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Review Article

ORAL CANDIDIASIS IN DENTURE WEARING PATIENTS: A REVIEW

Lakshmi Devi^{1*}, Gnanavel D², Arunkumar¹, Karuna Jothi³

¹Senior Lecturer, Dept of Prosthodontics, Adhi Parasakthi Dental college & hospital, Melmaruvathur, Chennai, Tamil Nadu, India

²Post Graduate Student, Dept of Oral Pathology & Microbiology, MGPGI, Pondicherry, India

³Post Graduate Student, Dept of Oral & Maxillofacial Surgery, MGPGI, Pondicherry, India

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*Corresponding Author: **Dr. Lakshmi Devi**

Senior Lecturer, Dept of Prosthodontics, Adhi Parasakthi Dental college & hospital, Melmaruvathur, Chennai, Tamil Nadu, India

ABSTRACT

A removable denture wearing patient is usually more prone for the development of candida associated denture stomatitis, as there is conversion of the normal oral commensal *Candida* species into a pathogen under favorable conditions. Immuno-compromised status, trauma from the prosthesis, other systemic conditions and improper maintenance of the dentures by the patient are few of the causative agents which turn the oral balance into an unhealthy and unsuitable foundation for wearing of the prosthesis. Denture-related stomatitis indicates an inflammatory process of the mucosa that bears a complete or partial removable dental appliance, typically a denture. It is also called as “denture related candidiasis. Nowadays, “denture stomatitis” stands for a mild chronic erythematous candidiasis, usually seen after middle age as erythema limited to the area beneath an upper denture, with the presence of the denture as the only common etiologic factor to these situations.

Keywords: Candidiasis, Denture related stomatitis, Denture related candidiasis, Complete denture.

INTRODUCTION

Longer life expectancy has led to an increase in the ageing population in developed countries. This growth in the number of elderly may lead to an increase in the number of people requiring removable dentures¹.

Edentulism is important as a correlate of self-esteem and quality of life in regarding to older adults, and it may represent the last sequel of dental caries and periodontal disease².

In the oral cavity *Candida* is a normal commensal along with other microbiota. In an immunocompromised patient who is wearing a complete denture, there is a risk of development of *Candida* associated denture stomatitis³. The most common form of oral candidiasis is candida associated denture stomatitis⁴.

Historically, the ancient Greek physician Hippocrate (460–370 BC) described oral candidiasis as “disease of diseased”¹.

Oral candidiasis is an opportunistic infection of the oral cavity. It is common and underdiagnosed among the elderly, particularly in those who wear dentures and in many cases is avoidable with a good mouth care regimen. It can also be a mark of systemic disease, such as diabetes mellitus and is a common problem among the immunocompromised. Oral candidiasis is caused by an overgrowth or infection of the oral cavity by a yeast-like fungus, candida. The important ones are *C. albicans*, *C. tropicalis*, *C. glabrata*, *C. pseudotropicalis*, *C.*

guilliermondii, *C. krusei*, *C. lusitaniae*, *C. parapsilosis*, and *C. stellatoidea*. *C. albicans*, *C. glabrata*, and *C. tropicalis* represent more than 80% of isolates from clinical infection.⁵

Studies has shown denture related candidiasis may occur on the maxilla and mandible; however, it is more often associated with the maxilla, sometimes found under maxilla partial dentures, but only rarely beneath mandibular dentures¹.

Reasons for the development of the denture related oral candidiasis^{4,6,7}:

1. Neuromuscular traumatic injuries arising from dentures with or without balanced occlusion
2. Traumatic injuries of oral mucosa resulting from traumatic occlusion of various kinds
3. Mere presence and action of the dentures as a foreign body,
4. Poor oxidation and ventilation of oral mucosa covered by dentures
5. Inadequate retention of the dentures,
6. Inadequate mucosal resistance caused by various systemic diseases,
7. Endocrinologic and neurological conditions,
8. Accumulation of infectious material on the undersurface of denture,
9. Chemotoxic injuries to the oral mucosa caused by denture base material
10. Poor nutrition.

11. Denture cleaning methods
12. Xerostomia, smoking, quality and quantity of saliva,
13. Parafunctional habits and carbohydrate rich diets,
14. Denture age and
15. Possibly a defect in the host's defense mechanism.

Possible mechanism of development:

There is a large body of evidence indicating that *Candida* is able to adhere to acrylic resin dentures. This is the first step that may lead to the development of the infectious process and that may ultimately result in varying degrees of denture stomatitis of the adjacent mucosa. *Candida* adheres directly or via a layer of denture plaque to denture base (polymethylmethacrylate – PMMA). Without this adherence, micro-organisms would be removed from the oral cavity when saliva or food is being swallowed⁸.

Surface free energy is one of the main factors related to the development of denture related candidosis. It is defined as the interaction between the forces of cohesion and adhesion and predicts whether or not wetting occurs⁸.

Surface roughness is calculated as the arithmetic average deviation of the surface valleys and peaks of a given surface. It directly influences micro-organisms initial adherence to surfaces, biofilm development, and *Candida* species colonization. Materials with the roughest surface usually exhibit higher yeast counts. This happens because surfaces may serve as a reservoir, with surface irregularities providing an increased chance of microorganism retention and protection from shear forces, even during denture cleaning. In addition, these irregularities sometimes allow the entrapped microbial cells time to attach irreversibly to a surface⁸.

Spongy denture tissue surface, full of nutritive substances, is an ideal incubator for species such as *Candida albicans*. *Candida albicans* is a commensal in the oral cavity of 45-65% of healthy individuals with a higher prevalence found in children and young adults. In denture wearers, the prevalence of *Candida* increases to 60-100% and the organism can be opportunistic, which can be explained by the fact that dentures decrease the flow of oxygen and saliva to the underlying tissue producing a local acidic and anaerobic microenvironment that favors yeast overgrowth. Additionally, *Candida* has affinity for the acrylic surface of dentures and non-renewing surfaces such as teeth, dental fillings. Surface characteristics of denture base acrylic resins, such as hydrophobicity, have generally been acknowledged to be one of the factors contributing to the adhesion, which is a crucial step in biofilm formation¹.

In addition, in a recent study, it was demonstrated that aged and denture stomatitis individuals show a lower number of salivary neutrophils than controls and present dysfunctions in the phagocytosis and killing of the *C. albicans* by both local and circulating neutrophils².

Classification:

This infection was classified according to Newton in 1962, based exclusively on clinical criteria, into three clinical types¹:
Type I:- Localized simple inflammation or pin-point hyperemia.

Type II:- Most common type. Shows presence of diffuse erythema and edema of palatal mucosal areas covered by dentures.

Type III:- Granular surface or inflammatory papillary hyperplasia in central palate.

Other host factors:

- T-cell and macrophage mediated activation of the immune system are considered to be critical in the host defense mechanism against *Candida albicans*.⁶
- T- Lymphocytes produce cytokines which elicit inflammation and the influx of polymorphonuclear neutrophils is the major factor in limiting the spread of infection^{1,2,4}.
- Defects in the cellular immune system predispose individuals to candida infections^{1,2,4}.

Four factors important in limiting candidal infections:

- The stratum corneum must be intact,
- The host must generate complement-dependent chemotactic factors,
- The neutrophils must confine the infection and
- Epidermal proliferation must occur to clear cutaneous candidosis.⁹

Importance of controlling denture related candidiasis:

- *Candida* colonization in denture wearers, especially immunocompromised patients, can be disruptive to dental treatment and may be a barrier to patient health^{10,11}.
- It is important in denture wearers with HIV infections and diabetic patients^{10,11}.
- Oral candidiasis has been reported to be associated with candidiasis in the lung and deglutition pneumonia^{10,11}.

CONCLUSION

Denture related candidiasis is common in relation to maxillary denture. Proper cleaning instructions and maintenance of the denture can decrease the chances of the denture related candidiasis.

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