

NEED FOR ORTHODONTIC TREATMENT AMONG ADULTS WITH GENERALIZED CHRONIC PERIODONTITIS

Type of Manuscript: Retrospective study

Running title: Need for orthodontic treatment among adults suffering from generalized chronic periodontitis

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Article Info

Volume 81

Page Number: 6730 - 6737

Publication Issue:

November - December 2019

Article History

Article Received: 5 March 2019

Revised: 18 May 2019

Accepted: 24 September 2019

Publication: 31 December 2019

Abstract:

One of the most common etiologic factors of periodontitis is malocclusion. Malocclusion as an etiologic factor to periodontitis is due to certain morphological traits of malocclusion which impede and prevent oral hygiene and self-cleaning, which then leads to increased bacterial dental plaque accumulation. The aim of this study was to evaluate the need for orthodontic treatment among adults suffering from chronic periodontitis. This study included adults, both males and females who reported to Saveetha Dental College between June 2019 to March 2020. Inclusion criteria included adult patients between 18 to 40 years with chronic periodontitis. Patients outside the age range were excluded from the study. Around 86000 patient records were reviewed and analyzed for the inclusion criteria and the following parameters were extracted; (i) patients' gender, (ii) patient's diet and (iii) presence of habits and (iv) orthodontic treatment need. Need for orthodontic treatment was measured using Dental Health Components of Orthodontic Treatment Need (DCH-IOTN). Data was recorded in Microsoft Office Excel (2013) and analyzed using SPSS Software Version 26.0. Chi-square test was done to find out the association in need for orthodontic treatment between variables such as patient's

gender, diet and presence of habits. Significant level test was set at $p < 0.05$. A total of 149 patients presented with chronic periodontitis and 63.4% of these patients needed orthodontic treatment (37.9% with need for orthodontic treatment and 25.5% with borderline need). 65.9% females and 62.4% males needed treatment. 96.1% of patients who presented with habits need orthodontic treatment. No statistically significant association was observed in gender and diet ($p > 0.05$). Statistically significant association was found between patients with and without habits ($p < 0.05$). Within the limits of this study, it was observed that the majority of patients with chronic periodontitis needed orthodontic treatment and treatment need was more common in females. Majority of patients with habits needed orthodontic treatment.

Keywords: Chronic periodontitis, malocclusion, oral habits, orthodontic treatment needs.

I. INTRODUCTION

Periodontitis is an inflammatory disease of the periodontium, characterized by progressive destruction of supporting tissues of the tooth. One of the most common etiologic factors of periodontitis is malocclusion. Malocclusion is defined as irregularity or incorrect placement of teeth in the dental arch that is outside the ideal range (Nalcaciet al., 2012). It has been hypothesized that malocclusion predisposes to periodontal disease and vice versa in patients with underlying medical conditions which affects the periodontium, in which case it is known as secondary malocclusion. Malocclusion as an etiologic factor to periodontitis is due to certain morphological traits of malocclusion which impede and prevent oral hygiene and self-cleaning, which then leads to increased bacterial dental plaque accumulation (Helm and Petersen, 1989). On the other hand, patients with periodontitis may lose osseous bone support of the tooth, which is an etiologic factor for developing secondary periodontitis. Periodontitis as a result of

malocclusion can be corrected with orthodontic treatment but clinicians have to be careful in case selection and evaluating prognosis as bone loss has already taken place.

Numerous studies have obtained conflicting results in association between malocclusion and periodontitis (Ramfjord, 1974). A few studies have found association between periodontal disease and increased maxillary overjet and overbite (McCombie and Stothard, 1964; GOULD and MSE, 1966; Geiger, Wasserman and Turgeon, 1973; Geiger, 2001) but negative findings have also been reported (Hellgren, 1956; Alexander and Tipnis, 1970). Previous study by Ngom et al reported significant correlation between malocclusion and periodontal disease (Ngomet al., 2007). Helm et al, in his study, found that periodontal disease is most frequent in maxilla with crowding, extreme overjet and crossbite (Helm and Petersen, 1989). Christensen et al made a research on adults seeking orthodontic treatment and observed that patients sought for

orthodontic treatment when there is drifting of the teeth where bone loss has occurred (Christensen and Luther, 2015).

Over the past 5 years, many clinical trials (Dinesh et al., 2013; Jain, Kumar and Manjula, 2014; Krishnan, Pandian and Kumar S, 2015; Rubika, Felicita and Sivambiga, 2015; Viswanath et al., 2015; Sivamurthy and Sundari, 2016; Felicita, 2017a, 2017b, 2018; Samantha et al., 2017; Vikram et al., 2017), in-vitro studies (Ramesh Kumar et al., 2011; Kamisetty et al., 2015) and surveys (Felicita, Shantha Sundari and Chandrasekar, 2012; Pandian, Krishnan and Kumar, 2018) had previously been conducted by our team. Currently we are focusing on analysing the orthodontic treatment needs in chronic periodontitis patients. The aim of this study was to evaluate the need for orthodontic treatment among adults suffering from generalized chronic periodontitis.

II. MATERIALS AND METHODS

This retrospective study included adults, both males and females who had reported to Saveetha Dental College between June 1st 2019 to March 31st 2020. The study setting was a university hospital-based study. Such setting allowed flexible data retrieval, automated data collection, cost-effective as well as time saving. However, such a setting allowed only a limited population to be covered and may be subjected to researcher's personal bias. Patients' data which were retrieved received approval from the Ethical Committee Board of Saveetha Dental College and patient's informed consent was obtained from patients prior to dental examination.

Around 86000 patient records between June 2019 to March 2020 were reviewed and analyzed for patients with generalized chronic periodontitis and information was cross verified with periodontal charts and intraoral photographs of patients which

were uploaded into the system. Patients with incomplete case sheets were exempted from the study. Simple random sampling was done to minimize sampling bias.

Data was collected by a single examiner. The inclusion criteria included adult patients between the age of 18 to 40 years with chronic periodontitis. Patients outside the age range were excluded from the study. The following parameters were observed and recorded; (i) Patient's gender, (ii) diet, (iii) presence of habits and (iv) need for orthodontic treatment. Need for orthodontic treatment was measured using Dental Health Components of Orthodontic Treatment Need (DCH-IOTN).

III. Statistical analysis

All the data's was entered into Microsoft Office Excel (2013) and analyzed using SPSS software Version 26.0. Descriptive statistics were used to report distribution of patients' gender, diet, presence of habits and orthodontic treatment needs. Chi-square test was further conducted to assess the association of orthodontic treatment needs between gender, diet and presence of habits. Significant level test was set at $p < 0.05$.

IV. RESULTS AND DISCUSSION

A total of 149 patients were found to have chronic periodontitis. This involved 44 (30.3%) females and 101 (69.7%) males (Figure 1). Figure 2 shows the distribution of diet in chronic periodontitis patients. Presence of habits was found in 22.1% of chronic periodontitis patients (Figure 3). 37.9% of chronic periodontitis patients needed orthodontic treatment and 25.5% had borderline need for orthodontic treatment. 36.6% did not need orthodontic treatment (Figure 4).

Based on gender, 65.9% of females need orthodontic treatment (27.3% borderline need and 38.6% need) and 62.4% males (24.8% borderline need and 37.6% need) need orthodontic treatment. (Table 1, Figure 5). However, no statistically significant association was

found in orthodontic treatment need between males and females ($p>0.05$)(Figure 5). Based on diet, no significant association was found between patients with mixed diet and vegetarian diet ($p>0.05$) (Table 2, Figure 6).

According to the presence of habits, 96.1% of patients who presented with habits needed orthodontic treatment and 54% of patients without habits needed orthodontic treatment (Table 3, Figure 7). Statistically significant association was found in orthodontic treatment need between patients with habits and patients without habits ($p<0.05$) (Figure 7).

Malocclusion and abnormal position of tooth are now qualified as potential contributors to periodontal disease process when they cause occlusal traumatism. Information obtained from previous cross-sectional study is important to monitor trends in oral health and evaluate levels of dental need (Burt, 1997; Jamieson and Thomson, 2002). In the wider literature, a vast majority of students investigated association of malocclusion and periodontitis and there is a lack of study with regards to orthodontic treatment need in patients with chronic periodontitis.

In this study, orthodontic treatment need was evaluated using Denial Health Components of Orthodontic Treatment Need (DCH-IOTN). The IOTN has been described as an index for easy use to grade and identify the need for orthodontic treatment (Brook and Shaw, 1989). Considering the results presented, DHC-IOTN could be considered reliable and valid.

Our study found that orthodontic treatment need was observed more in females that compared to males. However, no significant association was observed between need for treatment in males and females ($p>0.05$). Hirschfield et al agreed with the findings as his study reported 56% of patients who expressed orthodontic treatment need were females (Hirschfeld et al., 2019). This adds to the consensus

of our finding and can be included in clinical practice.

The current study observed no statistically significant association was seen in relation to diet intake and orthodontic treatment need ($p>0.05$). This finding was contradictory to previous study by Blackwelder et al who found association between dietary factors and malocclusion especially crowding (Blackwelder, 2013). The possible differences in finding may be due to differing study population, and socioeconomic status.

96.9% of patients with habits need orthodontic treatment. Our study found a significant association between orthodontic treatment needs and habits. Grippaudo et al agreed with the current findings as his study found significant association between bad habits and malocclusion, primarily in patients with increased overjet and open bite (Grippaudo et al., 2016).

V. Limitations of the study

This study has limitations as it was conducted as a university hospital-based study. Thus, research may be subjected to researcher's personal bias and allowed only a limited population to be covered.

VI. Future scope

Extensive research needs to be done with a larger sample population. Future study is needed to associate orthodontic treatment needs in patients with chronic periodontitis with other potential associating factors such as malocclusions, socioeconomic status and geographic location.

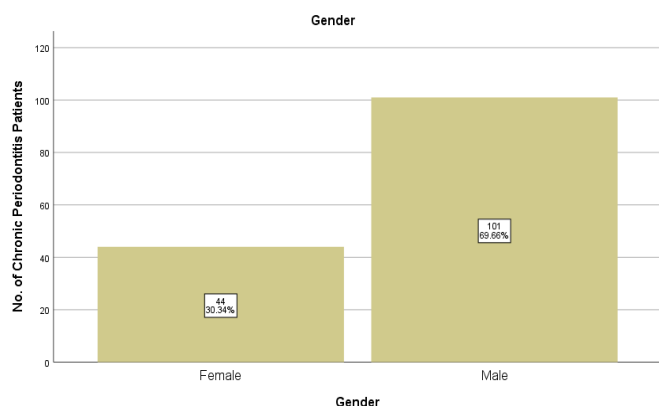


Figure 1. Bar chart represents the number of patients with chronic periodontitis based on gender. X-axis represents gender and Y-axis axis represents the number of patients with chronic periodontitis. More patients with chronic periodontitis were males (69.7%) compared to females (30.3%)

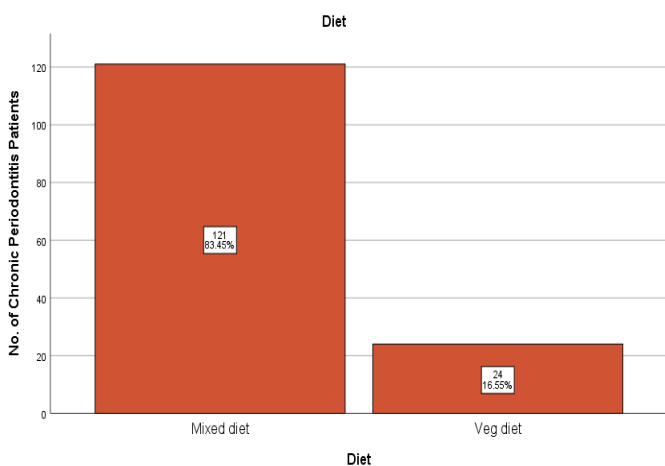


Figure 2. Bar chart represents the number of patients with chronic periodontitis based on diet. X-axis represents diet and Y-axis represents number of chronic periodontitis patients. Majority of the patients with chronic periodontitis had a mixed diet (83.4%) compared to a vegetarian diet (16.6%).

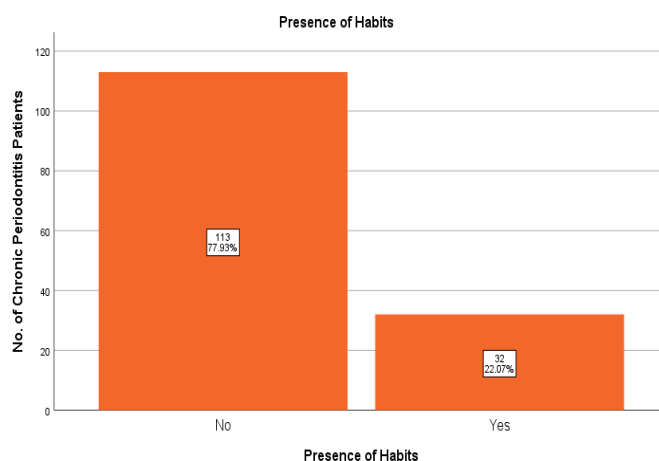


Figure 3. Bar chart represents the number of patients with chronic periodontitis based on the presence of habits. X-axis represents diet and Y-axis represents the number of patients with chronic periodontitis. Majority of the patients with chronic periodontitis had no habits (77.9%) compared to patients with habits (22.1%).

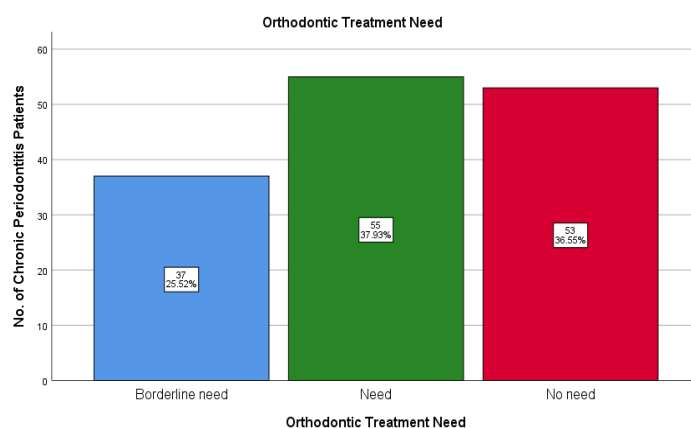


Figure 4. Bar chart represents the number of patients with chronic periodontitis based on orthodontic treatment needs. X-axis represents orthodontic treatment needs and Y-axis represents the percentage of chronic periodontitis patients. 37.9% of chronic periodontitis patients needed orthodontic treatment (green), 25.5% had borderline need for orthodontic treatment (blue) and 36.6% did not need orthodontic treatment (red). More patients with chronic periodontitis needed orthodontic treatment compared to patients who did not need treatment.

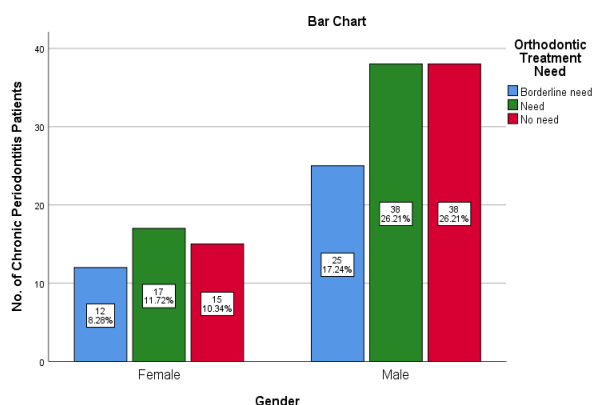


Figure 5. Bar chart represents the association between orthodontic treatment need and gender. X-axis represents gender and Y-axis represents the orthodontic treatment need in chronic periodontitis patients. Chi-square test was done and association was found to be statistically not significant. Pearson Chi-Square value- 0.189; df- 2; p value- 0.910 (>0.05), hence, not statistically significant. Orthodontic treatment needs (green) were higher in females compared to males but the results were statistically not significant.

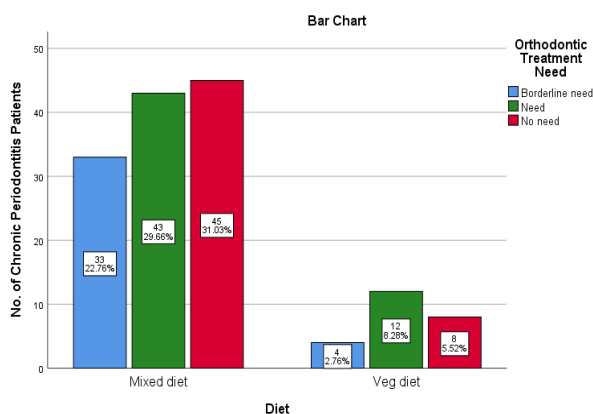


Figure 6. Bar chart represents the association between orthodontic treatment needs and diet. X-axis represents the diet and Y-axis represents the orthodontic treatment need in chronic periodontitis patients. Chi-square test was done and association was found to be statistically not significant. Pearson Chi-Square value- 2.069; df- 2; p value- 0.355 (>0.05), hence, statistically not significant. Orthodontic treatment needs (green) were higher in

patients with vegetarian diet compared to patients with mixed diet but the results were statistically not significant.

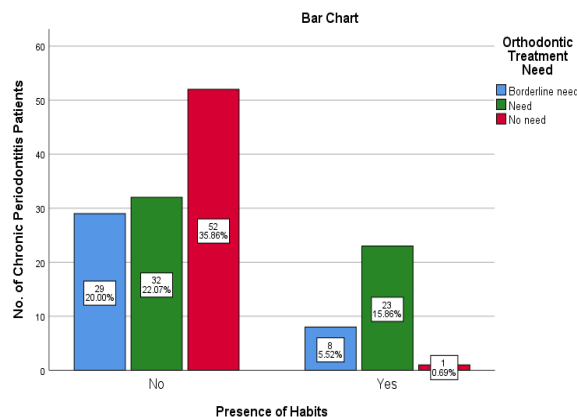


Figure 7. Bar chart represents the association between orthodontic treatment needs and presence of habits. X-axis represents presence of habits and Y-axis represents the orthodontic treatment needs in chronic periodontitis patients. Chi-square test was done and association was found to be statistically significant. Pearson Chi-Square value- 25.029; df- 2; p value- 0.000 (<0.05), hence statistically significant, proving patients with habits had significantly higher orthodontic treatment needs (green) compared to patients without habits.

VII. CONCLUSION

Within the limits of this study, it was observed that the majority of patients with chronic periodontitis need orthodontic treatment and treatment need was more common in females. Majority of patients with habits need orthodontic treatment.

VIII. AUTHORS CONTRIBUTION

NurulSyamimibintiMohdAzlan Sunil contributed to the original drafting, acquisition of data, analysis and interpretation of data and writing of this research. Dr. Ravindra Kumar Jain. Substantially contributed to improvising the research draft and revising the article critically for important intellectual content. Dr.

RevathiDuraismy contributed to the conception and design of this study.

IX. CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

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