

## *International Journal of Scientific Research and Reviews*

### **Awareness on oral hygiene practices among patients undergoing orthodontic treatment- an observational study**

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#### **ABSTRACT:**

Orthodontic treatment plays a significant role on the dento-facial complex by refining aesthetics, establishing functional occlusion and improving the overall oral health status and quality of life. Regular oral hygiene practices during and after orthodontic therapy helps in preservation of the gingival health and also determines the successful treatment outcome. The present study was aimed to assess the awareness of an individual towards oral hygiene practices among patients undergoing orthodontic treatment. A cross sectional online-survey was conducted using self-administered questionnaires, through Google forms among patients undergoing orthodontic treatment across Chennai city, Tamilnadu.

Most of the respondents (89.2%) were aware of special brush for persons with orthodontic appliance however only 74.5% prefer Orthodontic tooth brush over routine tooth brushes. Despite oral hygiene instructions from dental practitioners only 70% were aware of effects of improper tooth brushing on gums and 94.1% felt difficult to maintain oral hygiene during orthodontic treatment among which 50% prefer teeth cleaning once in 6 months by dentist while undergoing orthodontic treatment.

The study clearly shows lack for awareness among patients undergoing orthodontic treatment regardless of adequate oral hygiene knowledge and appropriate oral hygiene instructions provided by the dental practitioner. This could be attributed to ignorance, lack of time and motivation. Hence, intense oral hygiene programs should be established to ensure good oral hygiene practices with regular periodontal maintenance follow up to improve the quality of life.

**Keywords:** Awareness, Cleaning aid, Oral Hygiene Practice, Orthodontic Toothbrush, Orthodontic Braces.

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## **INTRODUCTION:**

Oral hygiene practices play an important role in maintenance of healthy oral tissues and prevent dental caries, halitosis, xerostomia, ulcers and tempo-mandibular disorder<sup>1</sup>. It is evident that dental or facial anomaly such as improper alignment of teeth caused due to crowding, rotation, protrusion, open bite, cross bite, and lack of space associated with tooth and Jaw position has a direct effect on the overall oral health status of an individual. Orthodontic treatment is widely accepted because of the significant effects on the dento-facial complex by improving aesthetics, establishing functional occlusion and improving the oral health and the quality of life<sup>2</sup>.

Over the years several studies have shown a rapid decline in the oral hygiene compliance after the initial bonding phase, and also the orthodontic appliance favors plaque deposition thus creating a major hindrance to the hygiene practice like tooth brushing and flossing<sup>3</sup>. Consequently regular oral hygiene practices are important for the maintenance of gingival health during and after orthodontic therapy as it helps in preservation of the gingival and periodontal tissue<sup>4</sup>. For achieving effective oral hygiene, proper instructions for oral health care practices along with demonstration of precise tooth brushing technique, frequency of brushing, use of orthodontic brushes and auxiliary aids such as inter dental brushes and mouthwashes has to be suggested and implemented to these patients<sup>5</sup>. Therefore, maintaining an adequate level of oral hygiene during orthodontic treatment requires commitment from the patient to practice good oral hygiene measures as instructed by the dental professionals and to acquire knowledge, develop skills that mandate time, effort, and motivation. Thus, assessing the awareness levels of an individual towards oral hygiene practices among patients undergoing orthodontic treatment is important.

## **METHODOLOGY:**

The present cross-sectional questionnaire survey was conducted amongst the patients undergoing orthodontic treatment across Chennai city, Tamilnadu to assess the awareness of an individual towards oral hygiene practices among patients undergoing orthodontic treatment. After obtaining the Ethical clearance from the Institutional Review Board (IRB), the required information was collected through published scientific articles pertaining to the study and self-administered structured questionnaires, comprising of 20 questions in English language was prepared and evaluated. The questionnaire had both combination of few selected response to the certain questions and also close-ended questions (Yes / No/ don't know). A total of 102 patients undergoing orthodontic treatment across the city participated in this survey. Since this study was conducted during COVID-19 Pandemic lockdown period, online Google forms were generated and distributed

through social media platforms and all the participants were informed about the purpose of the study and assured that their participation was purely voluntary.

### **STATISTICAL EVALUATION:**

Non-probability stratified convenient sampling technique was employed that yielded information from 102 patients undergoing orthodontic treatment were selected and taken into this observational study having a cross-sectional design. Responses recorded among the selected population group were evaluated for statistical analysis by SPSS software Version 19.0. All 102 responses were valid for the study with Cronbach's alpha reliability score being **0.844** (Significant score).

### **RESULTS:**

On statistical evaluation it was observed 74 female and 28 male patients participated in the study. The mean age of the study population was observed to be 22.37 years of age with minimum being 14yrs and maximum being 34yrs of age showing S.D of 3.6340 with 0.7137 at 95% confidence interval.

In the present study it was observed majority of the participants use toothbrush and toothpaste as the preferred cleaning aid for Oral hygiene practice among which 67.64% follow brushing twice a day. 45.09% perform brushing for about 3- 4minutes by combination of horizontal, vertical and circular movements (46.07%). Most of the respondents (89.2%) were aware of special brush for persons with orthodontic appliance however only 74.5% prefer Orthodontic tooth brush over routine tooth brushes and 59.8% use Soft tooth brush among which 42.1% change their tooth brushes once in 3 months and 22.5% replace their brush as soon as it worn out.

94.1% found difficult to maintain oral hygiene during orthodontic treatment and 88.2% felt their oral hygiene practices have changed after orthodontic treatment. On evaluation of their food habits only 12.74% consume stick foods often and 57.8% noticed difficult to clean the sticky food with/off the orthodontic braces. Apart from Tooth brush 51% use mouthwashes and 35% prefer Interproximal brushes to maintain a good oral hygiene. Despite oral hygiene instructions from dental practitioners only 70% were aware of effects of improper tooth brushing on gingiva such as Gum disease (18%), Decay (8.82%) and combination of both (56%) and 24.5% observed Shift in the position of gums away from the tooth due to improper brushing habits and oral hygiene practices. 79% obtained adequate information from dental practitioners to maintain oral hygiene during

orthodontic treatment among which 50% prefer teeth cleaning once in 6 months by dentist while undergoing orthodontic treatment (Table 1)

**Table no.1: Table Showing the Responses obtained from the Study Population**

Question	Response	N	%	Chi <sup>2</sup> value	P value
What kind of cleaning aid do you use?	Toothbrush and Toothpaste	101	99.020	0.51	.45714
	Finger and Toothpowder	1	0.980		
How often should you brush your teeth per day?	Once	31	30.392	66.412	<.00001*
	Twice	69	67.647		
	Thrice	2	1.961		
How many minutes should you brush your teeth?	1 minute	5	4.902	62.769	<.00001*
	2 minutes	46	45.098		
	3-4 minutes	46	45.098		
	More than 4minutes	5	4.902		
What method do you use for tooth brushing?	Horizontal	17	16.667	25.32	.00001*
	Vertical	13	12.745		
	Circular	25	24.510		
	Combined	47	46.078		
What type of tooth brush do you use?	Soft	61	59.804	32.294	<.00001*
	Ultra soft	22	21.569		
	Medium	19	18.627		
	Hard	0	0		
Are you aware that there is a special brush for persons with orthodontic appliance?	Yes	91	89.216	143.706	<.00001*
	No	8	7.843		
	Maybe	3	2.941		
Do you use ortho toothbrush in your daily routine?	Yes	76	74.510	24.51	<.00001*
	no	26	25.490		
How often do you change your tooth brush?	Every month	11	10.784	19.154	.00025*
	Once in two months	25	24.510		
	Once in three months	43	42.157		
	After it is worn out	23	22.549		
Is it difficult to maintain oral hygiene during orthodontic treatment?	Yes	96	94.118	79.412	<.00001*
	no	6	5.882		

Have your oral hygiene practices have changed after orthodontic treatment?	Yes	90	88.235	59.647	<.00001*
	no	12	11.765		
How often do you eat sticky food?	Rarely	29	28.431	33.588	<.00001*
	Sometimes	60	58.824		
	Often	13	12.745		
How difficult is to clean the sticky food off the braces?	Easy to clean	17	16.667	28.765	<.00001*
	Moderately difficult	59	57.843		
	Difficult to clean	26	25.490		
What are the other aids you use to maintain your oral hygiene?	Floss	3	2.941	52.274	<.00001*
	Mouthwash	51	50.000		
	Interproximal brushes	35	34.314		
	None	13	12.745		
Do you use a mouthwash regularly after starting orthodontic treatment?	Yes	75	73.529	22.588	<.00001*
	No	27	26.471		
Are you aware of effects of improper tooth brushing on gingival (gums)?	Yes	70	68.627	57.412	<.00001*
	No	14	13.725		
	Maybe	18	17.647		
What can happen as a result of poor oral hygiene?	Decay	9	8.824	55.180	<.00001*
	Gum disease	19	18.627		
	Both	58	56.863		
	Don't know	16	15.686		
Has orthodontic treatment caused a change in the position of the gums?	Shift in the position of gums towards tooth surface	8	7.843	58.294	<.00001*
	Shift in the position of gums away from the tooth surface	25	24.510		
	No changes seen	69	67.647		
Who is responsible for oral hygiene during orthodontic treatment?	Patient	30	29.412	72.300	<.00001*
	Dentist	1	0.980		
	Dental assistant	0	0		

	All of them	59	11.765		
	Don't know	12	57.843		
What information do you get from orthodontist (or) dental assistant regarding oral hygiene care?	Method of brushing	11	10.784	205.252	<.00001*
	Diet	1	0.980		
	Usage of other oral hygiene aids (floss, interdental brushes, etc.)	9	8.824		
	All of the above	79	77.451		
	None	2	1.961		
How often do you get your teeth cleaned by your dentist while undergoing orthodontic treatment?	At every visit	9	8.824	47.865	<.00001*
	Once in 3 months	32	31.373		
	Once in 6 months	52	50.980		
	Never	9	8.824		

\*P<.05- Significant

## DISCUSSION:

Bacterial plaque and calculus are the most common etiological factors associated with gingival and periodontal diseases along with various confounding factors like age, gender, oral habits, malocclusion, smoking, systemic diseases, malnutrition, hormonal changes, stress and poor oral hygiene practices. It is also evident that improper oral hygiene practices can cause severe destruction of the underlying structures with subsequent loss of tooth if left untreated<sup>6,7</sup>. Thus active cooperation of the orthodontic patient is essential over prolonged treatment duration and involves keeping appointments and the maintenance of an adequate level of oral hygiene and refraining from hard and sticky foods<sup>8</sup>.

In the present study it was observed majority of the participants use toothbrush and toothpaste as the preferred cleaning aid similar to studies by Jacob et al<sup>4</sup>, Shah et al<sup>9</sup>, Kapoor et al<sup>10</sup> for Oral hygiene practice however the percentage of respondents (67.64%) brushing their teeth twice a day is slightly higher in our study as compared with Shah et al [9], Nadar et al<sup>11</sup> but lesser than Berlin-Broner Y et al<sup>12</sup>, Aljohani et al<sup>13</sup> and Kapoor et al<sup>10</sup>. These findings suggests that frequency of brushing teeth is attributed to several factors such as availability of time, differences in demographic aspects, oral hygiene recommendation protocols implemented in several countries and influences from family and peers, dental awareness and positive attitude towards oral health.

About 45.09% perform brushing for about 3- 4minutes by combination of horizontal, vertical and circular movements (46.07%). Similar results were observed by Shah et al <sup>9</sup>, Baheti et al <sup>14</sup>, Al-harbi et al <sup>15</sup> that shows poor awareness on brushing strokes and techniques are due to lack of knowledge, improper oral hygiene instructions and awareness measures thus requiring urgent need for educating and motivating the patients undergoing orthodontic treatment to use efficient and efficient method of oral hygiene practices.

Apart from Tooth brush 51% use mouthwashes and 35% prefer Interproximal brushes to maintain a good oral hygiene similar to studies by Shah et al [9], Berlin-Broner et al [12], Bernabé E et al [16]. Studies by Benson P et al <sup>17</sup>, Baehni P et al <sup>18</sup>, Geiger et al <sup>19</sup>, Sawai et al <sup>20</sup> have shown adding mouthwash, interdental brushes as an adjunct to oral hygiene regimen may have positive effect on orthodontic patients in maintaining hygienic oral environment, thus reducing the likelihood for development of carious lesions and reduce gingival inflammation.

Despite oral hygiene instructions from dental practitioners only 70% were aware of effects of improper tooth brushing and 79% obtained adequate information from dental practitioners to maintain oral hygiene during orthodontic treatment among which 50% prefer teeth cleaning once in 6 months by dentist while undergoing orthodontic treatment. Similar studies by Sawai et al <sup>20</sup>, Baheti et al <sup>14</sup>, Ajayi et al <sup>2</sup>, Aikins et al <sup>21</sup>, Atassi et al <sup>22</sup> also suggests effective removal of dental plaque and active cooperation of the patient by following the instructions for adequate oral hygiene practices are very important parameters for determination of successful treatment outcome. The study also highlights the importance of dealing with patients' prospects as well as reinforcing oral hygiene practices and health care advice through informed consent and constant reminders during follow-up visits.

## **CONCLUSION:**

The study clearly shows lack for awareness among patients undergoing orthodontic treatment regardless of adequate oral hygiene knowledge and appropriate oral hygiene instructions provided by the dental practitioner. This could be attributed to ignorance, lack of time and motivation. Hence, intense oral hygiene programs should be established to ensure adequate knowledge, awareness, skills on effective oral hygiene practices is developed along with implementation of regular periodontal maintenance follow up to improve the quality of life.

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