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DIFFERENT DENTURE BASE MATERIALS AND ADHERENCE OF CANDIDA ALBICANS

Prosthodontics

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ABSTRACT

Introduction: Since years researchers have reported on the frequency of mycotic diseases prevailing in denture wearers. Hence this study was undertaken to evaluate the in-vitro adherence of Candida albicans to different types of denture base material i.e. self cure acrylic resin and heat cure acrylic resin. **Materials and Method:** 10 set of specimens were made per denture base material (DPI self cure acrylic resin, DPI heat cure acrylic resin). The specimen size was 1cm x 1cm x 1cm (length x width x height), culture preparation and growth of Candida albicans on the specimens was conducted. **Results & Conclusion:** From our present study, it can be concluded that heat cure acrylic resin showed less adherence to candidial cells as compared to self cure acrylic resin. The results were statistically highly significant.

KEYWORDS

Candida albicans, self cure resin, heat cure resin.

INTRODUCTION:

The oral cavity is known to harbor various micro-organism. Although bacteria and other yeast could be pathogen in many cases but it has been proven that Candida albicans is the primary microbial factor for denture stomatitis.1-5 There are several studies regarding the adhesion mechanisms of Candida albicans to denture base materials as well as about the different factors that affect these mechanisms.6,7 The adhesion of microorganisms to any surface is the prerequisite for the colonization at that surface, and hence the denture may act as a reservoir of infection.[2,6]

Adherence of the micro-organism is the first step in the process of infection, which is followed by formation of biofilm. Biofilm formation occurs in three phases which includes adherence of microorganisms to the surface, growth and secretion of extracellular polymers i.e. formation of mature biofilm and is followed by formation of a scaffold on the surface. In comparison of bacterial and yeast biofilm, extracellular polymers in yeast biofilm have lower protein and carbohydrate content and higher amounts of glucose and galactose8. Denture stomatitis is among the most common and important types of Candida infections. In this infection, yeast are usually present on the palatal surface of denture. Denture base acrylic resin gives a suitable environment for growth and colonization of Candida strains.

The purpose of this study is therefore to conduct an in-vitro experiment to evaluate the amount of surface adherence of Candida albicans to self cure acrylic resin and heat cure acrylic resin.

MATERIALS AND METHOD:

Modeling wax, hydraulic bench press, acrylizer, complete set of finishing and polishing burs, type III dental stone, phosphate bonded investment material, ultrasonic cleaner, glass slides, sterile petri dishes- sterile test tubes, sterile Sabouraud's broth-500ml, sterile distilled water, Candida albicans, light microscope, gram stains, DPI self cure acrylic resin, DPI heat cure acrylic resin.

Sample number: 10 per denture base material. (Fig. 1)
Sample size: 1cm X 1cm X 1cm (length x width x height)
Preparation of acrylic resin specimens:

Heat cure test specimens were fabricated by making wax blocks of the mentioned dimension. The wax block was then invested using type III dental stone to have a good reproduction of the surface.

Keeping in mind the sample size and number, the samples were fabricated by proper mixing of powder and liquid, working time and curing time according to the manufacturer instructions for both types of acrylic resin (DPI self cure acrylic resin, DPI heat cure acrylic resin). These acrylized blocks were trimmed for excess and were subjected to finishing & polishing using the standard laboratory finishing & polishing techniques.

All the samples were washed and stored in sterile distilled water.

For means of convenience, the two denture base materials were designated by Groups and then compared. They were
Group I: DPI self cure acrylic denture base material
Group II: DPI heat cure acrylic denture base material
Culture preparation:

The culture preparation and the growth of Candida albicans on the specimens prepared was conducted in Hazaribag College of Dental Sciences, Hazaribag, Jharkhand and RIMS, Ranchi, Jharkhand. Laboratory isolates of Candida albicans were used for this study. Before each adhesion experiment, 10ml of Sabouraud's broth was incubated with Candida albicans at 37 ° C for 24 hours. This was then added to 90ml of Sabouraud's broth and further incubated at 37 ° C for 24 hours.

The 48 hours broth culture with Candida albicans was dispensed in 2 sterile petri dishes, each dish containing 10 samples. These were then incubated at 37 ° C for 48 hours. After completion of the incubation period, the specimens were removed and washed in sterile phosphate buffered saline. The smear was prepared in glass slides and stained with Gram's staining technique and the stained smear was allowed to dry in air. A drop of cedar-wood oil was placed over the smear that was placed on a glass slide and observed under oil immersion lens of microscope.

Microscopically, yeast cells are dark purple and show characteristic budding. A total of 20 random fields were viewed under the light microscope for each of 10 samples, and fields that showed 1, 2 and 3 cells, were only included in statistical analysis. After 20 random fields, number of cells were counted and were tabulated and used for statistical analysis.

STATISTICAL ANALYSIS:

Independent t-test and Paired t-test was used to compare the values of the test result. From the test it was found that the results were statistically highly significant ($p<0.001$). The adherence of Candida albicans was seen to be significantly low in DPI heat cure acrylic resin denture base material and Significantly high in DPI self cure acrylic resin.

RESULTS:

The data obtained is shown in Table 1, where the overall totality of cells is shown in all the individual groups and Mean and Standard deviation of the respective group is given.

Table 1					
	Distribution of cells				
No. of Cells	1	2	3	Total (N)	Mean ± SD
Group 1 (DPI self	60	8	21	89	1.56 ± 0.84
Group 2 (DPI heat cure)	32	15	4	51	1.45 ± 0.63

DISCUSSION:

Edentulism is not a disease entity, but rather a consequence of some pathology. There is increased incidence of edentulism over the recent years that has questioned the adequacy of dental treatment as well. Yet, the management of the edentulous state till date remains to be an acrylic complete denture. Complete dentures not only rehabilitates them functionally but also esthetically and psychologically. However, prosthetic rehabilitation of the geriatric patient has been of great concern. The problems that arise may not only be attributed to construction of denture but also to the associated problems with continuous denture wearing. The most commonly occurring condition observed is denture stomatitis secondary to candidial infection. Denture stomatitis is a term applied to an inflammation of the denture bearing mucosa, which may affect as many as two-third of denture wearers. Its incidence has been reported to occur among 11 to 67% of the denture wearers.[9,10]

The occurrence of an infection is directly related to two major criteria- the virulence of the organism and the number of organisms colonizing the area. These two factors though, independent are related to each other.[10]

CONCLUSION:

Both the acrylic group are showing adherence of candidial cells. But among the acrylics, heat cure acrylic resin showed comparatively less adherence of candidial cells than self cure acrylic resin. So heat cure acrylics are the material of choice for fabrication of removable prosthesis. However, patient's oral hygiene should be given prime importance irrespective of the denture base materials used.

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