

THE USE OF TOBACCO AND BETEL LEAF AND ITS EFFECT ON THE NORMAL MICROBIAL FLORA OF ORAL CAVITY

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ABSTRACT

The use of tobacco, betel nut, betel leaf (pan) and chillies cause certain changes in the oral cavity because of different chemicals they contain. A total of twenty five patients were examined, both male and females, ranging between 10-70 years. Oral examination was carried out and most of them presented with, submucous fibrosis or blanched mucosa. Samples from oral cavity were collected with sterile swabs, swabbing it all round in the oral cavity and carried to the laboratory for both aerobic and anaerobic in Robertson's cooked meat medium(RCM) for further processing. The growth in the culture medium was specifically looked for the normal microbial flora of oral cavity i.e Streptococcus viridans, Coagulase Negative Staphylococcus, Diptheroides, Neisseria catarrhalis (aerobic flora) and the anaerobic flora. In twenty five patients most of them had no normal microbial flora except five patients who showed presence of 4 to 5 colonies i.e scanty growth of Streptococcus viridans indicating that the normal microbial flora was reduced considerably in these patients. Such patients are more prone to develop precancerous conditions and ultimately the carcinoma of the oral cavity with hundred percent reduction in the normal microbial flora.

Key words : Betel leaf, Oral cavity, normal microbial flora, submucous fibrosis

INTRODUCTION

It is a common practice in rural parts to take tobacco which is also known as misri (burnt tobacco) and place in the inner side of the lower lip. They say it is psychotropic, and have a euphoric feeling. The contents of tobacco are – nitrosamines (nicotine), polycyclic aromatic hydrocarbons, polonium, nitrosodiethineal amine and nitrosoproline. They also chew pan or betel nut to which a variety of spices are added. These products of pan and tobacco have psychotropic and antihelminthic activity due to the presence of areca alkaloids, predominantly arecoline and lauric acid. These alkaloids have powerful parasympathetic action, produce euphoria, and counteract fatigue. The products of betel nut are antiseptic, bactericidal and

antioxidant as reported by few investigators. They also consume chillies in dried powder form or raw at every meal. The capsaicin in chillies has been shown to produce mild changes in connective tissue in wistar rats similar to oral sub mucous fibrosis^[1]. And similarly the chewing of tobacco and products of betel nut are significantly contributing factors for the oral submucosal fibrosis. Therefore it was observed that in all these cases normal flora of the oral cavity was reduced and they developed submucosal fibrosis which leads to leukoplakia or cancer of the oral cavity^[2,3]. Betel leaves, cardamom and clove individually or in different combinations are able to inhibit the population of oral microorganisms^[4]. In mid western part of Maharashtra, Loni (village), the use of tobacco and betel leaf is abundant, therefore this study was undertaken to find the effects of these products on the normal microbial flora of the oral cavity.

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MATERIAL AND METHODS

The study included twenty five patients visiting oral surgery OPD of Rural dental college with following complaints.

1. Burning sensation in the oral cavity
2. Vesicles and ulcer formation
3. Stiffening of mucosa
4. Reduction in mouth opening
5. Periodontitis, gingivitis and pocket formation
6. Blackening of the teeth
7. Dryness of the mouth
8. Inability to whistle
9. Difficulty in swallowing

On oral examination following features were observed in most of the patients.

1. White mucosal lining could be easily seen in habitual tobacco chewers in the area of tobacco contact called tobacco keratosis or tobacco pouch keratosis.
2. Many mucosal alterations
3. Gingival recession
4. Most common area of involvement was the anterior mandibular vestibule followed by posterior vestibule
5. Surface of mucosa of oral cavity appeared white and was granular or wrinkled
6. Periodontal tissue destruction in the immediate area of contact
7. Oral mucosa, appeared grayish white and almost translucent
8. The area under the tobacco in the oral cavity appeared white, wrinkled or rippled
9. Oral mucosa appeared blanched and slightly opaque
10. Uvula was often reduced in size, with compressed tonsils. Fibrosis was seen spreading up to pharynx.

11. In the lip, circular bands of fibrosis around the entire rima oris, and bilateral dark brown hyper pigmentation of the commissure was present.

Swabs from oral cavity were collected, rolling it across the lesions as well as whole oral cavity and transferred to microbiology laboratory for both aerobic and anaerobic (in RCM) for further processing. Direct microscopic examination was done by Gram staining. Culture for the same was done on blood agar, MacConkey agar and RCM media incubated both aerobically and anaerobically respectively for identifying the organisms. Swabs from oral cavity of 20 people (comprising of teaching and non-teaching staff from the Department of Microbiology, RMC) were taken as the control group.

RESULTS

Swabs taken from the oral cavity showed following results as shown in Table -1. Due to insignificant presence of bacteria, colony count was not done, however all the patients showed hundred percent reduction in normal flora. Swabs taken from the oral cavity of control group showed following results as shown in Table-2

Sr. No.	Bacterial growth	No. of Patients	Total no of patients	Percentage
1	Streptococcus viridans	05	25	20
2	Pseudomonas aeruginosa	05	25	20
3	Klebsiella spp.	02	25	08
4	Leptotrichia(Anaerobic)	01	25	04
5	Candida albicans (fungus)	01	25	04
6	No growth of any micro organisms	11	25	44

Table 1: Organisms isolated by oral swab from the patients

Sr. No	Bacterial growth	No. of controls	Total no of controls	No of CFU per ml of saliva
1	Streptococcus viridans and CONS	15	20	> 1 lakh
2	Streptococcus viridans, CONS and Diptheroids	05	20	> 1 lakh

CFU= colony forming unit

CONS= Coagulase Negative Staphylococci

Table 2- Organisms isolated by oral swab from the control group

DISCUSSION AND CONCLUSION

The normal flora of the oral cavity comprises of both aerobic and anaerobic organisms. Aerobic flora normally consists of - Streptococcus viridans, Coagulase Negative Staphylococci (CONS), Diptheroids and Neisseria catarrhalis. The anaerobic flora shows predominance of Lactobacilli, Leptotrichia buccalis and Veillonella. The common fungus which inhabits the oral cavity is Candida albicans. The count of normal flora is more than one lakh bacteria/ml of saliva (CFU-colony forming unit).

Our study showed reduced flora (five colonies of Streptococcus viridans), some showed environmental bacteria like Pseudomonas aeruginosa, Klebsiella and Candida albicans was grown in one. Anaerobically, only one sample showed growth of Leptotrichia and not even normal flora was grown in the remaining samples. Our patients presented predominantly with submucosal fibrosis which lead to reduction of microbial flora. When the disease extends to the pharynx the patient may complain of referral pain in the ears, occlusion of Eustachian tube leading to deafness. Our patients were chronic tobacco eaters taking 25-30 gutkas / day. It affects 2-5 million people mostly in the Indian subcontinent. This can occur in any decade but the majority of our patients were between 20-40 years of age. Most of the reports suggest that there are no sex predilections. The high incidence of disease was

found to be associated with the use of areca nuts^[5]. A kind of hypersensitivity to chillies was suggested by Pindborg and Sirsat in 1966^[6].

The hyperkeratosis is due to the habit of chewing areca nut with tobacco. The cause of submucous fibrosis is still obscure^[7]. Microbial flora starts decreasing after fourth week of chewing betel leaf. The patients in our study gave the history of chewing betel leaf from 3 months to 25 years. Similar study was carried out by Sharad B et al^[4] which showed reduction in oral microbial flora to approximately 56% as compared to control where microflora reduction was 50% in the the betel leaf chewers. Thus it was observed that tobacco, betel nut and chillies reduced the normal oral flora to a great extent. Clinically the patients showed submucosal fibrosis (cancerous condition). This is predominantly seen in India and to a lesser extent in other Asian countries due to frequent tobacco chewing habits.

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