

Antimicrobial Activity of Chlorhexidine and Iodine against Candida Species on Denture Base

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Abstract

Aim:

The aim of this study is to evaluate and compare the antimicrobial activity of Various disinfectants against Candida species on the denture bases .

Objective:

Denture are worn by aged people who may have other endocrine or physiological disorder the local mucosal immunity may be impaired in them ,this may lead to colonisation of opportunistic pathogens like Candida .This may lead to formation of chronic ulcers at the interface of the prosthesis .The causative agent should be eliminated from the gingival mucosa as well as the denture base. Thus the objective of this study is to evaluate the antimicrobial activity of chemical disinfectants (mouth wash) in disinfecting the denture base .

Background :

Candida albicans is the most important etiological agent for chronic atrophic candidiasis (denture stomatitis), which develops in at least 50 % of denture wearers.In addition to primary causative agent, C.albicans and other oral bacteria also participate .In the pathogenesis of denture stomatitis.

Method:

The denture is coated with the Candida albicans and immersed in 0.2% chlorhexidine and iodine for various durations and examined for reduction .

Reason:

To reduce the discomfort and to maintain the oral hygiene for the reduction of the denture stomatitis .

Keyword: Candida albicans ,denture base, Chlorhexidine ,iodine .

INTRODUCTION:

Oral care is important for the prevention of caries,periodontal disease and many systemic disease.Also denture care is indispensable for general health of not only elderly people ,fragile and immunocompromised patient but also for healthy patients .^[1]

Candida is an opportunistic pathogen which causes many infections.^[2]Candida species may be involved in various forms of oral disease such as oral candidiasis ,angular cheilitis,endodontic infections . Mode of action of chlorhexidine is not entirely understood ,but it is known that it acts as a fungicide and has a fungistatic function which lead to coagulation of nucleoproteins and changes in the cell walls allowing in the possible escape of cytoplasmic components through the plasma membrane .^[3]

Povidone Iodine or polyvinyl pyrrolidone –iodine is an iodophor and a broad spectrum antimicrobial agent delivered in many forms including mouth wash ,powder ,oilments etc .PVP-I lacks the persistent action of chlorhexidine but is less toxic and can be safely used in areas with ulcers and burns. PVP-I has broader microbicidal property especially on resistant bacteria like M tuberculosis and other spore forming bacteria. Protein-rich biomaterial and other organic materials can neutralize the germicidal activity of povidone-iodine, where as they have little effect on the antibacterial activity of chlorhexidine.^[4]

MATERIALS AND METHOD :

Specimen fabrication:

A total of 30 acrylic denture base resin specimen were obtained from the wax pattern with the same dimension .patterns were invested in the metallic flask and type III dental stone. After the setting of dental stone ,the flask were opened ,the wax was removed .Heat-polymerized acrylic resin was mixed according to manufacturer's recommendation and packed into the mold at the dough stage .The metal flask were then closed .All flask were allowed to cool for 3 hours at room temperature and then opened .the excess resin were smoothed with a hard bur.

Contamination of specimen:

30 heat cured acrylic denture base were selected and sterilized by autoclaving at 15 lbs for 30 min.Then it is contaminated with the Candida albicans suspension made to the turbidity matching 0.5 Mc far land standard by immersing for 30 minutes . Then the contaminated denture base was immersed in sterile containers for various concentration of chlorhexidine and iodine .Samples were taken from the denture base using a sterile disposable swab .The swabs were inoculated into Candida differential media (Hi Media)and these plates were incubated at 37 degree Celsius for 24 hours aerobically. After incubation the plates were checked for presence of characteristic Candida albicans colonies.

EXPERIMENTAL AND CONTROL GROUPS:

Three groups, each containing contaminated specimen of 5 were assigned to various mouthwash:

GROUP I: Chlorhexidine 0.2% -Specimen were immersed in the 0.2 % chlorhexidine (1:2) ratio, For 10min,15min ,60 and 120 min .

GROUP II: IODINE- Specimen were immersed in the Betadine mouthwash(1:5) ratio for 10 and 15 mins

GROUP III: DISTILLED WATER (CONTROL GROUP):specimens were immersed in the distilled water for 10min ,15min.

RESULTS:

GROUP I: The Contaminated denture base were immersed in the Chlorhexidine for 1:2 (ratio) for the following duration 10min,15min,60 min and 120 min and checked for the growth .Finally there was no growth found in all the above duration.

GROUP II: The contaminated denture base were immersed in Betadine for 1:5 (ratio)for the following duration 10minand 15min and checked for the growth. Finally there was no growth found in above conditions.

GROUP III :In distilled water , the finall results was positive .Candida was present for 10 min and 15min.

Table 1: Number of specimen of each group and the antimicrobial effect against Candida albicans:

SNO	GP-I (GHX-1:2)				GP-II (I-1:5)		GP-III (distilled water)	
	10min	15min	60min	120min	10min	15min	10min	15min
1	-	-	-	-	-	-	+ ^{ve}	+
2	-	-	-	-	-	-	+ ^{ve}	+
3	-	-	-	-	-	-	+ ^{ve}	+
4	-	-	-	-	-	-	+	+
5	-	-	-	-	-	-	+	+

‘-’ Represents absence of Candida albicans

‘+’ Represents presence of Candida albicans

SUMMARY:

In the present study, the effects of denture cleaning method were effective in mouth wash when compared to distilled water. Main aim of this study is to compare the dilution ratio of the mouth wash with the duration of time .

CONCLUSION :

The chlorhexidine –based solutions were satisfactory in reducing the Candida species. Iodine has high soluble nature,low toxicity ,widest bactericidal range has made it trusted antimicrobial activity against Candida species .Thus immersing the denture base in the dilution of 1:2 ratio for 10min in chlorhexidine and in the dilution of 1:5 ratio of Iodine solution in 10min gives satisfactory result rather than placing the denture base for overnight.

REFERENCE

1. Kuriyama T, Williams DW, Bagg J, Coulter WA, Ready D, Lewis MA. In vitro susceptibility of oral Candida to seven antifungal agents. Oral Microbiol Immunol. 2005; 20: 349-53.
2. Greenspan D. Treatment of oral candidiasis in HIV infection Oral Surg Oral Med Oral Pathol. 1994; 78: 211-5. 3
3. Chandra J, Kuhn DM, Mukherjee PK, Hoyer LL, McCormick T, Ghannoum MA. Biofilm formation by the fungal pathogen Candida albicans: Development, architecture and drug resistance. J Bacteriol. 2001; 183: 5385-94.
4. Rabih O. Darouiche, Matthew J. Wall, Jr, Kamal M.F. Itani et al. Chlorhexidine-Alcohol versus Povidone-Iodine for Surgical-Site Antisepsis. N Engl J Med 2010;362:18-26