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Comparative Study of the Microfloral of the Oral Cavity in Sick and Healthy Adults in Enugu State

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ABSTRACT

Twenty eight adults were used for this comparative study of the microbial flora of the oral cavity in sick and healthy persons. Of this number, eight were confirmed typhoid subjects while the rest were confirmed healthy subjects used as control. Oral swab specimens were cultivated in nutrient agar, mackonkey agar and in sabroid agar, gram staining, total viable count of colonies, fungal types and ratios of cell types were performed with the organism carefully isolated from four different parts of the mouth of the subjects.

The results obtained from the mouth of the subjects with typhoid disease when compared with control subjects showed that the typhoid subjects had reduction in total viable count of colonies (10^6 org/ field in the teeth, gum and saliva). The gram reaction of most of the bacteria were positive. The only fungal type isolated is candida albicans. There is also reduction in the cell type(gram positive cocci and gram negative rods to gram negative rod).it is therefore concluded that typhoid disease affects the bacterial concentration of the buccal cavity.

INTRODUCTION

The alimentary tract consists of five major parts; the mouth, the stomach, the large and small intestines, the pharynx, and the anus. It provides the body with continuous supply of water, electrolytes and nutrients (Guyton 2006).

Microorganisms are generally regarded as living forms that are microscopic in size (Cruishank 1973) and relatively simple, usually unicellular in structure. The diameter of the smallest body that can be resolved and seen clearly with the naked eye is about 100microns. These micro-organisms live in our body including our mouth, hence the aim and objectives of these study is to identify and isolate the micro-organisms in our mouth in disease stage such as typhoid fever. The need for the comparative study of the micro flora of different part of the oral cavity of healthy and sick person such as typhoid is very important and useful.

The mouth is the beginning of the gastrointestinal tract and to suspect that micro-organism such as normal flora and salmonella could live there calls for interest and more over to know if this organisms are commensals as a result of the site they are living in the mouth and can get to another part of the body. Again, this study will help one to co-relate if it is due to the activities of these micro-organism in the mouth that used to bring about soured mouth when one wakes from night, makes people to suffer tooth ache, swollen gum, diseases of the tooth, ulcerous and swollen cheeks. The general observation of the activities of the micro-organism in the mouth made it necessary to determine the microbial load of different part of the mouth.

The mouth or buccal cavity is the entrance to the digestive tracts located in the face. It extends from the lips to the back of the tongue where the pharynx begins. The whole of the cavity is lined with a mucous membrane. Small mucous glands are scattered throughout the membrane except on the outer surface of the lips. In the mouth are located the teeth, the tongue, and salivary glands.

Microorganisms, if they can live in any particular environment especially in the mouth of healthy human adults must have regular supply of nutrients and the site of their habitation must be favourable for their continual existence in the body without being destroyed or wiped out by the host tissue activity, hence the term commensalism.

Parasitic micro-organism are either commensals or pathogenic (Cruishank et al, 1973).commensals constitutes the normal flora of the human body. They live on the skin and on the mucous membrane of the upper respiratory tract, the intestine, female genital canals and they obtain nourishment from the secretions and food residues. Since normally they do not invade the tissues, they are generally harmless, though under certain conditions, usually when the body defence are impaired, they invade the tissues and cause disease, thus acting as opportunistic pathogens while the true pathogens are the parasitic microorganisms that are adapted to overcoming the normal defence of the body establishing their growth in the tissues, producing poisonous substances or toxins, often causing damage to the tissues and thus manifestations of diseases.

Many commensal or non-pathogenic microbes are transmittable from person to person (Cruishank et al, 1973) or from the environment, they present often in numbers, on the skin, in the upper respiratory tract, the intestine and the lower genito-urinary tract and as much they constitute the normal bacterial floral of the body and may play some part in the body's defence against invading pathogenic microbes. Their infectivity is low, since they are unable to overcome the defence at the healthy body and invade the tissues. Some of the commensals are potentials or opportunistic pathogens in the sense that they are able to initiate infection if they leave their natural habitat and gain access to other part of the body example of such is coliform bacilli. Streptococcus iridans a common commensal in the mouth and oropharynx, may get into the blood stream after tooth extraction and cause sub acute bacteria endocarditis if it gets into the blood stream and settle on previously damaged or deformed heart disease.

MATERIALS AND METHODS

Subjects: Consists of those who reported in various hospitals within the Enugu metropolis and were clinically diagnosed of enteric fever and healthy subjects who tested negative in the widal reaction test constituted the study population.

Obtaining of Samples for Study: The 28 swab samples used in this study were collected from healthy subjects and typhoid subjects taking chloramphenicol capsules in various hospitals' within the Enugu metropolis. The samples were collected from the surface and under the tongue, saliva and gum located in the left and right mandible using the sterile swab sticks.

Methods: Culturing of samples were carried out by the prescribed method by Baker et al 1985. Gram staining as prescribed by Baker and Silverton 1985. Bacterial colony counts were done by method described by Baker et al 1985.

Statistical Analysis: The total viable counts of colonies and the organisms isolated from the different sites of the oral cavity were recorded. The parameters were compared for healthy (control) and sick subjects testing at 5% level of significance using the students´ t. test.

RESULTS

Table 1: Shows total viable count of colonies and gram stain reactions of bacteria in the different sites of the mouth in healthy adults and typhoid subjects

SUBJECTS	SITES OF MOUTH	TOTAL VIABLE COUNTS OF COLONIES OR $<10^6$ORGS/FIELD	GRAM REACTION	
			+ve	—ve
HEALTHY SUBJECTS OR CONTROL n=20	Underneath and surface of tongue	$>10^6$orgs/field	+ve	No reaction
	Teeth	$<10^6$orgs/field	+ve	No
	Gum located in the left and right mandible	$<10^6$orgs/field	+ve	No reaction
	Saliva	$>10^6$orgs/field	+ve	No
TYPHOID SUBJECTS n=8	Underneath and surface of tongue	$<10^6$orgs/field	+ve	—ve
	Teeth	$<10^6$orgs/field	+ve	No
	Gum located in the left and right mandible	$<10^6$orgs/field	+ve	No
	Saliva	$<10^6$orgs/field	No reaction	—ve

KEY	< = Less than	+ve = Gram positive
	> = Greater than	—ve = Gram negative

Table 2: Fungal types and ratios of cell types in typhoid disease and healthy subjects

SUBJECTS	SITES OF MOUTH	FUNGAL TESTS	RATIOS OF GRAMS —VE COCCI TO GRAM +VE COCCI	CELL TYPES GRAM +VE TO GRAM —VE
HEALTHY PERSONS OR CONTROL n=20	Underneath and surface of the tongue	Candida albicans	1:5	1:1
	Teeth	Non	0:16	9:5
	Gum located in the left and right mandible	Candida albicans	<1:11	5:4
	Saliva	Candida albicans	1:16	1:1
TYPHOID SUBJECTS n=8	Underneath and surface of the tongue	Candida albicans	0.5:2.5	0:1
	Teeth	Non	0:1	3:2
	Gum located in the left and right mandible	Candida albicans	<1:3	3:1
	Saliva	Candida albicans	0:3	0:1

KEY	> = Greater than	+ve = Gram positive
	< = Less than	—ve = Gram negative

DISCUSSION

Investigators such as Davis (1973) have previously pointed out that the oral cavity is flooded with commensal organism which sometimes causes dental disease (Gibbon, 1973). Parasitic micro-organisms are either commensals or pathogenic (Cruishank, 1973). Commensals constitute the normal flora of the healthy body. They live on the skin and on the mucous membranes of the upper respiratory tract, the intestinal and the females- genital canals, and obtain nourishment from the secretions and food residues. Since normally they do not invade the tissues, they are generally harmless; though under certain circumstances usually when the body defenses are impaired, they may invade the tissues and cause disease, thus acting as opportunistic pathogens. The oral cavity represents the number of surfaces and crypts for the colonization of micro-organism. Since nutrients are scarce except during meal, microbial growth is generally slow (Gibbon, 1973). According to Gibbon, large dense population accumulate on tooth surfaces (Dental plague), on the dorsum of tongue and in the gingival crevice area. The results obtained in this study (Tables 1 & 2) in healthy adults and in typhoid subjects shows that in typhoid subjects there is a drastic reduction of bacterial load or (count much less than 10^6 organisms/field) underneath and surface of tongue, in the teeth, gum located in the left and right mandible and also in the saliva. Candida albicans was the only fungi isolated in the buccal cavity in the healthy and sick states (Table 2). There is tendency that during the early stage of the infections that rapid multiplication of the bacteria present in the mouth occurs due to the presence of the invading salmonella organisms. This rapid multiplication of the bacteria (Table 1) present in the oral cavity is to help fight the salmonella organism and this protect the oral cavity, but in the later stage of the infection, they decrease in number due to antibiotic (Chloramphenicol, etc.) therapy killing the salmonella germs. The reduction of the bacteria count ratio to cell types in the presence of antibiotic is due to the fact that those normal flora in the mouth and the salmonella antigen are sensitive to it. Candida albicans remained unaffected by the antibiotic used. The normal flora regain their strength and property to multiply when the effect of the antibiotic is over in the body.

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