

## Original Research

### Ortho-perio synergism and its association with COVID-19: A survey

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#### ABSTRACT:

The episode of coronavirus 2019 (COVID-19) in the region of Wuhan, China, has advanced quickly into a general wellbeing and has spread exponentially to different parts of the world. These ribonucleic acid infection's creature supplies, zoonotic transmission, high change rates, and illustrated human-to-human spread has made them of specific open wellbeing concern. Given in all cases transmission of SARS-CoV-2 and reports of its spread, dental procedures like orthodontic procedure are at halt which thus are influencing the periodontal wellbeing of the patient. **Objective:** The reason of the study is to provide details regarding information and awareness among orthodontic patients about their periodontal wellbeing because of no/delay in treatment during lockdown. **Material and methodology:** A well-organized online multiple choice based survey was defined. The example size was picked by straightforward randomized testing as 300 from orthodontic patients of North India. The outcomes were classified, and elucidating insights were introduced for the scores of poll and furthermore dissected mean and standard deviations with a critical estimation of  $P < 0.05$ . Pearson correlations test was used to find the correlation between ortho-perio and effects of lockdown on orthodontic treatments. **Conclusion:** During the COVID-19 pandemic, it is basic those dentists think universally and act locally to limit the dangers of transmitting SARS-CoV-2 in the orthodontic setting. The study mainly focused on the orthoperio relationship and the effects of covid lockdown on the orthodontic treatments and problems faced by the patients.

**Keywords:** awareness, coronavirus, orthodontic, periodontal, inflammation.

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#### INTRODUCTION

Since the ending of 2019, coronavirus illness, brought about by serious intense respiratory condition coronavirus 2 (SARS-CoV-2; 2019-novel coronavirus

or 2019-nCoV) has quickly spread all through the occupied world and prompted uncommon significant wellbeing, helpful, and money related emergencies. Endeavors to contain the spread of the ailment have

prompted significant disturbances, compelling territorial and, in numerous cases, national crises and lockdowns, leaving just fundamental administrations to proceed. In numerous such endeavors, performing elective assignments, including orthodontic treatment, were required to be suspended on requests of the government.<sup>1</sup> The orthodontic mechano-therapy, much of the time incorporates the usage of fixed appliances in the organization of malocclusion and mal-relationship of the dental arches.<sup>2</sup> Orthodontic treatment targets giving adequate useful and esthetics impediments utilizing fitting tooth developments. These developments are explicitly identified with cooperations of the teeth with their steady periodontal tissues.<sup>3</sup>

Since orthodontic treatment is a long and persistent process, there are a large number of patients who were previously experiencing orthodontic treatment when planned care was suddenly suspended. Due to the phenomenal nature of this pandemic and the obscure time span that compulsory suspension of elective treatment might be in actuality in various locales, united data and rules for the clinical orthodontic administration of patients during the COVID-19 pandemic are inadequate. Oral cleanliness may be increasingly hard to keep up during treatment, which may prompt plaque aggregation and aggravation.<sup>4</sup> Legitimate occlusal work and masticatory work are stimulatory to the gingival tissue and the connection mechanical assembly, while, alternately, an absence of capacity inclines to disease, in that it expands plaque maintenance and analytics development with its companion gingival inflammation.<sup>5</sup>

Lip and/or cheek irritation from the brackets, elastic ligature loosening from bracket during eating or tooth brushing, broken or loose elastic chain loose orthodontic attachment (bracket, tube, or band) etc can be some problems faced by the patient leading to intense pain and irritation. Food accumulation, bleeding gingiva, recessions are the reasons due to improper brushing and poor oral hygiene maintenance which may be aggravated during this lockdown phase. Because of dental crises, orthodontists in coordination of a periodontist ought to at first endeavor to manage the emergency over the phone or remotely. A verbal or electronically stamped consent should be obtained to give counsel along these lines and all records ought to be kept that was given according to normal record keeping.

#### **MATERIAL AND METHODOLOGY:**

An electronic poll was send through an online survey (arranged in Google form survey) making out of requests and assessed using percentage with desire for evaluating the effect of lockdown due to corona virus on the treatment and outcome of orthodontic treatments The survey was send to a randomized sample of around

300 patients undergoing orthodontic treatment through mail-id taken from individual to individual contact and phone numbers. Study was set up in English to urge perfection and to give indications of progress appreciation of the requests by the respondents. Being an online survey no ethical clearance was required for the examination.

An online survey helped in straightforwardness of data collection, recording, and up keep of data for quantifiable assessment. The data got from an online structure was open immediately and could be easily moved into specific true programming or spread sheets for extra examination.

Thought guidelines were developed subjects undergoing orthodontic treatment and subjects much aware about the review with rejection subjects being the individuals who didn't have any data and capacity of understanding the web survey. The information was gathered and circulation of response was dissected as frequencies and percentage.

Survey was pretested and affirmed among 10 subjects; these subjects were barred from the examining study tests. Taking into account the response rate with margin of error at 5%, test size (example size) was resolved to be 218, however to expand the quality of the investigation the example size was expanded to 300. Sample size was calculated based on  $Z^2 pq/e^2$ .

$Z = 1.96$  for 95% of the confidence interval

#### **DATA ANALYSIS:**

Information was entered and investigated utilizing the (SPSS) programming (Inc., Chicago, IL, USA). Frequency disseminations were determined for all the measurable factors. Correlation were found using Pearson correlation test. The P value was considered to be significant at  $\leq 0.05$ .

#### **RESULTS:**

A sum of 300 subjects undergoing orthodontic treatment took part in the online based study from 25 April 2020 to 5 June 2020. In this overview, 31.67% of the investigation populaces were male while 68.33% were females with 59.33% of them having a place in the age gathering of 16-25 years. As per Kuppaswamy's Socio-Economic Status Scale 2018, 73.67% of the individuals had a place with upper middle class society (TABLE 1). 53.66% of the investigation populace had confidence in brushing their teeth twice day by day utilizing conventional tooth brushes (79.67%). 68.33% of them utilized mouth wash along with toothbrush, as their oral cleanliness looking after guide while only 5.33% used water pick (TABLE 2).

In poll asked from the investigation subjects, 64.67% of the population was influenced because of the lockdown as around 72.67% used to follow their normal dental subsequent meet-ups. 45.33% were the subjects whose

orthodontic treatment began two years back and 38.67% had begun their treatment a year prior to the lockdown, among which 68.34% were metallic section wearer while 13.33% wore ceramics. 67.67% of individuals discovered changes in their typical teeth movements and just 27% utilized telephonic calls for discussions during the lockdown stage in India. 59% thought about hard food as the principle explanation behind the breakage of their brackets (34%).72.33% endured challenges in keeping up their oral cleanliness and 75% were knowledgeable with an ortho-perio relation.59%, 61.67%, 67.67%, 65.33% 58.33%, 46%, and 46.33% considered orthodontic appliance as the fundamental,

causing in exacerbating the periodontal conditions including calculus, stains, halitosis, gingival pains and enlargements, and bleeding gums.

In fact a negative connection was discovered utilizing Pearson's relationship between's the periodontal and orthodontic condition with a feeble connection between the factors however with measurably significant value of  $p < 0.05$ . (TABLE 10)

So also a positive correlation among the orthodontic treatment and the outcomes of lockdown was found with statistically significant value of  $p < 0.05$ . (TABLE 11)

**TABLE ;1 REPRESENTING GENERAL CHARACTERISTICS OF STUDY PATIENTS**

		FREQUENCY/PERCENTAGE	MEAN±SD	P VALUE
AGE	>15 YEARS	-	2.417± 0.494	<0.0001*
	16-25 YEARS	178 59.33		
	26-35 YEARS	122 40.67		
	<35 YEARS	-		
	TOTAL	300/100		
GENDER	MALE	95 31.67	1.673±0.470	<0.0001*
	FEMALE	205 68.33		
	TOTAL	300/100		
OCCUPATION	Legislators, Senior Officials & Managers	6 2	3.461±2.715	<0.0001*
	Professionals	182 60.67		
	Technicians and Associate Professionals	36 12		
	Clerks	18 6		
	Skilled Workers and Shop & Market Sales Workers	18 6		
	Skilled Agricultural & Fishery Workers	-		
	Craft & Related Trade Workers	-		
	Plant & Machine Operators and Assemblers	-		
	Elementary Occupation	-		
	Unemployed	401 13.33		
	TOTAL	300/100		
	Profession or Honors	104 34.67		
	Graduate	159 53		
	Intermediate or diploma	28 9.33		

EDUCATION	High school certificate	9	1.780±0.716	<0.0001*
		3		
	Middle school certificate	-		
	Primary school certificate	-		
	Illiterate	-		
	TOTAL	300/100		
INCOME	>126,360	27	3.819±1.776	<0.0001*
		9		
	63,182-126,356	51		
		17		
	47,266-63178	66		
		22		
	31,591-47262	48		
		16		
18,953-31589	37			
	12.33			
6327-18949	56			
	18.67			
≤6323	15			
	5			

**KUPPUSWAMY'S SOCIO-ECONOMIC STATUS SCALE 2018: -**

		FREQUENCY/PERCENTAGE	MEAN±SD	P VALUE
26-29	Upper (I)	51 17	1.909±0.507	<0.0001*
16-25	Upper Middle(II)	221 73.67		
11-15	Lower Middle(III)	28 9.33		
5-10	Upper Lower(IV)	-		
<5	Lower(V)	-		
	TOTAL	300/100		

\*statistically significant results

GRAPH 1: REPRESENTING GENERAL CHARACTERISTIC OF STUDY PATIENT

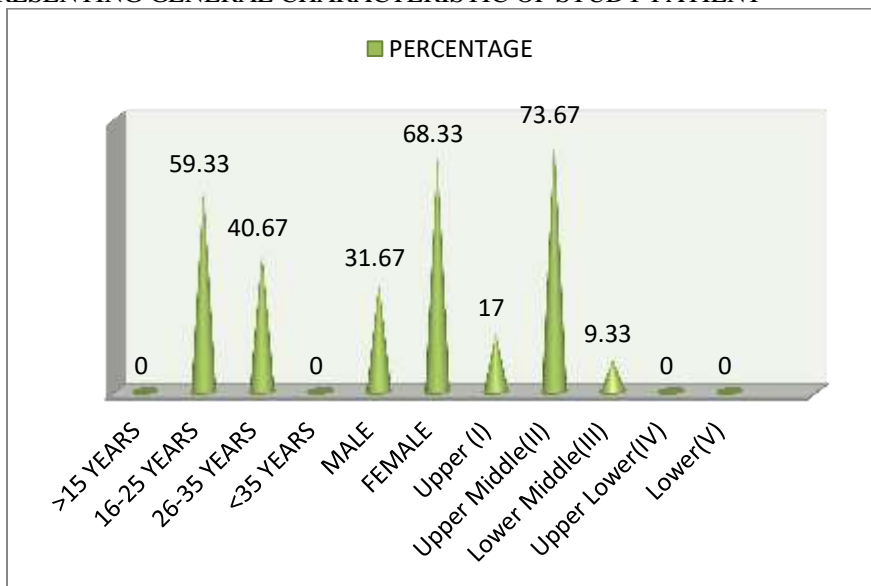


TABLE 2: REPRESENTING ORAL HYGIENE HABITS OF STUDY PATIENTS

		FREQUENCY/PERCENTAGE	MEAN±SD	P VALUE
FREQUENCY OF BRUSHING	NEVER	8 2.67	3.465±0.663	<0.0001*
	ALTERNATIVELY	-		
	ONCE A DAY	131 43.67		
	TWICE OR MORE	161 53.66		
	TOTAL	300/100		
USE OF ORAL HYGIENE AIDS	MOUTHWASH	205 68.33	2.075±1.641	<0.0001*
	FLOSS	3 1		
	INTERDENTAL BRUSH/ TOOTHPICK	20 6.67		
	WATERPICK	16 5.33		
	NONE	56 18.67		
	TOTAL	300/100		
TYPE OF BRUSH	ORTHO BRUSH	61 20.33	1.796±0.400	<0.0001*
	ORDINARY	239 79.67		
	TOTAL	300/100		

GRAPH 2: REPRESENTING ORAL HYGIENE CHARACTERISTICS OF STUDY PATIENT

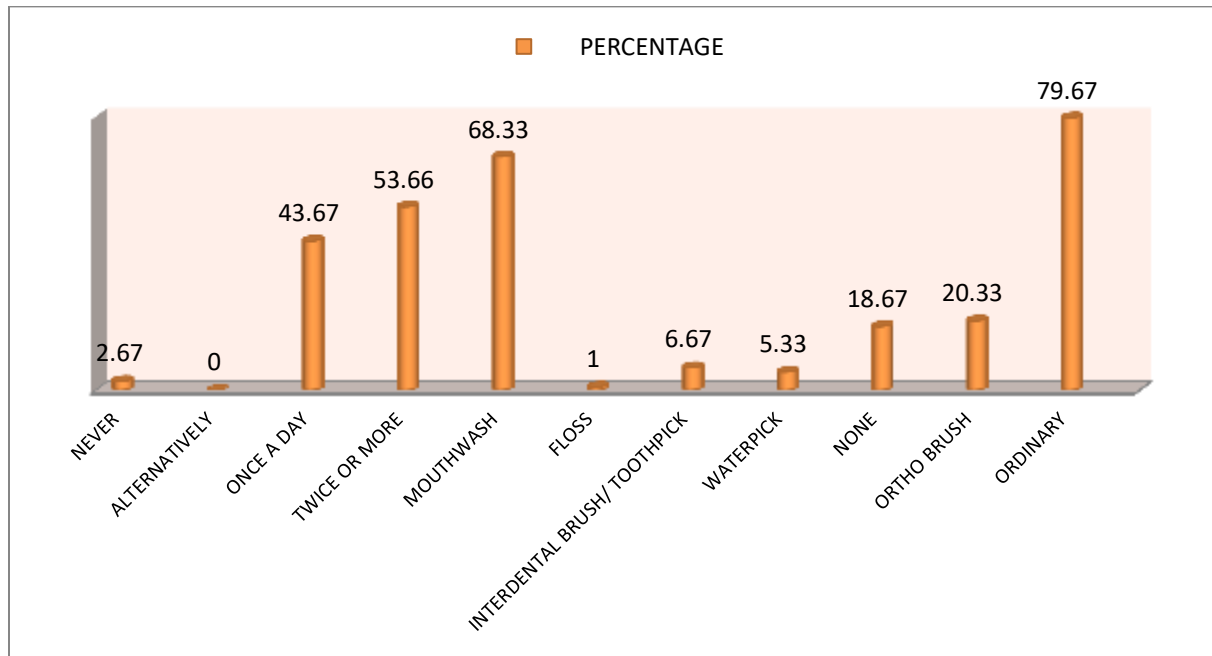


TABLE 3: REPRESENTING QUESTIONNAIRE OF STUDY PATIENTS

	YES N/%	NO N/%	DON'T KNOW N/%	MEAN±SD	P VALUE
AFTER WEARING ORTHODONTIC APPLIANCE DO YOU VISITED REGULARLY TO YOUR DENTIST?	218 72.67	38 12.67	44 14.67	1.441±0.740	<0.0001*
HAS CORONA OUTBREAK AFFECTED YOUR ORTHODONTIC TREATMENT?	194 64.67	64 21.33	42 14	1.492±0.726	<0.0001*
DO YOU FACE ANY PROBLEM IN PERFORMING ORAL HYGIENE PRACTICES WHILE BEING A WEARER OF ORTHODONTIC APPLIANCE?	217 72.33	48 16	35 11.67	1.409±0.687	<0.0001*
ARE THERE ANY CHANGES YOU HAVE NOTICED DURING LAST THREE MONTHS IN THE TREATMENT PHASE?	203 67.67	34 11.33	63 21	1.539±0.813	<0.0001*
DO YOU HAVE ANY KNOWLEDGE ABOUT ORTHODONTIC TREATMENT AND ITS RELATION WITH GUMS PROBLEM (PERIODONTAL HEALTH)?	225 75	21 7	54 18	1.430±0.779	<0.0001*
ARE THE HARD DEPOSITS (CALCULUS) ON THE TOOTH DUE TO FIXED APPLIANCE?	177 59	46 15.33	77 25.67	1.657±0.851	<0.0001*
DO THE DISCOLOURATIONS (STAINS) ON YOUR TEETH DUE TO PRESENCE OF APPLIANCE?	185 61.67	68 22.67	47 15.66	1.559±0.751	<0.0001*
IS THERE ANY EFFECT ON GUMS DUE TO ORTHODONTIC APPLIANCES?	203 67.67	35 11.67	62 20.67	1.531±0.813	<0.0001*
IS BAD BREATH (ORAL HALITOSIS) DUE TO ACCUMULATION OF FOOD BETWEEN THE APPLIANCES?	196 65.33	30 10	74 24.67	1.587±0.847	<0.0001*
IS WIRING THE MAIN REASON BEHIND GUM IRRITATION/PAIN?	175 58.33	68 22.67	57 19	1.618±0.790	<0.0001*
IS GUM ENLARGEMENT DUE TO THE MATERIALS USED IN APPLIANCE?	138 46	52 17.33	110 36.67	1.906±0.897	<0.0001*
ARE BLEEDING GUMS DUE TO THE APPLIANCE?	139 46.33	87 29	74 24.67	1.776±0.806	<0.0001*

DO YOU FEEL THERE WOULD BE CHANGES IN YOUR TREATMENT MODALITIES AFTER THE LOCKDOWN GETS OVER?	190 63.34	58 19.33	52 17.33	1.555±0.777	<0.0001*
WILL THE COST OF YOUR TREATMENT WILL BE AFFECTED AFTER THE LOCKDOWN?	170 56.67	64 21.33	66 22	1.654±0.819	<0.0001*
WILL YOU PREFER SOMEOTHER TREATMENT FOR THE CONDITIONS OCCURRED?	68 22.66	140 46.67	92 30.67	2.091±0.736	<0.0001*

GRAPH 3: REPRESENTING THE QUESTIONNAIRE

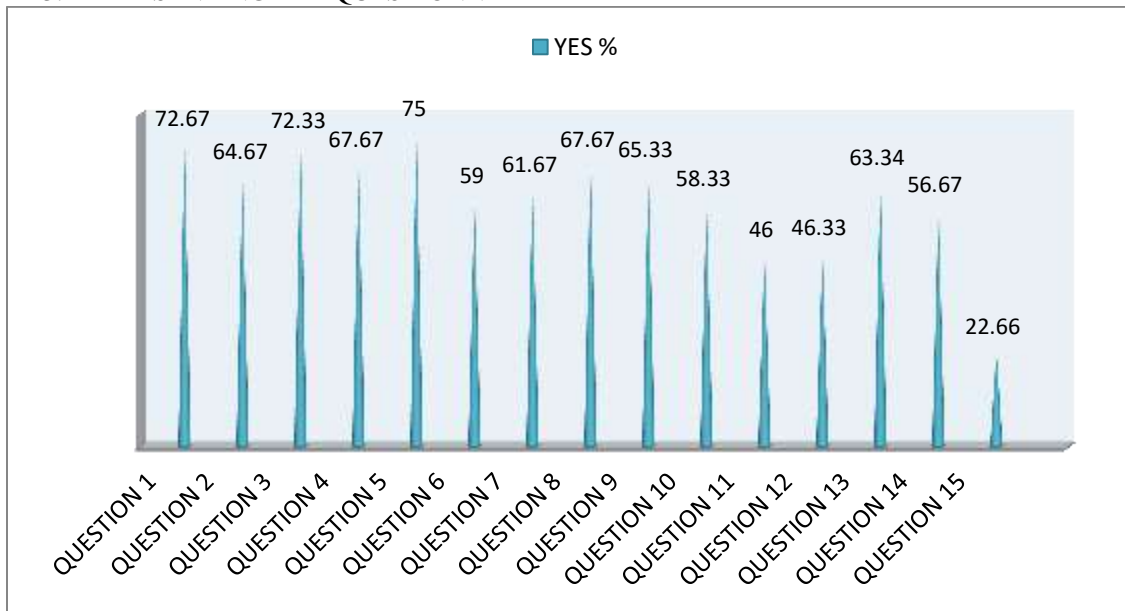


TABLE 4:

HAS ANYBODY IN YOUR FAMILY UNDERGONE ORTHODONTIC TREATMENT?	FREQUENCY/PERCENTAGE N/%				MEAN±SD	P VALUE
	SIBLINGS	PARENTS	COUSINS	NONE		
	50 16.67	17 5.66	140 46.67	93 31	2.925±1.009	<0.0001*

GRAPH 4:

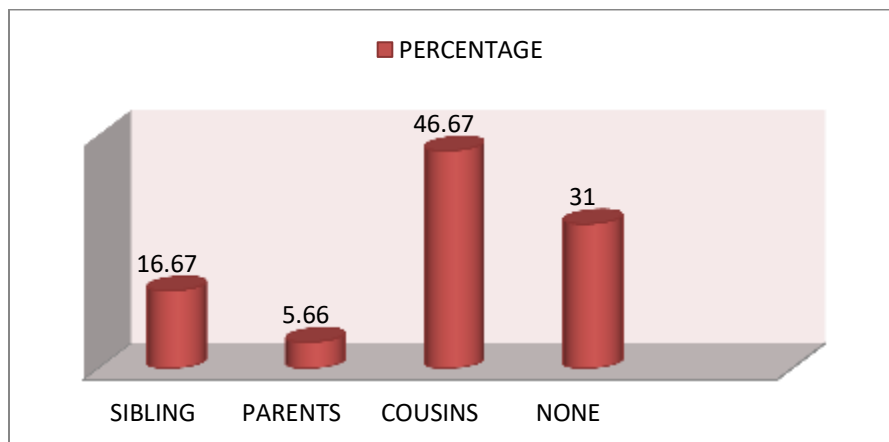


TABLE 5:

WHEN WAS YOUR ORTHODONTIC TREATMENT STARTED?	FREQUENCY/PERCENTAGE N/%			MEAN±SD	P VALUE
	8 MONTHS	16 MONTHS	24 MONTHS		
	48	116	136	2.299±0.73	<0.0001*
	16	38.67	45.33	1	

GRAPH 5:

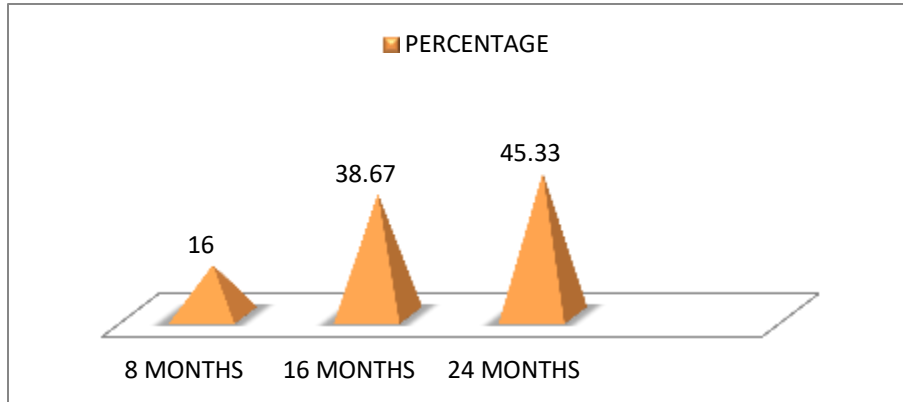


TABLE 6:

WHICH ORTHODONTIC APPLIANCE ARE YOU WEARING?	FREQUENCY/PERCENTAGE N/%			MEAN±SD	P VALUE
	METALLIC	CERAMIC	OTHER		
	205	40	55	1.512±0.794	<0.0001*
	68.34	13.33	18.33		

GRAPH 6:

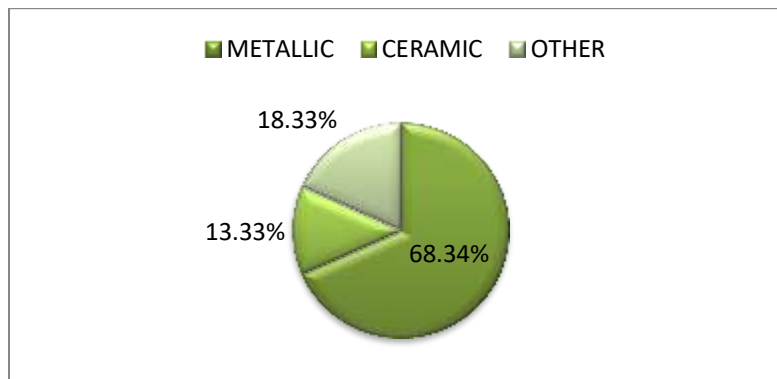


TABLE 7:

WHAT MEASURES ARE YOU TAKING ON THE PROBLEMS FACED DUE TO THE APPLIANCE DURING THIS LOCKDOWN?	FREQUENCY/PERCENTAGE N/%					MEAN±SD	P VALUE
	TAKING TELEPHONIC INSTRUCTIONS	WARM SALINE RINSES	BOTH A/B	DOING NOTHING	ANYTHING OTHER		
	81	4	103	70	42	2.980±1.373	<0.0001*
	27	1.33	34.34	23.33	14		



GRAPH 7:

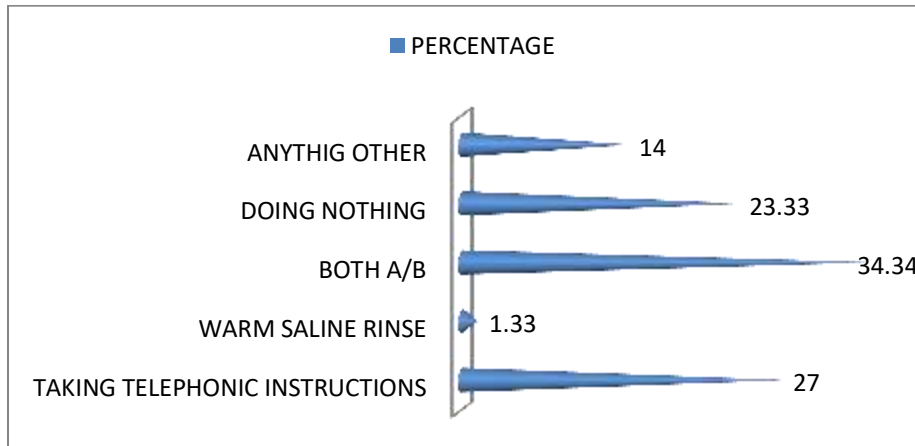


TABLE 8:

WAS THERE ANY BREAKAGE OF ANY PART OF THE APPLIANCE DURING THIS PHASE?	FREQUENCY/PERCENTAGE N/%			MEAN±SD	P VALUE
	BRACKETS	WIRE	OTHER		
	102	29	169	2.236±0.919	<0.0001*
	34	9.67	56.33		

GRAPH 8:

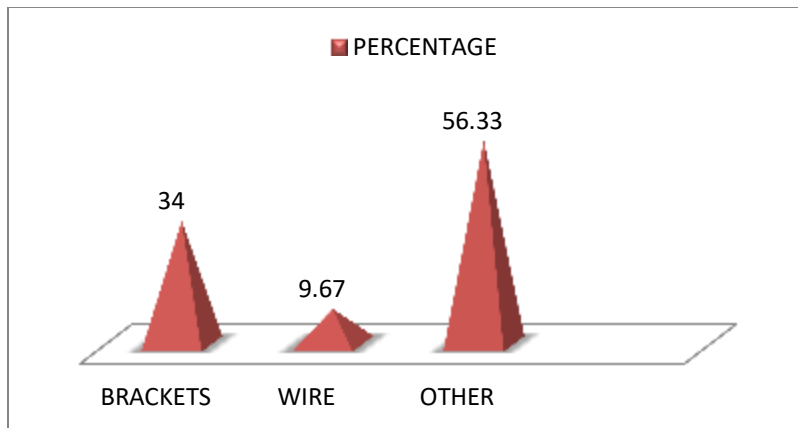


TABLE 9:

WHAT WAS THE MAIN REASON FOR THE BREAKAGE OF THE APPLIANCE?	FREQUENCY/PERCENTAGE N/%				MEAN±SD	P VALUE
	HARD FOOD	PLAYING	IMPROPER BRUSHING	OTHER		
	177	-	17	106	2.177±1.432	<0.0001*
	59	-	5.67	35.33		

GRAPH 9:

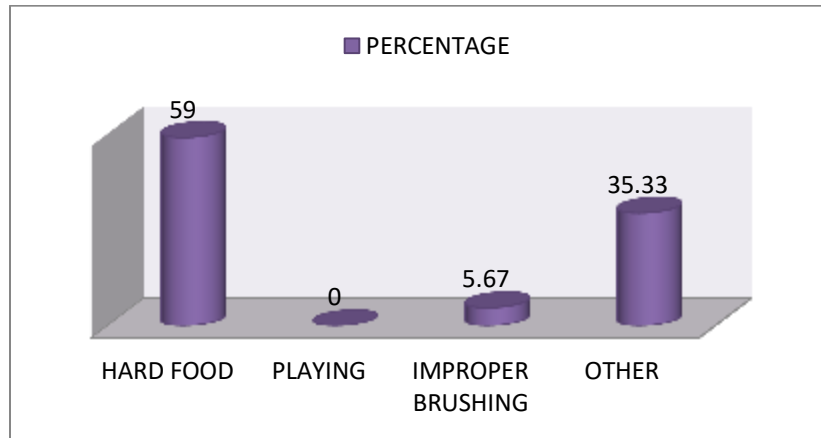


TABLE 10: RELATIONSHIP BETWEEN ORTHODONTIC TREATMENTS AND PERIODONTAL HEALTH

PERIODONTAL CONDITIONS	ORTHODONTIC RELATION	
	R value	P value
Oral hygiene practice	0.2851	<0.000*
Calculus	-0.3271**	<0.000*
Stains	-0.4171**	<0.000*
Gum problems	-0.2153**	0.001*
Halitosis	-0.4478**	<0.000*
Gingival irritation/pain	-0.0479**	0.417
Gingival enlargement	0.001	0.986
Bleeding gums	-0.1905**	0.000*

\*\*Although technically a negative value, there is a weak correlation relationship between the variable.  
 \*statistically significant results p<0.05.

TABLE 11: EFFECT OF LOCKDOWN ON THE ORTHODONTIC TREATMENT.

LOCKDOWN EFFECT	ORTHODONTIC TREATMENT	
	r-value	p-value
HAS CORONA OUTBREAK AFFECTED YOUR ORTHODONTIC TREATMENT?	0.4751**	<0.000*
ARE THERE ANY CHANGES YOU HAVE NOTICED DURING LAST THREE MONTHS IN THE TREATMENT PHASE?	0.2920**	<0.000*
WHAT MEASURES ARE YOU TAKING ON THE PROBLEMS FACED DUE TO THE APPLIANCE DURING THIS LOCKDOWN?	0.1056**	0.067
WAS THERE BREAKAGE OF ANY PART OF THE APPLIANCE DURING THIS PHASE? WHICH?	0.2011**	0.000*
WILL THE COST OF YOUR TREATMENT WILL BE AFFECTED AFTER THE LOCKDOWN?	0.1238**	0.032*

\*\*Although technically a positive correlation, the relationship between the variables is weak.  
 \*statistically significant p<0.05

**DISCUSSION:** Oral cleanliness is exceptionally disregarded in developing nations like India. Preventive oral wellbeing information and its usage are the significant methods of keeping our oral cavity sound apart from wearing any appliance. Henceforth, in this survey endeavors were made to assess effects of lockdown, preventive oral wellbeing information and its execution by patients experiencing orthodontic treatment in north India.<sup>6</sup> In managing a pandemic of this nature, dental specialist including orthodontists and periodontist ought to have an alternate course of action set up for the executives of their patients.<sup>1</sup>

The level of subjects brushing their teeth twice day by day is 53.66% which is very acceptable as contrasted and 23% of the geriatric patients at Vyas Dental College and Hospital, Jodhpur yet extremely less when contrasted with 75% of the elderly.<sup>7</sup> This recommends geriatric patient's recurrence of brushing teeth is more noteworthy. Reason might be because of more measure of time for oneself in resigned life. In this investigation, just 3% utilized floss as interdental help which is poor finding when contrasted with Hamilton and were about 44% of the subjects concentrating in north eastern Ontario utilized dental floss.<sup>8</sup> In contract, subject at Rural dental school just 6% subjects utilized floss.<sup>9</sup> Reason for this might be the critical oral cleanliness mindfulness programs that were done in Canada. This underlines the pressing requirement for teaching and spurring the general population to utilize this proficient technique for oral medicinal services.

With respect to oral cleanliness rehearses, in an examination by Berlin-Broner et al just 31.5% utilized mouthwash as an oral cleanliness help while in this investigation, just 68.33% of the people utilized mouthwash in their oral cleanliness practice and 6.67% of the people utilized interdental toothbrush. 65.33% of subjects considered orthodontic apparatus as primary explanation for rottenness and 61.67% of the subjects know that their teeth look grimy, this is as per members who got a post-treatment correspondence revealed more elevated level of oral cleanliness consistence than members in the benchmark group in which 46% of subjects experienced malodour and 54% know that their teeth look messy.<sup>10</sup>

In this study, around 63.34% agree in the changes treatment modalities after the lockdown gets over affecting the cost of treatment 56.67%.

### CONCLUSION:

Periodontal wellbeing is basic for any type of dental treatment, particularly for orthodontic treatment, as it has two different ways of activity on the periodontal tissues; it gives some level of insurance to the periodontium and keeps the gingiva, the bone, and the periodontal ligaments in a sound status however then again, it produces negative consequences for the

periodontium, mostly gum disease, gingival recessions, and bone dehiscences. In addition during this COVID-19 pandemic, it is essential that dental specialist think all around and act locally to confine the perils of transmitting SARS-CoV-2 in the orthodontic setting, Patient's training and inspiration as supplemented by this interdisciplinary methodology is compulsory and is need of an hour. In this way this examination for the most part centered around the orthoperio relationship and the impacts of covid lockdown on the orthodontic medicines and issues looked by the patients.

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