Microbial contamination of removable denture before and after insertion

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Abstract

In this study, we intend to evaluate the microorganism that colonizes the oral cavity after using a complete denture the study involved 43 patient attending prosthodontics clinc at dentistry department in Al-Yarmouk university college.
pre and post insertion samples were taken for each patient. The results indicated that all patients gave positive mixed bacterial growth with predominant of **Staph. aureas** and **Strep. spp** and appearance of candida after one month of denture use.

Key words : Oral cavity, Staph. aureas , Strep.spp, Candida , Denture

الخلاصه

في هذا البحث حاولنا ان نقييم الاحياء المجهريه التي تتمركز في تجويف الفم بعد استعمال طقم الاسنان الكامل .
الدراسه تضمنت ٤٣ مريضا راجع عيادات صناعة الاسنان في قسم طب الاسنان-كلية اليرموك الجامعة.
اخذت العينات من فم المرضى قبل وبد استعمال طقم الاسنان.
النتيجة ان كل المرضى كانوا يحملون بكتريا مختلطه من النوع الموجب لملون غرام والبكتريا المسيطرة هي من نوع المكورات العنقوديه و المكورات المسبحيه و كذلك ظهور الفطريات بعد شهر من استعمال طقم الاسنان .

كلمات المفتاح : تجويف الفم ، المكورات العنقوديه ، المكورات المسبحيه ، الفطريات ، طقم الاسنان

Introduction

Since the number of edentulous and denture users is increasing, investigating their oral micro-flora is becoming increasingly important However, complete removable denture usually used for aesthetic concerns is also used in order to return the natural teeth functions in edentulous elderly. Human oral cavity consists of a mass of microorganisms, which may be altered by the application of complete removable denture in edentulous patients[8].The age-related changes in their salivary flow and oral micro-flora will affect the health of their oral tissues[4]. Denture stomatitis, formerly known as denture sore mouth is an inflammatory disorder of the mucosa following the use of complete dental prostheses reported in about 60% of denture wearers. The attachment of the elderly oral micro-flora on the denture fitting mucosal surface particularly on maxillary part resulted in microbial plaque, which may have caused the condition.Since many opportunistic microorganisms are capable of adhering

and surviving on the denture acrylic resin surfaces, dental prostheses may act as a potential source of infection in elderly denture users. A wide diversity of oral and non-oral micro-flora such as Staphylococcus spp., Streptococcus spp., Candida spp., Lactobacillus spp., Pseudomonas spp., Entrococcus spp., and Actinomycss spp. are associated with denture biofilm. The presence of such microbial contamination may result in several local and systemic infections] such as periodontal disease, caries, mucosal inflammation, urinary tract infections, pneumonia, abscess and even endocarditis[7]. Walter et al. concluded that in the early stages of denture stomatitis development, a bacterial inflammation very similar to bacterial gingivitis was mainly seen due to lack of oral hygiene versus a fungal infection [10]. However, several other studies reported Candida colonization especially C. albicans, as the main etiologic agents responsible for the development of this opportunistic infection [11, 12].

Jafary et al showed that complete denture can act as a predisposing factor in the overgrowth of several oral micro-flora particularly Candida, non-aureus Staphylococci, α-hemolytic streptococci, gram negative cocobacillus, non-pathogenic Neisseria, and Corynebacterium, which emphasized the users denture hygiene.

He also confirmed that the insertion of a denture in patients with no previous denture experience was associated with significant changes in the composition of their oral micro-flora. These changes may persist and could result in plaque formation with considerable pathogenic microorganisms in edentulous denture users[8].

Materials and methods

43 patients visited prosthodontics clinic in Al-Yarmouk university college of dentistry department would like to have acrylic removable complete denture were involved in this study. Denture were fabricated to each patient 31 had upper 4 lower while 8 had upper & lower complete denture

Mean age of the patients was (63.13± 13.74) with a range from 34-88 year the highest incidence was in the 6 & 7 decade there were 25 male & 18 female

Bacterial identification regardless of the method used , first requires the cultivation isolation and gram-staining after colony characteristic, cell morphology and gram reaction is been determined species identification is done by biochemical tests oral swabs were taken for each patient before and after denture insertion for bacteriological assessment

Bacterial isolation

Swabs were emulsified in nutrient broth and directly cultured agar (sabourauds agar) medium according to raymound 1892 & macconky agar according to Alfred 1912. Grams stain was performed for each swab

Results

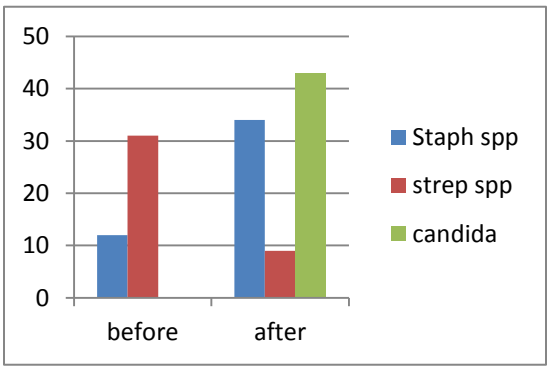
As shown in table 1 the mean age of patient was (63.31±13.74) 23.6% with lower denture and 76.4% with upper denture.

All patients gave +ve mixed bacterial growth with predominantly of staph. aureas spp in 28% of the cases and 72% strep. but after one month of using

denture 34 of patients gave growth of mixed bacterial species while only 9 patients gave positive growth for Candida albicans 20.94%

Results of Optocin sensitivities tests

The results indicated among the 29 samples isolated of streptococcus 89.65% were streptococcus mitis and 2 samples 6.89% were streptococcus pneumonia and one isolation 3.46% was streptococcus pyogenes (Beta hemolytic)



comparison of predominant Microorganism

Denture insertion	Predominant growth of		Candida
	Staph. Spp	Strep. spp	
Before insertion	12 (swap) 28%	31(swap) 72%	NON
After insertion	34 (swap) 79.06%	9 (swap) 20.94%	100%

Table1: percentage of predominant Figure 1: micro-organism isolated

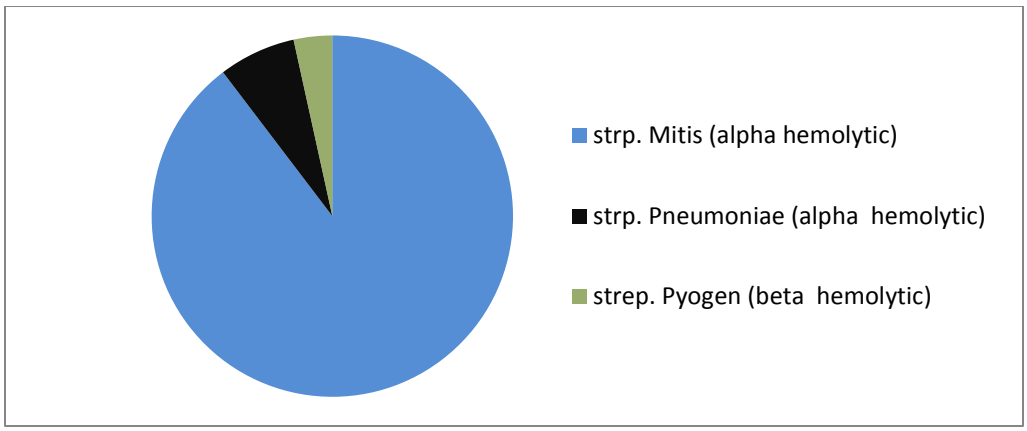


Figure 2: Results of Optocin sensitivities tests

Discussion

The number of elderly people worldwide has been increased by increasing lifetime. This condition resulted in a high prevalence of edentulism and complete denture wearers]. Removable prosthesis may be potential source of several diseases. Oral cavity is colonized by various pathogens and this microbial reservoir can cause several infections including denture stomatitis, aspiration pneumonia, and lung and gastrointestinal infections]. Denture stomatitis is possible source of infections in especially immunosuppressed patients.

Campos et al collected samples from

both the oral tissues and corresponding regions on the intaglio surfaces of the dentures in patients who were healthy (had no inflammation), and from patients with denture stomatitis. They identified 82 bacterial species in healthy patients and those with denture stomatitis, including three types of Candida species However, bacterial phylotopes were found only in the healthy denture wearers (with a strong representation of Streptococcus spp), while phylotopes were exclusively found in those patients with denture stomatitis. In this study,The results reflected the microorganisms were predominant in the oral cavity where the denture was found beside the appearance of candida albicans in the area that was negative before denture insertion, This is in contrast with Abd Alateef findings that concern fungi, the existence of candida albicans after one month of complete denture insertion was slightly reduced from 10.7% to 7.2% and this result is also far less than the level registered from oral mucosa in AL-Aswad study. This contrast may be due to the duration of wearing the denture at day only or day and night also the motivation that the patient may receive plays a role in the results. Several previous studies reported a decrease in and even disappearance of many bacteria such as Streptococcus mutans, a troublesome anaerobes usually found in human oral cavity in edentulous people before wearing the denture. Careful daily removal of the bacterial biofilm present in the oral cavity and on complete dentures is of paramount importance to minimize denture stomatitis and to help contribute to good oral and general health. Chemical methods may be recommended for patients with candidiasis to clean the acrylic resin dentures Nishi et al. reported that daily soaking of dentures in a denture cleanser was effective method for reducing the quantities of microorganisms adhering to dentures.

Conclusion

The results of the present study confirmed that the insertion of a denture in patients was associated with significant changes in the composition of their oral micro-flora. These changes may persist and could result in plaque formation with considerable pathogenic microorganisms in edentulous denture users. Correct prosthetic use and daily hygiene are important factors for good oral health.A more extensive longitudinal study on the flora of patients with denture is required to show the formation of plaque rich in Streptococcus, coccobaciluls or Candida which are specifically associated with the risk of denture stomatitis.

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