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Research Article

Leprosy Patients and Its Dental Problems Management-A Cross Sectional Study

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Abstract:

Objectives:

Leprosy is a chronic, non-fatal disease caused by Mycobacterium leprae. It can cause cutaneous lesions, peripheral nerve lesions and orofacial manifestations, including destruction of the alveolar premaxillary process associated with loss of the maxillary incisors. The aims of this study were to assess orofacial manifestations of disease in patients attending Anandaban Hospital Lele, and develop clinical guidelines for dentists.

Materials and Methods:

A cross-sectional questionnaire-based study was administered to 43 diagnosed leprosy patients. This included questions on perceived oral health status and oral hygiene habits. An extra-oral and intra-oral examination was also performed.

Results: Eighty-four per cent of patients were male with a mean age of 35.9 years. Forty-nine per cent had extra-oral cutaneous lesions. Twenty-eight per cent had intra-oral lesions including hyperpigmented patches. Twenty-one per cent had cranial nerve involvement and the trigeminal nerve was most commonly affected.

Conclusions:

From this data a clinical dental pathway protocol for managing patients with leprosy was developed. It highlights dental issues when managing leprosy patients. Nerve involvement may mean patients are unable to give an accurate account of their symptoms. Special tests should include cranial nerve examination and swabs of intra-oral ulcers. Low rates of infectivity means that normal infection control measures can be taken when treating these patients.

keywords: leprosy; mycobacterium leprae; oral health; orofacial

Introduction

Although viewed by many as a disease of antiquity which died out in Europe centuries ago, leprosy continues to present a worldwide health challenge. In 2010, 228,474 new cases were reported globally by 130 countries. With 126,800 new cases reported in 2010, India has the highest incidence of leprosy in the world1. Leprosy is a chronic, non-fatal disease caused by the acid-fast bacillus Mycobacterium leprae. The route of transmission is thought to be person-to-person via nasal droplets. The mycobacterium causes chronic granulomatous inflammation affecting the skin, eyes and peripheral nerves leading to anaesthetic skin lesions and peripheral neuropathies 2 The clinical presentation and classification of leprosy depends on the level of cell-mediated immunity (CMI) expressed by that individual towards the mycobacterium. The different types of leprosy are categorised according to the Ridley–Jopling classification: Tuberculoid (TT), Borderline Tuberculoid (BT), Borderline (BB), Borderline Lepromatous (BL) and Lepromatous (LL). Patients with high levels of CMI tend to develop the tuberculoid form with few lesions and undetectable mycobacteria. Patients with absent CMI develop lepromatous leprosy with multiple lesions and detectable mycobacteria. The borderline leprosy types lie between these two and develop in patients who have a degree of CMI, but they can develop multiple lesions because of unstable immunity. The World Health Organization (WHO) also recommends a further classification into Paucibacillary (PB) and Multibacillary (MB) types of leprosy to simplify multidrug therapy. Paucibacillary leprosy is defined as having one to five skin patches with definite sensory loss or any one nerve trunk affected by leprosy and MB leprosy is defined as having six or more skin patches with definite sensory loss, or two or more nerve trunks affected by leprosy or the presence of five skin patches and one nerve trunk (i.e. six lesions; see Table 1)3., 4.

Host's resistance	Clinical manifestations of leprosy
Excellent	None (no infection)
Good	None (subclinical infection showing spontaneous regression)
Fair	Tuberculoid leprosy (TT) Paucibacillary leprosy (PB)
Borderline tuberculoid leprosy (BT)	
Poor	Mid-borderline leprosy (BB) Multibacillary leprosy (MB)
Borderline-lepromatous leprosy (BL)	
Very poor/none	Lepromatous leprosy (LL) Multibacillary leprosy (MB)

Table 1: The level of host resistance to infection leads to a range of clinical manifestations.

Adapted from Leprosy for Medical Practitioners and Paramedical Workers S.J. Yawalkar (2002)5. Nerve damage is a serious complication of leprosy as it can lead to dryness, weakness of muscles and anaesthesia. This combination can lead to misuse of limbs and subsequent deformity and disability. The risk of disability is higher in patients with borderline leprosy. Leprosy is currently the leading infectious cause of disability4. The WHO has graded disability in leprosy into three categories; Grade 0 (no disability), Grade 1 (sensory impairment in the hands and feet or visual impairment in the eyes) and Grade 2 (visible deformity in the hands and feet, including ulcers, contractures and bone absorption or very reduced visual acuity, lagophthalmos or iritis in the eyes 6 . Leprosy may have relevance to dentistry because it often has orofacial manifestations. Of the different types of leprosy, LL is most commonly associated with orofacial disorders. These include intra-oral nodules on the palate, dorsum of tongue, lips and pharynx and skeletal changes which can cause destruction of the alveolar premaxillary process associated with loss or loosening of the maxillary incisors7. These nasal and orofacial changes are likely to be a result of the preference of M. leprae for cooler sites. However, it is not entirely clear whether these changes are related to the disease or poor oral health compounded by the lifestyle of a leprosy patient8., 9. A study in Fontilles, Spain, compared the presence of oral disease in a group of 76 patients with leprosy with matched control subjects and found that although the decayed, missing and filled (DMF) index was not significantly higher in the leprosy group, the number of missing teeth and filled teeth was significantly lower and higher, respectively10. This may suggest inequalities in access to the quality of dental care received. Another study done in Serra, Brazil, also examined oral disease in a cohort of 99 leprosy patients. Again, a high DMF index was noted, indicating a lack of oral health prevention, treatment and poor access to dental care11. In the UK, leprosy is a notifiable disease. Between 1999 and 2008, 36 cases of leprosy were reported in England and Wales. Seventy-five per cent of these cases were male, 70% were aged 15–44 years and 50% were from the Indian subcontinent12. Undernotification of the disease is likely because of its rare nature and low levels of awareness among health-care professional regarding its clinical presentation and diagnosis. Low levels of awareness mean that patients with leprosy in England and Wales still suffer considerable morbidity because of delays in diagnosis. There is often a very long lag time between infection and onset of symptoms, which means that cases from endemic areas may continue to present for several years. Therefore, it is important that all health-care professionals remain vigilant for the disease and consider leprosy in the event of undiagnosed orofacial lesions or unexplained cranial nerve impairments in patients who have lived in endemic areas. Based in Sion-Chunnabhatti, a slum area in Mumbai, India, the Bombay Leprosy project is a voluntary not-for-profit organisation where patients are diagnosed and treated for leprosy. It covers a population of two million in Mumbai and is also one of the main leprosy referral centres in India. Therefore, the aim of this project was to assess orofacial manifestations of disease in leprosy patients attending the Bombay Leprosy Project clinics and to develop a clinical pathway protocol for dental professionals in the UK.

Methods

A questionnaire was distributed to a random group of 43 patients attending the Anandaban Hospital Lele. This included questions regarding perceived oral health status, utilisation of dental services and barriers to care and oral hygiene habits. An extra-oral and intra-oral examination was also done to record a DMF index, the need and use of prosthesis, periodontal disease and the presence of mucous membrane oral lesions. Dental charting was used to record the presence of decayed, missing or filled teeth and the James index was used to classify periodontal disease as good, fair or poor, depending on the amount of debris and calculus present. A cranial nerve examination was also performed and documented for each patient. To confirm intra-examiner reliability, 10% of patients were recalled for a later repeat examination. Demographic data regarding age, gender, type of leprosy, treatment, disability grading and habits including chewing of paan were also collected from the medical notes. Interns from the Bombay Leprosy Project Clinic were assigned to help with translation and transcription from the medical notes. All patients were consented for treatment at BLP and a copy of the questionnaire and examination for each patient was left at BLP for inclusion in their medical notes, so as to form part of their care plan. The study was conducted in full accordance with the World Medical Association Declaration of Helsinki. All data were entered into Excel for analysis.

Results

Forty three patients were recruited into the study, 36 male (84%) and 7 female (16%) and the age ranged from 8–70 years (mean age 35.9 years). Five patients (12%) had PB leprosy and 38 patients (88%) had MB leprosy. Most patients (93%) were currently receiving treatment for leprosy or had received treatment in the past. Only five patients (12%) smoked but 20 patients (47%) chewed either paan, or tobacco or both. With regard to disability of the hands, 11 patients (26%) had a Grade 2 visible deformity, five (12%) of which exhibited deformity in both hands and nine (21%) had a Grade 1 sensory impairment. With regard to the feet, three patients (7%) had a Grade 2 disability and eight patients (19%) had Grade 1 disability. Three patients (7%) had Grade 2 eye disability and no patients had a grade 1 eye disability.

Questionnaire results

Of the 43 patients, 30 (70%) reported satisfaction with their current oral health. One patient (2%) reported the condition of their mouth to be 'excellent', 24 (56%) reported it to be 'good', 15 (35%) reported it as fair and three (7%) reported it as 'poor'. Although 29 patients (67%) reported current problems with their teeth, including pain, bleeding or swollen gingivae, pus, cavities and loose teeth, none of them were currently seeing a dentist. Thirty patients (70%) had never visited a dentist and the 13 patients (30%) only attended for a specific problem such as pain. None of the patients interviewed attended the dentist regularly. For those who had been to see a dentist, eight patients out of the 13 received a tooth extraction and two were advised to have a tooth extraction, making it the most common treatment. Seven of the 13 patients were satisfied with the

treatment they received and would be happy to return. However the other six reported reluctance in returning for various reasons, which included not wanting to have more teeth extracted or having too many appointments to attend. Of those who never visited a dentist the main reason for not attending was that they did not perceive a need to attend, even if they had current problems with their teeth. Out of the 30 patients, 18 (60%) would tell the dentist about their diagnosis with leprosy, often because they felt that the dentist should know about their medication. Out of the other 12 patients, nine would only tell the dentist about their diagnosis if the dentist specifically asked about it. Only six patients (14%) thought that leprosy could affect the mouth and teeth. With regard to oral hygiene, a range of dentifrices were used. Most patients (28 patients, 65%) used a toothbrush and toothpaste, however other dentifrices such as ayurvedic powder or tobacco powder were used. Seven patients (16%) used fingers instead of a toothbrush, four of which had Grade 2 disability in the hands. One patient (2%) with Grade 2 disability in the hands used neem sticks to clean their teeth. Only two patients (4%) had ever received any oral hygiene advice from a health-care professional. The majority of patients (74%) would prefer to have a filling rather than having an extraction if they could.

Examination results

Nine patients (21%) were found to have cranial nerve impairment. Five patients (12%) were found to have involvement of the trigeminal nerve and four patients (9%) had involvement of the seventh cranial nerve. Twenty-one patients (49%) had extra-oral lesions which included nodules, erythema and hypopigmented patches of anaesthesia (Figures 1 and 2). Twelve patients (28%) had intra-oral lesions which included sinuses and diffuse areas of hyperpigmentation (Figures 3 and 4). Out of these 12 patients, nine (21%) also chewed either paan, or tobacco or both. Only one patient had intra-oral ulceration and this was in the gingivae above the upper left central the patients examined exhibited any bony or skeletal changes. **Figure 1**

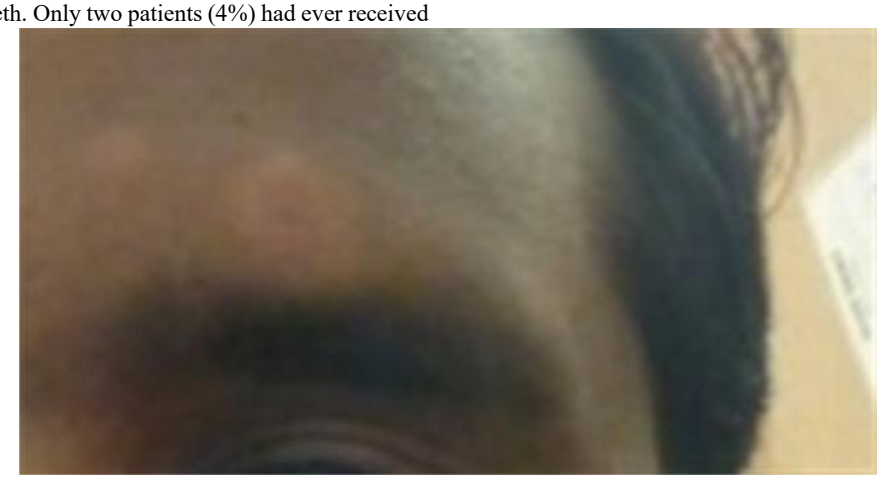

Figure 1: Open in a new tab Hypopigmented lesions.

Figure 2: Open in a new tab Nodular lesions on the face.

Figure 3: Open in a new tab Hyperpigmented intra-oral lesions on the buccal mucosa and palate.

Figure 4: Hyperpigmented intra-oral lesions on the buccal mucosa and palate.

Figure 5: Gingival ulceration above the upper left central incisor.

Interestingly, the DMF index in this group ranged from 0 to 21 and the mean was 3.42. The mean number of decayed teeth was 2 and the mean number of missing teeth was 1.5. None of the 43 patients had any fillings. Regarding the periodontal status, using the James Index, 13 patients (30%) had good oral hygiene, 15 (35%) had fair oral hygiene and 15 (35%) had poor oral hygiene. Only one patient had a prosthesis, which was a fixed acrylic device on the lower anterior teeth (Figure 6).

Figure 6: Fixed acrylic prosthesis on lower anterior teeth.

The majority of patients reviewed in this study were male. This is probably because most migrant workers who come to Mumbai are male whereas females tend to stay at home and care for the family. This indicates gender inequalities in access to health care. Other studies from Ethiopia and Bangladesh have also reported that women with leprosy have longer delays in diagnosis and therefore higher levels of nerve damage and disability on presentation, which, in turn can have an impact on oral hygiene and oral health2. Not many women were included in this study, so although the majority of women (four out of seven) had poor periodontal health according to the James Index, it is difficult to make conclusions as to whether women had worse oral hygiene or DMF scores.

The mean DMF was 3.42 and although comparable to other non-leprosy groups in India13, this is significantly lower than other studies done in Spain and Brazil where the mean score was reported as 19.06 and 14.4, respectively10., 11.. However, it is worth noting that the DMF for the general Brazilian population is also higher. Furthermore the study in Spain was done on leprosy patients resident in a sanatorium. The patients who attend BLP clinics are often those who have been diagnosed and treated early and therefore have less advanced disease. Patients residing in leprosy colonies tend to be older and have more advanced disease as multidrug therapy was less widely available in the past. Therefore they are very likely to have higher DMF indexes. There were no filled teeth in this study. The majority of patients in this study who had attended a dentist were treated with tooth extraction, which is characteristic of other disadvantaged groups. The patients in this study had a spectrum of oral hygiene levels, which was also seen in those with Grade 2 disability of the hands. In patients with deformity of the hands, the use of made-to-measure grip aids is advocated to improve handling of various implements such as pens and toothbrushes (Figure 7). Although the use of grip aids was not asked about in the questionnaire, one study has shown that they can improve oral hygiene14. However, it should also be noted that the two patients seen in this study with the most advanced disability and deformity of the hands (Figures 8 and 9) did not use toothbrushes with grip-aids, instead they used fingers or neem sticks. **Figure 7.**

Figure 7: Open in a new tab Grip-aids made of epoxy resin putty to assist eating and toothbrushing.

Figure 8: Advanced deformity causing disability of the hands.

Figure 9: Open in a new tab Advanced deformity causing disability of the hands.

Although relatively uncommon, for dentists, cranial nerve involvement is an important feature of leprosy. This study found the trigeminal nerve and the facial nerve were the most commonly affected nerves, which is similar to previous studies and reports15., 16.. This may have specific implications for the teeth. One patient who was found to have involvement of both the maxillary and mandibular branches of the trigeminal nerve reported anaesthesia on the affected side of the face and a feeling of 'looseness' within the teeth. Involvement of the buccal and mandibular branch of the facial nerve may also have implications for mastication and speech (see Figure 1). This emphasises the need for cranial nerve assessment in patients with leprosy. No bony or skeletal changes were seen as this sample of patients had received treatment in the early stages of the disease. This is consistent with other studies which have found that oral manifestations of leprosy are generally not present in patients undergoing treatment for leprosy17. As only one patient had any form of intra-oral ulceration, this was not a common feature. However the site may be significant as it was situated above the upper left central incisor. The characteristic triad of lesions in the mid-face, known as facies leprosa, consists of loss of the anterior nasal spine, alveolar inflammation and resorption of the anterior maxillary process16. An ulcer in this part of the mouth may be an early feature of infection with M. leprae and it may be worth doing swabs for microscopy from intra-oral ulcers to give an indication of infectivity. Although intra-oral soft tissue lesions were seen in 28% of patients, with the exception of oral ulceration, none were thought to be indicative of leprosy. This is because other confounding factors such as paan and tobacco chewing were often present.

Recommendations For Clinical Assessment by Dentists

From this data a clinical pathway protocol for managing patients with leprosy was developed (Figure 10). Management depends on whether the patient has a definitive diagnosis of leprosy or not. If they have then this should have been notified to the consultant in communicable diseases. In the patient history clinicians should be aware that a patient may or may not complain of pain caused by nerve involvement. The dental history may reveal problems accessing care and patients are more likely to have been treated for dental problems with extractions rather than restorations. Patients may not disclose their diagnosis of leprosy but their drug regimens should be recognisable. Habits such as chewing paan should

also be noted. In the examination, extra-oral systemic features should be noted. This includes cutaneous features in the head and neck and disabilities in the hands and feet which may affect oral hygiene. Intra-orally, the soft tissues should be examined for ulcers. As with any routine examination, oral hygiene levels should be noted and charting should be done. Special tests such as cranial nerve testing and swabs should also be done. Liaison with a specialist physician should also be considered. Management of the patient should include adaption of oral hygiene procedures according to the patient's level of disability and specialist referrals may also be required, for example to oral medicine for management of soft tissue lesions.

Figure 10.

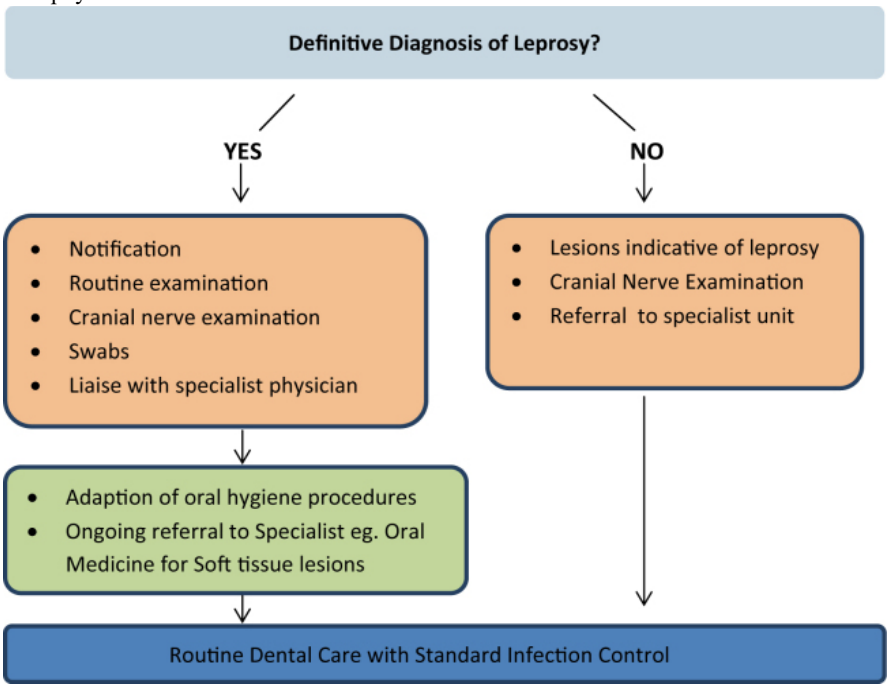

Figure 10: Open in a new tab A clinical pathway protocol for dentists to manage leprosy patients.

If there is no definitive diagnosis, but leprosy is suspected, then, following routine history and examination, cranial nerve testing should be done with referral to a specialist unit. Liaison with the consultant in communicable diseases should also be considered. All patients should be given routine dental care using standard infection control as the disease has low rates of infectivity.

Limitations

As the questionnaire was administered by a third party, translation was an issue. Language barriers made it difficult to assess stigma or perceptions of oral health. Limited resources and disposal facilities meant that only mirrors and no probes were used for oral examinations. Patients often did not know how to decide when asked certain questions, possibly as a result of low levels of education. During the 2-week period the Ganesh festival and Eid were taking place, which resulted in clinics being closed and fewer patients attending.

Conclusion

This study highlighted various issues that dentists should be aware of when managing leprosy patients. Nerve involvement may mean that patients are unable to give an accurate account of their symptoms such as pain. Systemic features should be noted as disabilities affecting the hands and feet can affect oral hygiene. Management of caries in this group is usually with extraction. Special tests should include cranial nerve testing and swabs of intra-oral ulcers should be taken as this may be an important early feature of leprosy. As the disease has low rates of infectivity, normal infection control measures can be used when managing these patients.

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