculty of Dentistry between January 2019 and June 2020 were included in the present study.

Ethics Committee Approval

The Sivas Cumhuriyet University Non-invasive Clinical Trials Ethics Committee approved this study. The verbal and written consent of the participants were obtained (Ethics committee decision no: 2018-12/16 Date: 05.12.2018)

G*Power 3.1 was used to calculate sample size. When the alpha value was set at 0.05 and the effect size at 0.51, the statistical power was calculated to be 0.95 and 168 patients (84 in each group) were thus identified. Given the possibility of losses during the follow-up, more subjects were recruited to bring that number up to 215. Only patients aged 11-17 years who had not received orthodontic treatment before were included in the study.

The subjects were followed up for 6 months as well as divided into two groups: cooperative and non-cooperative. All of them received fixed orthodontic appliances (MBT system). They were given routine information at the beginning of treatment. However, they were not given any form of motivation during the observation period. An orthodontist who had been trained beforehand about the questionnaires and criteria for identifying cooperative patients at the same university clinic had treated them. The orthodontist completed the forms on behalf of each patient at the end of the 6-month observation period, and determined which of patients cooperated, and which ones did not.

The following criteria were used to identify non-cooperative patients. Those who met at least one of these criteria were included in this group.

- They did not use elastics required by their therapy during the recommended treatment period. (Reason: the expected changes were not observed within the specified time period, and thus not used effectively.)
- They did not stick to their scheduled appointments (more than 3 times, more than 10 minutes late)
- They broke their brackets or bands multiple times
- They were unwilling to come in for treatment
- They acted in a glum, aggressive, or impolite manner
- They constantly complained about treatment (related to wires and brackets, etc.)

Subjects who did not exhibit any of the above criteria were deemed as cooperative.

Data collection tools

Patients' age and gender were recorded at the beginning of the treatment.

Children's Depression Inventory (CDI)

The CDI was developed by Kovacs in 1992 to assess the severity of depression among children and adolescents (16). It is the most commonly used self-report scale for childhood depression and its psychometric properties have been most thoroughly investigated. It is a self-report scale for children between the ages of 6 and 17. The child was read the scale, and then either asked to fill it out, or had it filled out for them. It contains 27 items, and three possible answers for each item: (1) "I get depressed from time to time.", (2) "I'm frequently depressed.", (3) "I'm always depressed." For two weeks, the child is asked to select the sentence(s) most relevant to them. Depending on the severity of the condition, each item can get 0, 1, or 2 points. The highest score of the scale is 54. Its Turkish validity and reliability study was conducted by Öy, who determined that the pathology cut-off point was 19 points (17).

State-Trait Anxiety Inventory for Children (STAIC)

This scale was developed by Spielberger (18). It has two multiple-choice subscales representing both forms of anxiety (state and trait), and features 20 questions for each subscale. Each item gets three possible scores (1, 2 or 3) depending on the severity of the symptom. It is used to determine a child's current and general anxiety levels. The validity and reliability study of the scale in Turkey was carried out by Ozusta (19).

Trait Anxiety Subscale: This subscale aims to assess both persistent individual differences and anxiety predisposition. It contains 20 items and assesses how the child usually feels based on the frequency of occurrence. Statements such as "I get nervous at home" or "My hands are shaking" are rated with "almost never," "sometimes," or "often." The subscale's

total score ranges between 20 and 60 points; the higher the score, the more trait anxiety the subject has.

State Anxiety Subscale: Children are asked to evaluate how they themselves feel right now and to select the most appropriate statement from a list of options such as "I feel very angry, I feel angry, I do not feel angry." There are 20 items in total. The lowest score is 20, whereas and the highest score is 60. In practice, the state anxiety scale should be administered before the trait anxiety scale, because it is sensitive to any possible excitement/anxiety that may emerge under test conditions.

Post-Traumatic Stress Symptoms Severity Scale Child Form 11-17 / Post Traumatic Stress Disorder National Stressful Events Short Form (NSESSS)

The NSESSS is a 9-item scale that assesses the severity of PTSD in children between ages 11 and 17 after they have extraordinarily stressful event or experience. It was designed for children who have been diagnosed with PTSD (or in the presence of clinically significant PTSD symptoms) to complete, namely prior to follow-up interviews with the clinician. For each item, the child is asked to rate the severity of PTSD symptoms within the past 7 days. Yalın Sapmaz conducted its Turkish validity and reliability study (20). Each item is rated using a 5-point scale (0=Not at all, 1=Slightly, 2=Mildly, 3=Quite a little, and 4=Extremely). The total score range from 0 to 36 points. The higher the score, the more severe the subject's PTSD is. During clinical interviews, the clinicians must examine the score of each item and indicate their raw scores in the "For Clinician's Use" section. To obtain a total raw score, the raw scores of the 9 items must be added up. Next, they must then compute and implement the total mean score. The total mean score converts the total score to a 5-point scale, allowing them to rate the severity of the individual's social anxiety disorder as none (0), mild (1), moderate (2), severe (3), or extreme (4). DSM-5 field studies have revealed that the scale is reliable, easy to use, and useful for clinicians. Dividing the total raw score by the number of items on the scale yields the total mean score.

Childhood Trauma Questionnaire (CTQ-28)

The CTQ-28 was originally developed by David P. Bernstein in 1995. It was translated into Turkish by Vedat Sar in 1996 (21). It is a five-point, Likert-type self-report scale and its validity and reliability studies have been conducted. It covers five factors: physical, emotional, sexual abuse, and physical and emotional neglect. It includes questions that assess emotional, physical, sexual abuse, and verbal violence in childhood. There are five possible answers: (1) never, (2) rarely, (3) occasionally, (4) frequently, and (5) very frequently. Each item can get a score between 1 and 5. It is possible to compute individual traumatic experience subscales as well as the total score. Before calculating them, the positive statements' scores are reversed (from 1 to 5, from 2 to 4, etc.) – items 2, 5, 7, 13, 19, 26, and 28, in that order. The total score is the sum of the five sub-scores. Sub-scores range between 5 and 25, and have a total score between 25 and 125. Calculation formulas are as follows: Emotional abuse: (3+8+14+18+25), Physical abuse: (9+11+12+15+17), Physical neglect: (1+3+6+2+26), Emotional neglect: (5+7+13+19+28, and Sexual harassment: (20+21+23+24+27).

Table 1. Distribution of descriptive characteristics of the participants

		n	*%*
Age (years)	***Min-Max (Median) Mean±Sd***	***11-17 (15) 14.86±1.77***	
	11	*2*	*0.9*
	12	*20*	*9.3*
	13	*37*	*17.2*
	14	*41*	*19.1*
	15	*22*	*10.2*
	16	*33*	*15.3*
	17	*60*	*27.9*
Gender	*Female*	*143*	*66.5*
	Male	*72*	*33.5*
Cooperation	*Yes*	*128*	*59.5*
	No	*87*	*40.5*
Mother's education level	*Primary school or below*	*128*	*59.5*
	High school	*66*	*30.7*
	University	*21*	*9.8*
Father's education level	*Primary school or below*	*67*	*31.2*
	High school	*82*	*38.1*
	University	*66*	*30.7*
Mother's profession	*Housewife*	*182*	*84.7*
	Employed	*33*	*15.3*
Father's profession	*Civil servant*	*58*	*27.0*
	Worker	*42*	*19.5*
	Self-employed	*59*	*27.4*
	Retired	*28*	*13.0*
	Other	*28*	*13.0*
Family type	*Extended*	*42*	*19.5*
	Nuclear	*168*	*78.1*
	Broken	*5*	*2.3*
Family income	*Minimum wage or below*	*39*	*18.1*
	Above minimum wage	*176*	*81.9*

Statistical Analyses

The NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) was used for statistical analysis. Descriptive statistical methods (mean, standard deviation, median, frequency, ratio, minimum, and maximum) were used to analyze the data. The Kolmogorov-Smirnov, Shapiro-Wilk, and graphical evaluations were used to find out whether or not the quantitative data were normally distributed. The Student's t-Test was used to compare normally distributed quantitative data between two

Table 2. Evaluation of descriptive characteristics by cooperation

		Cooperation		
		Cooperative (+) (n=128)	Cooperative (-) (n=87)	
		n (%)	n (%)	p
Age (years)	Min-Max (Median)	11-17 (15)	11-17 (14)	[a]0.149
	Mean±Sd	15.01±1.67	14.64±1.90	
Gender	Female	97 (75.8)	46 (52.9)	[b]0.001**
	Male	31 (24.2)	41 (47.1)	
Mather's education level	Primary school and below	75 (58.6)	53 (60.9)	[b]0.247
	High school	37 (28.9)	29 (33.3)	
	University	16 (12.5)	5 (5.7)	
Father's education level	Primary school and below	39 (30.5)	28 (32.2)	[b]0.939
	High school	50 (39.1)	32 (36.8)	
	University	39 (30.5)	27 (31)	
Mather's profession	Housewife	115 (89.8)	67 (77.0)	[b]0.010*
	Employed	13 (10.2)	20 (23.0)	
Father's profession	Civil servant	39 (30.5)	19 (21.8)	[b]0.314
	Worker	20 (15.6)	22 (25.3)	
	Self-employed	33 (25.8)	26 (29.9)	
	Retired	18 (14.1)	10 (11.5)	
	Other	18 (14.1)	10 (11.5)	
Family type	Extended	25 (19.5)	17 (19.5)	[c]0.717
	Nuclear	101 (78.9)	67 (77.0)	
	Broken	2 (1.6)	3 (3.4)	
Family income	Minimum wage or below	23 (18.0)	16 (18.4)	[b]0.937
	Above minimum wage	105 (82.0)	71 (81.6)	

[a]*Student t Test* [b] *Pearson Chi-square Test*
[c]*Fisher Freeman Halton Exact Test* ***p<0.01*

groups. The Mann Whitney U test was used to compare non-normally distributed quantitative data between two groups. The Pearson Chi-Square and Fisher-Freeman-Halton Exact tests were used to compare qualitative data. The Pearson's Correlation Analysis was used to evaluate the correlations between scale scores. Significance level was accepted as p<0.05.

Results

In the study, 66.5% (n=143) of the participants were girls and 33.5% (n=72) were boys.

Findings on Socio-demographic Data of the Participants

All of the subjects were aged between 11 and 17 years (average age = 14.861.77). Table 1 shows their descriptive traits.

Figure 1 shows the distribution of cooperative and non-cooperative patients.

There was no statistically significant difference between cooperative and non-cooperative patients in terms of age (p>0.05). However, there was a statistically significant difference between cooperative and non-cooperative patients in terms of genders (p=0.001; p<0.01), in so far as girls were more cooperative than boys (Table 2), (Fig. 2).

The educational levels of the parents in both groups did not show a statistically significant difference (p>0.05) (Tab. 2).

The employment status of mothers for both groups (p=0.010; p<0.05) was statistically significant (Fig. 3). Those whose mothers were housewives were more likely to cooperate. The employment status of the fathers did not differ significantly for both groups (p>0.05) (Tab. 2).

Differences in family type and monthly income level for both groups were not statistically significant, too (p>0.05) (Tab. 2).

Findings Based on the Scales

The Cronbach's alpha values showing the internal consistency of the state-trait anxiety inventory were 0.848 for the state anxiety subscale and 0.836 for the trait anxiety subscale (Tab. 3). The Cronbach's alpha value showing internal consistency of the depression scale questions for children was 0.809 (Tab. 4). The Cronbach's alpha value measuring internal consistency of the PTSD scale was 0.840 (Tab. 5). In conclusion, all three values proved that the scales were highly reliable.

Table 3. Distribution of State-Trait Anxiety Scale scores and internal consistency values in children

	Number of questions	Min-Max (Median)	Mean±Sd	Cronbach's alpha
State anxiety score	20	20-50 (30)	30.97±5.31	0.848
Trait anxiety score	20	20-56 (33)	32.96±6.42	0.836

Table 4. Distribution of Children's Depression Scale scores and internal consistency values

Depression scale score for children	Number of questions	27
	Cronbach's alpha	0.809
	Min-Max (Median)	0-31 (8)
	Mean±Sd	9.47±5.69
	No depression (< 19)	197 (%91.6)
	Yes depression (≥ 19)	18 (%8.4)

Table 6. Distribution of Childhood Mental Trauma scale scores and internal consistency values

	Number of Questions	Min-Max (Median)	Mean±Sd	Cronbach's alpha
Emotional abuse	5	1-5.0 (1)	1.23±0.50	0.844
Physical abuse	5	1-3.2 (1)	1.06±0.24	0.810
Physical neglect	5	1-2.8 (1)	1.25±0.38	0.542
Emotional neglect	5	1-4.8 (1.4)	1.69±0.78	0.822
Sexual abuse	5	1-3.4 (1)	1.06±0.24	0.732
Total	25	1-3.0 (1.2)	1.26±0.33	0.883

Table 5. Distribution of PTSD Scale Scores and Internal Consistency Values

PTSD scale score	Number of questions	9
	Cronbach's alpha	0.840
	Min-Max (Median)	0-3.4 (0.8)
	Ort±Ss	0.96±0.74

PTSD: Post-traumatic stress disorder

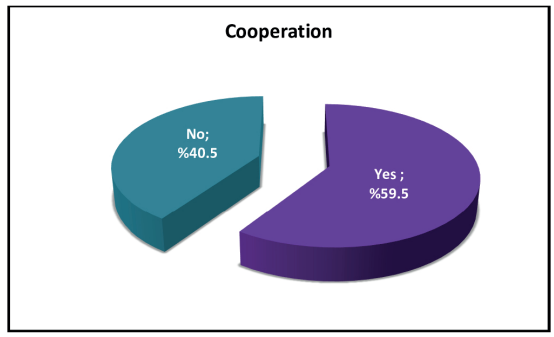

Figure 1. Distribution of cooperative and non-cooperative patients

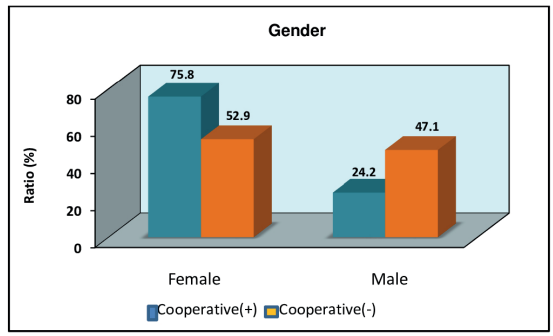

Figure 2. Gender distribution of cooperative and non-cooperative cases

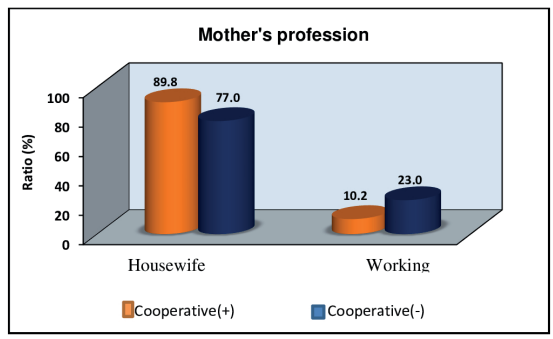

Figure 3. Maternal employment status distribution in cases with and without cooperation

The Cronbach's alpha values showing the internal consistency of the childhood trauma questionnaire were as follows: 0.844 for emotional abuse, 0.810 for physical abuse, 0.542 for physical neglect, 0.822 for emotional neglect, and 0.732 for sexual abuse. The Cronbach's alpha value for the overall childhood trauma questionnaire was 0.883. This indicated that the scale was highly reliable (Tab. 6).

The state anxiety and trait anxiety scores for both groups did not differ statistically (p>0.05) (Tab. 7). Likewise, the total score of the depression scale for all the children and the total score of the PTSD scale for both groups did not show a statistically significant difference (p>0.05).

Scores of the overall childhood trauma questionnaire and its emotional abuse, physical abuse, physical neglect, emo-

Table 7. Evaluation of scale scores by cooperation

		Cooperation		
		Cooperative (+)	Cooperative (-)	p
State-Trait Anxiety Inventory for Children				
State anxiety score	Min-Max (Median)	20-50 (31)	20-47 (30)	[a]0.893
	Mean±Sd	31.01±5.10	30.91±5.64	
Trait anxiety score	Min-Max (Median)	20-56 (33)	21-49 (32)	[a]0.480
	Mean±Sd	33.22±6.34	32.59±6.56	
Children's Depression Inventory				
Total score	Min-Max (Median)	0-25 (8)	0-31 (8)	[d]0.274
	Mean±Sd	8.99±5.16	10.17±6.35	
Post Traumatic Stress Disorder Scale				
Total score	Min-Max (Median)	0-3.4 (0.9)	0-3.1 (0.8)	[a]0.893
	Mean±Sd	0.96±0.67	0.97±0.84	
Childhood Trauma Questionnaire				
Emotional abuse	Min-Max (Median)	1-5 (1)	1-3.2 (1)	[d]0.870
	Mean±Sd	1.22±0.51	1.25±0.49	
Physical abuse	Min-Max (Median)	1-2 (1)	1-3.2 (1)	[d]0.240
	Mean±Sd	1.03±0.15	1.09±0.34	
Physical neglect	Min-Max (Median)	1-2.8 (1)	1-2.8 (1.2)	[d]0.061
	Mean±Sd	1.21±0.35	1.31±0.41	
Emotional neglect	Min-Max (Median)	1-4.8 (1.4)	1-4.2 (1.6)	[d]0.114
	Mean±Sd	1.63±0.77	1.78±0.81	
Sexual abuse	Min-Max (Median)	1-1.8 (1)	1-3.4 (1)	[d]0.214
	Mean±Sd	1.03±0.13	1.10±0.35	
Total score	Min-Max (Median)	1-2.8 (1.1)	1-3 (1.2)	[d]0.064
	Mean±Sd	1.23±0.30	1.31±0.37	

aStudent t Test *dMann Whitney U Test*

tional neglect, and sexual abuse subscales did not differ statistically significantly (p>0.05) between both groups.

Discussion

Adult patients are reported to be more cooperative during orthodontic treatment and have a lower likelihood of bracket failure than children do. To promote collaboration and optimize orthodontic treatment, strategies to motivate patients – and particularly adolescents – should be employed (22). Rasool et al., discovered that adults were more compliant and had less bracket failure, which was similar to these findings (23). Bremen et al., found that the patient's age and the type of appliances (removable ones) also influenced how well they cooperated during treatment (24). The lack of a correlation between age and cooperation in the present study was due to the small age range used. In the literature, some studies have showed that girls are more cooperative than boys (23, 25). These findings are compatible with findings of the present study. Unlike findings of the present study, Barbosa et al., found no significant difference between gender and bracket failure (22).

Another factor influencing cooperation in orthodontic treatment is the attitude of the patient's parents/guardians toward orthodontic treatment before and during treatment (26). One study reported that fathers had a positive effect on cooperation, which was comparable to findings of the present study. That same study also suggested that fathers accompanied their children to the first session and participated in the treatment education (5). In the present study, children of non-working mothers were more cooperative; this demonstrates the importance of the parental role once again.

One study that looked at the effect of parents' education level on their child's compliance to fixed orthodontic treatment reported that the higher the level of education the parents had, the lower the bracket failure there was and the more the (child) patients complied (27). Parents' education level influenced their children's demand for orthodontic treatment, as those who are more educated understand the importance of oral function and aesthetics (28). Unlike these findings, the present study revealed that parent education level had no effect on patient cooperation whatsoever.

The monthly income of low-income families typically falls below minimum wage. Therefore, in the present study, monthly income was classified as below or above the minimum wage. According to other studies, subjects from higher socioeconomic groups are more aware of the importance of an attractive smile on social and professional performance, and hence adapt better. Some studies have found that higher the person's socio-economic status is, the more likely they are to cooperate (27, 29). In contrast to these findings, in this study, there was no statistically significant correlation between monthly income and patient cooperation. Similarly, Mandall et al., did not find any correlation between socioeconomic status and patient cooperation (30).

There is evidence that anxiety causes sleep disorders and has a negative effect on one's social life (31). Trakyali et al. discovered that state anxiety occurred only during dental treatment and had no effect on daily life (5). They also learned that subjects experienced anxiety because of orthodontic treatment, and the higher their anxiety was, the less likely they were to cooperate. In contrast to this, another study discovered that individuals with high anxiety levels were more cooperative than expected. In one study, however, an increase in anxiety and a drop in cooperation were seen, contrary to the findings of the present study (32).

Depression is common in the general population. It affects between 10 and 20% of people at some point in their lives; this rate may be even higher in communities that seek

health care. (33). Depressed adolescents, unlike adults, tend to be frequently agitated, very active, and take risks, but also constantly devalue themselves (34). According to one study's findings, psychological maladjustment (depression, anxiety, stress), emotional reactivity, and intolerance to uncertainty are risk factors and psychological resilience is high among children and adolescents undergoing orthodontic treatment (35). This study revealed that non-cooperative individuals were more depressed. Zhang et al., reported that depression had a negative effect on cooperation, which is compatible with findings of the present study (36).

Some studies have shown that PTSD occurs in 25% of people exposed to traumatic stressors (37). Reliable and valid tools for use in children are a must, due to the prevalence of traumatic experiences and because children are frequently exposed to trauma, especially in recent years. In the present study, we used measurement tools with Turkish validity and reliability for this purpose. The scales used have a high level of reliability (20, 21).

Symptoms of PTSD can cause people to experience significant problems and disrupt the normal flow of their lives, and in turn inhibit depression, alongside mental and behavioral issues (38). A handful of studies on this particular topic demonstrate that PTSD has a negative impact on cooperation (39, 40). In turn, we predicted that people who suffered from PTSD were less likely to comply with orthodontic treatment. The present study's findings, however, did not support the hypothesis.

Cooperation is critical in orthodontics, at all stages of treatment. Further studies are needed to understand why patients with cooperation problems behave this way and what the underlying causes are.

Conclusion

Predicting patient cooperation will give orthodontists a significant advantage when it comes to ensuring successful orthodontic treatment. In particular, it seems that girls and those whose mothers do not work are more cooperative. Thus, patients from both of these groups will be better able to meet the expected goals.

There was no significant difference between PTSD, depression, and anxiety and patient cooperation; alas, non-cooperative subjects were more depressed. Perhaps making patients undergo a general psychiatric examination before beginning orthodontic treatment will make their therapy go more smoothly.

Conflict of Interest
The authors declare that they have no conflict of interest.

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