THE IMPACT OF ORAL HYGIENE MAINTENANCE ON THE GINGIVAL HEALTH OF PATIENTS HAVING FIXED ORTHODONTIC APPLIANCES "AN ANALYTICAL CROSS-SECTIONAL STUDY''

ROHANA REHMAN[1], MIRZA HASSAN ZAHEER[2], BASIL KHALID[3], EHSAN HAIDER[4], ADNAN KARIM[5], NADIA IRSHAD[6]

[1,4-5]Assistant Professor, [2]Postgraduate Resident, [3]Associate Professor, [6]Dental Surgeon

[1]College of Dentistry, Bakhtwar Amin Medical & Dental College, Multan, [2-4]Multan Medical and Dental College, Multan, [5]RHC Choti Zareen, [6]Sharif Medical and Dental College, Lahore

ABSTRACT

Background: Facial aesthetics is important for social as well as physical well-being. Malocclusion can cause poor facial aesthetics as well as the improper function of teeth.

Objective: To evaluate the oral hygiene habits among patients experiencing fixed orthodontic treatment

Method: The study was conducted in the orthodontic department of Multan medical and dental college, Multan. One hundred and five patients undergoing fixed orthodontic treatment were included in the study. Duration of study was 5months and 12 days. Patients were asked to fill out a questionnaire about the reason for undergoing treatment, the importance of orthodontic treatment in life, and oral hygiene practice after having fixed orthodontic treatment. Statistical data were analyzed by SPSS version 22 to determine the frequency distribution and percentage ratio for each variable. A Chi-square test was applied to compare gingivitis and frequency of brushing and a p-value ≤ 0.05 was considered significant.

Results: The mean age of participants was 20± 4.7 years, with females predominant (71%). Most of the patients were undergoing treatment due to a friend's suggestion (32%) and a dentist's suggestion (17%). Most patients brushed twice daily (25%) or after every meal (24.4%) and still have gingivitis which represents brushing alone is not enough. Chi- square test was utilized between frequency of brushing and gingivitis and p- value was > 0.05 which is considered insignificant. The most preferred toothbrush was the general toothbrush (28%) and unspecified brush (23%). Which means proper knowledge of the type of brush was lacking. Only 41% of patients were sure about using fluoridated toothpaste which again shows a lack of awareness. 35% of patients were using a toothpick and 22% were using pins to clean their teeth in absence of a brush which again shows a lack of proper knowledge. 37% of patients were using their mouth wash and 24% were using interdental brushes occasionally.

Conclusion: The orthodontic treatment itself causes plaque retention and gingivitis so in order to maintain good oral hygiene self-motivation and proper knowledge given by the care provider is very necessary to improve gingival outcomes.

Keywords: Oral hygiene; fixed orthodontic appliances; gingivitis; inflammation; tooth brushing.

How to cite this article: Rehman R, Zaheer MH, Khalid B, Haider E, Karim A, Irshad N. The impact of oral hygiene maintenance on the gingival health of patients having fixed orthodontic appliances. Pak Postgrad Med J 2023;34(1): 43-46

DOI: https://doi.org/10.51642/ppmj.v34i01.502

Correspondence to: *Rohana Rehmam*
Assistant Professor
[1]College of Dentistry, Bakhtwar Amin Medical & Dental College, Multan, Pakistan.

Email*: rohanakhan88@gmail.com*

INTRODUCTION

Facial aesthetics is important for social as well as physical well-being. Malocclusion can cause poor facial aesthetics as well as the improper function of teeth[1]. Malocclusion is a lack of proper occlusion and several factors are covered under this one heading of

malocclusion. These factors include crowding, spacing, proclination, overjet, overbite and crossbite, etc[2]. Patient seeks treatment for malocclusion which could be a result of hereditary, developmental or environmental factors. These factors also include intake of pasty diets, mouth breathing, and deleterious oral habits, especially pacifier sucking. These are the main causes attributed to the development of malocclusion[3]. Orthodontic treatment is needed to improve aesthetics as well as function[4]. Orthodontic treatment has many benefits regarding social, psychological, and functional well-being[5] (Al Fawzan et al.,2013). Apart from benefits, there are many demerits related to orthodontic treatment which could be the result of the negligence of a patient or a practitioner. The adverse effects of orthodontic treatment include demineralization of the tooth, tooth pain, gingivitis, and TMJ disorders. Plaque retention plays a significant role in the development of gingivitis[6] (Talic. 2011). So, this is very difficult to maintain good oral hygiene in a patient undergoing fixed orthodontic treatment. For this, the objecive of the study is to access the role of oral hygiene habits and proper instructions by the orthodontist about oral hygiene maintenance.

METHODS

The study sample was 105 patients who were undergoing orthodontic treatment at the orthodontic department of Multan Medical and Dental College Multan. Males and females 14-41 years of age were included in this study. These patients were recruited at the beginning of orthodontic treatment. The mean age of the sample was 20 years (SD±4.47years). Duration of study was 5 months and 12 days. Patients were treated by the postgraduate trainees and all the patients were asked to fill out a structured questionnaire. The questionnaire was composed of different questions regarding the reason for seeking orthodontic treatment, the importance of orthodontic treatment, and oral hygiene habits after fixed orthodontic treatment. The question regarding the oral hygiene behavior of the patients was toothbrush selection, use of toothpaste and other oral supplemental products, frequency of brushing, and information regarding oral care received by the orthodontist and dental assistant. The patient data was filled in by the trainee after face-to-face question answer session. The data was analyzed to determine the frequency and percentage ratio for each variable. The study was reviewed by the institutional review board and ethical committee of Multan Medical and Dental College Multan. The participants were informed about the procedure and were assured of the confidentiality of the collected information. Only those patients who gave consent were included in the study the results were expressed in percentage for each examined variable. The frequency of each variable was calculated by SPSS version 2022. The Chi-square test was applied to the gingival score and frequency of brushing. A p-value of ≤ 0.05 was considered significant.

RESULTS

Out of 105 total patients who responded to the questionnaire, 91(84.90%) were satisfied with the treatment. Only 14 patients (13.2%) were not satisfied.

Table 1 Percentage of satisfied respondents (no of respondents n=105)

Satisfaction	N=105	Percentage
Satisfied	91	84.90%
Not satisfied	14	13.20%

Out of 105 patients, 75 were female and 30 were male. Male: female ratio was 1:2.5. It means females are more interested in orthodontic treatment.

Table 2 Male to female ratio (no of respondents n=105)

Gender	N=105	M: F
Female	75	2.5
Male	30	1

Most frequent to least frequent reason of seeking treatment was fiend suggestion 32%, dentist suggestion 17%, mal-alignment 16%, difficulty in cleaning 9.5%, parents' suggestion 8.5%, dentofacial anomalies 8%, malocclusion 6% and 3% for other reasons.

Table 3 Reasons for seeking orthodontic treatment (no of respondents n=105)

Parameters	Total = 100%
Malocclusion	6%
Fiend suggestion	32%
Parents suggestion	8.5%
Dentist suggestion	17%
Difficulty in cleaning	9.4
Dentofacial anomalies	7.5
Fashion trend	0%
Other	3%
Mal-alignment	16%

After doing orthodontic treatment most of the patients were using a general toothbrush 28%, 23% of the patient was using a no specified brush and 19% were using medium bristle brushes. Only 10.4% were using an orthodontic brush. 37% of patients were not sure about their toothpaste and 35% of the patients were using fluoridated toothpaste. Most of the patients were brushing 2 times a day. 35% of the respondents were using toothpicks if a toothbrush was not available

Table 4 type of brush used (no of respondents n=105)

Parameters	Total = 100%
Soft bristle	7.5%
Hard bristle	12.5%
Medium bristle	18%
General	28%
Not specified	23%
Orthodontic	10.4%

Table 5.1 type of toothpaste (no of respondents n=105)

Fluoridated	41%
Non- fluoridated	23%
Not sure	36%

Table 5.2 frequency of brushing

Morning	14.2%
Before bed	17.9%
Morning and before bed	25.5%
After meals	24.5%
After each meal and snack	17%

Table 5.3 Cleaning aids if toothbrush not available

Rinse mouth	22.7%
Toothpick	35%
Pins	22.6%
Other	18.9%

Table 5.4 supplemental tools for teeth cleaning

Interdental brushes	24.5%
Mouth wash	37.7%
Floss	23.6%
Toothpick	13.2%

Table 6 information from the care provider and assistant

Correct brushing technique	51%
Type of toothbrush	64%
Use of fluoridating toothpaste	58%
Dental aids other than brushes	62%
Prescription of fluoridated toothpaste	62.1%
Type of Dietary intake	29%

DISCUSSION

In the present study, 75 patients were female and 30 were male. Male to female ratio for seeking orthodontic treatment was 1:2.5. It means women are more concerned about their aesthetic and functional well-being. The same results were evaluated in another study by Anuwongnukroh et al., 2017. His study also shown more females were undergoing fixed orthodontic treatment[7]. In another study by Lee et al., 2011 he also provide us with the same observation that females were more than males[8].

In our community mean age of the patient was 20 years (SD±4.47years). In another study by Anuwongnukroh et al., 2017 conducted in Thailand mean age of the patient was 20 years (SD ± 6.4)[7]. In a study conducted in china by Chen et al in 2010 mean age of the community undergoing fixed orthodontic treatment was 15.7 years[9].

Table 7 shows relation between frequency of brushing and gingivitis.

Gingivitis Score	Frequency of Brushing					Total
	Morning	Before bed	Morning & before bed	After meal	After meal and snack	
No Gingivitis	1	0	0	0	0	1
Mild	1	3	2	1	0	7
Moderate	8	12	18	14	9	60
Severe	5	4	7	11	9	37
Total	15	19	27	26	18	105

*p-value = ≤ 0.05

Chi- square test was utilized between frequency of brushing and gingivitis and p- value was > 0.05 which is considered insignificant. In the present study, 27 patients were doing brushing twice daily while 26 patients were brushing after every meal and 18 after every meal and every snack but their gingivitis was not linked to their brushing habits and p-value was > 0.05 which is considered insignificant. It means despite brushing frequently gingivitis can occur in patients undergoing fixed orthodontic treatment. Another study by Mahindra et al., in 2017 also reported the same result that brushing frequency does not influence plaque and bleeding index[10]. This is due to the increase in plaque retentive areas and the inability of the patient to perform adequate oral hygiene. Proper education and the patient's own motivation can play wonders in order to maintain oral hygiene[10]. Patients undergoing fixed Orthodontic treatment, in particular, must be trained in proper oral hygiene maintenance and their brushing procedures must be monitored regularly.

Only 7.5% of patients were using soft bristle brushes. 28% of the patients were using a general toothbrush and 23% were using an unspecified toothbrush. Proper knowledge regarding the use of a proper type of toothbrush must be encouraged to maintain proper oral hygiene. Different types of toothbrushes have different impacts so proper selection should be made to treat the related issues. Zanatta et al 2011.

In the present study, most of the patients were using toothpicks to clean their mouth in case of the non-availability of toothbrushes which is highly contraindicated as it can damage the tooth and gingiv[8,11]. Use of dental floss

should be encouraged instead of toothpick use. 37% of patients were using mouthwash along with toothbrush use to improve oral hygiene. As plaque retention increases after placing brackets wires and appliances. So brushing alone is not sufficient. The use of extra oral hygiene materials should be encouraged[9,10,12,1].

51% of the patients were informed about the correct brushing technique. 64% of the patients were informed about the type of brush. 62% were informed about dental aids other than brushes. 62% were prescribed fluoridated toothpaste but only 29% were informed about dietary intake. Patients should be properly informed about plaque removal, flossing, use of fluoride toothpaste, dietary modification, and use of fluoride-containing mouthwashes[14].

A study was conducted to determine the impact of oral hygiene practices on gingivitis. The study emphasized the role of proper knowledge given by the care provider about brushing technique, dental aids, type of brush, use of fluoridated toothpaste, and use of mouth wash which can provide better outcomes. Brushing alone was not sufficient to address the problem as brushing was not linked to gingivitis. The study limitations were all of the variables were patient-dependent. The type of dietary intake was not studied which might be a significant factor associated with gingivitis.

CONCLUSION

According to this study, most patients were undergoing orthodontic treatment because of a friend's suggestion and a parent's suggestion. Peer pressure was the leading reason. More than half patients were either not sure or using non-fluoridated toothpaste. The use of fluoridated toothpaste must be encouraged. ample number of patients were not properly informed about the use of a type of brush, dental aids, fluoridated toothpaste, and brushing technique. Dietary instructions were the least guided. So, in order to improve patients' oral hygiene status, the adjuncts must be reinforced.

ETHICAL APPROVAL

The study was approved by the Institutional Review Board & Ethical Committee of Multan Medical and Dental College, Multan, Dated 30.10.2021

REFERENCES

1. Houchens N, Saint S, Petrilli C, Kuhn L, Ratz D, De Lott L, et al. International patient preferences for physician attire: results from cross-sectional studies in four countries across three continents. BMJ open. 2022;12(10):e061092.
2. Marusamy KO, Marghalani A, Aljuhani LK, Alhelali SN, Ramasamy S, Nayak UA. Relationship of Malocclusion with Self-Esteem & Quality of Life of Adult Saudi Female Orthodontic Patients. Journal of Evolution of Medical and Dental Sciences. 2021;10(30):2276-2281.
3. Carvalho FSD, Carvalho CAPD, Sales-Peres A, Bastos JRDM, Sales-Peres SHDC. Epidemiology of malocclusion in children and adolescents: a critic review. RGO-Revista Gaúcha de Odontologia. 2014;62:253-260.
4. Al Fawzan A, Al Fawzan A. Reasons for seeking orthodontic treatment in Qassim region: A Pilot Study. International Dental Journal of Students Research. 2013;1:58-62.
5. Moosa Y, Han LN, Safdar J, Sheikh OA, Pan YP. Periodontal status of Pakistani orthodontic patients. Brazilian oral research. 2015;29:1-5.
6. Zeighami A, Maybodi FR, Toodehzaeim MH. Perception and practice of patients with fixed orthodontic appliance regarding oral health: A cross-sectional study in Yazd, Iran. 2022.
7. Mahindra RK, Suryawanshi GR, Doshi UH. Effects of fixed orthodontic treatment on gingival health: an observational study. International Journal of Applied Dental Sciences. 2017;3(3):156-161.
8. Olkun HK, Sayar G. Impact of orthodontic treatment complexity on oral health-related quality of life in Turkish patients: a prospective clinical study. Turkish Journal of Orthodontics. 2019;32(3):125.
9. Guo J, Li L, Guan G, Bennani F, Mei L. Oral health knowledge and practice among orthodontic clients in China and New Zealand. Canadian Journal of Dental Hygiene. 2020;54(3):124.
10. Buthelezi NL, Madiba TK. Oral hygiene habits and status of orthodontic patients attending the University of Pretoria, Oral and Dental Hospital. South African Dental Journal. 2021;76(3):130-135.
11. .Jena AK, Mohapatra M, Sharan J, Patro BK. Temporary deterioration of oral health–related quality of life (OHRQoL) in nonextraction and extraction modalities of comprehensive orthodontic treatment in adolescents. The Angle Orthodontist. 2020;90(4):578-586.
12. Kumar V, Singh P, Arora VK, Kaur S, Sarin S, Singh H. Assessment of effect of fixed orthodontic treatment on gingival health: An observational study. Journal of Pharmacy & Bioallied Sciences. 2021;13(Suppl 1):S425.
13. Hirschfeld J, Higham J, Chatzistavrianou D, Blair F, Richards A, Chapple IL. Systemic disease or periodontal disease? Distinguishing causes of gingival inflammation: a guide for dental practitioners. Part 1: immune-mediated, autoinflammatory, and hereditary lesions. British Dental Journal. 2019;227(11):961-966.
14. Ballini A, Di Cosola M, Saini R, Benincasa C, Aiello E, Marrelli B, et al. A Comparison of manual nylon Bristle Toothbrushes versus thermoplastic elastomer toothbrushes in terms of cleaning efficacy and the biological potential role on gingival health. Applied Sciences. 2021;11(16):7180.

AUTHOR'S CONTRIBUTIONS

RR: Manuscript writing, drafting, data collection
MHZ: Data collection, drafting
BK: Abstract formation, editing
EH, AK, NI: Drafting, editings