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Microflora in denture stomatitis - A review

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Abstract

Denture stomatitis is an inflammation that typically occurs in individuals that have a complete or partial denture. Denture stomatitis is commonly defined as persistent inflammatory changes in the mucosa-bearing denture surface, often characterized by palatal erythema and alveolar ridges on which the denture is mounted. All relevant search engines were searched for the literature pertaining to denture stomatitis, various microflora associated, prevention and treatment were searched. The required data was collected and quality analysis of the thus collected data was done. The knowledge in the current point of time-analyzed and thus the consensus was established. Denture stomatitis is induced by a variety of internal and external causes. The most pervasive causative factor for denture stomatitis is the concentration of microbial plaque on palate-covered removable dentures that cause denture stomatitis in close to 69% of denture wearers. The various microflora includes Candida, Streptococci, Staphylococci, Lactobacillus, Actinomyces, etc. Denture stomatitis has been shown to be a major oral disease seen on the denture wearers and is still prevalent in the majority of cases. Candida-associated denture stomatitis must be treated as it may serve as a repository for other infections and facilitate atrophy of the alveolar bone resulting in serious infections.

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INTRODUCTION

Denture stomatitis is an infection that usually occurs among individuals who wear a complete or a partial denture. Prosthetics, when introduced into the oral cavity in most cases results in severe alterations of the environmental conditions as the prosthesis leads to the development of colonization of microorganisms on the underlying mucosa resulting in distress of the denture wearer by causing denture stomatitis (Budtz-jørgensen, 2000). Denture stomatitis is generally described as the chronic inflammatory changes of the denture bearing mucosa, which is often characterized by erythema of the palate and the alveolar ridges on which the denture is placed (Budtz-Jørgensen, 1974). According to Arendorf and Walker (1987), Denture stomatitis has been reported in 11-67% of the complete denture wearers. It has also been mentioned that it is more prevalent in women than in men (Arendorf and Walker, 1987). Denture stomatitis is expressed in various other terms such as denture-induced stom-

atitis, denture sore mouth, inflammatory papillary hyperplasia next chronic atrophic candidiasis (Pattanaik *et al.*, 2010). The various microflora associated with denture stomatitis are C. albicans, C. tropicalis, C. krusei, C. guilliermondii, C. lusitaniae, C. freyschusii (Arendorf and Walker, 1987) . In the Streptococci variety, S. mitior, S. milleri, S. mutans, S. salivarius , and S. sanguis, Staphylococci variety contained mainly S. aureus, Lactobacillus spp, Actinomycesspp (Theilade and Budtz-Jørgensen, 1988). However, According to Jeganathan and Lin (1992) Candida albicans has been implicated as the major causative organism in denture-induced stomatitis (Jeganathan and Lin, 1992).

There have been numerous different types of research being done all over the world such as advances studies (Vijayalakshmi and Ganapathy, 2016; Venugopalan *et al.*, 2014) , practical research studies (Jyothi *et al.*, 2017; Duraisamy, 2019; Ashok, 2014), analysis based study (Jain *et al.*, 2017; Basha *et al.*, 2018), study of effects of various products (Ganapathy, 2016; Subasree *et al.*, 2016), review based studies (Ariga *et al.*, 2018; Selvan and Ganapathy, 2016), survey based awareness studies (Ashok and Suvitha, 2016; Kannan and Venugopalan, 2018) in the field of prosthodontics. The aim of this review is to analyze the various factors causing denture stomatitis, microflora associated, it's prevention, and treatment (Ampil, 1966; Radford and Radford, 1993).

MATERIALS AND METHODS

All relevant search engines (Google Scholar, PubMed) were searched for the literature pertaining to denture stomatitis, various microflora associated, prevention and treatment were searched. The required data was collected and quality analysis of the thus collected data was done. The knowledge in the current point of time analyzed and thus, the consensus was established.

Quality Analysis of The Articles

Denture stomatitis

Denture stomatitis is linked to as a prevalent recurrent problem seen in denture wearers. It is known to be an erythematous tissue-bearing denture disease (Pattanaik *et al.*, 2010). It is a non-specific inflammatory reaction due to action against microbial antigens. The key causes of denture stomatitis include inflammation, trauma or possibly a defect in the individual's host defense system (Jeganathan and Lin, 1992). Denture stomatitis has been identified in approximately 11–67% of full denture wearers (Arendorf and Walker, 1987).

Causes of denture stomatitis

Denture stomatitis is influenced by a number of internal and external factors (Gonzalez and Laney, 1966). The most common cause of denture stomatitis is the deposition of microbial plaque on removable dentures that cover the palate inducing denture stomatitis in close to 69% of denture wearers (Budtz-Jørgensen, 1974). Other potential causes of denture stomatitis includes diabetes mellitus, neoplastic diseases, chemotherapy, radiotherapy, broad-spectrum antibiotic treatment, etc (Dorko *et al.*, 2001). Aging, malnutrition and immunosuppression could be other possible causes for acquiring denture stomatitis (Budtz-jørgensen, 2000).

Microflora associated with denture stomatitis

Candida

The role of Candida in denture stomatitis is remarkable. Candida, due to its high infectivity and ability to adhere and biofilm on oral tissues (Gleiznys *et al.*, 2015). A swab test was performed on 171 patients and seven different Candida species in oral mucosal lesions and adjacent denture surfaces. C.albicans has been seen in 95 cases, C. Tropicalis, 26 patients, C. Around 20 patients with parapsilosis, C. Krusei in approximately 14 patients, C. Guilliermondii, 12 patients, C. Lusitaniae for 1 patient and C. Freyshot in 1 patient (Dorko *et al.*, 2001). Another research used oral swabs and swish samples obtained from a patient group and observed the recovery of C.albicans isolates. The evident presence of implicating Candida albicans has led to colonization on the tissue surfaces of the prosthesis. It occurs as an inflammation of the oral mucosa seen in denture stomatitis caused by continuous dentures (Ramage, 2004).

Cocci

There was an inventory of predominant flora, where the findings showed that the dominant microflora in both groups comprised mostly of Gram-positive bacteria and, in the control group, about 69% of the denture flora comprised of cocci. It should be noted that neither group of palates had any variations in the proportions of cocci. The most common species of cocci is Streptococcus bacteria (Cawson, 1965; Lytle, 1957). It has also been asserted that S. Salivarius was mostly present in the palate of both groups (Koopmans *et al.*, 1988).

Torulopsisglabrata

An experiment was performed in which yeast samples from 100 different patients were segregated with a generalized simple or granular form of denture stomatitis. Candida albicans and Torulopsisglabrata have been identified to be the most com-

Table 1: Quality Analysis

Author	Year of Publication	Quality Analysis
Budtz Jørgensen E	1974,1992	Strong
Allendorf TM	1987	Moderate
Seema Pattanaik	2010	Moderate
Else Theilde	1988	Strong
Jeganathan S	1992	Moderate
Dorko E	2001	Strong
Alvydas Gleizyns	2015	Moderate
Gordon Ramage	2004	Strong
ASF Koopmans	1988	Strong
Ingar Olsen	1974	Strong
Lytle RB	1957	Moderate
Ampil JP	1966	Moderate
Gonzalez	1966	Moderate
Cahn LR	1936	Moderate
Cawson RA	1965	Moderate
Doughlas WH	1973	Moderate
Vijayalakshmi B	2016	Strong
Venugopalan S	2014	Strong
Jyoti S	2017	Moderate
Duraiswamy R	2019	Moderate
Ashok V	2014	Moderate
Ranganathan H	2017	Strong
Basha FYS	2018	Moderate
Ganapathy D	2016	Moderate
Ajay P	2017	Moderate
Ariga P	2018	Strong
Selvam SR	2016	Moderate
Kannan A	2018	Moderate
Ashok V	2016	Moderate

mon microflora present (Olsen, 1974).

Other

Other kinds of microbiota that are known to cause denture stomatitis are Veillonellaparvula, certain Lactobacillus, Bacteroides and Actinomyces species (Theilade and Budtz-Jørgensen, 1988).

Treatment for denture stomatitis

Research by (Lytle, 1957), (Ampil, 1966), (Gonzalez and Laney, 1966), Cahn 1936 ('SEM analysis of denture plaque and oral mucosa of denture-related stomatitis,' 1993) and (Cawson, 1965) found that antifungal therapy is the most effective treatment choice for denture stomatitis. Recent work has proposed the use of denture liner products containing antifungal, antiseptic and microwave irradiation to treat Candida-associated denture stomatitis (Douglas and Walker, 1973).

Immunity to Candida

Immunity in Candida-associated denture stomatitis is given by IgA antibodies. It follows the concept of cell-mediated immunity, wherein the high serum antibodies work against C.albicans or other microorganisms, and continues to suggest a serious infection, much of which tends to be inflammation of the mucosa supporting the denture (Ganapathy *et al.*, 2017; Ajay *et al.*, 2017). Vitro cell-mediated immune response of circulating C lymphocytes. Albicans-no signs of compromised clinically significant immune response (Dorko *et al.*, 2001).

Prevention for denture stomatitis

Mitigation of denture stomatitis requires good oral and denture care and adequate denture construction (Budtz-jørgensen, 2000). The study noted that increased levels of anti-Candida antibody present in infected individuals and clinical improvement of

mucosa due to the eradication of yeast flora typically serve as a preventive measure for potential denture stomatitis attacks. It also mentions the regular use of antiseptic or antimycotic drugs seems excessive (Arendorf and Walker, 1987).

CONCLUSION

From this study, denture stomatitis can be considered to be a significant oral disease seen in denture wearers and is still prevalent in the majority of cases. Candida-associated denture stomatitis should be treated as a reservoir for other infections that are more severe and encourage alveolar bone resorption leading to serious infections. The eradication and management of the microbial plaque is known to be the most effective treatment in both therapy and prevention.

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Conflict of Interest

The authors declare that they have no conflict of interest for this study.

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