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RESEARCH ARTICLE

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Prevalence of Pathologic Migration in Patients with Periodontitis: A Retrospective Analysis

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ABSTRACT

Periodontal disease is characterised by gingival inflammation loss of connective tissue attachment and bone loss. These changes are associated with pathologic tooth migration. The aim of the study was to assess the prevalence of pathological migration in patients with periodontitis. Retrospective data collection was conducted from June 2019 to March 2020 among 157 patients with generalised chronic periodontitis who reported to the Department of Periodontics, Saveetha Dental College and Hospitals, Chennai. Both clinical and radiographic images were used to assess the presence and type of pathological migration and the results were analysed. Among the various types of pathological migration studied like diastema, crowding, spacing, mesial tilt and distal tilt, it was found that spacing between the teeth (53 sites) was the most common and the distal tilt of the tooth (5 sites) was the least common type of pathologic migration.

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KEYWORDS

Midline diastema, Pathologic migration, Periodontitis, Tooth position.

INTRODUCTION

Periodontal disease is characterised by inflammation of gingiva, loss of connective tissue attachment and bone loss. [1] These changes are associated with pathologic tooth migration, the concern about pathologic tooth migration is increasing constantly because it affects the aesthetic of the patient so pathologic tooth migration has become a subject of concern and awareness towards early diagnosis and early treatment has to be created since only few studies have discussed in detail about pathologic tooth migration as a major subject of concern.

Pathologic tooth migration has been described as displacement or shift of tooth that occurs when the balancing forces that maintain and support the tooth in position are altered by the presence of periodontal disease [2–5]. The position of the tooth depends upon the health of the periodontium and the forces exerted upon the tooth mainly occlusal and pressure from lips cheek and tongue. The main predisposing and causative factor for pathologic tooth migration is loss of periodontal support in case of periodontal disease, the tooth loses its resistance to external forces and as a result the tooth migrates [6–10].

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Various factors including factors like an occlusal factor which includes malocclusion, posterior bite collapse, loss of arch integrity, occlusive interference causes or affects the periodontal apparatus and causes pathologic tooth migration [11–13]. The prevalence of pathologic tooth migration is not known precisely but pathologic migration remains as a common chief complaint that allows the patient seeking dental treatment. Most of the pathologic migrations are disfiguring [14–17] the aetiology of pathology tooth migration is multifactorial most of the pathologic migration cases require orthodontic treatment surgical and prosthodontic treatment [17–21]. Diagnosis of pathologic tooth migration at an initial or early stage can reduce the severity of pathologic tooth migration.

Literature search reveals minimal studies assessing the prevalence of pathologic tooth migration in periodontitis patients. Previously we have focused our research on various invitro and invivo studies. [22–41] We have currently shifted our focus to this retrospective analysis. The aim of the study was to assess the prevalence of pathologic tooth migration in patients with chronic periodontitis and to determine which type of pathological migration was more prevalent in patients with chronic periodontitis.

MATERIALS AND METHODS

This retrospective study was conducted from June 2019 to March 2020 among 157 patients with generalised chronic periodontitis who reported to the Department of Periodontics, Saveetha Dental College and Hospitals, Chennai. A total of 157 systemically healthy patients with chronic periodontitis were enrolled. Patients with systemic diseases, patients with smoking habits, pregnant and lactating women, and patients who were undergoing orthodontic treatment were excluded from the study. Both clinical and radiographic images were used to assess the presence and type of pathological migration like diastema, spacing, crowding, mesial and distal tilt and then the results were analysed. Differential and inferential statistics were done for data summarization and presentation. The study protocol was approved by the Institutional Ethical and Review Board, Saveetha Dental College and Hospitals, Chennai.

RESULTS AND DISCUSSION

In the study it was seen that out of 157 patients, 83 (53%) were males and 74 (47%) were females belonging to the age group ranging from 30-70 years. Out of 157 patients, 113 (72%) patients presented with pathologic tooth migration and 44 (28%) patients had not presented with pathologic migration (Figure 1)

Among 113 patients who presented with pathologic tooth migration, there were 151 sites with various types of pathologic tooth migration. Of the 151 sites with pathologic tooth migration, it was observed that 53 sites presented with spacing, 36 sites presented with mesial tilt, 33 sites presented with crowding, 24 sites presented with diastema and 5 sites presented with distal tilt. (Figure 2) Correlation between gender and pathologic migration was assessed using Pearson's Chi square test. It is observed that the male (45.22%) patients presented with pathologic tooth migration more than females(26.75%). The Chi square value was 16.070 and p value was 0.01 ($p<0.05$) which was statistically significant (Figure 3).

Correlation between age and pathologic migration was performed; It is seen that the patients who were in the age group 41-50 presented more number of pathologic migration (n=47) followed by patients in age group 30-40 (n=35) and finally by 31 patients who belonged to age group 51-60 . It was observed that there is a significant association between age and pathologic tooth migration. The Pearson's Chi square value was 12.002 and p value is 0.002 which is statistically significant ($P<0.05$) (Figure 4)

Pathologic tooth migration is defined as displacement of tooth that occurs when the balance among the factors that maintain the physiologic tooth position is disturbed by periodontal disease that has aesthetic effects. Pathological migration can be an early sign of the periodontal disease or may be associated with gingival inflammation and pocket formation during the progression of periodontitis.There is a balance between the forces that hold the tooth in normal position and occlusal and muscular forces the tooth should normally bear. The weakened tooth is not able to maintain its normal position and it drifts or moves away from the opposing force.[42]

It has been observed that of the total 157 patients with chronic periodontitis, 113 (72%) presented with pathologic migration. This finding is partly in agreement with the study by Martinez-Canut et al [43] where the prevalence of pathologic migration in chronic periodontitis patients was assessed and the authors suggested that 55% of the patients had pathologic tooth migration.

In this study it was seen that spacing between teeth was the most common type of pathologic tooth migration and distal tilt was the least common type of pathologic tooth migration. The result of this study is an agreement with Towfigi et al [44] where he assessed the most common outcome of periodontitis and found out that spacing was the most common pathologic tooth migration.

Thus from the study it was seen that pathologic tooth migration was one of the major clinical outcomes of chronic periodontitis.

CONCLUSION

It has been observed that pathologic tooth migration was a common clinical outcome of chronic periodontitis of which spacing (53 sites) between the teeth was the most common and the distal tilt of the tooth (5 sites) was the least common type of pathologic migration.

AUTHORS CONTRIBUTION

Niveda Rajeshwaran carried out the retrospective study, participated in the sequence alignment, statistical analysis and drafted the manuscript. Arvina Rajasekar and Gurumoorthy Kaarthikeyan conceived the study, participated in its design and coordinated and provided guidance to draft the manuscript. All authors read and approved the manuscript.

CONFLICT OF INTEREST

There were no conflicts of interest as defined by the authors.

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ETHICAL CLEARANCE

It is taken from "Saveetha Institute Human Ethical Committee" (Ethical Approval Number-SDC/SIHEC/2020/DIASDATA/0619-0320)

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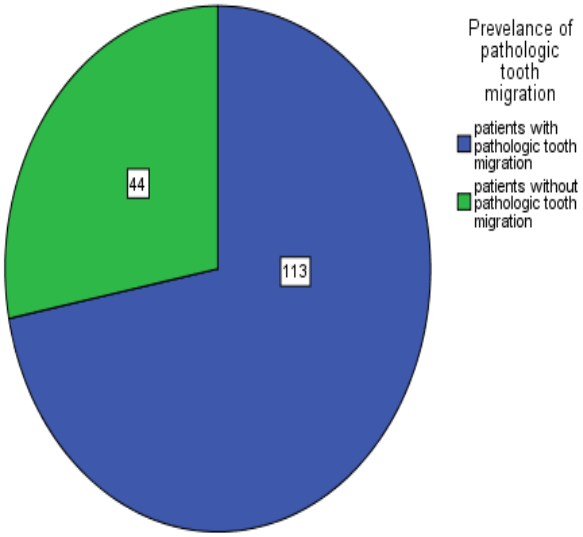

Figure 1: Pie diagram representing the prevalence of pathologic tooth migration among chronic periodontitis patients of which the colour green represents the number of patients who did not present any pathologic tooth migration (44). The colour blue represents the number of patients who presented with pathologic tooth migration (113).

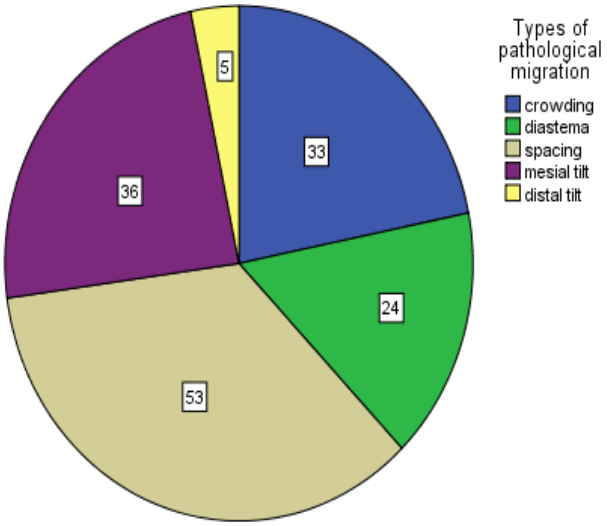

Figure 2: Pie chart representing distribution of different types of pathologic tooth migration. Of the 151 sites with pathologic migration, it was observed that 53 sites presented with spacing (brown), 36 sites presented with mesial tilt (purple), 33 sites presented with crowding (blue), 24 sites presented with diastema (green) and 5 sites presented with distal tilt (yellow). The most prevalent type of pathologic migration was spacing followed by mesial tilt, crowding and diastema and the least prevalent type of pathologic migration was distal tilt.

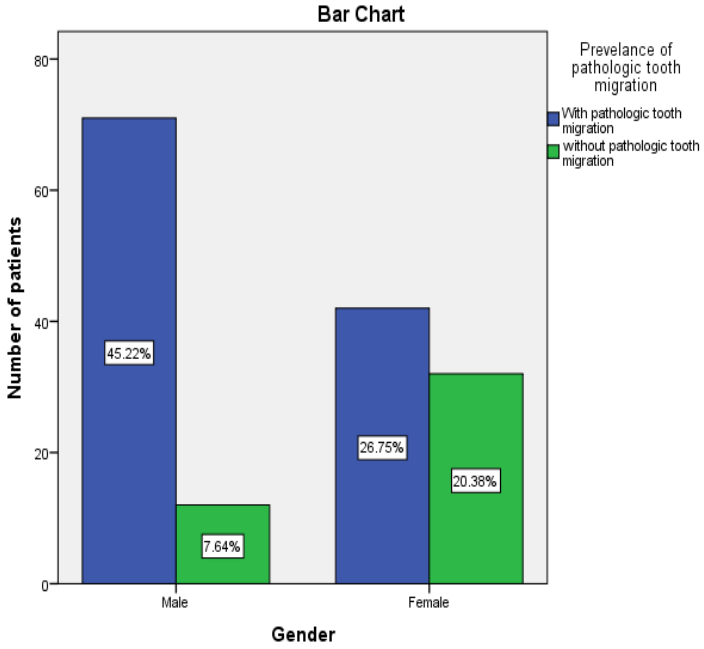

Figure 3: The bar graph depicts the association between gender and prevalence of pathologic migration. The X axis presents the gender and the Y axis presents the number of patients. It was observed that the male (45.22%) patients presented with pathologic tooth migration (blue) more often than females (26.75%). There is a significant association between gender and pathologic tooth migration. The Chi square value is 16.070, p value - 0.01, p < 0.05, statistically significant.

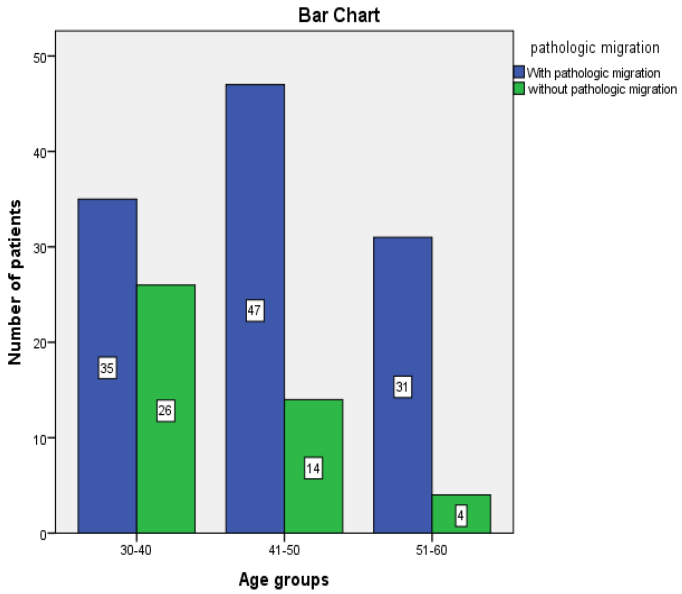

Figure 4: The bar graph depicts the association between Age group and prevalence of pathologic migration. The X axis presents age and the Y axis presents the number of patients. It was seen that the patients who were in the age group 41-50 years presented more number of pathologic migrations (blue). The Pearson's Chi square value was 12.002, and p value - 0.002 which is statistically significant. (p <0.05).