

## Orthodontic Treatment During Covid-19 Pandemic – A Cross Sectional Study On Patients' Perspective And Attitude

Research Article

Sunil Kumar M<sup>1</sup>, Ashok Kumar<sup>2\*</sup>, Padmanathan R<sup>3</sup>

<sup>1</sup> Professor, Department of Orthodontics and Dentofacial Orthopedics, Faculty of Dental Sciences, Ramaiah University of Applied Sciences, Bangalore-54, India.

<sup>2</sup> Post Graduate, Department of Orthodontics and Dentofacial Orthopedics, Faculty of Dental Sciences, Ramaiah University of Applied Sciences, Bangalore-54 India.

<sup>3</sup> Post Graduate, Department of Orthodontics and Dentofacial Orthopedics, Faculty of Dental Sciences, Ramaiah University of Applied Sciences, Bangalore-54, India.

### Abstract

**Background:** During this pandemic outbreak the protocols followed in all countries became a barrier to the existing dental practice. According to literature, this pandemic had a severe negative impact on orthodontic care provided to patients. There is less literature on the patient perspectives, who are undergoing orthodontic treatment. In India, the first wave of this pandemic outbreak which came to an end by the end of 2020, after which the second wave started in early 2021, and is ongoing. Orthodontists cannot delay the treatment for ongoing cases for a long time. This cross sectional survey among patients undergoing orthodontic treatment aims at assessing their knowledge about the ongoing pandemic, attitude on orthodontic treatment during these difficult times and the precautions needed to be followed in an orthodontic practice.

**Materials And Methods:** The study was conducted as a cross-sectional survey among patients undergoing orthodontic treatment in the dental hospital. The questionnaire was framed with reference from a study conducted by Umeh OD et al. The questionnaire was pilot tested and was distributed as a self-assessed e-questionnaire to the patients via social media platforms. Total of 215 responses obtained from the patients were compiled, processed further, and analyzed by entering the obtained data in Microsoft Excel 2007 version and graphs were made to represent them. Further statistical analysis was done. Table-1 demonstrated the demographic data of the study participants.

**Results:** The knowledge levels on the Covid-19 disease were adequate and there was a significant impact on the treatment which the participants were undergoing. When comparing these with the level of education, it was found to be insignificant.

**Conclusion:** Even if most of the patients were having issues on the undergoing treatment, they had a positive attitude in continuing the treatment during/after the pandemic. Various awareness programs in all available platforms both for the orthodontist and patients should be conducted to vigorously address this concern.

### Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered virus. On 31 December 2019, WHO was informed of cases of pneumonia of unknown cause in Wuhan City, China. A novel coronavirus was identified as the cause and was temporarily named "2019-nCoV" after which it was declared as a pandemic.[1-3]

The patients who suffered from this COVID 19 showed typical symptoms such as fever, cough, fatigue with abnormal chest CT.

Sputum production, head ache, hemoptysis and diarrhea [4-6] was also observed in some cases. The COVID-19 infectious agent is affecting older male patients with CRITICAL respiratory diseases [7, 8] requiring special attention to older males. This coronavirus (COVID-19) clinical symptoms were different from SARS corona virus seen in 2002-2003. This human-to-human transmission of virus has developed this Coronavirus (COVID-19) outbreak [8, 9]. The new virus genome was sequenced after quick isolation in Chinese Wuhan's laboratories [10]. This infectious agent was finally identified as a novel corona virus (2019-nCoV). This is the seventh member of family of corona virus which infects hu-

#### \*Corresponding Author:

Dr. Ashok Kumar M D,  
Post Graduate, Department of Orthodontics and Dentofacial Orthopedics, Faculty of Dental Sciences, Ramaiah University of Applied Sciences, Bangalore-54 India.  
Tel: 9943168569  
E-mail: ashokmd5597@gmail.com

**Received:** September 21, 2021

**Accepted:** October 28, 2021

**Published:** October 29, 2021

**Citation:** Sunil Kumar M, Ashok Kumar, Padmanathan R. Orthodontic Treatment During Covid-19 Pandemic – A Cross Sectional Study On Patients' Perspective And Attitude. *Int J Dentistry Oral Sci.* 2021;8(10):4857-4863. doi: <http://dx.doi.org/10.19070/2377-8075-21000982>

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mans [11]. The international Committee on Taxonomy of Viruses (ICTV) suggested the name “SARSCOV-2” for the new coronavirus due to the polygenetic and taxonomic analysis [12]. This novel viral pneumonia was finally named as “Corona Virus Disease (COVID 19)” by WHO on 11th February 2020.

During this pandemic outbreak the protocols followed in all countries became a barrier to the existing dental practice. According to literature, this pandemic had a severe negative impact on orthodontic care provided to patients. There is less literature on the patient perspectives, who are undergoing orthodontic treatment. In India, the first wave of this pandemic outbreak which came to an end by the end of 2020, after which the second wave started in early 2021, and is ongoing. Orthodontists cannot delay the treatment for ongoing cases for a long time.

This cross sectional survey among patients undergoing orthodontic treatment aims at assessing their knowledge about the ongoing pandemic, attitude on orthodontic treatment during these difficult times and the precautions needed to be followed in an orthodontic practice.

### Management Of Orthodontic Emergency Protocol

Professionals assess whether to stay open or to manage emergencies. One can postpone the appointments based on single Nation’s guidelines. Regarding any discomfort or problems relating to appliances should be strictly followed by the patients. Repeated breakages would prolong the treatment time and would end up in loss of confidence in appliance or operator. It would also decrease the patients’ motivation. Inconvenience, distress to patient and parent can be minimized by maintaining the efficiency of appliances, providing timely management. During COVID-19 pandemic guidelines issued by the Government should be strictly followed. The dentists should see such cases which cannot be postponed, such as an abscess or irreversible pulpitis. The urgent cases other than general dentistry problems should be evaluated

by Orthodontists based on video call or message with photo.

Virtual assistance: WhatsApp Messenger (Facebook Inc, Mountain view, California), are instant messaging applications developed from 2009. They quickly spread among users of all ages. They are used for personnel relationships, for entertainment, for study and also as virtual place of contact in group. Orthodontic emergencies should be attended step by step using new technology. Virtual assistance and WhatsApp could be used in first step as good tool. Photos, video calls, WhatsApp messages/calls are used as virtual assistance. Ways of management of different emergencies is explained in the table 2 below. [13, 14]

### Materials And Methods

The study was conducted as a cross-sectional survey among patients undergoing orthodontic treatment in the dental hospital of Faculty of Dental Sciences, Ramaiah University of Applied Sciences, Bangalore, India. The questionnaire was framed with reference from a study conducted by Umeh OD et al [3]. The questionnaire was pilot tested among orthodontic residents and post graduates in the same University for its feasibility and validity and was improvised based on their suggestions.

After testing, it was distributed as a self-assessed e-questionnaire to the patients via social media platforms. The consent of the participants was taken as a separate section in the questionnaire form itself. Demographic data about the age, sex and level of education was recorded under a separate section (Table-1). Patients under the age of 15 were advised to seek parental guidance to answer the questions. The questions were grouped and categorized under three different sections. Total of 215 responses obtained from the patients were compiled, processed further, and analyzed by entering the obtained data in Microsoft Excel 2007 version and graphs were made to represent them. Various studies were referred to gain more knowledge to improvise the study. Further statistical analysis was done. Table-1 demonstrated the demographic data of the study participants.

**Table 1 - DEMOGRAPHIC DATA (Total no. of participants = 215).**

Consent to take part in the study	Yes	No, not responded	No, responded		
n	201	0	14		
%	93.50%	0	6.50%		
Age	Less than 18 years	18-25 years	26 years and above		
n	54	118	43		
%	25.10%	54.90%	20%		
Sex	Male	Female	Others		
n	94	121	0		
%	43.70%	56.30%	0		
Level of education	Primary schooling	Secondary schooling	Under graduation	Post-graduation	
n	3	48	122	42	
%	1.40%	22.30%	56.70%	19.60%	
No. of months in treatment	1-12 months	13-24 months	25-36 months	37-48 months	More than 48 months
n	82	55	40	17	21
%	38.10%	25.60%	18.60%	7.90%	9.80%

### Statistical analysis

The minimum sample size of 215 was arrived by using the method of estimation of sample size for population proportion with reference to Umeh OD et al. with confidence value set at 0.95. SPSS (Statistical Package for Social Sciences) version 20. (IBM SPASS statistics [IBM corp. released 2011] will be used to perform the inferential statistical analysis with the level of significance set at 5%. Chi square test was conducted to compare the knowledge about the vaccines developed for Covid 19 among various education levels of the study participants (p=0.77) and also with the willingness of the participants to continue the orthodontic treatment during/after the pandemic (p=0.86). Tables and illustrations were made using Microsoft Excel 2007 version to demonstrate the Chi Square values.

### Result

Table 2 demonstrates the knowledge of the participants on Covid-19 disease. Figure 1,2 describes the responses of the participants on symptoms and transmission of the Covid-19 disease.

Table 3 demonstrates the responses received on the impact of the pandemic on orthodontic treatment. Figure 3 describes the effect of this pandemic on the undergoing orthodontic treatment faced by the participants.

Table 4 demonstrates the risk perception and attitude of the participants towards Covid-19 disease as an orthodontic patient. Figure 4,5 throws light on the patients' attitude on prevention of exposure in an orthodontic clinic. Figure 6 explains the patients' attitude on an unexpected exposure to a known or suspected Covid-19 patient.

Table 5 and Figure 7,8 demonstrates the Chi Square Test, to compare the knowledge levels on vaccines developed for Covid-19 disease and attitude of the patients on continuing orthodontic treatment during/after the pandemic to the level of education and was insignificant.

### Discussion

The Covid-19 pandemic has a significant impact on orthodontic treatment. Almost all orthodontic patients have to stop attending the appointment at some point during the lockdown period, putting them in a difficult situation and fear that their treatment will be delayed. Most of the problems reported by patients receiving treatment in public clinics and patients with fixed appliances. It was concluded that there is a need to pay more attention to tele-orthodontics, especially during this period and in the foreseeable future; in addition, if possible, orthodontists should prepare their patients to treat problems related to their appliances.[1]

Most participants believe that dental office is the place with the highest risk of spreading Covid-19, even if they will continue to see the dentist. Due to Covid-19, gender, age, and pain level are associated with increased fear of attending a dental clinic. Due to the pandemic, 16% of the patients receiving orthodontic treatment will not return to the dental clinic, while the rest will continue orthodontic treatment after closure. Compared with the patients who used removable appliances, the patients who used fixed appliances felt more discomfort because they did not attend their regular orthodontic appointments during the lockdown period.[2]

We should make sure that before going to dental setups, people should have all the related information about nCoV-19. Also,

**Table 2. Knowledge On Covid-19.**

How would you rate your knowledge level on COVID-19?					
Scale	1	2	3	4	5
Frequency (%)	3 (1.4%)	2 (0.9%)	70 (32.6%)	90 (41.9%)	50 (23.3%)
What is the average incubation period of COVID-19?					
Options	1-3 days	1-7 days	1-10 days	1-14 days	Don't know
Frequency (%)	13 (6%)	30 (14%)	18 (8.4%)	138 (64.2%)	16 (7.4%)
How would you rate your knowledge level on vaccines which are developed to fight the pandemic?					
Scale	1	2	3	4	5
Frequency (%)	2 (0.9%)	13 (6%)	75 (34.9%)	84 (39.1%)	41 (19.1%)
Have you got your vaccination against Covid-19?					
Yes			No		
74			141		
If NO, what was the reason? (141 respondents who were not vaccinated)					
Options	Demand in vaccine availability	Fear on side effects	Not interested in getting vaccination	Others	
Frequency (%)	60 (42.65)	13 (9.2%)	4 (2.8%)	64 (45.4%)	
Are you aware of risks or complications after recovering from Covid-19 virus infection like Black Fungus (Mucormycosis)					
Yes			No		
179 (83.3%)			36 (16.7%)		

Figure 1. Knowledge on Covid-19 symptoms.

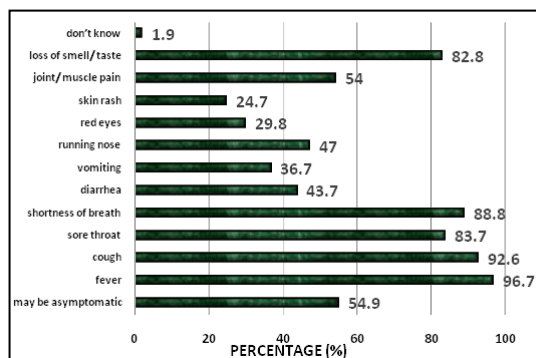


Figure 2. Knowledge on Covid-19 transmission.

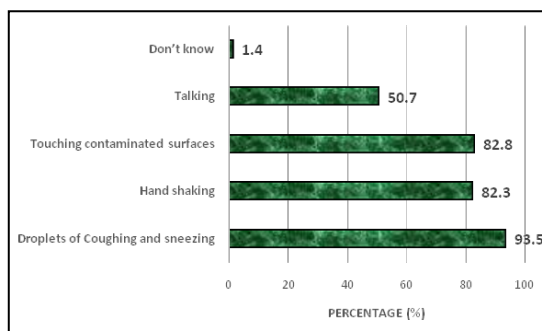
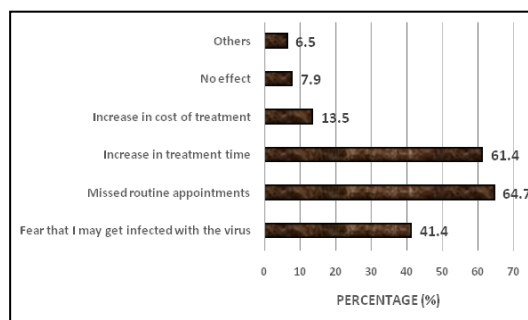


Table 3. Impact Of The Covid-19 Pandemic On Orthodontic Treatment.

Have you been to the orthodontist since the outbreak of the COVID-19 pandemic outbreak?					
OPTIONS	YES			NO	
FREQUENCY	154			61	
PERCENTAGE (%)	71.60%			28.40%	
If yes, what treatment did you receive? (162 responses)					
OPTIONS	Adjustment of a removable appliance	Routine fixed appliance review appointment	Arch wire adjustment	Loose brackets or band replacement	Others
FREQUENCY	16	54	33	38	21
PERCENTAGE (%)	9.9	33.3	20.4	23.5	13%
Are you worried about receiving Orthodontic treatment during this pandemic?					
OPTIONS	YES	NO	MAY BE		
FREQUENCY	63	84	68		
PERCENTAGE (%)	29.30%	39.10%	31.60%		

Figure 3. Effects of Covid-19 pandemic on patients' treatment.



they should be aware of the cause, signs and symptoms, and safety measures of nCoV-19 infection. The necessary seminars and workshops should be arranged for the awareness of general public regarding transmission of nCoV-19 and their respective preventive measures. People should be asked to avoid unneces-

sary visits to crowded areas and the medical health care and dental setups. If only the visit is absolutely necessary, then use of masks should be a must.

The procedures that include for an Orthodontist include use of

Table 4. Risk Perception And Attitude Towards Covid-19 As An Orthodontic Patient.

COVID-19 AS AN ORTHODONTIC PATIENT					
What is your perception concerning the vulnerability of orthodontic patients to COVID-19 infection?					
OPTIONS	Orthodontic patients are not vulnerable	Orthodontic patients are slightly vulnerable	Orthodontic patients are moderately vulnerable	Orthodontic patients are severely vulnerable	I don't know
FREQUENCY (%)	27 (12.6%)	28 (13%)	53 (24.7%)	9 (4.2%)	98 (45.6%)
Will you be willing to continue your orthodontic treatment DURING/AFTER the period of the COVID-19 pandemic?					
OPTIONS	Yes	No	Maybe		
FREQUENCY (%)	200 (93%)	1 (0.5%)	14 (6.5%)		
How do you consider the patients' role in spreading information and increasing awareness concerning COVID-19?					
SCALE	1	2	3	4	5
FREQUENCY (%)	1 (0.5%)	4 (1.9%)	24 (11.2%)	70 (32.6%)	116 (54%)

Figure 4. How Can Covid-19 Transmission Be Prevented In The Orthodontic Clinic By The Orthodontist?

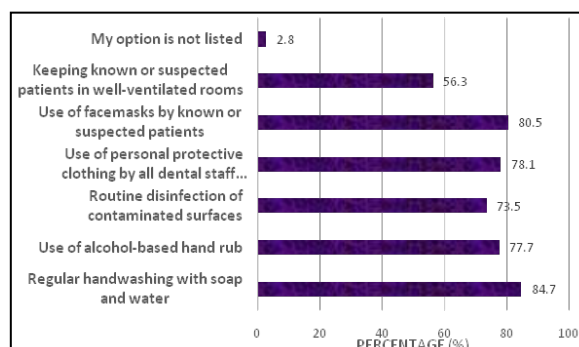


Figure 5. Measures To Prevent The Spread Of The Coronavirus In The Dental Clinic.

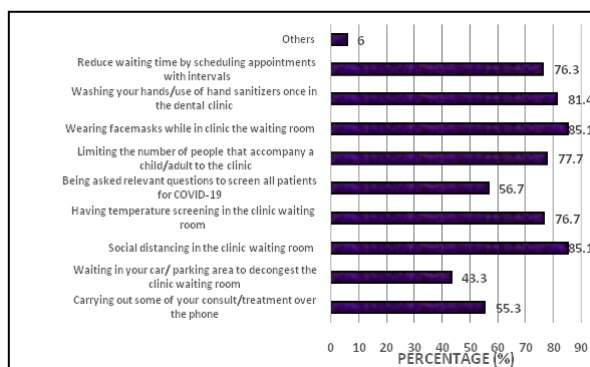


Figure 6. What Will You Do If You Have Unprotected Exposure To A Patient With Known Or Suspected Covid-19?

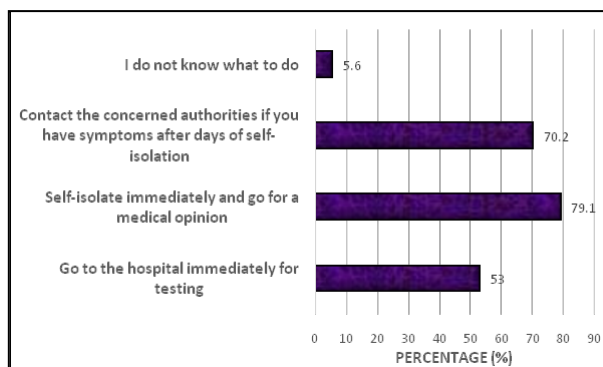


Table 5. Chi Square Test.

Table -5			How would you rate your knowledge level on vaccines which are developed to fight the pandemic?					Total	Chi-square value	p value
CHI SQUARE TEST			1	2	3	4	5			
Level of education:	Post-graduation	Count	0	1	13	20	8	42	8.09	0.77
		%	0.00%	0.50%	6.00%	9.30%	3.70%	19.50%		
	Primary schooling	Count	0	1	1	1	0	3		
		%	0.00%	0.50%	0.50%	0.50%	0.00%	1.40%		
	Secondary schooling	Count	0	3	17	18	10	48		
		%	0.00%	1.40%	7.90%	8.40%	4.70%	22.30%		
	Under graduation	Count	2	8	44	45	23	122		
		%	0.90%	3.70%	20.50%	20.90%	10.70%	56.70%		
Will you be willing to continue your orthodontic treatment during/after the period of the COVID-19 pandemic?	Maybe	Count	0	1	7	3	3	14	3.89	0.86
		%	0.00%	0.50%	3.30%	1.40%	1.40%	6.50%		
	No	Count	0	0	0	1	0	1		
		%	0.00%	0.00%	0.00%	0.50%	0.00%	0.50%		
	Yes	Count	2	12	68	80	38	200		
		%	0.90%	5.60%	31.60%	37.20%	17.70%	93.00%		
Total	Count	2	13	75	84	41	215			
	%	0.90%	6.00%	34.90%	39.10%	19.10%	100.00%			

Figure 7. Distribution Of Knowledge Scores And Level Of Education.

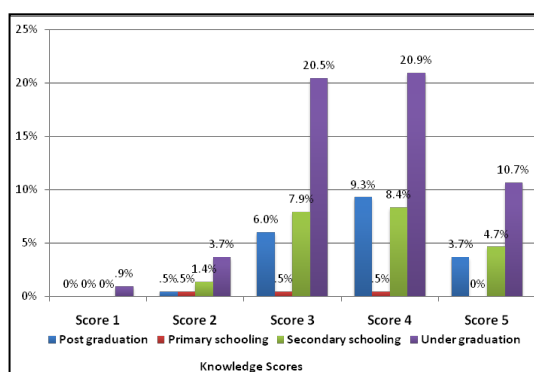
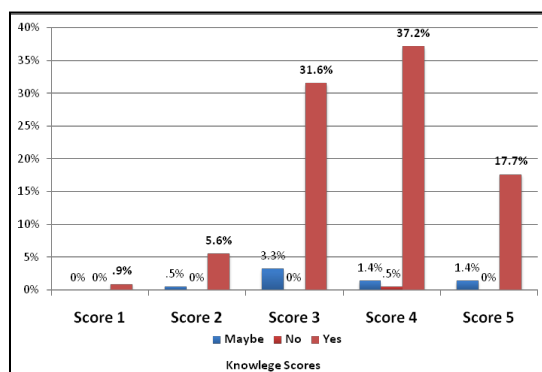


Figure 8. Distribution Of Knowledge Scores And Attitude.



high speed air turbine or slow speed rotary drill, 3 in 1 air/water syringe, and enamel preparation using ultrasonic or air abrasion devices. And these procedures could lead to direct impact on adhesive removal from enamel, and the use of air/water sprays and rotary handpieces for moisture control and cleaning. Also, with the use of High Volume Suction (HVE) and/or rubber dam to limit aerosol and the bio impact, these procedures are still considered AGP and appropriate PPE should be worn, along with appropriate decontamination protocols in the surgery. High and low volume suction themselves are NOT considered AGP.

In our study, the knowledge levels on the Covid-19 disease were adequate and there was a significant impact on the treatment which the participants were undergoing. When comparing these

with the level of education, it was found to be insignificant. The limitations of the study were that we did not include the socio-economic considerations and the sampling was randomized. This gives a need for more studies to be conducted for assessing the patients' social, psychological difficulties in taking up an orthodontic treatment during these times.

### Conclusion

To conclude, awareness among the patients seems to be adequate. Even if most of the patients were having issues on the undergoing treatment, they had a positive attitude in continuing the treatment during/after the pandemic. The orthodontist should be prepared to continue the practice as per the guidelines issued by their na-

tion. Various awareness programs in all available platforms both for the orthodontist and patients should be conducted to vigorously address this concern. Innovation and learning everyday can pave way for a healthy future and can establish a preparedness if any situations like these occur.

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