

# Candidiasis-Oral Manifestations: A Literature Review

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**Abstract:** *Some oral diseases, including the non - plaque induced gingival diseases, can be caused by various types of fungi. The most common fungal oral infection is candidiasis. Predisposing factors (local and systemic) for oral candidiasis are often difficult to be detected. The primary oral candida infection can be classified as acute, chronic and candida - associated lesions. Criteria that are used for diagnosis of Candida infection and for the differentiation of the different forms of oral candidiasis traditionally include: medical history, clinical, microbiological, microscopic and biopsy examination. The aim of this article is to provide a literature systemic review of the different predisposing factors, clinical oral manifestations and diagnosis of oral candidiasis in dental practice. The review paper is based on a literature review of latest updates of various different researches.*

**Keywords:** candidiasis, fungal infections, oral manifestations, oral candidiasis

## 1. Introduction

Some oral diseases, including the non - plaque induced gingival diseases, can be caused by various types of fungi. Some of these fungal infections are very rare and not all of them have manifestations in the oral cavity. Oral fungal infections include: candidiasis, histoplasmosis, aspergillosis, blastomycosis, cryptococcosis, etc. Candidiasis and histoplasmosis are the most common oral fungal infections [1].

Some Candida species are commensals and are part of the normal microbiota in oral cavity (*C. albicans*, *C. glabrata*, *C. krusei*, *C. tropicalis*, *C. parapsilosis*, *C. guilliermondii*, *C. lusitanae*, *C. pseudotropicalis*, *C. stellatoidea*, etc.) [2]. *Candida albicans* is the most commonly isolated one [3, 4].

The aim of this article is to provide a literature review of the different predisposing factors, clinical oral manifestations and diagnosis of oral candidiasis in dental practice.

## 2. Methods

The review paper is based on a literature review of latest updates of various different researches in a database of PubMed and Google Scholar during the years. It summarizes and discusses the current knowledge of the topic, and facilitate the understanding of the problem and the correct diagnosis of this oral infection in the dental practice. Different keywords and their combinations were used: "candidiasis", "fungal infections", "oral manifestations", "oral candidiasis". All articles that were used in the study and taken into consideration are in English only.

## 3. Literature Survey

The prevalence of *Candida albicans* in healthy subjects ranges from 2% to 69% and increases with age. The variations of its prevalence are due to differences in different populations and the techniques of isolation of fungi [1]. However, in cases there are predisposing factors, *C. albicans* becomes an opportunistic pathogen and causes candidiasis

(the most common fungal infection) by invading gingival epithelial cells, inducing hypersensitivity, and producing potent toxins [3]. Usually this opportunistic infection manifest as superficial candidiasis of the oral mucosa [5]. It is usually found as a consequence of decreased host immunity system [6].

Predisposing factors for oral candidiasis can be various and sometimes it is difficult to be recognized and detected. Thus, gingival candida infection can be often observed in HIV - seropositive and other immunocompromised patients. Sub - prosthetic stomatitis, in addition to allergies to Cr - Co prosthesis and plastic can also include the mechanism of development and growth of Candida infection. [7]

- **Local predisposing factors**—ill - fitting edges of removable dentures, low saliva pH [8] and decreased saliva flow [9], increased salivary glucose levels, poor oral hygiene, use of topical or inhalational corticosteroids [10], smoking [11]
- **Systemic predisposing factors**—age [12], systemic diseases (iron deficiency anemia) [13], long - term use of broad - spectrum antibiotics, immunosuppressive drugs (antineoplastic agents), corticosteroids [14], nutritional deficiencies (deficiencies of vitamin B<sub>12</sub> and folic acid) [9, 15], radiotherapy, post - radiation or drug xerostomia, HIV infection or AIDS, endocrine disorders (diabetes and Cushing's syndrome) [16], and other immunocompromised conditions (primary or secondary immunodeficiency), malignancies (leukaemia), congenital conditions (Chediak-Higashi syndrome) [7].

In healthy individuals, oral candidiasis is rarely diagnosed in the gingiva, although the frequent isolation of *C. albicans* from the subgingival dental plaque of patients with severe periodontitis. It has been proven that subgingival multiplication of *Candida* can also occur after long - term treatment with antibiotics [17].

Based on the localisation, the infection can be determine as superficial or systemic. Candidal infections of the oral mucosa are usually superficial. Invasion of the gingival epithelium is due to the production of hyaluronidase.

Candidiasis of the oral mucosa can be categorized as:

- Primary oral candidiasis - candida infection limited to oral and perioral tissues
- Secondary oral candidiasis - it is a manifestation of generalized systemic mucocutaneous candida infection of the skin and mucosal membranes [18, 19].

Primary oral candidiasis can be divided into the following forms:

- Acute forms - pseudomembranous and erythematous
- Chronic forms - pseudomembranous, erythematous, plaque - like and nodular [18].
- Candida - associated lesions - denture stomatitis, angular cheilitis, median rhomboid glossitis

The *pseudomembranous form* ("thrush") is characterized by asymptomatic or painless yellowish - white pseudomembranes that are easily removed with a tool or gauze leaving smooth bleeding lesions. These pseudomembranes consist of desquamated epithelial cells, hyphae and pseudohyphae, fibrin, leucocytes cells. They are most commonly seen on the surface of the hard and soft palate, tongue, as well as on the buccal and labial mucosa, and oropharynx. This type of candidiasis could also be manifest anywhere in the oral cavity. It is usually not accompanied by systemic symptoms [17]. It is commonly seen in infants, elderly and immunocompromised patients, in cases of long - term use of broad - spectrum antibiotics or corticosteroids [20]. The chronic form of pseudomembranous candidiasis may involve the mucosa of the oropharynx the could be characterized by dysphagia. The form must be distinguished from leukoplakia, secondary syphilis and diphtheria, lichenoid reactions, thermal or chemical injuries [21].

The *erythematous form* of candidiasis can be observed anywhere on the oral mucosa - mainly over the buccal and palatal mucosa or in cases of deepithelialization of the papillae - on the back of the tongue. It is characterized by intense red lesions that are in most cases very painful or associated with soreness or "burning" sensations. It is also known as "atrophic form" and can be observed alone or in combination with the pseudomembranous form. It can also be diagnosed in HIV - positive individuals mainly on the palatal mucosa [22]. It can be a result of long - term of use of broad - spectrum antibiotics that change the microbiota in the oral cavity and facilitate the overgrowth of Candida species [20]. The form must be distinguish from erythroplakia, erythema migrans, allergic reactions to denture prostheses, thermal injuries [21].

The *plaque - like (hyperplastic) form* is less common chronic lesion and is characterized by the appearance of white unevenly elevated plaques that cannot be removed. They are asymptomatic and cannot be clinically differentiated from oral leukoplakia. The lesions are commonly localized in the zone of the commissures of the lips, buccal mucosa and lateral sides of the tongue. It is diagnosed by biopsy, which reveals hyperkeratosis with abundant candidal hyphae in the epithelium [17]. It can be associated with smoking and can be commonly seen in heavy smokers [24]. The form must be distinguished from

oral leukoplakia, angular cheilitis [25], squamous cell carcinoma [26] or keratotic reticular form of lichen planus.

The *nodular form* of Candida infection rarely occurs in the gingiva. It is characterized by slightly raised nodules with whitish or reddish color [17].

Secondary oral candidiasis is a chronic form and is a manifestation of various systemic disorders. It is characterized with superficial candida infection lesions in the zone of oral mucosa, mucosa of larynx, pharynx or esophagus [21].

*Candida associated lesions* are angular cheilitis, denture stomatitis, median rhomboid glossitis. They are reported to be more prevalent in patients with diabetes mellitus [27].

- Angular cheilitis – candida associated lesions affecting the angles of the lips and can be a result of decreased vertical occlusal dimension, deficiency of vitamin B<sub>12</sub>.
- Denture stomatitis – erythematous form of candidiasis commonly on the palatal mucosa
- Median rhomboid glossitis – a rhomboid - like erythematous lesion on the back of the tongue responding to the atrophy of the filiform papillae on the midline of the dorsum of the tongue

Criteria that are used for diagnosis of Candida infection and for the differentiation of the different forms of oral candidiasis traditionally include:

- Medical and dental history
- Clinical examination
- Microbiological examination - swabs - positive bacterial culture of Candida cream colonies - inoculated on Nickerson or Sabouraud's agar medium at room temperature, blood agar, on Pagano - Levin medium or on Littmann's substrate [28].
- Microscopic examination of a smear from the lesions - presence of micelles and blastospores in direct microscopic examination with a phase contrast or light microscope. The spores are pear - shaped [28].
- Biopsyhistopathological examination - presence of hyphae and pseudohyphae in the epithelium. The hyphae are tubular [28].
- Serological test - increased levels of antibodies against Candida in serum and saliva [29].

Since the presence of *C. albicans* is common in healthy individuals, positive culture and smear do not necessarily mean the presence of Candida infection. To confirm the diagnosis a quantitative assessment of Candida and the presence of clinical signs corresponding to some of the described lesions in different forms of Candida infection are necessary to present. Identifying of hyphae or pseudohyphae in a biopsy of the lesions confirm the diagnosis [30, 31].

#### 4. Discussion

It is important for all dental clinicians to be aware of the predisposing factors, clinical symptoms, diagnosis of oral candidiasis, type and severity.

Diagnosis of candidiasis is based on medical history, clinical manifestations, additional paraclinical tests (culture, biopsy, microscopic examination).

Identification of risk factors and their control is important in the management of candida infection. It can be misdiagnosed with other white lesions as leukoplakia, lichenoid reactions, squamous cell carcinoma and biopsy is recommended in these cases [32].

Treatment of candida overgrowth does not seek the eradication of candida species from the diet or the person, but rather a restoration of the proper and balanced ecological relationship between man and yeast [33]. The management of candidiasis includes assessment and control of local and systemic predisposing factors and antifungal therapy (polyene and azole antifungal agents) [34]. It aims to restore the health and function of the tissues in the oral cavity.

The literature review of the oral manifestations of candidiasis in this article provides an opportunity to increase knowledge in different types of candida infection and facilitate the right diagnosis in clinical practice.

## 5. Conclusion

In conclusion, dental clinicians should play a significant role in the diagnosis and treatment in the oral candida infection.

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