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Review Article

Dentistry and tropical & infectious diseases. A review

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Abstract

Tropical and infectious diseases significantly affect oral health, especially in regions with poor sanitation and limited healthcare resources. This review examines an article discussing the oral manifestations of tropical diseases and their impact on dental practice. Key findings highlight bacterial, viral, fungal, and parasitic infections that present in the oral cavity, along with occupational risks faced by dentists. The article emphasizes the importance of early diagnosis, infection control measures, and interdisciplinary collaboration in managing these conditions. While the article provides valuable insights, incorporating updated epidemiological data and advancements in diagnostic tools would enhance its relevance. This review underscores the crucial role of dentists in identifying and preventing tropical infectious diseases, advocating for a multidisciplinary approach to global oral health challenges.

Keywords: Dentistry, Tropical Diseases, Infectious Diseases, Oral Manifestations, Public Health, Infection Control, Bacterial Infections, Viral Infections, Fungal Infections, Parasitic Infections

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1. Introduction

Oral health is increasingly recognized as a mirror of systemic health, especially in tropical and low-income regions where infectious diseases are widespread. The World Health Organization (WHO) reports that over 3.7 billion people globally are affected by oral diseases, with untreated dental caries ranking as the most prevalent health condition.[1] These burdens are compounded in tropical climates where poor sanitation, malnutrition, and limited healthcare access intersect with the prevalence of diseases like HIV/AIDS, tuberculosis, leishmaniasis, syphilis, and fungal infections.

Dentists practicing in endemic regions—or treating at-risk populations—often encounter oral manifestations of systemic infections. These signs may precede full-blown disease or persist despite systemic therapy. This review aims to critically analyze the relationship between tropical infectious diseases and dentistry, drawing from published literature, and highlighting clinical implications, regional disparities, epidemiological relevance, and interdisciplinary management approaches.

In places where diseases like leishmaniasis, tuberculosis, HIV, or fungal infections are common, dentists may be among the first healthcare workers to notice the warning signs. Swellings, ulcers, pigmentation changes, and gum problems can all point to infections that go far beyond the teeth and gums. Yet, many of these signs go unrecognized or are mistaken for more routine dental issues, simply because not enough attention is given to the link between tropical diseases and oral health.

This review takes a closer look at a published article that explores exactly that connection—how tropical diseases show up in the mouth and what it means for dental practice. The goal is to highlight the main findings of the article, consider its strengths and limitations, and reflect on why this knowledge matters in real-world clinical settings. By understanding the broader health picture behind oral symptoms, dentists can play a powerful role in early diagnosis and improving patient outcomes, especially in underserved communities.

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2. Discussion

2.1. Epidemiological and public health perspectives

While oral diseases affect billions worldwide, certain regions show disproportionately poor outcomes. For instance, oral cancer mortality is highest in Melanesia and South Asia, partly due to delayed detection, infectious comorbidities, and limited access to oral healthcare.[2] Socioeconomic determinants play a major role—noma, a devastating orofacial gangrene associated with extreme poverty and malnutrition, continues to affect children in sub-Saharan Africa, with a mortality rate exceeding 90% without timely intervention.[3]

Post-COVID shifts have also changed disease dynamics. Lockdowns disrupted oral healthcare services globally, leading to a surge in advanced caries, untreated infections, and worsened periodontal conditions.[4] Immunosuppression post-COVID and increased co-infections in already vulnerable populations have made oral screenings even more critical in tropical settings.

3. Tropical and Infectious Diseases: Oral Relevance

3.1. Bacterial infections

1. Tuberculosis (TB) may present intraorally as persistent, non-healing ulcers or nodules, often on the tongue, gingiva, or palate. These lesions may be mistaken for malignancies, underscoring the need for biopsy and referral in suspected cases.[5]

2. Syphilis, caused by *Treponema pallidum*, can manifest with oral mucous patches in secondary stages and Hutchinson's teeth in congenital cases—making dentists key contributors in diagnosis and surveillance.[6]

3. The article highlights how bacterial infections such as tuberculosis and syphilis can produce distinct and often overlooked signs in the oral cavity. Tuberculosis, typically known for affecting the lungs, may also present with persistent, non-healing ulcers in the mouth, particularly on the tongue, palate, or buccal mucosa.[7] These lesions are often painful and may be mistaken for aphthous ulcers or even malignancy if not properly investigated. Syphilis, caused by *Treponema pallidum*, can manifest in multiple oral stages—primary syphilis may cause chancre-like lesions, while secondary syphilis can lead to mucous patches on the tongue or palate. In cases of congenital syphilis, dental anomalies such as Hutchinson's teeth—characterized by notched, peg-shaped incisors—serve as hallmark signs, often aiding in historical or delayed diagnosis.[8] These findings underline the essential role dentists play in recognizing early or atypical presentations of bacterial infections.

3.2. Viral infections

1. HIV/AIDS profoundly affects oral health. Common manifestations include oral candidiasis, oral hairy leukoplakia, Kaposi's sarcoma, and necrotizing periodontal diseases.[9] These may be among the earliest signs, often prompting HIV testing.

2. Herpesviruses, including HSV-1 and CMV, are associated with recurrent vesicular lesions in immunocompromised individuals, which may need antiviral therapy.

3. The article gives particular importance to viral infections, especially HIV/AIDS, which often presents with a wide array of oral conditions. These include oral candidiasis, a common fungal superinfection in immunocompromised individuals, as well as oral hairy leukoplakia—a white, corrugated lesion typically found on the lateral border of the tongue.[10] Another significant oral manifestation is Kaposi's sarcoma, a vascular neoplasm that may appear as reddish, bluish, or purplish plaques on the palate or gingiva. Such lesions can be among the first visible signs of HIV infection, particularly in resource-limited settings where routine testing is not widely available. Dentists are often the first healthcare providers to observe these conditions, placing them in a key position for initiating early testing and referral, ultimately improving patient outcomes.

3.3. Fungal infections

1. Candidiasis, primarily caused by *Candida albicans*, is frequently observed in immunocompromised patients, presenting as pseudomembranous, erythematous, or hyperplastic lesions.[11]

2. Histoplasmosis and aspergillosis may also involve the oral cavity in systemic cases, mimicking neoplasms or chronic ulcers.

3. Fungal diseases are particularly relevant in patients with weakened immune systems, and the article draws attention to two significant examples—candidiasis and histoplasmosis. Oral candidiasis, caused by *Candida albicans*, is frequently seen in individuals with immunosuppression due to HIV/AIDS, prolonged antibiotic use, or corticosteroid therapy.[8] Clinically, it may appear in various forms such as pseudomembranous (white curd-like plaques), erythematous (red, painful areas), or hyperplastic (thickened white lesions that do not wipe off). On the other hand, histoplasmosis, a systemic fungal infection caused by *Histoplasma capsulatum*, may mimic oral cancer due to the presence of ulcerated or nodular lesions in the oral cavity. These may appear on the tongue, palate, or buccal mucosa, and are often associated with systemic symptoms such as weight

loss or respiratory distress. Differentiating these fungal infections from malignancies or other mucosal diseases is critical and requires a high index of clinical suspicion and appropriate laboratory support.

4. Parasitic Infections

1. Leishmaniasis, transmitted by sandflies, can present as chronic ulcers or nodular lesions on the oral mucosa, especially in mucocutaneous forms prevalent in Latin America and South Asia.[12]

2. Amoebiasis and toxoplasmosis are less commonly seen in oral presentations but may cause systemic immunosuppression affecting oral flora balance.

3. Parasitic diseases, while less common in routine dental settings, are a significant concern in endemic areas. The article discusses leishmaniasis as a prime example of such infections with oral involvement. Caused by *Leishmania* parasites transmitted through sandfly bites, mucocutaneous leishmaniasis may lead to chronic, painful ulcers in the oral and nasal regions, including the palate and uvula.[13] These ulcers can be disfiguring and resistant to standard treatments, requiring specialized care and systemic therapy. Dentists practicing in or treating patients from endemic regions need to consider parasitic infections in their differential diagnosis, especially when encountering chronic oral ulcers unresponsive to conventional therapy.

5. Infection Control and Occupational Hazards

Dentists are routinely exposed to bloodborne and airborne pathogens, including TB, hepatitis B/C, and HIV, via aerosol-generating procedures, sharp instrument handling, or inadequate sterilization.[14] The post-COVID era has heightened awareness of airborne infection risks in dental clinics, necessitating robust implementation of PPE, air filtration, rubber dam use, and preprocedural rinses.

Dental practices in tropical regions must reinforce sterilization protocols, biomedical waste disposal, and staff training to minimize occupational exposure and nosocomial transmission.

The article also addresses the occupational hazards faced by dental professionals, emphasizing the risk of acquiring infections such as tuberculosis, hepatitis B, and hepatitis C through routine procedures. Dental care often involves the generation of aerosols, which can carry infectious agents, especially during ultrasonic scaling, high-speed drilling, and surgical procedures. Additionally, percutaneous injuries like needlesticks present another route of transmission for bloodborne pathogens.[15] This highlights the necessity for vigilance, adherence to standard safety protocols, and ongoing training in infection prevention.

6. Interdisciplinary Framework and Collaborative Strategies

While the article recommends interdisciplinary collaboration, current literature suggests structured models for effective implementation:

1. *Integrated screening programs:* Countries like Malawi and Kenya have embedded oral health check-ups in malaria and HIV clinics, allowing dual screening and reducing missed diagnoses.[16]
2. *Referral protocols:* Dentists can coordinate with infectious disease specialists for co-management of complex cases (e.g., HIV-associated Kaposi's sarcoma, TB ulcers). Protocols should define when and how referrals should occur, with follow-up integrated into electronic health systems.
3. *Training deficits:* Studies from Egypt and China reveal that dental practitioners often lack formal training in tropical oral manifestations.[17] Addressing this, professional bodies should introduce CPD modules and incorporate WHO-recommended oral health curricula focusing on endemic diseases, emerging pathogens, and pandemic resilience.

6.1. Summary of the srticle

1. The article provides a comprehensive overview of several tropical and infectious diseases that can show up in the mouth—often as early warning signs of serious health conditions. It covers a wide range of illnesses, grouped into categories such as bacterial, viral, fungal, and parasitic infections. Among the bacterial diseases, tuberculosis and syphilis are discussed for their potential to cause oral ulcers, nodules, or even bone involvement. These symptoms are not only uncomfortable for the patient but can also mimic other dental conditions, making awareness crucial.

2. Viral infections, particularly HIV/AIDS and herpes, are explored in depth. The article explains how HIV, for example, can weaken the immune system to the point that the patient becomes vulnerable to multiple oral infections—ranging from persistent fungal infections to severe gum disease and ulcers. Herpes viruses, on the other hand, can cause recurrent cold sores or painful blisters that dentists need to recognize and manage carefully.

3. Fungal diseases such as candidiasis and histoplasmosis are also covered, with the article describing their common presentations like white patches, redness, or cracking at the corners of the mouth. These conditions are often seen in patients with weakened immunity or poor hygiene and may signal underlying systemic problems.

4. Parasitic infections, although less commonly thought of in dental settings, are given attention too. Diseases like leishmaniasis may present with lesions inside the

mouth or around the lips, especially in individuals living in or traveling from endemic areas. These symptoms can easily be mistaken for other oral diseases unless the dentist is trained to consider such possibilities.

5. Importantly, the article emphasizes that dentists play a key role in spotting these signs early—sometimes even before a medical diagnosis is made. It calls for greater awareness and training for dental professionals to recognize the oral signs of systemic infections, especially in areas where these diseases are common. It also stresses the importance of taking proper infection control precautions, educating patients about prevention, and working closely with doctors, dermatologists, and infectious disease specialists to ensure comprehensive care.
6. In summary, the article reinforces how essential it is for dentists to not just treat teeth, but to look at the bigger health picture. A sore in the mouth might be more than just a sore—it could be a clue to something far more serious. Recognizing these signs can make a real difference in a patient's overall health and well-being.

7. Conclusion

Tropical and infectious diseases significantly influence oral health, especially in underserved regions. Dentists are not just oral health providers—they are often the first line of defense in identifying systemic illnesses. Recognizing the oral signs of diseases such as TB, HIV/AIDS, leishmaniasis, and syphilis can lead to timely medical intervention and reduce patient morbidity.

However, for dentistry to respond effectively, updated epidemiological data, regional disease trends, and clear interdisciplinary pathways must be embedded in both training and practice. Dental professionals must be empowered with evidence-based guidelines, collaborative care models, and continuous education to meet the complex challenges of tropical infectious disease management.

8. Source of Funding

None.

9. Conflict of Interest

None.

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