

ORAL CANDIDIASIS IN REMOVABLE DENTURE WEARERS: A NARRATIVE REVIEW

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ABSTRACT

Denture-induced oral candidiasis, commonly referred to as denture stomatitis, is one of the most prevalent mucosal lesions affecting wearers of removable prostheses. Characterized by chronic inflammation of the oral mucosa covered by the denture base, its etiology is multifactorial, primarily driven by *Candida albicans* biofilms. This article reviews the underlying etiopathogenic mechanisms, details Newton’s clinical classification, and outlines contemporary preventive and therapeutic protocols essential for clinical practice. Ultimately, this comprehensive review aims to provide clinicians and dental students with an evidence-based framework to optimize patient care and significantly reduce post-prosthetic infectious complications.

Key words: Denture stomatitis, *Candida albicans*, Newton’s classification, Oral biofilm, Prosthetic rehabilitation.

INTRODUCTION

The rehabilitation of edentulous patients using removable partial or complete dentures remains a widespread treatment modality. However, the presence of an artificial biomaterial in constant contact with the oral mucosa alters the local ecosystem.

The onset of candidiasis is due to a decline in cellular immunity, leaving the host organism unprotected against various pathogenic microorganisms.

Denture stomatitis (also classified as chronic atrophic candidiasis) affects approximately 15% to 70% of denture wearers, showing a higher prevalence in elderly populations and females [1]. The oral cavity infection diagnosed by pediatrician Francois Veilleux was first highlighted and

described in 1838. It was observed that this condition occurs more frequently in patients with low immunity, who undergo long-term treatments and can be local or systemic, in both young and elderly patients. [2,3].

The most common finding is the presence of oral candidiasis detected following the clinical examination, medical history and description of risk factors. We initially recommend a classic treatment and if the condition does not resolve, a biopsy of the lesion is performed to prevent the appearance of premalignant lesions. When we have an ineffective treatment, cultures are also recommended. To resolve mild forms, we resort to a local topical antifungal treatment and rigorous oral hygiene [4].

RESULTS AND DISCUSSIONS

Denture care to prevent oral candidiasis:

Strict adherence to oral hygiene is important in the prevention and treatment of oral candidiasis. [5].

Mechanical brushing with a soft brush and non-abrasive soap is mandatory. Standard toothpastes must be avoided as they scratch the acrylic surface, creating more niches for fungal adhesion. Chemical disinfection includes soaking the denture for 10–15 minutes daily in:

- 0.5% Sodium Hypochlorite (Note: contraindicated if the denture contains metal frameworks, as it causes corrosion).
- Chlorhexidine gluconate (0.2% or 2%).
- Commercial effervescent cleansing tablets (perborate/monopersulfate based).

According to the author who described the treatment of denture-associated candidiasis, it turned out that it cannot cure oral candidiasis for a long time only by administering topical medications to the sick patient. Since electron microscopy demonstrated deep infiltration of *Candida* hyphae into the acrylate porosities, strict mechanical and chemical decontamination of the denture is mandatory to prevent immediate relapse due to recalcitrant biofilm [6]. Infections caused by *Candida Albicans* in removable denture wearers are quite common due to the incorrect and repeated use of medications and [7].

Due to the increased adhesion to acrylate,

it produces a favorable environment for *Candida* growth, with low pH and an anaerobic environment.

The structural composition and specific materials of dental prostheses play a critical role in the pathogenesis of denture stomatitis. Research indicates that acrylic denture bases, specifically polymethyl methacrylate (PMMA), possess a high surface affinity for *Candida* species adhesion and subsequent biofilm development, a characteristic far less pronounced in bases fabricated from cobalt-chromium-molybdenum (Co-Cr-Mo) metal alloys. [8-9].

The inherent microscopic porosity of the acrylic surface creates a protective ecosystem that promotes prosthetic plaque retention. Furthermore, the choice of overdenture attachment design significantly influences microbial load. As demonstrated by Kilić et al., overdentures secured via bar attachments exhibit a higher susceptibility to *Candida* biofilm accumulation compared to those utilizing locator systems. Consequently, implementing stringent maintenance protocols and optimal hygiene control is mandatory for both retention modalities to prevent infection.[9].

In the context of oral candidiasis and prosthetic dentistry, **Newton's Classification (1962)** is the globally recognized clinical framework used to diagnose and grade the severity of *Candida*-associated denture stomatitis [8-9].

Table 1. Newton's Grade (1962)

TYPE I Localized	TYPE II Generalized	TYPE III Granular
Hyperemia of the oral cavity. Appearance of red color. Irritation of the palatal glands.	Diffuse erythema. Thinning of the oral mucosa. Mucous membrane imprint caused by dentures.	Increased fibrous tissue growth. Generalized chronic inflammation.

Table 2. Clinical Management Newton's Grade (1962).

TYPE I Localized	TYPE II Generalized	TYPE III Granular
Patient hygiene training • Soft border adjustments • Mandatory nocturnal rest	Topical Miconazole 2% gel • Chemical soaking (0.2% CHX) • Screen for Diabetes	Laser / Surgical excision Tissue conditioning • New prosthesis remake

Candida species are common commensal microorganisms in the oral cavity and can be present even in healthy individuals. Among these commensal organisms, Candida albicans is non-pathogenic under certain conditions [10-11]. Prolonged wearing of dentures can act as a harmful factor that predisposes the oral environment to microbial virulence, leading to associated conditions such as Candida-associated denture stomatitis. [12,13,14,15]. Research conducted by Bachtar in 2020 and published in the *European Journal of Dentistry* indicates

that salivary *Candida albicans* levels are significantly higher in the elderly, regardless of whether or not they wear dentures. The study revealed that denture wearers exhibit higher expression of genes associated with tissue-invasive pathogenicity (ALS3, HWP1) on the dorsum of the tongue, identifying dentures as a critical reservoir for biofilm development. [16].

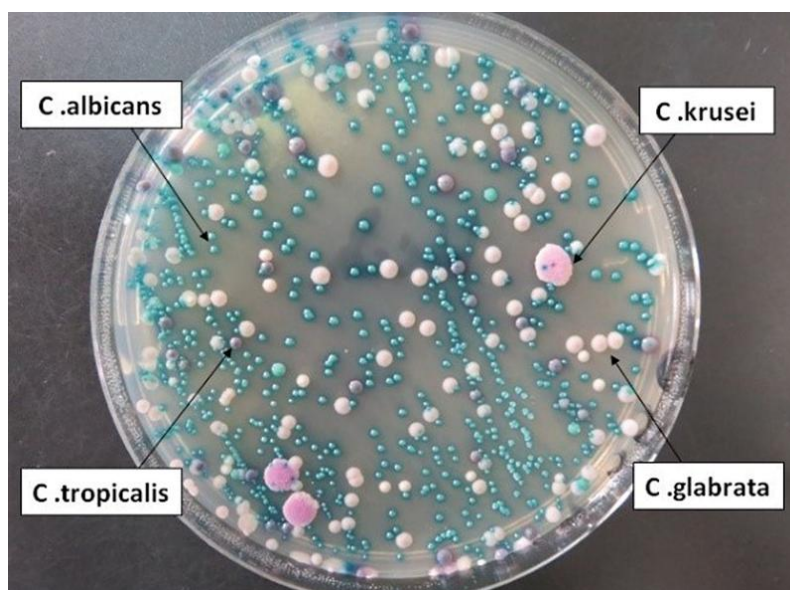


Fig 1. Fig. 1: A fungal culture of *Candida* species from a patient wearing a dental prosthesis [10].

A denture worn improperly and without adequate hygiene becomes a reservoir for microorganisms, and the trauma it causes promotes the development of infection. Several *Candida* species are known to be involved in this process. Although *C. albicans* is the most frequently encountered species, a predominance of non-*albicans* species has recently been reported.[17]. Treatment with an antifungal agent appropriate for the specific microbe identified must be initiated promptly to prevent further local or regional complications.[18].

Denture lining materials can be used as a treatment modality for oral candidiasis.[19]. Regarding treatment methods described in the literature on denture lining materials, Skupien et al. report that 0.5% sodium hypochlorite effectively disinfects these materials. Incorporating nystatin (at a concentration of 500,000 IU/mL) into denture lining materials has enabled the treatment or prevention of oral candidiasis. [20,21].

Bal and Safar reported on treatment using organic antifungal agents (nystatin, azole derivatives, and chlorhexidine), non-organic antimicrobial/antifungal agents, and natural and plant-based antimicrobial agents. [22,23]. According to clinical practice guidelines for the management of candidiasis—specifically the 2009 update from the Infectious Diseases Society of America[24], nystatin remains the standard treatment for mild oral candidiasis; the medical literature describes numerous treatment regimens regarding dosage, duration of therapy, and side effects.[25]. This article presents an overview of oral candidiasis (denture stomatitis), covering its etiology and summarizing the medications used for local treatment.[26]. The study highlights the most frequently employed methods and their importance in reducing the incidence of denture stomatitis; these methods were identified through high-quality scientific literature, specifically systematic reviews.[27]

It is noteworthy to identify emerging therapeutic approaches—whether for treating fragile mucosa or for disinfecting

the denture—such as the use of natural products, probiotics, and, in some cases, laser therapy [28]. Some studies have indicated that patients prefer to keep their dentures dry overnight—without cleaning or storing them in water—a harmful habit that promotes colonization by *Candida albicans*. [29]. In cases of papillary hyperplasia caused by poor hygiene or denture trauma, local treatment does not differ from that used for denture stomatitis. If there is excess tissue that does not resolve with medication, surgical intervention is required—a method that is significantly more traumatic and painful for the patient. Treatment approaches vary depending on the attending physician's experience and specialty, the severity of the condition, and the clinical presentation [30]. For cases with aggressive clinical manifestations, laser excision, electrosurgery, or cryotherapy are recommended [31]. Small, localized lesions have been treated topically with chlorhexidine-based mouthwash [32]. When lesions result from prolonged denture wear, it is recommended to discontinue use of the dentures and employ chlorhexidine mouthwash to treat the associated palatal erythema. [33].

The specialized literature highlights the presence of *C. albicans* as a significant component of the oral cavity microbiota, playing an important role in shaping the oral microbiome. [34,35] It is important to prevent the emergence of virulence factors and to investigate the causes underlying the transition of *C. albicans* from a harmless commensal to a pathogen. [36].

Maintaining the microorganism in a commensal state within the oral cavity

could be beneficial by helping to preserve proper oral hygiene and reducing the risk of acquired resistance. [37].

Conclusions

1. Medical literature describes oral cavity conditions—specifically oral candidiasis—affecting patients who wear partial or complete dentures; this condition occurs with increased frequency on the palatal mucosa of the maxilla.
2. It should be noted that the onset of this disease is driven by several factors, including hygiene, systemic conditions, and the prolonged or improper use of medication.
3. Local therapy may temporarily manage the condition but does not completely eliminate it; therefore, an accurate diagnosis and a comprehensive approach to addressing risk factors are recommended.
4. The use of dentures and systemic conditions in the elderly are significant risk factors for the development of oral candidiasis
5. It is important to properly inform patients who wear removable dentures about the importance of oral hygiene and correct maintenance in order to prevent oral cavity lesions and denture-associated candidiasis.

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