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Dental and oral condition in leprosy patients from Serra, Brazil

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Summary

Objectives To describe dental and periodontal diseases and oral lesions in newly diagnosed leprosy patients.

Design Cohort study with 99 leprosy patients carried out at the Leprosy Control Programme Outpatient Clinic, Serra-ES, Brazil. A questionnaire about demographic and clinical data was used. Clinical oral examination was performed through the decayed, missing and filled teeth index (DMFT index), the use and need of prosthesis, periodontal disease and the presence of mucous membrane oral lesions. Skin and oral mucous biopsies were also undertaken.

Results Decayed teeth were present in 73% of the patients, at least one lost tooth was present in 71·4%, the mean of the number of lost teeth among the patients in this survey was 8·8; and 60·3% of the patients did not have their teeth filled. Periodontal disease was present in 80·8%, and gingival bleeding in 92% of the patients. DMFT index average was 14·4. Nine out of the 63 patients presented with oral clinical lesions, however, most of them presented with unspecific chronic inflammation and typical epithelial hyperplasia.

Conclusions These newly diagnosed leprosy patients were similar in respect of oral health to the normal Brazilian population. Serious dental loss and edentulism were observed, as were a high DMFT index and frequency of periodontal diseases. These data highlight a lack of oral health prevention and treatment and poor access even when available.

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Introduction

Leprosy can be effectively treated with multidrug therapy (MDT), but therapy effectiveness largely depends on early diagnosis when permanent disabilities can be avoided. Many studies had been carried out on the impact of leprosy lesions in the head and mouth before the introduction of MDT in the 1980's.[1–11] It is known that oral health plays an important role in general health, and its deficiency can directly affect the patient's overall health.[12,13] Questions are often posed as to whether leprosy patients are at risk of oral lesions, and how often oral lesions are seen in leprosy patients.[14–17] However, most of the dentists have little information when they see leprosy patients and are unaware of the oral manifestations of leprosy; also, professionals who work at Leprosy Control Programmes are not involved with their patients' oral condition.

According WHO,[18] the most common oral pathologies are dental cavities and periodontal (gum) diseases. Indices for definitions, diagnostic criteria and classifications were developed and used to quantify oral health status within dentistry practice as well epidemiological studies. These systems have been used to describe dental caries prevalence, gingival inflammation,[19,20] bacterial plaque, dental calculus, periodontal disease and periodontal disease extent and severity index,[21–26] and also to evaluate periodontal treatment needs.

The DMFT index describes the prevalence of dental cavities and it is numerically expressed by calculating the number of decayed (D), missing (M) and filled (F) teeth.[13] WHO adopted it as the first global indicator of oral health status and this should have been achieved by 2000: an average of not more than three of DMFT at the age of 12 years; 85% of the population should retain all their teeth at the age of 18 years; a 50% reduction in present levels of edentulousness at the age of 35–44 years and a 25% reduction in present levels of edentulousness at the age of 65 years and over.[27]

The Official Buccal Health Programme from the Brazilian Ministry of Health[28] revealed that the DMFT index for the Brazilian population, by stratified age, is as follows: for the 12 years-old age group, 2·78; for the 15–19 age group, 6·17; for the 35–44 age group, 20·13; and for the 65–74 age group, 27·79; furthermore, about 10% of Brazilian adults had a increased probing depth in at least one buccal area indicating that dental supporting structures were affected or at risk of periodontal infection.

A study in Fontilles, Spain, evaluated 76 patients with leprosy for oral disease and dental and periodontal indices in the anterior maxilla and compared with a control group. Poor dental and periodontal health was found in the leprosy group.[29]

Oral lesions in advanced stages of leprosy were described between the 1930's and 1970's.[9,30,31] According to Pfalzgraff & Ramu,[32] pale yellow infiltration can be seen behind the upper incisors involving the gums extending to the hard palate, soft palate and uvula. Deep fissures and plaques may sometimes be found on the tongue in florid lepromatous leprosy[32] and histologic findings in the oral lesions were chronic granulomatous inflammation with and without bacilli.[17,33–35]

The aim of this paper is to describe the oral condition and manifestations of leprosy in newly diagnosed patients.

Patients and Methods

The cohort study was carried out at the Leprosy Control Programme Outpatient Clinic at the municipality of Serra-ES, Brazil, from March 2005 to May 2007. The research team was composed of two dentists (VAS, AE), two leprologist/dermatologists (EMC, PDD), a nurse (MGF), a technical assistant (EHS), and five medical students (FMG, MFG, SAC, CVA, RRGP). Ninety nine patients were surveyed, all of whom lived in the Metropolitan Region of Vitoria, in the State of Espírito Santo. After patients had been diagnosed with leprosy, they had slit skin smears taken by the nurse and technical assistant to determine their bacillary index. A dermato-neurological assessment to determine their leprosy classification and disability grade was undertaken by the leprologists and the nurse. Medical students participated in all these tasks including dentistry assessment. All patients were asked when they noticed their first symptoms of skin lesions, and the delay of their leprosy diagnosis was measured as the interval (in months) between the awareness of the first symptoms and the beginning of treatment.

Clinical oral examination was conducted by the dentists. Data were collected regarding the absolute number of decayed, missing and filled teeth, called DMTF index (WHO).[13] The authors used the same criteria used by Albandar *et al.* (1999)[23] to classify the periodontal status. According to those criteria, the periodontal fold depth (probing depth) was evaluated in millimeters, in all teeth in four dental areas (mesial, distal, vestibular and lingual) which considers periodontal disease extension and severity as follows: (1) Advanced periodontitis – two or more teeth (30% or more of the examined teeth) finding ≥ 5 mm probing depth; or, four or more teeth (60% or more of examined teeth) finding ≥ 4 mm probing depth. (2) Moderate periodontitis – one or more teeth with ≥ 5 mm probing depth; or, two or more teeth (30% or more of the teeth examined) finding ≥ 4 mm probing depth. (3) Mild periodontitis – one or more teeth with ≥ 3 mm probing depth. (4) Normal (no periodontitis) – six or more teeth which have not fulfilled any of the above criteria.

The gingival health was evaluated if bleeding was present or not 10 seconds after periodontal probing[24] as follows: (a) Extensive gingivitis – five or more teeth (50% or more of the examined teeth) with gingival bleeding; and (b) limited gingivitis – two to 4 teeth (25% to 50% of the examined teeth) with gingival bleeding.

Information about the use and needs of dental prosthesis as well the presence of lesions in the oral mucosa also were collected. Dental caries diagnosis was performed using a plane mouth mirror, while periodontal examination was carried out with a probe in order to determine pocket depth.

The leprosy diagnosis was carried out according to WHO[11] criteria. Skin and oral mucous biopsies, histopathological examination, slit-skin smears and photographic registration were undertaken.

This study was approved by the Ethical Committee in Research of the Federal University of Espírito Santo. Patients were informed both verbally and in writing about the purposes of the investigation, and written consent was obtained from the participants. The statistical analysis was performed using the SPSS version 14.0 for Windows.

Results

DEMOGRAPHIC AND LEPROSY DATA

Among the 99 leprosy patients, 49 (49·5%) were men and 50 (50·5%) were women, with ages ranging from 9 to 78 years. The Ridley-Jopling types in this cohort were, two indeterminate, 54 tuberculoid, 18 borderline, 20 lepromatous, and five pure neural leprosy Most of the patients (66%) had their leprosy diagnosed 6 months after the first signs and symptoms appeared. The patients' distribution according to age, sex, leprosy classification and delay in diagnosis of leprosy with their respective DMFT index are shown in Tables 1 and 2.

Figure 1 shows DMFT index among leprosy form according Madrid classification.

DENTAL AND PERIODONTAL ALTERATIONS

Decayed teeth were present in 73% of the patients, with at least one lost tooth in 71·4%, the mean of the number of lost teeth among the patients in this survey was 8·8 (SD 10); and, 60·3% of the patients did not have their teeth filled.

31% of leprosy patients had dental prostheses, and 47·5% of them needed a prosthesis to replace the loss of one or more teeth. Twenty seven (53%) patients, from the 51 who were older than 30, were using superior dental prostheses. The need for total superior dental prostheses was present in 12 (12·1%) patients and total inferior dental prosthesis in 5 (5%). However, the use of inferior prostheses was more frequent than superior ones.

Periodontal disease was present in 80 (80·8%) of the leprosy patients, gingival bleeding occurred in 91 (92%) patients, and 35 of them (35·4%) presented with extensive bleeding (Table 3).

The DMFT index ranged from 0 to 32, the mean was 14·4 (SD 10·2) (Tables 1 and 2). There were three patients between 15 and 19 years old who presented with DMFT index of 5 (SD 4·58); 17 between 35 and 44 years old had a mean DMFT index of 20·29 (SD 6·67) and three patients between 65–78 years old had a mean of 21 (SD 11·53).

Table 1. Distribution of the periodontal disease and DMFT index among age, sex

Periodontal Disease	Advanced	Moderate	Light	Without	Edent	Total	DMFT Mean	DMFT Upper/Lower
Age ($P = 0{\cdot}129$)								
< 15 years	0	0	9	1	0	10	1·5	0·02/2·97
16–20 years old	0	1	5	1	0	7	7·71	1·75/13·67
21–30 years	6	8	15	2	0	31	8·7	6·32/11·09
31–40 years	5	3	7	3	0	18	17·66	14/21·32
41–50 years	4	2	6	1	4	17	22·9	19·58/26·3
51–60 years	5	0	3	2	0	10	22·6	16·19/29
> 60 years	1	0	0	1	4	6	26·5	16·57/36·4
Total	21	14	45	11	8	99		
Sex ($P = 0{\cdot}098$)								
Female	7	6	24	9	4	50	15·98	13·15/18·8
Male	14	8	21	2	4	49	12·91	9·92/15·9
Total	21	14	45	11	8	99		

Legend: Edent – Edentulism; NI – not informed.

Table 2. Distribution of periodontal disease and DMFT index among leprosy classification and delay in diagnosis of leprosy

Periodontal Disease	Advanced	Moderate	Light	Without	Edent	Total	DMFT Mean	DMFT Upper/Lower
Leprosy ($P = 0{\cdot}07$) classification								
Borderline	6	2	8	1	1	18	19·22	15·24/23·19
Indeterminate	0	0	1	1	0	2	15·5	−92·5/123
Tuberculoid	11	8	25	7	3	54	11·96	9·25/14·66
Lepromatous	4	4	8	1	3	20	16·85	11·6/22·1
Neural	0	0	3	1	1	05	14·4	0·77/29·5
Total	21	14	45	11	8	99		
Delay in leprosy diagnosis ($P = 0{\cdot}08$)								
< 6 months	9	3	13	3	2	30	12·8	8·9/16·6
6–12 months	4	5	8	3	3	23	16·82	11·78/21·8
13–36 months	3	2	11	0	0	16	13·2	9·04/17·45
> 36 months	5	3	3	5	3	19	18·15	13·51/22·7
NI	0	0	2	0	0	2	9·45	3·03/15·87
Total	21	13	37	11	8	90		

Legend: Edent – Edentulism; NI – not informed.

ORAL LESIONS

Nine (14·3%) out of the 63 patients presented with oral clinical lesions and biopsies were done. The remainder had no significant alterations in the oral mucous membrane. Five were male and four female patients, with lesions localised in the palatum in six and in the jugal mucosa in three. Of these nine patients, five had tuberculoid leprosy, two lepromatous leprosy, one borderline and one pure neural leprosy. Of these nine, five (55·6%) patients had nonspecific chronic inflammation, two (22·2%) a typical epithelial hyperplasia, one (11·2%) líchen planus and one (11·1%) with no microscopic abnormalities.

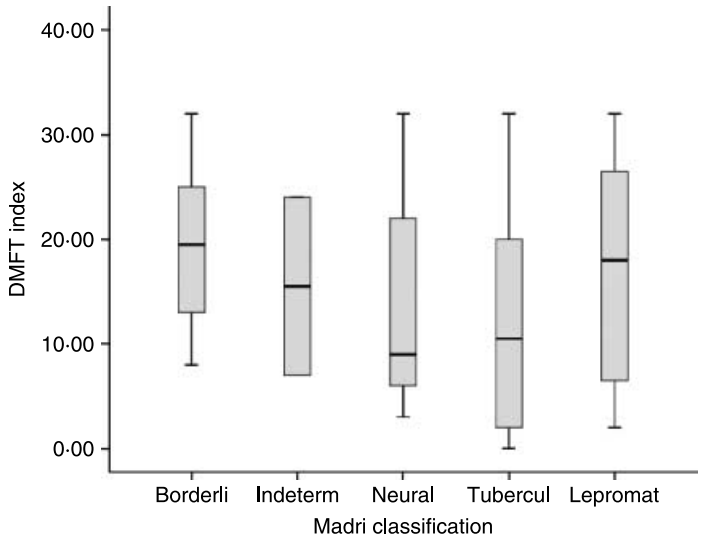

Figure 1. Box-plot graph showing distribution of DMFT index among leprosy forms according to Madrid Classification.

Table 3. Distribution of gingival bleeding in leprosy patients

Gingival bleeding	Number (%)
Extensive bleeding	35 (35·4)
Limited bleeding	25 (25·3)
Minimum bleeding	31 (31·3)
No bleeding	08 (8·1)
Total	99 (100)

Discussion

The age of patients ranged from 9 to 78 years, however the most of the patients were between 26 and 45 years old, more than half of the subjects (54·5%) had tuberculoid leprosy.

The distribution of periodontal disease among patients aged less than 15 years reached 10%, which is a worrying number.[13] Leprosy in childhood indicates that family members might either share the disease or live in close contact with carriers of the bacillus. Indeed, it is well-established that exposure to the bacillus seems to occur in the first years of life and oral mucosa may have an important role in leprosy transmission mainly from adults to children.[36]

Dental caries and periodontal disease are among the most significant oral health concerns in public health. Data from the last epidemiological survey carried out by the Ministry of Health revealed that caries in teeth afflict almost 70% of Brazilian children, and around 90% of the 15–19 age group have experienced at least one decayed tooth.[28] This age-related upward trend is increasingly common, as indicated by the cumulative DFMT index.

Our findings concur with these figures, as 73% of leprosy patients had caries, and 38 had never had any fillings. Serious dental loss was observed as 71% of the patients had at least one tooth loss. Endentulism remains a serious problem and a adental prosthesis may be needed by the age of 16 years. This accounts for such a high DMFT index, as the transition from adolescence into adulthood is marked by teeth extraction. Although there are few patients in 15–19 and 65–78 age groups in this study, leprosy patients did not present with a higher DMFT index than the normal Brazilian population when compared with the same age groups.

In the Fontilles study, a large proportion of maxillary incisors and canines were missing in the leprosy group. The mean of the probing depth was 2·96 (SD 0·8).[29] Although we present a descriptive cohort study with 99 leprosy patients, our findings were compared with the most recent 'normal' Brazilian population available data in oral health, and no significant differences were found between both populations.

Periodontitis is one of the most common oral diseases and is one of the two major dental diseases that affect human populations worldwide with high prevalence rates.[12,37] It can be caused by subgingival colonisation of about 10 specific Gram-negative pathogens in susceptible individuals.[38] Moderate and advanced periodontitis were present in 35% of the subjects. Findings of periodontal pockets during an examination indicate a worsening of the surrounding teeth-supporting structures and/or risk of periodontal disease, which may lead to tooth loss.

In the present research none of the biopsy findings were specific or pathognomic of leprosy, which seem to corroborate other studies.[15,16,34] However, recently leprosy patients were evaluated for oral mucosa lesions during and after MDT and fissured tongue, inflammatory papillary hyperplasia, chronic atrophic candidiasis, fibroma, erythematous candidiasis, and traumatic ulceration were found. Leprosy-related lesions were not present.[16]

The frequency and distribution of oral lesions in leprosy patients have been mapped by WHO,[11] and the most affected sites are ranked as follows: hard palate, soft palate, upper vestibular gingiva, tongue, lips, gingival palate, lower gingival and oral mucosa. Some authors found oral lesions in leprosy patients associated with acid-fast bacilli and granulomatous inflammatory reaction.[2,33,39–42] A rare florid lesion in the palate with a high load of mycobacteria was reported in a borderline leprosy patient during a Type-1 reaction.[41]

There are few studies on dental conditions and the oral manifestation in leprosy patients. There are few detailed descriptions and so it is difficult to comparing findings. With regard to oral lesions, most of references cited are old, and from a time when there was no effective treatment for leprosy. Work by many authors suggests that the oral mucosa offers a natural resistance to the emergence of leprosy and that oral lesions might be restricted to advanced stages of lepromatous disease.[14,15,17,34,36,40,43] This suggests that invasion of the oral mucosa might occur when there is an *M. leprae* bacteremia. However, oral mucosa might be a site for *M. leprae* localisation, even without any macroscopic signs. This would need confirmation using histological and molecular biology techniques.[31,44]

Patients treated pre 1980's were treated with dapsone monotherapy or confined to leprosy colonies. Many of these patients had the disease for many years, without a careful diagnosis or appropriate treatment. Although the number of patients presenting with periodontal disease was high, oral lesions were not so common in the present study.

In conclusion oral and dental conditions in leprosy patients are similar to the normal Brazilian population; however, both groups have poor oral health. This also points to an overall lack of oral health prevention and treatment and poor access where they are available.

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