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Oral Hygiene Maintenance of patients undergoing orthodontic treatment attending OPD at RVS dental college and hospital, Coimbatore, Tamil Nadu

Abstract
Background*: Orthodontic treatment can compromise the oral hygiene status by causing plaque accumulation and microbial biofilm formation.*
Aim*: To evaluate oral health awareness and hygiene practices among patients undergoing fixed orthodontic treatment.*
Materials and Methods: *A total of 300 fixed orthodontic patients were asked to fill-in a questionnaire comprising 15 multiple choice questions. The results were analysed using percentage.*
Results*: The results of the study showed that nearly two-third of patients did not follow the oral hygiene instructions, and despite being given instructions, most of them hesitated in practicing them consistently. An excellent finding was that all the patients used the toothbrush as an aid used to clean teeth.*
Conclusion*: The overall knowledge and attitude toward oral hygiene among orthodontic patients were found to be quite limited. This highlights the urgent need for better education and motivation to help patients commit to proper oral care throughout their orthodontic treatment. Consistent adherence to these hygiene practices is essential not only for achieving the best treatment results but also for preserving their long-term oral health and quality of life.*
Keywords*: Oral hygiene; fixed orthodontic treatment; Oral hygiene practices;*

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I. Introduction

Fixed orthodontic treatment is a common and effective method used to correct malocclusion, which is a misalignment or irregularity in the positioning of teeth and jaws. Beyond improving dental function, this treatment often boosts patients' self-confidence and positively influences their psychological well-being. [1,2] Malocclusion refers to a deviation from the normal dentofacial state. Orthodontic treatment is commonly performed for correction of malocclusion. [3]

Malocclusion or malalignment of teeth is one of the major contributing factors to poor oral hygiene. Nonetheless, components of fixed orthodontic appliances such as arch wires, brackets, and elastics act as primary retention sites for debris and plaque accumulation and further increase the risk of dental caries and periodontal disease. [4,5]

Research has shown that patients' commitment to oral hygiene tends to decline soon after braces are applied. The presence of the appliance can make routine cleaning tasks like brushing and flossing more difficult, often leading to plaque accumulation and gingivitis. Additionally, plaque buildup around the brackets can cause enamel decalcification, resulting in white spots on teeth that affect their appearance.[6-9]

This study focuses on evaluating how well orthodontic patients at RVS Dental College and Hospital maintain their oral health during treatment. The findings aim to inform the development of effective oral hygiene awareness programs tailored to the needs of these patients while correcting their dentofacial anomalies.

II. Material And Methods

In this cross-sectional study, a total of 300 orthodontic patients who attended orthodontic OPD at RVS dental college and hospital, Coimbatore, Tamil Nadu were included. The questionnaire was distributed during July 2022–December 2024 time period after ethical approval.

In order to determine the feasibility, application and clarity of the study, pilot research was conducted on 10% of the collected sample. They were asked to answer many questions relating to oral hygiene awareness. Furthermore, no adjustments were made.

Patients undergoing orthodontic treatment with metal brackets in an age range of 15-45 years were included in the study.

Patients treated with myofunctional appliances or ceramic brackets were excluded from the present study. Patients with a history of any systemic disease were excluded in the study. Prior to answering any questions, each participant gave their informed consent.

The survey included 15 closed-ended, multiple choice questions. (Table 1) Apart from these 15 questions, name, gender, age, socioeconomic status, and address were collected. The questionnaire consist of questions evaluating the attitude and awareness of oral hygiene practices in orthodontic patients. The results were computed based on the responses to the questions. Statistical analysis was done using SPSS software (version 23.0; IBM, Armonk, NY, USA).

Table-1; Questionnaire with 15 closed ended questions

S.no	**Questionnaire items**	Choices
1	Do you brush your teeth?	Yes/No
2	If yes, then how many times?	1/2/3
3	Which material do you use to brush your teeth?	Tooth Paste/Neem Powder/Salt
4	What tool do you use to brush your teeth?	Tooth Brush/Finger/Else
5	If brush, then what type of brush?	Soft/Medium/Hard
6	What direction do you brush in?	Straight/Horizontal/Vertical
7	Do you change your brush often?	Yes/No
8	If yes, then in how much time?	After 3 months/6 months/1 year
9	Do you use any tool to clean between your teeth?	Yes/No
10	Do you use any of the following?	Floss/Toothpick/Inter-dental/Brush/Water pick
11	Do you rinse after eating food?	Yes/No
12	If yes, then with what?	Water/Mouth Wash
13	Have you ever had malodour?	Yes/No
14	Have you ever brushed very forcefully?	Yes/No
15	Do you think your teeth look ugly with braces?	Yes/No

III. Results

A total of 300 orthodontic patients completed a questionnaire consisting of 15 multiple-choice questions. The detailed results are presented in Table 2. Among the participants, 65% were male and 35% were female. Regarding brushing frequency, 46% brushed once a day, 42% brushed twice daily, and 12% brushed three times a day (Graph 1). In terms of toothbrush type, 56% preferred soft-bristled brushes, 40% used medium bristles, and 8% chose hard-bristled brushes (Graph 2).

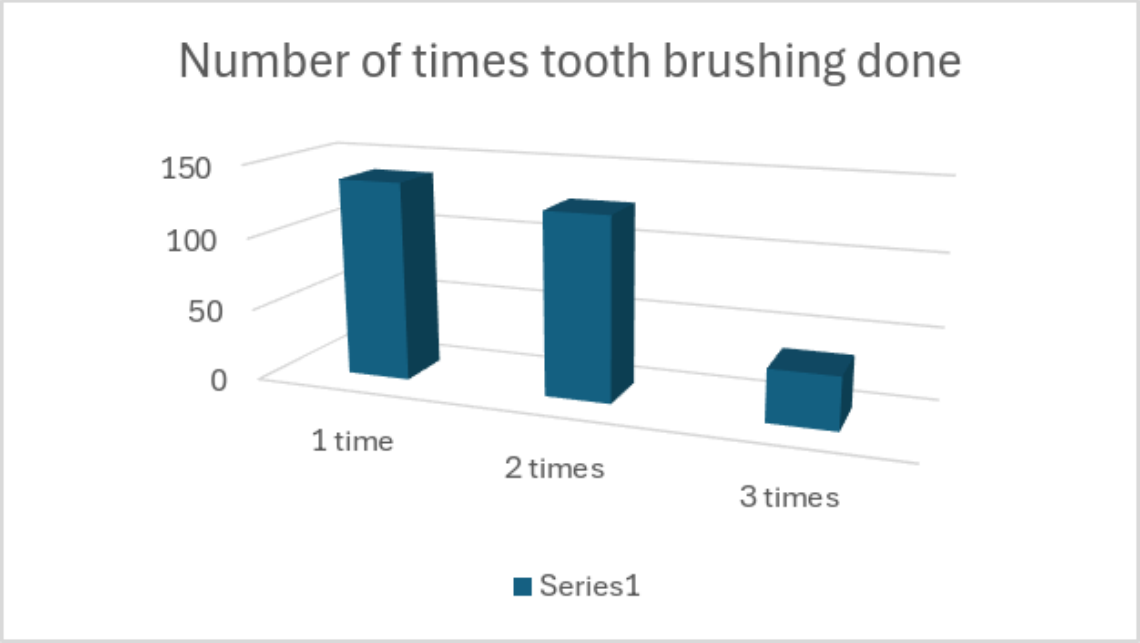
62% of the patients used inter-dental aid to clean the proximal areas in which 16% used interdental brush, only 22% showed evidence of using dental floss,16% used toothpick which should not be used, 2% used water-pick which is often recommended, 6% used combination of floss, inter-proximal brush and water pick which is the best approach (Graph 3).

Only 16% of the patients used mouthwash regularly, while 74% rinsed their mouths with water after meals. Notably, 10% did not rinse at all. Regarding their appearance with braces, 58% felt comfortable and satisfied, whereas 42% believed their braces made them look unattractive.

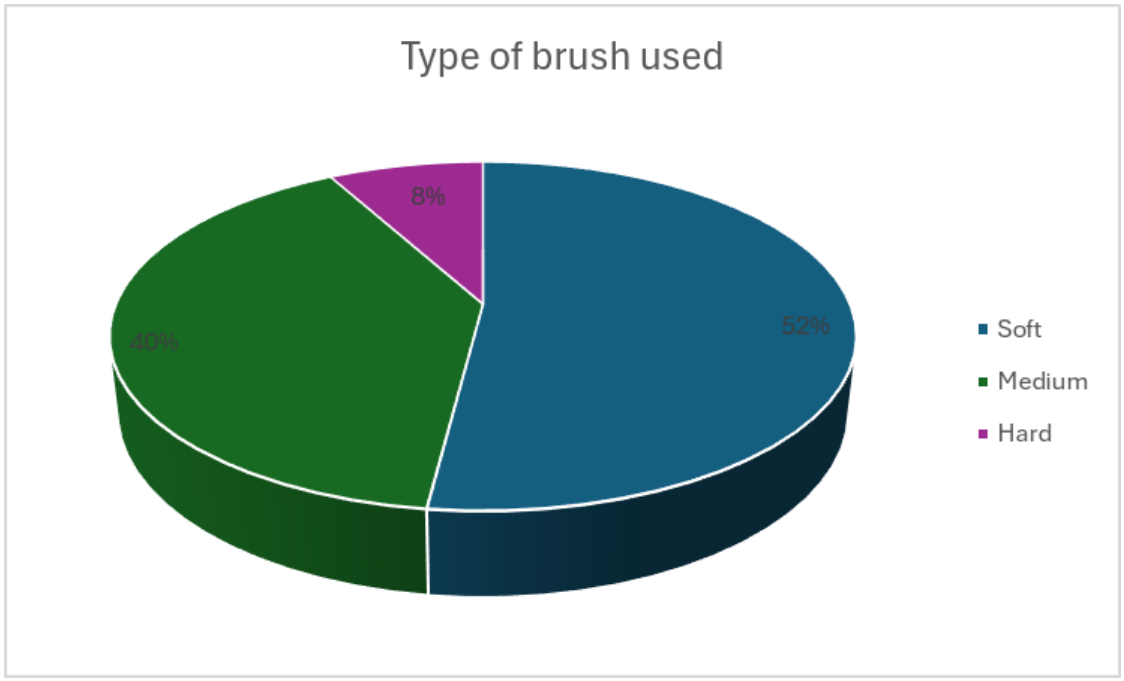
Table 2; Responses by the participants for the questionnaire

S.no	Questionnaire items	Choices	N	Percentage (%)
1	Do you brush your teeth?	Yes	300	100
		No	0	-
2	If yes, then how many times?	1	138	46
		2	126	42
		3	36	12
3	Which material do you use to brush your teeth?	Tooth Paste	288	96
		Neem	0	0
		Powder	2	0.9
		Salt	9	3
4	What tool do you use to brush your teeth?	ToothBrush	294	98
		Finger	5	1.58
		Else	3	1
5	If brush, then what type of brush?	Soft	156	52
		Medium	120	40
		Hard	24	8
6	What direction do you brush in?	Straight	75	25
		Horizontal	135	45
		Vertical	90	30
7	Do you change your brush often?	Yes	225	75
		No	75	25
8	If yes, then in how much time?	After 3 months	45	15
		After 6 months	195	65
		1 year	60	20
9	Do you use any tool to clean between your teeth?	Yes	264	88
		No	36	12

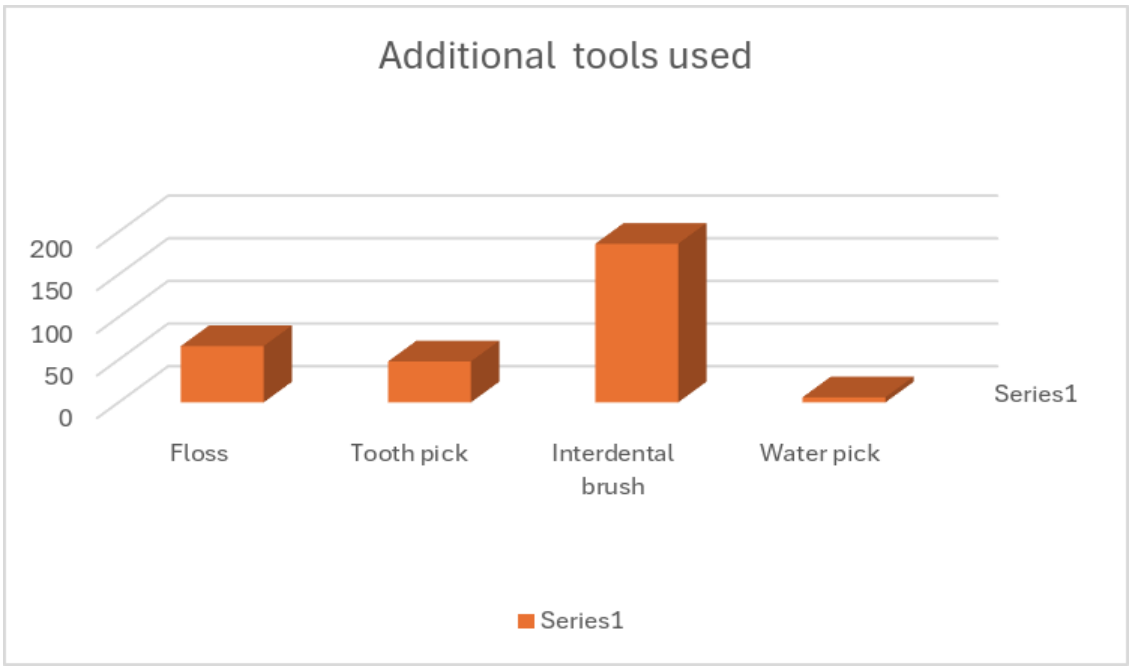
10	Do you use any of the following?	Floss	66	22
		Tooth pick	48	16
		Interdental brush	186	62
		Water pick	6	2
11	Do you rinse after eating food?	Yes	69	23
		No	231	77
12	If yes, then with what?	Water	222	74
		Mouth wash	48	16
13	Have you ever had malodour?	Yes	81	27
		No	219	73
14	Have you ever brushed very forcefully?	Yes	75	25
		No	225	75
15	Do you think your teeth look ugly with braces?	Yes	174	58
		No	126	42



Graph 1; Number of times tooth brushing done



Graph 2; Type of brush used



Graph 3; Additional tools used

IV. Discussion

Maintaining good oral hygiene is especially important for patients undergoing orthodontic treatment. Fixed appliances such as braces and aligners create extra spaces where plaque and food particles can easily get trapped. This buildup increases the risk of enamel demineralization which is often seen as white spot lesions, gingival inflammation, cavities, and bad breath. If oral hygiene is neglected during treatment, it can not only harm the patient's oral health but also compromise the success of the orthodontic therapy.[10,11]

In this study, 300 orthodontic patients took part in a survey about their oral care habits. Impressively, all participants reported using a toothbrush. Among them, 46% brushed once a day, 42% brushed twice daily, and 12% brushed three times a day. These findings align with previous research by Shah et al., [6] where 100% of patients also used toothbrushes. Another study by Tadin et al [12] involving students found that 83% brushed two to three times daily, while 17% brushed less often. Based on such evidence, it is strongly recommended that

orthodontic patients brush at least twice a day, ideally after every meal or snack, to effectively remove plaque. [13]

Regarding the type of toothbrush used, 56% preferred soft-bristled brushes, 40% used medium bristles, and 8% opted for hard bristles. A majority of 88% also used some form of interdental cleaning device: 62% used interdental brushes, 22% used dental floss, 16% used toothpicks (which are generally discouraged), and 2% used water picks. For comparison, Shah et al. [6] reported that 44% of their patients brushed twice daily, while Inaam Ahmad et al [14] found that 50% of dental students used manual soft toothbrushes and 67% replaced their brushes every three months. Orthodontic patients should be advised to use a soft-bristled toothbrush combined with fluoride toothpaste (containing 1350–1500 ppm fluoride) to gently clean all tooth surfaces, especially around brackets, wires, or aligner attachments. Additionally, specialized orthodontic toothbrushes or electric toothbrushes with orthodontic heads can be highly effective in removing plaque and maintaining oral health throughout treatment.

In this study, 45% of participants reported brushing their teeth using horizontal strokes, 30% used vertical strokes, and 25% brushed in a straight (or linear) motion. After meals, only 23% of patients rinsed their mouths, with 74% opting to rinse with water and 16% using mouthwash. Comparatively, Inaam Ahmad et al.[14] found that among dental students, 48% combined horizontal and vertical brushing techniques, and 22% used mouthwash daily, with usage being more common among students in their preclinical years. Existing literature suggests that the most effective brushing technique involves angling the toothbrush at about 45 degrees toward the gum line and using small circular or a combination of horizontal and vertical strokes, especially to clean thoroughly around orthodontic appliances.[15]

Interestingly, this study showed a slightly higher preference (16%) for mouthwash use among orthodontic patients as an additional method of plaque control. Other research has reported mouthrinse use in a range between approximately 26% and 33%, indicating some variation across populations. [16-19]

Most participants in this study brushed their teeth twice daily using a soft manual toothbrush and fluoride toothpaste. However, many were not fully aware of their oral hygiene status or the best practices to maintain it during orthodontic treatment. This highlights the important role of clinicians in enhancing patients' understanding and motivation regarding oral care.

Orthodontists and dental professionals should prioritize ongoing education and reinforcement of personalized oral hygiene instructions throughout the course of treatment. Regular reminders and tailored advice can help patients adopt and maintain effective habits, ultimately improving treatment outcomes.

V. Conclusion

Maintaining excellent oral hygiene during orthodontic treatment requires a comprehensive strategy. This includes careful brushing with fluoride toothpaste, daily interdental cleaning using specialized tools, the use of mouth rinses, mindful dietary choices, and consistent professional dental care. These combined efforts help prevent common complications such as enamel demineralization (white spot lesions), gingival inflammation, cavities, and bad breath, thereby supporting both oral health and the success of orthodontic therapy.

Educating and motivating patients to consistently follow these oral hygiene practices throughout their orthodontic journey is essential. Doing so not only promotes optimal treatment results but also helps preserve their overall quality of life.

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