

# Oral Health Status of Cleft Children in Enugu, Nigeria

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## ABSTRACT

**Objective** To assess dental caries experience, oral hygiene status, periodontal disease, malocclusions and enamel hypoplasia in cleft children in Enugu.

**Methods:** A descriptive, cross-sectional study of cleft children attending in a Nigerian tertiary hospital, an apex Centre for cleft surgery. A pretested questionnaire was administered by the trained interviewers to record the demographic information. A trained examiner examined all the recruited children for caries, plaque, calculus, gingivitis, malocclusions and enamel hypoplasia, according to WHO guidelines. Data from the questionnaire and clinical examinations were analyzed using the IBM SPSS Version 20.

**Results:** A total of sixty-two patients affected with CL/P, between the age of 3 and 18 years old were included in the study. The mean age was 9.8years  $\pm$  11.20. There were 58.1% males ( $n = 36$ ) and 41.9% females ( $n = 26$ ). 48.4% ( $n = 30$ ) children were affected with CL, 37.1% ( $n = 23$ ) had CLP and 14.5% ( $n = 9$ ) had CP. Most of them were unilateral cases, 64.5% ( $n = 40$ ). The prevalence of dental caries in this study was 19.4%. The mean dental caries experience in both the primary and permanent dentition increased with age. Twenty children (32.3%) had good oral hygiene. The mean Oral Hygiene Index Score was 1.9. All the children examined had different degrees of gingival inflammation. 56 (90.3%) require oral hygiene instructions and oral prophylaxis. Enamel hypoplasia were minimal and affected all age groups. 90% of all the children examined had various forms of malocclusion.

**Conclusion:** The oral health status of cleft children in Enugu is poor. This underlines the need for a more vigorous approach to maintenance of good oral health amongst cleft patients, thereby preventing oral diseases.

**Keywords:** Cleft lip and palate, dental caries, oral health status

## INTRODUCTION

Oro-facial clefts are a major public health problem affecting 1 in every 500 to 1000 births worldwide (Butali et al., 2014). The incidence of births with cleft lip and palate (CLP) varies geographically by regions, affecting approximately 1.3 of every 1,000 live births in Igbo population (Jac-Okereke & Onah, 2017). The aetiology of this deformity is not fully understood, though it has been associated with various factors including genetic predisposition and environmental factors (Butali et al., 2011).

Nutritional deficiencies, ingestion of certain drugs, maternal infections by some pathogenic organisms and increased parental age have all been considered as risk factors (Tahir & Abubakar, 2006).

**Citation:** Okoye LO (2019). Oral Health Status of Cleft Children in Enugu, Nigeria Nig J Med Dent Educ; 1(1&2):53-57.

Patients who have clefts of the lip and palate often need complex and extensive treatment, usually

provided by an interdisciplinary team. Maintaining an optimal oral health in cleft patients may be difficult due to the altered oral anatomy of the cleft area, malaligned teeth, hypoplastic defect and scarring (Pandey and Pandey, 2005). It has often been speculated that the irregularity of the teeth, oral soft tissue defects, and unpredictable dental, skeletal and soft tissue development related to surgical repair could result in a higher frequency of dental caries and poor oral hygiene in CLP patients than in normal persons (Hazza'a et al., 2011). Zhu et al. in 2010, published a report that patients with oral clefts have a higher caries prevalence compared with patients with no oral clefts. However, other studies (Lucas et al., 2000; King et al., 2013) reported no significant differences in caries experience between the CLP and control group. Chapple and Nunn, (2001) had reported that cleft children and their parents give more importance to the surgical correction of their clefts and neglect their dental health which results to having more decayed and missing teeth, poor oral hygiene, various dental anomalies including malocclusion, overcrowding, enamel hypoplasia and varying degrees of periodontal diseases. Limited data is currently available on the oral health status of CLP patients in our environment. There is no known publication yet on the oral health status of the CLP patients in South Eastern Nigeria. Hence the decision to assess the dental caries, periodontal disease, malocclusion, enamel hypoplasia and oral hygiene status of individuals with cleft lip and palate in Enugu, Nigeria.

## **MATERIALS AND METHODS**

### **Selection of Subjects**

This descriptive, cross-sectional study was carried out at National Orthopaedic Hospital Enugu, an apex Centre for cleft surgery in the South Eastern Nigeria. The study population was sixty-two cleft patients of the plastic surgery units, between the ages of 3 and 18years, who attended the Smile Train recall programs. This occasion was organized annually between 2014 and 2016 to bring together previously treated, newly identified and currently being managed patients with Cleft of the lip (CL), Palate (CP) or Lip and Palate (CLP).

### **Ethical approval and informed consent**

The ethical approval was obtained from the Ethics Committee of National Orthopaedic Hospital Enugu. A written consent was taken from the parents/primary care givers and an oral informed consent was obtained from the participants before the complete oral examination was carried out. Those who were absent on the Smile Train recall

program days, those who were uncooperative, patients outside the ages of 3 – 18years, patients with associated syndromes and those who refused to participate in the study were excluded from this study.

### **Questionnaire Administration and Clinical examination**

A pretested questionnaire was administered by the trained interviewers to record the demographic information, type of cleft, decayed missing and filled teeth (DMFT/dmft), Community Periodontal Index of Treatment Need (CPITN), Oral Hygiene Index-Simplified (OHI-S), malocclusion and enamel hypoplasia. A single examiner was trained through a series of clinical training sessions and calibrated prior to the commencement of the study by conducting repeat assessments on 5 children at one week interval. Agreement of clinical assessments was established to be good (Kappa values = 0.72) which validated the examination procedure.

All the recruited children were examined for caries, plaque, calculus, gingivitis, malocclusions and enamel hypoplasia. The examination procedures and diagnostic criteria were those recommended in the World Health Organisation Oral Health Survey Basic Methods (WHO, 1997).

Assessment of dental caries experience was done using the Decayed, Missing, and Filled Teeth (DMFT/dmft) (WHO; 1997), Periodontal diseases using Community Periodontal Index of Treatment Needs (CPITN) (Cutress et al., 1987).

The sum of the Debris Index Score (DI-S) and the Calculus Index (CI-S) gives the Oral Hygiene Index. The criteria used for the scoring of debris index are as laid out by Greene et al, (1964). Calculus Index was scored using the criteria recommended by Spolsky (1990). The scoring method is the best for scoring oral hygiene in CL/P, because the next tooth can be included in the study if the prescribed tooth for observation is absent, a condition that is often found in CL/P. It is also the only specific index of oral hygiene that is available in the literature for patients with CLP (Nagappan and John, 2015).

The presence of developmental defects of enamel was also recorded as being present/absent on index teeth based on the Development Defects of Enamel Index criteria (WHO, 2000; WHO, 2003). The assessment for enamel hypoplasia was based on the examination of upper incisors, canine and the first premolar (or the upper first primary molar in the case of primary dentition) and the first permanent lower molars if present. Scores were then given based on the presence or absence of

defects. When the defect was present, a score of 1 was given while 0 was the score when absent.

In assessing malocclusion, the presence or the absence of anterior open-bite, overjet, crowding, spacing and other orthodontic anomalies were recorded.

### Statistical Analysis

Data from the questionnaire and clinical examinations were analyzed using the IBM SPSS Version 20.0. Chi-square test of association was used to compare proportions and ratios with the significant level set at  $P < 0.05$  and 95% confidence level.

### RESULTS

A total number of sixty-two patients affected with CLP were included in the study. The age of the participants ranged between 3 and 18 years old, with the mean age 9.8years ( $SD \pm 11.20$ ). There were 58.1% males ( $n = 36$ ) and 41.9% females ( $n =$

26), giving a male to female (M: F) ratio of approximately 1.4:1.

Out of the study population of 62 children, 48.4% ( $n = 30$ ) children were affected with CL, 37.1% ( $n = 23$ ) had CLP and 14.5% ( $n = 9$ ) had CP. Most of them were unilateral cases, 64.5% ( $n = 40$ ), out of which 54.8% ( $n = 34$ ) had prominence in their right side of the face. Cleft types are distributed among the age group as shown in Table 1. The prevalence of dental caries in this study was 19.4%. The mean dmft was 0.28 in 3-6years age group and 0.40 in 7-12 years age group. Mean DMFT 0.25 in 13-18years (Table 2). Data for dental caries for boys and girls have been combined because there was no significant difference between the groups. Overall, 80.6% of the children were caries free in both dentitions. The mean dental caries experience in both the primary and permanent dentition increased with increasing age. The oral hygiene index, when grouped as clinical levels of oral hygiene: 32.3% ( $n=20$ ) had good oral hygiene, 51.6% ( $n=32$ ) fair; and 16.1% ( $n=10$ ) had poor oral hygiene (Table 3).

Table 1: Distribution of cleft by Age Group

Age groups (years)	Cleft Type			Total
	ICL	CLP	ICP	
3 – 6	11	9	2	22
7 – 12	16	8	4	28
13 – 18	3	6	3	12
Total	30	23	9	62

Table 2: Caries experience amongst children examined

Age group (years)	No of children	No of children with caries	Mean dmft	Mean DMFT
3 – 6	22	5	0.28	-
7 – 12	28	4	0.40	0
13 – 18	12	3	-	0.25

Prevalence 19.4%

Table 3: Oral hygiene (OH) levels seen in the patients

Clinical OH level	OHI-Score	Frequency	%
Good	0.0 – 1.2	20	32.3
Fair	1.3 – 3.0	32	51.6
Poor	3.1 – 6.0	10	16.1
-	-	62	100

The most common periodontal problem was bleeding on probing, supra- and sub-gingival calculus, plaque retention factors. All the children examined had different degrees of gingival inflammation. Only one child within the 13-18years age group had shallow pockets (4-5mm). No child had deep pocket more than 6 mm (Table 4). Among the 62 cleft children, 5 (8.1%) needed oral

hygiene instructions and 56 (90.3%) require oral hygiene instructions and oral prophylaxis.

Enamel hypoplasia affected the primary dentition of two children but affected permanent dentition in 5 children (17.9%) of 7-12 years age group, and 33.3% in 13-18years age group. The incisors, tips of the canines and the upper portions of the first permanent molars are the affected teeth.

Fifty-six (90%) of all the children examined had various forms of malocclusion ranging from proclined teeth (increased overjet) to crowding, spacing, Anterior open bite, Increase overbite,

cross bite, missing teeth. 25.8% (n=16) of the children manifested more than one form of malocclusion.

Table 4: Prevalence of periodontal disease among the patients

Age group (years)	Percentage of patient coded				
	0	1	2	3	4
3 – 6	-	22.7	77.3	-	-
7 – 12	-	-	100.0	-	-
13 – 18	-	-	91.7	8.3	-

Code 0: Healthy tissue; Code 1: Bleeding observed during or after gentle probing; Code 2: Calculus (supra or sub gingival) or other plaque retentive factors such as ill-fitting crown, or poorly adapted edges of restorations either seen or felt during probing; Code 3: Pathological pocket of 4-5mm; Code 4: Pathological pocket of 6mm or more.

## DISCUSSION

The caries prevalence of 19.4% observed in this study is higher than the previous report of 15.5% among 12 -15year old non-cleft children in Enugu (Okoye et al., 2010), although the age ranges and the population selection techniques in the two studies differ. In the non-cleft study, the data were presented in discrete age band whereas in this study, all ages from 3 to 18 years were covered. It is difficult, therefore, to compare across the various studies, but the results are broadly similar. This finding agrees with the report by Lucas et al (2000) and Kings et al. (2013) who observed a higher prevalence of caries in cleft patients than their non-cleft control. Caries was significantly higher in deciduous than permanent teeth ( $P = 0.003$ ). This agrees with the report of King et al. (2013) among the Chinese children. Caries experience on teeth increases with time, (Okoye & Ekwueme, 2011) and deciduous teeth have stayed longer in the mouth than the permanent teeth in this study. Data for dental caries for boys and girls have been combined because there was no significant difference between the groups.

The mean Oral Hygiene Index Score (OHI-S) in this study is 1.9. This compares favourably with the findings of Fadeyibi et al. (2011), who reported mean OHI-S of 2.1 amongst cleft patients in Lagos State of South Western Nigeria. The slight difference in the value could be accounted for by difference in study population. While their population was made up of subjects with unrepaired cleft, this study looked at both children who have had surgical repair and those with unrepaired cleft. The mean OHI-Score increased with increase in age group. This agrees with the report of Chapple & Nunn (2001). The oral hygiene status of the patients continued to deteriorate with age. Awareness of oral care increases as cleft patients come in contact with oral health

caregivers. Discussions between mother and the dental surgeon should commence shortly after birth. Tooth brushing should be encouraged as soon as the first tooth erupts, starting with a soft brush. There is usually increased difficulties and degree of disturbance as more teeth erupt. The mother sometimes is fearful of accidental trauma while brushing the teeth, especially with a struggling child. This fear must be allayed and mother reassured. The tendency to neglect the general care of their teeth must be discouraged.

About 90% of all the children in this study require oral hygiene instructions and oral prophylaxis. The prevalence of periodontal diseases from the study is high when compared to those reported by Nagappan & John (2015), Chapple and Nunn, (2001) amongst the Indian and Chinese cleft children respectively. The high prevalence in this study reflects the lack of oral hygiene practices in the patients. This could be due to poor dental awareness on the need and proper technique for maintaining good oral hygiene in this group of children.

Almost all the children in this study had one form of malocclusion or the other and this prevalence increased with age. The associated disturbance of the facial growth and malpositioning of the teeth make oral cleaning difficult. Much can be achieved by simple orthodontic procedures to improve the occlusion of these children, which will improve oral health and surgical outcome.

Enamel hypoplasia as recorded in this study were minimal and affected all age groups. This is basically a defect without visible loss of enamel, but changes in colour and translucency occur. Enamel formation is affected both by genetic and exogenous factors. Hypoplasia due to exogenous factors affects only portions of enamel that are formed during the course of the disturbance.

## CONCLUSION

Children with cleft lip and palate frequently have poor oral health status, as seen in this study. These findings provide a baseline for oral health parameters in children with clefts in Enugu, and underlines the need for a more vigorous approach to maintenance of good oral health thereby preventing oral diseases. Dental checkups and oral health education should be instituted as part of regular Cleft Clinics. More studies are recommended with more patients with the same demographics to determine the comparison of dental caries in cleft and non cleft patients

## ACKNOWLEDGEMENT

Dr. Ifeanyi Onah, Head of cleft team NOHE for his support throughout this research. Dr. Felix Egbonwonu for his assistance in data collection.

## Financial support and sponsorship

This work received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

## Conflict of interest

The author declare that she has no conflicts of interest.

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