

Study of oral microflora and application of oral deposition (local antibiotic) to avoid oral infection in RPD/CD (removable partial denture) patients

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ABSTRACT

Oral cavity is open growth system with an interrupted introduction and removal of microbes and their nutrients of all the types of microbes living in, our mouth in abundant number. It has been estimated that more than 600 different types of bacteria are present in saliva. Due to which periodontal diseases are occur severely. In which Streptococcus mutans, Staphylococcus aureus , Enterococcus faecalis, Streptococcus pyogens, Lactobacilli sp. are common infectors and results into dental carries and common encountered problem in dentistry is loss of teeth and consequential replacement by RPD/CD. However it has been reported that the presence of a prosthesis (RPD/CD) in oral cavity promotes the condition for establishment and accumulation of micro-organism. It increases infection to edentulous space and adjacent healthy teeth. Various antibiotics has proven to be effective in showing antimicrobial activity against gram positive and gram negative bacteria and fungi. So, instead of using oral drug (chlorohexidine) , the application of oral depositors reduces the chances of oral infection related to RPD/CD and minimize the formation of MDR sp. of micro-organism including bacteria and fungi. It also protects the liver and nerve system from damage due to excessive use of antibiotic.

Keywords: Oral microflora, RPD/CD, oral deposition

I. INTRODUCTION

Oral cavity is an open growth system with an uninterrupted introduction and removal of microbes and their nutrients .It offers diverse habitat where different spp. of microorganism can prosper. The primary requisite for any group of microbes to flourish in a niche and is their ability to adhere to tooth surfaces and multiply in shielded environment like periodontal packet and RPD crevices. The aggregates of microorganism that reside on the surface have traditionally referred to as plaque because of its yellowish colour of characteristics microorganism found there (1).

The aggregate of microorganism that reside on the surface and in deep layer of skin, in saliva and oral mucosa as well as in conjunctiva and in gastrointestinal tracts. The microflora existing in oral cavity is called oral microflora(7). Oral microbiology is the study of microorganism of oral cavity and their interactions between oral microbes or with their host.

The environment present in mouth allows the growth; the presence of nutrients, epithelial debris and secretions makes the mouth a favourable habitat for a variety of microorganism. Resident microbes of the mouth adhere to the teeth and gums to resist mechanical flushing from mouth to stomach where acid sensitive microbes are destroyed. The oral cavity represents a unique environment. Oral microbiology

at early stage: Although minute and primordial, bacteria were incredibly versatile and diversified judging by their number and biomass, they are arguably the most successful living organism on earth. They can tolerate environmental extremes and colonize almost every habitat on Earth, including human oral cavity (8).

At the time of birth oral cavity is composed solely of the soft tissue of lips, cheeks soft palate and tongue. Kept moist by salivary gland secretion. *Streptococcal spp.* will adhere strongly to gum and soft tissue. With the creation of gingival crevice area, increase the habitat for variety of anaerobic species (3). One of the commonly encountered problems in dentistry is loss of teeth and consequential replacement. Along with the restoration of function and aesthetic, removable prosthesis may change the oral ecology either qualitatively or quantitatively, such as increasing the total amount of oral microorganism or increasing a certain part of the oral microflora(8).

Disease due to bacterium can be prevented by maintenance of good oral hygiene and regular dental check-up; prophylactic antibiotic may be needed prior to major dental work and incident infections (3). All medications have side effects, when used appropriately antibiotic are relatively safe with typically few side effects. However some antibiotics are notorious for producing side effects that can be especially intolerable. An antibiotic side effect is known as an unwanted reaction that occurs in addition to the desirable therapeutic action of the antibiotic. Like any drug antibiotic side effect can occur and many interfere with patient's ability to tolerate and finish the course of medication (4).

Usually antibiotic treatment should not be stopped without a health care providers approval; all medication should be finished. Stopping antibiotic early due to side effects may allow the infection to worsen and may lead to antibiotic resistance, making an antibiotic less effective. Even if the infection

appears to have clear up before all of the medication is gone, the full course of antibiotic treatment should always be completed.

Antibiotic resistance is one of the biggest threats to global health food security and development today. Antibiotic are medicine use to prevent and treat bacterial infection, antibiotic resistance occurs when bacterial genes changes in response to use of these medicine or antibiotic. Bacteria become antibiotic resistant, these bacteria may infect human and infection the cause by resistant bacteria are harder to treat than sensitive bacteria(Guidelines by WHO). Antibiotic resistance is raising dangerously high level in all parts of world. A new resistant mechanism is spread and emerging globally. A growing list of infections such pneumonia, tuberculosis, blood poisoning, gonorrhoea and food born disease are become harder sometimes impossible to treat as antibiotic became less effective. Therefore to prevent and control and spread antibiotic resistance in different species of microbes, health professional can only dispense or local antibiotic when patient need, according to guideline given by WHO. Hence the scope of present study is cure oral infection arises due to RPD/CD are treated with application of oral depositors (antibiotic) RPD wearer patients

II. MATERIAL AND METHODOLOGY

A sample of 30 patients was included in study, 23 were females and 7 were males visiting prosthodontic clinic at Akola city in month August – September 2017. Complete history and examination was performed for study of common oral microflora and further study of oral depositors. All patients with denture RPD/CD subject to bacteriological examination. The oral rinse technique was used to study the oral flora. Patients were ask to rinse thoroughly and vigorously with 10 ml of sterile distilled water. The water was then cultured using streak plate method on Blood agar plate, culture for 24 hrs and incubated the Corn meal agar for suspected

Candidal growth was identified by conventional recognised method ,incubated at 23-27 degree Celsius for 3-4 days(1).

Composition of Blood Agar

Table 1

Peptone	0.5%
Beef extract	0.3%
Agar-Agar	1.5%
NaCl	0.5%
Sheep blood	5%
Distilled water	1000mL
pH	7.3

Composition of Corn Meal Agar

Table 2

Corn meal infusion form	50grams
Agar-Agar	15grams
pH	6.2
Distilled water	1000mL

RPD/CD in oral cavity promotes the condition establishment and accumulation of microorganism, it increase the infection to edentulous space and adjacent healthy teeth. In this study application of various local depositors were used in combined powder form i.e. Amoxicillin : Clavulanic acid potassium salt(5:1) , Amphicillin Sodium Salt, Erythromycine, Oxacillin sodium salt, Niastasin (Hi Media, Mumbai). These local depositors subject to apply on inner part of RPD/CD where it come in contact with edentulous space(10).

Under the study RPD/CD patients was asked to wear prosthesis with oral depositor application continuously for minimum period of 3 days. Oral rinse water technique was use to study for growth of microorganism. The rinse water was then cultured using streak plate method on blood agar and corn meal agar for bacterial and fungal growth respectively.

III. RESULTS

Sample Characteristics:

Table 1 illustrate the age, sex and distribution of sample among RPD/CD wearer. Age range of patient was 31-85 years. Mean age was 50.70 years and Mode was 40 years. It was found that 76.7% females and 23.3% males were carry prosthesis. Age range majority of patient 41-60 years was 60.1% while 31-40 years and 61-above 80 was nearly 40%.

Table 3. AGE, SEX AND DISTRIBUTION OF RPD/CD SAMPLE

Age Group	Sex		Total % RPD/CD
	Female No. (%)	Male No.(%)	
31-40	4(13.3)	3(10)	7(23.3)
41-50	8(26.7)	2(6.7)	10(33.4)
51-60	8(26.7)	-	8(26.7)
61-70	3(10)	1(3.3)	4(13.3)
71-85	-	1(3.3)	1(3.3)
Total	23(76.7)	7(23.3)	30(100)

Microbiological Findings:

Table 4 illustrate the no of patients having the occurrence of *Streptococcus mutans* ,*Streptococcus pyogens*, *Staphylococcus aureus* ,*Enterococcus feacalis* and *Candida albicans* before and after application of oral depositors. It was found that there was 80% irradiation of infectious microbes from oral cavity in RPD/CD wearer patients. Among 30 patients only 20% patients were found with *Streptococcus mutans* , *Streptococcus pyogens* with alpha and beta haemolysis on Blood Agar and *Staphylococcus aureus* shows Coagulase positive test along with haemolysis on Blood Agar respectively.

Table 4 Summarised the changes in predominantly cultured species in oral flora prior and after application of oral depositors in RPD/CD patients 20% among 30 does not show any change in

predominantly cultured microorganism after using combination of oral depositors after using minimum 3 days.

Candida albicans 26.66% was the most cultivated microorganism among RPD/CD wearer it shows almost total decrease in its population than pre treated visit .Among 30 patients the percentage of *Streptococcus mutans* (43.33%) ,*Streptococcus pyogenes* (13.33%), *Staphylococcus aureus* (10%) decreases upto 10%, 3.33%, 6.66% respectively while *Enterococcus faecalis* (6.66%) was not found in culture after application of local depositors.

Table 2 .Predominantly Cultured Oral Flora Distribution By Rpd/Cd Before And After Application Of Oral Depositors

Name of Microorganism	Common flora in RPD/CD pts.		Oral flora after application of depositors	
	No. of patients	%	No. of patients	%
<i>Streptococcus mutans</i>	13	43.33	3	10
<i>Streptococcus pyogenes</i>	4	13.33	1	3.33
<i>Staphylococcus aureus</i>	3	10	2	6.66
<i>Enterococcus faecalis</i>	2	6.66	-	-
<i>Candida albicans</i>	8	26.66	2	6.66
Total	30	100	6	20

A wide variety of the predominately cultured bacterial strain were found among females some strains were mostly cultured from female including *Streptococcus mutans* and *Candida albicans*. Table 3 illustrate sex wise distribution of microorganism in RPD/CD patients. Among 30 ,60% females having *Streptococcus mutans*(26%) ,*Streptococcus pyogenes*(6.66%),

aureus(6.66%) ,*Enterococcus faecalis*(3.33%) and *Candida albicans*(16.66%) while 40% males having *Streptococcus mutans*(16.66%) ,*Streptococcus pyogenes*(6.66%), *Staphylococcus aureus*(3.33%) ,*Enterococcus faecalis*(1.33%) and *Candida albicans*(10%).

Table 5. Predominantly Cultured Microorganisms Distribution In Both Sexes

Name of Microorganism	SEX		Total
	Female	Male	
<i>Streptococcus mutans</i>	8(26)	5(16.66%)	13(43.33%)
<i>Streptococcus pyogenes</i>	2(6.66%)	2(6.66%)	4(13.33%)
<i>Staphylococcus aureus</i>	2(6.66%)	1(3.33%)	3(10%)
<i>Enterococcus faecalis</i>	1(3.33%)	1(3.33%)	2(6.66%)
<i>Candida albicans</i>	5(16.7%)	3(10%)	8(26.66%)
Total	18(60%)	12(40%)	30(100%)

IV. DISCUSSION

The result of this study revealed that a fairly considerable change in oral flora does occur following the application of depositors. This is very acknowledge in literature and is of particular concern since oral treatment and essential to maintain oral health. This can be universal rather there is use of local depositors in RPD/CD patients. Host and properties of mouth are internal factors which is responsible for development of microorganism. Antimicrobial susceptibility depends upon particular bacterial strain, PH, nutrient availability, material, type, design of prosthesis and oral hygiene.

This study gives new drug delivery system because local drug delivery has been chosen as a better

treatment protocol over systemic therapy which maximise efficiency and minimise side effects. Dr. Sneha Gada and her co workers performed work on this new drug delivery system using 150 gms of Flucanazole powder and compare modulation efficiency with systemic therapy

Although fungi represents a minor percentage of oral microflora *Candida albicans* gives rise to dental Candidosis and stomatitis .The fact that this is the most common investigated microorganism is not surprising considering that one of the most common cause for RPD/CD wearer hence by using local depositors Niastasin (powder form) fungal growth can be minimise. Wala M. Amin and his co workers gives a new form of intraoral delivery of antifungal drug for treatment of denture induced oral Candidacies. Following the guidelines of WHO , health and dental experts should recommend local depositors and tropical antibiotic in permissible quantity which checks the formation of new resistant strain of bacteria and fungi.

In future scientist can use various combination of these drug in denture fixative and denture material, Dr. Addy from Dental School ,Cardiff performed work on in vitro studies into the use of denture base and soft liner material as carrier for drug in mouth in his study use of chlorohexidine acetate was incorporated in acrylic gel soft liner to minimise bacterial infections.

RPD/CD changes oral ecology which increases the risk of oral infection. Thus this study is imperative that a factor such as oral depositors maintains healthy oral function and environment. This study assure and maintained healthy oral function in RPD/CD wearer patients and prevent from organ damage from higher antibiotic dose which checks to form new resistant species of microbes.

V. REFERENCES

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