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ORIGINAL ARTICLE

Brushing Characteristics and Dietary Patterns of Orthodontic Patients with Fixed Appliances

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ABSTRACT

Background: Proper brushing practices are required to maintain good oral hygiene. This is of utmost importance in patients with fixed orthodontic appliances as these appliances can facilitate plaque accumulation and make cleaning process difficult. Hence if good oral hygiene is not maintained with these appliances then deterioration of gingival and periodontal health will result. Frequent intake of acidic drinks and sweet food can further harm the teeth.

Aim: To determine tooth brushing characteristics of orthodontic patients with fixed appliances. Determine dietary patterns of such patients. Determine other oral hygiene measures used by them.

Study Design: Cross sectional study

Duration of the study: 6 months

Methodology: Questionnaires were conveniently distributed among 104 orthodontic patients who met the inclusion criteria and provided consent to provide the information. Data collected was analyzed using SPSS 2020.

Results: Most (70%) of the responding patients brush two times daily. Correct brush type (soft) is in use by 77% of the individuals. Approximately 64-66% of individuals combine vertical and horizontal technique of tooth brushing, use interdental toothbrush and report that they hardly intake fizzy drinks. However, only 55% patients have reported brushing for total duration of 2 minutes. Around 30% of the respondents have frequent intake of junk food and sugary food.

Practical Implication: According to our knowledge, this study is the first study to date to evaluate the brushing habits and dietary patterns in Pakistani orthodontic patients with fixed appliances.

Conclusions:

The present study shows that majority of the patients show good brushing practices but need to improve their total duration of brushing. Frequent intake of junk food, sweets and fizzy drinks are also avoided by most patients. Use of fluoride mouthwashes and floss was seen in lesser proportion of surveyed patients.

Keywords: Brushing characteristics, oral hygiene measures, dietary patterns, orthodontic patients with fixed appliances.

INTRODUCTION

Orthodontic treatment aims to establish optimal and stable occlusal relationships with dentofacial harmony. Orthodontic treatment not only improves facial aesthetics but also oral functions such as mastication and speech. Orthodontic treatment therefore enriches quality of life by enhancing general oral health. However, in addition to its benefits, it also has certain associated risks and side effects.[1,2] Orthodontic therapy is most commonly associated with periodontal complications. Orthodontic patient face difficulty to adequately clean oral cavity due to the braces which can lead to gingival inflammation.[3] Further, studies demonstrate significant quantitative increase in dental plaque and occurrence of gingivitis among patients with fixed orthodontic appliances. Increase in microbial flora, plaque and calculus formation result in bleeding from the gums.[4]

Diligent oral health practices are important for patients undergoing orthodontic treatment. Factors such as patients' knowledge, motivation and cooperation are crucial in adequate oral hygiene maintenance during fixed orthodontic treatment. Poor oral hygiene may be correlated with poor knowledge or negligence by the patient.[5] Literature showed that in spite of appropriate oral hygiene instructions by orthodontists, most of the patients undergoing orthodontic therapy fail to maintain adequate standard of plaque control. Several studies demonstrate poor knowledge related to gingival health and oral hygiene practises amongst orthodontic patients. An example to that is a study done in Saudi Arabia which revealed inadequate oral home care among patients undergoing fixed orthodontic treatment. Further Terri showed in a study that inadequate oral hygiene can contribute to poor periodontal tissue status in orthodontic patients. Orthodontists must encourage and raise the awareness of importance of oral hygiene practices in their patients throughout orthodontic treatment.[2]

Foods or drinks which have low pH are said to be acidic. Examples include fizzy drinks. Such food and drinks when frequently consumed are not just harmful for the enamel but they also tend to decrease life of dental restorations. Such effects are generally unknown to patients and should be warned from time to time for better dental health during orthodontic therapy.[6] Frequent sugary solid or drinks consumption tends to decrease salivary pH. When this occurs in patient of fixed appliances, it creates conditions that are extremely favourable for caries development. Regular motivation, reinforcement of oral hygiene measures and professional prophylaxis performed at needed intervals help to reduce chances of enamel demineralization and thus caries formation.[7]

It is also well-established that maintaining good oral hygiene is crucial during orthodontic treatment in order to prevent inflammatory changes, worsening of the gingival situation, and decalcification of enamel surfaces.[8,9] Therefore, the long-term efficacy of orthodontic treatment depends on diligent brushing technique, a "tooth-healthy" diet, and regular check-ups.[10] Dentists and their patients both need to put in extra work to help their patients improve their dental and nutritional health. Improvements are possible, but only with the patient's buy-in and cooperation. Plaque and gingivitis can be efficiently reduced by using mouthwashes like chlorhexidine in along with regular oral care practises.[9]

People in their teens typically get orthodontic treatment. Oral disorders of the hard and soft tissues emerge in patients having orthodontic treatment because adolescents typically have subpar manual skill, low motivation, and poor long-term compliance with appropriate oral hygiene maintenance.[11] When compared to "non-adherent patients," those who consistently demonstrate good attendance, follow the orthodontist's suggestions, properly care for their appliances, and practise good dental hygiene have better clinical orthodontic outcomes.[12]

Unfortunately, there is a lack of information regarding the brushing habits and dietary habits of patients with fixed orthodontics in Pakistan. Assessing the patients' oral healthcare needs and the patients' compliance with oral hygiene guidelines requires collecting baseline data on Brushing Habits and Dietary Patterns. Future preventative programmes for patients using fixed orthodontic appliances can refer to this data for guidance. Thus, this research set out to determine the food and brushing habits of people with fixed orthodontics.

MEATHODOLOGY

Ethical approval was obtained before starting our study. Our cross-sectional study was done in orthodontic department of Punjab Dental Hospital, Lahore amongst 104 patients receiving fixed orthodontic appliances. Care was taken to keep all the participants personal information confidential. Patients in dental and medical field were excluded. All the participating patients chosen were healthy and had their fixed orthodontic treatment started at least 6 months prior to providing information for this cross sectional study. Information about oral hygiene practices such as frequency, duration and method of brushing along with patients dietary practices was obtained.

In order to collect data, the authors created a questionnaire. Individuals were asked to fill out a confidential online survey about their demographics (gender, age, country of residence), dental hygiene routines (how often they brushed their teeth) and diets (how often they saw a dentist). We asked about how often you brush your teeth, for how long, with what kind of toothbrush, and what kind of toothpaste you use. Questions about regular dental checkups and professional teeth cleanings were among those related to the topic of professional dental care. In addition, individuals undergoing orthodontic treatment were polled about how their dental hygiene routine had evolved during the course of therapy.

The reliability of the questionnaire was also determined by Cronbach Alpha which was 0.8. Written consent was obtained from every participant before filling out the questionnaire. The data was collected by using the purposive sampling technique.

Analysis of the data was done using SPSS Version 20. A chi-squared (X^2) test was used to check the relationship between categorical variables. Standard deviations (SD) and age-group means were computed. Differences were considered significant if the p-value was less than 0.05.

RESULTS

Total 104 patients answered the questionnaires. Mean age of the respondents was 19.5 years and had standard deviation of 3.5. Among the responding patients, 76 were females and 28 were males. Most of the patient respondents reported correct brushing characteristics. 69 % of them informed brushing two times daily, 77% confirmed using soft tooth brush and 55% informed brushing for whole 2 minutes. Pie -Charts below briefly summarize brushing patterns of the patients who participated in the survey.

Other oral hygiene practices of patients explored in this survey were related to mouthwash usage, cleaning tongue and rinsing the mouth after meal. It was found that 36% of surveyed individuals hardly used mouthwash and similar proportion of surveyed participants (35%) frequently used mouthwash. 29% used mouthwash occasionally. Approximately half number of the participants (52%) reported frequent rinsing of the mouth with water and around similar proportion of respondents 23% reported rinsing the mouth occasionally and hardly. Percentage of patients brushing tongue frequently, occasionally and hardly are 45%, 26% and 29%. Majority of the responding patients (96%) do not use floss and 66% prefer using interdental brush. Bar chart below represents dietary patterns of our surveyed orthodontic patients with fixed appliances.

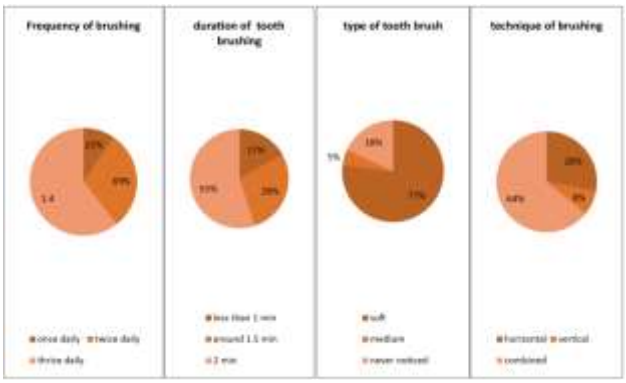

Figure 1: Pie-Charts Summarizing Brushing Characteristics Of Respondents

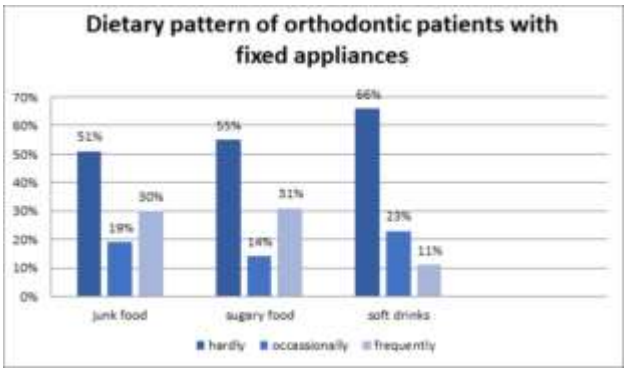

Figure 2: Dietary Patterns of Orthodontic Patients with Fixed Appliances

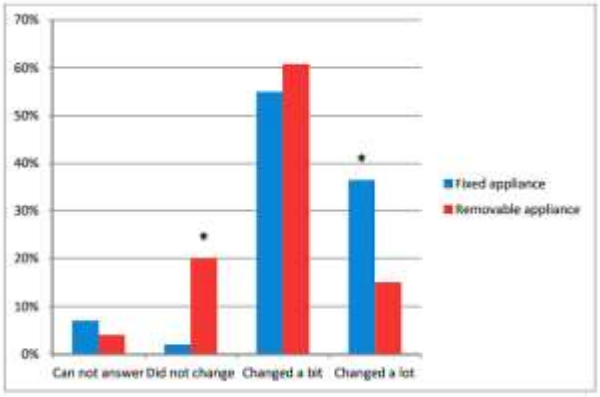

Figure 3: Alterations in the oral hygiene practices of orthodontic patients.

Table 1: A univariate logistic regression analysis of the participants' factors that explain their oral behaviour while undergoing orthodontic treatment

	OR	95% CI	*p*-Value
Tongue Brushing			
Yes	1.712	1.059–2.767	0.028
No	1	-	-
Auxiliary Measures			
Yes	1.797	1.118–2.887	0.015
No	1	-	-
Mouth Rinsing After Meals			
Yes	1.707	1.048–2.781	0.032
No	1	-	-

OR—odds ratio; CI—confidence interval.

DISCUSSION

This present study is the first one in our knowledge to explore brushing and dietary characteristics of orthodontic patients with fixed appliances in Pakistan. Both of these aspects play crucial role in maintaining dental health. Matter of fact is that the orthodontic appliances facilitate the food specks and debris accumulation both within the teeth as well as appliances by hindering adequate cleaning. This leads to enhanced plaque formation. Research infer that the commonly occurring adverse effects arising in absence of preventive programs such as brushing are decalcification of enamel and inflammatory gingival diseases around the fixed orthodontic appliances. Among the major reasons held responsible for such periodontal complications are poor practises related to oral hygiene. Thus our study was commenced to figure out the specific pitfalls in oral hygiene and dietary practises in Pakistani orthodontic patients with fixed appliances.[13,14]

Our study found that 22 %, 69% and 9% of the respondents brushed once, twice and thrice daily respectively. A study done in Pakistan's neighbouring country concluded that 63%, 26% and 11% brushed once, two times and three times daily. Bardal et al. showed in his research amongst patients undergoing fixed orthodontic treatment that approximately 44%, 30% and 4% brush their teeth thrice a day, twice and once every day.[12] Among the two mentioned studies, our study had greatest proportion of patients brushing two times daily.

Patients should use soft toothbrush and floss between the meals. Proper flossing is done by positioning the floss below the orthodontic wire attaching the brackets together. Results of our study conclude that 96% of our surveyed patients don't use floss. This can be compared with previous study done amongst BDS students in De'Montmorency College of Dentistry Lahore where 92.8% of the students studying dentistry didn't do flossing daily.[14]

Among the main detrimental latrogenic effects of fixed orthodontic treatment are white spot lesions. White spot lesions are first clinical signs of enamel surface demineralization and also mark first stage of caries. Patients are thus informed that they are responsible to prevent white spot lesion formation. Chlorhexidine mouthwashes can reduce gingival inflammation while fluoride mouthwashes reduce decalcification of enamel.[2] Bardal et al. found that only 11% of the respondents with fixed orthodontic treatment used soft tooth brushes as well as interdental brushes for maintaining their oral hygiene.[12] A study in India inferred that 25% respondents use soft tooth brush, 42% use liquid mouth wash and only few (9%) use interdental cleaning aids. Comparing these results with results from our study, it can be said that greater percentage of respondents (66%) of patients from the present study use interdental brushes. However lesser (35%) of the respondents from the present study use mouthwash frequently.[17]

It is well known that plaque plays key etiologic role for gingivitis. Further, previous studies have shown that orthodontic forces and movements do not cause gingivitis in absence of plaque. However, when similar forces causing intruding and tipping movement act in presence of plaque, they can lead to both angular bone defects and attachment loss. Data collected over time has hence shown that the vital factor contributing to periodontal diseases is the presence of plaque. Periodontic dentistry and Orthodontic dentistry have synergistic relation. [18]

A study in the Iran concluded that DMFT index of individuals who never consumed sugary beverages was 39% lesser than individuals who had such beverages. The same study found that erosion was 94% lesser seen in individuals who never had soft sweet beverages when compared to those who used it daily. Our study found that majority (66%) of the orthodontic patients hardly consume fizzy drinks, 23% consume it occasionally and only 11% reported consuming it on daily basis.[19]

When comparing our results with study done among Nepalese orthodontic patients, it was seen that similar proportion (around 30%) of surveyed individuals consumed junk food and sweet food frequently. Patients should be warned that frequent sugary food consumption tends to decrease salivary ph. When this occurs in patient of fixed appliances, it creates conditions that are extremely favourable for caries development.[20]

It is orthodontist duty to enlighten his patients about measures involving oral hygiene. This includes both brushing techniques as well as usage of interdental cleaning aids1. Results of our research can be useful for the orthodontists while educating their patients so that they can focus to terminate the ill practises of patients with regards to their diet and oral hygiene. Improved oral hygiene practises and dietary patterns will ensure better dental and oral health. Research advocate that good attitude and education are vital for disease free oral health.[19]

Limitations of our study is that the patients are conveniently selected for this survey. More studies with bigger sample size and individuals selected randomly should be conducted to infer more reliable conclusions.

CONCLUSIONS

The present study shows that majority of the patients show good brushing practices but need to improve their total duration of brushing. Frequent intake of junk food, sweets and fizzy drinks are also avoided by most patients. Use of fluoride mouthwashes and floss was seen in lesser proportion of surveyed patients.

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