ANALYSIS OF ORAL HYGIENE INDEX AND TOOTH MOBILITY IN CHRONIC PERIODONTITIS PATIENTS - A RETROSPECTIVE STUDY

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Abstract

Periodontitis is a chronic inflammatory disease that affects periodontium and gradually destroys the tooth-supporting alveolar bone. Tooth mobility is one parameter which we use to evaluate the status of the periodontium. The aim of the present retrospective study is to assess the oral hygiene index and tooth mobility in chronic periodontitis patients. The data from 332 systemically healthy patients who were diagnosed with chronic periodontitis were included in this study. Demographic details such as patient identity number (PID. No), age and sex were recorded. Based on the severity of periodontal disease the patients were categorised into generalised chronic periodontitis and generalised chronic gingivitis with localised periodontitis. The oral hygiene status was assessed using the Simplified Oral Hygiene index (1964). The grading of mobility was assessed by Miller’s classification(1985). The required data was collected and imported to SPSS software for analysis. Majority of the subjects were in the age group of 50-89(50.30%), whereas the age group of 40-50(29.52%) and the age group of 19-39(20.18%). Among the study population male patients were 60% and female patients were 40%. The oral hygiene status was good in 18.37%, fair in 79.22% and poor in 2.41% of patients. Grade 1, 2 and 3 mobility in patients was 76.40%, 13.32% and 10.28% respectively. Based on periodontal diagnosis, patients with generalized chronic periodontitis were 88% and patients with generalised chronic gingivitis with localised periodontitis were 11.75%. There was a statistically significant association seen between the diagnosis and tooth mobility among mandibular posterior teeth. (p < 0.05) Within the limitations of the present retrospective analysis, it can be concluded that in the patients with generalised chronic periodontitis, grade 3 mobility was most commonly seen in relation to maxillary anteriors, posteriors and mandibular anteriors, posteriors. Fair oral hygiene was commonly seen in chronic periodontitis patients. Maintenance of proper oral hygiene is necessary for the prevention of periodontal diseases.

Key words - Oral hygiene index (OHI), Tooth mobility, Generalised chronic periodontitis, Generalised chronic gingivitis with localised chronic periodontitis
Introduction

Tooth mobility, which is undue horizontal and vertical tooth displacement due to examiners force, occurs when the periodontium is primarily diseased, secondarily involved by diseases or traumatized. It is primarily caused by periodontitis which is a severe form of periodontal disease but may be caused by dental trauma, trauma from occlusion, pregnancy, diabetes mellitus, and local and metastatic jaw tumors. Tooth mobility may cause occlusal instability, masticatory disturbances, and impaired quality of life, thereby prompting dental attendance, individuals experiencing tooth mobility may resort to unilateral mastication and dietary restriction as their coping mechanisms [1]. Physiological/normal tooth mobility may be defined as the slight displacement of the clinical crown of a tooth, that is allowed by the resilience of an intact and healthy periodontium, under the application of a moderate force [2],[3].

The degree of tooth mobility may be influenced by a wide variety of factors, such as the root surface area with connective tissue attachment, the tooth type and morphology, the structural, biophysical and metabolic properties of the periodontal ligament and the supporting alveolar bone.[4] Tooth mobility may be affected by a plethora of factors, it is clinically important to examine the association of mobility with various parameters. Periodontitis is the most common oral disease worldwide, with an age-standardised prevalence of 11.2% [5],[6] Periodontitis is a multifactorial disease and the risk factors for periodontitis includes diabetes mellitus, smoking and most commonly inadequate oral hygiene [7],[6] The accumulation of dental plaque and calculus is usually caused by improper tooth brushing techniques, failure to carry out interdental cleaning and irregular dental visits. This accumulation predictably results in gingival inflammation.

Persistent gingivitis is a key risk predictor for the breakdown of periodontal attachment. Oral health has been defined as “the standard of health of the oral and related tissues which enables to eat, speak and socialize without active disease, discomfort and embarrassment and which contributes to general well being[8]. The Simplified Oral Hygiene Index (OHI-S), described by Greene and Vermillion, was used for estimating individual’s oral hygiene. The OHI-S has two component parts-debris and calculus-each with a possible range of scores from zero to three.[9] The present retrospective study was done to assess the oral hygiene index and tooth mobility in chronic periodontitis patients.

Materials and methods

The retrospective cross sectional study was carried out by the analysis of the patients’ records who had visited the department of periodontics from June 2019-March 2020. The study design was reviewed and approved by the
ethical committee of the institute. (Ethical approval number SDC/SIHEC/2020/DIASDATA/0619-0320). A total of 4000 case records were analysed for the study. The data from 332 systemically healthy patients who were diagnosed with chronic periodontitis at Saveetha dental college, Chennai were included in this study. Case sheets with incomplete data were excluded from the study.

Demographic details such as patient identity number (PID.No), age and sex were recorded. Inclusion criteria - Age(19-89), Gender(Male and Female), Presence of mobility, Presence of chronic periodontitis. Exclusion criteria - Aggressive Periodontitis, Undergone periodontal treatment for past 6 months, Presence of systemic diseases and smoking habits.

Based on the severity of periodontal disease the patients were categorised into generalised chronic periodontitis and generalised chronic gingivitis with localised periodontitis. The oral hygiene status was assessed using the Simplified Oral Hygiene index (1964). The grading of mobility was assessed by Miller’s classification (1985).

Statistical analysis –

The data was obtained and analysed using statistical software SPSS version 23.0 (Statistical Package For The Social Sciences). Chi square test was used to study association between the parameters. Pearson correlation analysis was used to assess the correlation between the variables. The results were considered to be of statistical significance if p < 0.05.

Results and discussion

A total 332 systemically healthy patients with periodontitis were included. Majority of the subjects were in the age group of 50-89(50.60%), whereas the age group of 40-50(29.22%) and age group of 19-39(20.18%). (Figure 1) Among the study population male patients were (60.84%) and female patients were (39.16%). (Figure 2) The oral hygiene status of the patients were analyzed by an OHI-S index in which patients with Good (0.0-1.2) were 18.37%, Fair (1.3-3.0) patients were 79.22% and poor (3.0-6.0) patients were 2.41% (Figure 3).

Mobility of teeth were assessed which contain 1202 which includes maxillary anteriors and posteriors and mandibular anteriors and posteriors, in which grade 1 mobility of patients were 76.40%, grade 2 mobility of patients were 13.32% and grade 3 mobility of patients were 10.28% (Figure 4). Based on periodontal diagnosis, patients with generalized chronic periodontitis were 88.25% and patients with localised periodontitis were 11.75%.(Figure 5).

When comparing the Diagnosis with mobility in the maxillary anteriors, Grade 1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis compared with localised chronic periodontitis. Type of tooth mobility commonly seen in maxillary anteriors among generalised chronic periodontitis patients was grade 3. Chi square test done, p value=0.084(>0.05), hence statistically not significant.(Figure 6).

When comparing the Diagnosis with the mobility in mandibular anteriors, Grade 1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis compared with localised chronic periodontitis. Type
of tooth mobility commonly seen in mandibular anteriors among generalised chronic periodontitis patients was grade 3. Chi square test done, $p$ value=0.883, ($>0.05$) hence statistically not significant.(Figure 7).

When comparing the Diagnosis with the mobility in maxillary posteriors, Grade 1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis compared with localised chronic periodontitis. Type of tooth mobility commonly seen in maxillary posteriors among generalised chronic periodontitis patients was grade 3. Chi square test done, $p$ value=0.204 ($>0.05$), hence not statistically significant.(Figure 8).

When comparing the Diagnosis with the mobility in mandibular posteriors, Grade 1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis compared with localised chronic periodontitis. Type of tooth mobility commonly seen in mandibular posteriors among generalised chronic periodontitis patients was grade 3. Chi square test done, $p$ value=0.014 ($<0.05$), hence statistically significant.(Figure 9).

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**Figure 1**-This bar graph represents the distribution of patients based on age groups, where X axis denoted the age distribution and Y axis denotes number of patients. Highest number of patients was seen in 50-89 years of age(Orange)(50.60%), followed by 40-50 years of age(Maroon)(29.22%) and 19-39 years of age (Purple)(20.18%)
Figure 2 - This bar graph represents the distribution of patients based on gender, where X axis denotes gender and Y axis denotes number of patients. It was found that majority of the patients were males (Blue) (60.84%) whereas the remaining were females (Red) (39.16%).

Figure 3 - This bar graph represents the distribution of oral hygiene index score, where X axis denotes oral hygiene index score and Y axis denotes number of patients. The graph shows oral hygiene index score Good (Light green) (18.37%), Fair (Dark grey) (79.22%) and Poor (Yellow) (2.41%).
Figure 4 - This bar graph represents the distribution of grades of mobility, where X axis denotes Mobility and Y axis shows Y axis denotes number of patients. This graph shows that Grade 1 mobility (Grey) was seen in 76.40% of patients and Grade 2 (DarkBlue) and grade 3 mobility (Green) was seen in 13.32% and 10.28% of patients.

Figure 5 - This graph represents the distribution of type of periodontal disease, where X axis denotes the periodontal disease and Y axis denotes number of patients. Generalised chronic periodontitis (Ocean blue) was seen in 88.25% and localised chronic periodontitis (Lavender) in 11.75% of the patients.
Figure 6 - This graph represents the association between diagnosis and mobility in maxillary anteriors, where X axis shows Diagnosis and Y axis shows Number of patients. Type of tooth mobility commonly seen in maxillary anteriors among generalised chronic periodontitis patients was grade 3. Grade 1, grade 2 and grade 3 mobility in maxillary anteriors were more commonly seen in generalised chronic periodontitis patients when compared with localised chronic periodontitis patients. Chi square test done, p value=0.084(>0.05), hence not statistically significant.

Figure 7- This graph represents association between diagnosis and mobility in mandibular anteriors, where X axis shows Diagnosis and Y axis shows Number of patients. Type of tooth mobility commonly seen in mandibular anteriors among generalised chronic periodontitis patients was grade 3. Grade 1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis patients when compared with localised chronic periodontitis. Chi square test done, p value=0.883(>0.05), hence not statistically significant.
Figure 8-This graph association between diagnosis and mobility in maxillary posteriors, where X axis shows diagnosis and Y axis shows Number of patients. Type of tooth mobility commonly seen in maxillary posteriors among generalised chronic periodontitis patients was grade 3. Grade 1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis compared with localised chronic periodontitis. Chi square test done, p value=0.204 (＞0.05), hence not statistically significant.

Figure 9-This graph association between Diagnosis and mobility in mandibular posteriors, where X axis shows Diagnosis and Y axis shows Number of patients. Type of tooth mobility commonly seen in mandibular posteriors among generalised chronic periodontitis patients was grade 3. Grade 1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis compared with localised chronic periodontitis. Chi square test done, p value=0.014 (＜0.05), hence statistically significant.
Previously our team had conducted various studies on treatment modalities for periodontal diseases and periodontal procedures\cite{10}\cite{11}\cite{12}\cite{13}\cite{14}\cite{15}\cite{16} studies correlating various diseases and factors related to periodontal diseases \cite{17}\cite{18} and in-vitro & radiological studies \cite{19}\cite{20} and reviews \cite{21}\cite{22}\cite{23}\cite{18}\cite{24} over the past 5 years. Now we are focusing on the various other conditions that will guide us and give a deeper understanding in managing periodontal problems.

In present study, based on periodontal diagnosis, patients with generalized chronic periodontitis were 88.25% and patients with generalised chronic gingivitis with localised periodontitis 11.75%. In the present study, the majority of the subjects were in the age group of 50-89 (50.60%). The main explanation for tooth mobility in periodontitis which increases with aging among dentate individuals explains why a greater proportion of the patients who had tooth mobility were older in age. In the present study, comparing the Diagnosis with mobility in the maxillary anteriors, Type of tooth mobility commonly seen in maxillary anteriors among generalised chronic periodontitis patients was grade 3. Grade1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis compared with localised chronic periodontitis. This association was found to be statistically insignificant (p value-0.084).

When comparing the Diagnosis with the mobility in mandibular anteriors, Type of tooth mobility commonly seen in mandibular anteriors among generalised chronic periodontitis patients was grade 3. Grade1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis compared with localised chronic periodontitis. This association was found to be statistically insignificant (p value-0.883). When comparing the Diagnosis with the mobility in maxillary posteriors, Type of tooth mobility commonly seen in maxillary posteriors among generalised chronic periodontitis patients was grade 3. Grade1, grade 2 and grade 3 mobility were more commonly seen in generalised chronic periodontitis compared with localised chronic periodontitis. This association was found to be statistically insignificant (p value-0.204).

Demetriou et al stated that they found tooth mobility to be one among the most symptoms of periodontitis after the age of 40 years \cite{25}. The oral hygiene status of the patients in the present study was analyzed by an OHI-S index, in which for the majority of patients the score was fair (79%). Savage et.al conducted a study to assess the prevalence of calculus, where fair to poor oral hygiene was evident in periodontitis cases.\cite{26} Okeigbmen et.al in a study found that in elderly patients that presence of abundant dental calculus occurs due to poor oral hygiene care. \cite{27} Knack KC et.al study stated that males have higher prevalence of dental calculus compared to females \cite{28}.

In the present study, grade 1 mobility was more common in periodontitis patients which were about 76.4%, followed by grade 2 mobility in 13% of cases and grade 3 mobility in 10% of cases. Savage et.al and Okeigbmen et.al study stated the importance of tooth mobility measurement, which serves as a valuable clinical indicator of the periodontal diseases.\cite{26}\cite{27}.
Low level of self-awareness in individuals may also influence oral care seeking behaviour.[29] Jain et al. study stated that males have poor oral hygiene and have increased prevalence of periodontal diseases. Al-Ansari and Peker et al. stated that males have limited knowledge for oral health related topics.[31],[32]. Kateeb et al. study states that females had more positive dental health attitudes and behaviours when compared to males.[33]. This might also be a reason for poor oral hygiene and more prevalence of periodontal diseases in males. Contrary to this, Kobayashi et al., Azoda et al. stated that there is no difference between males and females in prevalence of periodontal disease.[29][34] Lertpimonchais A. et al. stated that fair to poor oral hygiene increases the risk of periodontitis by two- to five-fold. This risk can be reduced by regular tooth brushing and dental visits. [35]. Poor oral hygiene leads to poor periodontal status through direct mechanisms release of exotoxins, endotoxins, proteolytic and hydrolytic enzymes and toxic metabolic products, and indirect mechanisms through hypersensitivity reactions, activation of antigen antibody reaction and complement system activation.[36]. The limitations of present study are less sample size and we included only healthy individuals with no adverse oral habits.

**Conclusion**

Within the limitations of the present retrospective analysis, it can be concluded that in the patients with generalised chronic periodontitis, grade 3 mobility was most commonly seen in relation to maxillary anteriors, posteriors and mandibular anteriors, posteriors. Fair oral hygiene was commonly seen in chronic periodontitis patients. Similar studies, in patients with presence of various systemic diseases and smoking habits can be done in future. Maintenance of proper oral hygiene is necessary for the prevention of periodontal diseases.

**References**


