

**Impact of Covid-19 lockdown on the orthodontist and patients undergoing orthodontic treatment - A questionnaire-based study**

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**Abstract**

**Introduction:** COVID–19 pandemic caused havoc in the country, as a result of which a nationwide lockdown was implemented overnight. As there was no prior warning or anticipation patient appointments were temporarily ceased as institutions and clinics were indefinitely closed. The orthodontist was also unable to treat ongoing patients.

**Aim:** To assess impact of covid-19 lockdown on the orthodontist and patients undergoing orthodontic treatment

**Material and methods:** A separate self-designed online questionnaire of 12 questions to 250 patients and 250 orthodontists was evaluated using descriptive and inferential statistics.

**Results:** Response rate was 86.4% (n=216) for patients and 91.2% (n=228) for orthodontists. The study revealed

that the majority of patients were affected as they were unable to visit the clinics. Inconveniences caused due to dislodged wires, debonded brackets. Fear of increased treatment duration affected psychology of patient.

Most common problems affecting orthodontists were: lack of communication, fear of increased patient load post lockdown, delayed treatment procedures. Lockdown affected orthodontists financially as well.

**Conclusion:** The study threw light on the essential need for understanding the psychology of patients and orthodontists. Orthodontist should see to it that their patients are being looked after mentally, if not physically.

**Keywords:** COVID-19, lockdown, orthodontist, orthodontic patient.

### **Introduction**

The spread of the "SARS-CoV-2," had resulted in a large number of affected patients, which was closely monitored due to the virus's high contagiousness and the main transmission channels outlined. With the quick rise in COVID-19 cases, the epidemic prompted various governments around the world to take action, placing many cities under complete lockdown, imposing travel bans, and closing schools, universities, and private clinics indefinitely. The limits in India went into effect overnight on March 24, 2020, and were first scheduled to last for 21 days, but were later extended due to the constant rise in incidence rates.<sup>1,2</sup> As a result, all OPDs, dental clinics, and institutions in India have been ordered to close, with only emergency services remaining operational. Due to the presence of aerosol particles of saliva, blood, and secretions, the biological risk of transmitting SARS-CoV-2 when conducting dental operations is highly significant. Furthermore, the creation of aerosol/droplets promotes the contamination of dental equipment, instruments, and surfaces. Dental

emergencies, on the other hand, are a distinct possibility for COVID-19 patients, and in these instances, contact is unavoidable.<sup>1</sup>

Treatment is rarely considered an emergency in the field of orthodontics. However, the significance of frequent check-ups or monthly appointments, as well as the influence of limits placed on patients regarding accessing their orthodontists in times of necessity, are not well recognised. Patients' perceptions of the importance of regular follow-ups, the need for orthodontic treatment to be treated as an emergency, and the reasons for fear or inconvenience in the minds of patients undergoing orthodontic treatment in a time when they are completely confined to their homes are all grey areas that have yet to be explored.<sup>3</sup>

The study was created, and a survey was distributed, to determine the impact of the COVID-19-related lockdown on patients undergoing orthodontic treatment across the country, as well as to investigate orthodontists' opinions and perceptions about the epidemic and how it affected their practise.

### **Methodology**

Data for this questionnaire-based cross-sectional study was obtained after the patients' consent to participate. Two sets of online questionnaires with 12 questions each were prepared for patients undergoing orthodontic treatment and orthodontists' respectively.

**Data selection:** Those individuals undergoing orthodontic treatment of any form (fixed/removable appliances), whose treatment started before the implemented lockdown were selected for patients survey and orthodontists from different areas were selected for practitioners survey. The samples were selected by random sampling methods.

A questionnaire consisting of 12 questions were distributed to 250 potential responders each for both the

surveys through email and messages. It was mandatory to answer all questions and the survey was anonymized and did not contain any identifying information. A total of 216 (86.4%) filled questionnaires by patients and 228 (91.2) by practitioners were returned, and the data was assessed for the same.

Statistical Package for Social Sciences [SPSS] for Windows, Version 22.0, released 2013, IBM Corp., Armonk, NY, was used to perform statistical analyses. The descriptive analysis included the expression of responses to the study questionnaire using frequency and

proportions. Chi-square ( $\chi^2$ ) goodness of fit test was used to compare the difference in the distribution of responses for the study questionnaire. The level of significance (p-value) was set at  $p < .05$ .

**Results**

Total of 86.4% (n = 216 individuals) patients and 91.2% (n = 228 individuals) orthodontists responded to survey. Comparison of differences in the distribution of responses using Chi Square Goodness of Fit test for both the surveys is shown in table 1 and table 2.

Table 1. Comparison of differences in the distribution of responses of patients using Chi Square Goodness of Fit test.

| Sl. no. | Questions   | Response  | n   | %    | $\chi^2$ | P-value |
|---------|---|---|-----|------|----------|---------|
| 1.      | How long has it been since you visited your orthodontist?   | A) More than 1month   | 99  | 46   | 70.19    | <0.001* |
|         |   | B) Much more than 2months   | 103 | 48   |          |         |
|         |   | C) I don't remember   | 14  | 6    |          |         |
| 2.      | Are you following all the instructions given by your orthodontist, such as wearing of elastics and other oral hygiene instructions? | A) Yes, following all of it very accurately   | 105 | 49   | 82.75    | <0.001* |
|         |   | B) Sometimes, not too regular   | 102 | 47.5 |          |         |
|         |   | C) No, I do not have the material needed (eg, My elastics got over and lack of floss)                         | 9   | 3.5  |          |         |
| 3.      | Have you been in touch with your orthodontist?  | A) Yes, I call my orthodontist if at all I have any problems regarding my treatment                           | 105 | 48.8 | 66.02    | <0.001* |
|         |   | B) No, I have not called my orthodontist  | 95  | 44.2 |          |         |
|         |   | C) I tried calling my orthodontist, but he/she is never reachable   | 16  | 7    |          |         |
| 4.      | Does your orthodontist check on you regularly?  | A) Yes, my orthodontist calls me regularly to check if everything is okay                                     | 91  | 42   | 96.19    | <0.001* |
|         |   | B) No, my orthodontist has not called me since the lockdown started   | 119 | 55.1 |          |         |
|         |   | C) My orthodontist calls me, but I do not pick up because anyway there is no use since I cannot visit him/her | 6   | 2.9  |          |         |

|     |   |   |                 |                      |        |         |
|-----|---|---|-----------------|----------------------|--------|---------|
| 5.  | What exactly are you most worried about regarding your treatment?   | A) My treatment time will be longer<br>B) My treatment can go wrong, things might get complicated<br>C) My orthodontist will have a lot of work post lock down, so he/she will not be able to give enough time for my treatment                             | 157<br>34<br>25 | 72.5<br>15.7<br>11.8 | 151.08 | <0.001* |
| 6.  | Since the lockdown started, have you had any problems with anything fixed in your mouth (eg, brackets, elastics, appliances and plates) | A) Yes, there are broken brackets and a few things like elastics have come out<br>B) No, everything is as it was before the lockdown<br>C) I do not know how to check, and I am unsure  | 93<br>100<br>23 | 43.1<br>46.5<br>10.4 | 50.36  | <0.001* |
| 7.  | What problems are you most commonly facing with your braces?  | A) The wire came out and is poking me, and I have pain<br>B) A few brackets and elastics have come out<br>C) No problems  | 65<br>74<br>77  | 29.9<br>34.3<br>35.8 | 1.08   | <0.001* |
| 8.  | Have you suffered from any emergency such as pain, swelling, lacerations/ cuts, etc., due to treatment since the lockdown?              | A) No, my braces/ appliances have not given me any problem<br>B) Yes, but I called my orthodontist and asked him/her what to do<br>C) Yes, but I took self-medication without informing my orthodontist and I am fine                                       | 156<br>43<br>17 | 72<br>20<br>8        | 151.69 | <0.001* |
| 9.  | This lock down has:   | A) Made me realize the importance of me being regular with my appointments<br>B) Made me realize that is okay to miss appointments because nothing happened<br>C) Made no difference to what I think about my treatment                                     | 142<br>8<br>66  | 65.7<br>3.9<br>30.4  | 125.44 | <0.001* |
| 10. | What do you think about your treatment cost following the lockdown?   | A) Orthodontist may charge extra or advice unnecessary procedures to make up for money loss<br>B) Not worried, since I believe that the amount remains same that was told to me earlier<br>C) I am okay with anything as long as my treatment finishes fast | 48<br>131<br>37 | 22.3<br>60.4<br>17.3 | 73.36  | <0.001* |

|     |   |  |                 |                      |        |         |
|-----|---|--|-----------------|----------------------|--------|---------|
| 11. | Following this lockdown, when do you plan to visit your orthodontist? | A) I will rush to the hospital as soon as I can<br>B) I will wait for my orthodontist to call me and give me an appointment<br>C) I will not go till the pandemic is entirely over | 147<br>52<br>17 | 68<br>24<br>8        | 125.69 | <0.001* |
| 12. | Are you scared to visit your orthodontist after the lockdown ends?    | A) Yes, I am scared<br>B) No, I am not scared<br>C) Not so much, but my fear has increased as compared to before   | 111<br>69<br>36 | 51.4<br>31.8<br>16.8 | 39.25  | <0.001* |

Table 2. Comparison of differences in the distribution of responses of practioners using Chi Square Goodness of Fit test.

| Sl. no. | Questions   | Response   | n               | %                    | X <sup>2</sup> | P-value |
|---------|---|--|-----------------|----------------------|----------------|---------|
| 1.      | Did you provide any dental emergency during lockdown period?  | A) Yes<br>B) No.   | 122<br>106      | 53.3<br>46.6         | 1.12           | 0.2     |
| 2.      | Which of the dental emergencies did you provide most frequently during the lockdown period?   | A) Wire replacement, loose bands<br>B) Bonding of debonded brackets<br>C) Any other (RCT, restoration, extraction) | 81<br>76<br>71  | 35.5<br>33.3<br>31.1 | 0.657          | 0.7     |
| 3.      | Are you afraid of getting SARS-CoV-2 infection during emergency/urgent dental care?   | A) Yes<br>B) No<br>C) I don't know   | 124<br>58<br>46 | 54.4<br>25.5<br>20   | 46.42          | <0.001* |
| 4.      | Have you ever performed telephone triage in order to investigate for major symptoms of SARS-CoV-2 such as fever, cough, breathing difficulties, muscle pain and sore throat, in patients who asked to be visited? | A) Yes<br>B) No  | 172<br>56       | 75.6<br>24.4         | 59.01          | <0.001* |
| 5.      | Has the staff that helps you in clinical practice had specific training on how to wear, remove and dispose of any Personal Protective Equipment (PPE) to be used according to WHO?                                | A) Yes<br>B) No  | 190<br>38       | 83.3<br>6.7          | 101.33         | <0.001* |

|     |  |  |                 |                      |        |         |
|-----|--|--|-----------------|----------------------|--------|---------|
| 6.  | In your clinical practice prior to the SARS-CoV-2 epidemic, did you use oral rinses for the patient before any treatment?              | A) Yes<br>B) No  | 124<br>104      | 54.4<br>45.6         | 1.75   | 0.18    |
| 7.  | If you answered yes to the previous question, do you indicate which ones you used most:  | A) Chlorhexidine mouthwashes<br>B) Mouthwashes with essential oils<br>C) Hydrogen peroxide diluted with water      | 91<br>81<br>61  | 39.8<br>35.5<br>24.7 | 8.55   | 0.01    |
| 8.  | To date, are the visit and/or care provided performed with specific PPE?   | A) Yes<br>B) No  | 218<br>10       | 95.5<br>4.5          | 189.75 | <0.001* |
| 9.  | If your answered yes to the previous question was “yes, can you indicate which of the following PPE were used?                         | A) Surgical mask<br>Safety glasses<br>B) Safety visor<br>Disposable headset<br>Multipurpose cloth cap<br>C) Others | 86<br>81<br>61  | 37.7<br>35.5<br>26.8 | 4.6    | 0.09    |
| 10. | Since the onset of the SARS-CoV-2 epidemic, your financial activity has affected in percentage of:                                     | A) 100-70%<br>B) 60-30%<br>C) 20-0%  | 101<br>68<br>59 | 44.4<br>30<br>25.6   | 12.86  | <0.001* |
| 11. | Are you worried about increased treatment time for ongoing patients?   | A) Yes<br>B) No<br>C) To some extent   | 88<br>56<br>84  | 38.8<br>24.5<br>36.7 | 8      | 0.01    |
| 12. | How do you see your future work according to a scale where green is for very good, yellow is acceptable and red is for bad/disastrous? | A) Yellow<br>B) Red<br>C) Green  | 144<br>46<br>38 | 63.3<br>20<br>16.7   | 91.68  | <0.001* |

Figure 1: Responses by patients for Q1-Q4

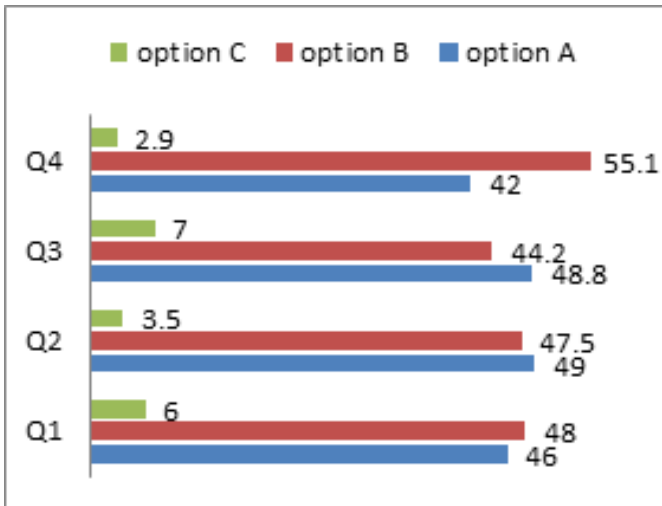


Figure 2: Responses by patients for Q5-Q8

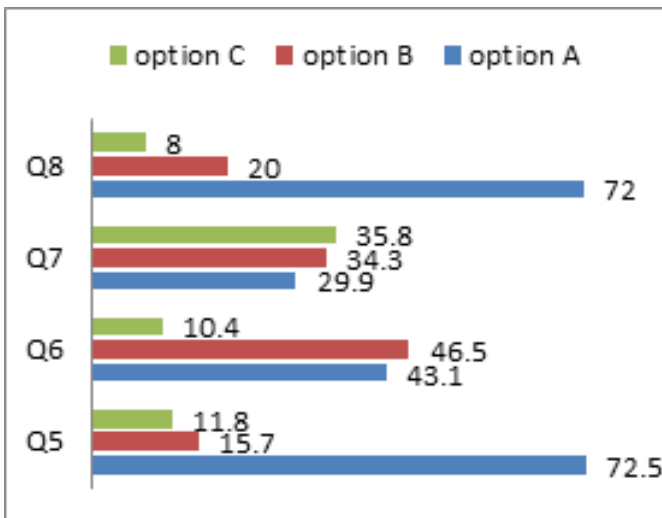


Figure 3: Responses by patients for Q9-Q12

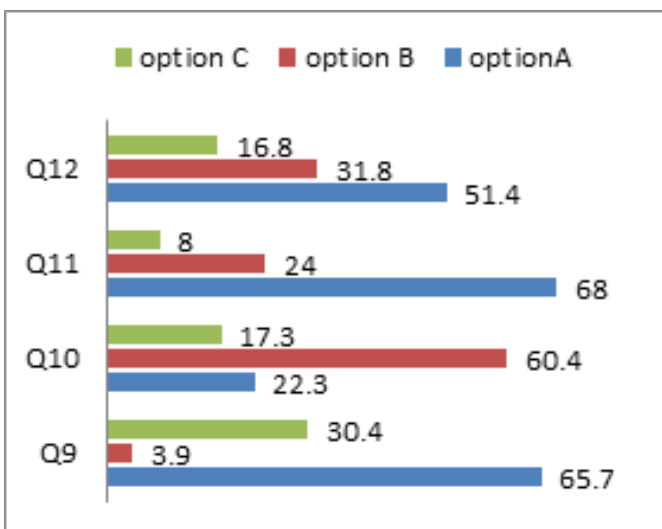


Figure 4: Responses by orthodontists for Q1-Q4

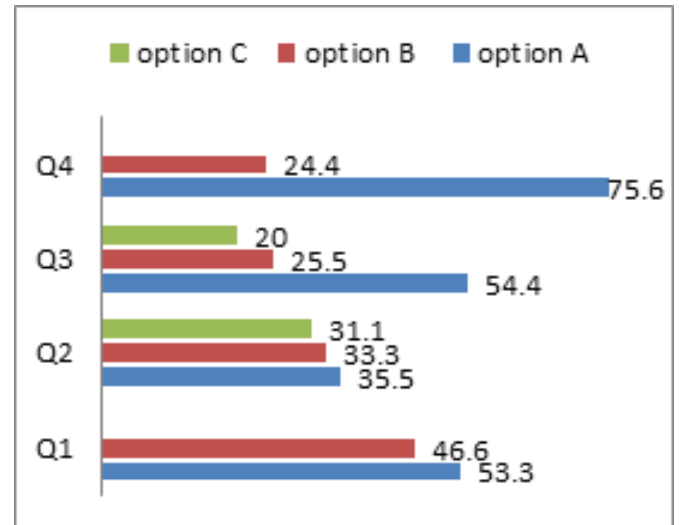


Figure 5: Responses by orthodontists for Q5-Q8

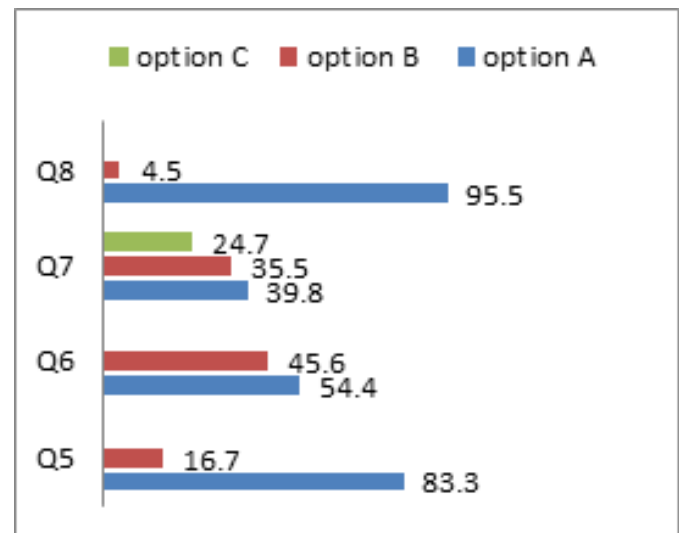
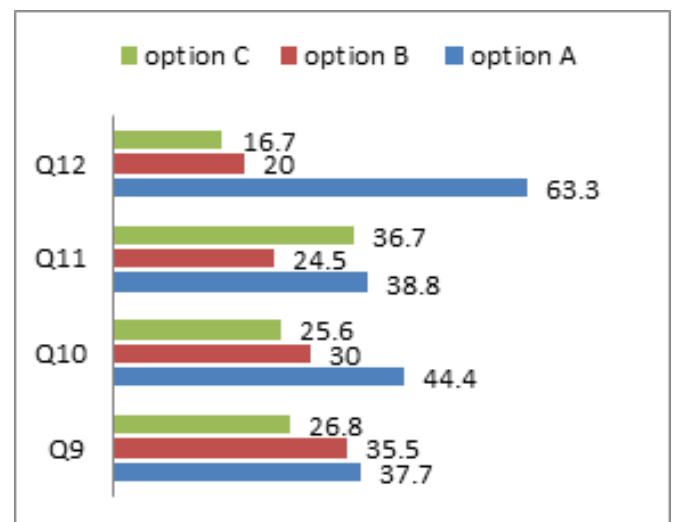


Figure 6: Responses by orthodontists for Q9-Q12





## **Discussion**

Intending to get an idea as to how this lockdown affected the treatment progress, as well as understanding the difficulties faced, the results revealed that most patients undergoing treatment were concerned about their restriction to orthodontic clinic visits. Forty-eight percent of the individuals replied that it had been over 2 months since their last follow up. Orthodontic therapy usually consists of brackets or appliances fixed into the patient's mouth, and thus the accumulation of plaque is inevitable. Plaque accumulation, along with patients' reduction in adherence to oral hygiene instructions worsens the situation. Careful inspection of the appliances at every visit and proper prophylactic therapy is very essential. To improve the subsequent oral health, disclosing tablets can be administered to patients after instructions on how to use them for improving oral health is properly understood.<sup>2</sup> Apart from caries and oral hygiene assessments, certain treatment mechanics require regular follow-ups. The elastics used for retraction or space closure mechanics decay over time, add to the accumulation of plaque and deterioration of oral hygiene. This often goes unnoticed by patients as they are unaware of the same. Until there are evident inconveniences such as poking distal wires, loose brackets, or lacerations, most teeth-related problems are overlooked. For example, wire bending with loops left in patient's mouth for a long time, sunken or loose orthodontic bands, broken fixed functional appliances, and loose temporary anchorage devices, can cause deleterious effects in the treatment progress, which was until then going smoothly.

It was found that a majority of patients did not face inconveniences related to appliances through the lockdown, however, from those who did, there was an almost equal response with poking wires, brackets

debonded, and appliances and elastics coming out. A study by Rajesh Gyawali et al<sup>4</sup> stated that the most common reason for orthodontic emergencies or appointments was the loosening of brackets or bondable buccal tubes, followed by the loosening of bands. The other possible reasons were trauma to the mucosa by the overextended distal wire, detachment of buccal tubes from the band, tearing of bands, breakage of acrylic plates, loosening of ligature ties, and dislodgement of elastomeric chains.

The survey revealed that the patients were worried about not being able to go for regular follow-ups, the most common cause being an increase in the treatment duration (72.5%). A total of 15.7% of the patients were worried that something could go wrong with their treatment. This shows the awareness of the need for regular follow-ups, which is in accordance with 65.7% of patients stating that the lockdown had made them realize the importance of regular follow-ups. When asked if the patients were regularly in touch with their orthodontists, results showed that approximately 48.8% patients did keep in touch and 44.2% did not. These results can again be attributed to the level of interest in treatment, fear as well as problems encountered during the treatment. Another reason could be the lack of transport or facility to visit the orthodontist, despite the need. Looking at it from the perspective of orthodontists following up on their patients in whichever way possible, 55.1% of the patients replied that they did not receive calls from their orthodontists. This result reflects the very fact that many times the orthodontists themselves forget to realize the fact that their patients too are in helpless situations, and might be worried about their treatment—emphasizing the need for this study. In such instances, small gestures such as regular check-up calls boost confidence, reduces the worry, and give



patients a sense of comfort. This helps the patient understand that their orthodontist cares for their treatment as much as they do. It was seen that only 22.3% of patients were worried about extra charge applied to make up the loss orthodontist suffered in this pandemic proves the trust of patient on his clinician. Response to fear of increased treatment costs, though a small fraction shows the importance for the orthodontist to re-ensure patients that, provided no additional treatment is essential (with patients' consent), the treatment cost would remain the same even post the lockdown period. Also, if at all any additional cost is charged to the patient, it would be for the personal protection equipment to ensure safety for both the health care professional as well as the patient.

Going by the definition, though not life-threatening in all situations, certain inconveniences as mentioned earlier, might need immediate attention to reduce the chances of further complications. It also goes without saying that emergencies such as sudden swellings and aspiration or the accidental swallowing of appliances need to be considered as potential life-threatening emergencies. The severity and seriousness of the spread of disease should be clearly explained to all patients, making them aware of the importance of social distancing and the need for personal protection even after the lockdown has been lifted. If at all patients plan on rushing to their orthodontists', it should be made sure these patients are symptomless and are visiting hospitals only for emergencies. The possible explanation for 31.8% of patients not having any fear to visit their orthodontist post the lockdown, shows the lack of awareness of the various modes of possible transmission of diseases in a dental office with aerosols, doctors' proximity to patients, etc. This study thus throws light on the awareness of these patients about their health, not

considering orthodontic treatment essential at such times. Such patients should be reassured that proper protection will be taken to limit the spread of disease.

This survey focused on understanding what type of treatment was provided the most, as well as to thoroughly investigate the perception of the professionals and their behaviour during the lockdown period. Specifically, in April 2020, Ahmed et al.<sup>8</sup> investigated the perception of the state of anxiety and fear in the dental population regarding the risk of contagion. In their study, 78% of the 669 participants were anxious and scared by the devastating effects of COVID-19. A large number of dentists (90%) were aware of recent changes in the treatment protocols. Similarly, 54.4% of respondents to our questionnaire were affirmed to be afraid of being infected by SARS-CoV-2 after performing urgent dental procedures during the lockdown period. Further, Duruk et al.<sup>9</sup> in April 2020 conducted a survey in order to understand what kind of precautions were taken by the dental population in Turkey. Even in this scenario, more than 90% were frightened by the possibility of contagion, thus confirming the direct role of the dentist and the high risk of contagion. The authors declared that 12% of the participants use N95 masks. On the other hand, in my study, the variation in the type of devices used has been analyzed. The analysis started from 86 dentists (37.7%) who used only the surgical mask before the emergency, during normal dental practice. Only 81 professionals (35.5%) reported to use the PPE after the start of the pandemic. These differences can be justified by the difficulty in the intensive wear of N95 masks. In fact, Scarano et al.<sup>10</sup> in a recent study showed that N95 respirators are able to induce an increased facial skin temperature with greater discomfort compared to surgical masks. In addition, among the ministerial

recommendations, the use of disinfectants and mouth-rinses with chlorhexidine or not was strongly recommended to reduce the microbial load. Disinfection protocols and professional oral hygiene can also aid in the long-term maintenance. Moreover, the use of the appropriate personal protection equipment (PPE), strict dressing and operational protocols were recommended. In this study it was seen that 38.8% of orthodontists were worried about increased time of their patients ongoing treatment. On a scale from green to red (where green means optimistic and red pessimistic), 63.3% of doctors surveyed see the future of dentistry is acceptable from an economic and professional point of view, whilst 20% of the dentists are pessimistic (red) for the upcoming years and only 16.7% see the future of dentistry in a positive way (green).

During the COVID-19 outbreak since the last 2 years orthodontists have promptly responded to new scenarios, improving safety. According to the COVID-19 guidelines, doctors have changed their workflows patterns or re-configured their clinic settings to ensure safety. The availability of vaccines for the population now and the awareness of patients about recommended guidelines to prevent COVID-19 infection support a safe and lasting resumption of routine dental activities.<sup>11</sup>

It has come to light that communication with patients about adopted precautions in dental clinics plays a fundamental role in reducing patients' dental anxiety and fear related to the risk of COVID-19 infection within dental clinics. Compliance with orthodontists' appointments should be encouraged, helping patients rediscover the confidential relationship of trust with their orthodontist and return to regular dental visits.

It can be concluded that "Learning from the past remains the only key note to be taken into future endeavours."

### **Limitations**

The study was a self-designed online questionnaire, sent to those undergoing orthodontic treatment and various orthodontists through various platforms and thus there was a 13.6% non-response rate for patients and 8.8% for orthodontists.

However, irrespective of the nonresponse rate, the purpose of the study was mainly to understand the psychology of these patients and orthodontists.

This will further help in improving the patient–doctor rapport as well as enhance practice management skills.

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