

Effect of Two Chemical Disinfectants on Both Acrylic and Metallic Dentures

Emiel Abdul Massieh Hanna¹ and Mona Fatheey²

¹Prosthodontic Department, 6 October University.

²Clinical pathology Department, Faculty of Medicine, Mansoura University.

*Hanayousef_egypt@yahoo.com

Abstract: Aim: This study aimed to compare between the effect of two different chemical disinfectants on both acrylic and metallic dentures. Materials and method: Sixthly patients were selected of both sexes. Their age were ranged from 50-60 years, and free from any systemic diseases. Two types of chemical disinfectants were used which are glutaraldehyde, and lysoformine as tissue surface disinfectants. Both acrylic and metallic dentures were represented. According to the type of disinfectant used, the patients were classified into three groups, and each group divided into two sub group, acrylic denture sub group and metallic denture sub group. Group I received glutaraldehyde chemical disinfectant. Group II: received lysoformine chemical disinfectant. Group III is the control group. Results: The results demonstrated that lysoformine disinfectant was effective for both types of dentures, while glutaraldehyde disinfectant was effective in acrylic resin dentures only, while in metallic dentures was not effective. Conclusion: Lysoformine disinfectant is promising tissue surface disinfectant for both acrylic and metallic dentures. [Journal of American Science. 2010;6(10):84-88]. (ISSN: 1545-1003).

Keywords: Effect; Chemical Disinfectants; Acrylic and Metallic Dentures

1. Introduction

An essential component of complete denture service is patient education about denture hygiene. The literatures has shown the correlation between poor oral hygiene and lesions in the oral mucosa of complete dentures wearers, mainly chronic atrophic candidosis. Furthermore the colonization of the tissue surface of dentures can act as reservoir for domination of infection so, the complete cleaning has been a reason of concern.

In the most clinical experiments, the levels of the (biofilm) or the microorganisms are evaluated in the tissue surface of complete dentures. Other surfaces are also incorporates mainly the upper buccal fitting surfaces.

Ideally denture care products should be easy of handling, effective for removal of inorganic / organic deposits, stains, bactericidal, non toxic to the patient, non deleterious to the denture materials, non expensive and clinically viable.

Chemical disinfection agents which are either a chemical or physical agents that is applied to objects to kill the microorganisms.

The general impression is that chemical disinfectant or the chemical cleanser are mostly effective on denture microorganisms. However another report showed that some of denture cleaners are not effective especially on *Candida*.

In spite of the chemical disinfectants seems to be safer to physical properties of the denture resins, their effect on different microorganisms especially

Candida needed to be investigated on both acrylic and metallic dentures, in this study we realize the action and suitable time needed to achieve acrylic and metallic complete disinfection by two different chemical disinfectants. The aim of this study was to investigate the effect of two chemical disinfectants which are glutaraldehyde and lysoformine on the tissue surface of both acrylic and metallic dentures.

2. Material and Methods

This study was done on 60 patients selected from the out patients clinic of 6 October university, Faculty of Oral and Dental Medicine with the following criteria:

1-Patients were with no previous denture experience.

2-Both of either sexes were represented, the age ranged from 50-60 years.

3-Patients were instructed for good oral hygiene measures. Periodic follow up for the patients every week for the first month was done to eliminate any prosthetic problems interfering with the settling of the dentures.

4- Oral hygiene for complete dentures during this month obtained through conventional way by using brushing and water only.

5-According to disinfectants used patients were randomly classified into equal three groups each group consists of twenty patients, and each group consist of two equal subgroups.

Group I:

The subgroup of Patients were received acrylic dentures and were instructed to clean their dentures through immersion the dentures in fresh glutaraldehyde disinfectant for one week. The other subgroup of patients were received metallic dentures and were instructed to clean their dentures through immersion the dentures in fresh glutaraldehyde disinfectant for one week.

The swab was cultured on blood agar and was incubated in 37°C for 24 hours for isolation of aerobic bacteria. Film was done from the growing organisms on blood agar and stained with gram stain. Preparing a smear for staining

On a new glass, we put a drop of sterile saline on the middle of the slide.

Then sterilize the inoculating needle in the Bunsen flam or micro-incinerator till it turns red hot, when the needle has cooled. Collect a small part from the growing bacterial growth from the surface of the agar. Rub the tip of the needle on the glass slide in the drop of the saline in a circular movement till we get a homogeneous smear then fix the film by moving it above the flame, finally stain the film with gram stain.

Gram stain

This is the most important differential stain used to diagnostic identification of various organisms.

The smear was covered with crystal violet for 30-60 seconds. Then we poured it of and washed with water, iodine was added and left to act for 1 minute. Then pour it off and wash with water. Decolorize by adding 95% alcohol and rock the slide from side to side and pour it off and reapply till no violet color comes off the smear, wash rapidly with water. Counter stain with dilute basic fuchsine for 1 minute, wash with water, and then the slide was placed at angle to dry or blot dry. We examined the stained smear by light microscope by the oil immersion lens.

Group II:

The first subgroup of patients received their acrylic dentures and were instructed for cleaning their dentures through immersion the dentures in fresh lysoformine disinfectant for one week. The other subgroup of patients received their metallic dentures were instructed for cleaning their dentures through immersion in fresh lysoformine disinfectant for one week..

Group III (control group).

All patients received acrylic and metallic dentures and were instructed for cleaning their

dentures in the conventional way by using water and brushing without using any disinfectants.

3. Results

Three groups of patient were evaluated for the growth of microorganisms. These groups were group I (glutaraldehyde) group . group II (lysoformine) group, and group III were control group .

In group I

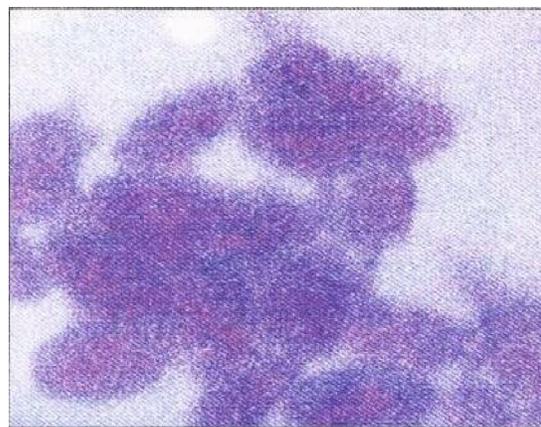
The subgroup of patients who received their acrylic dentures and were instructed for cleaning their dentures through immersion the dentures in glutaraldehyde disinfection for one week, showed no growth of microorgsmisms as shown in Table.

The other subgroup of patient who received their metallic dentures and were instructed for cleaning the denture through immersion the dentures in glutaraldehyde disinfectant for one week, showed bacterial growth which arc Candida, and Nisseria as shown in Table (1) Fig (1) and Fig (2).

Table I : type of growth in the study groups:

	Group I Glutaraldehyde group		Group II lysoformine group		Group III Control group	
	A	M	A	M	A	M
Type of growth	- NG	Candi da Nisse ria	- NG	NG	Nisseri a -G-ve Bacilli	Candida Nisseria Micrococi Sreptococci

A=Acrylic tissue surface microorganisms
NG=No growth of M=Metallic tissue surface

**Fig. (I): Candida organism obtained from group I sub group metallic denture tissue surface**

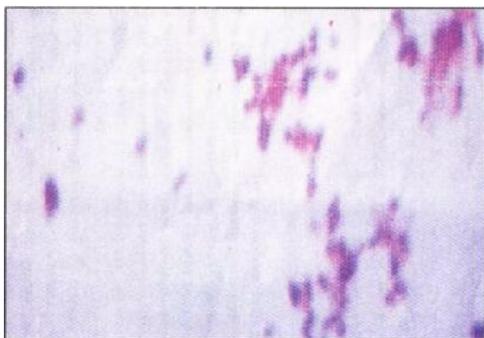


Fig. (2): Nisseria gram-ve cocci in pairs obtained from group 1 subgroup metallic tissue surface and group III both subgroup acrylic and metallic denture tissue surface

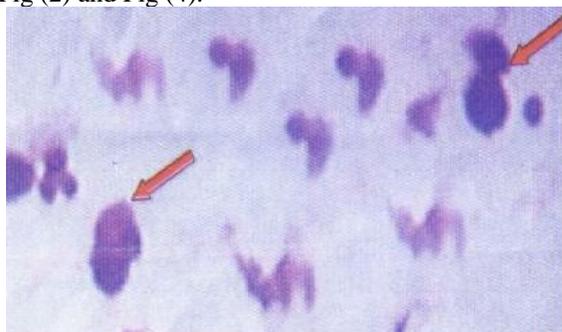
In group III (control group)

The Subgroup of patients who received their acrylic dentures using conventional way (brushing and water only) for cleaning we found G -ve Bacilli, and Nisseria as shown in Table (1) Fig (3) and Fig (2). On the other hand the subgroup of patients who received their metallic dentures



Fig. (3): G-ve Bacilli obtained from group III subgroup acrylic tissue surface.

Using conventional way for cleaning their dentures there was growth of different types of microorganisms including G-ve Bacilli, Nisseria-Micrococci, and Streptococci as shown in Table (3) Fig (2) and Fig (4).



Fig, (4): Micrococci (Gram +ve cocci) in 2, 4 or 8 arrangement obtained from group III sub group metallic denture tissue surface.

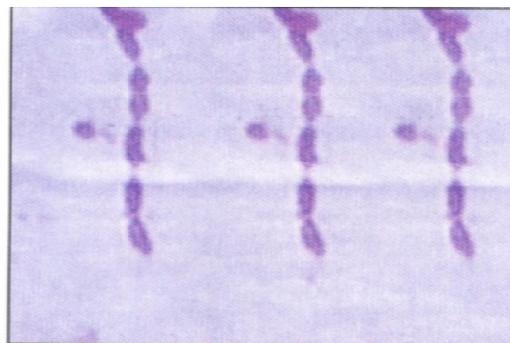


Fig. (5): streptococci (gram +ve cocci) arranged in chains obtained from group III sub group metallic tissue surface

The % of detected microorganisms shown in Table (2).

Table 2: - %& Detected Organisms in Each Groups

Control group	%	Glutaraldehyde group (Metallic)	%
-Nisseria	100	- Nisseria	100
-Candida	50	- G-ve bacilli	50
•Micrococci	50	- Candida	25
-Streptococi	50		

Beside the previously mentioned data the surface roughness of both acrylic and metallic tissue surface of the dentures were measured by Surtest S1201P as shown in Fig (6). The mean value of live reading of the surface roughness of the tissue surface of acrylic dentures were 3.844. While the mean value of five readings of surface roughness of metallic dentures tissue surface were 5.164 as shown in Table (3) Fig (7) and Fig (8)

2.2.2. Surface Roughness

A portable surface texture measuring instrument, Surf test SJ-201P (Mitutoyo Corporation, Japan), was used for surface roughness assessment of the denture base. It is a portable solution for precise, effective and easy surface measurements in a production environment. It has an oversize characters are displayed on the large easy- to- view LCD and equipped with differential inductance detector. A diamond stylus with tip radius Sum is used in the measurements. The detector moves over the specimen by a driving speed 0.25mm/s for a measured length 4.0mm (sampling length 0.8mm). The measured roughness parameter is the average roughness height of the surface Ra. Ra is one of the first parameters used to quantify surface texture and it is the most commonly used parameter in dentistry applications.

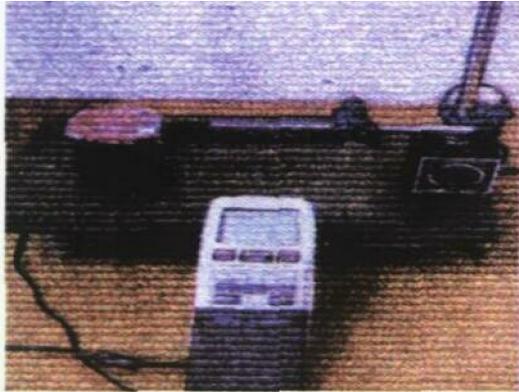


Fig. (6): Surface roughness tester, Surf test SJ201 P.

Table 3: Show the average of surface roughness of both acrylic and metallic dentures

Ra	1st reading	2nd reading	3rd reading	4th reading	5th reading	Average
Acrylic	3.01	2.79	5.18	5.18	3.06	3.844
Metallic	3.59	5.76	6.16	4.62	5.06	5.146

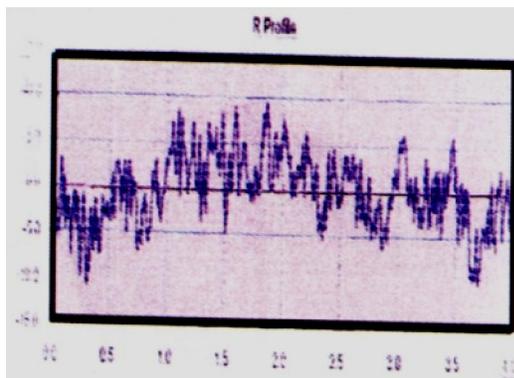


Fig. (7): The Surface roughness of the mean value of five milling of acrylic tissue Surface.

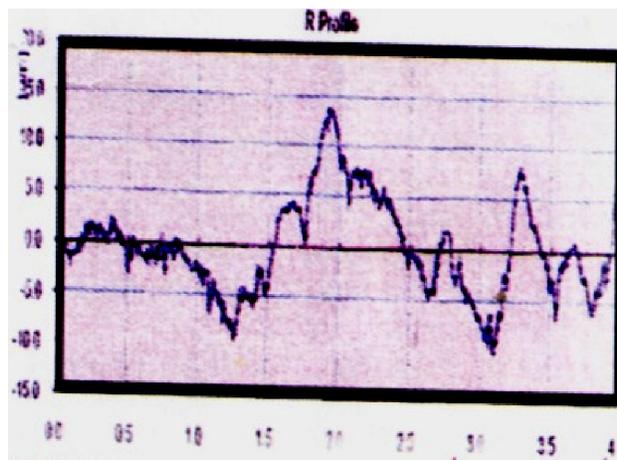


Fig. (8): The Surface roughness of the mean value of five readings of metallic tissue Surface.

4. Discussion:

This study was done on three groups of patients group I was classified into two equal subgroup.

Group I

In subgroup of patients who received acrylic dentures and treated with glutaraldehyde disinfectant. No growth was found this might be due to the effectiveness of the disinfectant, and low surface roughness of acrylic dentures.

The other subgroup patients who received metallic dentures and also treated with glutaraldehyde disinfectant.

Two types of microorganisms were detected which are Candida albicans which are the main etiological factor in candidosis, and Nisseria. this might be due to high surface roughness of metallic denture tissue surface than acrylic dentures.

In group II

Patients who received both acrylic and metallic dentures no growth of microorganisms were detected at all. This may be due to the powerful effectiveness of this chemical disinfectant.

In group III (control group)

The patients who received both acrylic and metallic dentures used mechanical means of cleaning by brushing and water only different types of microorganisms were displayed which are Candida, Nisseria, Micrococi and Streptococci.

Although it has been widely accepted that the mechanical cleaning as an effective method, but is needed careful attention and an effort of the patient.

A longer study might be needed for better evaluation.

5. Conclusion:

Recommending the patients for using chemical disinfection as lysoformine disinfectant. Beside cleaning tissue surface of the dentures we must direct an attention to smoothen the tissue surface of the denture to decrease the surface roughness for better and oral hygiene.

Corresponding author

Emiel Abdul Massieh Hanna
 Prosthodontic Department, 6 October University.,
 cairo, Egypt.
Hanayousef_egypt@yahoo.com

6. References

1. . Kenneth Shay. Denture hygiene: A review and update Journal of Contotomprary Dental Practice. v. 1, no2, 2000.
2. Nikawa H, HamadaT, Yama ashine H. A review of in vitro and vivo methods to evaluate the efficacy of denture cleaners. Int J Prosthodont.; 12:153-9, 1999.
3. Kulak - Ozkan Y, Kazaoglu E, Arikan A. Oral hygiene habits , denture cleanless, presence of yeasts and stomatitis in elderly people . J Oral Rehabil.; 29:300 - 4, 2002.
4. Fernands RAG , Zaniqu'elli O, Paranhos HFO Analise dos metods de contagem de pontos e plaimetro as quantificatacao de biofilms do dentadura: um estuao de validacao metodologica Pes qui Odon to Bras. 16:63-8, 2002.
5. Paranhos HFO, Silva CHL. Comparative study of methods for the quantification and plaque accumulation on complete denture surfaces. J. Prosthet Dent, Pesqui dontol poras; 18:215-23, 2004.
6. Keng SB, Lim M. Denture Plaque Distribution and the effectiveness' of a perborate – containing dentures cleansers. Quintessence Int.; 27:814 - 5, 1996.
7. Me Cabe JF, Murray FD, Laurie J, Kelly PJ. A method for scoring denture plaque. Eur J Prosthodont Restor Dent.; 4:59-64, 1996.
8. Sheen SR, Harrison A. Assessment of plaque prevention on dentures using an experimental cleansers. J Prosthet Dent., 84:594 - 601, 2000.
9. Budz - Jorgensen E, Loe II. Chlorhexidine as a denture disinfectant in the treatment of denture stomatitis J Dent Res; 80:457 - 404 1992.
10. Dark D, Wells J Ettinger R . Efficacy of denture cleansing agents is an vitro bacteria – yeast colonization model - Int J Prosthodont; 5:214-220, 1992.
11. Penna TC, Mazda PG, Marten AM. The efficacy of chemical agents in cleaning and disinfection. BMC Inf Dis; 1: 16-25 2001.
12. El-Mished AM. Preparation and interpretation of gram stained smear. In Manual of Practical Microbiology. Chapter 4, 12-13, 2002.
13. Duguid JP.'Stating methods In practical Medical. Microbiology. Collee J G, Duguid J P, Fraser AG and Marmion B P (eds)13 Churchill living stone., 41-42, 1989.

6/1/2010