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Bacterial Cross-contamination between clinic & dental laboratory during polishing procedure of complete denture.

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Abstract

Polishing of dental prostheses can cause a dangerous cycle of cross-contamination involving dentists, laboratory technicians, patients and auxiliary personnel. The aim of this study was to show the microbial contamination in the dental laboratory during the polishing procedure of complete dentures. For this purpose, 30 samples & 4 experiments were conducted.

Experiment I - Determination of the contaminating complete maxillary dentures from plaque &from patient saliva .

Experiment II- after disinfection of complete dentures

Experiment III- determination of microorganism transferred During the polishing procedure, to the denture

Experiment IV - The remaining microorganism in the lathe spindle Microbiological tests were conducted to detect the presence of bacteria. plates showing growth, colonies were observed and identified using Gram staining,. As a result viable organisms from patients denture before and after polishing & after disinfection were found Improper disinfection of the denture , using tab water with pumice powder allowed for the introduction of pathogens so The polishing of dental prostheses is a possible source of transmission of communicable diseases in the laboratory appropriate universal precautions must be followed to decrease the likelihood of cross contamination

Key words: cross infection, dental laboratory, dental prostheses.

Introduction

Dental professionals are potentially exposed to a wide variety of pathogenic microorganisms in the blood and saliva of patients, With the steadily increasing frequency of diseases such as tuberculosis, hepatitis and AIDS, disinfection and sterilization procedures within dentistry have attracted the interest of many clinicians and researchers. The ethical and legal implications of infection control in the dental setting require that attention be paid to potential avenues of transmission that may have been ignored in the past [1].

Bacterial cross-contamination as a result of prosthetic treatment has been the subject of general comment but has received little specific attention.[2,3] Although a number of bacterial species have been isolated from impressions and dentures, few studies have attempted to isolate bacteria from intermediary appliances used in prosthetic treatment, such as occlusal rims and try-in dentures, which are

returned to the laboratory and are a source of laboratory cross-contamination.[2] Most recent literature has focused on cross-contamination of prosthetic appliances in the dental laboratory.[4]

Cross contamination is a severe problem that involves health professionals, especially in dentistry. The transmission of diseases during treatment between patients and dentists, auxiliary personnel and dental laboratory technicians can occur if preventive measures are not taken. The risk of cross-contamination in dental clinics as well as transmission of microorganisms in prosthetic laboratories has been reported in various studies [5]. More than 60% of the prostheses delivered to clinics from laboratories are contaminated with pathogenic microorganisms, i.e., streptococci, lactobacilli, diphtheroids originating in the oral cavity of other patients [6].

In prosthetic laboratories, lathes and pumice, usually used for polishing procedures and finishing of prostheses have been described as the greatest sources of contamination with levels of contamination reported of 1.4-8.0 x 10^5 colony forming units (CFU) in pumice pans [5].

Materials and Methodes

A total of 30 edentulous patients from the Complete Dentures Clinic participated of this study. They were of both sexes, ranging in age from 50 to 70 years and had complete maxillary dentures made of thermopolymerized resin. Patients who fulfilled 3 requirements were selected: had not taken antibiotics during the previous 6 months, had used a maxillary denture for at least 2 months which had not been polished during this time and used only toothbrushes and tooth paste or soaps for cleaning.

To verify the transfer of microorganisms from the polishing of complete dentures, four experiments were conducted Swab were taken at different point and as stated below

Swab (1) taking smear from the maxillary denture of the patient

Swab (2) after using lacalut dent (denture disinfectant tab) for 15_20 minute

Swab (3) swab taken after polishing procedure of the maxillary denture

Swab (4) from lathe spindle .

The swab were transported immediately to bacteriology laboratory and processed within one hour slandered protocols for the culture and identification of bacteria in use at the bacteriology laboratory ,the swab inoculated in blood agar & macConkey agar for 24 hrs &the media incubated at 37°C for showing growth colonies were observed and identified using gram stain.

Results

The results are reported in Tables 1, Figure 1 shows the microorganisms isolated from the various items , the highest bacterial load was recorded In stage one complete dentures (appliances are exposed to oral contamination)

While the lowest was recorded in stage two dentures after using disinfected materials (**Klebsiella**, **Ecoli**) .

Stage four which show the Pumice contamination Aspergillus, which is the prevalent fungi isolated from most of pumice and pseudomonas & proteus were the isolated bacteria .

The remaining microorganisms on the denture after polishing shows in stage three . **(Klebsiella ,Ecoli** normal oral flora) **(Staphylococcus aureusu.** as pathogenic bacteria)

Discussion

Dental laboratory technicians are particularly exposed to oral and non-oral microbial cross contamination from dentures, pumice powder and particularly pumice slurry, which are used for polishing of dental prostheses [(11).]

.The results of culture conducted in present study revealed pathogenic fungi & bacteria which they saprophyte and opportunistic that could be harmful for immune compromised and elderly debilitating people [(12)] in present study the same as Witt and Hart [(10)] E. coli and Staphylococcus epidermisus were isolated from denture as normal flora they also reported the isolation of pathogenic bacteria such as Pseudomonas (in pumice), Streptococcus pyogenes, Staphylococcus areus (in denture)

In spite of using disinfectant for the denture (oxygen release lacalut tablet) we observe bacteria still present on the denture, on other hand staphylococcus_aureuse which is pathogenic bacteria appear on the disinfectant denture after polishing even its not isolated as pathogenic bacteria on pumice lath wheel therefore denture still 1st source of cross contamination between dental clinic and dental lab [.(7)]

Polishing lathes and brushes are considered to be second source of contamination in prostheses laboratories contaminated invisible aerosol particles remain in the air for long periods of time when lathes have been used for the polishing of prostheses.. It is necessary to perform the effective infection control measures to reduce the cross contamination of oral and non-oral microorganisms[(7)]

in spite of the fact that the elimination of all contamination source is not possible in dental laboratories dental laboratory personnel should have awareness to the microbial contamination of pumice.[(8)]

Disinfection of dentures before sending them to the laboratory and also before returning to dental clinic, using sterile pumice and brushes or the association of disinfectants with pumice for polishing ,using barriers during polishing are important alternatives to significantly reduce cross-contamination in the dental laboratory [(9).]

Conclusion

Pumice are contaminated with microorganisms and can serve as the primary source of the microbial cross infection cycle in dental laboratories. Disinfection of dentures before polishing, using disposable gloves, associating of disinfectants with pumice, disinfection of polishing cones and prevention of aerosols production can control cross contamination in dental laboratories. dental technology students, they should be educated about this important issue as a component of their curriculum. These instructions should be updated as required; there should be individual counseling, post-exposure evaluation, and follow-up to prevent any misunderstanding about the procedures and to cover any exposure incidents that could happen in the dental clinics and laboratory.

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Table (1) frequency of stages of bacteria

Name of Bacteria	1		2		3		4		Type of bacteria
	No.	%	No.	%	No.	%	No.	%	
Neisseria catarales	9	100	0	0	0	0	0	0	Normal oral flora
Klebsiella	11	57.9	2	10.5	6	31.6	0	0	Normal oral flora
Ecoli	14	48.3	7	24.1	8	27.6	0	0	Normal oral flora
Pseudomonas	0	0	0	0	0	0	18	100	Pathogenic bacteria
Staphylococcus epidermidig.jpg	7	100	0	0	0	0	0	0	Normal oral flora
Staphylococcus aureusu.jpg	7	70	0	0	3	30	0	0	Pathogenic bacteria
Streptococcus pyogenes	4	100	0	0	0	0	0	0	Pathogenic bacteria
Proteus	0	0	0	0	0	0	2	100	Pathogenic bacteria
Aspergillus falvus	0	0	0	0	0	0	13	100	Pathogenic fungus

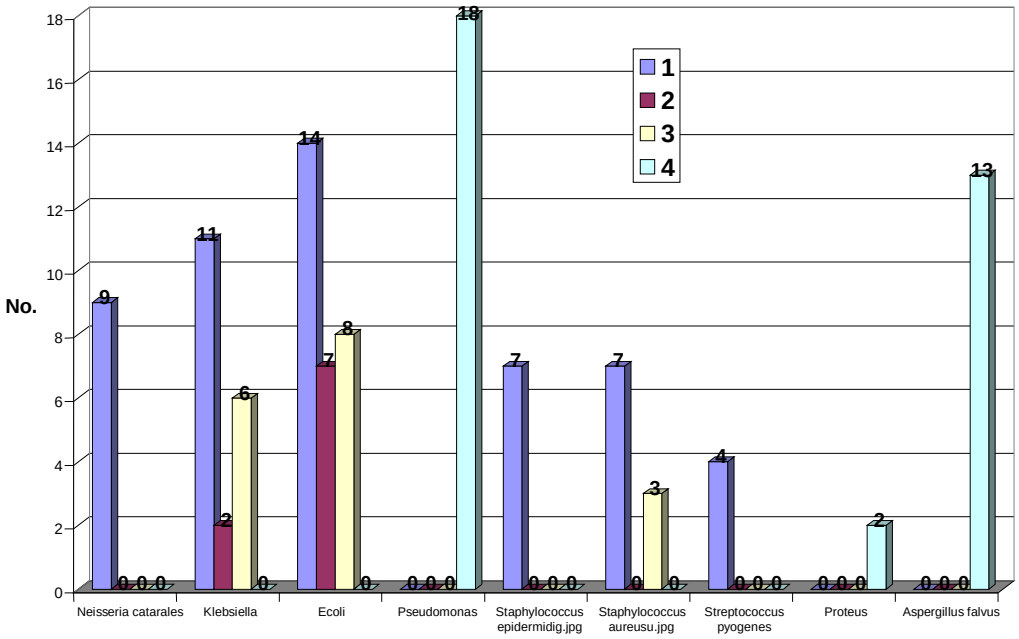

Figure (1) Types of micro_organesims