

**Ministry of Higher Education
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College of Dentistry**



**The influence of chlorhexidine di-acetate salt
Incorporation into soft denture lining material on
Antifungal Activity and Some mechanical Properties.**

A thesis

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Abstract

Background: one of the most common problem associated with the used of soft denture lining material is microorganisms and fungal growth especially *Candida albicans*, which can result in chronic mucosal inflammation that's why the development of antimicrobial polymer became so important. The reason for conducting this study was to evaluate the influence of incorporating different percentages of chlorhexidine di-acetate salt (CDA) into acrylic-based heat cured soft denture lining material on the antifungal activity; against *Candida albicans*, and the amount of CDA salt leached out of soft liner/CDA composite. Furthermore, to evaluate hardness and shear bond strength after CDA addition to soft liner.

Materials and methods: CDA salt was added with different concentrations (0.5%, 1.5%, 2.5%, and 3.5% by weight) into heat cure acrylic-based soft denture lining material. Four hundred and fifty (450) simples were made and divided according to the test to be performed into four groups.

Fourier Transform Infrared Spectroscopy (FTIR) analysis was conducted to determine if there is any chemical reaction between CDA and the soft liner. Disk diffusion test was performed at four different periods to evaluate the antifungal properties of soft denture lining material incorporated by CDA. UV spectroscopy was used to measure the amount of CDA leached out of soft liner/CDA composite into artificial saliva at three different periods. Shore A hardness and shear bonding strength of the soft liner to the acrylic denture base material was also tested.

Results: This study showed that no chemical reaction between chlorhexidine di-acetate salt and soft denture lining material as FTIR analysis proved. The results of disk diffusion test showed that the antifungal activity of CDA is a concentration and time dependent (the antifungal activity increase with concentrations of added drug and decrease when the period of incubation in

artificial saliva increase) in which 3.5% group showed that highest mean value during all incubation period (22.52, 18.55, 17.3, 15.66 mm.) and the result of CDA release test was also concentrations and time dependent (increase with concentrations and decrease when the period of incubation in artificial saliva increase) which 3.5% group showed that highest mean value during all incubation period (0.209, 0.101, 0.059 mg\L) .The result of this study showed significant increase in the mean value of hardness for experimental group in compare with control group and for both periods of incubation in artificial saliva, in which control group showed the lowest mean value for both incubation periods (78.423, 75.708) . As for shear bond strength this study showed that there was a highly significant decrease in the mean value of shear bonding strength after incorporation of CDA at 0.5% and 1.5% percentages into soft liner while non-significant differences appeared in the mean value of shear bond strength after incorporation CDA at 2.5% and 3.5% .

Conclusion: The addition of CDA into acrylic-based soft denture lining material result in developing antifungal properties for soft denture lining material , thus decreased the susceptibility to develop Candida and Candida-associated denture stomatitis. This addition resulted in an increased hardness for all experimental groups while the shear bonding strength of soft denture lining material to denture base did not seemed to be affect by adding CDA at 2.5% and 3.5% percentage.