Research Article

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ESTIMATION OF BACTERIAL LOAD IN GINGIVA OF PATIENTS WEARING REMOVABLE DENTURES ATTENDING OUT PATIENT CLINICS FOR REVIEW

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INTRODUCTION

Dentures are inevitable part of modern dentistry. India has approximately about 7.7% of partial and completely edentulous population.[1] This population size is estimated to increase rapidly by the year 2030.[2] Factors concern with old age are decreased salivary secretion, compromised quality and quantity, reduced immunological responses and impaired self-defense system may facilitate the process of destruction of oral tissues such as gingiva. In this aspect, loss of tooth structures in old age people is a major concern.

Replacing lost tooth structures, helps maintain muscle tone, helps in chewing and breaking down food and facilitate normal phonetics and help the patient to enjoy the quality of life.[3,4]

Even though modern dental treatments such as implants are available, due the affordability and treatment duration, the demand for partial and complete dentures are high as they are economical and patient friendly. So removable prosthesis are still preferred more than implants and fixed partial dentures due to different factors influencing them such as cost efficiency, the ease of use, duration of treatment and long last characteristics of the treatment.[5]

Complete denture and removable partial dentures are the most widely used treatments for restoring the functions of lost tooth among the population. The removable partial dentures can be removed by the patients when they are not in use. Among the 13% of the geriatric population more than 50% are reported of wearing complete dentures or removable partial dentures1. Concerned care of the dentures and surrounding tissues such as gingiva and mucosal tissues of cheek of the geriatric patients is very important for maintaining overall health.

The introduction of the removable prosthesis into the oral cavity induces a lot of changes in the normal environment[6] of the oral cavity by increasing the total number of oral microorganisms and reducing the salivary flow and facilitating the growth of different types of bacteria such as *Streptococcus aurens, C.albicans, Eschericha coli, Diptheriod.*

It has been reported that majority of the denture wears do not practice necessary hygienic practices to keep the denture clean.[7] The different factors contributing to the lack of hygienic practices include lack of awareness about these practices, improper storage medium which leads to increased growth of microorganisms which gradually infects the gingiva.

The various diseases caused due the mechanical injury and chemical injury of denture on gingiva cause the inflammation of gingiva which leads to denture stomatitis, ulcerations, oral lesion, oral carcinoma, laceration, and chelitis and often associated with systemic injuries also.[8]

So this study was done in order to assess the bacterial load in gingiva of patients wearing Complete or removable partial dentures since any prosthetic material placed in mouth will make the oral cavity more susceptible to infections. There are many contributing factors, some of the major is the bio-stability of the denture materials and bio-host-ability.

MATERIALS AND METHODS

Study Design and Setting
The present study was conducted on patients attending the outpatient clinics of Saveetha dental college and hospitals. The present study was a randomized control study. 20 patients of age group 40 to 80 wearing removable dentures participated in the study. The ethical permission was obtained from the scientific review board of Saveetha dental college and hospitals before starting the study.

Selection Criteria
Inclusion Criteria

Patients wearing complete or partial removable dentures on a regular basis.

Exclusion Criteria

Patients with systemic diseases patients with fixed dentures and implants patients prescribed antibiotics or other medications for 3 to 6 months

Method of data collection
Sample size

A sample of 20 patients wearing removable dentures was included in the study where 11 males and 9 females where included in the study. Two complete dentures wears and eight removable partial denture wearers were randomly selected

Randomization

Patients fulfilling the above criteria of wearing removable dentures were divided into two groups of 10 patients each.

Control Group: Patients with natural teeth in normal gingiva without any removable denture.

Study Group: Patients wearing removable denture

Examination Procedure

Aseptic measures where strictly maintained while collection of samples, swab method was employed to collect the samples by the principle investigator. Swab was taken from the gingiva of patients wearing removable denture using a sterile cotton tip with Phosphate buffer system solution and transported to the microbiology lab of Saveetha dental college and hospitals by a transport media.

The collected swab sample was shaken well for equal dispersion of microorganism, then the PBS was inoculated onto Brain Heart infusion (BHI) Agar using spread plate technique.

The culture plate was incubated for 24h at 37C and absorbed for microbial growth.
The Colony forming Unit (CFU's) where manually counted and tabulated as CFU/microlitre.

RESULTS

The colony forming units where manually counted and tabulated.

Table 1: CFU count in gingiva of patients with natural tooth without dentures.

S.No	Sample	No of CFU
1	Control 1	302
2	Control 2	480
3	Control 3	1024
4	Control 4	1488
5	Control 5	584
6	Control 6	550
7	Control 7	confluent
8	Control 8	confluent
9	Control 9	confluent
10	Control 10	confluent

Table 2: CFU count in gingiva of patients with removable dentures.

S.No	Sample	No of CFU
1	Study 1	1920
2	Study 2	1232
3	Study 1 3	1200
4	Study 4	1600
5	Study 5	1224
6	Study 6	1280
7	Study 7	2000
8	Study 8	816
9	Study 9	confluent
10	Study 10	confluent

There is 40% confluent growth of bacteria in the control group which comprised of non-denture wearer, whereas there is 20% confluent growth of bacteria in the study group comprised of removable denture wearers.

Apart from the sample which gave confluent growth, the mean value of the bacterial population in CFU is 738 in control group which comprises of non-denture wearers, whereas in the study group which comprises of removable dentures wearers the CFU was 1409.

The bacterial load on gingiva of removable denture wearers is twice as much as in the gingiva of non-denture wearers

DISCUSSIONS

Increasing awareness of about modern dental treatments has urged people to replace the missing teeth with different types of dentures which restores the function of the tooth as well as maintains related structures such as muscle tone and movements.[3,4] The dentures are of two types, fixed and removable dentures. The removable dentures can be removed by the patient easily while fixed dentures are cemented to the adjacent tooth. The removable partial dentures which are easily removed by patients are easily prone to contamination very easily due to various environmental factors in the oral cavity.

The Denture which is a foreign material which is in the oral cavity elucidates various effects in the oral cavity which includes reduced salivary rate, gingival abrasions and related effects. These effects pave way to increased microbial growth in the oral cavity which has lots of effects in the oral environment causing diseases such as oral lesions and denture stomatitis.[8]

The removable dentures which are commonly used to replace missing tooth and restore aesthetics are made of Cold cure resin, polyvinyl acrylate which are highly porous which leads to increased microbial growth of bacteria in the denture.[9]

So many studies[10,11,12] have been done in order to estimate the bacterial load on the removable dentures from the patients and found high amount of bacterial load and prophylactic measures have been identified to reduce the bacterial load which is a primary cause for many diseases and infections the geriatric patients are suffering these days. Many measures have been taken to isolate the micro-organism from the dentures and find appropriate drugs which can inhibit and terminate the growth of microorganisms in the denture.

There were also studies which showed that different species of bacteria such a streptococcus Mutans, Streptococcus Aurens were found in dentures which was used for a month by the patients, while different species of bacteria was found to be in dentures which was used for 3 months and 6 months.[13]

Because of the increase in bacterial load in dentures, infections are caused which causes discomfort to patient and lead to disuse of the dentures because of the discomfort and pain caused by the infections caused due to bacterial colony in dentures.[3,10]

But none of the studies have attempted to check the microbial load on the gingiva of edentulous region of the patient wearing removable partial dentures. This study attempted to estimate the microbial load on the gingiva of the patients wearing removable partial dentures.

There are various factors which could have influenced the results of this study which includes the type of denture material used to fabricate the dentures, the duration of the denture placed in oral cavity, personal hygiene habits of the patients and the patient's oral cavity.

The type of material used to fabricate the denture has a high chances of influencing the results as some of the material are highly porous which can facilitate the growth of microorganisms and provide a good source of adhesion to the denture as the highly porous surface increases the surface area and all the roughens of the surface gives a good adhesion to the microbes to the surface. Some materials which are smooth and not highly porous do not facilitate the growth of microbes in the oral cavity.[8]

The duration of the denture placed in the oral cavity also is considerable factor which needs to be accounted for because when the denture remains in the oral cavity for a very long time, the chances of the increased or accelerated bacterial growth is witnessed and when the denture is placed for very short duration, the growth of bacterial colonies have identified to be low.[8,9]

The patients oral cavity and personal hygiene habits are minor factors which can influence the microbial count, if the patient does not practice the basic oral hygiene techniques such as brushing and rinsing of the oral cavity, the possibilities of increased microbial activity is seen whereas in patients practicing these techniques have reported less infections due got microbial growth.

CONCLUSION

The bacterial load on the gingiva of patients in the edentulous region who are wearing removable partial dentures was twice as much as the bacterial load on patients who are non-denture wearers. So patients wearing removable dentures are twice prone to the risk of bacterial infections such as denture stomatitis, Candidiasis and other infections in oral cavity than the non-denture wearing patients. The main source of infections in denture wearing patients was not the microbial load on the denture but on the gingiva of the patients wearing removable dentures. So these patients need extra prophylactic measures such as using herbal mouth wash and fruit juices to rinse their mouth which is proven to be effective against a wide spectrum of microbes to prevent bacterial accumulations.

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