

ASSOCIATION BETWEEN DENTAL PROSTHESIS AND PERIODONTAL DISEASE IN A RURAL JAIPUR POPULATION.

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Received: 13/01/2014

Revised: 12/05/2014

Accepted: 27/05/2014

Abstract

Objective: The aim of this study was to describe the periodontal conditions and to analyze the association between the wearing of fixed or removable partial dentures and periodontal disease in a representative adult rural population in Jaipur. **Materials and methods:** Cross-sectional study of a representative sample comprising 200 individual aged 30-60 years. Data were collected by clinical examinations by the World Health Organization Basic Methods Criteria, which included the Community Periodontal Index and dental prosthesis exam. A descriptive analysis and the chi-square statistic were performed. **Results:** The wearing of dental prosthesis resulted in higher community Periodontal index. **Conclusion:** It was concluded that the wearing of dental prosthesis was detrimental to periodontal health in patients whose oral hygiene was less than adequate.

Keywords: periodontal diseases, dental prosthesis, oral health, periodontal index, epidemiology.

INTRODUCTION

A removable partial denture is a common treatment modality for the reinstallation of partially edentulous ridges.(1) Although remarkable advances are available to replace missing teeth in fixed prosthesis and implantology, removable partial dentures are very cost effective and a well accepted choice in the most part of developing countries such as India. Numerous researches have been conducted to determine the effect of removable partial dentures on periodontal health. Commonly,

removable partial dentures have been well connected with increased plaque formation, gingival inflammation, mobility, periodontal pockets and minute bone loss not only on the abutments but also on other teeth. (2) Some other studies have revealed increased or continuous periodontal breakdown in patients fitted with partial dentures. (3) Even though a few studies have demonstrated that periodontal structure can be protected from damage by periodic professional dental checkups recalls which have resulted in the preservation of good oral

hygiene,(4) the overall consensus has been that, removable partial dentures are detrimental to periodontal health and are denigratingly called “gum-strippers”. (5) Most of the studies have assessed the effect of cast-metal partial dentures; few studies have demonstrated the effects of acrylic partial dentures 6 which is the common method of replacement of missing teeth in India. The aim of this study is assessment of the effect of removable partial dentures on periodontal health.

Removable partial denture (RPD) wearers exhibit high risk for tooth loss. People who have periodontal disease and high caries susceptibility are obviously at greater risk for further tooth loss since partial dentures are likely to aggravate these conditions. As RPD wearing may cause to amplify plaque development on those vicinities of teeth and soft tissues which are covered by the denture, excellent oral hygiene measures along with care in denture design to maintain a healthy oral environment are highly recommended.(7)

MATERIAL AND METHODS

Study methodology

The target population of the present study was adults living in the rural area of Jaipur. Two hundred patients aged 30-60 years were examined . The sample was randomly selected to represent the 30-60 year old adult population of rural area of Jaipur. The specific area where the data were collected was Department of Periodontology and Prosthodontics. Mahatma Gandhi Dental college Hospital, Jaipur(Rajasthan). An ethical clearance was obtained for the study from the ethical

committee, Mahatma Gandhi dental college, Jaipur. The patients were chosen at random, using the census data and other relevant information.

Exclusion criteria were presence of diseases/conditions that may interfere with the clinical examination and the results. Therefore, subjects were excluded if they were identified with smokers, intoxicated with alcohol or drugs, pregnant women and psychiatric problems.

Clinical examinations

Examinations were performed by one dentist, assisted by a recorder, and they were conducted in Department of Periodontology and Implantology. Clinical examinations were carried out in natural light. Cotton buds, Gauze squares, sterile sets of plane mouth mirrors and Community Periodontal Index (CPI) probes were filled in adequate numbers for each working day. Strict procedures for infection control were followed. The clinical examination lasted an average of 5 minutes per adult. The Community Periodontal Index (CPI) was recorded for each sextant. Ten index teeth (17, 16, 11, 26, and 27 in the maxilla, and 47, 46, 31, 36, and 37 in the mandible) in six sextants (17-14, 13-23, 24-27, 37-34, 33-43, and 44-47) were probed and scores ascribed to each sextant on the following basis:

score 0 - no signs of disease;
 score 1 - gingival bleeding after gentle probing;
 score 2 - presence of supra or subgingival calculus or other plaque retentive factors;
 score 3 – subgingival calculaous or 4 or 5 mm deep periodontal pockets;
 score 4 - 6 mm or deeper periodontal pockets (8)

A sextant was examined if at least 2 teeth were present. A 0.5 mm ball-ended probe with color markers at 3.5 and 5.5 mm was used to measure the CPI. The WHO recommends that the pressure applied in probe should not exceed 20 grams. For each tooth, 6 sites were examined: mesial, midline and distal on both buccal/labial and lingual/palatal surfaces. Probing depth was defined as the distance from the free gingival margin to the bottom of the pocket/sulcus (8). The use of dental prosthesis was assessed according to criteria suggested by WHO: score 0: don't wear dental prosthesis; score 1: fixed partial denture wearer; score 2: removable partial denture wearer; score 3: combined dentures (fixed/removable) wearer.

Data analysis

For the descriptive statistical analysis of the periodontal parameters (CPI), mean values were calculated for each patient and for sextant, since all patients present alterations in their periodontal condition. The presence or absence of disease and the identification of partial denture in the same sextant were compared, for which the chi-square test were used. Level of statistical significance was chosen at $p < 0.05$.

RESULTS

A mean number of 4.57 sextants presented bleeding and calculus as worse condition, and the sum of these conditions (score 1 and 2) represented 76.16% of total of sextants, whereas only 1.3 sextant were found to have a pocket of 4 mm or more, score 3 and 4 represented by 21.66% of sextants. The mean number of

sextants with healthy periodontal tissues was 0.11, which represents 1.83% of the total.

Table No.1 Mean Number of Sextants

	<i>SCORE 0</i>	<i>SCORE 1 & 2</i>	<i>SCORE 3 & 4</i>
<i>Mean No. Of Sextants</i>	0.11	4.57	1.30
<i>Relative %</i>	1.83%	76.16%	21.66%

Table showing Mean Number of Sextants involved in relation to Periodontal Scores with their relative percentage in the studied sextants.

DISCUSSION

This Study was made known to deal with the hypothesis that there was an association between the wearing of fixed/removable partial dentures and periodontal condition in a JAIPUR adult rural population. The results of this study propose that partial dentures may involve in the pathogenesis of periodontal disease. In this study, all subjects presented signs of periodontal disease. The percentage of patients with periodontal pockets was relatively high (57.2%), but when only deep pockets were considered, the percentage found was much lower (9.65%). A mean number of 5.89 sextant presented bleeding or more severe problems; however, only 1.30 sextants had 4 mm or deeper periodontal pockets. This signifies that the periodontal modifications were more common affecting more sextants, and having a few deeply involved teeth. Thus, gingivitis was the principal clinical manifestation of periodontal disease in the subjects examined.

Among the factors that account for poor periodontal condition are the lack of professional

recommendation regarding oral health maintenance and the low rate of follow-up. **(9)** Besides, the prevalence of periodontal diseases in rural populations seems to be higher than in urban populations. A research performed in rural and urban areas of a Jaipur city compared the oral health condition of these regions, including the main oral diseases as dental decay and periodontal disease, and the authors observed that rural peoples had worse index than urban people. **(10)** One study carried out in a rural area of São Paulo State, Brazil, determined values as 99.5% of children aged 6 to 14 years showing signs of periodontal disease.**(11)** Even though surveys performed with rural populations have some methodological differences, it is clearly distinguished the worse periodontal conditions of these populations. To understand these differences, it is necessary to know the social determinants of health involved in the health-disease process of periodontal disease, like income, education, habitation conditions, work, transport, sanitation and environment. Various researches have shown that, on comparing the periodontal condition of abutment teeth and natural teeth, a statistically significant difference was found between both periodontal conditions, the abutment teeth presenting a greater depth of gingival crevice, an increase of calculus and dental mobility. **(9,12,13)** It is believed that the increase in plaque accumulation is related to negligence of the patient and not necessarily brought about by the prosthesis. Periodontal alteration may be solely due to the patient's poor oral hygiene with no prosthesis involvement. **(14)**

Older patients maintain hygiene of natural teeth better than denture hygiene, and their results underscore the need for better instruction on

maintaining denture hygiene.**(13)** A study comparing patients with removable partial dentures, patients with no prosthesis, or patients with fixed partial dentures showed the greatest plaque and calculus deposition, periodontal probing depth, and alveolar bone loss on the abutment teeth in detachable partial denture wearers. **(15)** Some studies examined effects of forces transmitted to abutment teeth, jiggling, and eventual orthodontic tooth movement, and the findings showed that such forcing factors did not cause periodontal disease or progressive destruction of the periodontium if a person maintained good hygiene.**(9,14)**

We found a significant prevalence of periodontal disease in denture wearers in the present study. The causative factors associated with the pathogenesis of periodontal disease could be identified both in sites with and without dentures, and poor oral hygiene one of the most probable factors as described by the dentists during the clinical examinations.

Thus, evaluation of the wearing of partial dentures and periodontal condition must be carried out based on several evidences related to the importance of controlling bacterial plaque in order to preserve the integrity of the periodontium. However we could not ignore the in situ effect of dental prosthesis in relation to its several functionality characteristics, such as definition of margins and prosthetic adaptation, which, if not correct, may effectively contribute to the development of periodontal disease.

Most of the authors agreed about the necessitate for proper oral care at home and a regular follow up system, which influences the success of prostheses.**(16,17)** Different Clinical researches showed that reinstruction, re-motivation and

partial dentures might not cause any damage of the periodontium. In a retrospective study, the modification in the periodontal situation of patients wearing different designs of detachable partial dentures over long-term were evaluate, and found a higher deterioration in the abutment teeth than in the non-abutment teeth.(17)

According to these authors, the substantial dental and periodontal destruction in patients with partial dentures is found more frequently in patients who had a poor oral hygiene and seldom visited their dentist. Every patient should be included in a preventive oral health service, with control of bacterial plaque by the dentist and the patient. In populations with low level of oral hygiene and limited oral health care resources, a “whole population” strategy for general oral health promotion should be applied. (18) Besides this, based on the risk profile, the basic strategy should be individualized treatment to eliminate infection by periopathogens and to manage modifying risk factors and prognostic risk factors, as the wearing of dental prostheses. Rural populations require easily available services with different strategies that must emphasize on the necessities and difficulties of those populations. The access to health services must be facilitated in the form of Curative treatment, preventive and educative activities. Finally, the results highlight the need for further epidemiologic studies to clarify the relationship between dental prosthesis and periodontal disease, types of dentures and period of development of disease.

CONCLUSION

The wearing of partial dental prosthesis was associated with periodontal disease in this study

population, and implementation of plaque control intervention can reduce a significant number of cases. The results suggest a need for populations based plaque control programs in an attempt to reduce the incidence of development of periodontal disease in population.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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