

Oral manifestation in leprosy: A cross-sectional study of 100 cases with literature review

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ABSTRACT

Background: Leprosy is a chronic granulomatous disease of the peripheral nerve and muscle of upper respiratory tract. Consequence to the neighboring primary site, oral lesions have been seen in 20--60% of patient with leprosy mainly lepromatous leprosy. The lepromatous nodules may be infective and may lead to the spread of disease and hence require proper diagnosis. **Aim:** To assess oral lesion in leprosy patients. To assess the disease and the occurrence of oral lesion according to age and gender. To detect any primary lesion in oral cavity and compare these lesions in duration to study. **Materials and Methods:** A total of 100 patients with leprosy were examined and there oral manifestations were recorded. **Results:** It was found that 70 (70%) leprosy patients showed oral manifestations. And 18 (25%) had chronic generalized periodontitis, 9 (12.8%) cases of oral melanosis, 7 (10%) atrophy of papillae and loss of taste sensation each, 6 (8.5%) complained of aphthous and candidiasis each, 5 (7.14%) depigmentation, and 4 (5.71%) smokers palate, oral submucous fibrosis, and fissured tongue. **Conclusion:** Our clinical findings are in conjugation with previous studies; however, as per the review of literature this is the first study worldwide where we have examined 100 cases of leprosy which has not been documented till date. We suggest that the lesser incidence of oral lesions observed recently compared to older reports because of more effective present treatment which is initiated earlier.

Keywords: Leprosy, mouth, oral manifestations

Introduction

Leprosy (from the Greek word lepi, meaning scales on a fish), or Hansen's disease (HD), was first described in the ancient Indian texts from the 6th century BC, as a nonfatal, chronic infectious disease which was caused by *Mycobacterium leprae*, whose clinical manifestation was largely confined to the skin,

the peripheral nervous system, the upper respiratory tract, the eyes, and the testis. It is a chronic disease caused by the bacteria *M. leprae* and *Mycobacterium lepromatosis*. For long a general misconception has prevailed as to the nature of leprosy. It was once considered as a mutilating highly contagious disease with no cure which in turn led to public hysteria prompting mass segregation of leprosy patients to isolated colonies. Although in the past the prevalence of leprosy was worldwide, at present its presence is largely reduced to the following five countries in descending order of being a progressively debilitating disease, most patients suffer from some form of permanent prevalence: India, Brazil, Mozambique, Nepal, and Madagascar.^[1] Despite the

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epidemiological confinement, the severe debilitating nature of leprosy has prompted the World Health Organization (WHO) to consider leprosy as a major health issue, especially in the above-mentioned developing countries. The advent of multidrug therapy recommended by the WHO is considered to be a major reason for effectively curbing the prevalence of leprosy. Despite effective treatment modality, the main concern in leprosy remains to be the associated morbidity. Apart from neural and cutaneous manifestations, leprosy can also affect mucosa and internal disability post-treatment,^[2] most commonly involved oral mucosal surfaces include the tongue, lips, soft palate, uvula, organs. Several studies have shown the presence of orofacial manifestations in all the variants (indeterminate, tuberculoid, borderline, and lepromatous) of leprosy. Although orofacial manifestations may occur in any variant of leprosy, it is relatively more common (60% cases) in the lepromatous variant. The oral lesions in these cases are generally asymptomatic and are insidious in nature. In most cases, nasal manifestations preceded oral manifestations as the *M. leprae* prefers mucosa with lower temperature (nasal mucosa) for multiplication, the periodontium, and the gingiva. The presentation of lepromatous lesions varies largely ranging from sessile to pedunculated nodules to ulcerations and even perforation of the mucosa in advanced stages. Manifestations in tongue include loss of papilla and development of longitudinal fissures. Fibrosis, scarring, and loss of uvula are not uncommon. Patients may also present with chronic inflammation of the gingiva, periodontium. Periodontoclasia has also been reported. The global burden of leprosy has declined dramatically, from 5.2 million cases in 1985 to 204,800 cases at the end of 2009, having a prevalent rate which is <1 per 10,000 [1]. In India, after the introduction of multiple drug therapy (MDT), the leprosy case load came down from 57.6 cases per 10,000 population in 1985 to less than one case per 10,000 population in 2005.³ Leprosy is primarily a granulomatous disease of the peripheral nerves and mucosa of the upper respiratory tract (skin lesions are the primary external symptom).^[1,2] Left untreated, leprosy can be progressive, causing permanent damage to the skin, nerves, limbs, and eyes. Infection with *M. leprae* remains endemic in many tropical countries.^[2,3] A proportion of infected individuals develop characteristic lesions (primarily on the skin and extremities) that are referred to as tuberculoid, lepromatous, and borderline or reactional, depending on the stage of the infection.

Tuberculoid leprosy appears clinically as macular lesions of the skin which are found to overlie subepidermal tuberculoid granulomas containing small numbers of acid-fast bacilli under microscope. Patients with tuberculoid leprosy give positive delayed hypersensitivity responses (referred to as Fernandez or Mitsuda reactions) to intradermal injections of extracts of the organism (lepromin test).^[4-6]

The patient with lepromatous leprosy displays little evidence of immunity to the organism and develops multiple granulomatous masses (lepromas) affecting the face, nose, and ears (leonine facies) and the skin over the wrists, elbows, knees, and buttocks.

Peripheral nerve tissue is also extensively involved, with both lepromatous nodules and apparently unaffected patches of skin often exhibiting hypoesthesia or anesthesia. Patients with lepromatous leprosy are infectious and usually have progressive disease requiring antimycobacterial therapy. Borderline or reactional leprosy^[4] represents an intermediate stage between the tuberculoid and lepromatous types. Cell-mediated immunity is considered to be the crucial defense against the disease and the magnitude of this immunity defines the extent of the disease.^[2,3] Oral mucosal lesions are seen in about 20--60% cases of lepromatous leprosy, while they are quite rare in the tuberculoid and the borderline forms. The lesions are proportional to the duration of the disease, indicating that these are late manifestations.^[3-5] The propensity of the disease, when untreated, results in characteristic deformities and the recognition in most of the cultures that the disease is communicable from person to person, has resulted historically in a profound social stigma.

The literature contains few descriptions of oral lesions in cases of tuberculoid leprosy. Lepromatous nodules of the tongue, palate, lips, and pharynx are reported more frequently, as reddish yellow or brown sessile or pedunculated mucosal nodules^[2] and destructive lesions of the palate and nasal bones can lead to deformities that are traditionally associated with this disease. Oral lesions have been reported in 20% to 60% of patients with Hansen's disease, the majority of these being lepromatous nodules. With the institution of appropriate and effective antimicrobial therapy, the patients can lead productive lives in the community, and deformities and other visible manifestations can largely be prevented. We emphasize here the importance of the evaluation of the oral mucosa by an oral health professional during patient care, since the oral lesions may act as a source of infection.^[2-5] The data from the study could provide valuable insight into the manifestation of lepromatous leprosy in the 21st century in the presence of the WHO's multidrug therapy.

Materials and Methods

The present study was carried out in the Department of Oral Medicine and Radiology, K.M Shah Dental College, Piparia, Vadodara, Gujarat. The study was approved by Ethical Committee of Sumandeep Vidyapeeth, Vadodara. SVUEC/ON/84/2009 The total of 100 subjects suffering from leprosy was randomly selected for the study from the OPD of Dhiraj General Hospital and K M Shah Dental College and Hospital Piparia, Vadodara and Ansuya Hospital, a Governmental organizations working for leprosy patients, Vadodara. Written consent was obtained from each participant. Chi square test was applied for statistical analysis to access the disease and find the correlation between age and gender.

The personal and medical history along with the findings of oral examination and Investigations were recorded in the proforma specially designed for this study. All the patients with either

of clinical form having confirmed diagnosis taking MDT for leprosy according to WHO criteria were included irrespective of age and sex. Patients who were fully treated by antileprotic drugs or with history of any other systemic condition were not included in the study.

Results

The study population comprised of 100 leprosy patients 60 males and 40 females and age range from 10 years to 82 years with mean age of 37.40 ± 13.31 . In study population, there were 4 males and 1 females below 20 years of age, 13 males and 11 females in age group of 21-30 years, 23 males and 14 females in age range of 31 to 40 years, 12 males and 10 females in age range of 41-50 years, 5 males and 0 females in age group of 50--60 years, 2 males and 1 females in age group of 61--70, 0 males and 1 females in age group of 71--80 and 1 male and 2 females in age group of 80 and above. Chi-square test was applied for statistical analysis to access the disease and find the correlation between age and gender P value <0.05 .

[Table 1] In study population of 100 infected leprosy patients 75% patients had poor oral hygiene and periodontal status, 22% had fair oral hygiene and periodontal status, whereas 3% had good oral hygiene and periodontal status P value <0.05 (Chi-square test) [Figure 1].

93 (93%) leprosy patients had systemic manifestations out of which 40 (43%) had loss of digits, 20 (21.5%) had fever and body ache, 12 (12.9%) had loss of sensation, 9 (9.6%) had ulceration, 6 (6.4%) had erythema, 2 (2.1%) had nasal congestion and discharge, 1 (1.07%) each had depigmentation and in melanin pigmentation each. [Figure 2] Out of total 60 males all had systemic manifestations 10 (16.6%) cases had fever and body aches, followed by 30 (50%) cases of loss of digits, 8 (13.3%) cases of loss of sensation, 5 (8.3%) cases of ulceration, 4 (6.6%) cases of erythema, 1 (1.6%) had nasal congestion and discharge. Out of total 40 females, 33 (82.5%) had systemic manifestations

12 (36.3%) cases had fever and body aches, followed by 10 (30.3%) cases of loss of digits, 4 (12.1%) cases each of loss of sensation and ulceration, 2 (6%) cases of erythema and 1 (3%) cases of nasal congestion and discharge [Table 2]. The oral manifestations were seen in 70% of leprosy patients, 18 (25%) had chronic generalized periodontitis, 9 (12.8%) cases of oral melanosis, 7 (10%) atrophy of papillae and loss of taste sensation each, 6 (8.5%) complained of aphthous and candidiasis each, 5 (7.14%) depigmentation, 4 (5.71) smokers palate, oral submucous fibrosis (OSMF) and fissured tongue. [Figure 1] Out of total 60 males 41 (68.3%) had oral manifestations 10 (24.3%) had chronic generalized periodontitis followed by 5 (12.1%) cases of each of atrophy of papillae, melanosis and loss of taste sensation, 3 (7.3%) cases of aphthous, 4 (9.7%) cases of candidiasis, 3 (7.3%) cases of depigmentation, 2 (4.8%) cases each of fissured tongue, OSMF, and smokers palate. Out of total 40 females, 29 (72.5%) had oral manifestations 8 (27.5%) had chronic generalized periodontitis followed by 3 (10.3%) cases of aphthous and 2 (6.8%) cases each of atrophy of papillae, loss of taste sensation, oral and submucous fibrosis (OSMF), candidiasis, melanosis, smokers palate, depigmentation and fissured tongue. [Table 3] In study population out of 100 infected leprosy patients 86% patients had normal salivary flow, 11% had decreased salivary flow whereas 3% had increased salivary flow. The results were not statistically significant (P value >0.05) to comment that patient suffered from xerostomia or ptyalism. [Table 4] Most common systemic manifestation in both males and females was fever and body aches (P value <0.05)

Table 1: Age group distribution in study population

Age group	Males	Females
10--20	4	1
21--30	13	11
31-40	23	14
41--50	12	10
51--60	5	0
61--70	2	1
71--80	0	1
80 above	1	2

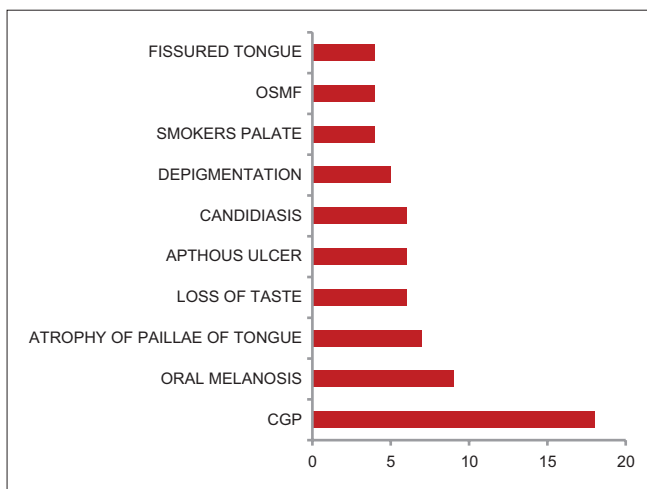


Figure 1: Oral manifestations of leprosy *CGP-Chronic generalized periodontitis Note- One patient may have more than one type of lesion

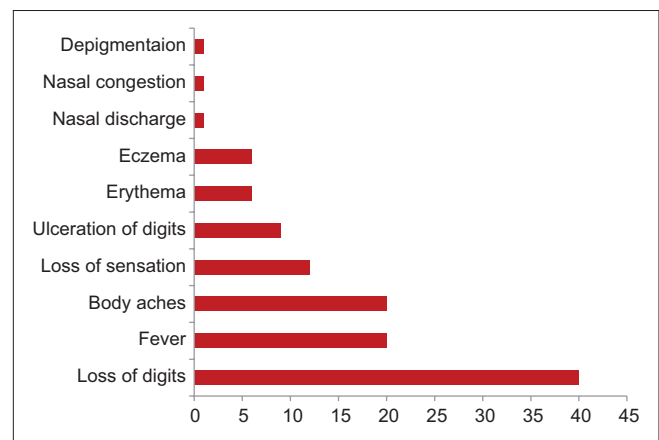


Figure 2: Systemic manifestations of leprosy Note- One patient may have more than one type of lesion

Table 2: Systemic manifestations in males and females of study population

Systemic manifestations	Study population (n=100)	
	MALE (n=60)	FEMALE (n=40)
Fever and body aches	10	12
Loss of digits	30	10
Ulcerations of digits	5	4
Loss of sensation	8	4
Depigmentation	1	0
INC in melanin pigmentation	1	0
Generalized erythema/eczema	4	2
Nasal congestion	1	1

Table 3: Oral manifestations in males and females of study population

Oral manifestations	Study population (n=100)	
	Male (n=60)	Female (n=40)
CGP		
AOP	10	8
LOT	5	2
Aphthous	5	2
OSMF	3	3
Candidiasis	2	2
Melanosis	4	2
Smokers palate	5	4
Depigmentation	2	2
Fissured tongue	3	2

Table 4: Salivary flow in leprosy patients (p<0.05)

Salivary flow	No of patients
Normal	86
Increased	11
Decreased	3

followed by loss of digits (P value <0.05) Chi-square test was applied and results were statically significant. [Table 3].

Discussion

Oral health is general health. Screening and diagnosis is crucial to understand the disease and obtain a certain diagnosis. Family medication masters and therapeutic officials is the foundation of medical services. Family medication pros in the essential consideration level assume an indispensable job being taken care of by the overall population, especially the individuals who could not bear the cost of private care. Patients with sickness are generally from the lower financial gathering who will look for treatment in government hospitals. Assessing the learning and certainty of family medication, masters in diagnosing and overseeing patients with sickness is significant these days on account of the expanding pattern of diseases. In any case, the learning and certainty among these essential consideration specialists is obscure.^[7] In view of their constrained preparing and instruction, it is speculated that the learning and certainty would be low. Misdiagnosis of sickness as cutaneous illnesses is not exceptional. Understanding the oral manifestations present in

leprosy will same way help the health professionals to understand the disease better and provide primary and effective care.

In the present study, we have attempted to access oral manifestations in leprosy patients. The sequence of pathological alterations follows the pattern described by Pinkerton in 1932 in the nasal and oral mucous membranes: congestion, infiltration, and formation of nodules, possible ulceration, atrophies, and fibrosis.^[3,5,6,8] Important medical and odontological complications may follow the involvement of the oral and nasal mucous membrane and the bones of the face in leprosy.^[9] The upper airway is the main point of entry for the bacillus and a route for bacillary elimination in leprosy.^[10-12,14] For this reason, the control of the mucosal lesions is very important. The mucosal involvement is particularly outstanding in the nose, probably due to the preference of *M. leprae* for cooler sites. The oral lesions of leprosy occur more frequently in areas of the mouth which have a lower surface temperature. The oral lesions usually appear as ulcerations on the hard or soft palates as was observed in our case. The main oral cavity sites of leprosy include the gingiva in the anterior portion of the maxilla, the hard and soft palates, the uvula, and the tongue. In advanced leprosy, the mouth can acquire the characteristics of a reservoir of bacilli, and it may thus act as an important risk factor for the transmission of the illness. *M. leprae* favors temperatures which are a little below the body temperature, for its multiplication.^[10,14] Based on this fact, a pathophysiological mechanism has been postulated for the oral involvement: a nasal lesion with obstruction of the air flow leads to oral breathing (mouth breathing), which is very common in lepromatous leprosy. This causes a decrease in the intraoral temperature, mainly in sites near the air intake and in the anterior areas, thus facilitating the harboring of the bacillus. General aspects: The extremely wide spectrum of clinical manifestations of leprosy may be considered a reflection of different cellular responses to *M. leprae*. There is a relation between dominant cytokine profiles and clinical presentation of leprosy; interleukin-2 (IL-2) and interferon γ markedly dominate in tuberculoid lesions, while interleukin (IL)-4, IL-5, and IL-10 are common in the lepromatous forms of leprosy.^[6,8,10,12,13]

In our study population, 75% of patients had poor oral hygiene and periodontal status, 22% had fair oral hygiene and periodontal status, whereas 3% had good oral hygiene and periodontal status. These results were consistent with previous findings by Costa *et al.* in 2003^[10] who had also insisted the maintenance of good oral hygiene to prevent further spread of infection and incidence of oral lesions.

Out of total 100 leprosy patients, it was found that 70 (70%) had oral manifestations. The oral lesions in leprosy develop insidiously are generally asymptomatic and are secondary to nasal changes. 8,12 18 (25%) had chronic generalized periodontitis, 9 (12.8%) cases of oral melanosis, 7 (10%) atrophy of papillae and loss of taste sensation each, 6 (8.5%) complained of aphthous and candidiasis each, 5 (7.14%) depigmentation, 4 (5.71%) smokers palate, OSMF and fissured tongue these results were

in conjugation with previous study done by Costa *et al.* in 2003. Out of total 60 males 41 (68.3%) had oral manifestations, 10 (24.3%) had chronic generalized periodontitis followed by 5 (12.1%) cases of each of atrophy of papillae, melanosis and loss of taste sensation, 3 (7.3%) cases of aphthous, 4 (9.7%) cases of candidiasis, 3 (7.3%) cases of depigmentation, 2 (4.8%) cases each of fissured tongue, OSMF, and smokers palate. Out of total 40 females 29 (72.5%) had oral manifestations 8 (27.5%) had chronic generalized periodontitis followed by 3 (10.3%) cases of aphthous and 2 (6.8%) cases each of atrophy of papillae, loss of taste sensation, OSMF, candidiasis, melanosis, smokers palate, depigmentation and fissured tongue. A similar results were found by previous studies reported in literature.^[10,15,16]

Most common oral manifestation in both genders was chronic generalized periodontitis these findings could not be correlated with any other study done by various authors in past although a higher prevalence of oral manifestations in males than females was found like previous studies.^[5,6,8,10,14] The greater prevalence in men could be explained by the fact that women seek doctor's advice earlier, perhaps for esthetical reasons.^[5]

In study population of 100 leprosy patients 86% patients had normal salivary flow, 11% had decreased salivary flow whereas 3% had increased salivary flow which has not been estimated in any of the previous studies.

Out of 100 leprosy patients 93 (93%) had systemic manifestations out of which 40 (43%) had loss of digits, 20 (21.5%) had fever and body ache, 12 (12.9%) had loss of sensation, 9 (9.6%) had ulceration of digits, 6 (6.4%) had generalized erythema and eczema, 2 (2.1%) had nasal congestion and discharge, 1 (1.07%) each had depigmentation and increase in melanin pigmentation each. These figures are almost similar to earlier studies reported.^[5,6,8,14] Out of total 60 males all had systemic manifestations, 10 (16.6%) cases had fever and body aches, followed by 30 (50%) cases of loss of digits, 8 (13.3%) cases of loss of sensation, 5 (8.3%) cases of ulceration of digits, 4 (6.6%) cases of generalized erythema and eczema, 1 (1.6%) had nasal congestion and discharge. Out of total 40 females, 33 (82.5%) had systemic manifestations 12 (36.3%) cases had fever and body aches, followed by 10 (30.3%) cases of loss of digits, 4 (12.1%) cases each of loss of sensation and ulceration of digits, 2 (6%) cases of generalized erythema, eczema and 1 (3%) cases of nasal congestion and discharge. The most common systemic manifestation in both genders was fever and body aches which could not be correlated with any other reports given by various authors in their previous studies.

Since there are many important complications of involvement of the oral and nasal mucosa and bones of the face by leprosy, patients should be examined carefully and informed regarding improvement of their oral hygiene.^[17-21] With the idea of other authors, it is believed that oral mucosal lesions are sources of infection in leprosy patients who expel great numbers of bacilli when they spit, sneeze, cough, or speak, once released into the

environment, the bacilli could be viable for up to nine days or even longer.^[6,8,10,11] The lesser incidence of oral lesions observed recently compared to older report could be because the present treatment is more effective and is initiated earlier, and probably because of improvement in oral hygiene.^[12] Still oral features in leprosy were noticed in hard palate and premaxilla including case of bilateral seventh nerve palsy is noted.^[22-24] To conclude, the oral cavity must be examined in cases where leprosy is suspected. With the institution of appropriate and effective antimicrobial therapy, the patients can lead productive lives in the community, and deformities and other visible manifestations can largely be prevented. Three major strategic components of leprosy control include: early detection of the disease, adequate treatment, and comprehensive care for prevention of disabilities and rehabilitation.^[1,17,18,19,25]

Conclusion

Oral leprosy lesions are nonspecific in their presentation and are often over looked by clinicians or misdiagnosed. The role of dental profession and especially the oral medicine specialist is of great importance in early diagnosis of oral lesions. A thorough knowledge of this chronic infection is hence necessary to provide optimum level of health care.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Ethical clearance

Taken from institutional ethical committee.

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Conflicts of interest

There are no conflicts of interest.

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