

# Orthodontic Emergencies and Their Management during COVID-19 Using Artificial Assistance- A Randomized Controlled Study

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## ABSTRACT

**Aim:** The main aim of the study was to provide any emergency treatment to the orthodontic patients during the period of lockdown due to the spread of corona virus pandemic.

**Material and Methodology:** A self made Performa was made and sent to 200 orthodontic patients via an electronic media. The results were tabulated and descriptive analysis was presented using frequencies and percentage. Every patient was called after filling the form and a complete examination of the patient was done using a video call and using different photographs. A detailed solution was given to them via phone to prevent any cross-contamination during this period.

**Results:** All the related questions and video calling examination was done which revealed different percentages of problems faced by the subjects.

**Conclusion:** Any emergency relating to dental problems can be evaluated using a social networking site (WhatsApp) and a profound treatment can be given thus making these sites as a best mode of contacting patients and evaluating their issues.

**Keywords:** Appliances, COVID-19, Pandemic, Treatments

## INTRODUCTION

COVID-19 coronavirus has risen today as a pandemic infection. It has affected practically whole human race on the planet. After the first instance of this illness analyzed in Wuhan (China), it is

developing at a faster rate.<sup>1</sup> During this time of public health emergency, it is the obligation of the dental specialist to analyze and treat crises which emerges because of any dental ailments. In the dental field, to control COVID-19 disease, the crucial preventive measure lies in the channel of patients who come to the ambulatory.<sup>2</sup> Consequently, a survey ought to be utilized to screen patients with expected disease of 2019-nCoV before they could be directed to the dental seat, as recommended.

Another basic angle is the right utilization of personal protection equipment (PPE) and the strict consistence with the behavioral guidelines at the dental office built up by WHO and the competent authorities.<sup>3</sup> The professionals can assess whether to remain open or manage emergencies only. One decision that can be made is to delay schedule orthodontic treatment, as indicated by the rules of the single Nations, however patients should be guaranteed and followed, particularly on the accounts if the patients are encountering discomfort or any issues related to orthodontic appliance which they are using.

An orthodontic emergency may be depicted as an issue emerging from an orthodontic apparatus, where an unscheduled appointment is required to resolve the issue. At the point when a patient has such an issue, an untimely additional appointment should be organized with an expert. Patients who present with

orthodontic emergencies might be encountering agony or discomfort. It can likewise be inconvenient for the patient and guardians in attending sudden, extra appointment. Therefore, repeated breakages prolong treatment time and can prompt diminished patient inspiration because of lost certainty in the appliance or the dentist. By giving suitable convenient managements, inconvenience and pain to the patient might be limited with the adequacy of the appliance still being maintained<sup>4</sup>.

As indicated by Nations rules during COVID- 19 pandemic, dental specialists ought to acknowledge in the private practice only non-deferrable urgencies, for example, an abscess or irreversible pulpitis. Orthodontic issues are similar to general dentistry problems; they represent urgencies, but not true emergencies, so a video call (WhatsApp, Facebook, Instagram and many more social networking sites) or message with a photograph may be the best choices to assess the case.

## **MATERIAL AND METHODOLOY**

A self made questionnaire was prepared on the basis of H. Popat<sup>5</sup> orthodontic emergency scenario survey done in the year 2016. The respondents indicated their opinions on 3 point likert scale when dealing with the situations. The poll was prepared electronically via <http://surveyheart.com/form> and send through mails, and social media to the 200 patients undergoing orthodontic treatment. The questionnaire was set up in English for the ease of understanding and quick response. The online survey was conducted for the ease of data collection and transfer into the software for statistical evaluation. Being an online survey, no ethical approval was required. The study undertook in the months of May and June in which the questionnaire was distributed among the orthodontic patients and their problems were evaluated accordingly.

Taking into account on the number of orthodontic patients available, the sample

size was evaluated to be around 200 using the formula:  $Z^2pq/e^2$ . In which  $Z=1.9$  for 95% confidence interval,  $p$ =proportion of population in decimal as 0.15, and  $e$  margin of error at 5% as 0.05. The sample size was estimated to be around 195.922 (195). In order to increase the validity of the study the sample size was taken to be around 200 (n). The response collected were transferred to Microsoft excel sheet and statistical analysis were evaluated using frequencies and percentages.

## **ARTIFICIAL ASSISTANCE:**

The main purpose of the study was to resolve the problems of orthodontic patients at home during this pandemic period. A questionnaire was made according to the problems faced by the orthodontic patients including their demographic as well frequency of brushing. After evaluation of the form every patient was consulted telephonically and the availability of the medium used.

India being a developing country includes most of its population among middle class<sup>6</sup> using WhatsApp as the connecting social networking sites. Clement published data about the world's most popular mobile messenger application based on the number of monthly active users on Statista(<https://www.statista.com/statistics/258749/most-popular-global-mobile-messenger-apps/>), a German web portal for statistics. The most popular messenger app turns out to be WhatsApp, with 1.6 billion users on a monthly basis.

WhatsApp is the biggest social networking application and generally usable indeed, even by unpracticed crowds. The most ideal approach to oversee orthodontic emergencies is to decide step by step. The initial step ought to consistently be artificial-help (virtual-help) which may be performed by utilizing photographs, recordings, or video calls.

## **PERFORMA:**

NAME:

AGE:

PHONE NUMBER:

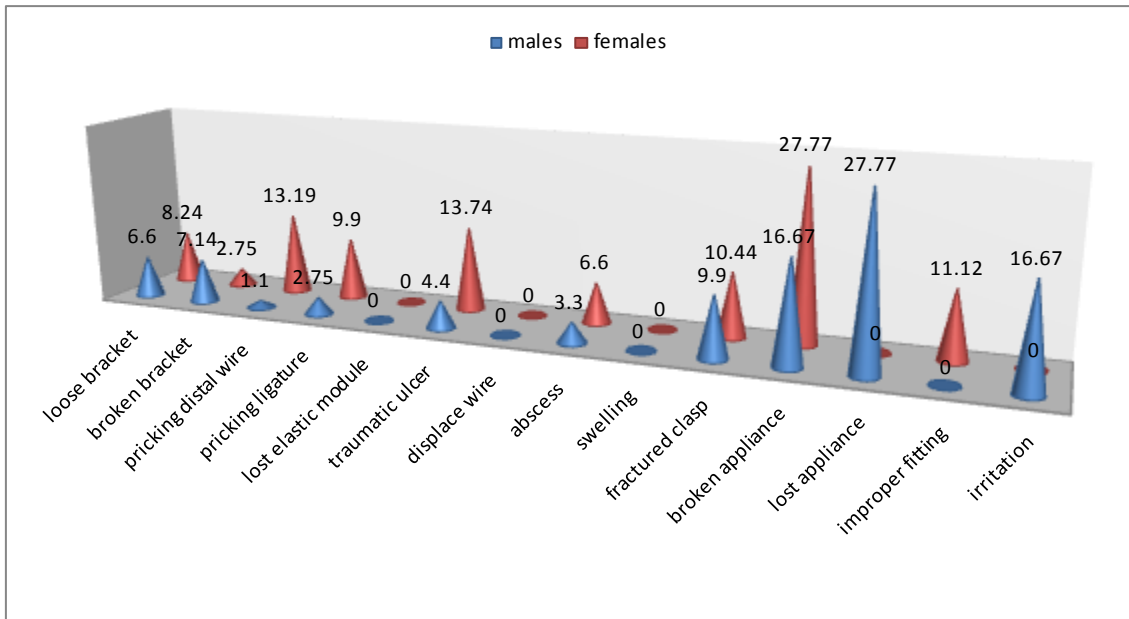
DEMOGRAPHIC QUESTION: }  
 ORAL HYGIENE QUESTION: } TABLE:1 TYPE OF APPLIANCE USED:  
 PROBLEMS FACED:----TABLE 2

**RESULTS**

TABLE 1:DEMOGRAPHIC RESPONDENTS		FREQUENCIES (N)	PERCENTAGE (%)
GENDER	MALE	75	37.5
	FEMALE	125	62.5
	TOTAL	200	100
ORAL HYGIENE RESPONDENTS			
FREQUENCY OF BRUSHING	ONCE A DAY	15	7.5
	TWICE A DAY	185	92.5
	MORE THAN TWICE	-	-
	TOTAL	200	100
USE OF ORAL HYGIENE AID	FLOSS	-	-
	MOUTH WASH+FLOSS	56	28
	MOUTH WASH	40	20
	WARM SALINE RINSE	104	52
	TOTAL	200	100
TYPE OF APPLIANCE USED	FIXED	182	91
	REMOVABLE	18	9
	TOTAL	200	100

Out of 200 subjects, 75 were males and 125 were females. Around 7.5% of the populace brushed only once while 92.5% brushed twice. Regarding oral hygiene aid use 52% of the population used warm saline rinses and only 28% used mouth wash and floss. Out of all the subjects only 9% i.e. 18 study subjects used removable orthodontic appliance while maximum of them were fixed orthodontic appliance wearer.

TABLE 2:PROBLEMS FACED		FREQUENCY/PERCENTAGE (n/%)	
		MALE	FEMALES
FIXED WEARERS	LOOSE BRACKET	12 6.6	15 8.24
	BROKEN BRACKET	13 7.14	5 2.75
	PRICKING DISTAL WIRE	2 1.1	24 13.19
	PRICKING LIGATURE	5 2.75	18 9.90
	LOST ELASTIC MODULE	-	-
	SORENESS RELATED TO TRAUMATIC ULCER	8 4.4	25 13.74
	DISPLACED WIRE	-	-
	PERIODONTAL ABSCESS	6 3.30	12 6.60
	SWELLING DUE TO ACTIVATED, NON REMOVABLE APPLIANCE	-	-
	FRACTURED CLASP	18 9.90	19 10.44
	TOTAL	182/100	
REMOVABLE WEARES	BROKEN APPLIANCE	3 16.67	5 27.77
	LOST APPLIANCE	5 27.77	-
	IMPROPER FITTING	-	2 11.12
	IRRITATION DUE TO THE ACRYLIC PART	3 16.67	-
TOTAL	18/100		



In the filled Performa, out of 75 males 64 were fixed appliance wearers and only 11 were removable appliance wearer while out of 125 females 118 were fixed wearers and only 7 were removable appliance wearers. According to the questions involved around 6.6% males and 8.24% had loose brackets as their main problem causing item while in 7.14 and 2.75 it was a broken bracket. 1.1% males and 13.19% females had poking distal wire and 2.75% males and 9.90% females found poking ligature wire troublesome. Pain due to the traumatic ulcer was the main concern among 4.4% males and 13.74% females. Not only this, a periodontal abscess was

found in around 3.30% of males and 6.60% of females which was found only after examining the patients through the video calls. 9.90% males and 10.44% females had fractured clasps as a problematic unit.

Similarly in removable wearers only 16.67% males and 27.77% females had broken appliance while 27.77% of males lost their appliance due to their careless behavior. In 16.67% of male acrylic part of the non-removable appliance was found to be causing frequent ulcerations and sometime difficulty in eating. While only 11.12% of females complained about improper fitting of the appliance.



FIGURE1: REPRESENTING TRAUMA TO SOFT TISSUES ADJACENT TO MOLAR AND MISSING BRACKET FROM PREMOLAR.

## DISCUSSION

An orthodontic appliance is classified on the basis of the type of appliance used. It can be fixed as well as removable. Orthodontic emergencies are

related according to the type of appliance used. Removable include aligners, retainers and functional appliances. These appliances can be used and removed by the patients without any specialists help. Functional

appliances which are used to guide the correct dento-alveolar complex and jaws in growing children.<sup>8</sup> No such appliance question was used as such in the study, still if the appliance breaks or any discomfort is felt, stopping the use of appliance is the utmost emergency treatment which can be given on phone. A similar event can occur with an aligner or a retainer, as the patient may lose or break the appliance. For the utmost, the treatment plan will be of suspending the treatment plan till the lockdown gets over. But if the patient is a continuous aligner wearer, in case of broken or lost appliance he/she can continue with the old aligners until further treatment. A hot customizable preform contentive appliance can be order in cases of broken retainers in which a chance of relapse is possible until the clinician can perform the retainer procedures all again.

Fixed appliance include non removable appliance, appliance which can be activated by the patients and pre-activated, non-removable appliance. All the emergencies related to fixed appliances were confirmed using photographs, videos or a video call to the patient to confirm the requirements. Pre-adjusted appliance are most commonly used to treat any type of malocclusion, which include the bonding of brackets, archwires, ligatures, band and many more.<sup>9</sup> the consequence of eating hard, and sticky food, and improper chewing can lead to breakage of any part of the appliance including the bracket, ligatures and the arch wire. The mode of treatment given can subsequently be given depending upon the type of the damage to the part. If the bracket loses its adhesiveness or breaks, it can be removed from the tooth using a hair remover tweezer or kept as it is if it doesn't comes out of the arch wire. If any part of the appliance is causing a constant irritation to the soft tissues, in cases of no event possible, they can be covered using a chewing gum or orthodontic relief wax which can be easily available on the pharmacies. Arch wires and ligature wires can be cut using nail cutter if no other

option is possible. Before using any home instrument, disinfection of the material is of utmost importance. Disinfection can be performed by boiling the instrument at 100°C for 30 minutes.<sup>10</sup>

Head gears, lip-bumpers are included in the non-removable appliance which can be activated by the patients at home itself, but if the patient is in agony, any kind of swelling or redness is present due to the band fixed to the molar, he or she should be advised to take anti-infective therapy including the antibiotics only after the proper drainage by the dentist in fully sterile conditions. If no emergency treatment is possible a proper dose of antibiotics and NSAIDS can be prescribed to the patients via the messaging app in hand written prescription.<sup>9</sup>

Preactivated appliances such as distal jet, pendulum, transpalatal bar can also be the reason for the agony. In any such case, removal by the specialist is the only cure. All these treatment and home-made equipments can only be made accessible to the patients if the specialist uses artificial intelligence like WhatsApp videos and pictures which can give a clear idea about the ongoing problem. The only mind set should be of preventing the emergencies rather than curing.

## CONCLUSION

Being the first kind of the study in which a treatment plan can be made on the phone and a help can be given in cases of emergency treatment in cases of orthodontic patients, it becomes the main responsibility of the patients to avoid any kind of thing which can lead them to pain and difficulty in handling the appliance.

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