IDENTIFICATION OF BACTERIA CONTAMINANTS ON PLASTIC PROSTHESES AND INSTRUMENTS USED IK DENTAL LABORATORY

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Abstract

This study was conducted to identify the presence of microorganisms on prosthetic plastic materials and instruments used in dental laboratory at Federal School of Dental Technology and Therapy, Enugu. A total number of 19 used material and instruments were selected for the study. The specimens collected from these items were individually cultured in nutrient agar media. Identification of contaminants was done using Colony morphology, motility test, gram-staining and catalase test. The result of the test showed that all the plastic materials and instruments studied had microbial contaminants. Of the organisms identified, 59% were Gram-positive bacteria, while 42% were Gram-negative. Also, while 26% were motile, 47% were catalysed positive. This work therefore suggests the need for proper decontamination of dental restorations before delivery and instruments after use.

Introduction

Dental prostheses are used to replace missing teeth and their supporting and surrounding structures in appearance, form or function, A dental prosthesis must be compatible with the remaining dental structures and must not insult their integrity, impair their function or foreshorten their life (Jerb, 1975). In a similar vein, a dental prosthesis whether fixed or removable denture; removable partial denture or complete denture should not be a vehicle of contamination or infection of the oral cavity of patients.

Previous works conducted in the western countries has shown the possibility of cross-infection and contamination occurring between patients and dental technologists in dental laboratory via items such as impressions, dentures, appliances and instruments including articulators, shade guides, etc (Adel, 1997). The need therefore, to ascertain the suitability of dental prostheses microbiologically before delivery to the patient appears to be a compelling necessity.

The objective of the present study was to investigate the possible bacterial contaminants on dental prosthetic plastic materials and instruments, including finished dentures.

As an objective of the study, possible microbial contaminants would be identified, appropriate disinfection strategy for prosthetic items would be suggested and encourage the maintenance of standard hygiene in dental laboratories and clinics.

Materials and Methods

Specimen Collection

Impressions, registration bite blocks, try-ins (denture in wax work), finished dentures (partial and complete) that needs little corrections after insertions and all instruments used on them were collected from both clinic and laboratory of Federal School of Dental Technology and Therapy, Enugu, Enugu State. 19 items were randomly selected out of 35 available as at the time of this study. The respective samples were later introduced into test tubes containing sterile water and aseptically covered.

Media Preparations

Nutrient agar media was prepared according to the manufacturer's instruction. 28g of the media was dissolved in 1000ml of distilled water and autoclaved at 121°C and 15psi. The prepared media were aseptically poured into sterile petri dish and incubated overnight at 37°C to test for sterility

Inoculation and Incubation of Specimen

Inoculation wire loop was treated until red-hot to decontaminate it and then cooled in air briefly. Each test tube containing the specimen was opened close to the flame and positioned at an angle. The wire loop was used to collect about 0.02m! quantity of each sample and then transferred on to the respective sterile agar medium in the plates. The plates were covered to avoid contamination and were subsequently incubated at 37°C for 24 hours.

Identification of Isolates

Pure cultures of each isolate were prepared using the streak plate technique. Then each isolate was identified using colony morphology, motility test, gram-staining and catalase test as described by Amadi and Ayogu (2005) and Cheesbrough (2002).

Results and Discussion

The result of this study showed that all the 19 dental materials and instruments cultured in nutrient agar contained microbial contaminants. The shape of the isolates ranged from spherical (63%) to mucoid (37%); the texture from smooth (78%) to hairy (21%) and the colour from milky (74%) to light yellow/yellow (26%). 74% of the isolates were non-motile, 58% Gram-positive, while 53% were catalase positive (Tables 1 and 2).

It is obvious from the result of the study that microorganisms contaminate dental instruments and materials. Although, the contaminants were not identified to the specie level, the organisms may well include the pathogenic ones. Thus, dental instruments and materials could pose a viable source of microbial dissemination. This finding corroborates earlier reports in which cross-infection / contamination between patients and dental technicians in dental laboratory were reported (Adel, 1997).

The findings in this work therefore underscores the need to decontaminate dental instruments and materials especially those that come in contact with the oral environment. Previous report had emphasised the need to sterilise dental instruments using moist heat under pressure.

Furthermore, Bamango (1995) also opined that contaminated dental materials should be disinfected before being handled in the laboratory and after being processed before leaving the laboratory back to the surgery for try-in or for final delivery to the patient.

Table 1: Colony Morphology of Isolates

S/N		Colony	Percentage (%)
1.	Shape	(i) Spherical (ii) Mucoid	63% (12/19) 37% (7/19)
2.	Texture	(i) Smooth (ii) Hairy	79% (15/1 9) 21% (4/19)
3.	Colour	(i) Milky (ii) Light yellow	74% (14/19) 26% (5/1 9)

Table 2: Grams Reaction, Motiiity and1 Cgtalase Tests **on the Isolates**

No. of Specimen	o/ /o Moiility	%ofCatalase(~ ve)	%of Catalase (+ve)	% of Gram (-ve)	% of Gram (-We)
19 specimens	26% (3/19)	42% (8/1 9)	58% (11/19)	53% (10/19)	47% (9/1 9)

Recommendations

From the result of the study, the following recommendations are hereby suggested:

a) Dental professionals especially dental technologists should use hand gloves before touching or handling impression, try-in dentures and any instruments used on dental patients.
b) All dental materials and instruments used by or on patients should be disinfected before embarking on further laboratory work.
c) In like manner, prostheses should be disinfected before delivery to the surgery/clinic.
d) Every dental laboratory should operate using one of the two general techniques to manage infection control mentioned below:-

i. Dental laboratories should be isolated from the clinic which requires that all impressions, prostheses be disinfected before entering the laboratory. Such laboratory is called 'Clean Dental Laboratory' (OSHA Standard, 1990).
ii. Establishing a receiving area in the laboratory where all impressions, prostheses and other items coming in and leaving the laboratory are decontaminated. A laboratory of this nature is termed Standard Dental Laboratory (OSHA Standard, 1990).

e) This study recommends periodical medical check for all practicing dental technologists to evaluate the exposure risk they face from blood borne pathogen.
f) Above all, it is also recommended that Dental Technologist Registration Board should set up monitoring committee that will inspect all dental laboratories from time to time for proper management of infection control.

References

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