



Original Article

Has the COVID-19 Pandemic Affected Orthodontists' Interest in Various Orthodontic Appliances?

Merve Nur Eğlenen¹, Mehmet Ali Yavan²

¹Yeditepe University Faculty of Dentistry, Department of Orthodontics, Istanbul, Turkey

²Adiyaman University Faculty of Dentistry, Department of Orthodontics, Adiyaman, Turkey

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Main Points

- Orthodontists' interest in brackets, functional appliances, orthognathic surgery, miniscrews, and retainers remained largely unchanged.
- There was a marked increase in the interest in clear aligners.
- Interest in standard metal brackets and fixed functional appliances decreased more in women than men.
- Interest in standard metal brackets decreased as respondents' work experience increased.

ABSTRACT

Objective: To determine the changes in orthodontists' interest in various orthodontic appliances during the coronavirus disease-2019 (COVID-19) pandemic.

Methods: A questionnaire probing respondents' interest in orthodontic appliances and techniques, including standard buccal metal brackets, self-ligating brackets, standard ceramic brackets, lingual brackets, clear aligners, orthodontic facemasks, removable functional appliances, fixed functional appliances, orthognathic surgery, orthodontic miniscrews, and lingual retainers, was prepared using Google Forms and then sent to the Turkish Orthodontic Society to invite all members of the society to participate in the survey. Of the 1903 members invited, 230 (response rate, 12.08%) orthodontists completed the questionnaire.

Results: The respondents' interest in brackets did not change among 70% of the respondents (standard buccal metal bracket 80%, self-ligating bracket 72.2%, standard ceramic bracket 77%, and lingual bracket 76.5%). A significant difference was observed between the genders only about the interest in standard metal brackets and fixed functional appliances ($p < 0.05$ for both). Interest in standard metal brackets decreased as respondents' work experience increased ($p < 0.05$). The interest in self-ligating brackets was higher among respondents with 1-5 years of experience than among other respondents ($p < 0.05$). Interest in self-ligating brackets increased more among lecturers and residents than among clinicians ($p < 0.05$).

Conclusion: The interest of orthodontists in clear aligners showed the highest increase during the COVID-19 pandemic among all orthodontic appliances, whereas their interest in other appliances, particularly standard buccal metal brackets, did not change.

Keywords: COVID-19, Orthodontic appliances, Orthodontists

INTRODUCTION

Coronavirus disease-2019 (COVID-19) has affected almost every aspect of life, and since its outbreak, people have tried to adapt to this unexpected change.¹ To prevent the spread of COVID-19, different types of lockdown measures with varying durations have been imposed in different regions across the world.² The dental setting is a unique environment in the COVID-19 pandemic because it potentially possesses all transmission risk factors for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). SARS-CoV-2 has been reported to be detected in

Corresponding author: Mehmet Ali Yavan, e-mail: yavanmehmetali@gmail.com

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alternative sites and specimens pertaining to dental practice.³ In the first months of the pandemic, due to the inability to maintain social distance and the risk of infection through the inhalation of aerosol during dental procedures, these procedures were limited to treatments requiring emergency intervention.^{4,7} With the increase in precautions, lockdown measures were loosened, and dental treatments were resumed.^{1,8}

Orthodontic treatment mostly includes permanent or removable appliances, requiring patient compliance and months and years of regular follow-up.⁹ Due to the COVID-19 pandemic, orthodontic treatment appointments are likely to be delayed or canceled, leading to various side effects.^{4,7,10} In the literature, many orthodontic emergencies have been reported during the COVID-19 pandemic, including soft tissue irritation caused by brackets or wires and loosening or breakage of metal ligatures, elastic ligatures, chains, brackets, and retainers.¹¹ Accordingly, preventing orthodontic emergencies is important for reducing both patient discomfort and prolonged treatment.¹² This can be achieved by improving orthodontic materials and techniques¹³ and incorporating new technologies.¹¹ Another effective orthodontic measure taken against COVID-19 is the minimization of chair time, which is useful for reducing aerosol transmission and has been enhanced with the emergence of new technologies and digital flow.¹¹ A scoping review by Kaur et al.¹¹ indicated that, in unpredictable times of crisis such as COVID-19, clear aligners are safer and provide more predictable and effective outcomes than fixed orthodontic treatments.

The literature indicates that COVID-19 is driving orthodontists toward treatment options that allow careful patient screening and collection of records, minimal physical visits, effective use of technology, virtual consultation instead of physical appointments using personal protective equipment (PPE), and less aerosol generation.¹¹ These requirements may change orthodontists' interest in orthodontic appliances. The aim of this study was to determine the impact of the COVID-19 pandemic on orthodontists' interest in various types of orthodontic appliances and techniques. Our null hypothesis is that the COVID-19 pandemic situation does not change orthodontists' appliance selection and treatment techniques.

METHODS

The study was initiated after obtaining ethical approval from the Adiyaman University Non-interventional Clinical Research Ethics Committee (approval no: 2021/10-7, date: 14.12.2021). A questionnaire was prepared using Google Forms and was sent to the Turkish Orthodontic Society to obtain the necessary permissions and approvals. Subsequently, all 1903 members of the society were invited via email to participate in the survey, and 230 (response rate: 12.087%) of them filled out the questionnaire. A total of 15 questions were included in the questionnaire to increase the efficiency of the research and the usefulness of the questionnaire. The questions followed a

standard pattern (e.g. How has the COVID-19 pandemic affected your interest in the (any specified) appliance throughout your orthodontic treatments?) and a three-point Likert scale ("My interest has increased.", "My interest has not changed.", and "My interest has decreased."). The appliances and techniques probed in the questionnaire included standard buccal metal brackets, self-ligating brackets, standard ceramic brackets, lingual brackets, clear aligners, orthodontic facemasks, removable functional appliances, fixed functional appliances, orthognathic surgery, orthodontic miniscrews, and, in the forthcoming phase of treatments, the effect on the choice of clear and lingual retainers as retention devices. Additionally, the questionnaire probed their demographic characteristics, including gender, total work experience (1-5 years, 6-10 years, and 10 and more years), and academic position (resident, lecturer, clinician).

Statistical Analysis

Data were analyzed using SPSS for Windows version 22.0 (IBM Corp., Armonk, NY, USA). Descriptives are expressed as frequencies (n) and percentages (%). Categorical variables were compared using the chi-square test. A p value of <0.05 was considered significant.

RESULTS

The 230 participants comprised 144 women and 86 men. The overall response rate was 12.08%. The distribution according to total work experience revealed that 1-5 years constituted most respondents (40%). In terms of academic position, clinicians (45.7%) constituted majority of respondents, followed by residents (32.6%) and lecturers (21.7%).

Table 1 presents the changes in respondents' interest in orthodontic appliances. Accordingly, 80%, 72.2%, 77%, and 76.5% of the respondents indicated that their interest in standard buccal metal brackets, self-ligating brackets, standard ceramic brackets, and lingual brackets did not change. In contrast, the highest increase in interest was reported for clear aligners (62.2%). On the other hand, 92.2% and 90% of the respondents declared that their interest in facemask and orthognathic surgery remained unchanged. Interest in fixed functional appliances decreased among 10.9% of respondents, and interest in removable functional appliances increased among 6.1%. Interest in miniscrews remained unchanged among 83% of the respondents, whereas it increased among 15.2% of the respondents. Interest in fixed and removable retainers showed no change among 83% and 80% of the respondents, respectively. However, interest in fixed retainers decreased among 9.1% of respondents, whereas interest in removable retainers increased among 15.7% respondents.

Table 2 presents a comparison of responses according to gender. Accordingly, a significant difference was observed between genders only in terms of interest in standard metal brackets and fixed functional appliances (p<0.05 for both).

Table 3 presents a comparison of responses according to respondents' total work experience annually. A significant relationship was found between the length of total work experience and interest in standard buccal metal, self-ligating brackets, and fixed lingual retainers ($p < 0.05$).

Table 4 presents a comparison of responses according to the respondents' academic positions. A significant difference was found among academic positions concerning the interest in self-ligating brackets, miniscrews, and fixed lingual retainers ($p < 0.05$).

DISCUSSION

Studies have reported that orthodontic emergencies are encountered more frequently during COVID-19 lockdowns than during normal times.¹⁴ The most common emergencies include bracket breakages, archwire breakages, and molar tube and band breaks.¹⁵ Although these emergencies are not life-threatening, they require prompt treatment because they cause prolonged treatment periods, decrease patients' motivation, and reduce patients' trust in orthodontists.¹⁶ The literature indicates that among fixed functional appliances, breakage of preadjusted stainless steel brackets has been the most common orthodontic

emergency during the COVID-19 pandemic, with a rate of 74.7%.¹⁵ Therefore, our null hypothesis was that orthodontists' interest in standard buccal metal brackets might decrease during the COVID-19 pandemic. Nevertheless, the results indicated that the interest in these appliances did not change among 80% of the respondents, while it showed a reduction among 17% of the respondents. Buccal metal brackets have been by far the most commonly used appliances in the last 30 years¹⁵ and they are the gold standard for obtaining successful outcomes in orthodontic treatment.¹⁷ The literature indicates that 45% of orthodontists consider that aligners limit the success of orthodontic treatment and thus prefer fixed treatments.¹⁸ Given that standard buccal metal brackets are more accessible and economical¹⁹ and that physicians have more experience and confidence in these appliances,^{18,20} the absence of a remarkable change in the interest of orthodontists in these appliances, as revealed in our study, seems highly reasonable.

Cotrin et al.¹⁵ reported that the breakage of ceramic brackets was the second most common emergency reported during the COVID-19 pandemic (29.6%). In our study, the interest in clear brackets, which are more esthetic alternatives to metal brackets, did not change among 77% of orthodontists. In contrast, interest in clear brackets decreased among 21.7% of the respondents, which could be due to possible emergencies or increased interest in clear aligners. Similarly, Walton et al.¹⁹ reported that their patients found clear aligners and lingual brackets esthetically more attractive than ceramic brackets and accepted them more easily.

A number of studies claim that self-ligating brackets have shorter total treatment and chair times and longer session intervals because they provide high patient comfort and allow faster wire replacement.^{19,21} Moreover, because these appliances do not involve ligatures, they do not cause soft tissue injury or elastic ligature detachment.¹⁹ Our null hypothesis was that interest in such appliances might increase during the COVID-19 pandemic because of these advantageous features. Nevertheless, it was observed that interest in these appliances increased only among 22.2% of orthodontists, whereas no change was observed among 72.2% of them. This finding could be explained by the difference in the costs of these appliances and standard metal brackets, as well as by the increased interest in clear aligners that have a lower risk of emergency orthodontic problems.¹⁹

Clear aligners have been reported to be highly advantageous during the COVID-19 pandemic because they have less chair time than fixed treatments, require minimal bonding, reduce appointment frequency (recall visit), and allow for remote/virtual planning. In addition, studies have shown that among all orthodontic appliances, clear aligners had the lowest rate of emergency conditions during the COVID-19 pandemic.^{7,22} A scoping review by Kaur et al.¹¹ indicated that in unpredictable times of crisis such as COVID-19, clear aligners are safer and provide more predictable and effective outcomes than fixed orthodontic treatments. In line with the literature, our findings indicated that the interest in clear aligners increased among

Table 1. Survey results

Appliances	Total (n=230)		
	Interest		
	Increased (n%)	Not changed (n%)	Decreased (n%)
Standard buccal metal braces	7 3%	184 80%	39 17%
Self-ligating braces	51 22.2%	166 72.2%	13 5.7%
Clear braces	3 1.3%	177 77%	50 21.7%
Lingual braces	7 3%	176 76.5%	47 20.4%
Clear aligners	143 62.2%	84 36.5%	3 1.3%
Orthodontic facemask	8 3.5%	212 92.2%	10 4.3%
Removable functional appliances	14 6.1%	206 89.6%	10 4.3%
Fixed functional appliances	14 6.1%	191 83%	25 10.9%
Orthognathic surgery	10 4.4%	206 90%	13 5.7%
Orthodontic miniscrews	35 15.2%	191 83%	4 1.7%
Lingual retainer	18 7.8%	191 83%	21 9.1%
Essix retainer	36 15.7%	184 80%	10 4.3%

Table 2. Comparison of survey results according to genders

Appliances	Female (n=144)			Male (n=86)			p value
	Interest		Decreased (n%)	Interest		Decreased (n%)	
	Increased (n%)	Not changed (n%)		Increased (n%)	Not changed (n%)		
Standard buccal metal braces	1 0.7%	115 79.9%	28 19.4%	6 7.0%	69 80.2%	11 12.8%	0.015*
Self-ligating braces	34 23.6%	102 70.8%	8 5.6%	17 19.8%	64 74.4%	5 5.8%	0.794
Clear braces	2 1.4%	113 78.5%	29 20.1%	1 1.2%	64 74.4%	21 24.4%	0.745
Lingual braces	4 2.8%	112 77.8%	28 19.4%	3 3.5%	64 74.4%	19 22.1%	0.838
Clear aligners	95 66.0%	47 32.6%	2 1.4%	48 55.8%	37 43.0%	1 1.2%	0.286
Orthodontic facemask	2 1.4%	135 93.8%	7 4.9%	6 7.0%	77 89.5%	3 3.5%	0.075
Removable functional appliances	8 5.6%	131 91.0%	5 3.5%	6 7.0%	75 87.2%	5 5.8%	0.624
Fixed functional appliances	4 2.8%	121 84.0%	19 13.2%	10 11.6%	70 81.4%	6 7.0%	0.012*
Orthognathic surgery	8 5.6%	127 88.2%	9 6.3%	2 2.4%	79 92.9%	4 4.7%	0.446
Orthodontic miniscrews	19 13.2%	121 84.0%	4 2.8%	16 18.6%	70 81.4%	0 0.0%	0.176
Lingual retainer	8 5.6%	124 86.1%	12 8.3%	10 11.6%	67 77.9%	9 10.5%	0.198
Essix retainer	22 15.3%	116 80.6%	6 4.2%	14 16.3%	68 79.1%	4 4.7%	0.962

n: number, α: chi-square test,
*Statistical significance: p<0.05.

62.2% of the respondents. In contrast, the interest in these appliances did not change among 36.5% of the respondents, which could be attributed to the fact that these orthodontists might have been using these appliances since before the COVID-19 outbreak or might have avoided them because of their limitations or high costs.¹⁸⁻²⁰

Lingual suspenders constitute an esthetic treatment alternative. However, they prolong chair time.²³ Due to this disadvantage, we considered that its popularity might have decreased during the COVID-19 pandemic. However, 76.5% of the respondents indicated that their interest did not change, whereas only 20.4% reported a decrease in their interest. On the other hand, lingual braces are preferred only by a small number of orthodontists because they require substantial experience and training, are expensive, and involve technical difficulties.²³ These notions may explain the absence of a change in the interest of orthodontists who do not currently use these appliances. In our study, the interest in these appliances decreased among 20.4% of the respondents, which could be attributed to the characteristics of these appliances that could be important disadvantages, particularly during the COVID-19 pandemic, such as the

technical difficulties of working indirectly in the lingual region, the availability of other aesthetic options such as clear aligners, and decreased cosmetic anxiety among the patients due to the routine use of disposable surgical face masks.

Given that broken brackets, bands, and wires were the leading orthodontic emergencies during the COVID-19 pandemic,¹⁵ we considered that the interest in fixed functional appliances might decrease during this period and, conversely, the interest in removable functional appliances might increase. Nevertheless, in our study, the interest in both appliances did not show a remarkable change, which could be ascribed to the achievement of good compliance in only two-thirds of cases treated with removable appliances and clear aligners.²²

Similarly, for orthodontic facemask appliances, regular follow-up is of prime importance for solving the compliance problem and preventing possible side effects.¹⁶ In our study, we considered that the interest in these appliances might decrease because of the difficulty in achieving patient compliance and performing follow-up visits during the COVID-19 pandemic. Nonetheless, among all the appliances evaluated in the study, facemask showed the least change about respondents' interest, which

Table 3. Comparison of survey results according to work experience

Appliances	1-5 years (n=92)			6-10 years (n=64)			Over 10 (n=74)			p value ^a
	Interest			Interest			Interest			
	Increased (n%)	Not changed (n%)	Decreased (n%)	Increased (n%)	Not changed (n%)	Decreased (n%)	Increased (n%)	Not changed (n%)	Decreased (n%)	
Standard buccal metal braces	4 4.3%	81 88.0%	7 7.6%	3 4.7%	50 78.1%	11 17.2%	0 0.0%	53 71.6%	21 28.4%	0.004*
Self-ligating braces	30 32.6%	57 62.0%	5 5.4%	12 18.8%	49 76.6%	3 4.7%	9 12.2%	60 81.1%	5 6.8%	0.029*
Clear braces	0 0.0%	74 80.4%	18 19.6%	1 1.6%	48 75.0%	15 23.4%	2 2.7%	55 74.3%	17 23.0%	0.571
Lingual braces	5 5.4%	70 76.1%	17 18.5%	1 1.6%	48 75.0%	15 23.4%	1 1.4%	58 78.4%	15 20.3%	0.494
Clear aligners	59 64.1%	32 34.8%	1 1.1%	43 67.2%	20 31.3%	1 1.6%	41 55.4%	32 43.2%	1 1.4%	0.661
Orthodontic facemask	3 3.3%	84 91.3%	5 5.4%	5 7.8%	56 87.5%	3 4.7%	0 0.0%	72 97.3%	2 2.7%	0.129
Removable functional appliances	6 6.5%	84 91.3%	2 2.2%	5 7.8%	56 87.5%	3 4.7%	3 4.1%	66 89.2%	5 6.8%	0.573
Fixed functional appliances	9 9.8%	76 82.6%	7 7.6%	3 4.7%	50 78.1%	11 17.2%	2 2.7%	65 87.8%	7 9.5%	0.114
Orthognathic surgery	4 4.3%	82 89.1%	6 6.5%	4 6.3%	56 87.5%	4 6.3%	2 2.7%	68 93.2%	3 4.1%	0.815
Orthodontic miniscrews	15 16.3%	75 81.5%	2 2.2%	10 15.6%	53 82.8%	1 1.6%	10 13.5%	63 85.1%	1 1.4%	0.977
Lingual retainer	10 10.9%	76 82.6%	6 6.5%	7 10.9%	46 71.9%	11 17.2%	1 1.4%	69 93.2%	4 5.4%	0.007*
Essix retainer	14 15.2%	73 79.3%	5 5.4%	12 18.8%	48 75.0%	4 6.3%	10 13.5%	63 85.1%	1 1.4%	0.496

n: number, α : chi-square test,
*Statistical significance $p < 0.05$

could be explained by the fact that facemask, when applied at an appropriate time, is the gold standard in terms of efficiency when compared with its alternatives.²⁴

In the first wave of COVID-19, at least 21 million elective surgical procedures were canceled worldwide because of postoperative SARS-CoV-2 infection concerns of the patients and the capacity of the hospitals.²⁵ Our null hypothesis was that interest in orthognathic surgery might decrease because of such cancelations and delays. However, the interest in this surgical procedure remained unchanged among 90% of the respondents, which could be attributed to the fact that the surgeries had returned to their normal routine at the time of the survey.

Miniscrews have been frequently used in orthodontic practice in recent years and can cause mucosal injuries because of their positioning and angulation in the mouth.²⁶ However, these mucosal injuries can be prevented by placing protective caps and taking utmost care during implantation. When miniscrews

become loose, they can cause pain, discomfort, infection, facial swelling, and periodontal abscesses; therefore, they may need to be removed during an emergency follow-up visit.¹⁶ Yavan et al.¹⁴ evaluated patients who underwent orthodontic treatment during the COVID-19 lockdown period and reported that 8.16% of their patients experienced miniscrew failure.²⁷ In our study, the interest in miniscrews did not change among 83% of the respondents, whereas it increased among 15.2%. Respondents whose interest did not change might have considered the long-term advantages of miniscrews rather than their possible risk factors. In addition, in the increase in the interest in miniscrews could be ascribed to the fact that miniscrews can reduce the side effects of conventional therapy, such as loss of anchorage, and can shorten the treatment period.²⁷

Several studies indicated that during the COVID-19 pandemic, 15.9% of the patients visited the clinic with the complaint of a broken fixed retainer and less than 10% of the patients presented with the complaint of a broken removable retainer.¹⁵ Some other studies suggested that during the COVID-19 pandemic,

Table 4. Comparison of survey results according to academic position

Appliances	Lecturer (n=50)			Clinician (n=105)			Resident (n=75)			p value ^a
	Interest			Interest			Interest			
	Increased (n%)	Not changed (n%)	Decreased (n%)	Increased (n%)	Not changed (n%)	Decreased (n%)	Increased (n%)	Not changed (n%)	Decreased (n%)	
Standard buccal metal braces	2 4.0%	36 72.0%	12 24.0%	2 1.9%	82 78.1%	21 20.0%	3 4.0%	66 88.0%	6 8.0%	0.114
Self-ligating braces	15 30.0%	34 68.0%	1 2.0%	11 10.5%	87 82.9%	7 6.7%	25 33.3%	45 60.0%	5 6.7%	0.002*
Clear braces	2 4.0%	40 80.0%	8 16.0%	1 1.0%	78 74.3%	26 24.8%	0 0.0%	59 78.7%	16 21.3%	0.262
Lingual braces	1 2.0%	35 70.0%	14 28.0%	2 1.9%	86 81.9%	17 16.2%	4 5.3%	55 73.3%	16 21.3%	0.282
Clear aligners	33 66.0%	16 32.0%	1 2.0%	59 56.2%	45 42.9%	1 1.0%	51 68.0%	23 30.7%	1 1.3%	0.470
Orthodontic facemask	3 6.0%	46 92.0%	1 2.0%	1 1.0%	100 95.2%	4 3.8%	4 5.3%	66 88.0%	5 6.7%	0.243
Removable functional appliances	5 10.0%	44 88.0%	1 2.0%	3 2.9%	95 90.5%	7 6.7%	6 8.0%	67 89.3%	2 2.7%	0.203
Fixed functional appliances	3 6.0%	40 80.0%	7 14.0%	4 3.8%	90 85.7%	11 10.5%	7 9.3%	61 81.3%	7 9.3%	0.559
Orthognathic surgery	2 4.0%	44 88.0%	4 8.0%	4 3.8%	98 94.2%	2 1.9%	4 5.3%	64 85.3%	7 9.3%	0.242
Orthodontic miniscrews	13 26.0%	36 72.0%	1 2.0%	7 6.7%	96 91.4%	2 1.9%	15 20.0%	59 78.7%	1 1.3%	0.018*
Lingual retainer	3 6.0%	37 74.0%	10 20.0%	6 5.7%	92 87.6%	7 6.7%	9 12.0%	62 82.7%	4 5.3%	0.021*
Essix retainer	12 24.0%	36 72.0%	2 4.0%	12 11.4%	89 84.8%	4 3.8%	12 16.0%	59 78.7%	4 5.3%	0.355

n: number, α: chi-square test,
*Statistical significance p<0.05

thermoplastic retainers produced by 3D software should be preferred over fixed retainers to prevent aerosol emission caused by the aerator and to reduce the risk of breakage.¹¹ Our null hypothesis was that interest in lingual retainers might decrease because of prolonged chair time. However, the interest in these appliances did not change among 83% of the respondents, which could be due to poor patient compliance with removable retainers.²⁸

In our study, the only difference detected between male and female respondents was the change in their interest in standard metal brackets and fixed functional appliances, whereby the interest in these appliances decreased more in women than in men. Women have greater anxiety than men during the COVID-19 pandemic,⁴ which might explain the relative decrease in interest caused by possible side effects of fixed mechanical appliances.

An examination of respondents' interest in appliances concerning their total work experience indicated that interest in standard metal brackets decreased more in individuals with 10 years or more of experience. These findings could be explained by the fact that as orthodontists' experience increases, their ability to detect possible complications improved.²⁹ On the other hand, the interest in self-ligating brackets was higher among respondents with 1-5 years of experience. This finding could be associated with the fact that orthodontists who have low experience and hence longer learning curves spend more time on patient care,³⁰ which, in turn, might have led to an increased interest in self-ligating brackets due to their shorter chair times.²¹

In our study, the interest in self-ligating brackets increased more among lecturers and residents than among clinicians. This difference could be associated with the greater necessity of shortening the chair time in busy clinics such as university

hospitals.^{1,21} Similarly, these two groups also showed an increased interest in miniscrews, which could be explained by the fact that university hospitals are more affected by the COVID-19 lockdown procedures due to the large number of employees and the high number of patients, and the resulting long-term suspension of appointments.¹ On the other hand, these two groups might have increased their interest in miniscrews to reduce the side effects of orthodontic treatment, such as loss of anchorage, and to reduce the duration of treatment.²⁷

It is commonly known that measures taken to prevent the spread of the COVID-19 pandemic have also resulted in serious economic consequences, which, in turn may cause financial issues to overshadow the potential side effects of orthodontic appliances.²⁸ A study conducted in Brazil reported that orthodontists were more affected by the financial impact of the COVID-19 pandemic than its impact on orthodontic treatment.^{15,31} We consider that one of the primary reasons for the absence of a change in the interest of orthodontists in the appliances might be their routine use of these appliances because of their habits.^{18,20}

Study Limitations

Our study had several limitations. First it was a cross-sectional study that evaluated a certain population during a specific period of the COVID-19 pandemic. The COVID-19 pandemic continues to affect the world with new variants in numerous waves.^{2,28,32} Moreover, the World Health Organization warns of possible future viral pandemics. Additionally, the number of cases diagnosed with COVID-19 varies with time and place, and vaccination rates vary widely across the world.² All these factors may lead to a change in the interest of orthodontists in appliances. Another limitation is the number of responses provided to the survey, which is a problem encountered in most surveys.³³ Because orthodontists have a busy schedule during the day, they cannot allocate enough time for surveys.^{23,33} Further studies may investigate the interest of orthodontists in appliances during the COVID-19 pandemic in different countries or regions. This study may provide insight for orthodontists regarding possible new pandemics and lockdowns.

CONCLUSION

The results indicated that the interest of orthodontists in clear aligners showed the highest increase during the COVID-19 pandemic among all orthodontic appliances, whereas their interest in other appliances, particularly standard buccal metal brackets, did not change.

Ethics

Ethics Committee Approval: The study was initiated after obtaining ethical approval from the Adiyaman University Non-interventional Clinical Research Ethics Committee (approval no: 2021/10-7, date: 14.12.2021).

Informed Consent: Necessary permissions and approvals were obtained for this study.

Peer-review: Externally peer-reviewed.

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