

How Did the Covid-19 Pandemic Effect the Anxiety Levels of Individuals Undergoing Orthodontic Treatment?

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ABSTRACT

In this study, it is aimed to evaluate the problems and anxiety levels of individuals who receive orthodontic treatment in a certain patient group during the pandemic period.

For this research, a questionnaire with 20 questions about the treatment process in pandemic conditions was designed. The questionnaires were conducted on 560 individuals who started orthodontic treatment six months before the declaration of the pandemic and continued their treatment throughout the pandemic. While evaluating the study data, descriptive statistical methods were used. Fisher-Freeman-Halton exact test was used to compare qualitative data.

In our research, it was observed that 16.4% of the individuals participating in our study could not go to their routine controls for 1 to 1.5 months, 6.1% of them for 1.5 to 2 months, 7% of them 2 to 2.5 months and 28.4% for 3 months or more. It was observed that 44.1% (n=247) of the individuals did not need to communicate with their doctor. In addition, it was observed that while 19.1% of individuals do not think that they have concerns about the prolongation of the treatment process due to the pandemic process; 15.2% of them rarely, 28% of them sometimes, 14.3% of them often, 23.4% of them always worry about this issue.

It has been determined that individuals who receive orthodontic treatment during the pandemic period often disrupt their routine controls, and individuals generally experience anxiety about the prolongation of the treatment process during the closure period.

Keywords: Covid-19; pandemic; orthodontic treatment; anxiety

Introduction

In January 2020, the number of deaths due to Covid-19 disease, as defined by the World Health Organization (WHO), exceeded 6 million (1,2). Even if it is thought that the course of the pandemic will decrease through treatment or immunity, it is stated that long-term changes and effects are expected on individuals and their relationships with each other (3). In the public opinion surveys conducted with the onset of the epidemic, it was reported that the society was exposed to moderate and severe anxiety and psychological effects (4).

With the announcement of the first case detected in Turkey on March 11, 2020, the process of applying partial and full-time restrictions began in all countries of the world with the advice of WHO (5,6). The process, which started with partial restrictions on education, sports and collective

activities of some institutions in the public sphere in Turkey, then continued with the curfew of individuals over the age of 65, under the age of 18 and with chronic diseases (7). Subsequently, the process in which full-time closures were observed, excluding health and safety units, started with partial normalization with the discovery of the vaccine, and it was announced that the controlled normalization period started in July 2021 (8). It is observed that the Covid-19 pandemic, which affects all societies in the world economically, socially and psychologically, negatively affects clinicians, assistant staff and patients in the field of dentistry, which has a high risk of contamination (9). Dentists constitute one of the most vulnerable groups for the Covid-19 pandemic, which is transmitted through droplets and from person to person. Clinicians and patients are known to be a source of direct and cross-infection via aerosol. In this case, it is inevitable that clinicians serving in the field of orthodontics

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and individuals receiving treatment will not be affected by the Covid-19 pandemic, as well as all areas of dentistry (10).

The duration of orthodontic treatment can vary between two and three years (11). The sudden onset of the pandemic has led to the inability of individuals receiving treatment during the curfew period to receive routine treatment services (12). This situation has led to the emergence of more psychological problems in individuals who continue their orthodontic treatment (13). In addition to routine operations, orthodontic emergencies that should be seen by the physician during the pandemic period, intraoral removable appliances that can be completely removed by the patient or parent, or partially loose appliances that require physician intervention, fixed intraoral appliances pressing on the palate or gingival tissue, broken appliances, essix or retainers, failure brackets and setbacks in clear aligner treatments; are among the biggest problems of individuals in the period of full lockdown (14).

These patients, who already have a long treatment process, are expected to be worried due to the uncertainty of the process and considering all the factors mentioned above. In the light of this information, it is aimed to evaluate the problems and anxiety levels of individuals receiving orthodontic treatment during the pandemic period.

Material and Methods

The research was carried out on 560 individuals between 15.02.2022 and 01.04.2022 at Van Yüzüncü Yil University, Department of Orthodontics and a private clinic. It was started after Yüzüncü Yil University Non-Interventional Clinical Research Ethics Committee approval was obtained (2022/01-03). Adults were included in the study by obtaining consent from their parents and non-adults from their parents.

While individuals who started fixed or functional orthodontic treatment at least six months before 11.03.2020, and continued orthodontic treatment between 01.07.2021, when the scope of controlled normalization, and who did not have psychological problems, were included in the study; Individuals who started treatment during the pandemic period, were illiterate and did not want to participate in the research, and had mental and behavioral problems were excluded from the study. The questionnaire consists of 20 questions in four parts. The first part of the questionnaire consists of questions about obtaining the

demographic data of the patients (questions 1-4). In this section, information about the age, gender, education level and occupation of the individuals participating in the research was obtained. The second part consists of questions about obtaining information about the type of orthodontic treatment that individuals receive and their communication with the physician (questions 5-12). This section is the section where information about the type of orthodontic treatment, when they were last examined, how they contacted their doctors, whether they consulted their own or another physician for emergency reasons, and whether their controls were affected by intercity restrictions.

The third part consists of questions about obtaining information about the problems faced by individuals undergoing orthodontic treatment (questions 13-15). This is the section where information about how they come up with solutions when faced with emergencies, whether they encounter bracket breakage, and oral hygiene. In the fourth and last section, information about the pain and anxiety levels of individuals receiving orthodontic treatment will be obtained (questions 16 and 20).

The power of the study is expressed as $1-\beta$ (β = probability of type II error) and in general studies should have 80% power. The number of individuals to be included in the study was determined as 501 by simple random sampling method ($n=(Nt^2pq)/d^2(N-1) +t^2pq$) in order to obtain 80% power at the $\alpha=0.04$ level from 3000 orthodontic patients admitted to clinic but the losses were not taken into account. It is seen that it would be more appropriate to take more than this number (15).

Statistical Analysis: NCSS (Number Cruncher Statistical System) 2020 (Kaysville, Utah, USA) program was used for statistical analysis. While evaluating the study data, descriptive statistical methods (mean, standard deviation, median, first quartile, third quartile, frequency, percentage, minimum, maximum) were used. In multi-well setups, the Fisher-Freeman-Halton exact test was used to compare qualitative data, since the number of observations below 5 was 25% or more. Significance was evaluated at a level of $p<0.05$.

Results

Demographic data of the individuals participating in the research regarding gender, age and educational status are given in Table 1.

Table 1. Distribution of Descriptive Features

		n (%)
Sex	Male	145 (25.9)
	Female	415 (74.1)
Age	Mean±SD	23,95±5.80
	Median (Min-Max)	24 (11-47)
Educational status	Illiterate	1 (0.2)
	Literate	8 (1.4)
	Primary School	8 (1.4)
	Secondary or High School	175 (31.3)
	University or higher	368 (65.7)

n: Frequency, SD : Standart deviation

It was observed that 96.6% (n=540) of the participants were treated with fixed appliances and 3.4% (n=19) were treated with removable appliances. It was determined that 28.4% (n=159) of the individuals passed 3 months or more. 44.1% (n=247) of the individuals stated that they did not need to communicate with their doctor. When the reasons for going to the health institution due to an emergency reason in the pandemic were examined, it was determined that 56.2% (n=50) were due to the wire stretching and sinking into their cheeks, and 16.9% (n=15) due to bracket failure. 5.7% of individuals (n=32) had an orthodontic session performed by another physician during the pandemic (Table 2).

When he had a problem for any reason during the pandemic, when the applications he made on his own were examined, 10.5% of the cases (n=20) cut the back of the ingrown wire with nail clippers and/or a similar tool; and 50.5% (n=96) used orthodontic wax on the painful area. The brackets of 60.1% (n=328) of individuals who received fixed orthodontic treatment were failure; among these individuals, 19.2% (n=105) had one, 9.5% (n=52) two, 4.9% (n=27) three, and 2.2% (n = 12) four, 4% (n=22) of more than four brackets were found to be failure (Table 3).

The questions and answers about the pain and anxiety levels of individuals receiving orthodontic treatment are given in Table 4.

A statistically significant difference was found between the participants' toothache during the pandemic process, according to their anxiety about the prolongation of the treatment process due to the pandemic process ($p=0.002$; $p<0.05$).

Those who do not think they are worried have never experienced a toothache during the pandemic, and those who rarely, sometimes, often and always have anxiety, and those who rarely

have anxiety rarely experience toothache, than those who do not experience anxiety, and those who sometimes and often worry.

Those who sometimes experience toothache are more likely to experience toothache than those who do not, and those who also experience frequent anxiety are more likely to experience toothache than those who do not experience anxiety and who rarely experience anxiety. A statistically significant difference was found between the participants' situations of clenching, grinding, etc.

The rate of never experiencing clenching – grinding, etc., of those who do not worry, is higher than those who sometimes, often and always experience anxiety, but also the rate of rarely clenching – grinding, etc., is higher than those who always experience anxiety. Those who always experience anxiety are sometimes more likely to experience situations such as clenching, grinding, etc. than those who are sometimes worried. Those who frequently experience anxiety and those who are always anxious are more likely to experience situations such as clenching and grinding than those who do not have anxiety and those who rarely experience anxiety. There was no statistically significant difference between the participants' pain in the jaw muscles during the pandemic process, according to the anxiety about the prolongation of the treatment process due to the pandemic process ($p>0.05$) (Table 5).

Discussion

The word health is defined by the World Health Organization as “a state of physical, social and mental well-being, not merely the absence of disease or infirmity” (16). In addition to the biological problems caused by the pandemics, it

Table 2. Orthodontic Treatment of Individuals and Their Communication With Their Physician

	n (%)
Orthodontic treatment duration	
0-6 months	86 (15.4)
6-12 months	129 (23.0)
12-18 months	107 (19.1)
18-24 months	88 (15.7)
≥24 months	150 (26.8)
Type of device used in treatment	
Fixed	540 (96.6)
Mobile	19 (3.4)
Time since doctor's appointment	
0-1 month	170 (30.4)
1-1.5 month	92 (16.4)
1.5-2 month	34 (6.1)
2-2.5 month	39 (7.0)
2.5-3 month	66 (11.8)
≥3 month	159 (28.4)
The patient's contact with his doctor during the Pandemic	
Never	71 (12.7)
Rarely	73 (13.0)
Sometimes	70 (12.5)
Often	21 (3.8)
Always	78 (13.9)
How the patient communicated with his/her doctor:	
I did not need to contact my doctor	247 (44.1)
Phone	217 (86.1)
Mail	3 (1.2)
SMS	4 (1.6)
Whatsapp	25 (9.9)
Social Media	3 (1.2)
If the patient went to the health institution for an emergency reason in the pandemic, the reason:	
The wire stretched out and pierced my cheek	50 (56.2)
Bracket failure	15 (16.9)
Apparatus fracture	1 (1.1)
Orthodontic elastics expired	3 (3.4)
Other	20 (22.5)
The status of having an orthodontic session to another physician during the pandemic:	
Yes	32 (5.7)
No	528 (94.3)
Considering that he/she does not benefit from orthodontic service when there is a restriction on intercity travel in the pandemic:	
Yes	141 (54.0)
No	120 (46.0)

n: Frequency

Table 3. Problems Faced By Individuals Undergoing Orthodontic Treatment

If the patient has had a problem for any reason during the pandemic epidemic, the practices he/she does on his/her own:	
I cut the back of the wire that stung with nail clippers or a similar tool.	20 (10.5)
I used orthodontic wax on the painful area	96 (50.5)
I used normal (paraffin) wax or gum on the painful area	32 (16.8)
I used a rubber band because I ran out of elastics	1 (0.5)
I bought orthodontic elastic from the seller	2 (1.1)
I straightened my elongated wire with tweezers and/or a similar tool	13 (6.8)
Other	26 (13.7)
If there are brackets in the mouth, how many brackets are failure	
My bracket is failure	328 (60.1)
1	105 (19.2)
2	52 (9.5)
3	27 (4.9)
4	12 (2.2)
>4	22 (4.0)

n: Frequency

has been stated that the quarantine processes also affect the societies psychologically (17). Considering that orthodontic treatment is not urgent, and that orthodontic treatment lasts between two and three years in the form of monthly check-ups has caused individuals to delay appointments during curfew periods (11,12). Disruptions in appointments may cause individuals receiving treatment to be concerned about the increase in orthodontic treatment times (18). In our research, we aimed to have information about the problems and anxiety levels of individuals receiving orthodontic treatment during the pandemic period. According to the findings of our study, 19.1% (n=107) of the individuals did not think that they had anxiety about the prolongation of the treatment process during the curfew periods of the pandemic, while 15.2% (n=85) rarely, 28% (n=157) sometimes, 14.3% (n=80) frequently, 23.4% (n=131) always experienced anxiety.

Disruptions in appointments are accompanied by the fact that the individuals receiving treatment from time to time want to come to the appointments or do not want to continue the treatment due to the risk of transmission (19). Routine controls in fixed orthodontic treatment are important for the duration of the treatment. These routine controls become even more important, especially in patients with space closure and reverse curve arch wires (14, 20). Beckwith et al. (21) reported that orthodontic treatment may take an average of 1.09 months for each missed routine checkup. Xiang et al. (20) found that

98.6% of individuals receiving fixed orthodontic treatment delayed their treatment, and the average of this period was 8.98 ± 5.19 weeks. In our research, it was observed that 16.4% of the individuals could not go to their routine controls for 1 to 1.5 months, 6.1% (n=34) of them for 1.5 to 2 months, 7% (n=39) of them for 2 to 2.5 months, 11.8% of them (n=159) for 3 month or more, a total of 53% of the individuals participating in the survey could not participate in their routine controls. At this point, although the rate of individuals who receive removable orthodontic treatment is low, we think that when routine controls are not performed, compliance problems may be observed in the appliances and the treatment motivation of individuals may decrease. In addition, the fact that the number of individuals stating that they do not need to communicate with their physicians during the pandemic process is 247, which suggests that physicians can establish a healthy communication with their patients during the pandemic process.

It has been observed that when individuals undergoing orthodontic treatment want to contact their physicians, they usually communicate via telephone. It is observed that the individuals participating in our research generally do not prefer to go to another physician. In the literature, it has been reported that they usually refer to physicians due to emergency situations such as archwire stinging and bracket failure (22,23). Jones et al. (23) stated that 13% of the emergency cases were arch wire penetration, while Turkistani (24) stated in his study that 30% of the emergency

Table 4. Pain and Anxiety States of Individuals Receiving Orthodontic Treatment

		n (%)
Thinking that oral hygiene has decreased during the pandemic	No, I don't think so	281 (50.2)
	Rarely	93 (16.6)
	Sometimes	139 (24.8)
	Often	34 (6.1)
	Always	13 (2.3)
Experiencing toothache during the pandemic	Newer	282 (50.4)
	Rarely	139 (24.8)
	Sometimes	111 (19.8)
	Often	22 (3.9)
	Always	6 (1.1)
Clenching – grinding, etc. during the pandemic	Never	315 (56.3)
	Rarely	92 (16.4)
	Sometimes	98 (17.5)
	Often	39 (7.0)
	Always	16 (2.9)
Experiencing pain in the jaw muscles during the pandemic	Never	379 (67.7)
	Rarely	92 (16.4)
	Sometimes	69 (12.3)
	Often	19 (3.4)
	Always	1 (0.2)
Drug use due to pain caused by orthodontic treatment during the pandemic process	Yes	43 (7.7)
	No	491 (87.7)
	I did not use medicine even though I have pain,	26 (4.6)
	No, I don't think so	107 (19.1)
Concern about the prolongation of the treatment process due to the pandemic process	Rarely	85 (15.2)
	Sometimes	157 (28.0)
	Often	80 (14.3)
	Always	131 (23.4)

n: Frequency

cases were arch wire penetration and 27.3% bracket failure. Dyke and Sandler (25), on the other hand, stated that, in contradiction with these studies, 28.2% of them applied to the clinic urgently with bracket failure and only 8.2% with arch wire penetration. On the other hand, Popat et al. (26) stated that 37% of them applied to the clinic with bracket failure and 25% with archwire stinging in their study. In our study, it was determined that 56.2% of the individuals who applied to the clinic with emergencies were admitted with the complaint of arch wire stinging, and 15% with the complaint of bracket failure. We think that the differences in the studies may be due to the methodological differences of the studies such as the differences in fixed orthodontic appliances, the education level of the individuals, age and gender. Individuals stated that

they used 50.5% orthodontic wax for the ingrown part of the archwire, and 10.5% cut the back of the ingrown wire with nail clippers and/or a similar tool. We think that it would be beneficial to examine the individuals in this period in terms of mucosal health in their controls, with the disruption of routine controls and the high rate of mucosal irritations.

It has been stated that bruxism may accompany the increase in anxiety levels of individuals receiving orthodontic treatment, and there may be pain on the temporomandibular joint and chewing muscles (27). It has been reported by Machado et al that the symptoms of individuals with orthodontic treatment and bruxism are accompanied by anxiety and depression. However, no difference was found between the pain level and the anxiety level. Mendonça et al. (28)

Table 5. Complications Due To Prolongation of The Treatment Period

	Concerns about the epidemic process extending the treatment procedure					p
	Never	Rarely	Sometimes	Often	Always	
Experiencing toothache during the pandemic						
Never	71 (66.4)	39 (45.9)	78 (49.7)	35 (43.8)	59 (45.0)	a0.002
Rarely	19 (17.8)	32 (37.6)	36 (22.9)	21 (26.3)	31 (23.7)	
Sometimes	14 (13.1)	13 (15.3)	38 (24.2)	17 (21.3)	29 (22.1)	
Often	2 (1.9)	0 (0)	5 (3.2)	5 (6.3)	10 (7.6)	
Always	1 (0.9)	1 (1.2)	0 (0)	2 (2.5)	2 (1.5)	
Experiencing a situation such as clenching, grinding, etc. during the pandemic						
Never	73 (68.2)	52 (61.2)	87 (55.4)	42 (52.5)	61 (46.6)	a0.013
Rarely	12 (11.2)	18 (21.2)	30 (19.1)	12 (15)	20 (15.3)	
Sometimes	18 (16.8)	8 (9.4)	28 (17.8)	15 (18.8)	29 (22.1)	
Often	3 (2.8)	5 (5.9)	6 (3.8)	10 (12.5)	15 (11.5)	
Always	1 (0.9)	2 (2.4)	6 (3.8)	1 (1.3)	6 (4.6)	
Experiencing pain in the jaw muscles during the pandemic						
Never	75 (70.1)	58 (68.2)	107 (68.2)	52 (65.0)	87 (66.4)	a0.916
Rarely	18 (16.8)	18 (21.2)	21 (13.4)	13 (16.3)	22 (16.8)	
Sometimes	12 (11.2)	7 (8.2)	22 (14)	11 (13.8)	17 (13.0)	
Often	2 (1.9)	2 (2.4)	7 (4.5)	4 (5.0)	4 (3.1)	

^aFisher Freeman Halton Test
Significance level of p<0.05

reported that individuals with high anxiety levels felt more pain during orthodontic treatment. In our study, there was no statistically significant difference between the participants' pain in the jaw muscles during the pandemic process, according to the anxiety about the prolongation of the treatment process due to the pandemic process. In addition, it was observed that individuals with low anxiety levels were statistically significantly lower than those who felt toothache. Again, it was observed that the rate of clenching-grinding, etc., of individuals with low anxiety levels during the pandemic was statistically significantly lower than those who felt it.

The gender distribution of the individuals participating in the study, cross-sectional design, and the reliability of the individuals' questionnaire answers are among the main limitations of our research. Within the findings and limitations of our research, it can be deduced that individuals who receive orthodontic treatment during the pandemic period often disrupt their routine controls. During the closure periods of the pandemic, individuals are generally concerned about the prolongation of the treatment process. Complaints of pain and bruxism are observed less in individuals with low anxiety levels

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