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Occurrence of periodontal pathogens in ethnic groups from a native Brazilian reservation

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ABSTRACT

Objective: The present study was designed to evaluate the occurrence of periodontal pathogens in the subgingival biofilm of 100 native Brazilians living at the Umutina Indian Reservation, Mato Grosso State, Brazil.

Methods: Periodontal clinical examinations were carried out prior to collection of subgingival biofilm, and the presence of 14 periodontal microorganisms was evaluated by polymerase chain reaction (PCR). The prevalence and risk analysis was performed using Cochran and Mantel–Haenszel statistics for dichotomous variables or Pearson's chi-squared test for analysis of proportions when variables had three or more categories. The interrelations between clinical and microbiological parameters were assessed using Fisher's exact test and the Mann–Whitney *U* test.

Results: Individuals with chronic periodontitis were frequently colonized by the association between *Porphyromonas gingivalis* and *Campylobacter rectus*, *P. gingivalis* and *Prevotella intermedia*, or *P. gingivalis* and *Tannerella forsythia*. Patients with chronic periodontitis were also colonized by *Porphyromonas gulae* and *P. intermedia* or by the association between *P. gulae* and *T. forsythia*. *P. gulae* was detected only in the subgingival samples from natives on a traditional diet. Gingival bleeding was associated with *Aggregatibacter actinomycetemcomitans*, *Fusobacterium nucleatum*, *T. forsythia*, *P. gingivalis*, *P. gulae*, *Porphyromonas endodontalis*, *P. intermedia*, and *Prevotella nigrescens*. *Treponema denticola* was uncommon.

Conclusions: Peculiar microbiota was demonstrated to be associated with different periodontal disease statuses in native Brazilians, with modest occurrence of certain pathogens, such as *T. denticola*, and the presence of *P. gulae* in natives with gingivitis or chronic periodontitis.

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1. Introduction

Estimates suggest that the Brazilian indigenous population was from three to five million natives during the period preceding the first contact with Europeans. At present, 300,000 still live in the Amazon region and in the vast central Brazilian highlands, distributed in 215 groups, whose communities have different integration statuses with the nonnative society, corresponding to 0.2% of the Brazilian population. Depending on contact with nonindigenous communities, the distribution of different types of oral diseases may change, reflecting changes in habits and nutrition, among other factors.[1]

Periodontitis is a highly prevalent infectious disease that leads to periodontal destruction and early tooth loss. The aetiology of these infections frequently involves members of the oral microbiota, particularly strict and facultative anaerobes of the genera *Aggregatibacter*, *Eikenella*, *Campylobacter porphyromonas*, *Prevotella*, *Fusobacterium*, *Tannerella*, and *Treponema* spp.[2–5] In addition, the microbiota associated with periodontitis shows important geographical particularities,[6–8] at times influenced by the ethnic/racial characteristics of the population.[6,7,9] However, little attention has been dedicated to the study of this microbiota in remote communities, such as the native population of the Umutina Indian reservation, where the way of life is strongly linked to their ancestral lifestyle with no history of racial mixing with nonnative communities.

This population encompasses a group of 480 native Brazilians of the Umutina, Paresi, Bororo, Bakairi, Kayabi, Irantxe, Nambikwara, and Terena ethnicities, who have occupied the same geographic area for six generations. This population has evidenced significant endogamy and presence in the oral cavity of some deviations from normality linked to genetic inheritance, such as ankyloglossia, which is much more frequent in the Umutina reservation than in non-Indian communities living around the reservation.[1]

The present investigation evaluated the distribution of major periodontal pathogens in the Umutina population, through polymerase chain reaction (PCR), correlating them with the periodontal status, lifestyle, tobacco and alcohol consumption, as well as the socioeconomic and cultural aspects of the native population.

2. Materials and methods

This study was approved by the Institutional Review Board of the School of Dentistry of Araçatuba, Univ Estadual Paulista – UNESP (2006-01417), Brazilian National Indian Foundation (FUNAI), and Mato Grosso School of Public Health (021/07 CEP/SES-MT), Brazil. The informed consent form was read and explained to all eligible individuals and the leaders of the communities, in Portuguese and in local languages. All subjects who agreed to participate were asked to sign the informed consent form. Anthropologists and social workers assisted in the application of a questionnaire to assess diet patterns, socioeconomic/cultural conditions, and tobacco and alcohol consumption.

Clinical examinations, collection, and sample processing were performed from December 2005 to December 2010. Periodontal clinical examinations were carried out in 100 native Brazilians of the Umutina, Paresi, Bororo, Bakairi, Kayabi, Irantxe, Nambikwara, and Terena ethnic groups, living at the Umutina Indian Reservation (15°05′28.67″ S, 57°06′27.10″ W), Mato Grosso State. The inclusion criteria were as follows: age of at least 18 years (18–70 years; mean 36.2 ± 21.3 years) and the presence of 20 scorable teeth (not including the third molars). The exclusion criteria were systemic illnesses (diabetes mellitus, cancer, HIV, metabolic diseases, radiation, or immunosuppressive therapy), pregnancy or lactation, systemic antibiotics and/or anti-inflammatory drugs (within the previous 6 months), and dental or periodontal therapy in the last year. The demographic and periodontal status of the population studied is presented in Table 1.

2.1. Periodontal examinations

Periodontal clinical examinations were carried out by a single trained examiner. The clinical probing depth and gingival recession were measured and used to determine the clinical attachment level. These measures were obtained from six sites per tooth (mesio-vestibular, vestibular, disto-vestibular, mesiolingual, lingual, distolingual), excluding the third molars. The presence of supragingival biofilm and marginal

Table 1 – Characteristics of the population examined.

Characteristic	PHS[a]	GS[b]	CPS[c]
Age	18.04 ± 2.12	21.13 ± 1.09	33.01 ± 1.06
Gender			
Male *N* (%)	5 (35.7)	20 (41.7)	14 (36.8)
Female *N* (%)	9 (64.3)	28 (58.3)	24 (63.2)
Type of diet			
Traditional indigenous[d]	6 (42.9)	32 (66.7)	29 (76.3)
Industrialized[e]	8 (57.1)	16 (33.3)	9 (23.7)
Alcohol consumption (%)[f]	1 (7.1)	3 (6.3)	2 (5.2)
Tobacco consumption (%)[g]	0 (0.0)	4 (8.3)	2 (5.2)
Clinical probing depth (mm)	1.92 ± 0.23	3.09 ± 0.85	5.59 ± 1.17
% of sites with			
Visible plaque	22.45 ± 13.02	41.76 ± 11.75	48.22 ± 10.7
Bleeding on probing	12.44 ± 1.12	42.29 ± 2.36	38.88 ± 0.68
Bone loss	0.87 ± 0.21	4.22 ± 2.66	42.08 ± 2.06
Tooth mobility	1.02 ± 0.14	20.04 ± 1.62	27.56 ± 1.12
Food retention	3.02 ± 0.28	8.22 ± 1.44	21.04 ± 1.26
Gingival edema	8.33 ± 2.1	39.24 ± 2.44	36.42 ± 1.22

[a] Periodontally healthy subjects (*N* = 14).
[b] Subjects with gingivitis (*N* = 48).
[c] Subjects with chronic periodontitis (*N* = 38).
[d] Percentage of natives with diet based on traditional indigenous food products (products from hunting, fishing and small community gardens).
[e] Percentage of natives with diet based on industrial or nonnative food products.
[f] Percentage of natives who consume alcohol.
[g] Percentage of natives who smoke.

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