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Prevalence of Furcation Involvement Among Patients with Periodontitis: A Cross Sectional Study

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ABSTRACT

A furcation is defined as "the anatomic area of a multirooted tooth where the roots diverge" and furcation invasion refers to the "pathologic resorption of bone within a furcation. Many classifications were derived to classify furcation. The aim of the current study was to assess the prevalence of furcation involvement among periodontitis patients. The retrospective study was done among the outpatients of saveetha dental college and hospitals, chennai from june 2019 to march 2020. Periodontal data of adult patients aged between 18-70 years, were collected from the patient records. The data then analysed and interpreted using ibm,spss software version 20, california. Male predilection was observed in relation to furcation involvement. the prevalence of furcation involvement among patients with periodontitis was 38%. Maxilla had an increased furcation involvement than the mandible. Grade I furcation was the most commonly observed type of furcation with 6mm loss of attachment approximately.maxillary arch was more involved than mandible.

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INTRODUCTION

Periodontal disease are infections of polymicrobial origin which is characterised by irreversible chronic inflammation of the periodontium which leads to the loss of periodontal ligaments (Offenbacher, 1996; Morrison and Petersen, 2003) and surrounding alveolar bone which is observed as loss of attachment of gingiva and bleeding on probing in the clinical situation (Page and Schroeder, 1976; Ramamurthy, 2018).

Untreated periodontal diseases lead to destruction of the periodontium (Varghese *et al.*, 2015; Khalid *et al.*, 2016) which includes periodontal ligaments, alveolar bone and cementum which manifest clinically as periodontal pocket formation associated with recession (Page and Schroeder, 1976; Offenbacher, 1996).

When posterior teeth such as molars are taken into consideration, the progress of the periodontal disease results in invasion of the furcation areas of the teeth which could be bifurcated or trifurcated. This phenomenon is termed as furcation involvement. A furcation is defined as "The anatomic area of a multirooted tooth where the roots diverge", and furcation invasion refers to the "pathologic resorption of bone within a furcation. Many classifications were derived to classify furcation (Cattabriga *et al.*, 2000).

The involvement of the furcation as a result of periodontal disease progression can pose the greatest

challenge in the success of periodontal therapy and prognosis due to the complex anatomy and morphology of the teeth (Kavarthapu and Thamaraiselvan, 2018). Further untreated furcation areas might be the most essential reason for tooth loss (Haffajee and Socransky, 1994; Albandar, 2005). Tooth loss, especially the molars can result in decreased chewing efficiency which leads to reduced nutrition of the patient ultimately diminishing the quality of life (Axelsson *et al.*, 1991).

The presence of furcation involvement which is one of the clinical signs, can be of immense help in diagnosis of advanced periodontitis as early diagnosis and timely surgical intervention can increase the survival rate of the tooth which is involved. Early involvement can be treated non-surgically while delay in the diagnosis or advanced periodontal conditions requires regenerative and resective surgeries (American Academy of Periodontology, 1993; Gajendran *et al.*, 2018).

Furcation involvement presents as a diagnostic tool and a therapeutic dilemma, where early diagnosis and intervention is more favourable. Henceforth, the study was undertaken to assess the prevalence of furcation involvement among the periodontitis patients diagnosed at Saveetha Dental College and Hospital which is a tertiary health care hospital in Chennai.

MATERIALS AND METHODS

This study was performed among the outpatients of Saveetha Dental College and Hospitals, Chennai who were diagnosed with generalised chronic periodontitis during the time period from June 2019 - March 2020. Patient data regarding periodontal data of study participants were collected from the records. The sample size of our current study was 300. Institutional ethical committee clearance was obtained for data retrieval and usage as needed for the study (SDC/SIHEC/2020/DIASDATA/0619-0320).

The verification of case sheets was done in the presence of two external reviewers to minimize operatory or observer bias. The case sheets were verified with the help of photographs and procedural notes.The data was obtained and tabulated in excel and the following parameters such as age, gender, arch of involvement, furcation involvement, loss of attachment, grade of furcation involvement were included in the data collection.The data was analysed in IBM,SPSS software, version 20, california using pearson's chi square test and the results were interpreted and tabulated.

RESULTS AND DISCUSSION

Within the time frame of our current study, 300 patients who were diagnosed with periodontitis participated in the study. Mean age of the patients participating in the study was 37.5 years. Furcation involvement was observed in 38% of the study population while 62% of the population had no furcation involvement. Y axis represents the percentage of patients diagnosed with generalised chronic periodontitis and X represents shows whether there is furcation involvement (Figure 1).

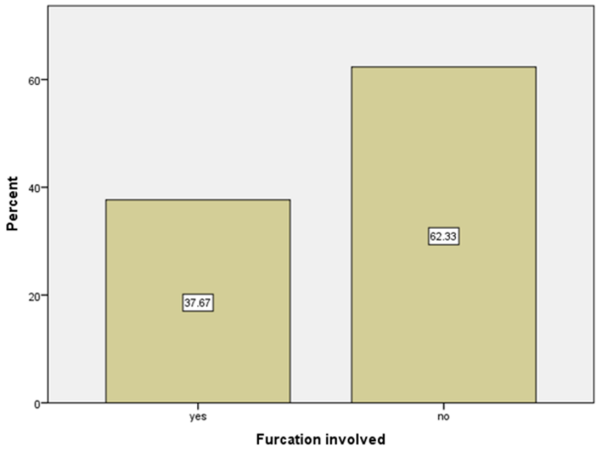

Figure 1: Bar graph depicts the distribution of furcation involvement among periodontitis patients.

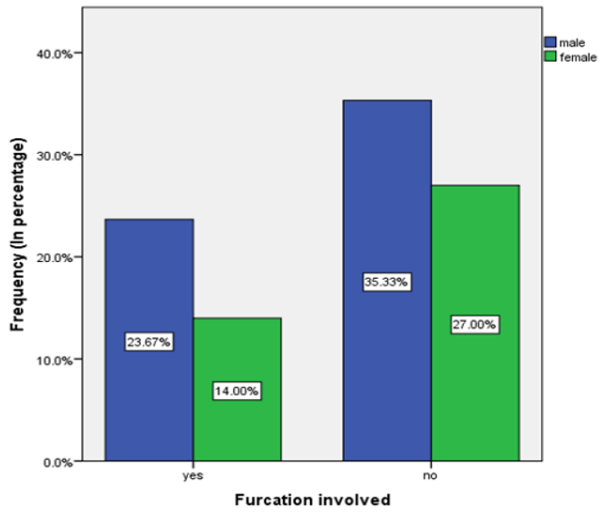

Figure 2: Bar chart represents the association between gender and furcation involvement among periodontitis patients.

In gender wise comparison, among the patients with furcation involvement, 23% were males while 14% were females. The current study reveals a male predilection towards furcation involvement. Also, association between gender and furcation was

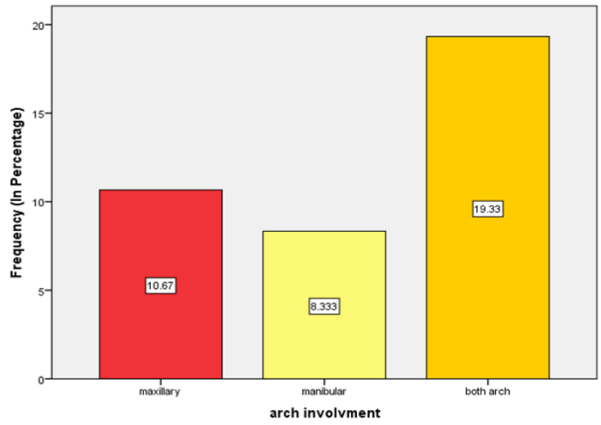

Figure 3: Bar graph depicts the distribution of furcation involvement in maxillary and mandibular arch.

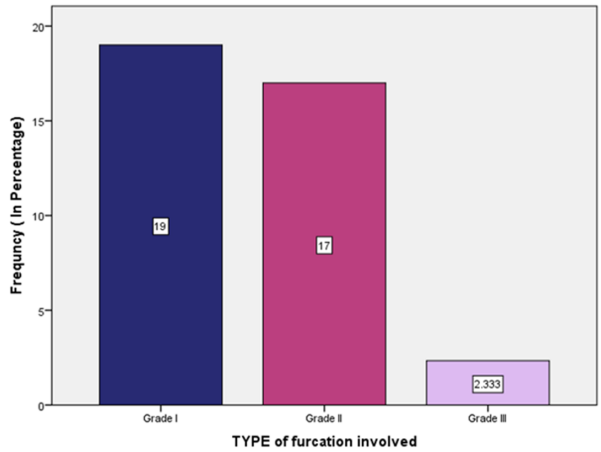

Figure 4: Bar graph depicts the distribution of grade of furcation involvement among periodontitis patients.

assessed and found to be statistically not significant with p value - 0.294. Y-axis represents the percentage of patients diagnosed with generalised chronic periodontitis and X axis represents the status of furcation involvement (Figure 2).

In archwise comparison, 19.3% of the population had furcation involvement in both the arches simultaneously, while 11% had involvement only in the maxillary arch and 8% had involvement only in mandibular arch. The current study shows higher prevalence of furcation involvement in maxilla in comparison with mandible. Y-axis represents the percentage of patients diagnosed with generalised chronic periodontitis and X axis represents the arch of furcation involvement (Figure 3).

Based on the grade of furcation involvement, grade I furcation involvement (19%) was predominantly observed followed by grade II furcation involvement (17%), while grade III furcation involvement (2%) was the least observed among the study population. Y-axis represents the percentage of patients diagnosed with generalised chronic periodontitis and X -axis represents the grade of furcation involvement (Figure 4).

The mean loss of attachment was 6mm in 58% of the cases which had furcation involvement while 42% had 5mm of loss of attachment.

In our present study, the prevalence of furcation involvement was 38% among the periodontitis patients diagnosed in Saveetha Dental College and Hospitals, Chennai, whereas the prevalence of furcation involvement was slightly decreased in study done by Kumar *et al.* (2018) among the north indian population. Abdelmalek and Bissada (1973) reported 31% of furcation involvement in molars of egyptian skulls, while 22% of prevalence was reported by Ross and Thompson (1980). Similar to Svärdström and Wennström (1996) also reported 30% of prevalence of furcation involvement. The results of our current study is in accordance with those of the previous literature.

In our current study a male predilection was observed among the periodontitis patients with furcation involvement. The result suggests that male are prone to have increased risk of furcation involvement while Kumar *et al.* (2018); Najim *et al.* (2016); Bakutra *et al.* (2018), have observed no gender predilection in furcation involvement. The results of our current study contradicts the previous studies. This variation could be due to the decreased sample size and convenient sampling of our current study

In our current study the 11% of furcation involvement was observed in maxilla, 8% of furcation involvement in mandible and 20% of furcation involved in both the arches simultaneously. These results were similar to the previous studies performed by Najim *et al.* (2016) among the swedish population and Najim *et al.* (2016); Bakutra *et al.* (2018), where maxillary arch had more prevalence of furcation involvement than the mandibular arch. The results of our current study match with that of the previous studies.

In our current study, the majority of the patients had more than 5 molar teeth and 38% prevalence of furcation involvement while patients with less than 5 molars also showed 30% furcation involvement. These results are in agreement with previous studies done by Najim *et al.* (2016); Bakutra *et al.* (2018).

Our current study has increased prevalence of grade I and grade II furcation involvement which marks the beginning of periodontal destruction,

while Najim *et al.* (2016); Bakutra *et al.* (2018) reported similar results of increased prevalence of grade II among the swedish population. Najim *et al.* (2016) reported increased prevalence of grade II furcation according to Hampy's classification. The previous studies are in agreement with the results of our current study.

The loss attachment positively correlates with furcation involvement where 5-6mm of LOA is seen in furcation involvement , which is in agreement with studies done by Najim *et al.* (2016) where there was mild to moderate LOA in relation to molars involved in the furcation.

The limitations of our current study includes operator bias, limited availability of samples, geographically isolated population and short term analysis. Further assessment is required to understand the pattern of furcation involved and its association to progressive periodontitis which is to be evaluated in larger sample size.

CONCLUSION

Within the limitations of our current study, it can be concluded that the prevalence of furcation involvement was 38% among the chronic periodontitis patients out of which Grade I furcation involvement was the most common type, while maxillary arch was more involved than mandible.

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Author contributions

Jembulingam Sabarathinam performed the analysis, interpretation and wrote the manuscript. Arvina Rajasekar contributed to conception, data design, analysis, interpretation and critically revised the manuscript. Madhulaxmi M helped in coordinating the research and was one of the reviewers. All the authors have discussed the results and contributed to the final manuscript.

Conflict of interest

The authors declare that they have no conflict of interest for this study.

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