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### Original Article

#### Quantitative Relationship of Candida Species in saliva between completely edentulous denture wearers and Non-wearers

Narayanan Mohan<sup>1</sup>, Sidhagounder Rajamanickam Prem Anandh<sup>2</sup>

<sup>1</sup>Professor and HOD, <sup>2</sup>PG Student, Department of Oral Medicine and Radiology, Vinayaka Missions Sankarachariyar Dental College, Sankari Main Road, NH-47, Ariyanoor, Salem- 636308. Tamil Nadu, India

##### ABSTRACT:

**Background:** Denture-related stomatitis is a disorder that often affects denture wearers. The purpose of this study was to evaluate the total candidal colony count in saliva between completely edentulous denture wearers and non wearers. **Materials and methods:** Forty edentulous patients of which 20 are completely edentulous denture wearers and 20 patients are completely edentulous non wearers are considered for the study. Total candidal colony count in saliva between these study groups have been estimated. **Results:** The total number of candidal colonies between denture wearers and non-wearers was statistically significant (P=0.049). **Conclusion:** The amount of candidal organism in saliva has been significantly altered by wearing dentures.

**Key words:** Candida albicans, denture-related Stomatitis, denture wearers.

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**Corresponding author:** Dr. Sidhagounder Rajamanickam Prem Anandh, Post Graduate Student, Department of Oral Medicine and Radiology, Vinayaka Missions Sankarachariyar Dental College, Sankari Main Road, NH-47, Ariyanoor, Salem- 636308. Tamil Nadu, India

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##### INTRODUCTION:

Normal oral flora is taking an important role in keeping the oral mucosa in a health status. It is important to fully define the human microflora of the healthy oral cavity before one can understand the role of bacteria in oral diseases<sup>1</sup>. There is a distinctive predominant bacterial flora of the healthy oral cavity that is highly diverse which are site and subject specific. As the completely edentulous patients are usually in elderly status, so the age-related changes in salivary flow will affect the oral microflora<sup>3</sup>, as well as functional use of the complete dentures will affect the salivary flow by changing the occlusal forces<sup>2</sup>. Previous studies suggested that proper replacement of full complete dentures will increase the salivary flow rate along with improved occlusal force at the same time it enhances the accumulation of dental plaque and bacteria on the surface of the dentures.<sup>2</sup> Studies revealed bacteria which depend on hard surfaces for attachment and growth will in part re-colonize the mouth if a denture is worn. Investigations and researches revealed that a number of pathogenic microorganisms which were present

in the mouth when the patient was dentate, they were harbored in the oral cavity even when they are in the edentulous state. Human oral cavity is a reservoir of approximately 700 species of microorganisms including 20 species of Candida. Candida is not considered harmful in healthy hosts but may cause opportunistic infections resulting in candidiasis. Old age necessitates wearing artificial dentures which results in changes in the oral environment and consequently oral flora. Microbes from the oral environment colonize the denture surface to form adherent biofilm which is dependent on the denture characteristics.<sup>5</sup> Dentures made from synthetic polymers like polymethyl methacrylate are micro-porous in nature and, therefore, cause Candida to easily adhere and colonize.<sup>3</sup> In addition, several host factors such as diet, immune competence, surface roughness, denture cleansers, cleaning methods, saliva with food particles, age, hormonal imbalance and other predisposing factors facilitate the adhesion and colonization on the dentures surface.

**MATERIALS AND METHODOLOGY**

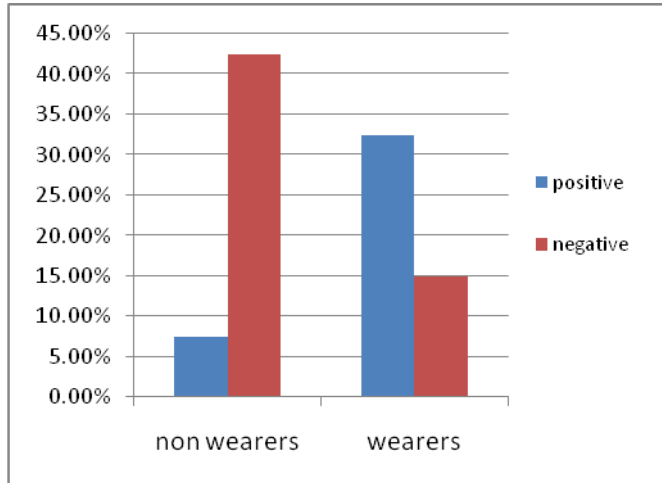
This study was conducted on forty edentulous patients of which 20 are completely edentulous denture wearers and 20 patients are completely edentulous non wearers between the age group of 40 to 80 years patient’s attending the department of Prosthodontics, Vinayaka Mission Sankarachariyar Dental College were considered for the study healthy individuals with no systemic diseases and no clinical signs of oral infection including Candidiasis was included in the study.<sup>4</sup> All the individuals under study, who received or were currently on antibiotics, antifungal, steroids or immunosuppressive drugs in the past 6 months, was excluded from the study. A questionnaire was prepared to document the subject’s profile. Subjects with other systemic diseases diabetes mellitus and immunosuppressive diseases was excluded<sup>6</sup>. Subjects who are tobacco smokers, tobacco chewers and alcoholics will be excluded. Subjects who have taken antibiotics in the past six months was excluded. Whole saliva will be collected under non Stimulatory conditions at least 1 hour after eating. Patient was asked to generate saliva and spit in wide sterile container. Saliva was stored in sterile containers and transported to department of microbiology for total candidal count.<sup>5</sup> The saliva sample was centrifuged and then cultured on sabouraud’s agar media (FIGURE 1). Growth obtained

was examined and colonies are counted manually. Gram staining was done on growth to confirm candida albicans (FIGURE 2). Comparison of candidal count in completely edentulous denture wearers and non-wearers if candidal outcome is considered negative (if count is zero) and considered positive (Candidal count > 0). The data were analyzed by using t test, P-value <0.05 was regarded as statistically significant.

**RESULT ANALYSIS**

Candida species was isolated and identified from both denture wearers and non wearers. There was a significant difference in the numbers of Candida species isolated from both denture wearers and non wearers. Denture wearers showed more presence for candidal colonies while non wearers showed low presence of candidal colonies (TABLE:1) Study revealed out of 40 patients examined 17 patients (42.5%) non-wearers showed no growth and 3 patients(7.5%) non-wearers showed growth and 7 patients (15%) denture wearers showed no growth and 13 patients (35%) denture wearers showed growth (TABLE 2). A total of 4 colonies was found in non-wearers and 86 colonies were found in wearers. P-value is 0.049 which is < 0.05 is found to be statistically significant.

**TABLE 1:** Presence of candida between denture wearers and non-wearers



**TABLE 2:** Number of patients showing candidal colonies in denture wearers and non-wearers

Candidal Outcome	Edentulous Non-Wearers	Edentulous Denture Wearers	P-Value
Negative	17 (42.5%)	7 (15%)	0.049
Positive	3 (7.5%)	13 (35%)	



FIGURE 1: Growth of candidal colonies on sabouraud’s dextrose agar media

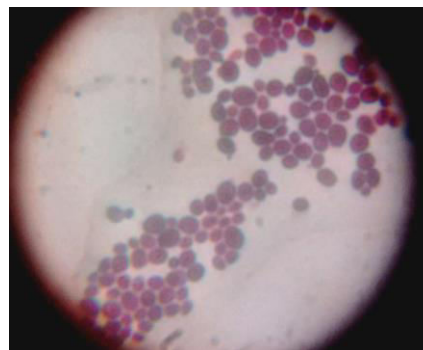


FIGURE 2: Microscopic view of candida albicans after gram staining

## DISCUSSION

Insertions of the denture bring about changes in the physiology and normal flora of the oral cavity. Investigation of the oral flora of edentulous subjects is becoming increasingly important because of recent wide spread use of implants in the treatment of edentulism. Jolanta et al conducted a study which revealed the distribution of the number of yeast colonies by gender was found to be statically significant<sup>2</sup>. Bacteria that depend on hard surfaces for attachment and growth will in part recognize the mouth if the denture is wornoral carriage of candida count was higher in female compared to males.<sup>1</sup> Candida species readily forms a biofilm on denture acrylic surfaces and, therefore, are isolated more frequently from denture plaque than from dental plaque. There was a significant difference in the prevalence of Candida species between Denture wearers and non wearers.<sup>6</sup> The results of the present study support the hypothesis that there is a significant quantitative alteration in the candidal count after the complete denture is worn for a year. Smoking is more common in males and can be a reason of high candidal count. Smokers were excluded in this study. Increased Prevalence of candida was found in diabetics patients<sup>9</sup>. Chikarukoba et al study reveals that the amount of candida albicans species was slightly higher when compared to other species of candida . Candida albicans was predominantly seen on the inner side of denture fitting surfaces and from deep portions of denture materials<sup>5</sup>. Adhesion of candida species is influenced by surface roughness, surface free energy, denture liners and saliva<sup>7</sup>. The results of this study showed that wearing complete denture significantly increased the candidal count<sup>8</sup>, which is also seen in other studies also.

## CONCLUSION

This study assessed the total candidal colony count in saliva of completely edentulous denture wearers and non-wearers and found that there is a significant increase in the total candidal colony in denture wearers when compared with non-wearers. This study revealed Denture wearing can predispose to the growth of candida albicans in saliva. Hence patient should be advised to maintain proper oral hygiene and stress should be emphasized on cleaning dentures frequently. Furthermore, this method can be used to educate patient the importance of cleaning dentures

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