



## Original Research Article

### The occurrence and effect of some antibiotics on *Streptococcus mutans* in dental caries in Jos

M.F.Istifanus<sup>1\*</sup>, O.M.Oyawoye<sup>1</sup> and C.C.Caleb<sup>2</sup>

<sup>1</sup>Microbiology Department Plateau, State University Bokkos P M B 2012,  
Jos Plateau State, Nigeria

<sup>2</sup>Biological Science Programme Abubakar Tafawa Balewa University Bauchi,  
Bauchi State, Nigeria

\*Corresponding author

#### ABSTRACT

Antibiotic sensitivity test was carried out on *Streptococcus mutans* isolated from patients with tooth decay at the Dental Clinic of plateau State Hospital Jos, to establish their antimicrobial susceptibility. Samples were collected from 100 patients with tooth decay by scraping the sulcus part of the decayed tooth, out of which 74% were identified to have *Streptococcus mutans*. The Molar teeth were more affected with 56% compared to the premolars and the roots with 35% and 9% respectively, and the number of cases with dental caries was found to be highest between ages of 21 – 40 with more females (54%) than male (46%). Obtained results shows *Streptococcus mutans* to be susceptible to ampicillin 84%, amoxyl 90%, ciprofloxacin 85%, penicillin 78%, ampiclox 55% and streptomycin 30%, but resistant to erythromycin, gentamycin and cefuroxime. The level of dental health in a community depends on the extent to which people seek dental care and apply preventive measures

#### Keywords

*Streptococcus mutans*,  
Dental caries in Jos

#### Introduction

Dental caries also known as tooth decay is a disease in which the mineralized tissues of the teeth undergo progressive destruction from the surface of the tooth. It is caused by bacteria that colonize the tooth surface under certain conditions produces sufficient acids to dematerialize the enamel covering of the tooth crown or the cementum covering the root and then the underlying dentin (Halmilton, 1996). Dental caries is a complex disease which has received

significant research attention during the nineteenth and most of the twentieth century (Amid *et al.*, 2001). It remains the most common and important disease affecting the hard structures of the teeth.

However, *Streptococcus mutans* is considered to play an important role in the development of dental caries, and is a significant contributor to tooth decay (Loesche, 1986). The work is therefore

aimed at identifying *Streptococcus mutans* in carious lesions, with respect to age and sex and to also determine the antimicrobial susceptibility of this organism.

## Materials and Methods

One hundred samples were collected from patients with tooth decay at the Plateau State Dental Hospital Jos. The samples were collected from human, aged from 6 to 60 years by scrapping the sulcus part of the decayed tooth with commercially sterile scalped blades. The scrapings were then emulsified in sterile peptone water and taken to the laboratory for analysis. Samples were inoculated on chocolate and blood media (two separate media for each patient's sample) using aseptic techniques and were incubated at 37°C for 24–48 hours under anaerobic conditions. After which the plates were then examined for bacterial growth.

Sensitivity test was also carried out using some antibiotics to determine the antimicrobial susceptibility of the organism. A disc of blotting paper is impregnated with a known volume and appropriate concentration of an antimicrobials and was placed on a plate of sensitivity testing agar uniformly inoculated with the test organism plates and were incubated at 37°C for 24 hours. Strains sensitive to the antimicrobials are inhibited at a distance from the disc where as resistance strain have smaller zones of inhibition or grow up to the edge of the disc.

## Results and Discussion

Result shows that out of the 100 decayed tooth samples obtained from patients, Molars were mostly affected with 56% pre molars were the next with 35% and root which comprises of the incisors and canine were least affected with 9% as shown in Table 1. *Streptococcus mutans* was isolated from 74 patients, giving prevalence rate of

74%. Table 2 shows the antibiotics sensitivity pattern of *Streptococcus mutans* which were susceptible to amoxyl (90%), ciprofloxacin (85%), ampicillin (84%), penicillin (78%), ampiclox (55%) and streptomycine (30%) but were resistant to cefuroxime, erythromycin and gentamycin. Table 3 gives an analysis of cases of dental caries based on age and sex. The highest was found between the ages of 21 and 40 with more females than males, 54% and 46%, respectively.

The occurrence of *Streptococcus mutans* in dental caries was discovered to be high with 74% which confirm previous research carried out by Loesche, (1986) where *Streptococcus mutans* was discovered to cause 90% of dental caries in human.

It was observed that the molars and premolars were the commonest affected with dental caries among patients sampled as show in Table 2. This may be attributed to the location of these teeth where food particles are easily retained. The occurrence of *Streptococcus mutans* was also found to be higher in females than male of the same age group, which could be as a result of taking sweet things which is an important contributor to the production of caries. Geddes (1995) reported that sugars are inform fermented carbohydrate, ingestion of large amount result in rapid production of lactic acetic, succinic acid which causes decrease in pH leading to dental caries.

The prevalence in children may be as a result of sharing tooth brush, while for all aged groups, could be as a result of people's poor attitude toward seeking dental care and preventive measures (Carlesson el al., 1987). Some antibiotics were discovered to have positive effective on the micro-organism and therefore should be encourage mostly before refilling of teeth or extraction which will go a long way in reducing dental caries.

**Table.1** Representing the distribution by site and type of teeth affected and the percentage

Type of Teeth	UR		UL		LL		LR		Total	
	No	(%)	No	(%)	No	(%)	No	(%)	No	(%)
Molars	15	57.7	11	50	10	62.5	20	55.6	56	56
Premolars	7	26.9	10	45.5	5	31.2	13	36.1	35	35
Roots	4	15.4	1	4.5	1	6.3	3	8.3	9	9
Total	26	100	22	100	16	100	36	100	100	100

Key: UR – Upper right                      LL – Lower left  
 UL – Upper left                              LR – Lower right

**Table.2** Sensitivity of the isolates to different antibiotics used

Isolates	AMP	AMX	AMO	STR	PEN	GEN	ERU	CIP	CX
Streptococcus	84%	55%	90%	30%	78%	-	-	85%	-
<i>Mutans</i>									

Key: AMP – Ampicillin                      ERU – Erythromycin                      AMX – Ampiclox  
 PEN – Penicillin                              AMO – Amoxyl                              CIP – Ciprofloxacin  
 STR – Streptomycin                              CX – Cefuroxime                              GEN – Gentamycin

**Table.3** Analysis of cases of dental caries based on age and sex

Age Group	Total Number	No of Male	%	No of Female	%
0 – 10	2	1	2.2	1	1.9
11 – 20	5	2	4.3	3	5.6
21 – 30	39	20	43.5	19	35.2
31 – 40	35	14	30.4	21	38.9
41 – 50	11	7	15.3	4	7.4
51 – 60	8	2	4.3	6	11
Total	100	46	100	54	100

**References**

Amid I. Isamil, Hana Hasson, Woosun Sohn, 2001. Dental caries in the second millennium. *J. Dent. Educ.*, 65(10):953–9.

Carlesson, J., Gandour, I.A., Olsson, B., Rickardsson, B.J., Abbas, K. 1987. High prevalence of *mutans Streptococci* in a population with extremely low prevalence of dental caries. *Oral Microbiol. Immunol.*, 2:121–124.

Geddes, D.A.M. 1995. Acids produced by human dental plaque metabolism in situ. *Caries Res.*, 9: 98–108.

Halmilton, J.R. 1996. Growth metabolism and acid production by *Streptococcus mutans*. In: S. Hamada, S.M. Michalek, H. Kiyonon, L. Menaxer, J.R. Mc Ghee (Eds). *Molecular microbiology and immunobiology of Streptococcus mutans*. Pp. 145 – 156.

Loesche, W.J. 1986. Role of *Streptococcus mutans* in human dental decay. *Microbial Rev.*, 50: 353–380.