# Original Article

## Clinical Assessment of Effects of Untreated Dental Caries in School Going Children Using PUFA Index

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## Abstract

**Objective:** To assess the effects of untreated caries in school children and designing the interventional strategies with a view to attend the oral health care needs of children.

**Study design:** A total of 250 school children of age range 5-16 years were examined for the presence of pulpal involvement, ulceration, abscess and fistula. Effect of untreated caries was evaluated according to PUFA index between three age groups of 5-8, 9-12 and 13-16 years . The data was analysed using Paired t test, One way ANOVA and Tukys HSD test ($p < 0.05$).

**Results:** The pufa index for the primary dentition was 1.71, and the PUFA index for the permanent dentition was 0.3. Significant differences were seen among the three age groups but not between the males and females. The main component of PUFA/PUFA was pulpal involvement.

**Conclusion:** The pufa index is an epidemiological tool complementary to existing caries indices aimed to assess dental caries.

**Key Words:** Caries, Fistula, Dental Abscess, Pulp involvement, Traumatic Ulceration.

## Introduction

Dental caries is a global oral health problem which can be effectively prevented and controlled through a combination of individual, community and professional efforts. In order to prevent and control dental caries, one should know its exact nature of occurrence and distribution in the community. Prevalence studies on dental caries in India have shown results ranging from 31.5% to 89%[1]. According to national oral health survey caries prevalence in India was 51.9, 53.8 and 63.1% at ages 5, 12 and 15 years, respectively[2].

Most of the dental decay remains untreated with significant impact on general health, quality of life, productivity, development and educational performance[3]. Research suggests that untreated caries can have an effect on children's growth and their general health, therefore the consequences of untreated caries often presents as children with under body weight and failure to thrive[4,5].

The classical DMFT/dmft index provides information on caries and restorative and surgical treatment but fails to provide information on the clinical consequences of untreated dental caries, such as pulpal involvement and dental abscess, which may be more serious than the caries lesion it self[4]. A deep caries cavity with pulpal involvement is usually considered under the code 'caries of dentin'[6] and pulpal involvement is not mentioned at all in the caries scoring system in the latest addition of oral health surveys – basic methods WHO[7]. Thus the objective of the study was to determine the clinical effects of untreated caries in children using PUFA/pufa index.

## Materials and Methods

The study was conducted on 250 school children aged 5-16 years. The sample consisted of 119, 78 and 53 children in the 5-8, 9-12 and 13-16 years age-groups, respectively. An attempt was made to include equal number of male and female subjects in a sample. Consent for examining of the children was obtained from the respective heads of the schools.

Inclusion criteria were children with the presence of either a visible pulp, ulceration of the oral mucosa due to root fragments, a fistula or an abscess. Lesions in the surrounding tissues that were not related to a tooth with visible pulpal involvement as a result of caries were not recorded. The children were examined in their respective schools seated on an ordinary chair, in broad day light facing away from direct sunlight. All examinations were carried out by a single examiner.

Caries was scored according to classical DMFT/dmft index by WHO criteria and by using PUFA/pufa index. The assessment was made visually without the use of an instrument. Only one score was assigned per tooth. In case of doubt on the extent of odontogenic infection, the basic score (P/p for pulp involvement) was given. If both the primary and its permanent successor tooth showed stages of odontogenic infection, then both teeth were scored. Upper case letters for permanent and lower case for primary dentition were used for scoring.

## Following are the codes and criteria[4]:

P/p: When opening of pulp chamber visible or coronal tooth structure is destroyed by caries process and only root or root fragments are left then pulp involvement is recorded. No probing is performed to diagnose pulpal involvement (fig 1a,b).

U/u: When the sharp edges of pulpally involved dislocated tooth cause traumatic ulceration on surrounding soft tissues. e.g. tongue or buccal mucosa (fig 2 c).

F/f: When pus releasing sinus tract related to pulpal involvement is present then fistula is scored (fig 3 d, e).

A/a: Abscess is scored when a pus containing swelling related to a pulpally involved tooth is present (fig 4 f,g).
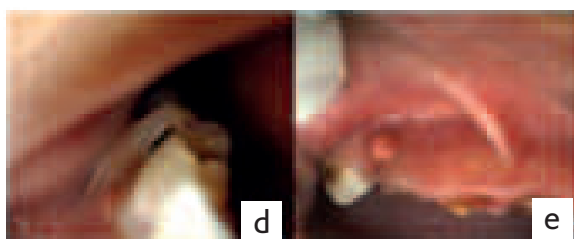
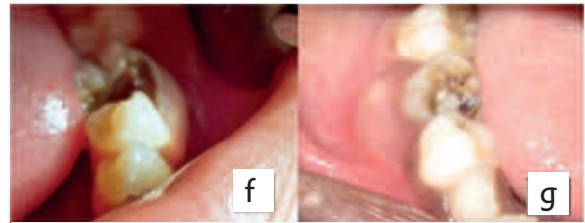The PUFA/pufa score per person is calculated in the same way as DMFT/dmft index.
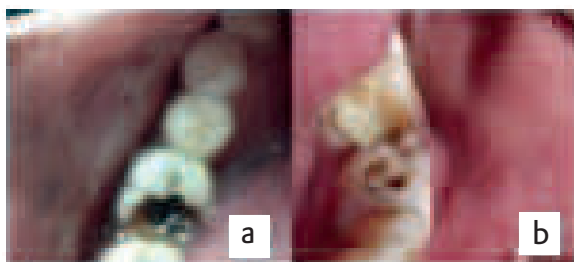


**Fig 1** -Clinical picture 'a' and 'b' shows pulpal involvement P/p respectively.
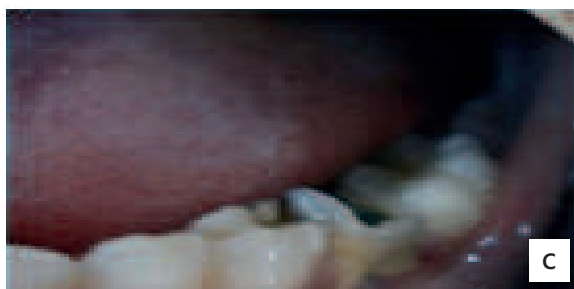


**Fig 2** -Clinical picture 'c' shows ulceration u.



**Fig 3** -Clinical picture 'd' and 'e' shows fistula F/f, respectively.



**Fig 4** - Clinical picture 'f' and 'g' shows abscess A/a, respectively.

## Statistical method

The recorded data of untreated caries in terms of PUFA/pufa index were analysed using SPSS 21 software. Paired t-test was used to assess PUFA/pufa value between males and females  and one way ANOVA followed by TukysHSD test was used to assess PUFA/pufa value among different age groups.

## Result

Two hundred fifty children (124 boys and 126 girls) with an age range of 5-16 years were included in the study. Caries experience in the primary dentition was 2.97 dmft. The permanent dentition presented 1.02 DMFT (Table 1, Graph 1). The pufa index for the primary dentition was 1.71, and the PUFA index for the permanent dentition was 0.3(Table 1, Graph 1). The main component of PUFA/pufa was pulpal involvement (Table 1).

Two hundred fifty children were divided into three age groups comprising 119, 78 and 53 children of 5-8 years, 9-12 years and 13-16 years, respectively and the PUFA/pufa value was compared between these age groups. Result shows significant difference between them with PUFA value of permanent dentition was 0.07 in 5-8 years, 0.18 in 9-12 years and 0.99 in 13-16 years (Graph 2).  The pufa value of primary dentition was 2.63 in 5-8 years, 1.17 in 9-12 year and 0.46 in 13-16 year (Graph 2).

Out of two hundred fifty children, 124 were boys and 126 were girls. No significant difference was seen in the PUFA/pufa value between males and females (Graph3).

| | 5-16 year old (n=250) |
|---|---|
| Mean PUFA | 0.3(0.66) |
| Mean DMFT | 1.02(1.85) |
| Mean pufa | 1.71(1.90) |
| Mean dmft | 2.97(2.8) |
| Mean P | 0.28(0.65) |
| Mean U | 0.004(0.04) |
| Mean F | 0.008(0.08) |
| Mean A | 0.004(0.04) |
| Mean p | 1.52(1.86) |
| Mean u | 0.016(0.12) |
| Mean f | 0.032(0.17) |
| Mean a | 0.13(0.40) |

**Table 1** - Mean caries experience (SD) and mean PUFA/pufa experience (SD) of 5-16 yrs age group.
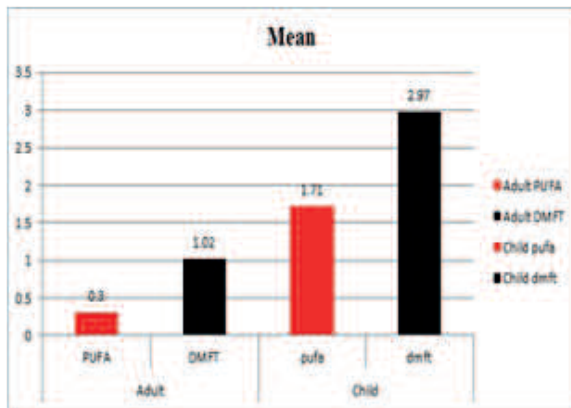
**Graph 1 -** Comparison between DMF and PUFA; pufa and dmft scores
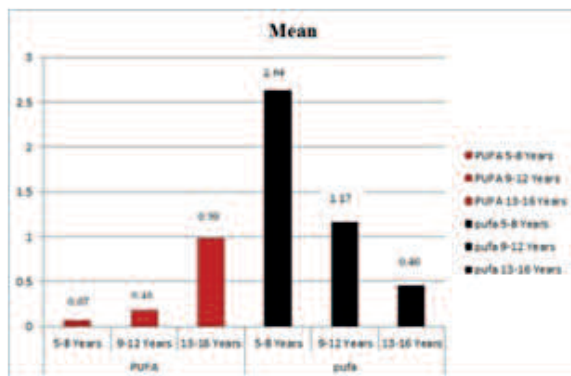


**Graph 2 -** PUFA/pufa value in different age groups.
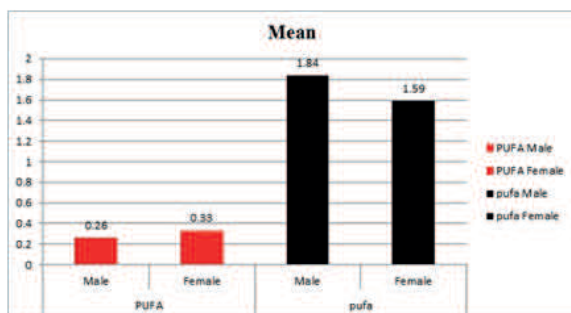


**Graph 3 -** PUFA/pufa value between males and females.

## Discussion

During the last decade, studies on caries epidemiology have focused on the development of more sensitive diagnostic criteria to allow for assessment of the initial stages of caries[8]. However in low and middle income countries, the prevalence of caries is still high, affecting the general health and quality of life of children[9,10,11]. The classical DMFT/dmft index fails to provide information on clinical consequences of untreated dental caries[12], therefore a new index called PUFA/pufa index was developed in Philippine National Oral Health Survey 2006, determining the extent of odontogenic infections from untreated caries[4].

In the present study clinical effect of untreated caries by using, PUFA/pufa index was seen in two hundred fifty school children of age 5-16 years. The mean PUFA and pufa values are 0.3 and 1.71, respectively (Graph 1). The data revealed that untreated caries results in pulpal

involvement more in primary dentition as compared to permanent dentition. Children were divided into three age groups of 5-8, 9-12 and 13-16 years, respectively. Among them PUFA value was higher in 13-16 years old whereas pufa value was higher in 5-8 years(Graph 2). Results show an increase in the pulpal involvement in children with primary dentition emphasizing the need for awareness and proper preventive measures for caries in the early childhood. In permanent dentition increased pulpal involvement is seen at 13-16 years when all the permanent teeth come into the oral cavity. The main component of the PUFA/pufa value of this study was pulpal involvement. Figueiredo et al[13] (2011) determined the prevalence and severity of clinical consequences of untreated dentine carious lesions in children from a deprived area of Brazil and reported that Code 'p' was the most prevalent.

Various research shows that an untreated caries affects the quality of life and general growth in children; Benzian et al[3] (2011) reported that children with odontogenic infections have increased risk of below normal BMI as compared to children without odontogenic infections.

In the present study no significant difference was found for PUFA/pufa value between males and females.

This information gathered by PUFA/pufa for untreated caries will provide health planners with relevant information about severity of disease and help in planning measures to treat dental caries according to severity. It will also help in evaluating access to emergency treatment and exposure to fluoride as component of basic package of oral health care (BPOC)[14].

### What this paper adds:

- The classical caries indices do not provide the severity of dental caries.

- This paper has presented the clinical consequences of untreated caries like pulp involvement and other effects using PUFA index.

### Why this paper is important to a pediatric dentist:

- The pufa index is an epidemiological tool complementary to existing caries indices aimed to assess dental caries.

- This study assessed the effect of untreated caries, thus indicating the need for proper preventive measures and treatment planning.

**Conflict of interest:**

The authors declare no conflict of interest.

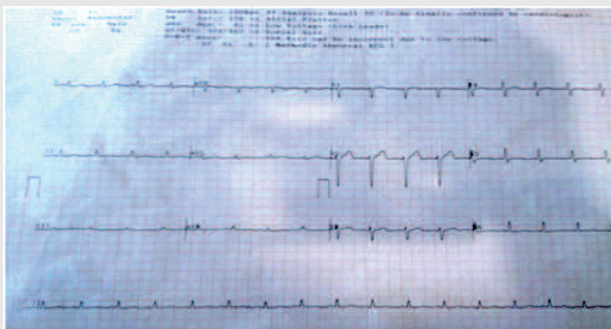## References

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**Diagnose the condition**

Mr.M. 58 yrs old came with complaints of intermittent chest pain for past 10 days.



ECG 1 - Initial ECG

ECG 2 - Taken 10 days after 1st ECG

Dr. M.Chokkalingam, Consultant Cardiology, CSSH.