



## Identification of Candida Albicans Infection on Denture Wearing According to the Sex and Type of Denture Base Materials

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### Article Info:

#### -Article History:

-Received: 14/8/2020

-Accepted: 7/9/2020

-Available Online:

Dec, 2020

#### Keywords:

Fungal infection, denture wearing, denture base materials, sex

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### Abstract

Background: Oral Candidiasis is a wide opportunistic infection of the mouth due to an overgrowth of Candida species, the most being Candida albicans. Its harmless commensally organism inhabiting the mouth, but it will change into a pathogen, invade tissue, and cause acute and chronic diseases. The predisposing factor for infection with Candida was dentures in about sixty-five percentages of older peoples who are wearing full upper dentures. Objective: This research aims to determine the sex distribution of fungal infection in corresponding with fungal infection among groups (acrylic and metal denture base). Patients & Methods: Sixty-eight patients attend the private dental clinic were subjected to usual dental treatment. They were divided into two groups: group 1: included 43 (24 females and 19 males) with acrylic denture base wearers. As well as, group 2: metal denture base wearers in 25 (10 females and 15 males). Questionnaire Paper to determine demographic data include, if patient take any fungal or antibiotic or not (treated and non-treated) and would obtain from the patients by including sex, age, and nocturnal wear. Result: The results in this study found that the prime etiology of Candida growth was the prosthesis materials itself. Sixty-five percent of the wearers of dentures showed Candida growth, while thirty-five percent of patients who had their dentitions showed Candida growth that the appliances are the dominant etiological factors in the growth of Candida other local factors should be considered.

### Introduction:

It is obvious that the health of the oral cavity and condition reflects the body's general health. Oral cavity conditions, hygiene levels, and residing pathogens

have affected the completely human organism. There are many studies on bacteria of the oral cavity prove that considers the main cause of bacterial

endocarditis, pneumonia, gastric infection, chronic obstructive pneumonia, and other diseases<sup>(1)</sup>. Recent researches indicate that oral health and oral microbial inhabitants are increasingly being recognized for their effect in overall human health and disease<sup>(2)</sup>. Introduction of a prosthesis into the mouth results in profound the environmental alteration of conditions such as the prosthesis, and the underlying mucosa became colonized by oral microorganisms, as *Candida* spp. *Candida* was recognized as a part of the usual oral flora without any harmful effects<sup>(3)</sup>. The effect of oral environment changes by tooth loss or denture wearing can cause changes in oral microflora. The amounts of *Candida* have been found, which increased in elderly individuals 8 to 10, but the previous investigations showed solely on *Candida albicans*<sup>(4,5)</sup>. In humans, *Candida albicans* is the more frequent fungal opportunistic pathogen. Denture plaque contains *Candida* would give increase oral Candidiasis, such as denture stomatitis and oral thrush. *Candida* colonization of the tissue surfaces of the denture, services as reservoirs for disseminated infection, especially in medicated elderly or immunocompromised<sup>(6,7)</sup>. The tissue surfaces of the dentures are a suitable location for proliferation *Candida*. The predisposing factors for oral colonization with *Candida* are dentures wearing, and their prevalence was increased from (60% – 100%)<sup>(8)</sup>. Roughness surfaces of the denture enhance microorganisms' likelihood to remain on surfaces after cleaning of the prosthesis, thus allow continue palatal reinfection<sup>(9)</sup>. The microenvironments present underlying the dentures are protected from salivary washing action to removing of the microorganisms and debris<sup>(10-12)</sup>. *Candida albicans*, dimorphic oral commensally yeast was considered as the most common causes of opportunistic oral cavity fungal infection<sup>(13,14)</sup>. Wearer dentures, especially elderly edentulous patients, have a poor or low level of oral hygiene practice depending on the occupation, physical health, and social background. No complete hygienic dentures and its Wearing possess a big challenge for their

health and dental professional. Denture predisposes to Candidal infection for 65% of older people who are wearing the full maxillary denture. Wearing of the Denture is produce a microenvironment conducive to the Candidal growth with less oxygen and pH, as well as an anaerobic in the oral cavity environment. This result may be enhanced by *Candida*'s spp. adherence to acrylic, decreased salivary flow under the tissue surface of the denture fitting, poor oral hygiene, or improperly fitting of the denture<sup>(15, 16)</sup>. The entrapment of yeast cells in the denture base irregularities are considered the prime cause of fungal infections<sup>(17)</sup>. The prevalence of fungal growth affected by acrylic itself that has been proved by several studies carried out<sup>(18)</sup>. Most of the healthy patients of denture wearing had a fungal infection, so that, some of the investigators suggested that denture stomatitis was appear because of the overgrowth of *Candida albicans* commensally strain<sup>(19)</sup>. In addition to investigators proved that fungal overgrowth in denture wearers considered a multifactorial, which is a combination of local factors (the denture itself) and systemic factors (excluded). Trauma caused by an ill fitting denture, age of the denture, and nocturnal wear of the denture<sup>(20)</sup>.

## Materials and Methods

Sixty-eight patients attend to the private clinic were subjected to thorough dental treatment. Biofilm present on tissue surface of dentures is controlled with mechanical, chemical methods and (mechanical-chemical) sanitization<sup>(21)</sup>. Candidal quantitative culture from the tissue surface of the denture and used the following three methods for diagnosis:

- 1- Germ Tube<sup>(22, 23)</sup>
- 2- Gram Stain<sup>(24, 25)</sup>
- 3- ChromAgar media<sup>(23)</sup>

They were divided into two groups:

**Group 1:** Acrylic denture base wearers. They were 43 (24 females and 19 males).

**Group 2:** Metal denture base wearers. They were 25 (10 females and 15 males)

Questionnaire paper is designed to determine demographic include, if patient take any fungal or antibiotic or not (treated

and non-treated) and data was obtained from the patients that including gender, age, and nocturnal wear.

**Results:**

Table (1) Shows the total number was 68 patients (34 females and 34 males) classified into two groups.

**Group 1:** denture wearers, they were 43 (24 females and 19 males).

**Group 2:** They were 25 (10 females and 15 males).

Table (2) shows the fungal growth distribution among the groups and the percentage (%).

**Discussion:**

Dentures wearing are predisposing factors for colonization of Candida in the oral cavity, with its prevalence are increasing from (60% - 100%). The denture surface roughness enhances the microorganism's likelihood for remaining on the surface of the denture after cleaned of the prostheses that allowed continuous palatal reinfection. In-group one, wearers of the acrylic denture base were 43 patients, 28 patients had a fungal infection, and the percentage is 65%. In comparison with the Jordan study was done, the overall percentage 52%. A similar Poland study was done; the overall percentage was 67%. This result is in agreement with other previous studies (Odds, 1979, Daniluk, et al. 2006). While in-group two, wearers of the metal denture base, were 25 patients, nine patients had a fungal infection, and the percentage is 35%. The current study finds that the growth of

Candida albicans species more frequently in patients wearing acrylic dentures than in patients wearing metal dentures. This result indicates that the acrylic denture bases are a factor in entrapment of microorganisms, especially Candida albicans. This finding is confirmed by an investigation carried out in the USA by fabrication of 19 dentures, one-half of the denture bases were made of acrylic, and the other half of denture bases were made of metal. The metal denture base was proved to be effective in reducing the growth of fungus typically present in full complete dentures. This result was in agreement with (Perezous, et al. 2005, Webb, et al. 1998, Akpan, 2002, Zaid Nawaf, 2008, Martin, et al. 1987). In the present study, no clear difference was observed between males and females; however, sex-related prevalence differs among the studies carried out. As well as, the current study found that many risk factors may be associated with fungal growth, like trauma from ill-fitting denture base, nocturnal denture wearing.

**Conclusion**

According to our results in this study, we conclude that:

1. Group one, wearers of the acrylic denture base, had a high percentage of fungal infection.
2. Group two, wearers of a metal denture base, had a low fungal infection.
3. Sex-related prevalence differs fungal infection in females more than in males.

Table (1): Number of patients according to groups

Group	Total	Females	Males
1	43	24	19
2	25	10	15

Table (2): Sex distribution of fungal growth among the groups and the (percentage)

Group	Females		Males	
	Infected No.	%	Infected No.	%
1	16	66%	9	47%
2	6	60%	3	20%

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