



## Oral Manifestation of Leprosy: A Narrative Review

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### Abstract

Leprosy is a chronic infectious disease caused by *Mycobacterium leprae*. Broadly it is divided into two forms lepromatous and tuberculoid forms. Mainly it affects skin, peripheral nerves and nasal mucosa. It can also affect the oral cavity. Oral lesions are more common in lepromatous type of leprosy. In the oral cavity, it can involve the palate, buccal mucosa, tongue etc. The aim of this review is to highlight the oral manifestations of leprosy and to develop awareness to prevent, diagnose and to treat the disease.

**Keywords:** Oral Lesions; M Leprae; Leprosy

### Introduction

*Mycobacterium leprae* is a Gram-negative, acid-fast bacillus [1-4]. Leprosy is caused by *Mycobacterium leprae* after sustained exposure. It prefers to colonize at a place where the temperature is comparatively low like peripheral nerves, nasal mucosa. But *M. leprae* may affect muscles, eyes, testes, bones, and internal organs and oral mucosa. Primarily it affects the skin and peripheral nervous system but it may also involve another system of the body like gonads, joint, lymph nodes liver and kidneys. The clinical presentation of leprosy depends on the complex relationship between the immune system of the patients and offending bacteria. Depending upon the bacillary load leprosy can be divided broadly into two main categories ie paucibacillary and Multibacillary. Paucibacillary type is characterized by the small hypopigmented well-defined border of the anaesthetic lesion with the low bacillary load. This is mediated by T-helper 1 (Th1)-mediated immune response and affect peripheral nerve earlier. While, "multibacillary" type is characterized by numerous infiltrated skin lesions displaying high bacillary loads, impaired peripheral nerves, may involve internal organs. This is mediated by Th2-mediated immune response [5]. The oral lesion is more common in multibacillary type [6]. Oral lesions are a late manifestation of leprosy.

### Epidemiology

Prevalence of oral lesions in leprosy can vary from 19–60% [7,8]. Leprosy related lesions in the oral cavity are uncommon in patients undergoing multidrug therapy [9]. *M. leprae* prefer to colonize the cooler parts of the body. This is a possible explanation to the preferential sites involved in the leprosy, that is the peripheral nerves and the nasal mucosa. This was confirmed by the observation in which higher bacterial index was found in the skin with lower mean skin surface temperature (32.5°C) compared to the higher mean skin surface temperature (33.46°C) [10]. The commonest site of oral cavity involvement was hard palate followed by the soft palate, labial and buccal maxillary gingiva, tongue, lips, labial mandibular gingiva and the buccal mucosa [11]. This could be explained as the nasal obstruction is commonly seen in leprosy (lepromatous type) patients, resulted in mouth breathing. During mouth breathing temperature of the air is lower while it touched to the anterior palate (mean surface temperature 27.4°C), which further become warm. This resulted in the harbouring of bacilli in the anterior area of the mouth.

### Pathogenesis

Pinkerton described the sequence of pathological changes in the nasal and mucous membrane following *Mycobacterium leprae*

invasion [12]. Congestion of mucosa is the first change followed by infiltration and formation of nodules which ultimately resulted in ulceration, fibrosis and atrophy. This further leads to gross disfigurement of the face, dental deformity and functional abnormality.

### Morphology

The oral lesions in leprosy are gradually progressive and initially asymptomatic in nature. The lesions may vary from non-specific enanthem on palate or uvula to specific ones like papules, nodules and ulcers. In histology, enanthem shows non-specific infiltrates while specific lesions may show the presence of bacilli [13].

Due to cosmetic reasons, females presented to clinicians at a younger age but oral lesions in leprosy are more common in males [14]. Oral lesions also increase in numbers as age increases. It is also observed that a positive family history of leprosy is an important predictor of severity of the oral lesion. Macrocheilia, flat-topped nodules and microstomia are the common presentations after the involvement of lips [15]. All these may lead to the appearance of lips as rigid and swollen. Leprous macrocheilia was observed in 10.7% of the patients presenting with chronic macrocheilia [16].

Previous studies suggested that the tongue may be affected in 17–25% of the cases [17,18]. The lesion can be in the form of multiple superficial ulcers, mild glossitis, loss of papillae, chronic atrophic candidiasis and fissured tongue [19]. Nodular lesions on the anterior part of the tongue further progressed to pavement stone-like appearance which ultimately leads to scarring. In the majority of the cases, tongue muscles are not affected unlike the involvement of subcutaneous muscles.

Initially, the appearance of buccal mucosa appears paler. In later stages, it may further lead to the development of diffuse infiltration, swelling, papules, nodules and ulceration. The lesions on the hard palate are the most varied type which may initially manifest as erythematous or reddish papules. These lesions coalesce to form larger generalized nodular sub-mucosal infiltrate. In advance stage, oral mucosa loses its shine and present as a matt-like [20]. Some literature suggesting that verrucous carcinoma of the buccal mucosa may arise in leprotic patients [21]. But the association between oral verrucous carcinoma and lepromatous leprosy has not been established.

Involvement of the palate may lead to ulceration and perforation which finally may lead to the formation of an oro-nasal fistula. After this, patients may lead to the development of functional abnormalities like difficulty in deglutition, eating and drinking. Some studies reported that erythema nodosum leprosum is an important but rare cause of the destruction of the hard and soft palate [22]. Palatal noduloulcerative lesions of leprosy may mimic squamous cell carcinoma [23]. In advance stage of the disease, the mucosa of the soft palate, uvula and fauces of tonsils may become infiltrated and appear like miliary papules or nodules. These lesions in later stage may break down forming superficial ulcers, especially during leprosy reactions. Initially, the uvula may appear swollen and later completely effaced or may adhere to the soft palate. Scarring causes a triangular deformity in fauces.

Previous literatures also suggested that leprosy may involve the gums in the form of gingivitis, periodontoclasia and periodontitis. In gross, gums may appear swollen with shiny mucosa and bleed easily with decreased sensitivity to pain. According to Miranda, *et al.* Involvement of teeth in leprosy can be specific pulpitis, dental anomalies and periapical granulomas. Marti, *et al.* concluded that in leprosy patients, poor dental and periodontal health is common irrespective to the presence of facial destruction and type of leprosy [24].

Variable histopathological findings have been observed in mucosal lesions in leprosy. Scheepers, *et al.* described epithelial atrophy in lepromatous leprosy type [14]. Grenz zone, a narrow zone of the unaffected papillary dermis by underlying pathology is a consistent feature of leprosy lesions is uncommon in oral lesions. In oral lesions of lepromatous leprosy infiltration of macrophages, lymphocytes and plasma cells with plenty of acid-fast bacilli, are usually seen. Some cases report hyperkeratosis in reversal or downgrading reactions. Abreu, *et al.* conducted a study on 19 patients with multibacillary leprosy and concluded that to confirm the clinical changes in the oral mucosa histopathological examination should be done [6]. Conversely, the normal oral mucosa can show specific histopathological changes.

Involvement of the cranial nerve is also observed in leprosy. Previous literature suggested that the trigeminal nerve (5<sup>th</sup>) and the facial nerve (7<sup>th</sup>) are the commonly affected nerves [14,15]. Affected maxillary and mandibular branches of the trigeminal nerve may

cause ipsilateral anaesthesia of the face and feeling of looseness within the teeth. When the buccal and mandibular branches of the facial nerve get involved it may result in difficulty in mastication and speech. So examine of these two cranial nerves is important in leprosy patients [25]. Previous literature suggested that the frequency of atrophy of nasal spine, facial nerve lesion, ocular lesions and facial deformity were found to be 15%, 17%, 22% and 44% of leprosy patients, respectively [26].

## Conclusion

Leprosy patients usually first seek consultation from the dermatologist and dentist usually unaware about the precautions to be taken while handling all types of oral lesion, like wearing gloves and mask. Oral mucosa examination should be routinely practised in every leprotic patient. Treatment of dental infection may reduce leprosy reaction as well as improvement in oral hygiene of the patients. Oral and nasal lesions are the important source of dissemination of leprosy in the community. Reduced number of oral lesion in leprosy can be explained by an early diagnosis of the disease and effectiveness of multidrug therapy.

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