

# A Clinical Study on Effect of Denture Adhesive on Candidal Growth

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## ABSTRACT

**Background:** Oral cavity has various pathogens and most of the denture wearers are older individuals with impaired ability to clean denture and there are conditions where prescription of adhesive is must, which in turn can act as biofilm for growth of Candida. As there are contradictory review on use of adhesive there is a need to study the affect of denture adhesive on candidal growth. **Methods:** In this randomised clinical trial 24 healthy individuals were randomly recruited. These 24 were divided into 2 groups of 12 individuals each. Group 1 subjects were given powder form of adhesive and group 2 subjects were given paste form of adhesive. Baseline sample (swab) was taken from palate and saliva. After 15 days of use of adhesive, three samples (swab) were taken from palate, saliva and tissue surface of denture. These samples were further subjected to microbiological analysis. **Results:** Both the groups showed significant increase in candidal growth. **Conclusion:** This study advocates that denture adhesive do promote the growth of Candida. This could also be due to impaired manual dexterity of the individual or improper hygiene.

**Keywords:** Candidal growth, complete denture, Denture adhesive.

## INTRODUCTION

The aim of most prosthodontists is to provide comfortable, well fitting prosthesis. In order to achieve this there are few practitioners who advocate use of denture adhesive, while others believe there can be no replacement for a properly constructed denture. Any complete denture can be considered successful when it gives considerable amount of retention and stability. According to glossary of prosthodontics, retention is resistance of denture dislodgement.

There are few forcing situation in which denture retention maybe a problem, severely atrophied edentulous ridges, severely abused/hypertrophied, lack neuromuscular control, xerostomia, maxillofacial defects, which provide inadequate tissue support. In these situation use of denture adhesive is recommended for enhancing the quality of retention.<sup>[1]</sup>

Potential benefits of denture adhesive are reported to be improved chewing ability, increased denture

stability, improve comfort and confidence, reduced food collection under denture, alleviation of denture sore spots, improved mastication.<sup>[2]</sup> As most of denture wearers are elderly individuals, maintaining satisfactory hygiene is an issue of concern. Denture adhesive in turn can act as base for the candidal growth. In fungal colonization, subsequent biofilm formation and pathogenesis development, the adherence of fungi to surface of denture material is known to be first step, followed by subsequent growth and colonization on the material.<sup>[3]</sup>

Candida species are formed in the oral cavity in 25-50% of healthy individuals, including adults and children. This value increases to 60 to100% when complete denture patients are considered.<sup>[4,5]</sup> The presence of high salivary counts of Candida must be considered in the etiology and pre disposition to prosthetic stomatitis, a condition that affects palate of 11-67% of complete denture wearers.<sup>[6-10]</sup> As there are contradictory reviews on the use of denture adhesive there is a need to study the effect of these adhesive on the oral mucosa. In this context, this study was carried out to study the effect of denture adhesive, both paste and powder form on Candidal growth.

## MATERIALS AND METHODS

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This study was conducted in the department of prosthodontics. Study sample consisted of 24 patients who were completely edentulous. Ethical clearance was approved by institutional review board. Informed consent was obtained from each patient prior to participation in this study.

#### Inclusion criteria

1. Healthy Individuals
2. Completely edentulous
3. Age: 45-70years

#### Exclusion criteria

1. Known case of Candidas
  2. Individual or systemic antibiotics
  3. Subject not willing to accept adhesive
- Patients were randomly assigned into 2 groups, with 12 patients in each group
- Group I: Powder adhesive was given to the patients
- Group II: Paste adhesive was given to the patient
- Group I: Subjects in the group were given powder form( fixon)of adhesive and asked to use this along with routine cleaning of dentures. Group II: Subjects in the group were given paste(fittydent) form of adhesive and were asked to use this along with routine cleaning . Patients were asked to use these adhesive for 15 days. All 24 patients were instructed to clean the denture in same manner. A baseline sample was taken prior to prescription of denture adhesive. A swab was taken from palate and saliva. After 15 days swab was taken from palate, saliva and tissue surface from each of the patients and were subjected to microbiological analysis.

#### Microbiological Analysis

Each swab was further subjected to microbiological analysis.

#### 1. Culture Medium

Sabouraud's dextrose was used in this study for isolating clinical Candida species SDA plate were incubated at 37oC for 24 hours. Other media that can be used are potato dextrose agar or broth, yeast nitrogen dextrose.

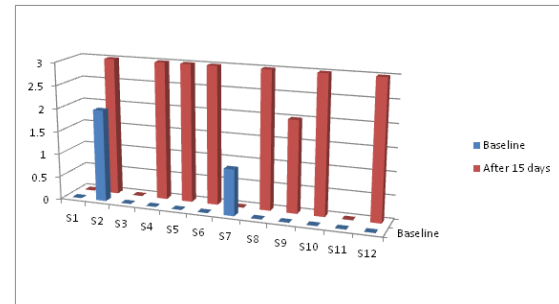
#### 2. Microscopy

It is considered one of the best methods in identification and observing different species. In this study agar plate were gram stained for identification of the species.

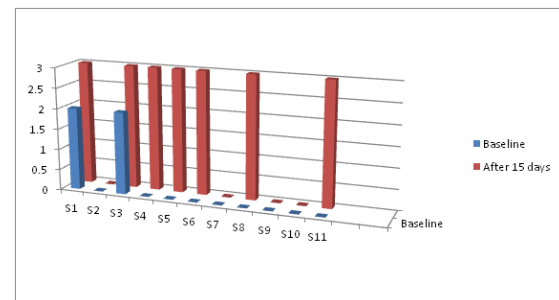
## RESULTS

The sample included 24 subjects (12 n in each group). The microbiological analysis showed significant increase in Candidal growth in total 15 days of study. Both groups that used paste adhesive and powder form adhesive showed similar increase in Candidal growth. [Figure 1-3]. Within the

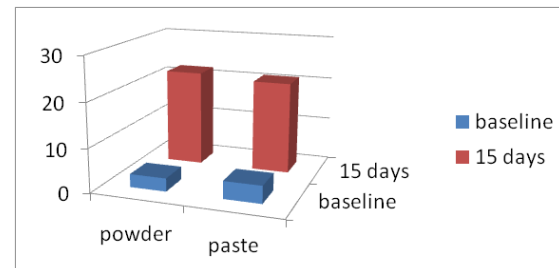
limitations, this study gives the pattern of candidal growth in 2 form of adhesive (Paste and Powder form).



**Figure 1: Patients using powder form of adhesive**



**Figure 2: Patients using paste form of adhesive**



**Figure 3: Comparison of paste and powder form**

## DISCUSSION

This study demonstrates that there is significant candidal growth when observed for 15 days in both group involved in study. It has been reported that denture adhesive do not have an inhibiting effect upon oral flora.<sup>[11,12]</sup> While it has been demonstrated that denture adhesive do not support bacterial growth.<sup>[12]</sup> In contrast it has been shown that some adhesive will support the growth of streptococcus mutants and *C. albicans*.<sup>[11]</sup> In addition, denture adhesive have been reported to contain hexachlorophene, sodium tetra borate and ethanol, which should act as anti microbial agent.<sup>[13]</sup>

In vivo studies have found out that the use of denture adhesives do not significantly alter biofilm formation over a period of 14 days.<sup>[14,15]</sup> Adhesive use produced a bio film covered area significantly higher than area of biofilm measured after the non

use adhesive period, irrespective of type of denture.<sup>[16]</sup>

Sato et al,<sup>[17]</sup> stated that denture adhesive swell and become viscous and sticky in presence of saliva, which may explain the difficulty in removing these adhesive off the denture surface in this study. Contrast to the study, Ozkan et al,<sup>[18]</sup> evaluated use of adhesive in denture wearers for 2 months and results showed no increase in micro biota.

This study found, marked increase in Candida growth with use of adhesive. This could be due to patient's inability to maintain satisfactory hygiene. Limitation of this study is that 2 patients failed to follow up. This loss can indicate a mirror bias in result obtained.

Other limitation includes, systemic conditions of patient (Diabetes, Hypertension) could be influencing growth. Both mechanical method of denture cleaning along with soaking in chemical cleanser would give a better hygiene condition.

Within the limitations, this study gives the pattern of candidal growth in 2 form of adhesive (Paste and Powder form). This study eliminated any bias by intake of antibiotic or already existent candidal infection in patients.

## CONCLUSION

Within the limitations of the study, it was concluded that use of adhesive did alter the Candidal growth in 15 days of study. There is a significant evidence that denture adhesive promotes candidal growth in both powder and paste form of adhesive. Both patient and dentist need to be educated in best use of adhesive. Patient who need to be under long term use of adhesive should be asked to maintain oral hygiene and keep the denture clean. Dentist should educate the patient regarding the use of adhesive and emphasize the importance of cleaning the denture since the residual adhesive promote the candidal growth.

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