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Incidence of Tooth decay and Its Percentage Bacterial Load in Mbaitolu Imo State of Nigeria.

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ABSTRACT

A toothache is mild to severe pain in or around the teeth and jaws. The occasional sight of persons holding the jaw and groaning of aches necessitated this study.

Thirty (30) subjects consisting of male and female persons identified as having toothache and visiting dental centres were selected for this study to evaluate the percentage bacterial load present in the diseases. Many methods were adopted in identification of various bacteria in the samples of patients collected with swab sticks from site of the infected tooth.

The samples were incubated for 24 to 48hrs and after that, colonies were isolated and treated further with HLR-S (High level resistant to streptomycin) agar, agglutination, immunofluorescence a dot blot immunoassay procedures and electron microscopic tests to identify the bacteria among the mixed colonies.

Streptococcus mutans was identified as the highest (60%) occurring bacteria in tooth decay followed by Actinomyces specie (30%) and others such as Lactobacillus (5%) S. Sobrinus (3%) and Atopium Specie (2%).

In periodontal disease the highest occurring virulent bacteria is Treponema denticola (55%) followed by P.gingivalis (30%) peptostreptocaccus (10%) and others.

Aggregatibacta (3%) and F. Mucleatum (2%). It could be deduced that the highest percentages occurrence of T.dentcola and S. mutans in tooth problem could necessitate the aches and necrosis involved in tooth aches.

INTRODUCTION

Toothache can be regarded as a common dental problem that affects persons of all ages. It is characterized by pain or discomfort in the teeth, jaws, and gums. The intensity of the pain can range from mild to severe. A toothache is not a disease but an indication that there is a malady in the tooth or gum.

Toothache pain can strike at any time leaving one feeling miserable and desperate for relief. Some times the victim under a helpless conditions tries to get relief by pressing sharp objects such as broom sticks, pins, needles, knives in between the tooth or they hold their chin in their hand looking sad.

The intensity of the pain can range from mild to severe state. The mouth is colonized by 200 to 300 bacterial species (Loeche, 1986).

Micro organisms 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 100nm.

Microorganisms include bacteria, fungi and virus.

Bacteria:

They are microscopic unicellular organisms which can be classified into the following cell type. The ovoid or spheroid called coccus; the red or cylindrical bacillus, the curved vibrio, the spiral shaped spirillum and coil shaped spirochaetes. The coccus (Plural cocci) size 0.5-1.0µm in diameters. Cocci generally have one axis approximately equal to any other axis, sometimes the cell is thickened (giving rise to a kidney shaped cell) or distorted in some way as to depart from the spherical shape e.g in streptococci.

Bacteria can be commensals (non pathogenic) or pathogenic and so are adapted to overcoming the normal defences of the body and establish their growth in the tissues producing poisonous substances or toxins often causing damage to the tissues.

The tooth surfaces are unique in that they are only the body part not subject to metabolic turnover. Once formed, the teeth are indestructible, yet in the living individuals the integrity of the teeth is assaulted by a microbial challenge so great that dental infections rank as the most universal affliction of human kind (DZink et al, 1988). The discomfort caused by these infections and their enormous cost gives dental diseases prominence despite their non life-threatening nature (Dzink et al, 1988).

Three types of tooth infections can cause abscesses; they are:

Gingival: It develops in the gum

Periapical: it is an infection that forms at the tip of root of the tooth

Periodontal: This infection starts in the bone and tissues that support the teeth.

Causes of Tooth decay

Dental Decay: This is as a result of the irreversible solubilization of tooth mineral by acid produced by certain bacteria that adhere to the tooth surface in bacteria/communities known as dental plaque (DZink et al, 1988).

Causative organism is streptococcus mutans: it is a gram-positive bacteria which constitute biofilms on the surface of teeth. Various lactobacill: are associated with progression of the lesion.

Teeth Grinding (Bruxism): It is the grinding or clenching of teeth. This can result to pain

Periodontal disease: This can establish itself when the gums detach from the teeth as a result of an inflammatory response to plaque (Lamster, 1992).

Causative organism in periodontal infections are usually mixed most often involving anaerobes such as Triponema denticola and Porphyromonas gingivalis. There is no apparent pain until very late when abscesses may occur. Bleeding gums and bad breath may occur.

Cavity: This is a hole in a tooth that develops from tooth decay. Cavities form when acids in ones mouth wear down (erode) ones tooth's hard outer layer (Enamel).

The menace of toothdecay and tooth infection is on the high level in our locality hence our curiosity to embark on this research to find the bacterial load, the etiology of the disease and the causative bacteria.

MATERIALS AND METHODS

Experimental Design

Subjects:

Thirty (30) subjects consisting of male and female subjects residing at Mbaitolu Imo State attending Baptist Dental clinic were selected for this study.

Bacteriological Studies

Swab samples were collected from the subjects suffering from tooth decay and periodontal disease using sterile swab sticks and cultured in blood agar medium, saboureid agar media, mackonkey agar media and nutrient agar media using the method of culturing techniques as described by Baker and Silverton 1998. The cultured samples were allowed to incubate in anaerobic condition for 24-48hrs before reading out and examining the isolated organisms.

Catalase and Coagulase tests were done using the procedure described by Baker et al, 1998.

Gram Staining test was carried out using the procedure described by Baker et al, 1998.

Identification of Species of S. mutan

The typical colonies of streptococcus mutans in plaque were determined using selected agar such as HLR-S (High level resistant to streptomycin) Agar. The plaque was inoculated on a HLR-S agar medium in the laboratory. The role of the medium was to support the growth of the tested micro organisms and inhibition of the remaining species found in the saliva.
Colony counting was also performed.

Identification of species of T. denticola

The strains of Treponema denticola were identified to the species level by various methods such as agglutination, immunofluorescence, a dot blot immunoassay procedures, electron microscopy.

RESULTS

The results obtained from this work were represented with histogram.

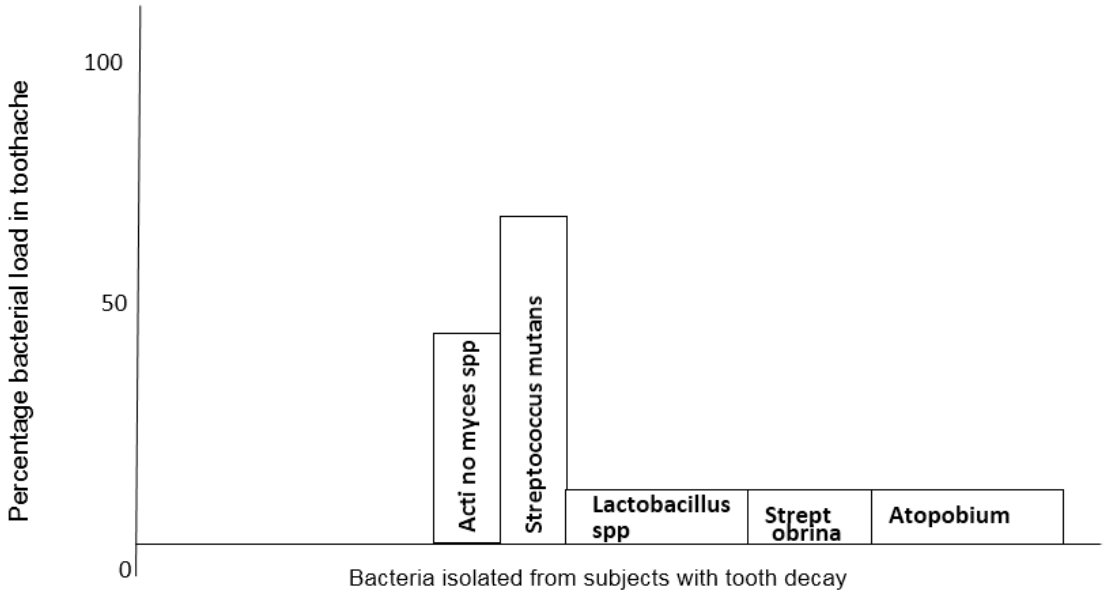

Figure 1: Percentage bacterial load in subjects with Tooth decay.

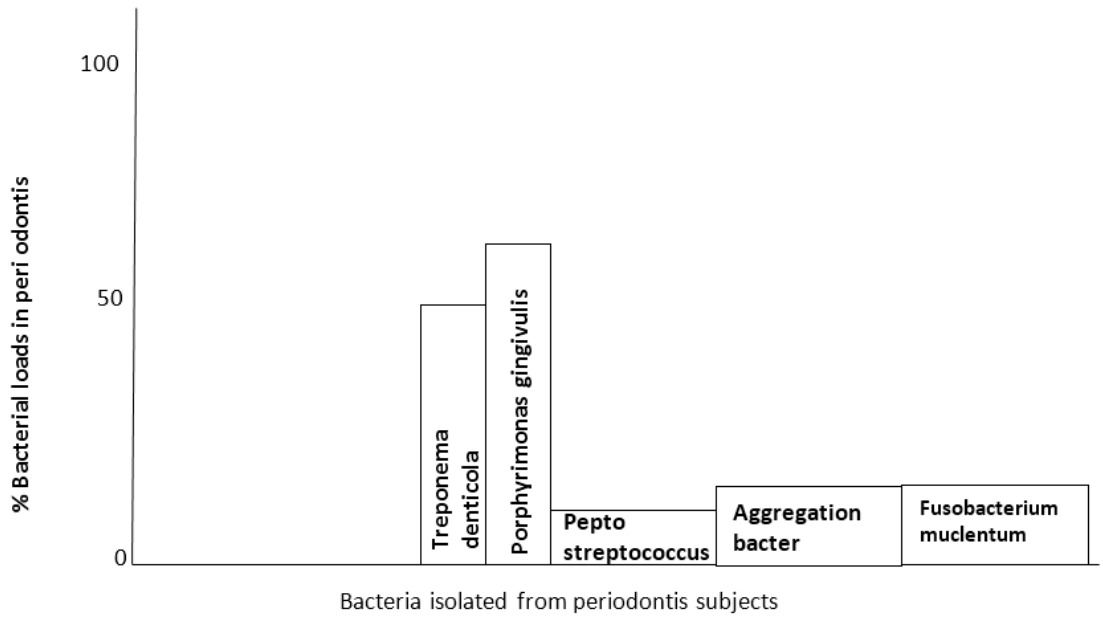

Fig 2: percentage bacterial load in male and female subjects with periodontal disease

DISCUSSION

The incidence of tooth decay and its percentage bacterial load in Mbaitoli local government area of Imo State Nigeria has been studied.

Dental decay occurs at discrete sites on the surface of the enamel. Progress through the enamel is usually slow because of the remineralizing action of the saliva. Also the microbiologic diagnosis of a simultaneous lactobacilli infection is rarely sought primarily because the acute pain that brings the patient to dentist is almost always relieved by a dental restoration or extraction. (Christerson et al, 1987).

The result of this study shows that only few virulent bacteria causes toothaches and periodontal disease among all the 200 to 300 bacteria (Dzink, 1987) present in the mouth. It shows in figure 1 that strept mutans was much more implicated (60%), Actinomyces (30%), lactobacillus (5%) streptococcus sobrinus (3%) and Atopium specie (2%). In figure 2; the most implicated bacteria causing periodontal disease is Treponema denticola (55%) followed by Porphyromonas gingivalis (30%) and others are peptostreptococcus organisms (10%).

Aggregatibacter (3%) and Fusobacterium mucheatum (2%). Although there was a vast diverse collection of microbial species present in the plaque, S.mutans causes the disease and caries. It does so by rapidly metabolizing sugar into acid. S. Mutans and lactobacilli are strong acid producers and hence cause an acidic environment creating the risk for cavities (Loeche, 1984). Streptococus mutans is a leading etiologic agent of human dental carries and it is specifically active to develop biofilms above solid tissues.

T. denticola was able to cause the disease for it has the ability to adhere to fibroblasts and epithelial cells as well as to extracellular matrix components present in periodontal tissues and to produce several deleterious factors that may contribute to the virulence of bacteria. Treponema dent-cola have been associated with periodontal diseases such as early-onset periodontitis, necrotizing ulcerative gingivitis; A spirochaete bacterium associated with progression of periodontal diseases, infectious diseases that destroy attachment of teeth.

Another high percentage occurring bacteria in Fig. 2 is P. gingivalis. It is the most important pathogenic bacteria for chronic periodontitis. It forms the “red complex” with Tannerella forsythia and Treponema denticola. Gingi pains are accountable for 85% of the extra cellular proteolytic activities of P. gingivalis and are important in the pathogenesis of periodontitis disease.

If one has a toothache, it is important to figure out what is at the root of the discomfort before one can determine how best to relieve the pain, swelling or other symptoms. It is essential to maintain good oral hygiene by brushing and flossing regularly, avoiding sugary foods and drinks. Its incidence is very low in region of our country that do not dwell more on sugary foods and drinks.

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