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Full Length Research Paper

Periodontal health status and prevalence of root caries in Brazilian adults of Aracaju city

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The aim of this study was to evaluate the prevalence and severity of periodontal disease and root caries in a Brazilian population, in the city of Aracaju, state of Sergipe. Two hundred subjects, age ranging from 20 - 60 years old, were recruited. The following full-mouth clinical parameters were evaluated: number of missing teeth, number of exposure root surfaces (gingival recession) and root caries, bleeding score, root caries index (RCI), and periodontal screening recording (PSR). The outcomes demonstrated a mean of 4.54% of missing teeth per patient, bleeding score of 29.72, 1.26 root caries, and a RCI of 9.21%. The most prevalent PSR score was 2 (for all the mandible sextants), 0 (2nd sextant), 1 (3rd sextant), and 3 (1st sextant). Based on theses results, it is concluded that the prevalence of periodontal disease and root caries occur with low frequency in the subjects evaluated.

Key words: Periodontal screening record, root caries, periodontal disease.

INTRODUCTION

Periodontal disease and root caries are a group of closely related conditions that manifest in all ages (Beck, 1990; Oh et al., 2002). Gingival inflammation is prevalent disease in the USA and affects 70% of children and nearly 100% of adults (Albandar, 2005; Moodéer and Wondimu, 2000). Periodontitis exhibit radiographic bone loss and clinical attachment loss, and can be localized or generalized. In US epidemiologic surveys, over 43% of adults aged 35 - 44 years and 74% of those aged 55 - 64 years, had at least one tooth exhibiting periodontal attachment loss of $\geq$ 3 mm; among these age groups 12 and 35%, respectively, demonstrated attachment loss of 43% of adults aged 35 - 44 years and 74% of those aged 55 - 64 years, had at least one tooth exhibiting $\geq$ 5 mm on at least one tooth (Albandar et al., 1999; Brown et al., 2007). In US epidemiologic surveys, over periodontal attachment loss of $\geq$ 3 mm; among these age groups 12 and 35%, respectively, demonstrated attachment loss of $>$ 5 mm on at least one tooth (Albandar et al., 1999; Brown et al., 2007).

In many countries, a growing number of older people are retaining more teeth than past generations (Sumney et al., 1973). Root caries has been prevalent in adults (43 - 63%) and the incidence has been increased with age (Beck, 1990; Sugihara et al., 2010; Sumney et al., 1973) due to several possibilities of risk indicators for caries (Ravald et al., 1986); higher number of *mutans Streptococci* and *Lactoacilli* in plaque and saliva, higher plaque scores and sugar intake, decreased salivary secretion rate, increased number of exposed root surfaces, and lower number of remaining teeth (Fure and Zickert, 1991; Ravald et al., 1993). However, there are few studies in Brazilian population that specifically investigated the incidence of root caries in periodontal patients. It has

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Abbreviations: RCI, Root caries index; **PSR,** periodontal screening recording.

Table 1. Means and standard deviation for characteristics of subjects (n = 200).

Characteristic	Value
Age (years)	34.33 ± 10.84
Number of missing teeth	4.54 ± 4.19
Number of exposed root surfaces	0.11 ± 0.37
Total number of root caries	1.26 ± 1.50
Full mouth bleeding score	29.72 ± 30.75
Root caries index (RCI)	9.21 ± 24.53

patients. It has been suggest that periodontal patients have a higher incidence of root caries due to the higher prevalence of gingival recession (Reiker et al., 1999). Therefore, the purpose of this study was to investigate the prevalence and severity of periodontal disease, using a periodontal screening record and root caries assessed by root caries index, in a specific Brazilian adult's population from Aracaju, state of Sergipe.

MATERIALS AND METHODS

Two hundred subjects (20 - 60 years old) were recruited from those referred for dental evaluation to the Department of Periodontics, Federal University of Sergipe, Aracaju, Brazil. Subjects were enrolled from August 2007 - May 2008. All participants were, on individual basis, informed about the nature of the research and informed consent forms were signed. The protocol was presented to and approved by the Ethical Committee of the School of Dentistry of Sergipe Federal University under the number protocol 0042.0.107.000-07. The sample was calculated on basis of estimated prevalence of periodontal disease and caries surfaces in the total number of subjects of Aracaju. The sample sized necessary to obtain a precision rate of 95% (confidence interval: 95%) was calculated to be 199 individuals to prevalence of periodontal disease and 186 individual to caries surfaces. This population is representative sample of Aracaju, Sergipe, Brazil, adults, population.

The clinical periodontal parameters were performed using a periodontal probe OMS-621 (Trinity, São Paulo, SP, Brazil) in sites per tooth for all sextants (excluding third molars). The periodontal health status was determined using the Periodontal Screening Record (PSR) (Nasi, 1994). The following conditions constituted exclusion criteria: subjects without at least 2 teeth in each sextant, pregnancy, hematological alterations (hemophilia, anticoagulant and/or platelet aggregation inhibitor therapy), and cardiovascular disease (valvular disease, endocarditis, pacemaker, or advanced cardiovascular disease). Root surfaces caries were evaluated using a standard operation light, mouth mirror and periodontal probe. The periodontal probe (PCP-UNC15, Hu-Friedy, Chicago, IL) was used to verify the presence of gingival recessions in millimeter (distance from cemento-enamel junction to the gingival margin) at the midbuccal, mesiobuccal, distobuccal and midlingual surfaces. All tooth surfaces with gingival recession were evaluated for the presence of root caries lesions. Root caries were defined as the presence of active or inactive caries according to the diagnosed criteria (Ferjeskov et al., 1991; Nayvad and Ferjeskov, 1996). In addition to the total number of lesions, the root caries index (RCI) was calculated as the percentage of decayed and/or filled root surfaces of total number of exposed root surfaces (Ferjeskov et al., 1991; Katz, 1990).

All measurements, medical history and a complete clinical intraoral examination were performed by one examiner (CESS). The examiner was previous trained and calibrated. The weighted Kappa test was used to verify the examiner calibration and was based on the analyses of average of all pairwise comparisons between the first and second exam with intervals of 1 week to analyses of PSR scores was assed by sextants and RCI of twenty individuals, 10% of total number of subjects. The means values obtained by the study examiner revealed the minimum agreement of 0.91 to PSR and 0.72 to RCI. After the evaluation, subjects that needed treatment were referred to appropriated treatment of their oral conditions at Federal University of Sergipe.

Data analysis and statistical methods

Data were analyzed to determine descriptive analysis of subjects according to age, race, gender, number of missing teeth and gingival recession, full mouth bleeding score, RCI, and root caries. Data analysis was accomplished using MINITAB Statistical Program version 15 (Minitab Inc., Demo, Belo Horizonte, Brazil).

RESULTS

Of the 200 subjects of this study, 38.5% were men and 61.5% women. Age ranged from 20 - 50 years, with a mean age of 34 years (Table 1). The most common race was mulattoes (48.5%), followed by black (31%) and white (20.5%). On average, patients had 4.54% missing teeth (range 0 - 13), with a mean of 0.11% (range 0 - 14) exposed root surfaces, that is, gingival recession. To assess the level of inflammation of the periodontal tissue, it was analyzed by the presence of bleeding on probing. The mean bleeding score was 29.72% (range 0 - 100). The number of root caries per subjects was 1.26 (range 0 - 7). The mean root caries index (RCI) over the total population was 9.21 (range 0 - 100) (Table 1).

The PSR scores are described by sextants on Table 2. The most prevalent PSR scores were 2 (for all the mandible sextants), 0 (2nd sextant), 1 (3rd sextant), and 3 (1st sextant). This results demonstrated that only a minor part of the teeth present severe (score 4) and moderate (score 3) periodontitis, and most part of the teeth demonstrate periodontal health (score 0) or gingivitis (scores 1 and 2) (Table 2).

DISCUSSION

This cross-sectional study is based on data from the population of Aracaju, state of Sergipe, Brazil. The exam was done in a specific group of age, and it was possible to see trends in periodontal healthy condition and root caries index. The results indicate a high incidence of root caries for the population between 40 and 50 years old, low index of periodontal treatment needs in the population, and a higher prevalence of gingivitis (PSR scores 1 and 2).

Papas et al. (1992) did a research in a North American population that have a great attention to their oral health.

Table 2. Distribution of PSR score by sextants (n = 200).

	Sextant						
PSR	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**	**6 (%)**	**n total (%)**
0	38 (19)	58 (34)	40 (20)	55 (27.5)	58(29)	53 (26.5)	312 (26)
1	56 (28)	57(28.5)	58 (29)	42 (21)	37 (18.5)	52 (26)	302 (25,16)
2	39(19.5)	53(26.5)	38 (19)	58 (29)	58(34)	55 (27.5)	311 (25,91)
3	58 (29)	15 (7.5)	46 (23)	33 (16.5)	31 (15.5)	30 (15)	213 (17,75)
4	9(4.5)	7(3.5)	18 (9)	12 (6)	6(3)	10 (5)	62 (5,16)

PSR, Personal screening and recording.

The authors observed a mean of 4.4 missing teeth per person in a group with more than 65 years old. These outcomes are similar to the present study that deals with a lower age population. This difference can be due to the poor access to public or private oral care in the present population compared with 85% of participants of Papas' study who reported visiting their dentist in the year before the study. However, compared with a study in a Brazilian population with age ranging from 35 - 44 years, the incidence of missing teeth in the present study was lower (4.54 teeth/person) than in the (Barbato et al., 2007) study (6 teeth/person), who analyzed 12811 persons in 250 Brazilian cities. There was an increase in remaining teeth in older age groups and more root surfaces become exposed by gingival recession due to periodontal disease itself or its treatment and/or by tooth brushing. Therefore, the risk for root surface caries seems to increase with age (Gustavsen et al., 1988).

To analyze root caries in the present study, it was verified that the mean RCI (9.21) was a little higher than those of Reikert et al. (1999), who found a mean RCI of 7.7. However, Reikert et al. (1999) showed a much higher number of gingival recessions (64.7%) and root caries (4.3%) than the present study (0.11 and 1.26%, respectively). This can be explained by the difference in the study populations. While this study present a low age population (mean of 34.3 years old), Reikert et al. (1999) evaluated an older population (mean of 55.1% years old) in a maintenance phase of the periodontal treatment and who had received active periodontal treatment for chronic periodontitis 11 - 22 years ago. The Reikert et al. (1999) population is much more susceptible to gingival recession and root caries than the present population. The authors concluded that root caries can be regarded as a complication in periodontal maintenance patients and that the individual number of root lesions correlate with individual dental plaque scores.

Keltjens et al. (1988) found an overall RCI of 6.28% and a mean of 2.9 root caries, and Ravald et al. (1993) found a much higher mean RCI of 12.2%. The authors show that higher age, smoking, salivary *S. mutans* counts, and a combination of higher salivary *S. mutans* and *lactobacilli* counts were good indicators for the presence of root surface caries. The PSR index was used to evaluate the periodontal treatment needs of the population. This index is effective, objective, and easy to perform, with high sensibility, being indicated for routine use in dentistry (Khocht et al., 1995; Khocht et al., 1996; Moodéer and Wondimu, 2000). Bourgeois et al. (2007), in an epidemiologic study in an adult population in France, verified that 46.68% of the population presented advanced attachment loss (> 5 mm), needing specialized periodontal treatment. Diefenderfer et al. (2007) evaluated the periodontal health of 1107 US Navy personnel and showed that 71.4% presented with a PSR indices of 0, 1, and 2 and 28.6% indices 3 and 4. These outcomes are similar to the present study, in which 77.1% presented with indices 0, 1, and 2 and 22.9% indices 3 and 4.

The success of periodontal therapy depends primarily on patient compliance with both home care and supportive, or maintenance, periodontal therapy (Novaes and Novaes, 1999; Wilson, 1998). Without regular professional intervention, patients may be incapable of maintaining oral hygiene at levels to prevent plaque accumulation and/or disease progression (Becker et al., 1984). Moreover, in addition to the normal twice a day brushing and the once a day complete extensive tooth cleaning, adjunctive measures to prevent new root caries lesions in the high risk patients should be advocated; these include diet counseling and fluoride rinses, as well as fluoride and chlorhexidine varnishes (Keltjens et al., 1988).

Conclusion

Within the limits of this study, it is concluded that the prevalence and severity of periodontal disease and root caries occur with low frequency in the subjects evaluated in the Aracaju city adult population.

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REFERENCES

Albandar JM (2005). Epidemiology and risk factors of periodontal diseases. Dent. Clin. North Am., 49(3):517-32.

Albandar JM, Brunelle JA, Kingman A (1999). Destructive periodontal disease in adults 30 years of age and older in the United States, 1988-1994. J. Periodontol., 70 (1):13-29.

Barbato PR, Nagano HCM, Zanchet FN, Boing AF, Peres MA (2007). Tooth loss and associated socioeconomic, demographic, and dental-care factors in Brazilian adults: an analysis of the Brazilian Oral Health Survey. Cad. Saúde Pública, Rio de Janeiro, 23(8):1803-1814.

Beck J (1990). The epidemiology of root surface caries. J. Dent. Res., 69:1216-21.

Becker W, Becker BE, Berg LE (1984). Periodontal treatment without maintenance. J. Periodontol., 55(9):505–9.

Bourgeois D, Bouchard P, Mattout C (2007). Epidemiology of periodontal status in dentate adults in France, 2002-2003. J. Periodont. Res., 42: 219-227.

Brown JL, Brunelle JA, Kingman A (1996). Periodontal status in the United States 1988-1991: prevalence, extent, and demographic variation. J. Den. Res., 75(Spec Iss):672-83.

Diefenderfer KE, Ahlf RL, Simecek JW, Levine ME (2007). Periodontal health status in a cohort of young US Navy personnel. J. Public. Health Dent., 67(1):49-54.

Ferjeskov O, Luan WN, Nyvad B, Budtz-Jorgensen E, Holm-Pedersen P (1991). Active and inactive root surfaces caries lesions in a select group of 60 to 80-year-old Danes. Caries Res., 25:385-91.

Fure S, Zickert I (1991). Root surface caries and associated factors. Scand. J. Dent. Res., 98(5):391-400.

Gustavsen F, Clive JM, Tveit AB (1988). Root caries prevalence in a Norwegian adult dental population. Gerodontics 4: 219–23.

Katz RV (1990). Clinical signs of root caries: measurement issues from an epidemiologic perspective. J. Dent. Res., 69(5):1211-5.

Keltjens HMAM, Schaeken MJM, Van der Hoeven JS, Hendriks JCM (1988). Epidemiology of root surface caries in patients treated for periodontal diseases. Com. Dent. Oral Epidemiol., 16: 171–174.

Khocht A, Zohn H, Chang KM (1995). Assessment of periodontal status with PSR and traditional clinical periodontal examination. J. Am. Dent. Assoc., 126: 1658-65.

Khocht A, Zohn H, Deasy M, Chang KM (1996). Screening for periodontal disease: radiographs vs. PSR. J. Am. Dent. Assoc., 127:749-56.

Moodéer T, Wondimu B (2000). Periodontal diseases in children and adolescents. Dent. J. Clin. North Am., 44:633-58.

Nasi J (1994). Background to, and implementetion of, the Periodontal Screening and Recording (PSR) procedure in USA. Int. Dent. J., 44:585-8.

Nayvad B, Ferjeskov O (1996). Active root caries converted into inactive caries as a response to oral hygiene. Scand. J. Oral Res., 94:281-4.

Novaes Jr AB, Novaes AB (1999). Compílance with supportive periodontal therapy. Part 1. Risk of non-compliance in the first 5-year period. J. Periodontol., 70(6): 6798-2.

Oh TJ, Eber R, Wang HL (2002). Periodontal diseases in the child and adolescent.J. Clin. Periodontol., 29(5):400-10.

Papas A, Joshi A, Giunta J (1992). Prevalence and intraoral distribution of coronal and root caries in middle-aged and older adults. Caries Res., 26(6):459-65

Ravald N, Birkhed D, Hamp SE (1993). Root caries susceptibility in periodontally treated patients. Results after 12 years. J. Clin. Periodontol., 20, 124–29.

Ravald N, Hamp SE, Birkhed D (1986). Long-term evaluation of root surface caries in periodontally treated patients. J. Clin Periodontol., 13(8):758-67.

Reiker J, Van der Velden U, Barendregt DS, Loos BG (1999). A cross-sectional study into the prevalence of root caries in periodontal maintenance patient. J. Clin. Periodontol., 26:26-32.

Sugihara N, Maki Y, Okawa Y, Hosaka M, Matsukubo T, Takaesu Y (2010). Factors associated with root surface caries in elderly. Bull Tokyo Dent. Coll., 51(1):23-30.

Sumney DL, Jordan HV, Englander HR. The prevalence of root surface caries in selected population. J. Periodontol., 1973; 44:500-04.

Wilson TG Jr (1998). How patient compliance to suggested oral hygiene and maintenance affects periodontal therapy. Dent. Clin. North Am., 42(2):389–403.