

# Assessment of awareness of orthodontic emergencies and psychosocial wellbeing of patients during novel coronavirus pandemic through teledentistry

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## Author's Contribution

<sup>2,3,4</sup> Conception of study

<sup>1,2,3,4,5,6</sup> Experimentation/Study conduction

<sup>2,3,4</sup> Analysis/Interpretation/Discussion

<sup>2,3,4</sup> Manuscript Writing

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## Abstract

**Introduction:** At the end of December 2019, the novel coronavirus began to spread in central China and soon became a pandemic. Unfortunately, all elective dental treatments including orthodontic visits were postponed and patients could not be counselled on how to manage orthodontic emergencies that they could encounter at home. Teledentistry can play a major role in providing instructions to patients during quarantine.

**Objective:** The study aimed to assess the awareness of orthodontic patients regarding the management of orthodontic emergencies and their psychosocial well-being during the novel coronavirus pandemic through Teledentistry.

**Materials and Methods:** A questionnaire-based study was conducted on two groups during the lockdown period in which their anxiety, psychological status, and their ability to manage orthodontic emergencies at home during the COVID-19 pandemic lockdown were assessed through teledentistry.

**Results:** A total of 170 patients participated in our study, Independent sample t-test was used to compare the means of the group's control and experimental. Statistically, a significant difference was determined between the two groups regarding their psychosocial well-being (social media embarrassment  $p=0.049$ , awareness of how to manage orthodontic emergencies  $p=0.00$ ). The participants displayed a better understanding of how to deal with orthodontic emergencies at home after having instructions. 48.2% of the patients selected voice call as a preferred mode of instruction for managing orthodontic emergencies at home.

**Conclusion:** Experimental group of patients was more aware of how to manage orthodontic emergencies and they were less anxious. Teledentistry has proven to be an important tool for providing instructions to anxious patients as well as reducing the spread of coronavirus due to lack of contact. Voice call was the preferred mode of instruction.

**Keywords:** Anxiety, COVID-19, Orthodontic emergencies, Tele-dentistry.

## Introduction

At the end of 2019, the emergence of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2 earlier named the 2019-novel coronavirus or 2019-nCoV) infection that originated in Wuhan, China had spread very rapidly, not only in China but many other countries around the world and had proven to be deadly with a mortality rate of 3.4%.<sup>1</sup> This Novel Coronavirus was declared a pandemic on March 11, 2020, by the World Health Organization and issued necessary guidelines which should be followed around the globe to stop its spread.<sup>2</sup> Coronavirus shows different levels of signs and symptoms among different age groups and varies from person to person.<sup>3</sup> Symptoms usually appear after an incubation period of 2-14 days but many individuals are positive without symptoms and are carriers of the virus which can cause its spread.<sup>4</sup> To control the spread of coronavirus lockdown was declared in Pakistan like the rest of the world.<sup>5</sup> All OPDS in hospitals were shut down. Healthcare facilities were performing selective emergency procedures only. In such a situation, most dental and orthodontics procedures were considered essential non-urgent, so they were not being performed. Orthodontic procedures are elective and can be monitored remotely through video calls and messages with a photo.<sup>6</sup>

In times like these, when people are quarantined at their homes, Teledentistry played a major role in managing orthodontic emergencies. Teledentistry is the combination of telecommunication and dentistry to provide health care at a distance.<sup>7</sup> Its roots lie in telemedicine. Telemedicine has been practiced since the late 1950s.<sup>8</sup> The term teledentistry was first used by Cook in 1997 who defined it as "The practice of using video conferencing technologies to diagnose and provide advice about treatment over a distance".<sup>9</sup> In teledentistry, *Whatsapp* is one of the most important and widely used communication tools.<sup>10</sup> It is a prominent app with more than 500 million monthly active users worldwide. Orthodontic emergencies occur occasionally and they may be a little problematic for the patients but these emergencies can be managed at home by patients themselves with proper guidance.<sup>11</sup>

Due to the sudden announcement of lockdown by the Government and restricting all Dental procedures to emergency care only, many Orthodontic patients undergoing their regular appointments could not be counselled by the concerned Orthodontists about their unanticipated missed appointments and basic

instructions on how to manage orthodontic emergencies like bracket breakage, protruding wire and irritation to the lips and cheeks they could encounter due to their braces at home before the regular appointment schedule could be resumed. Hence the study aimed to assess the awareness of orthodontic patients regarding the management of orthodontic emergencies and their psychosocial well-being during the novel coronavirus pandemic through Tele-dentistry.

## Materials and Methods

It was a questionnaire-based cross-sectional comparative study with two groups; Group A The control group and Group B The experimental group in which their anxiety, psychological status, and their awareness to manage orthodontic emergencies at home during the COVID-19 pandemic lockdown were assessed through teledentistry. Simple Randomization was done. Ethical approval was taken from the ethical research committee of the Institutional Review Committee of Islamic International Dental College, Riphah International University before conducting the study. Ref.No. IIDC/IRC/2021/001/008. A total of 170 consecutive patients undergoing treatment at the Orthodontic Department were enrolled in the study fulfilling the inclusion criteria. Verbal informed consent was taken through phone calls because of the complete lockdown.

Inclusion Criteria:

1. Both male and female patients undergoing fixed orthodontic treatment of ages 18 and above.
2. Patients possessing personal mobile phones with access to *Whatsapp* (ver ©2020 *Whatsapp Inc. CA, USA*).
3. Patients that consented to be part of the study.

Exclusion Criteria:

1. Patients with Dental/Medical backgrounds.
2. Patients that were mentally handicapped.
3. Patients undergoing removable appliance orthodontic treatment.

170 patients that were undergoing fixed orthodontic treatment consented to be a part of this study. They were divided into two groups randomly, each comprising of 85 participants.

Before collecting the data from the participants, two investigators were trained by a Consultant Orthodontist to ensure a standardized response would be collected from the subjects. Participants of both

groups were called on their given phone numbers via *WhatsApp* by the Research Investigators.

All patients were informed about the cancellation of their appointments by the Orthodontic Department during the Covid-19 pandemic. Participants of groups, A and B were called by the research investigators, to ask about their Last routine visit to the orthodontic appointment. The participants were further told about the current Pandemic situation of the Sars-Cov-2 Virus and the lockdown protocols that the concerned authorities had enforced which led to routine dental procedures being delayed and ultimately resulting in patients not being able to attend their regular appointments. Patients were also given standard oral hygiene instructions to follow till their next appointment.

Group A participants were asked to fill out the questionnaire before they were provided with any instructions. They were asked to answer the questions from the questionnaire to assess their levels of anxiety and understanding and whether they had any previous knowledge in handling Orthodontic emergencies that could arise due to missed appointments. Since they were not given any information, questions from Section three were not asked of them. After recording their response, this group was given the same set of instructions given to the experimental group which was in three different forms, via Video, Audio, and a written Document.

Participants belonging to Group B were given a set of instructions through three different mediums via Video (A three minute YouTube video, [https://www.youtube.com/watch?time\\_continue=00&v=J\\_Pmw4Cz6P8&feature=emb\\_logo](https://www.youtube.com/watch?time_continue=00&v=J_Pmw4Cz6P8&feature=emb_logo)) Audio, and a written document (<https://www.aainfo.org/blog/handling-orthodontic-issues-at-home/>). All three aimed to explain the management of common orthodontic emergencies that the patient could handle at home. A follow-up call was arranged after 24 hours as per the availability of the subject to assess the effect of the provided information on the anxiety level of the patients, and their quality of life and to evaluate their preferred mode of instruction. The responses were recorded on the questionnaire.

The questionnaire used in this study was self-designed and adapted by combining L. Favero et al<sup>12</sup> and OHIP-14<sup>13</sup> to assess the anxiety levels of the participants and their understanding of how to manage orthodontic emergencies at home during the COVID-19 lockdown. The questionnaire was divided into three sections. Section one comprised of participants' demographic

details and their treatment time. Section two was related to assessing their psychosocial well-being and anxiety levels; it had questions that evaluated if the participants felt tense because of issues identified with their teeth or braces and their irritability. Section 3 inquired about their understanding of managing Orthodontic emergencies in situations where they could not attend their appointments. It also asked about their preferred mode of instruction given to them through Video/ Voice Call/ Written document. The responses were recorded on a five-point Likert scale with 1. Being strongly disagree 2. Disagree 3. Uncertain 4. Agree 5. Strongly agree.

Data collected from both groups were entered into the *Statistical Package for Social Sciences SPSS®* software for Windows® ver.23.

## Results

The data were analysed in IBM SPSS version 20. The descriptive statistics are summarized in Table 1-2. An Independent sample t-test was used to compare the means of the group's control and experimental. Statistically, a significant difference was determined between the two groups in the variables tested, except for patients who faced irritation and those who felt tense because of problems due to braces (p 0.42 and 0.92 respectively) when the p-value was taken to be equal or less than 0.05.

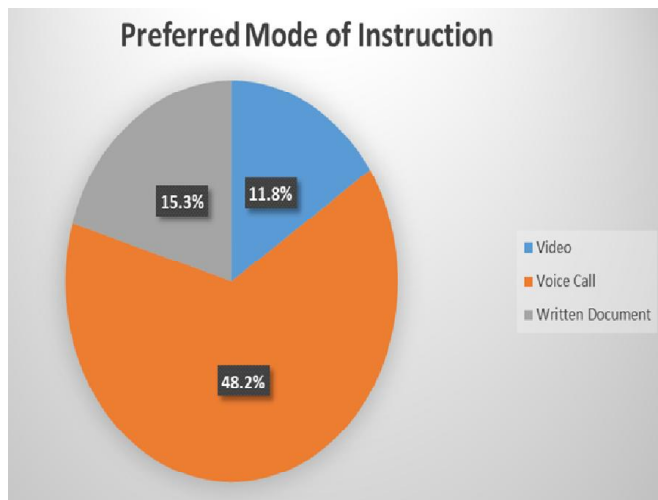
When asked about understanding and preferred mode of instruction given to the Experimental Group (N = 85); 41 (48.2%) selected Voice Call as their preferred mode of instruction, 13 (15.3%) preferred Written Document and lastly, 10 (11.8%) voted for Video. (Figure I)

**Table 1: Age groups and treatment time and gender distribution of the participants**

Age group in Years	Frequency	Percent (%)
18-22	121	71.2
23-27	33	19.4
28-32	11	6.5
33-37	4	2.4
38 and above	1	0.6
<b>Your Orthodontic Treatment has been going on since:</b>		
0-6 months	54	31.8
7-12 months	59	34.7
13-18 months	37	21.8
19-24 months	20	11.8
<b>Gender</b>		
Male	59	35
Female	111	65

**Table 2:** Means of the responses of participants

		Age group in Years	
		Mean	P – Value
Q 1	<b>Control Group:</b> I feel more relaxed and comfortable knowing that, if I need to, I can contact the orthodontic office. <b>Experimental Group:</b> I feel more relaxed and comfortable knowing that, if I need to, I can contact the orthodontic office.	3.18+1.2	0.01
Q 2	<b>Control Group:</b> I have felt tense because of problems with my Teeth/braces. <b>Experimental Group:</b> I have felt tense because of problems with my Teeth/braces.	2.99+1.2 2.89+1.2	0.93
Q 3	<b>Control Group:</b> I have been a bit irritable due to problems with my braces <b>Experimental Group:</b> I have been a bit irritable due to problems with my braces.	3.02+1.2 2.80+1.2	0.420
Q 4	<b>Control Group:</b> I have been totally unable to function because of problems with my braces/teeth. <b>Experimental Group:</b> I have been totally unable to function because of problems with my braces/teeth.	2.74+1.1 2.42+1	0.002
Q 5	<b>Control Group:</b> I was already aware of how to manage Orthodontic Emergencies <b>Experimental Group:</b> I was already aware of how to manage Orthodontic Emergencies.	2.08+0.8 2.64+1.1	0.00
Q 6	<b>Control Group:</b> I have been embarrassed in my social media communications due to braces. <b>Experimental Group:</b> I have been embarrassed in my social media communications due to braces.	2.09+1 2.27+1.0	0.049



**Figure 1:** Preferred mode of instruction by the experimental group participants

## Discussion

Our study revealed that the majority (73.2%) of the participants were between the ages of 18-23, The reason for this trend might be because it is seen that most adolescents seek orthodontic treatment mainly for aesthetic reasons as they are more conscious

regarding their appearance.<sup>14</sup> Since our sample was mostly among the age group of 18-23 years, a higher percentage of anxiety (71.2%) was reported which is similar to a study published by Humphris et al.<sup>15</sup> In our study, more than half of the sample (65.2%) was comprised of females, and it is generally seen that females are more concerned about the aesthetics of their teeth than males, which leads them to go for Orthodontic treatment.<sup>16</sup> Similar trend was seen in a study published in Korea that women (368 out of 598 participants) had more interest in orthodontic treatment as compared to men (38.5%).<sup>17</sup> According to our results, 65.3% of females were found to be more anxious than male (34.7%) patients during this pandemic. These findings are similar to a nationwide study of psychological distress among Chinese individuals during the COVID-19 pandemic, where female respondents demonstrated altogether higher anxiety than their male partners. (mean (SD)=24.87 (15.03) vs. 21.41 (15.97), p<0.001).<sup>18</sup> During the COVID-19 pandemic, people were unable to meet their family and friends due to physical distancing measures, so most people resorted to social media to connect with other people. According to our study orthodontic patients also felt embarrassment in their social media communication due to braces. An

increase in usage of social media has been seen in the past few years above the age group of 18. A survey conducted in the United States on February 2019, concluded that 90% of the people who use social media fall in the age group of 18-29.<sup>19</sup> Our study concluded that the majority of the participants were embarrassed by social media communications due to their braces were between the ages 18 to 22 years and most of them were females. The use of social media to interact with family and friends increased, which led to both positive and negative psychological outcomes. According to the literature presented, females are more active on social media as compared to males.<sup>20</sup> These results are in accordance with our study whereas, the results of a study conducted on the students of the university of Sharjah showed contradiction to our results concluding that males (49.6%) were more addicted to social media as compared to females (32%).<sup>21</sup> This difference could be explained by considering the impact of cultural norms in Sharjah, where females mostly are reluctant in disclosing personal information. Moreover, males are mostly active on social media to create potential friends and socialize with people having common interests.

In our study, the group which received instructions showed lower levels of anxiety as compared to the one which did not receive instructions. A similar course was seen in a study conducted during lockdown where orthodontic patients had a lower level of anxiety when they were given instructions through video call.<sup>22</sup>

Regarding the instructions provided through voice call, video, and a written document, 51.3% of the participants preferred the instructions through voice call. There has been seen a study where doctors establish adequate communication with the patients, and their anxiety levels have decreased significantly.<sup>23</sup> The reason for the preference for a voice call maybe because it gives a sense of reassurance while interacting with the research investigator and makes the patients feel more relaxed and comfortable during the time of lockdown. They were able to interact with the investigator and their apprehensions were answered which lowered their anxiety levels. Sivrikaya et al. found a similar trend that there was a statistically significant difference between the fear and anxiety of the patients who were counseled.<sup>24</sup>

Similarly, it was observed that 48.15% of participants preferred Video as compared to Written Documents. This has also been seen in a study done on Home Exercise programs where 69% of the participants

preferred Visual aid.<sup>25</sup> It has been shown that visual information is more easily retained and is simpler to learn as compared to verbal instructions which support our findings as well.<sup>26</sup> Since managing Orthodontic emergencies is a physical task, it is easier to copy what is shown through a video as opposed to reading instructions off a written document and then acting upon them. A demonstration can be better understood through a video and not in writing. A live educational lecture may end at a specific time and we can't repeat it. However, a video can be delayed and replayed whenever indicated by the comfort of the viewer.<sup>27</sup>

Strengths: Our study had a few strengths, first of all, the data was collected prospectively, secondly, we had a control group, thirdly, no previous study was conducted in the management of orthodontic emergencies with the help of Tele-dentistry. Limitations: There were however a few limitations of our study, the large sample size was required, data should have been randomized and we major problem we faced was the lack of response from the patients.

## Conclusion

Experimental group patients were more aware of how to manage orthodontic emergencies and they were less anxious. Teledentistry has proven to be an important tool for providing instructions to anxious patients as well as reducing the spread of coronavirus due to lack of contact. Voice call was the preferred mode of instruction.

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