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Correlation of dental caries in chronic generalized periodontitis patients

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Abstract

Background and Objectives: Dental caries and chronic generalized periodontitis are the two most common oral diseases of the adult population. Etiology of these two diseases is entirely different along with the other salivary factors like salivary Ph, calcium, phosphorous levels etc. Depending on these variations an inverse relationship exists between these diseases. Hence the aim of the study was to evaluate the prevalence of dental caries in chronic generalized periodontitis patients.

Materials and Method: Sample consisted of 60 patients diagnosed with chronic generalized periodontitis using DMFT and CPI index.

Results: The mean DMFT scores of our test group were 3.13 ± 1.53 and mean number of decayed teeth was 2.23±1.12.

Conclusion: The prevalence of dental caries was lower in chronic generalized periodontitis patients. Hence we would like to conclude that preventive measures have to be considered in such patients to lower the risk of caries.

Introduction

Extensive epidemiological studies have been conducted to evaluate the relationship between the two most common microbial diseases i.e. dental caries and chronic generalized periodontitis and the results are diverse. However, a plethora of evidence exist which show that the patients suffering from chronic generalized periodontitis have lower levels of dental caries and also lower number of *S. mutans* counts when compared to healthy/cariogenic individuals.[1,2,3,4,5] There are various contributory factors which govern the oral environment, some of which include the salivary Ph, salivary buffering capacity, calcium and phosphorous levels and even the microbial counts. It has been shown that these contributory factors may play a major role in modifying the oral environment which in turn may influence the occurrence and also the progress of the disease.[6] Extensive study have been conducted on this topic with the following review of literature. Studies have been conducted to evaluate the relationship between dental caries and periodontitis and the results have been diverse. A Nationwide Health 2000 health examination survey in Finland was carried out in 2000 and 2001 by National Institute of Health and Welfare conducted by Mattila P *et al* to evaluate the simultaneous occurrence of periodontal disease and dental caries in Finnish population aged 30 years and above and found that subjects having periodontal disease had significantly more dental caries than those without periodontal disease.[7]

But another study was also conducted by Entezari S *et al* and Judy Skier where they found that there was no significant difference between the occurrence of periodontal disease and dental caries in chronic generalized periodontitis patients.[8,9]

Kinane DF *et al* conducted another study to know the synergistic association of dental caries and periodontitis in the same individuals with a sample size of 800 subjects using dental radiographs and did not find any significant association between the two diseases.[10]

Iwano Y *et al* conducted a study to evaluate the presence of dental caries in healthy and periodontitis patients using real time polymerase chain reaction in 40 individuals where he concluded that the caries incidence was higher in periodontitis patients. Literature also exists which shows increased incidence of root caries in periodontitis patients following phase-I therapy.[11,12,13,14] As it is evident from the above mentioned studies, the incidence of dental caries in periodontitis patients is varied. Hence the aim of the present study was to evaluate the prevalence of dental caries in chronic generalized periodontitis patients.

Objectives

To estimate the prevalence of dental caries in chronic generalized periodontitis patients.

Inclusion Criteria

1. Patients aged 30-55yrs diagnosed with chronic generalized periodontitis.
2. Patients who were not under antibiotic medication were included in the study.
3. Presence of dental caries in chronic generalized periodontitis patients as determined by DMFT index.

Exclusion Criteria

1. Patients having systemic diseases were not included in the study.
2. Smokers were excluded from the study.

Materials and Method

The total study sample consisted of 60 subjects diagnosed with chronic generalized periodontitis reporting to Department of Periodontics and

Implantology, Coorg Institute of Dental sciences. Clinical information included name of the patient, age being between 30-55years, 38 males and 22 females and their address. Chronic generalized periodontitis and dental caries were diagnosed by using CPI index and DMFT index. The CGP patients were followed up after phase -I therapy within a duration of one month.

Table 1: Mean DMFT of test group

	Mean	SD
Test group	3.13	1.53

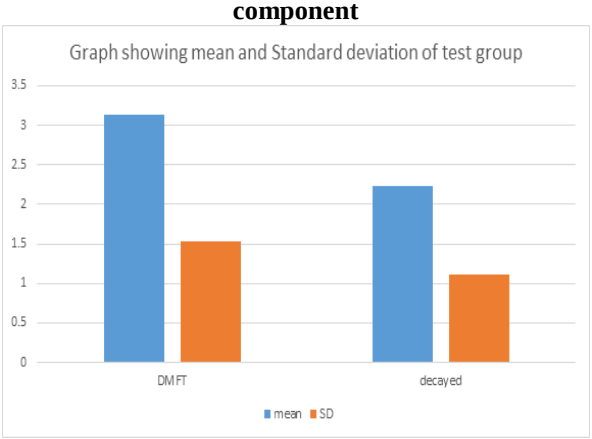
DMFT scores of the test group were in the range of 1-7. Descriptive statistics of DMFT scores was carried out in the test group and a mean value of 3.13±1.53 was obtained.

Table 2: Mean 'decayed' component of test group

	Mean	SD
Test group	2.23	1.12

The decayed component had a range of 1-5. The decayed component of the DMFT in the test group gave a mean value of 2.23±1.12.

Graph 1: Graph showing mean and standard deviation of test group with DMFT and decayed component



Discussion

The most prevalent oral diseases *i.e.* Dental caries and Chronic generalized periodontitis are known to be multifactorial in origin. Dental caries is caused by a constant interplay between diet, host and time. The resultant changes favours growth of cariogenic microorganisms which further promotes the carious process.[15] Chronic generalized periodontitis on the contrary can be attributed to poor oral hygiene, smoking, stress, systemic risk factors etc. The interplay between these factors brings about changes in the oral environment by creating a niche favourable for the growth and propagation of microorganisms which further aid in disease progression.[16]

The fact that the primary microorganisms responsible for the formation of dental caries are the *Streptococcus mutans* group is well established. In the presence of a suitable substrate like fermentable carbohydrates *Streptococcus mutans* produces organic acids. This leads to reduction in the pH of both saliva and plaque, leading to the dissolution of the tooth. Reduced pH also creates a favourable habitat for the further growth of *Streptococcus mutans* and other cariogenic bacteria.[17]

In contrast, in chronic generalized periodontitis a disease of adult population the contributory factors modify the pH of saliva[18,19] causing an increase in the population of indigenous bacteria which include *P. gingivalis, P. intermedia, F.nucleatum, Capnocytophaga, C. rectus, B. forsythus* and *A. actinomycetemcomitans*. An alkaline pH has been shown to favour the growth of these periodontopathogens, a salivary pH of 7.0 is seen to be favourable for the growth of *P. melanogenica*, as the pH increases to 7.25 the environment is ideal for the growth of *P. intermedia*, whereas above 7.5 *P. gingivalis* grows dominantly.[20] These bacteria and their products bring about an inflammatory host response which leads to destruction of supporting tissues of teeth causing disease progression.

This shows that the environmental conditions necessary for the growth of peridontopathogenic and cariogenic microorganisms are different from and converse to each other. In accordance with this, various studies have shown that an inverse relationship between the prevalence of dental caries and chronic generalized periodontitis exists. In view of this extensive literature conducted by Sewon *et al*, Sioson *et al*, Ramjford *et al* exists which imply that patients with CGP have been shown to have lower DMF scores when compared to persons who do not suffer from CGP.[1,2,3,4,21] Results contrary to these have also been found. Hence, we conducted the present study to evaluate the prevalence of dental caries in CGP patients.

The mean DMFT scores of our test group were 3.13 ± 1.53 as shown in Table 1. Thus the patients of our test group could be classified under the low caries experience group according to the classification giving by WHO.[22] The mean number of decayed teeth was 2.23±1.12 and was also associated with low caries experience. Thus our results are in agreement with various authors who have found an inverse correlation between caries and periodontitis.[2,3]

The reason for the decreased incidence of carious lesion in patients with CGP has been researched exhaustively and is said to be because of the increased alkalinity of the saliva in these patients caused by metabolism of nitrogenous compounds in the plaque by the periodontopathogens and increased mineralization potential due to increased salivary calcium, phosphorous and buffering capacity among other factors.[23,24]

We also calculated the *S. mutans* counts of these patients before and after phase-I treatment and found and increase in the microbial counts. But the patients were followed up only after one month. Hence, it would not

be appropriate to arrive at a conclusion regarding the changes in the DMFT scores in these patients. Rather we would propose that these patients are at a higher risk of acquiring caries with regard to increased *S. mutans* counts. Therefore, various preventive measures have to be taken into consideration in CGP patients to reduce the risk of dental caries.

Conclusion

As it is evident from our results that the prevalence of dental caries is low in chronic generalized periodontitis patients we would like to conclude that patients with chronic generalized periodontitis have lesser DMFT scores and hence a reduced caries experience. Literature also exists which indicate that the patients undergoing phase-I therapy come across various changes in the oral niche for example the salivary Ph, concentration of calcium, phosphorous etc. and also the microbial load. Hence the procedures to prevent caries in such patients have to be considered in the follow up.

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