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Relationship of Tooth Mobility with Systemic Diseases among Patients Reporting Private Dental College in Chennai

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Abstract

Periodontitis begins with bacterial infection of the oral structures and if not properly treated eventually leads to tooth loss. Over the past decade, a growing body of scientific evidence suggests an exquisite association between oral infection and systemic diseases. The purpose of our study was to compare the tooth mobility which is the main indicator of periodontal diseases with systemic diseases. An institutional study was conducted using case records of patients attending private dental college from July 2019- March 2020 . A total of 71 case sheets of patients who had recorded tooth mobility index were retrieved and data was collected. Data analysis was done using SPSS software version 23.0. Chi-square association was done to explore the relationship between tooth mobility and systemic diseases. From the study results, 50.70% of participants belong to the age group of 36-55 yrs, 40.85% were females and 59.15% were males, thus showing male predominance in the current study population. 66.197% of study participants have absence of systemic diseases and 33.803% have systemic diseases. 4.2% of participants with systemic diseases and 2.12% of participants without systemic diseases have mobile teeth between 17-24 (GROUP IV). No statistically significant association was found between tooth mobility and systemic diseases.(P = 0.858). The results of the present study indicate that prevalence of increased number of mobile teeth was found among participants with systemic diseases. But the association was not statistically significant. Knowledge of disease interrelationships and their associations may prove to reduce patient risks and prevent systemic disease outcomes and hence further studies to be carried out to assess the interrelationships.

Keywords*: Tooth mobility; systemic disease; tooth loss; Periodontal disease.*

Introduction

Gingival and periodontal diseases in their various forms, have afflicted mankind since the dawn of history. Diseases of the periodontium occur in childhood, adolescence and early adulthood but the prevalence of periodontal disease, tissue destruction and tooth loss increases with age [1]. Periodontal diseases are oral disorders characterized by inflammation of the supporting tissues of the teeth. Usually, periodontitis is a progressively destructive loss of bone and periodontal ligament (loss of the attachment apparatus of the teeth). Periodontitis has documented risk factors, including but not limited to specific plaque bacteria, smoking, and diabetes mellitus. The oral cavity contains almost half of the commensal bacteria in the human body, approximately 6 billion microbes representing 300 to 500 species reside in the oral cavity. The oral microbial ecosystem is remarkably dynamic [2]. As a consequence, there has been a resurgence of interest in oral microbial

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ecology, mucosal immunity and associations with periodontal disease which leads to mobility of teeth [3].

Teeth play a vital role in the oral cavity. They contribute in the process of mastication, speech and maintaining the facial aesthetic. Edentulous can result in disturbance in daily-living activities such as chewing adequately as well as causing emotional problems [4,5]. Loss of self confidence and concern about appearance and self image are the emotional impacts of tooth loss[6]. Early tooth loss or premature exfoliation of teeth is defined as loss of tooth in the oral cavity prior to the normal expected period of time. Since there are no references to address the exact natural expected age for loss of permanent dentition early loss is a relative term. There are both local and systemic factors that could result in such a phenomenon. In developing countries like India , oral cavity is prone for many diseases like dental caries, periodontal disease, oral cancer, malocclusion, fluorosis etc. These diseases affect different age groups in various aspects. Various treatment options are emerging for treating the oral diseases thus leading them a quality life [7– 16].

Poor oral hygiene could cause caries and periodontal disease leading to loss of teeth [17,18]. Additionally, there are a number of systemic diseases such as diabetes, leukemia, hyperthyroidism etc. whose effect on the oral cavity could make the teeth susceptible to exfoliation. They could increase the risk of caries as a result of interrepling the normal function of salivary glands, or affect the periodontal tissues, which support the teeth [19]. In addition, periodontal disease is a prevalent disorder with risk parameters that contribute to mobility in terms of decreasing oral function and increasing tooth loss. Risk factors have been studied extensively in dentistry and include specific bacteria. Smoking and systemic disease like diabetes mellitus.

Initially link between systemic disease and tooth mobility in unidirectional. Currently, there is increasing evidence that the relationship may be bidirectional [20,21]. This knowledge of disease intra-relationship may prove vital in intervention strategies to reduce patient risks and prevent systemic disease outcomes. In this study, we aim to focus on the systemic disease that can lead to tooth mobility or early tooth loss and to determine the relationship between tooth mobility and systemic diseases.

MATERIALS AND METHODS:

Study setting

The present study was conducted by reviewing patient records from July 2019-March 2020 visiting Saveetha Dental College and Hospitals. Among them 71 case records of patients aged 18-80 years to whom tooth mobility index recorded were retrieved .

Ethical approval:

Ethical approval was obtained from the Institutional Review Board (IRB) of the University to use the data from case records (SDC/SIHEC/2020/ DIASDATA/0619-0320). Informed consent was obtained from the patient at the time of screening procedure. Case sheets with informed consent were included in the study.

Sampling

All the patients for whom tooth mobility index have been recorded were included in the study and their case sheets were reviewed. Internally validity of the study was established by using universally accepted tooth mobility Index.

Index used and scoring criteria

Tooth Mobility Index [(22)] was used in the present study. Study population was categorized into five groups based on the number of mobile teeth in their oral cavity. When the patients didn't have any mobile tooth, they were categorized as Group I. Participants with less than 8 teeth were categorised as Group II. If the number of mobile teeth was between 9-16, the participants were grouped as group III. Participants having mobile teeth between 17-24 were grouped as Group IV. When the number of mobile teeth falls between 25-32, they are categorized as group V. Among the patients to whom tooth mobility index recorded, data related to their systemic diseases were collected and reviewed.

Statistical Analysis

The collected data was entered in MS Excel and imported in IBM SPSS software version 23.0. The independent variable were age and sex and systemic disease while the dependent variables was tooth mobility. Frequency distribution of age, gender, systemic diseases was done using descriptive statistics. Chi-square test was done to determine the association between systemic diseases and tooth mobility.

Results and Discussion

Measuring the degree of tooth mobility is an important part of any thorough periodontal examination. Tooth mobility is the measurement of horizontal and vertical tooth displacement created by examiner's force. Even a tooth with significant alveolar bone support reveals proper tooth mobility [23]. Very often, the course of periodontal disease is modified by the systemic disorder of patients. Distribution of study subjects based on age showed that 19.71% participants were between 18-35 years, 50.704% were between 36-55 years and 29.77% were above 55 years(Figure 1). Figure 2 represents the distribution of study subjects based on gender. Among 71 participants, 40.85% were females and 59.15% were males. The systemic disorder exerted the effect in a generalized manner and so affects the occurrence and management of the periodontal conditions [24]. Figure 3 represents the distribution of presence or absence of systemic diseases among the study subjects. 66.197% didn't have systemic diseases and 33.803% reported to have systemic diseases. Periodontal diseases are prevalent disorders with risk parameters that contribute to morbidity in terms of decreasing oral function and increasing tooth loss [23]. From the results of the present study , systemic diseases like diabetes Mellitus , female sexual hormones condition hypopituitarism, hyperthyroidism , primary hyperparathyroidism ,osteoporosis hypophosphatasia, hypophosphatemia, acatalasia etc., could result in tooth loss and tooth mobility was determined [4]. Number of participants with systemic disease was 33.83%.This was almost similar to the study conducted by Mealey et al [25]. In contrast to these findings, a study conducted by researchers [26] ,60% of periodontitis patients with tooth mobility suffer from the same type of systemic diseases. According to a study, it was reported that 85.96% of patients suffering from periodontitis had at least one type of systemic disease. The findings of the present study were less than the studies by Georgiou et al [27]. This could be because of the differences in patient data recording systems. Also other studies included systemic diseases such as osteoporosis, rheumatoid arthritis, sinusitis , tumours etc whereas in our study we had included only diabetes and hypertension.

Periodontitis is due to the injury to the periodontal membrane and many risk factors contribute to periodontal infections [28]. Evidence exists which suggests a relationship between periodontal status and nutrition, alcohol consumption, socioeconomic status and stress levels [29-31].Smoking is the best established of the modifiable risk factors for developing periodontal disease[32]. Diet we consume also plays a major role in periodontal diseases[33]. Nutrition can influence the growth, development and metabolic activities of the periodontium; the high rate of cell turnover in the periodontal tissues requires that essential nutrients are readily available. The health care professionals are expected to provide treatment with all the knowledge and skill and as a public health dentist we should give proper awareness and proper healthcare to the patients even in the crisis period [34,35].

In this study hypertension and diabetes mellitus were the most frequent conditions detected and were significantly higher in periodontitis patients with tooth mobility. This is in agreement with previous studies [36]. From our study results, we found that there was no statistically significant relationship between systemic diseases and tooth mobility. Figure 4 cluster bar depicts the association between tooth mobility and systemic diseases. 4.2% of participants with systemic diseases and 2.12% of participants without systemic diseases have mobile teeth between 17-24(Group IV). Majority of the participants with systemic disease(70.21%) and without systemic disease(75%) belong to Group II . Previous studies show that systemic diseases are among elderly aged [37]. Such a finding implies that public healthcare dentists should need to actively seek changes and address more for elderly people.

In the present study, we found that there was a trend for mild mobility to severe mobility of teeth. Majority of patients with systemic diseases were in mild mobility

of teeth and number decreased towards severe mobility of teeth. Tooth mobility score, however, was not having statistically significant association with systemic diseases.This is in accordance with the previous study results [37,38]. They stated that none of the systemic disease in their study was significantly associated with tooth mobility, periodontal disease severity. Further implications to be done to elucidate whether periodontal infections could be a true risk factor for some important systemic conditions and provide more insight to the association of periodontitis and systemic disease.The present study has certain limitations attributed to study design which is a retrospective study. Further longitudinal prospective studies with standardized measuring instruments are needed to prove the hypothesis.

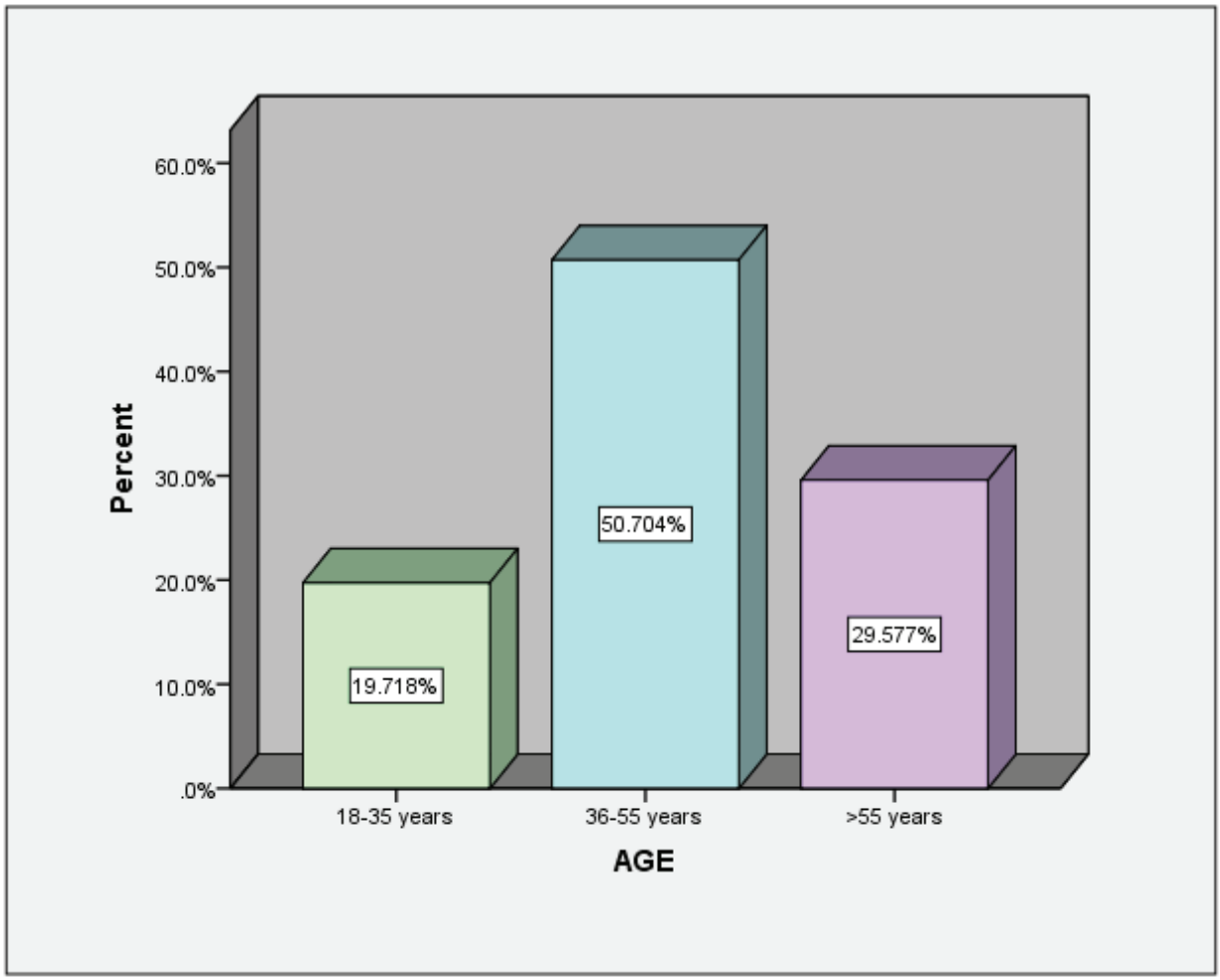

FIGURE 1: Bar diagram showing the percentage distribution of study subjects based on age. X axis represents the different age groups of the study participants and Y axis represents the percentage of the participants' age groups. 19.71% participants were between 18-35 years, 50.704% were between 36-55 years and 29.77% were above 55 years. Almost half of the study population belongs to the age group of 36-55 years.

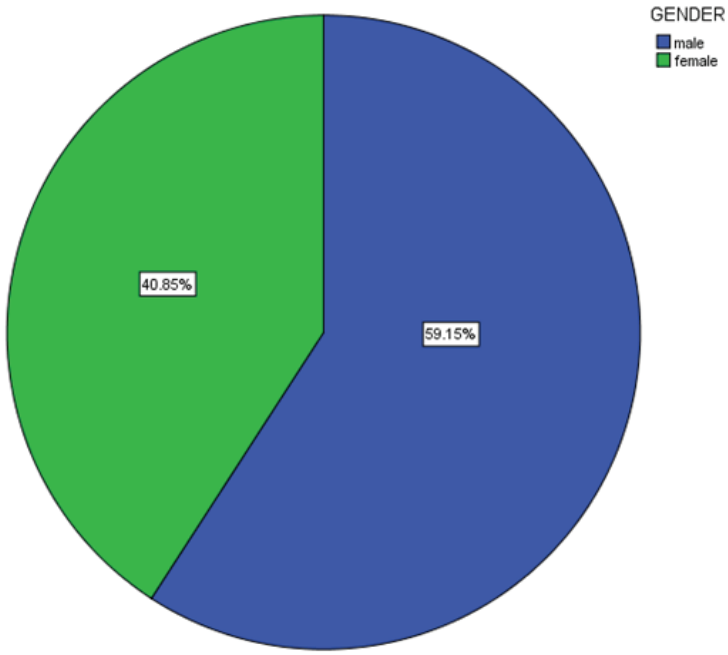

FIGURE 2: Pie chart represents the percentage distribution of study subjects based on gender. Among 71 participants, 40.85% were females and 59.15% were males, thus showing male predominance in the current study population.

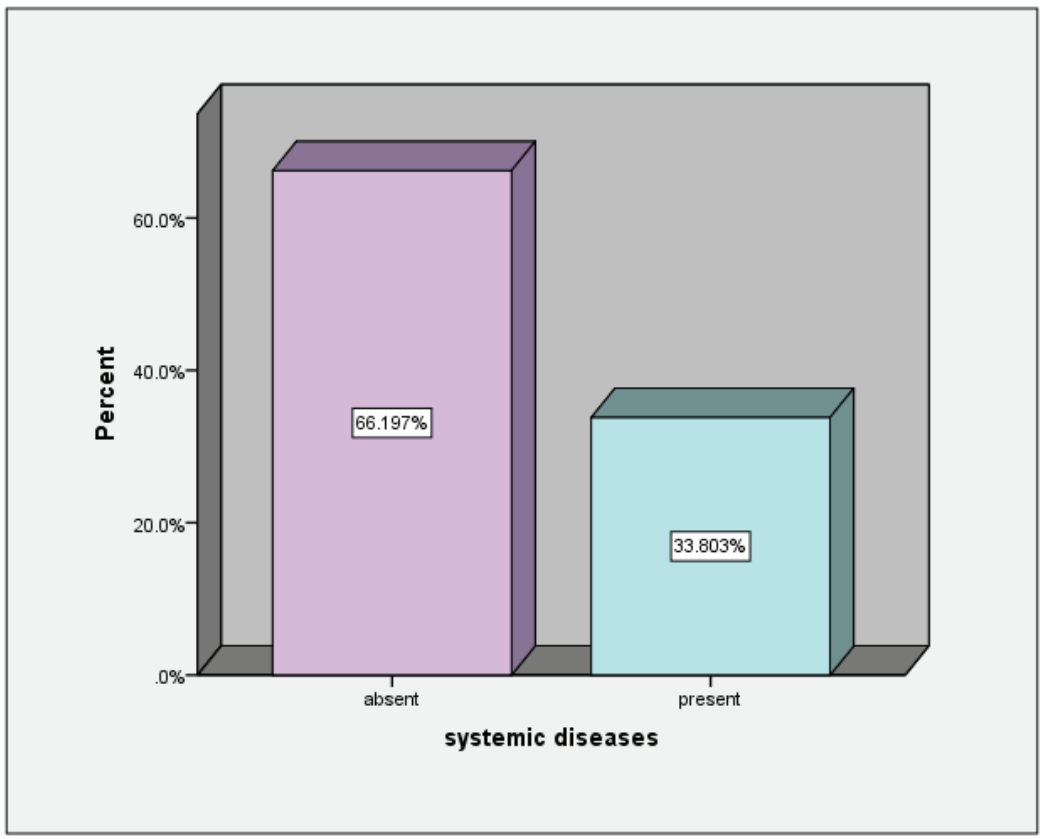

FIGURE 3: Bar graph depicting the percentage distribution of presence or absence of systemic diseases among the study subjects. X axis represents presence or absence of systemic diseases. Y axis represents the percentage of the study population with and without systemic diseases. 66.197% of the study population didn't have systemic diseases and 33.803% have systemic diseases.

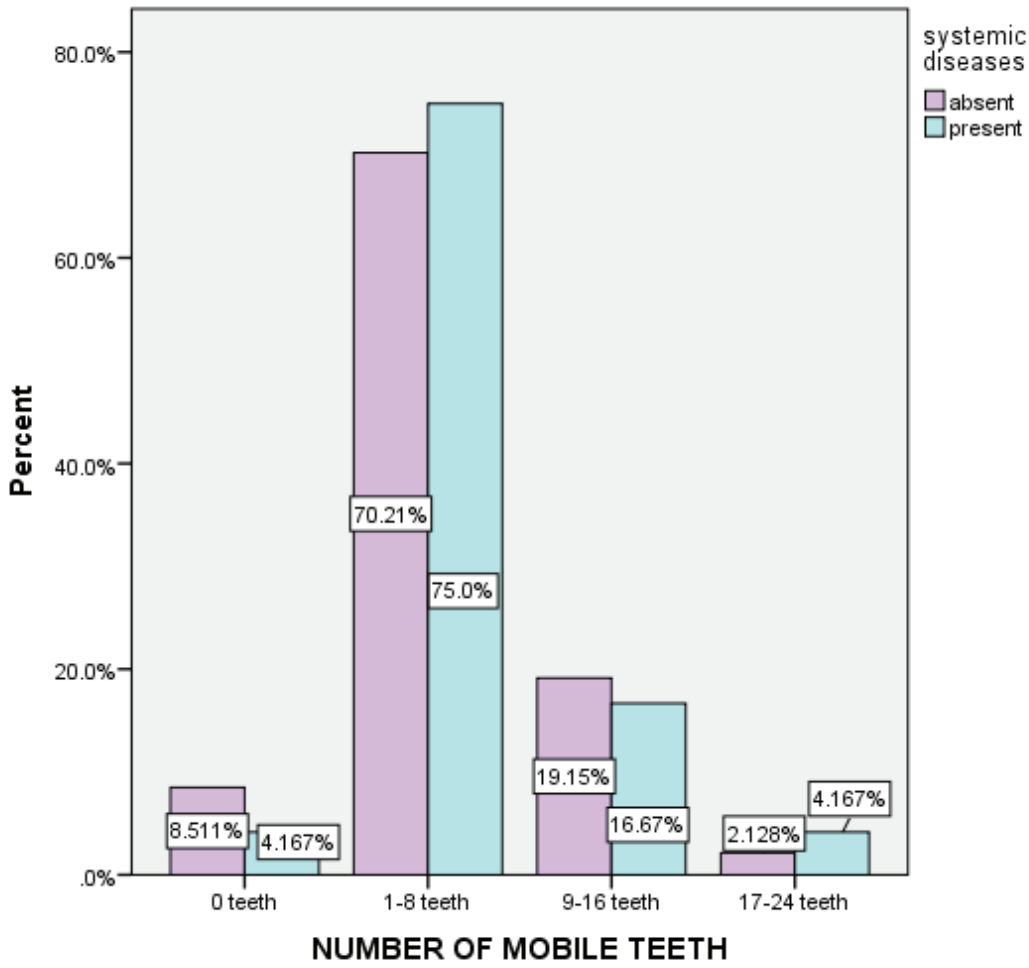

FIGURE 4: Clustered bar graph depicting association between number of mobile teeth and systemic diseases. X axis represents the number of mobile teeth and Y axis represents the percentage of study population with and without systemic diseases. Most of the participants without systemic diseases (70.21%) and with systemic diseases(75%) belong to Group II (1-8 mobile teeth). Highest number of mobile teeth(17-24) was found among 4.16% of the study participants with systemic diseases and 2.12% participants without systemic diseases. Chi-square test revealed no statistically significant association between tooth mobility and systemic diseases using (Chi-square value - 0.794 ; p value - 0.858).

Conclusion

Within the limits of the study, it was found that participants with systemic diseases comparatively had an increased prevalence of more mobile teeth than participants without systemic diseases. But this difference was not statistically significant. Further studies should be conducted with a larger sample population to assess better inter-relationships between tooth mobility and systemic diseases.

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Conflicts of Interest: Nil

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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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