

Impact of COVID-19 Lockdown on Patients Undergoing Orthodontic Treatment: A Questionnaire Study

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Abstract

With COVID-19 declared as a worldwide pandemic, a nationwide lockdown was implemented overnight in India on March 24, 2020. With no prior warning or anticipation, patient appointments were temporarily ceased as institutions and clinics were indefinitely closed. To our knowledge, no study addresses the orthodontic patient perspective in such testing times, where they are entirely restricted to the confines of their homes.

Aim: To assess the impact of the COVID-19-related lockdown on the treatment and psychology of patients undergoing orthodontic treatment.

Material and methods: A self-designed online exploratory questionnaire of 15 questions was distributed to 500 potential responders selected from obtained lists through messages and emails. It was mandatory to answer all questions and the survey was anonymized and did not contain any identifying information. Online consent was taken before participation in the study. The obtained data were evaluated using descriptive and inferential statistics.

Results: The response rate was 81.6%. The study revealed that the majority of patients were affected by the lack of access to orthodontic visits. The reasons for the same were attributed to fear of increased treatment duration, inconveniences caused by poking wires, broken brackets, etc., and lack of communication between the orthodontists and patients, among the various other reasons. The importance of orthodontic appointments was also understood by patients.

Conclusion: The study threw light on the essential need for understanding the psychology of patients undergoing orthodontic treatment. In any situation where patients do not have access to seek help, all the factors discussed in the study should be considered and it is of utmost importance that orthodontic professionals see to it that their patients are being looked after mentally, if not physically, in whatever way possible.

Keywords

Challenges, corona, COVID-19, lockdown, orthodontic, orthodontic patient, patient psychology, treatment

Introduction

With the rapid rise in the number of cases with COVID-19, the pandemic led to several governments across the world taking action and many cities were placed under complete lockdown, travel bans were implemented, and schools, universities, and private clinics were indefinitely closed.¹

The restrictions in India came into force overnight on March 24, 2020,² which at first was announced to be for 21 days following which continued to be extended due to the steady increase in incidence rates. As a result, all OPDs, dental clinics, and institutions across India were instructed to be shut, leaving only emergency services functioning.

Thus, with no prior warning or anticipation, orthodontic appointments were temporarily ceased. In the field of

orthodontics, treatment is generally not considered an emergency. However, what is not understood is the importance of regular check-ups or monthly appointments, as well as the impact of restrictions put on patients concerning visiting their orthodontists in times of need.

Understanding whether patients realize the importance of regular follow-ups, feel the need for orthodontic treatment

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to be regarded as emergencies, or assess the reasons for fear or inconveniences in the minds of patients undergoing orthodontic treatment in a time where they are entirely restricted to the confines of their homes are grey areas that are left unexplored.

With this background, the study was conceived, and a survey was circulated to assess the impact of the COVID-19-related lockdown on those patients undergoing orthodontic treatment across the nation.

Methodology

Data for this questionnaire-based cross-sectional study was obtained after the approval of the institutional research ethics committee, and patients' consent to participate.

Selection Criteria

Those individuals undergoing orthodontic treatment of any form (fixed/removeable appliances), whose treatment started before the implemented lockdown.

Study Design

A self-designed closed-ended online questionnaire.

Study Duration

The data was collected between April 10, 2020 and May 3, 2020.

A total of 408 filled questionnaires were reverted, and the data was assessed.

Sample Size Determination

The sample size was determined using the formula for the research methodology

$$N = \frac{Z^2(1-\alpha) \times PQ}{\delta^2}$$

where

- $Z_{(1-\alpha)} = 1.96$ (for 95% confidence interval)
- $P = 0.50$ (based on the probability, that approximately 50% of the population would require emergent treatment)
- $Q = 1 - P$
- δ (margin of error) = 0.05
- $N = 384.16$ rounded off to 400
- The sample size $N = 400$

Anticipating 15–20% of a non-response rate for online surveys, the sample size was inflated to 500. So, the total

sample size needed for the present study was 500 participants, to receive a minimum of 400 responses.

Data Collection

The samples were selected by random sampling methods, based on the collection of a list of those patients receiving orthodontic treatment from various practitioners, clinics, and institutions across the nation.

The questionnaire consisting of 15 questions were distributed to 500 potential responders through email and messages. It was mandatory to answer all questions and the survey was anonymized and did not contain any identifying information. Online consent was taken before participation in the study.

Statistical Analysis

Statistical Package for Social Sciences [SPSS] for Windows, Version 22.0, released 2013, IBM Corp., Armonk, NY, was used to perform statistical analyses.

Descriptive Statistics

The descriptive analysis included the expression of participants' responses to the study questionnaire using frequency and proportions.

Inferential Statistics

Chi-square 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

A total of 81.6% (408 individuals) of the participants responded to the survey. The questions were categorized into three domains as given (Tables 1–3):

- Table 1: Patient general perspective on the importance of regular check-ups/monthly appointments (Q1–Q5).
- Table 2: Impact of lockdown on patients' visit to orthodontist for treatment needs (Q6–Q12).
- Table 3: Psychological distress among patients regarding post lockdown visit to orthodontist and treatment charges (Q13–Q15).

With descriptive analysis in Figures 1–4.

Table 1. Comparison of Differences in the Distribution of Responses Toward “Patient General Perspective Importance of Regular Check-ups/Monthly Appointments” Domain Using Chi Square Goodness of Fit Test

Sl No.	Questions	Responses	n	%	χ^2 -value	P-value
Q1	How long has it been since you visited your orthodontist?	More than 1 month	188	46.1	138.588	<.001*
		Much more than 2 months	196	48.0		
		I do not remember	24	5.9		
Q2	How worried that you are not getting to go for regular follow ups for your treatment?	Very worried, I wish to meet my orthodontist soon	200	49.0	46.118	<.001*
		Not so worried, everything that goes wrong can be fixed later	96	23.5		
		I am more concerned about the worldwide pandemic	112	27.5		
Q3	Are you following all the instructions given by your orthodontist, such as wearing of elastics and other oral hygiene instructions?	Yes, following all of it very accurately	232	56.9	105.412	<.001*
		Sometimes, not too regular	104	25.5		
		No, I do not have the material needed (eg, My elastics got over and lack of floss)	72	17.6		
Q4	Have you been in touch with your orthodontist?	Yes, I call my orthodontist if at all I have any problems regarding my treatment	200	49.0	169.647	<.001*
		No, I have not called my orthodontist since the lockdown started	196	48.0		
		I tried calling my orthodontist, but he/she is never reachable	12	2.9		
Q5	Does your orthodontist check on you regularly?	Yes, my orthodontist calls me regularly to check if everything is okay	172	42.2	192.235	<.001*
		No, my orthodontist has not called me since the lockdown started	228	55.9		
		My orthodontist calls me, but I do not pick up because anyway there is no use since I cannot visit him/her	8	2.0		

Note: * Statistically significant.

Table 2. Comparison of Differences in the Distribution of Responses Toward “Impact of Lockdown on Patients’ Visit to Orthodontist for Treatment Needs” Domain Using Chi Square Goodness of Fit Test

Sl No.	Questions	Responses	n	%	χ^2 -value	P-value
Q6	What exactly are you most worried about regarding your treatment?	My treatment time will be longer and I will have my braces on for much more time	300	73.5	309.882	<.001*
		My treatment can go wrong, things that are not supposed to happen with my teeth can happen	84	20.6		
		My orthodontist will have a lot of work post lock down, so he/she will not be able to give enough time to my treatment	24	5.9		
Q7	Since the lockdown started, have you had any problems with anything fixed in your mouth (eg, brackets, elastics, appliances and plates)	Yes, there are broken brackets and a few things like elastics have come out	176	43.1	93.882	<.001*

(Table 2 Continued)

(Table 2 Continued)

Sl No.	Questions	Responses	n	%	χ^2 -value	P-value
		No, everything is as it was before the lockdown	188	46.1		
		I do not know how to check, and I am unsure	44	10.8		
Q8	What problems are you most commonly facing with your braces?	The wire came out and is poking me, and I have pain	122	29.9	2.294	.32
		A few brackets and elastics have come out	140	34.3		
Q9	Have you suffered from any emergency such as pain, swelling, lacerations/ cuts, etc., due to treatment since the lockdown?	No problems	146	35.8	283.294	<.001*
		No, my braces/ appliances have not given me any problem	296	72.5		
		Yes, but I called my orthodontist and asked him/her what to do	64	15.7		
		Yes, but I took self-medication without informing my orthodontist and I am fine	48	11.8		
Q10	Do you think that orthodontic treatment should be considered an emergency?	Yes, because I do not want anything to go wrong with my treatment	124	30.4	1.647	.44
		Yes, because sometimes certain problems can be considered as emergencies such as cuts/ lacerations, swellings, etc.	144	35.3		
		No, because it is not life threatening	140	34.3		
Q11	Who do you think this lockdown is affecting more?	I think my orthodontist is more affected than I am	28	6.9	425.176	<.001*
		I think I am more affected than my orthodontist	48	11.8		
		I think this lockdown is affecting both me and my orthodontist equally	332	81.4		
Q12	This lock down has:	Made me realize the importance of me being regular with my appointments	268	65.7	235.059	<.001*
		Made me realize that is okay to miss appointments because nothing happened	16	3.9		
		Made no difference to what I think about my treatment	124	30.4		
Q13	What do you think about your treatment cost following the lockdown?	Orthodontist may charge extra or advice unnecessary procedures to make up for money loss		40	9.8	195.765
		Not worried, since I believe that the amount remains same that was told to me earlier	264	64.7		
		I am okay with anything as long as my treatment finishes fast	104	25.5		

(Table 2 Continued)

(Table 2 Continued)

Sl No.	Questions	Responses	n	%	χ^2 -value	P-value
Q14	Following this lockdown, when do you plan to visit your orthodontist?	I will rush to the hospital as soon as I can		88		
		I will wait for my orthodontist to call me and give me an appointment	240	58.8	21.6	119.529
		I will not go till the pandemic is entirely over	80	19.6		
Q15	Are you scared to visit your orthodontist after the lockdown ends?	Yes, I am scared		52		
		No, I am not scared	216	52.9	12.7	99.059
		Not so much, but my fear has increased as compared to before	140	34.3		

Note: * Statistically significant.

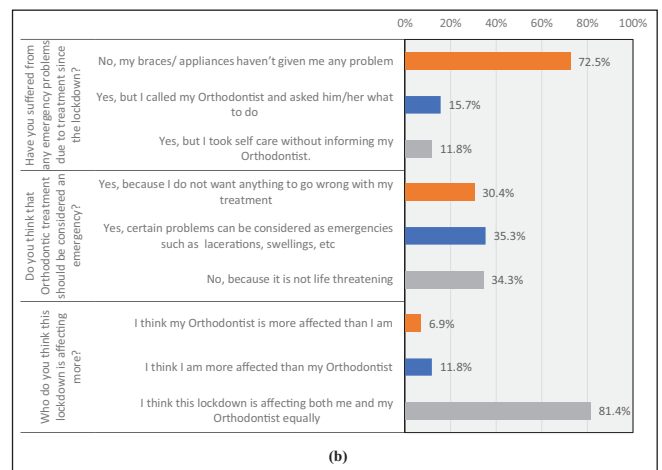
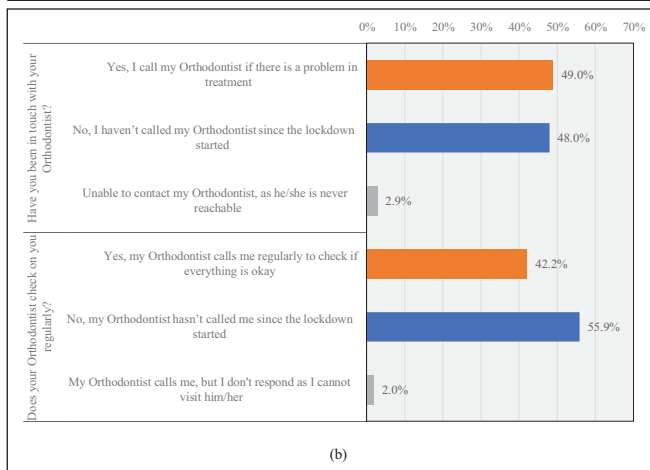
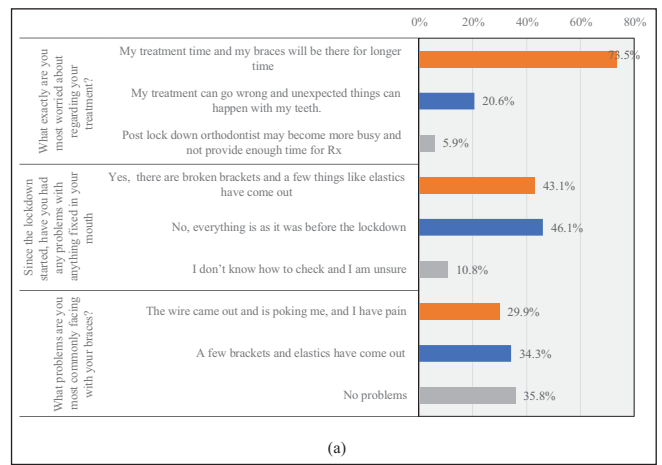
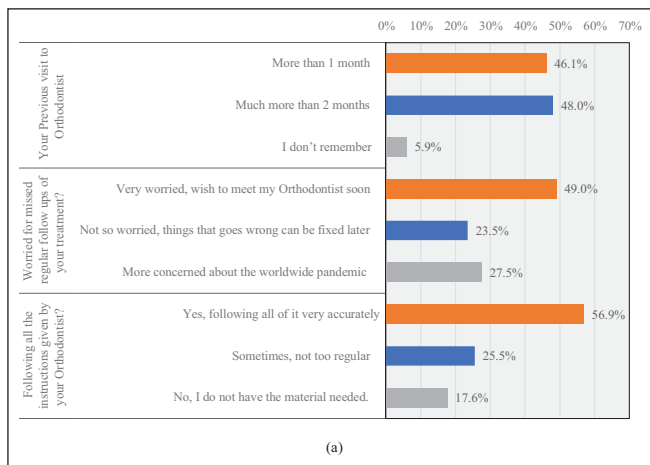


Figure 1. Distribution of Responses Toward “Patient General Perspective on Importance of Regular Checkups/Monthly Appointments”: (a) Domain—Q1 to Q3 (b) Domain—Q4 and Q5

Figure 2. Distribution of Responses Toward “Impact of Lockdown on Patients’ Visit to Orthodontist for Treatment Needs”: (a) Domain—Q6 to Q8 (b) Domain—Q9 to Q11

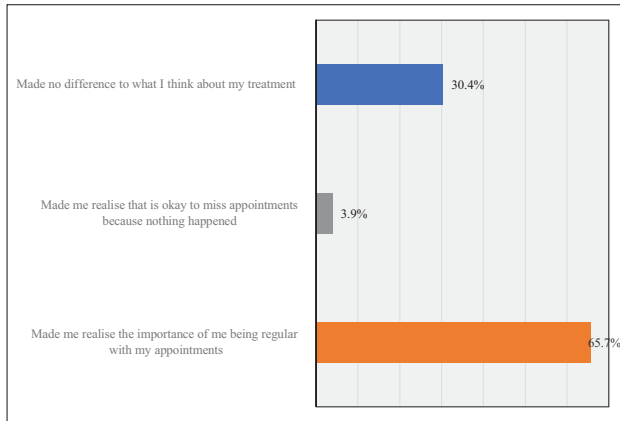


Figure 3. Distribution of Responses for the Question Regarding the Impact of Lockdown on Patients' Perception on Importance of Regular Appointments—Q12

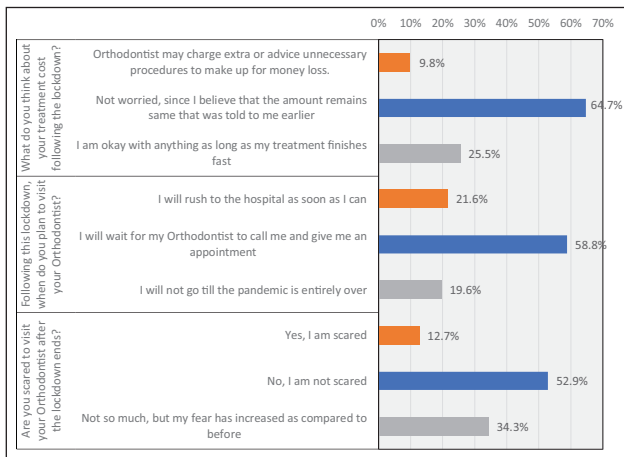


Figure 4. Distribution of Responses Toward "Psychological Distress Among Patients Regarding Post Lockdown Visit to Orthodontist and Treatment Charges" Domain—Q13 to Q15

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. To our knowledge, no study addresses the orthodontic patient perspective in such testing times.

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. A study by Huser et al,³ concluded that "the demineralization associated with orthodontic therapy is an extremely rapid process caused by a high and continuous cariogenic challenge in the plaque developed around brackets

and underneath ill-fitting bands." Bartsch et al⁴ stated that compliance is a major problem in orthodontics. Because there is going to be inevitable plaque accumulation, along with patients' reduction in adherence to oral hygiene instructions (due to prolonged treatment duration⁵) initially explained to them, careful inspection of the appliances at every visit and proper prophylactic therapy is very essential. To improve the subsequent oral health, disclosing tablets⁶ can be administered to patients after instructions on how to use them for improving oral health is properly understood.

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. This shows that in the study, no single problem, in particular, was the sole cause for an inconvenience or emergency, however, patients did face problems such as the ones stated earlier. A study by Rajesh Gyawali et al⁷ 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.

Caprioglio et al⁸ and Suri et al⁹ in their article mention the possible orthodontic emergencies with simple do-it-yourself solutions such as cutting of distal ends of wires with nail cutters, use of over the counter disclosing wax for relief, and the importance of virtual assistance in such times.

The survey revealed that 49% of 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 (73.5%). Rokyo et al⁵ stated that compliance and the length of the orthodontic treatment were indirectly proportional to each other, that is compliance is stronger in case of shorter treatment durations. This also explains a possible chance for the reduction in compliance of patients during the lockdown, though in the present study, during the period of the data collection, 56.9% of patients stated that they were following all instructions previously given to them.

A total of 20.6% 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.

It should be noted here that many times, certain treatment mechanics (such as Begg's mechanotherapy, Tip Edge mechanotherapy, or final stages of settling the occlusion) require the use of elastics changed by the patient daily. A total of 17.6% of the individuals stated that they did not have the material required to carry out the practices instructed to them by the orthodontist. The unavailability of such material to compliant patients leave both the orthodontist as well as patients in a helpless situation. This creates untoward dental effects such as opening up or spaces or movement of teeth that will result in round-tripping, and thus further increase in treatment duration and subsequent reduction in compliance.

In treatment mechanics such as Begg's mechanotherapy, elastic wear by the patient is the running force. With one-point contact bracket mechanics, free tipping is unavoidable. This accompanied by incorrect elastic use can lead to detrimental effects on the treatment. However, in recent times, the use of pre-adjusted edgewise appliances dominates the mechanotherapy used for treatment. This could probably be a reason for why the lack of material needed by patients during the lockdown gets overshadowed.

In those cases where patients run out of settling elastics, increasing chewing efficiency (eg, with the help of chewing gum) and instructing patients to chew bilaterally could help settle the occlusion a little better than with no stimulation at all.

The reason for 23.5% of patients not being worried about their treatment, can probably be attributed to those patients who did not face any problems during the lockdown (35.8%), or those patients who were externally motivated to undergo treatment and have no active interest in the same. However, this does not represent the majority of patients affected.

When asked if the patients were regularly in touch with their orthodontists, results showed that approximately 50% patients did keep in touch and 50% 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, 55.9% 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.

However, 81.4% of the patients thought that the lockdown was affecting both the orthodontist as well as patient equally. This suggests that the patients too are sympathetic toward the feelings of their doctors through this lockdown.

When asked about the need for orthodontic treatment to be considered as an emergency, results revealed mixed opinions (Figure 2[b]).

According to *Merriam-Webster Dictionary* (<https://www.merriam-webster.com/dictionary/emergency>), the word "emergency" is defined as "an unforeseen combination of circumstances or the resulting state that calls for immediate action" or "an urgent need for assistance or relief."

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.

Response to fear of increased treatment costs, though a small fraction (Figure 4) 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.

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 dentists, it should be made sure these patients are symptomless and are visiting hospitals only for emergencies. The possible explanation for 52.9% of patients not having any fear to visit their orthodontist post the lockdown, shows the lack of awareness¹⁰ of the various modes of possible transmission of diseases in a dental office with aerosols, doctors' proximity to patients, etc.

Finally, it should be mentioned that 27.5% of the patients were more concerned about the worldwide pandemic, and 19.6% of patients stated they will not visit their orthodontists until the entire pandemic is over. 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.

Limitations

The study was a self-designed online questionnaire, sent to those undergoing orthodontic treatment through various

platforms such as messages, emails, Facebook, etc., and thus there was a 18.4% non-response rate.

However, irrespective of the nonresponse rate, the purpose of the study was mainly to understand these patients and spread awareness of the same.

This study can thus be considered as an exploratory study to get a generalized idea on the impact of the lockdown on patients and can thus help in the future better understanding of specific patient-related problems. This will further help in improving the patient–doctor rapport as well as enhance practice management skills.

Conclusion

The study was carried out with the aim of assessing the impact of the lockdown on patients undergoing orthodontic treatment, as well as sheds light on how these problems could in turn affect the progress of their treatment.

It was seen that majority of patients had some or the other problem associated with the lockdown, regarding their orthodontic treatment.

The need for understanding the psychology of patients undergoing orthodontic treatment is extremely essential. In any situation where patients do not have access to seek help, irrespective of the cause for restriction to access, all the above discussed factors should be considered.

In conclusion, the take home message from this survey stresses on the importance of orthodontic professionals seeing to it that their patients are being looked after mentally, if not physically, in whatever way possible in such testing times. Also, proper communication with patients and explanations on how to maintain proper self-care, when regular follow ups are not possible, is indispensable. This would ultimately give the patient a sense of reassurance that they are being well looked after.

Declaration of Conflicting Interests

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