

DENTURE STOMATITIS: UNRAVELLING VARIANTS AND THEIR IMPLICATIONS IN ORAL HEALTH

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Abstract

Denture stomatitis, an inflammatory condition in denture wearers, is the focal point of this comprehensive study. The research dissects its prevalence, revealing a higher incidence in female patients, and delves into its clinical manifestations, including punctiform, diffuse, and granular hyperaemia. It builds on Newton's initial classification, integrating modern insights into the condition's pathophysiology. The paper meticulously examines multifaceted aetiologies such as mechanical trauma, nocturnal denture wearing, ageing of dentures, and the central role of *Candida albicans*. Additionally, it scrutinizes saliva's dual function and systemic health impacts. Management strategies highlighted include rigorous denture care, antifungal treatments, and advanced therapeutic options. This study emphasizes a holistic approach, combining precise care with innovative methodologies to tackle this prevalent oral health issue.

Key words: denture stomatitis, oral health, *Candida albicans*, denture care, antifungal treatment, prosthetic dentistry

Introduction. Denture stomatitis, characterized by a variety of clinical manifestations ranging from punctiform hyperaemia to granular hyperaemia, presents a unique challenge in oral healthcare. The paper builds upon Newton's foundational classification from 1962, integrating it with advanced understanding of the condition's pathophysiology. Central to this exploration are the multifactorial aetiologies, including mechanical trauma, nocturnal denture wearing, the ageing of

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dentures, and the pivotal role of *Candida*, particularly *C. albicans*, in its pathogenesis. Additionally, the paper scrutinizes the dual role of saliva and the impact of systemic health conditions on the prevalence and severity of denture stomatitis. Emphasizing a comprehensive approach, the study outlines current management and treatment strategies, highlighting the necessity of precise denture care and innovative treatment methodologies in addressing this prevalent oral health issue.

Definition and prevalence. Denture stomatitis is found in 11–67% of complete denture wearers with a higher prevalence seen in women [1]. In 1962, NEWTON [2] established a pioneering classification for denture stomatitis, categorizing it into three primary types based on clinical manifestations. These types are punctiform hyperaemia (Class I) (Fig. 1), characterized by localized, pinpoint hyperaemic areas often linked to trauma; diffuse hyperaemia (Class II) (Fig. 2), presenting as widespread erythematous areas, commonly seen across the denture-bearing region; and granular hyperaemia (Class III) (Fig. 3), involving nodular, hyperaemic mucosa typically in the central part of the hard palate or maxillary alveolar ridges, rarely but not uncommon to be found on the mandibular mucosa [2].



Fig. 1. Areas of pinpoint hyperaemia and inflammation



Fig. 2. Diffuse areas of inflammation involving the denture-bearing region

Building on Newton's classification, Budtz-Jorgensen and Bertram, and later Bergendal and Isacson, proposed refined classifications. These focused on the type and extent of inflammation observed, introducing categories like simple localized inflammation for limited areas, simple diffuse inflammation covering the entire denture area, and granular inflammation, often central in the palate and linked to both trauma and *Candida* infection.

This expanded classification system aids in a more nuanced understanding of denture stomatitis, correlating clinical presentations with underlying causes. This classification is crucial for diagnosing the severity and progression of the condition, which can range from asymptomatic stages to symptoms like irritation, taste alteration, and discomfort, indicative of a more severe stage of the condition.

By integrating Newton's foundational work with subsequent classifications,



Fig. 3. Papillary overgrowth involving the central part of hard palate

a comprehensive framework for diagnosing and understanding denture stomatitis emerges, encompassing both its physical manifestations and underlying etiological factors [3].

Aetiology. This condition is commonly observed in individuals who wear dentures, as the introduction of these oral appliances often leads to significant alterations in the oral environment. These changes can compromise the health of oral tissues. Denture stomatitis arises from various factors, each playing a role in its onset and development [4]. The primary causes of this condition include:

Trauma and occlusal pressure. Trauma in denture stomatitis primarily stems from poorly designed or fitted dentures. This misalignment leads to uneven distribution of mechanical forces across the oral mucosa, resulting in increased irritation and susceptibility to infection. Histopathological studies have shown that the intensity of occlusal pressure plays a significant role, indicating that a combination of mechanical stress and microbial invasion, particularly by *Candida albicans*, is pivotal in exacerbating the condition. The complexities in the biomechanics of dentures underscore the need for precise fitting and regular adjustments to minimize the risk of trauma-induced stomatitis [5].

Nocturnal denture wearing. The practice of wearing dentures overnight is a significant contributor to the development of stomatitis. This habit impairs the natural cleansing and protective mechanisms of saliva, leading to an acidic and dry oral environment. Such conditions are ideal for the proliferation of pathogenic microorganisms, including fungi and bacteria, leading to inflammation of the denture-bearing mucosa. The reduction in saliva's buffering capacity and antimicrobial action during sleep exacerbates the risk, making nocturnal denture wearing a key factor in the aetiology of the condition [6].

Denture age and fit. The age of the dentures plays a critical role in the development of stomatitis. Older dentures, with their accumulated wear and tear, present increased surface roughness, making them susceptible to microbial plaque accumulation and colonization. Additionally, the natural changes in the oral cavity over time can lead to an improper fit of older dentures, further enhancing the risk of inflammation and infection. Regular assessment and timely replacement of aged dentures are essential preventive measures against denture stomatitis [7].

Microbial factors – Candida and oral microflora. The microbial ecosystem of the oral cavity, particularly the presence and activity of *Candida* species, is central to the pathogenesis of denture stomatitis. These microorganisms adhere to denture surfaces and form biofilms, releasing antigens and irritants that trigger the body's immune response, leading to inflammation. The alteration of oral microflora due to prolonged denture use exacerbates this process, contributing significantly to the development and persistence of stomatitis [8].

Denture lining materials and surface texture. The composition and texture of denture materials are critical in the aetiology of stomatitis. Denture linings made from various polymers can provide a conducive environment for fungal growth, especially if they become porous or rough over time. This facilitates the retention and proliferation of pathogenic microorganisms, leading to chronic irritation and infection of the underlying mucosa. Understanding the properties of denture materials and their interaction with oral tissues is crucial in managing and preventing denture-related stomatitis [9].

Saliva's dual role. Saliva plays a contradictory role in the development of denture stomatitis. While it offers protective benefits through its antimicrobial properties, certain salivary components can also facilitate the adherence of pathogens, particularly *Candida*, to oral surfaces. The composition and flow of saliva are therefore important factors in the aetiology of stomatitis, with variations in salivary properties influencing the oral microbial balance and the risk of infection [10, 11].

Impact of systemic conditions. Systemic health factors significantly influence the susceptibility to denture stomatitis. Conditions such as malnutrition, diabetes, immunodeficiencies, and hormonal imbalances can alter the oral environment, making it more prone to infections and inflammations. These systemic conditions can affect saliva production, immune response, and the overall health of oral tissues, thereby increasing the risk of developing stomatitis in denture wearers [12].

Management and treatment strategies. Patients with denture-associated erythematous candidiasis require thorough examination for denture adequacy. The key management strategies include:

Denture examination and adjustment. Denture stomatitis, a common condition in denture wearers, necessitates a multifaceted management strategy. The first step involves a thorough examination of the dentures for proper fit and

condition. Ill-fitting dentures can lead to trauma and exacerbate stomatitis. Adjustments or replacements might be needed for older dentures that no longer fit well or have surface irregularities [13].

Oral and denture hygiene. Oral and denture hygiene is paramount. Patients should be educated on effective cleaning techniques, including mechanical brushing with a nonabrasive denture paste. Additionally, regular soaking of dentures in antimicrobial solutions like diluted white vinegar, 0.1% hypochlorite solution, or chlorhexidine is recommended. This routine not only maintains the cleanliness of the dentures but also reduces the microbial load, preventing the recurrence of stomatitis [14].

Antifungal treatment. Antifungal therapy plays a crucial role in managing denture stomatitis. Topical antifungals such as 2% Miconazole gel and Nystatin in various forms are effective first-line treatments. For persistent or severe cases, systemic antifungals like Fluconazole and Ketoconazole are employed. However, their usage requires monitoring for side effects, particularly hepatotoxicity in the case of Ketoconazole [15].

Advanced therapies. Advanced treatment methods, including laser therapy, cryosurgery, electrosurgery, and scalpel surgery, are considered for more severe infections. These techniques are particularly effective in treating Types II and III infections, characterized by diffuse and granular hyperaemia, respectively [16].

Implant overdentures. Innovative prosthetic solutions like implant-supported overdentures have shown efficacy in controlling denture stomatitis. These dentures distribute stress more evenly across the mucosa, reducing trauma and the likelihood of stomatitis. This option is especially beneficial for elderly patients who are more prone to mucosal irritation [17].

Systemic factors and lifestyle changes. Managing systemic factors that contribute to stomatitis is also crucial. Dietary modifications, especially for patients with high sugar consumption, and advice on smoking cessation can significantly impact the course of the condition. For patients with xerostomia, salivary substitutes can be beneficial [12].

Innovations and recent developments. Recent developments in denture care include the use of protective coatings on denture surfaces to decrease *Candida* adhesion, integrating antibodies specific to *Candida* in the prosthesis material, and incorporating antifungals directly into the denture material. These advancements aim to prevent recurrence and provide long-term relief for patients [18].

Conclusion. In conclusion, denture stomatitis, with its multifaceted nature, demands a comprehensive approach in both understanding and management. This paper has highlighted the complexity of the condition, from its varied classifications and aetiological factors to the diverse treatment strategies. The importance of thorough denture evaluation, rigorous hygiene practices, and the use of antifungal treatments forms the cornerstone of effective management. Additionally, advancements in prosthetic solutions and an emphasis on addressing systemic

health factors play a crucial role in improving patient outcomes. The insights gained from this analysis underscore the need for continuous research and development in denture care, aiming not only to treat but also to prevent the recurrence of denture stomatitis, thereby enhancing the quality of life for denture wearers.

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