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PREVALENCE OF GINGIVITIS AND ORAL HYGIENE STATUS AMONG ORTHODONTIC PATIENT

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ABSTRACT:

Objective: The aim of this study was to evaluate the prevalence and severity gingivitis and oral hygiene status among patients with fixed orthodontic appliances.

Methods: The study is based on assessing and evaluating the severity gingivitis and oral hygiene status among patients with fixed orthodontic appliances. The sample and data collection for the study would be based on pre-determined inclusion and exclusion criteria. The orthodontic patients were examined for their oral hygiene status using the Simplified Oral Hygiene Index (OHI-S) by Greene and Vermillion. The gingival index (GI) was developed by Lee and Silncss"to describe the clinical severity of gingival inflammation using a mouth mirror and periodontal probe.

Results: A total of one hundred individuals were included in the sample, wherein 54 were females while 46 were males. In context to Angle's classification, nearly half, 44% of the sample had Class I malocclusion, 44% has Class II malocclusion, and 12% has class III malocclusion. In context to gingival inflammation, 84% of the study population had mild gingival inflammation while only 16% had moderate gingival inflammation. There was a higher prevalence of gingival inflammation among study participants who had Class I and II Angle's classification. Participants with Class III malocclusion were found to have the least oral hygiene status as compared to the previous groups. There was clear evidence that patients with Class III Angle's classification had reasonable poor oral hygiene status compared to participants with Class I and II Angle's classification.

Conclusion: Thus, it could be concluded that the oral hygiene status among participants with Class III Angle's classification was significantly poor compared to other groups.

Keywords: orthodontic, gingivitis, oral hygiene, malocclusion

INTRODUCTION:

Oral and dental health play a key role in overall physical health and quality of life... Based on current evidence, there is a strong relationship between chronic oral infections or poor oral health and preventable lifestyle disease such as diabetes, stroke, heart and lung diseases, premature birth or even low birthweight. Oral health forms an integral component of both health of the mouth and a reflection of the health of the entire body.[1]

The concept of oral health has been attributed with overall quality of life as per the World Health Organizations (WHO) definition of health. Health can be defined or understood as '*A state of complete physical, mental, and social well-being which should not be based merely by the absence of any disease or infirmity*' [2]

Malocclusion is a preventable and treatable orthodontic health issue. It can be defined as the incorrect relation or misalignment between the teeth of the

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two dental aches that help the jaws close and open.[3] In some cases, patients may request for orthodontic treatment to align teeth properly for aesthetic purposes only. In a few cases, skeletal disharmony of the face could be caused as a result of malocclusions, wherein the upper and lower jaws are not set appropriately. In rare and serious cases, malocclusions may cause severe skeletal disharmonies which not only affects the aesthetics of the face but also affects speech and mastication (chewing).[4]

Edward Angle had classified malocclusions based on sagittal relations of teeth and jaws which was published as Angle's classification system in 1899. Based on Angle's classification, there are 3 major classes or types of malocclusions class I, II, and III

In the past few years, researchers, dentist, and orthodontist have provided key insights on the inter-relationship of periodontic-orthodontic care.[14] However, this relationship has been a matter of great controversy considering underlying assessment, care, treatment, and management. Based on current evidence, malocclusion has been observed to negatively affect periodontal health. Early assessment and orthodontic treatment is required to prolong life of dentition and overall dental/oral health. Researchers have claimed that early orthodontic treatment has contributed to improved oral hygiene through correction of dental irregularities which in turn reduces or permanently eliminates occlusal trauma.[5-6] Thus, there has been a greater emphasis that orthodontic treatment is key to successful and improved periodontal status.[7]

The treatment and management of orthodontal health issues often requires development and planning of customized treatment plans that would benefit the individual. The orthodontist aims not only at gingival health but oral health-related quality of life.[8]

Patients undergoing orthodontic treatment are also advised to visit a dentist or dental hygienist once or twice a year for check-ups and cleaning (if required). In the event that patients have inadequate oral care at home and have poor oral hygiene practices, plaque accumulation over time could lead to gum disease and other oral health issues.[9] Gingival enlargements or inflammation is an early sign for infected gums that can be treated and revered easily. However, prolonged delay in cleaning and removal of plaque could result in several acute or chronic dental/oral issues such as gingival recession, gingivitis, dental caries, loss of periodontal support, and/or loss of gingival attachment.[9]

The aim of this study was to evaluate the prevalence and severity gingivitis and oral hygiene status among patients with fixed orthodontic appliances.

MATERIALS AND METHODS:

The study is based on assessing and evaluating the severity gingivitis and oral hygiene status among patients with fixed orthodontic appliances. In this case, a descriptive cross-sectional study would be conducted at the outpatient clinic, Department of Orthodontics & Dentofacial Orthopedics of private hospital. Ethical commitment clearance was obtained before conducting the study. Written consent form obtained from participant.

The sample population comprise of 100 participates would be included in the study .they were examined and the relationship between orthodontic appliances, oral hygiene status, and gingivitis would be determined.

The sample and data collection for the study would be based on pre-determined inclusion and exclusion criteria.

Inclusion criteria would be as follows:

(a) All participants would be of Chinese origin

(b) The age of all participants would be between 12 to 37 years

(c) All participants would have no history of medical trauma, injury or surgery and

(d) All participants would have no chronic disease conditions.

The exclusion criteria were as follows:

(a) Patients with systemic illness

(b) Non-cooperative patients and

(c) Patients with a history of previous orthodontic treatment.

Clinical examination

The clinical examination of all the orthodontic patients on active fixed appliances therapy was done by a single calibrated examiner using a mouth mirror and periodontal probe. Malocclusion class was determined clinically and radiographically.

The orthodontic patients were examined for their oral hygiene status using the Simplified Oral Hygiene Index (OHI-S) by Greene and Vermillion. The standard six tooth surfaces were examined for debris and calculus for each patient and recorded in a chart. The average individual Debris index and Calculus index were subsequently determined and added to obtain the simplified Oral hygiene index for each patient. The state of oral hygiene among the patients were then graded into three groups and determined as Good (OHI value 0-1.2), Fair (OHI value1.3-3.0) and Poor (OHI value 3.1-6.0). Gingival health status was determined using the GI of Leo and Sinless. In accordance with the GI score, the subject's gingival health was assigned as follows: no inflammation (<0.1); mild inflammation (0.1-1.0); moderate inflammation (1.1-1.9); and severe inflammation (2-3).

The oral hygiene status was assessed using the simplified oral hygiene index

(OHI-S) as described by Greene and Vermillion. The six surfaces (four posterior and two anterior teeth) were examined for the OHI-S. The first fully erupted tooth distal to the second premolar, usually the first molar, was examined. If the first molar is missing, the second molars were examined. The buccal surfaces of the maxillary molars and the lingual surfaces of the mandibular molars were examined. In the anterior teeth, the labial surfaces of the maxillary right and the lingual surface of mandibular left central incisors were examined. If either of the anterior teeth was missing, the incisor on the opposite arch was examined. Based on the examination of tooth surfaces, the debris (DI-S) and calculus index (CI-S) scores were recorded and calculated. The OHI-S index was determined by summing up the DI-S and CI-S indices. A total OHI score of 0.0 to 1.2 was considered as good, 1.3 to 3.0 as fair, and 3.1 to 6.0 as poor.

Data analysis

The data analysis was carried out with Statistical Analysis Software, SAS v9.4 (SAS Institute Inc, Cary, NC, USA).

RESULTS:

The study was carried out from September 2017 to February2018.. A total of 100 participants were included in the study, wherein 54 were females while 46 were males. In context to Angle's classification, nearly half, 44% of the sample had Class I malocclusion, 44% has Class II malocclusion, and 12% has class III malocclusion (table 1). Malocclusion or misaligned teeth was a common issue among both genders with no significant difference between the genders. In context to gingival inflammation, 84% of the study population had mild gingival inflammation while only 16% had moderate gingival inflammation (table 2& figure 1). There was a higher prevalence of gingival inflammation among study participants who had Class I and II Angle's classification. Gingival inflammation was uncommon among participants who had Class III Angle's classification

In context to extent of malocclusion, 41.49% or 26 participants and 47.37% or 18 participants with Class I malocclusion had good to fair oral hygiene status (Table 3& figure 2).

DISCUSSION:

In dental practice, orthodontic treatment is one of the most accepted, recognized, and acknowledge approach for dentofacial abnormalities.[10-11] It has several benefits and positive outcomes that make it one of the most suitable treatment approaches for different age groups. In patients with varying malocclusion, orthodontist or dental professionals may prefer the use of mixed orthodontics which helps the improvement of functional occlusion. [29-30] it also helps improve dentofacial appearance, aesthetics, and dental function. In some cases, the use of orthodontal devices improves oral health as it improves teeth alignment and makes

it easy for the individual to maintain optimal oral hygiene. [10-11]

Several anomalies or malformations of the jaws and face may influence oral health hygiene, increase risk of oral diseases, and require immediate orthodontic treatment. In most cases of malocclusion or misaligned teeth, there is an increased risk of dental plaque accumulation.[30-]These anomalies not only facilitate food particles to get trapped but increases risk of dental plaque formation and gum diseases.[10-11]

Based on current evidence misaligned teeth may not be considered as a primary etiological factor but a secondary or supporting factor that facilitates dental plaque formation and oral diseases. [10-11]

There is a plethora of evidence and reports indicating the use of fixed orthodontic appliances within the oral cavity of patients adversely affects and alters the nature of dental plaque. There is strong evidence that the composition, metabolism, and structure of dental plaque among orthodontic appliance users adversely changes.

The overall change in oral microbiome increases the microbial population, specifically *Lactobacillus* and *Streptococcus*. [10-11] the use of fixed orthodontic appliances not only hampers effective oral hygiene and care but also causes high cariogenic challenge. [10-11]

The use of orthodontic appliances may also influence the subgingival microbiota while maintaining oral hygiene may become challenging and difficult.

Inadequate oral hygiene is one of the major causes of periodontal disease and dental caries among patients undergoing orthodontic treatment. Fixed orthodontic appliances and allied rough-surface adhesives within the oral cavity are known to develop new retentive sites that support plaque formation which in turn facilitates inflammatory response. [10-11] Based on current evidence, patients having problems in managing high-standard oral hygiene with fixed orthodontal appliances have an increases risk of suffering from hyperplastic marginal gingivitis which if left untreated and unmanaged can progress to periodontitis.[10-11]

The success of orthodontic treatment is associated with high-standard oral hygiene care and techniques. [10-11] as discussed earlier, dental plaque accumulation remains to be one of the most common but preventable oral health issues among patients with fixed orthodontic appliances. However, difficulties in cleaning, brushing, and flossing due to the presence of appliances may hinder patients in maintaining optimal oral hygiene care. The occurrence of gingivitis, gum inflammation, and orthodontic appliances can be easily prevented and controlled by adoption optimal oral hygiene care. [10-11] Maintenance of oral hygiene is a primary risk factor for plaque accumulation and poor oral hygiene status among patients

with fixed orthodontic appliances. In a recent review, a team of researchers indicated that self-cleansing among those with fixed orthodontic appliances is also limited as there reduced mechanical chewing which in turn reduces the cleansing effect of saliva within the oral cavity to dislodge food residues or particles. Discontinuation of orthodontic treatment may occur if patients lack optimal oral healthcare. [12]

Some of the basic oral hygiene tips or instructions that could be given to patients include accurate technique of brushing, rinsing, and cleaning, adequate and optimal use of the right tool, device, or dental equipment at home, and sufficient length of brushing for every single tooth in order to maintain high-standard of oral hygiene. Customized preventive programs may be developed and implemented for patients with fixed appliances. As observed from the study, majority of the participants with malocclusions had poor oral health hygiene status which either reflected poor understanding of oral care or lack of use of optimal oral hygiene tools or devices. Regular health check-ups and cleaning with a dental hygienist or orthodontist is required in order to improve oral hygiene status.[13]

Since malocclusion hinders normal oral hygiene, the risk of plaque accumulation increases which in turn increases the risk of gingival inflammation, and gum diseases. An estimated 44% of study participants with Class I and Class II Angle's classification were observed to have mild to moderate gingival inflammation respectively. However, only 12% of the study participants with Class III Angle's classification were found to have mild to moderate gingival inflammation. There was a higher prevalence of gingival inflammation among study participants who had Class I and II Angle's classification. Gingival inflammation was uncommon among participants who had Class III Angle's classification.[13]

As per the results, there was an equal prevalence of oral hygiene status among participants with Class I and Class II Angle's classification. In each class, 44% of the participants were found to have fair to good oral health status while only 12% of participants with Class III Angle's classification had fair to good oral hygiene status. There is a strong correlation between malocclusion and poor oral hygiene status among patients with fixed orthodontic appliances. Participants with Class III Angle's classification had reasonable poor oral hygiene status compared to participants with Class I and II Angle's classification.

CONCLUSION:

From the study we can concluded that, participants with Class III Angle's classification had reasonable poor oral hygiene status compared to participants with Class I and II Angle's classification. Thus, it can be concluded that orthodontic patients with fixed orthodontic appliances and malocclusion have a poor oral hygiene status.

REFERENCES:

1. Benjamin, R. M. (2010). Oral Health: The Silent Epidemic. Public Health Reports, 125(2), 158–159.
2. Scardina, G. A., & Messina, P. (2012). Good Oral Health and Diet. Journal of Biomedicine and Biotechnology, 2012, 720692. http://doi.org/10.1155/2012/720692
3. Joshi, N., Hamdan, A. M., & Fakhouri, W. D. (2014). Skeletal Malocclusion: A Developmental Disorder with a Life-Long Morbidity. Journal of Clinical Medicine Research, 6(6), 399–408. http://doi.org/10.14740/jocmr1905w
4. daCosta, O. O., Aikins, E. A., Isiekwe, G. I., & Adediran, V. E. (2016). Malocclusion and early orthodontic treatment requirements in the mixed dentitions of a population of Nigerian children. Journal of Orthodontic Science, 5(3), 81–86. http://doi.org/10.4103/2278-0203.186164
5. Boke, F., Gazioglu, C., Akkaya, S., & Akkaya, M. (2014). Relationship between orthodontic treatment and gingival health: A retrospective study. European Journal of Dentistry, 8(3), 373–380. http://doi.org/10.4103/1305-7456.137651
6. Mahindra, R., Suryawanshi, G., & Doshi, U (2017). Effects of fixed orthodontic treatment on gingival health: An observational study. International Journal of Applied Dental Sciences. 3(3): 156-161
7. Samah Alfuriji, Nora Alhazmi, Nasir Alhamlan, et al., "The Effect of Orthodontic Therapy on Periodontal Health: A Review of the Literature," International Journal of Dentistry, vol. 2014, Article ID 585048, 8 pages, 2014. doi:10.1155/2014/585048
8. Navabi, N., Farnudi, H., Rafiei, H., & Arashlow, M. T. (2012). Orthodontic Treatment and the Oral Health-Related Quality of Life of Patients. Journal of Dentistry (Tehran, Iran), 9(3), 247–254.
9. Guo, L., Feng, Y., Guo, H.-G., Liu, B.-W., & Zhang, Y. (2016). Consequences of orthodontic treatment in malocclusion patients: clinical and microbial effects in adults and children. BMC Oral Health, 16, 112. http://doi.org/10.1186/s12903-016-0308-7
10. Nilima S. Kadam, Rahul Patil, Abhijit N. Gurav, et al., (2014). Oral Hygiene Status, Periodontal Status, and Periodontal Treatment Needs among Institutionalized Intellectually Disabled Subjects in Kolhapur District, Maharashtra, India," Journal of Oral Diseases, vol. 2014, Article ID 535316, doi:10.1155/2014/535316
11. Nadar S, Saravana Dinesh S P. A questionnaire study about oral hygiene awareness among orthodontic patients. Int J Orthod Rehabil 2016;7:97-100
12. De Freitas, A. O. A., Marquezan, M., Nojima, M. da C. G., Alviano, D. S., & Maia, L. C. (2014). The influence of orthodontic fixed appliances on the oral microbiota: A systematic review. Dental Press Journal of Orthodontics, 19(2), 46–55. http://doi.org/10.1590/2176-9451.19.2.046-055.oar
13. Atassi F & Awartani F (2010). Oral hygiene status among orthodontic patients. J Contemp Dent Pract. 2010 Jul 1; 11(4):E025-32

TABLES & FIGURES:

Table 1: Comparison of Angle's classification among male and female.

Angle's classification	Gender		
	Female, n (%)	Male, n (%)	Total, n (%)
Class I	21 (38.89)	23 (50.00)	44 (44.00)
Class II	27 (50.00)	17 (36.96)	44 (44.00)
Class III	6 (11.11)	6 (13.04)	12 (12.00)

Table 2: Comparison of Angle's classification among the gingival inflammation.

Angle's classification	Gingival inflammation		
	Mild GI, n (%)	Moderate GI, n (%)	Total, n (%)
Class I	38 (45.24)	6 (37.50)	44 (44.00)
Class II	38 (45.24)	6 (37.50)	44 (44.00)
Class III	8 (9.52)	4 (25.00)	12 (12.00)

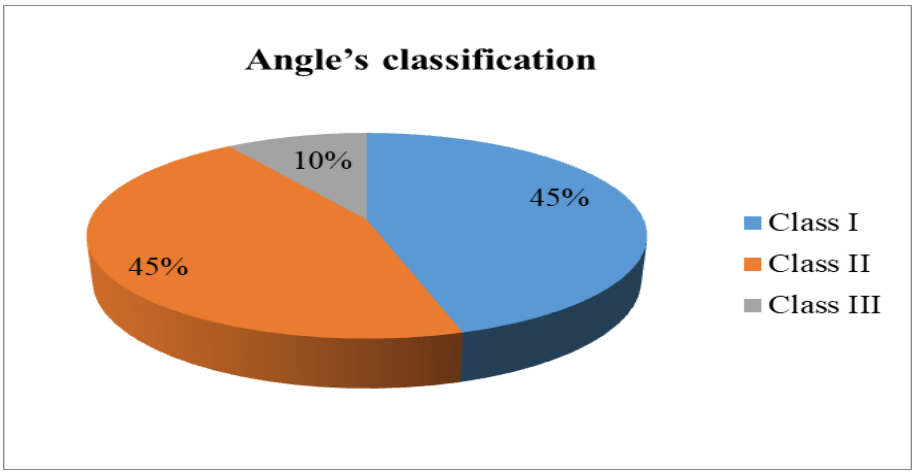

Figure 1. Angle's classification in Mild Gingival inflammation.

Table 3: Comparison of Angle's classification among oral hygiene status (OHI-S) of the subjects.

Angle's classification	Oral hygiene status		
	Fair, n (%)	Good, n (%)	Total, n (%)
Class I	18 (47.37)	26 (41.94)	44 (44.00)
Class II	13 (34.21)	31 (50.00)	44 (44.00)
Class III	7 (18.42)	5 (8.06)	12 (12.00)

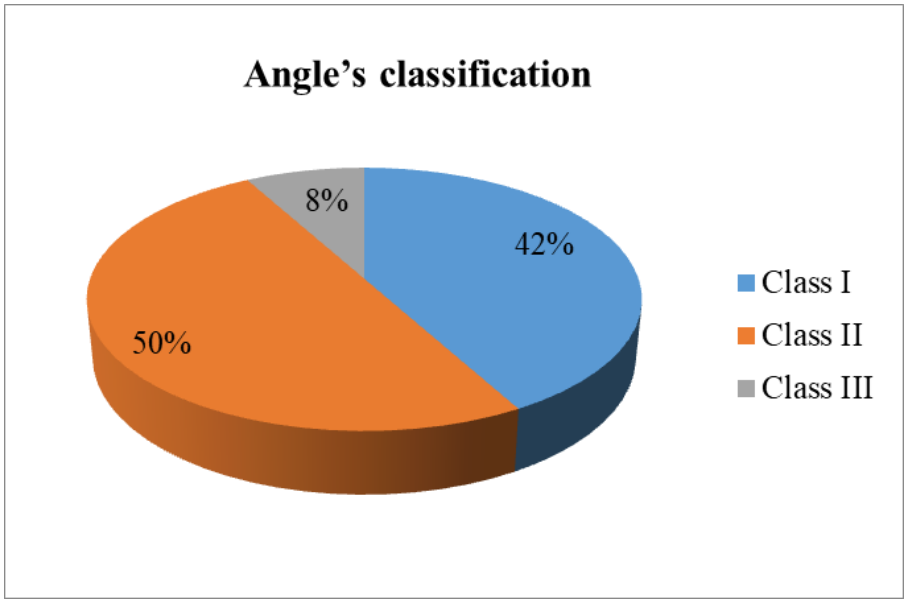

Figure 2. Angle's classification in Good Oral hygiene status.